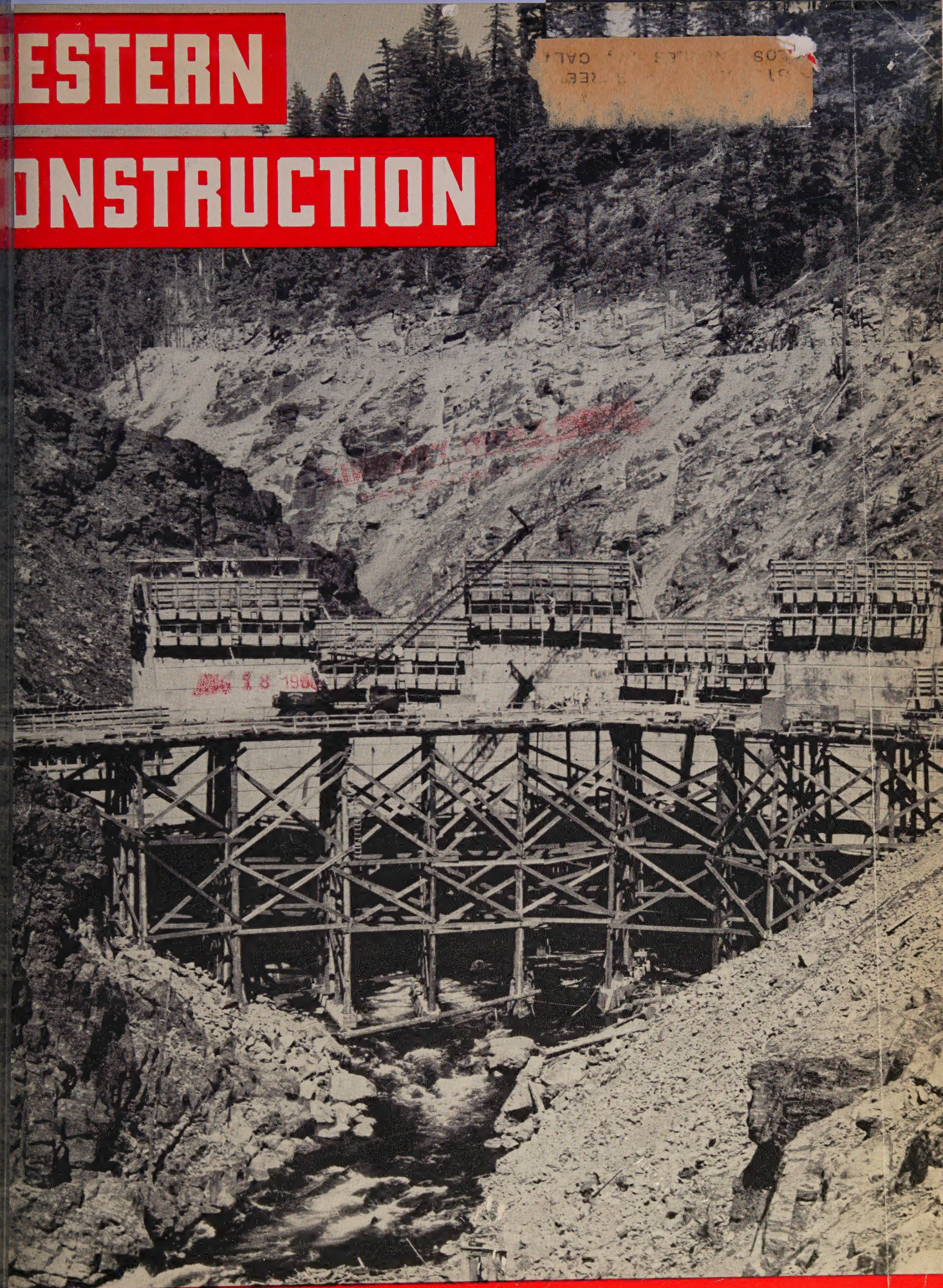
ESTERN
ONSTRUCTION



Junction Dam built from trestle . . . page 27

AUGUST 1960

H&L Teeth that really dig

SPEED DIGGING OPERATIONS IN TOUGHEST CONDITIONS!

H&L GETS THE JOB DONE!

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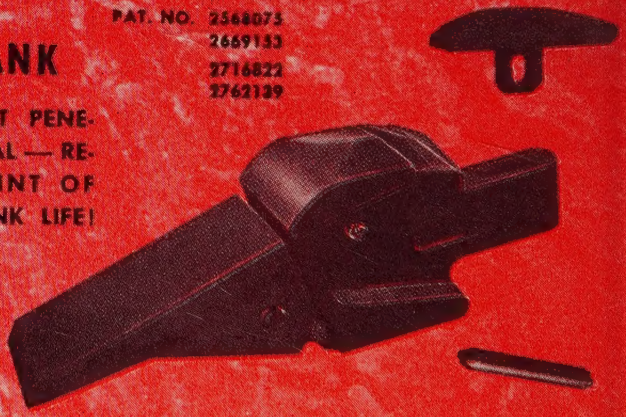
CUTS RIPPING COSTS — SHARP POINT PENETRATES DEEP IN TOUGHEST MATERIAL — REPLACEABLE WEAR-PLATES AT POINT OF MAXIMUM WEAR INSURE LONG SHANK LIFE!



H&L WEAR-PLATE SHOVEL ADAPTER

REPLACEABLE WEAR-PLATE MINIMIZES ADAPTER WEAR, SIMPLY REPLACE WHEN WORN AND ADAPTER IS RESTORED TO NEAR NEW CONDITION.

H&L HAS A DIGGING POINT FOR EVERY MAKE AND MODEL OF DIGGING EQUIPMENT.

Pat. Pend.

MANUFACTURERS OF DIGGING TEETH FOR OVER 29 YEARS

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You can say... "THEY'RE ALWAYS READY TO GO!"

Crane and Shovel production is not measured by the speed of a hoist rope or the number of revolutions per minute. Production is the result of maintained steady month in and month out operation. *Northwests get the job done* — not for a day or a shift, but month in and month out, year in and year out.

Northwest construction insures that marvelous advantage of always being ready to go. Their purpose is to make money for you and they have proved their ability to earn a profit on jobs the world over.

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Operators and owners everywhere tell us so!

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WESTERN CONSTRUCTION

AUGUST
1960
Vol. 35 No. 8

CONTENTS

COVER—Trestle provides a work platform 65 ft. above the stream bed for cranes used in placing concrete for Junction Dam, a 168-ft. arch structure which forms part of the $85,000,000 Upper American River hydroelectric development. Story on page 27.

Published monthly by
KING PUBLICATIONS
609 Mission Street
San Francisco 5, California
Phone: YUkon 2-4343

James I. Ballard . . . . President
L. P. Vrettos . . . . Vice President and General Manager
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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.

Accepted as Controlled Circulation publication at Portland, Oregon. Postmaster: Please send Notice 3579 to Western Construction, 609 Mission Street, San Francisco 5, California.

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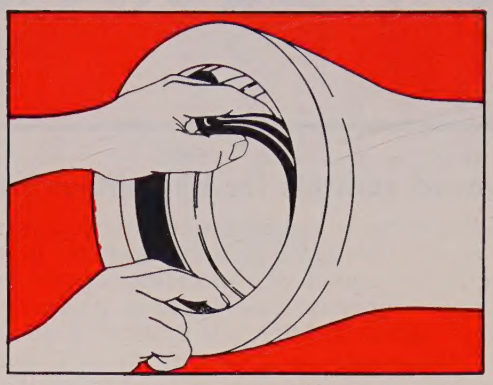
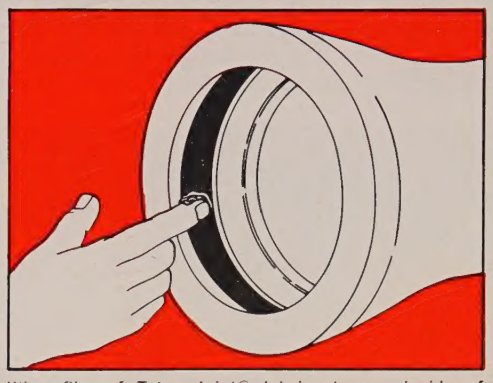
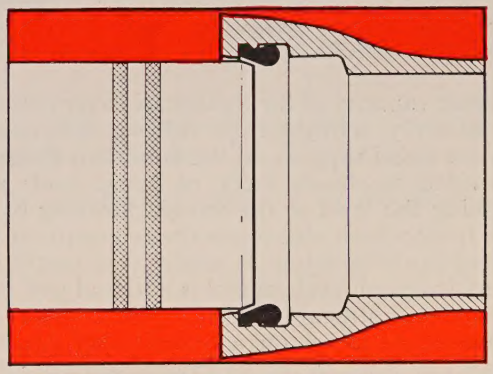


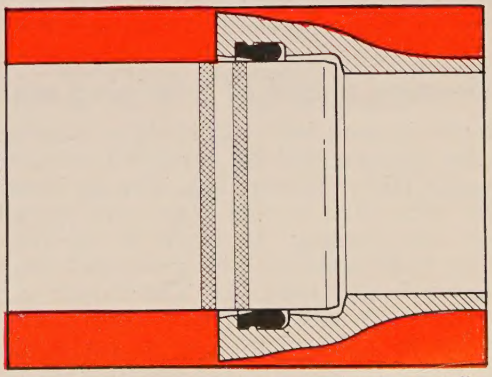
Insert gasket with groove over bead in gasket seat . . . a simple hand operation.



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?

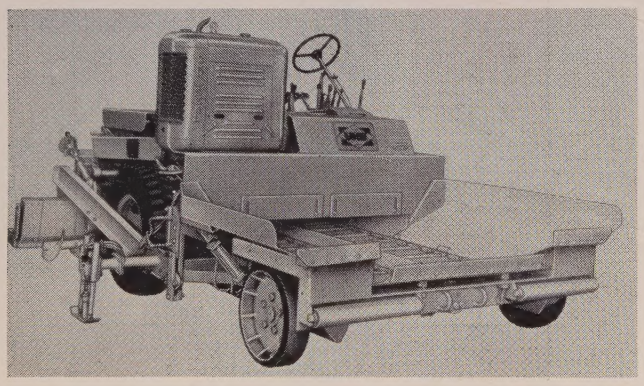
. . . for more details, write No. 6 on Reader Service Postcard

NEW EQUIPMENT

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

Improved controls for bituminous pavers

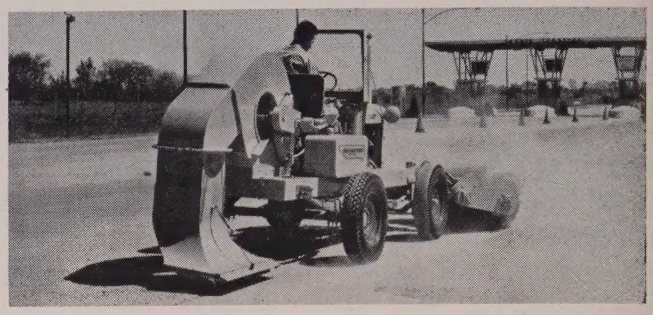
Folding hoppers and improved steering controls are some of the new features introduced by **Blaw-Knox Co.** in the redesign of their bituminous paver finishers. The hopper wings are now hinged at the conveyor line and fold up to discharge all material onto the conveyor. This assures maximum use of each load of hot mix and resulting reduction in hand labor. The hoppers are hydraulically operated with simple controls and the adjustment of these wings reduces width of the machines for travel and also for paving around obstructions. The hopper design also reduces waiting time and permits more operation between truck loads.



Hopper capacity of the Suburban Paver (illustrated) is 4 tons and that of the Express Paver is 10 tons. Note the front wheel support on the Suburban Paver which is provided to absorb shock of dump loads without disturbing the level of the screed. Steering by means of the front wheels eliminates the intermittent motion required in the steering of crawler type machines. An automatic screed level control is optional and provides continual adjustment to match joints. This control is designed to travel on a previously placed mat. Mounted in front of the steering wheel are all of the controls for the traction clutch, conveyors, and the conveyor-auger adjustment that sets the automatic feed control. *. . . Write No. 150*

For cleaning ahead of a striping machine

For pre-cleaning before guide-line marking, a self propelled sweeper and blower has been announced by **Topeka Hiway Mower, Inc.** The rig is claimed to provide substantial savings over conventional methods for such cleaning. It travels on the highway at speeds up to 50 mph., and in operation it has a range of 8 speeds from 1 mph. up. The blower is rated at 10,000-cu. ft. capacity and is turn-table mounted. Its nozzle can be adjusted to blow in any position and can be manually adjusted for traveling on the highway. The blower operates on its own hydraulic system completely independent of the broom. This broom is 4 ft. wide and available in either fiber or wire. In its maximum position, left or right, the broom sweeps an area more than 14 in. beyond the outer lines of



the front wheels. This permits wheels to stay on the pavement when pre-cleaning for marking the outer edge line. It is claimed that the striping paint bonds to the pavement better and has longer life and greater visibility when the cleaning is done with this sweeper-blower combination. *. . . Write No. 151*

All-around machine for secondary roads

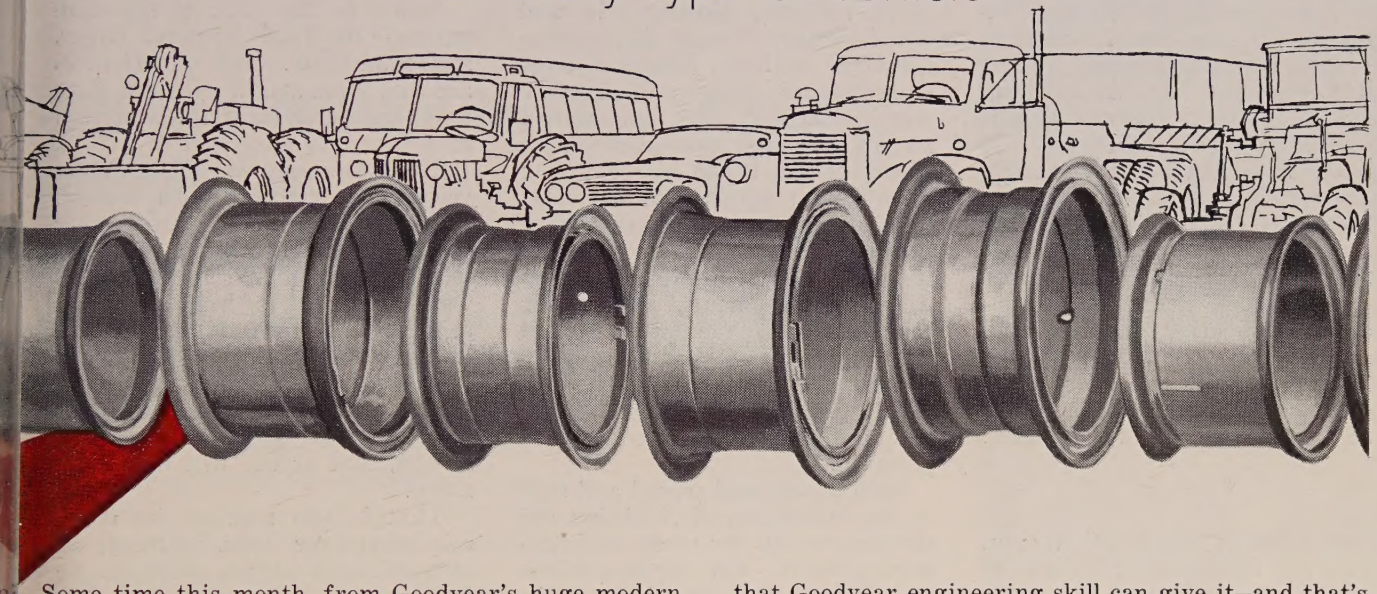
Designed to provide an all-around machine for secondary road work in both construction and maintenance, the **Rome Plow Co.** announces a new installation to be mounted on Caterpillar No. 12 and No. 14 motor graders. The unit is a Rome disk plowing harrow. Lifting links which attach to the blade and scarifier arms of the motor grader provide the operator with complete control over the harrow's position and

its penetration. The 16-disk model with its 12-in. spacing between disks is designed to scarify, mix and blend, aerate, and pulverize materials in road construction. It is also designed as a maintenance machine for unpaved roads. Another model with 22 disks placed at 6-in. spacing is designed primarily for maintenance on oiled roads. *. . . Write No. 152*

(Turn to page 114 for more New Equipment. New Literature can be found on page 110.)

MILLIONTH RIM

Latest, greatest in the world's most complete line of rims, designed to provide superior performance for every type of vehicle



Some time this month, from Goodyear's huge modern facilities in Akron, will come the 60 millionth rim to be manufactured by the world's leading tire-maker.

Most likely it will be a Job-Master.

And this is appropriate, for the Job-Master is the culmination of Goodyear's long experience in building rims for every type of vehicle.

The Job-Master is the first rim designed to fit properly all flat-bead tires—the first designed to seal out all foreign matter. In fact, Job-Master represents the biggest advance in "over-the-road" rim design in over 15 years.

But Rim No. 60,000,000 could just as well be anything from a lightweight rim for pick-up trucks to a mammoth 45" size for giant earthmovers.

Whatever size and type this historic rim happens to be, of this you can be sure: it will embody every advantage that Goodyear engineering skill can give it—and that's considerable. For example:

Longer rim life—because they're job-designed by experts.

Truer running performance—virtual elimination of "wobble" and "hop"—lateral and radial run-out.

Longer uninterrupted service—fewer road delays, more miles, lower cost-per-mile.

Bond-A-Coat Finish—a Goodyear exclusive, providing lasting protection against rust and corrosion.

Our industry leadership, experience and knowledge gained in building 60 million rims qualifies us to solve your rim problems. Write the Goodyear Rim Sales Engineer. Address: Goodyear, Metal Products Division, Akron 16, Ohio, or get in touch with your local Goodyear Rim Distributor.

YEAR

More tons are carried on Goodyear Rims than on any other kind

Job-Master—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

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

The WEST from WASHINGTON

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

Congress' decision to come back to work this month (August) upset a lot of calculations on the fate of key construction legislation, temporarily at least. Many measures that could have been considered dead are given a new lease on life—since, under terms of its recess, Congress did not change the status of pending legislation during its political vacation.

But the main premise, made when this session started last January, still holds: Politics is even more the ruling factor. So you can still make a safe bet that anything of doubtful political advantage still hasn't any chance. You have to qualify that, just a little, though. Some matters that might have been allowed to die in the hope that voters would forget or wouldn't care may now be revived, under the glare of publicity that will attend the late-period meeting. Congressmen are well aware that actions now could make or break their party—and themselves—when voters go to the polls in November.

* * *

For Western construction men, here's the box-score of legislation as Congress comes back to work:

Of general interest: Measures passed include—The $1.07 billion military construction appropriation (see July column); appropriations for Post Office, Health, Education and Welfare departments, Defense Department, Aeronautics and Space, Commerce, Interior (excepting Bureau of Reclamation). Also approved—Authorization for federal participation in California's San Luis Project; U. S.-Mexican participation in construction of the $100 million Amistad Dam on the Rio Grande, near Del Rio, Texas.

Still to be acted upon: Federal aid for school construction; area assistance bill (depressed areas bill); appropriations for federal-aid highway (ABC system); various bills concerning minimum wages; tax exemptions for the self-employed (HR 10); "common situs" picketing permission for construction unions; various other tax law amendments, including a provision requiring depreciation of the value of raw clay and other products, rather than on finished tile and brick; a bill to prevent states from taxing out-of-state corporations' business.

Of specific Western concern: Bills approved included continuing investigations of air pollution by motor vehicles; the previously-mentioned okays for San Luis and Amistad projects.

Still to be acted upon are appropriations (totaling about $4 billion) for Army Civil Works ($730 million), Bureau of Reclamation ($173 million), Bonneville and Southwestern Power Administrations ($20 million), Atomic Energy Commission ($230 million); various "wilderness" bills; approval of an international sewage-treatment plant for San Diego and Tijuana; bills setting up "basin accounts" for Pacific Northwest reclamation projects; bills requiring federal-state-local cooperation in conservation developments, and other "state's rights" measures; several dozen individual bills relating to specific Western construction projects; a bill (S 3557) to extend and enlarge the saline water conversion program.

Both houses had passed and sent to the President a $1.4 billion authorization bill for rivers and harbors projects—but appropriations for this work were tied up in the $4 billion "omnibus" measure noted above. One of the key sticking points in the appropriations bill was a Senate-inserted provision that would make recreation benefits in a federally-constructed water resources project non-reimbursable up to 10% of the total cost of the project.

* * *

For an illustration of what can happen now—and the original premise that politics will be the overriding consideration—take the school-aid and depressed areas bills:

As you may recall, the Senate early in the session passed its own school-aid bill (S 8), providing a $1.8 billion, two-year fund, partly to be used to pay increases in teachers' salaries. The House, much later, okayed $1.3 billion, for four years, not including teachers' salaries, but including an amendment that would chop off federal aid to school districts practicing segregation. Either measure would include something over $500 million of direct construction money, and Western states would get a healthy share.

The Senate then took the House measure, knocked out all its provisions, and substituted its own, then "requested a conference" with the House to iron out difficulties. The House Rules Committee then killed the whole matter—apparently—by refusing to schedule the conference. That action was a happy one, politically, for both sides: Potential candidates on both sides wanted to be able to say that they had tried hard for an aid-to-education bill, but really didn't care too much about a big-spending item.

Now—in the glare of the campaigns—the issue becomes larger, and immediate. And the chances are that some action will now have to be taken to force this question to a vote and some sort of action.

The same goes for the area development bill. As you know, President Eisenhower successfully vetoed the first bill on this subject (providing $251 million) that was presented to him, and two others were immediately introduced by Republicans. Thus both sides could claim some action, and plead lack of time for failure of passage. But with the extended session, that excuse will no longer stand.

That is also true of the many minimum-wage bills. These, in fact, got into such a snarl on the last two days before the recess that the House inadvertently voted to exempt some 14 million workers—already covered—from provisions of the law, while it was attempting to cover an additional 1.4 million. That'll have to be straightened out, and quickly.

* * *

For construction men, probably the most serious matter that was finally rammed through Congress, in the wee hours of Sunday morning (July 3), was the two-year appropriations of $925 million for the ABC (primary, urban and rural) highway system.

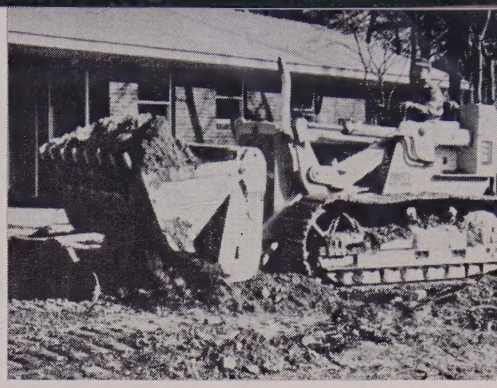
Up to the last minute, it seemed that Senate insistence on adding $100 million to the bill (as an emergency fund to aid depressed areas) and 250 miles of interstate mileage for Alaska, might knock the program into a cocked hat.

House insistence on its original bill, however, prevailed in conference committee, and the two objectionable provisions were knocked

(*Continued on page* 22)

GRADE With "carry-type scraper" action, grade with inch-close labor-saving accuracy. The earth "boils" into this TD-9 Four-in-One!

STRIP Set the 4-in-1's clam in "carry-type scraper" position —strip sod or topsoil precisely! Get jobs other rigs can't do!



SPREAD On-the-go, put down a layer of topsoil, fill dirt, or "cover" with exclusive 4-in-1 "carry-type scraper" accuracy!

Only clam-action 4-in-1's multiply your money-making ability!

Why limit your income to what an old-style single-action loader, or any other limited-duty rig can earn you? Prove to yourself each big-capacity 4-in-1 action "doubles" for one or more special-duty machines—each action gives you an unlimited choice of working positions! See how only the clam-action 4-in-1 can multiply your ability to make money. Let your International Drott Distributor demonstrate!

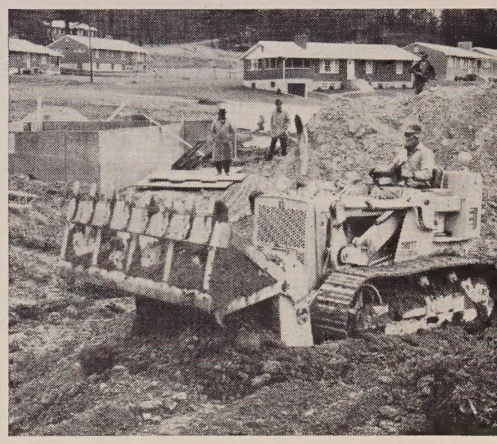
5 Four-in-one sizes: ¾ to 3 cu. yd. capacity.

INTERNATIONAL®
DROTT®

International Harvester Company, Chicago 1, Illinois

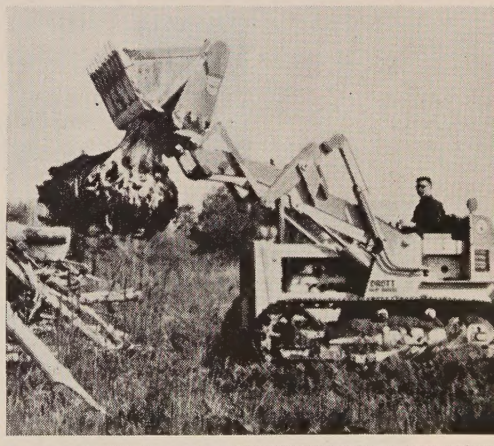
Drott Manufacturing Corp., Milwaukee 15, Wisconsin

PICK-UP "Surround" elusive loose materials without "chasing" them. Note this TD-6 Four-in-One. Just place open 4-in-1 over them, close the clam, and load!



BULLDOZE Open the 4-in-1's clam and you've got a full-capacity, earth-rolling dozer—depth-regulated by positive "radius control"!

GRAB Only the clam-action 4-in-1 lets you sit, grab, lift, and load "impossibles" like stumps, concrete, and rubble of all kinds!



BOTTOM-DUMP End the sticky materials problem, for good! Opening the clam of this TD-15 Four-in-One pulls material from bucket surfaces—gravity pull does the rest!

BACK-DRAG Pull down materials wholesale from the sand or gravel bank—and grade hard-to-get-at slopes with 4-in-1 back-drag action!

DO SHOVEL WORK Apply power-shovel-like 4-in-1 breakout power as this 3-cu. yd. TD-20 does—to dig up concrete slab, excavate hard materials.

out, despite the protests of West Virginia's Senator Jennings Randolph—who had sponsored the "emergency" amendment to aid his hard-hit state.

As you know, the House went along with the President's requests for a hold-down of spending in this area by approving a $925 million, two year appropriation—higher than the President asked ($900 million), but no higher than the previous biennium. It would have provided $416.3 million for primary; $277.5 million for secondary; $231 million for urban; $33 million for forest highways; $12 million for Indian reservation roads and bridges, among other amounts.

The Senate's Public Works Committee, however, added two significant things to this measure: a special $100 million appropriation as an "emergency fund" to aid depressed areas, and 300 mi. to the Interstate system, primarily to aid Alaska and Hawaii. House leaders immediately pointed out that the extra $100 million was put in exactly as was the $1 billion emergency fund in 1958—without any provision for making up that sum to the Highway Trust Fund.

* * *

Meanwhile, on highway matters, the Bureau of Public Roads went ahead with its allocations for Fiscal Year 1961—making available a total of $2.8 billion for both Interstate and ABC programs. The total is $50 million less than the states might ordinarily get, due to the strictures caused by the 1958 action.

For Western states, here's the breakdown: Alaska, $36.7 million (ABC), none (Interstate); Arizona, $10.6 million (ABC), $25.4 million (Interstate); California, $46.5 million (ABC), $189.1 million (Interstate); Colorado, $13.4 million (ABC), $14.4 million (Interstate); Hawaii, $3.9 million (ABC), none (Interstate); Idaho, $7.9 million (ABC), $21.98 million (Interstate); Nevada, $7.8 million (ABC), $14.8 million (Interstate); New Mexico, $11.3 million (ABC), $22.3 million (Interstate); Oregon, $12.4 million (ABC), $32.3 million (Interstate); Texas, $48.9 million (ABC), $84 million (Interstate); Utah, $8.6 million (ABC), $17.4 million (Interstate); Washington, $13.6 million (ABC), $33.7 million (Interstate); Wyoming, $8.2 million (ABC), $19.3 million (Interstate).

WESTERN CONSTRUCTION

The System Works Better than it Should

VIEWED from a fairly neutral observation post, it seems amazing that the contract construction system works as well as it does. This comment is echoed by many who have had broad and extended experience on both sides of the engineer-contractor fence.

Nothing is more American than the competitive bidding system for construction. Like so many things American, it is difficult to analyze accurately as to just how and why the system works. Basically, the engineer who plans a complex project and the contractor who agrees to carry out the work for a fixed and publicly announced sum of money are rather far apart in approach, responsibility and objectives. One is a practical scientist concerned with building a structure to serve a definite public need. The other is a business man who accepts more than ordinary risks in carrying out the work, and hopes to end up with a profit.

The engineer considers his efforts as being applied science, with a touch of creativeness; many contractors look upon their part as a fascinating, competitive "game." It is this gaming attitude that brings some contractors to the bid opening with two envelopes in their pocket and the glance around the room at those present determines which he puts on the table. The low bid and resulting contract signals the start of the contest. The degree of lowness may be a measure of its severity.

If there are some gaming elements and corresponding competition in the situation, then the specifications, written by one of the participants, might be considered as the rules. In most contests, where there are rules to be observed, an umpire or referee is a standard part of the procedure, having a neutral approach to provide equitable interpretations. Just as every set of rules cannot anticipate every play or situation, so specifications can not spell out every problem that may come up on a construction job. The engineer being conservative and conscientious leaves the interpretation in his favor to be sure that planned results will be accomplished. This may lead to a specification similar to this quoted from a well recognized public agency:

"The contractor shall take no advantage of any apparent error or omission in the plans or specifications and the engineer shall be permitted to make such corrections and interpretations as may be deemed necessary for the fulfillment of the intent of the plans and specifications."

This type of pre-game rule must necessarily be weighed and considered by every contractor who submits a figure for performing the work.

Personalities are also an important aspect of every game-like operation, and are particularly important when it comes to interpretation of the rules. Contractors are of all types, and engineers supervising jobs in the field are equally dissimilar. After several jobs with interpretations from one type of resident, a contractor may unconsciously tend to bid this factor and end up with a surprise. On the other hand, a supervising engineer may have dealt with one type of contractor for years and then hit another with equally frustrating experiences.

Contract construction is a recognized partnership with somewhat differing objectives between the partners, and some conflicts in their interests. Considering the need for the constant interpretation of complicated plans and wordy specifications, not to mention the factor of science working alongside of business, there is reason to find the contract construction system a unique and yet effective American procedure that works surprisingly well.

Jim Ballard

NYGEN-BUILT

GENERAL TIRES

stay on the job 'til it's done to assure most profit per project

Built with exclusive Nygen cord, General Off-the-Road tires are the one sure way to protect and build job profits. Nygen cord construction means extra protection from costly in-the-field damage. And General's deep-digging, high flotation treads keep rolling whatever the going. From now on, be sure of less downtime, more profit . . . with Nygen-built General Tires on your units.

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KING PUBLICATIONS

WESTERN CONSTRUCTION

AUGUST, 1960

Trestle solves steep site problem

Crane on trestle used to place concrete for Junction Dam in narrow gorge too steep and rocky for conventional cableway. Contractor developed insulated roofs for blocks to pour through winter despite floods which twice washed over the dam.

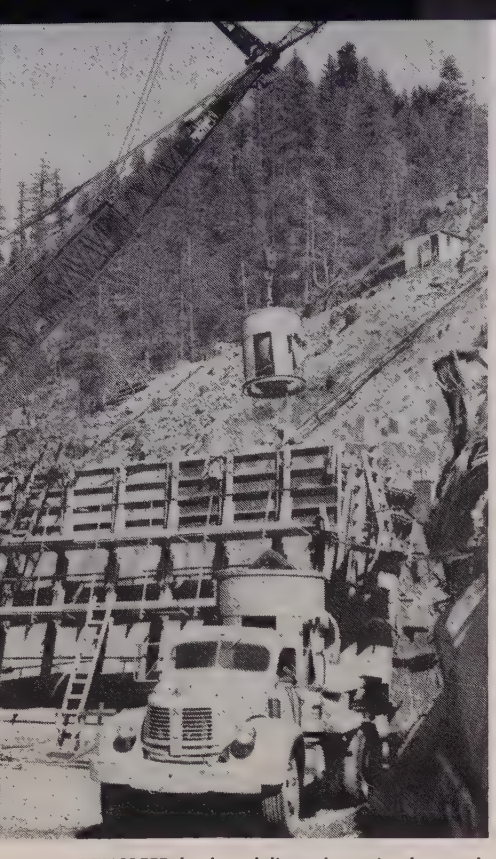
THE BIG TROUBLE with dam building is the site, particularly that of the thin, gracefully curved concrete arch which is always stuck into a narrow canyon with rock walls and access for the birds only.

Locate said canyon in a remote mountain gorge on the western slope of the Sierra, 35 miles above Placerville, Calif., and you have conditions which fit Junction Dam, a unit in the $85,000,000 multiple-dam power development under construction by Sacramento Municipal Utility District along the Silver Creek branch of the American River (*Western Construction*, March 1960).

The complex of reservoirs, tunnels and power installations was designed by the Bechtel Corp., which also supervises construction of the individual projects. The Junction Dam contract covering construction of the 32,500-cu. yd. arch dam and attendant portal structure was awarded to Fruin-Colnon Contracting Co., Burlingame, Calif., on a low bid of $1,557,270.

The contractor began work in June 1959, and has now completed about 60% of the dam.

The function of Junction Dam is to provide the intake reservoir for Jaybird Tunnel, diverting water through the tunnel and penstocks to a downstream powerhouse. The dam is placed a few yards downstream from the intake portal, below the confluence of two branches of the stream in a



CONCRETE bucket delivered to site by truck is picked up with crane and spotted over dam block.

STEEL form panel is hoisted to new position by crew using A-frames and hand hoists. Form angle is adjusted with the bolts in cantilever legs extending beneath form.

narrow gorge. Here, Bechtel engineers designed a variable radius arch structure 168 ft. high and 520 ft. across at the top. To accommodate the increasing width as it rises, the structure is built on a vertical curve as well as a horizontal arch so that the top actually overhangs the base on the downstream side by 32 ft.

Surveying the site, the steep rock slopes of the canyon, and the single access road leading down the mountain side to the tunnel portal, the contractor faced a tough decision on how to proceed. A cableway with two movable towers was ruled out because of the drilling and blasting needed to bench the canyon side opposite the access road. Similarly a cableway with one fixed tower would still mean extensive blasting on the road side to create a shelf on which the traveling tower could operate, and it would be several hundred feet long to form the base leg of a triangle enclosing the arch of the dam.

On the other hand, crane placement would involve extension of the access road, and construction of a trestle to enable the crane to work over the river, as well as to reach the top of the structure.

The crane method was chosen as the least costly alternative. The contractor blasted out a short switchback extending the access road to the stream bed.

Following excavation of the keyways for the dam abutments (which involved about 10,000 cu. yd., nearly all blasting) concrete placing operations were set up. In the early stages the crane worked from a gravel dike across the stream on the upper side of the dam. It was planned to place the lower tiers of blocks from this dike while a timber trestle was being erected on the downstream side.

Concrete came to the dam in two stages, starting at an aggregate pit at the top of the ridge about 4 mi. away. Aggregate was trucked to a batch-mixing plant half a mile above the dam site. From here the concrete is delivered to the forms by seven flat rack trucks each with wooden templates to hold two 2-yd. concrete buckets.

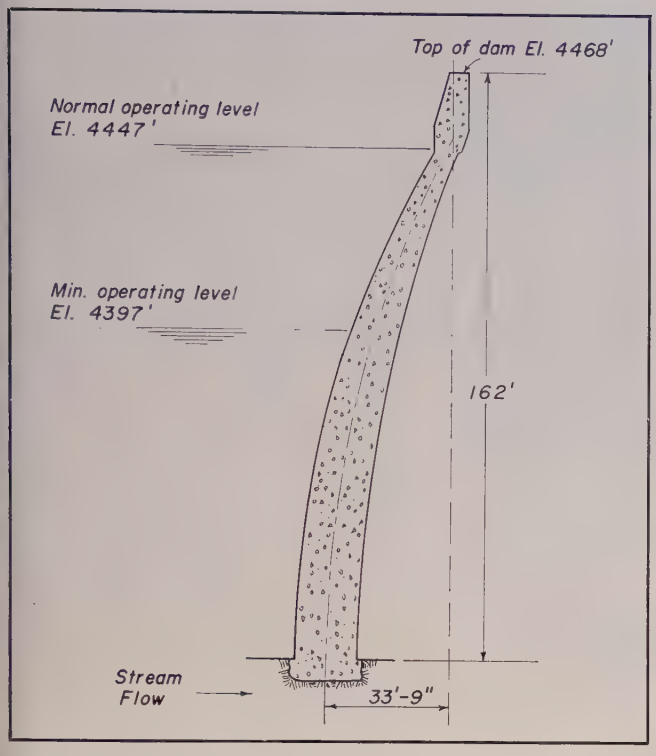
Three of the lower blocks of the dam contained 5x8-ft. openings permitting the stream to flow through during construction.

Winter work

The contractor started pouring in November and elected to continue through the winter months to bring the dam up to trestle height. To prevent the fresh concrete from freezing, steel panel forms were covered with insulation and plywood and job-made insulated wooden roofs were placed on top of the completed pour. Salamanders and electric heaters were used inside the "houses" to maintain a 50-deg. temperature for three days. At the batch plant aggregate piles were kept covered with tarps, and concrete was mixed with hot water to maintain specified 40-deg. minimum mix temperatures. These measures provided adequate protection against low temperatures, but not against the weather which produced two floods. The first one hit Feb. 8, when water level in the shrunken creek rose 20 ft. in 12 hours and swamped the job. It flowed over the dam, taking an equipment trailer full of tools with it, and inflicted about $20,000 worth of damage. Operations were shut down for two weeks while flood damage was repaired. When the second, smaller, flood hit a few weeks later, the construction crew was ready. Losses were negligible and work was delayed only one week.

Trestle construction

The timber trestle, 65 ft. high and 24 ft. wide, was built across the downstream face of the dam during the early spring. Supporting structure was composed of 12 bents of five piles each set on concrete footings in the floor of the canyon. Working space was so limited that the first two bents were built on the upper haul road, picked up by the crane stationed on the lower road level, and lowered into place. The bents were quickly braced and decked to pro-



SECTION of Junction Dam showing downstream overhang of nearly 34 ft. Slender tapering structure uses 32,000 cu. yd. of concrete.

BATCH PLANT above dam. Aggregates are drawn from stockpiles at left, weighed, and mixed in 4-yd. mixer. Trucks drive under mixer.

vide an additional work platform.

As fast as a section of trestle was completed, it was occupied by the concrete crew who competed for space with carpenters and pile bucks building new sections. The Bucyrus-Erie 38B crawler crane handling the concrete was supplemented with a Lima 25-ton truck crane for trestle construction and utility work.

Pouring operation

With completion of the trestle across the face of the dam, a smooth concrete placing operation has been evolved. Trucks carrying concrete buckets are spaced to have two or three at the job continuously.

Because the single-lane switchback haul road is too narrow for passing or turning around, trucks head into a short "Y" at the turn and back down the final section. There is a space at the trestle landing for two trucks, while a third can be parked at the "Y". The single lane portion of the road extends only a few hundred yards above the dam, where it widens to two lanes. The scheduling problem is to get trucks in and out of the narow portion one at a time.

Loaded concrete bucket is picked off the truck by the crane and swung over the form and dumped. To speed flow of the stiff low-slump (avg. 1¼ in.) mix out of the bucket, the contractor has devised a means of vibrating it from the outside. A short casing is welded to the hopper of each bucket and during dumping a vibrator head is thrust into it. This speeds up dumping, does not damage the bucket, and is considerably faster than climbing up on the bucket with a heavy vibrator hose.

Three blocks totaling 300 cu. yd. of concrete are placed in an 8-hour day.

Steel panels, each with a series of cantilever legs extending below the bottom of the form, are used for the intricate forming job. The dam curves in both a horizontal and vertical plane, and the arch rings increase in width and decrease in thickness as they go up, so that no two lifts are the same size or shape. Panel forms are held in place by she-bolts thrust through the slotted legs into cones in the previously placed concrete. The form can be tilted in or out to obtain the desired contour by a take-up arrangement on the she-bolts.

Forms for each block lift are positioned from 10 previously established reference points, and marked on top of the previous lift with nails. It is then a relatively easy matter to measure the required distance from a plumb line over the point to the edge of the form.

Each panel is hoisted from one lift to the next by a system of hand-operated hoists suspended from pipe A-frames which are in turn guyed to anchors imbedded in the top of each lift. The A-frames were used instead of the utility crane because it is easier to tilt the form to level up the top, and more convenient since the crane was often in use elsewhere when a crew was ready to move the form.

Short lengths of tubing are welded to the forms at convenient spots to act as holsters for the she-bolts which are removed and replaced at each change. These eliminate the hazard of bolts rolling around the scaffold floor or falling over the side and speed up the forming job.

The inevitable gaps at the corners of the forms, caused by changes in size and shape of the blocks, are closed with wood forming custom cut for each block. To add to the forming chores, copper waterstops with brazed joints are imbedded between blocks, and vertical keyways are formed in the sides.

Curing and cooling

In the initial stages, sides of the pour were sprayed with a membrane curing compound while the top was cured with a water spray. As summer advanced, this was changed to water spray on both sides and top. Plumbin' for this system is attached to the forms, in-

(Continued on page 64)

NEW LOCATION, shown in this air view, in a mountain canyon near the upper end of the project. This new alignment has 20 curves, compared to 131 on the old location.

Idaho cuts 111 curves from famous Culdesac Hill grade

Driving north from Lewiston, the traveler and truck will no longer have to climb the famous, but slow and circuitous route.

DRIVERS climbing or descending the Culdesac Hill on U. S. 95 near Lewiston, Idaho, have been apt to feel like they tied their vehicles to a snake's tail. Extending 17.5 mi. between Craigmont and the grain-rich Camas Prairie, the grade is a nightmare of switchbacks, containing 131 curves with a total of 7,724 deg. of central angle—equal to more than 21 complete circles. The grade has been recognized ever since it was built in the 1920's as one of the most hazardous stretches of road in the Pacific Northwest and a major bottleneck in the flow of traffic between north and south Idaho. Since November 1957, various contractors have been working under a series of awards totaling more than $3,451,000 from the Idaho State Department of Highways to punch out a new route that will be a safe, high-capacity road with no sharp curves and no short-sight distances.

Scheduled to be opened to traffic this fall, it is 4.3 mi. shorter than the old stretch of road and will shave an estimated 25 min. off the travel time.

The relocated route leaves U. S. 95 at Culdesac and follows Lapwai Creek up a narrow, mountain-walled canyon to the plateau-like Camas Prairie, and then connects with the existing highway. It will be 34 ft. wide for all but 2.8 mi. Here it will be 46 ft. wide to permit passing lanes for slow, upgrade traffic.

Designed to modern standards, the new route has only 20 curves—111 less than the old grade. These curves have a total of 634 deg. of central angle. None of the new route's curves exceed 3 deg., whereas all but five of the old road's 131 curves were more than 3 deg., with 31 of them on 20-30 deg., 13 of them 30-40 deg., and 19 of them topping 40 deg.

The new route's grade has been correspondingly improved. For example, only 2.7 mi. have grades between 5 and 6%, compared with 7 mi. on the old road. Unlike the old road, which has 0.3 mi. of grades 6% or more, the new route has none.

Because the project consists of an all-new route, contractors were spared the frustrations of handling traffic and keeping work going at a respectable pace at the same time. But that was the only easy thing about the job.

On every front the grading contractor, S. S. Mullen, Inc., was faced with difficulties. To begin with, the canyon up which the new route advanced was virtually inaccessible, the only thing resembling a road being a dozer trail carved out by state forces that ruled out all but four-wheel drive vehicles. Added to this was the fact that most of the canyon is little more than a corridor between the steep mountain slopes, forcing the contractor to cut much of the new route out of one wall and a new channel for the creek from the other wall.

Slides, clearing and a scarcity of backfill also were troublesome. In addition, the area is subject to cloudbursts that more than once transformed Lapwai Creek from a docile stream into a savage torrent, washing out temporary bridges and haul roads, and scattering debris.

Mullen's contract items were just as formidable. Among them was some 1,450,000 cu. yd. of unclassified excavation, most of it rock. This total included about 350,000 cu. yd. of excavation to carve some 8 mi. of new creek channel.

The contractor also constructed seven 3-span concrete bridges (101 ft. long with precast stringers) and 12 multiplate pipe culverts. They were built to carry the new route back and forth across the creek no less than 19 times within the narrow canyon. Of some 11,235

CRUSHING PLANT producing surfacing material for Grant Construction Co. paving operations. The project required 208,600 tons of base and 41,385 tons of plant mix.

ft. of culverts installed about 2,535 ft. were large multiplate.

Under a separate contract, John E. Alexander, Inc., converted two railroad trestles crossing the right-of-way into underpasses. This project consisted of cutting the centers from the two timber structures and replacing them with steel spans resting on concrete piers to bridge the new route.

Despite the many problems and sizable contract items, Mullen moved the grading phase of the job steadily forward to completion last fall.

Chief among Mullen's many headaches were the slides. Most serious was a movement of a fill after 33,000 cu. yd. of a total requirement of 67,800 cu. yd. had been placed. At that point, surface cracks were discovered on the mountainside above the fill and, though work was halted at once, the material began to move. Its shifting raised the nearby railroad tracks and caused damage to a grain elevator.

Quick action was taken after it was revealed that the failure was in a clay bed under the fill, weakened by excessive moisture. First the grade was lowered and the line moved away from the mountainside. Then, to counterbalance the movement, a 60,000-cu. yd. fill was built on the toe of the slide to match the existing weight.

Meanwhile, to reduce the flow of ground water, every spring that could be found above the fill was developed and horizontal drains were installed.

With room at a premium in the canyon, a contract requirement that timber on land bought from private owners be trimmed and decked outside the construction area posed another problem. Mullen first tried skidding the logs with tractors, but it was apparent that the costs of tidying up the landscape after this type of operation would be prohibitive. As a less costly alternative, the contractor switched to double-drum logging. This permitted him to keep all of his equipment off the mountainsides.

Mullen also came up with an answer to finding suitable material to backfill the project's many bridges and culverts, as well as to riprap the creek channel. Long hauls were used at first, but then the contractor brought in a jaw crusher to manufacture this material within economical distances.

To load and haul the rock on the job, Mullen used a P&H 3½-yd. shovel and four Euclid end-dump trucks. Three Euclid S-18 scrapers handled common excavation during the project's early stages, but later were replaced with two Euclid TS-24 twin-engine scrapers. The contractor's other maor equipment included a Bucyrus-Erie 22B shovel, an American 25-ton truck crane, three D9 and four D8 Caterpillar tractors, and two International TD24 tractors.

A battery of Ingersoll-Rand Crawl-I-R drills handled the drilling. The drills were supplied with air by Ingersoll-Rand Gyro-Flo compressors.

Surfacing of the new route with plant mix started in June, after a long-awaited break in winter weather. The paving is being performed in two sections under separate contracts, with Grant Construction Co. handling one and Clifton & Applegate the other. Both contractors are operating crushing plants at convenient locations to provide materials for their respective sections. The entire project requires a total of 208,600 tons of base course, 4,885 tons of top surfacing, and 41,385 tons of plant mix.

TIMBER railroad trestle, on section of completed grade, converted into underpass. Placid Lapwai Creek frequently becomes a mountain torrent, washing out temporary bridges and haul roads.

Hand-lettered signature is questioned

BECAUSE the signature of a contractor on a bid proposal was hand-lettered, rather than signed in script, an interesting legal aspect of contracting has developed in Idaho.

According to reports, this proposal of the low bidder on a state highway job was declared invalid and refused by the Idaho Highway Commission, and the job awarded to the second low bidder.

The low bid submitted by the Holland Construction Co. of Bozeman, Mont. was for approximately $588,000, and the second bid was from Earl L. McNutt Co. of Eugene, Ore. at about $619,000. The complainant mentioned the fact that refusal to accept his hand-lettered signature will cost the taxpayers of Idaho about $31,000 more for this highway job. Bid opening and contract award took place last April.

The losing contractor has filed suit and has a petition before the courts in Idaho claiming that the hand-lettered signature of Francis H. Holland represents his actual and legal method of signing his name. The petition contends that such hand-lettered signatures have previously been accepted by courts and that the president conducts his business under such a signature.

Raising Mathews Dam and dike

Winston-Green is moving 25,000 cu. yd. per day in two shifts. Project is part of general enlargement of Colorado River Aqueduct System, one of world's engineering wonders and backbone of Metropolitan Water District of Southern California.

THE CAPACITY of the 19-year-old Colorado River Aqueduct System has been doubled. This has been accomplished by a construction program started in 1952 and completed on the main aqueduct line early in 1960. Work on the enlargement of the aqueduct's terminal reservoir, Lake Mathews, is now under way. This is construction which according to original estimates made 20 years ago shouldn't have been necessary until about 1980. But no one could have foreseen the fantastic growth of Southern California and the development of its enormous thirst.

The main features of the system are Parker Diversion Dam on the Colorado River below Hoover Dam, a 240-mi. main aqueduct, and Mathews Dam near Riverside. The system includes 412 mi. of distribution lines. The main aqueduct consists of canals, tunnels, and precast and cast-in-place concrete pipe. It crosses a rugged region of mountains and desert and is a magnificent display of engineering and construction imagination and skill. The canals and tunnels were built to twice the initially-needed capacity with a view toward future expansion of the entire system, an act of foresight which is saving millions of dollars in the present enlargement work.

Constructing the second siphon barrels parallel to the first is now completed and was described in the July 1959 issue of *Western Construction*. Work featured the use of the Pipemobile, developed and built by the contractor, American Pipe & Construction Co., to carry and place the 68-ton pipe sections.

Original construction of Mathews Dam (formerly called Cojalco Dam) was described in three *Western Construction* articles in September 1935, March 1936, and July 1937.

The raising of Mathews Dam and dike is being done by a joint venture of Winston Bros. Co. and Green Construction Co. on a $7,583,866 contract, scheduled for completion late in 1960. Construction will increase the capacity of the lake from 107,000 ac. ft. to 182,000 ac. ft.

The Colorado River Aqueduct System is part of the facilities of the Metropolitan Water District of Southern California. MWD was organized in 1928 and now serves an area with a total population of over 7,500,000. The current work is part of MWD's $200,000,000 expansion program (*Western Construction,* August and September, 1957).

Description of the work

The Winston-Green contract involves the raising of the dam and dike by 33 ft., resulting in new crest lengths of 6,500 ft. and 7,800 ft. The existing rock blanket on the downstream face of the dam is to be removed and replaced on the new dam embankment. The new embankments for the dam and dike are being constructed of compacted earthfill material with internal drain, filter, and transition zones. Like the original structures, reinforced concrete will be placed on the upstream faces.

A second dike is also being built. It will be about 32 ft. high above the existing ground and has a length of 2,700 ft. Also of compacted earthfill material, it will have a 24-in. rock blanket on the downstream face and a 12-in. fine rock blanket under a 3-ft. thickness of riprap on the upstream face.

The outlet tower is being raised

by removing the roof and extending the walls to the required elevation. Nine more hydraulically operated gate valves will be installed in the tower. The existing suspension foot bridge, the only access to the tower, will be removed, and a new one built at a higher elevation. A new spillway at a higher elevation is also being built. The concrete of the old spillway is being removed on a sub-contract to Emsco.

The contractor is moving the 4,500,000 cu. yd. of material on two shifts and is averaging around 20,000 cu. yd. a day. The earthmoving fleet is led by 18 Caterpillar DW-20's, 6 Euclid bottom-dumps, 6 Euclid end-dumps, 5 Caterpillar D-9 tractors, 7 Caterpillar D-8 tractors, and a Euclid belt loader.

Earth work on the dam is nearly finished and the equipment fleet is concentrated on the dike. About a dozen rigs work under the Euc loader, which is pulled by a turbocharged D-9. The rest of the scrapers self-load, assisted by D-8's and D-9's. Extensive ripping in the borrow pits has been necessary, with the D-9's doing most of the work. Ripping depth has determined the depth of cut the loader can take. Haul roads are carefully maintained with a Caterpillar No. 14 grader and two No. 12 graders. Hauls are about 2 mi. long.

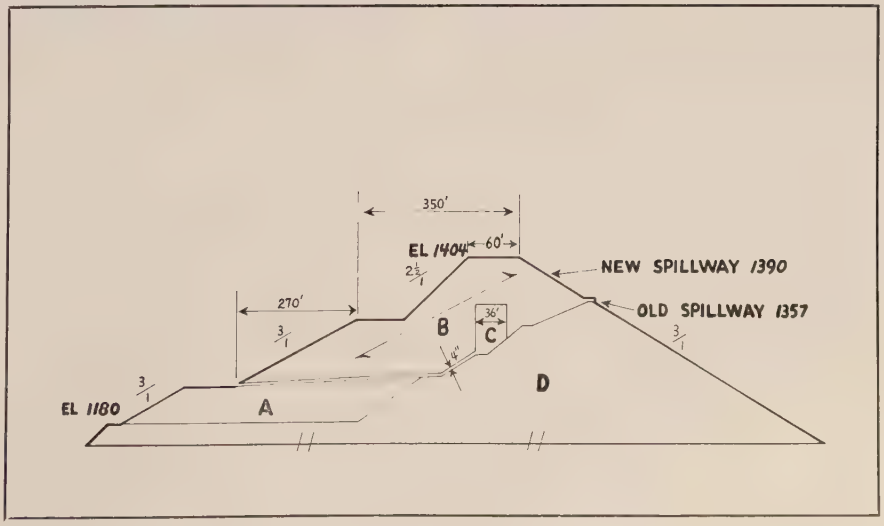
Most of the water is added to the material in the borrow areas in order to make it easier to load and reduce the number of rigs on the fill. Water is added with networks of Rain Bird sprinklers delivering about 450 gal. per min. 24 hours per day. It takes about two days to get the necessary 12-ft. penetration. Watering is discontinued 6 weeks before excavation begins.

Considerable effort is expended on the fill in bringing the material to the required 98% of maximum density at optimum moisture content. The first pass is made with a D-8 pulling a scarifier. Disc harrows were tried at first, but were found to be inferior in this type of soil. Next, water is added from a sprinkler truck, if needed. Then another pass is made with a scarifier. Compaction begins when the inspector gives the signal and consists of making 12 passes on 8-in. layers. The shape, size, and weights of the rollers is carefully spelled out in the specifications.

About 500,000 cu. yd. of rocky material for the drain and transition zones is processed from material taken from a granite quarry at the west end of the dike. Blast-

EUCLID BELT LOADER makes such fast work of loading a scraper it takes a dozen DW 20s to keep it busy. Loader is pulled by a turbocharged D-9. Borrow area is ripped in advance.

DIKE can be a busy place even though it is 7,800 ft. long. Compaction specs are rigid, requiring two scarifier passes and 12 sheepsfoot passes on each 8-in. layer of embankment.



TYPICAL SECTION of dam shows areas B and C, which are being added to existing structure under present contract. Dike differs in that slopes are 2½ to 1, and crest width is only 28 ft.

Mathews Dam Equipment list

18 Caterpillar DW20s
6 Euclid bottom dumps
6 Euclid end dumps
5 Caterpillar D9s
7 Caterpillar D8s
1 Euclid belt loader
1 54B Bucyrus-Erie crawler crane
1 Northwest 80D shovel
1 American truck crane
2 Caterpillar No. 12 graders
2 Caterpillar No. 14 graders
2 Caterpillar DW21 tractors with Southwest water tanks

ing is done with Hercules Dynatex in 2¾-in. holes up to 60 ft. deep drilled with Ingersoll-Rand equipment using Brunner & Lay carbide insert bits. Blasting caps with up to 5 delays are used. The size of the shots is limited to about 5,000 lb. of powder because of the nearness of the outlet tunnel.

Material from the quarry is loaded with a Michigan front-end loader and Northwest 80-D shovel into Euclid rear-dump trucks for the short haul to the crushing plant.

The crushing plant is designed to produce material graded as follows:

Size	Percent Passing
1½	100
¾	60-100
⅜	25-70
4	0-40
18	0-10
16	0

The dumped rock is carried from the hopper by a Universal Wobbler to a 42x48 Pioneer jaw primary crusher. A Symons grizzly separates the oversize and sends it to a 22x36 Cedarapids jaw crusher. Final screening is carried out by two 5 x 16 Cedarapids vibrating screens. Oversize is reduced by a 4¼ standard Symons cone crusher.

To keep his equipment fleet flowing freely, the contractor has set up a thorough preventive maintenance program, as well as a well-equipped shop able to handle major repairs. Tire repair is handled by Firestone.

Controlling the fill

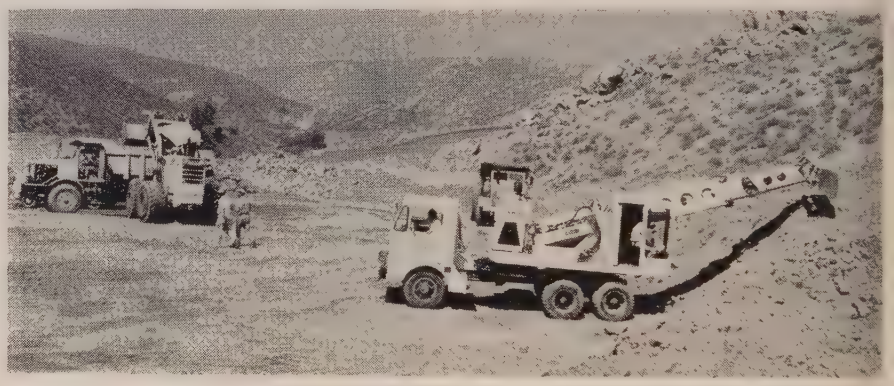
The Metropolitan Water District has a soil testing laboratory set up at the site to keep close control of the rapidly growing fill.

One sample is taken for roughly every 2,500-3,000 cu. yd. of material placed. The sand volume method is used to determine density and an oven for finding moisture content. However, if density looks bad, the alcohol burnout method is used to quickly find the moisture content. It is interesting to note that the alcohol burnout method has been found always to be within 1% of the slower oven technique.

On 25% of the samples, a complete soil characteristic curve is developed including specific gravity, screen tests, percolation, and consolidation. A final mechanical analysis is made to see if there has been any significant changes. If more than 5% of the fines have been lost, the tests are rerun.

MWD engineers use a 4-in. diameter steel test cylinder with a 2-in. thick layer of soil. This is a great improvement over the formerly used 8-in. diameter cylinder which weighed 145 lb. loaded. The new cylinder weighs only 50 lb. and is quite easy for one man to handle in the lab.

OUTLET TOWER is being raised by removing roof and extending walls. Nine more hydraulic gate valves will be installed. Note new pier at left for suspension access bridge at higher elevation.

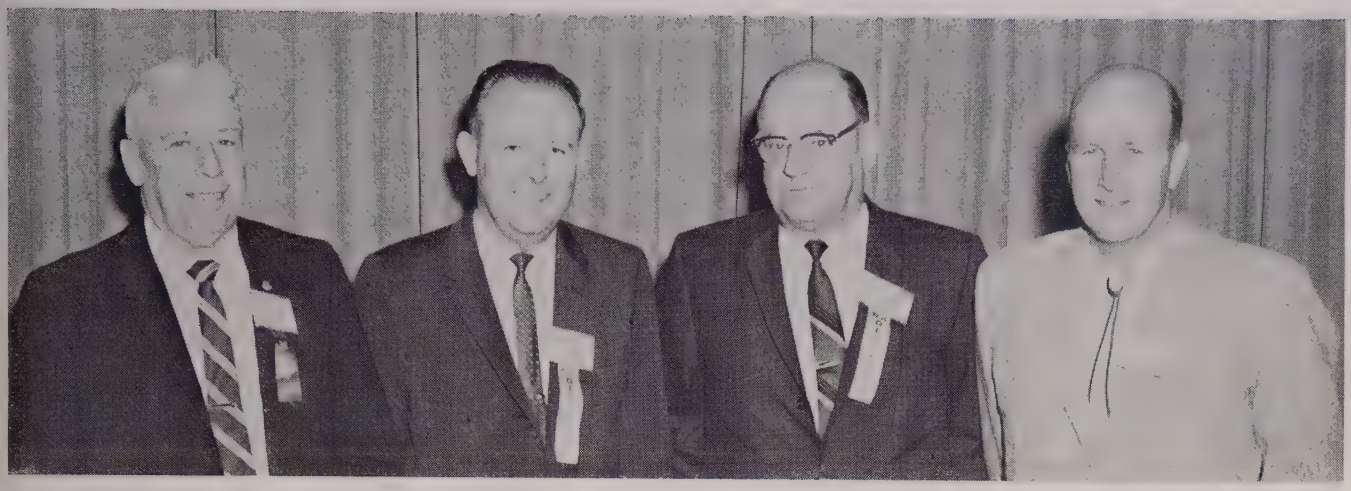


MODERN MACHINES speed slope trimming and clean-up. At left a rubber-tired Michigan loader fills a Euclid rear-dump. Versatile Gradall quickly removes excess material from slope.

Personnel

For the Metropolitan Water District of Southern California, Robert B. Diemer is general manager and chief engineer; Robert A. Skinner is assistant chief engineer; and H. J. Mills is construction engineer. W. S. Merrithew is resident construction engineer in charge of the enlargement; W. F. McCleary is resident engineer, Albert L. Hovanec is office engineer, and A. H. Smith is soils laboratory engineer.

For Winston-Green, H. S. Thompson is project manager, R. H. Hickman is general superintendent, and C. R. Clark is office manager. H. C. Miller is project engineer. H. L. Ballentine is equipment superintendent. B. H. Ferguson is excavating and embankment superintendent, H. H. Measley is structure superintendent, and A. Emmons is night superintendent. Photo on page 92.



NEW OFFICERS of Western Association of State Highway Officials are, from left: Forrest Cooper, Oregon Deputy State Highway Engineer, secretary-treasurer; G. Bryce Bennett, Idaho State Highway Engineer, president; Fred C. Quinnell, Jr., Montana State Highway Engineer, outgoing president; and T. D. Sherard, Director and Chief Engineer of the Alaska Division of Highways, outgoing secretary-treasurer and new executive board member.

WASHO Conference

Western Association of State Highway Officials holds record-size conference in Portland. Bennett of Idaho is new president. Highway leaders from national organizations express concern over the hurdles faced by the highway program during 1961.

WITH A RECORD ATTENDANCE and a program sparked by speakers from national agencies, the Western Association of State Highway Officials held its 39th Annual Conference June 19-24 in Portland. Hosting the meeting was the Oregon State Highway Commission, with W. C. Williams, State Highway Engineer, acting as general chairman. Fred Quinnell, Jr., president of WASHO and State Highway Engineer of Montana, presided at the general sessions.

The "Dr. L. I. Hewes Award" for 1960 was won by W. A. King and J. M. Rylander of the Texas State Highway Department for their development of a method of "locating and classifying sub-marine soils by Sonar."

G. Bryce Bennett, Idaho State Highway Engineer, was named president during the closing session to succeed Fred Quinnell.

Others elected included J. C. Womack, California State Highway Engineer and Chief of the Division of Highways, vice president; and Forrest Cooper, Oregon Deputy State Highway Engineer, secretary-treasurer. Named to the executive committee were T. D. Sherard, Director and Chief Engineer of the Alaska Division of Highways; D. B. Dixon, New Mexico Chief Highway Engineer; Joseph J. Marsh, Colorado Highway Commissioner; and Ernest J. Ketcham, Washington State Highway Commission Chairman.

At the invitation of the Nevada Highway Department, Las Vegas, Nev., was selected as the site of the 1961 conference.

The first general conference event was the "get acquainted" party which was put on by the Portland Cement Association for all those registered. With this social event concluded the conference got down to serious business the following day. At the first session, after the usual welcome from local officials, the roll call of WASHO showed delegations from all fourteen states and all of the interested federal agencies.

The general session featured talks by top men in several national organizations, was particularly well attended and interest was high in their discussions relating to the highway program for today, and especially for tomorrow.

Ellis M. Armstrong of BPR

The key note of the national approach and the federal thinking on the Interstate System was presented in a talk by Ellis M. Armstrong, Commissioner, Bureau of Public Roads. He impressed WASHO with the fact that, although excellent progress has been made on the Interstate System and the program moves forward smoothly, there are serious problems to be solved and divergent interests to be coordinated as the advance planning moves into 1961. Excerpts from his talk follow:

We are all in the program together — the Federal Government, the states, the localities, and of course, directly, every one of our 180 million individual citizens. The national road program is another test of our way of life. We must show that, with the disseminated responsibility and authority of a democracy, and the freedom of the individual, we can accomplish a program of this magnitude. A free society must continually prove that it can achieve and is worthy of survival.

In the basic Federal-State relationship, we in the Bureau of Public Roads must take the national view and try to adjust the sometimes divergent interests of the states. The states in turn must consider the viewpoints of the counties and other local authorities. Actually, each must act in

the capacity of a referee to see that the rules of the league, which we all have agreed upon, are followed in the game.

It is quite an undertaking certainly, and one that involves every one in America. But the need is great and the benefits are great. In fact, in our world grown small our very existence is at stake; for if our way of life, our freedom is to endure, we must show that we can continue to be a dynamic, growing America. And to do so we must meet our needs. We cannot stagnate for we are in competition with alien forces, contrary to our way of life, and they aren't fooling.

Last year we killed nearly 38,000 of our friends and neighbors in highway accidents and injured over 1,400,000. And the direct cost of these accidents to you and me and all the rest of us in America amounts to about one cent per vehicle-mile traveled.

Last year we traveled with our 71½ million automobiles, trucks, and buses, over 700 billion vehicle-miles on our highways and nearly half of this was in our urban areas. And we spent for this travel, all together, about $75 billion. Detailed studies have shown that savings in costs of operation on a controlled access freeway in our urban areas, over the costs on the usual urban streets, is as much as four cents per vehicle-mile. And in our rural areas the savings approach one cent a mile.

Since the WASHO meeting last year there has been a population gain of over three million people in America. This annual growth is about equivalent to the addition of the cities of San Francisco, Seattle, Denver, Portland, Phoenix, Salt Lake City, Spokane, Reno and Boise to this country each year.

Today across America bells are ringing for the accomplishments of our highway program. Since passage of the 1956 Act, about $17½ billion of Federal and state funds have been obligated in agreements for engineering, right-of-way, and construction on our Federal-aid Highway System. This includes the completion of construction on 110,000 mi. of highways, and another 25,000 mi. now under construction. And on the Interstate System, about 9,000 mi., including the 2,300 mi. of toll roads incorporated into the system, are now open to traffic. We are already reaping large returns in savings in lives, time, operating costs and in providing convenient, smooth-flowing, safe, traffic facilities.

One of our problems in getting full appreciation of the accomplishments has been that our new roads are being opened in relatively short sections. Usually, on our Interstate itself, the sections of 2 or 5 or maybe 10 mi. are opened to traffic with little or no fanfare. In many instances I suspect the motorist does not realize the new road is a part of our Interstate, he does know it is a wonderful new road and a boon to traffic.

A good deal has been said, in criticism, that the Interstate System is removing property from the tax rolls of cities and counties, with a resulting loss of revenue to the local government. While this is happening, there is a more-than-compensating occurrence. Land along the expressways becomes more desirable, is assessed at higher values, and thereby brings in larger tax revenues than before. Certainly there is not likely to be a net loss; often, there is a considerable gain. Example after example of completed sections of Interstate, and of improved sections of the regular Federal-aid system, show the great benefits. This is after the roads are completed. Of course during construction there usually isn't universal enthusiasm.

The problems that have had to be overcome have been tremendous and we still have many problems ahead. I'm sure you share with me the feeling I've had of good, solid accomplishment all across America as I've seen what the opening of these modern highway facilities do toward rejuvenating area after area.

Of course we've had troubles. The price of progress is always trouble. But actually for a program of this size, involving as it has so far about 50,000 construction contracts and directly in the program about 1½ million people, we have been remarkably free of mistakes and wrongdoings.

One of our big problems has been, and no doubt will continue to be, those who, with cynical irresponsible approach, have been seeking sensationalism in some of our public press. A small well-organized minority can wreak havoc with any program, if we have indifference and lack of understanding by the great majority. And certainly here we have a real challenge. I'm still convinced that careful, objective reviews of our program will continue to show that it is sound and is being competently administered, designed and constructed.

We've had some instances of minor graft and petty larceny. And no doubt will have a few more. These certainly demonstrate that even a minute part of one percent of our program going sour can toll the bells for all of us. But I often wonder why that even though every week or so a bank teller is caught cheating, nobody seems to criticize the entire banking industry. They haven't found a total cure for the problem, and probably we won't either.

Of this I am convinced, by and large America's road program is being run by dedicated men of integrity. In one of the toughest jobs there is—that of providing a highway system that affects directly every one of our 180 million citizens, and affects each one differently—there is no easy solution.

Certainly the high ideals and standards of service and dedication and integrity that you represent is characteristic of the values that have made America great. And in your accomplishments I'm sure that you are often tense and fatigued and worried and you don't have much time for fishing. And all this with little reward, except your own personal sense of accomplishment. But this is good. For there is exhilaration in hard work and intense effort toward accomplishment of great worthwhile goals such as the balanced optimum highway system we are striving for.

The challenge that is before us is great. We must continue to justify the great faith that the people of America demonstrated they had in us when they passed the 1956 Highway Act. We must continue to do the very best job of engineering that we can. We must seek ways to improve our planning, our designs, our specifications and our construction. The administration of our program requires sound businesslike methods and procedures that are unassailable.

Further, two other and equally analytical reviews of the present highway situation were presented in talks by A. E. Johnson, Executive Secretary of AASHO, and Bertram Tallamy, Administrator, Bureau of Public Roads. Both of these officials indicated the importance of maintaining the established relationship between the federal agency and the state highway departments. They indicated that Congress has decided to continue its study of the overall program, not only through the present committee investigations, but through a careful review of the

(Continued on page 54)

Winners of the
"DR. L. I. HEWES AWARD"

AT the annual WASHO Conference in Portland, Ore., another Western engineer was honored as the recipient of the "Dr. L. I. Hewes Award" for 1960. Following is a list of the previous winners and a brief description of the award.

•

The award was originated and is financed by WESTERN CONSTRUCTION to commemorate the memory of Dr. L. I. Hewes, for many years the Western Regional Director of the Bureau of Public Roads, and active in the founding of WASHO.

1952

HERBERT W. HUMPHRES
District Soils Engineer,
Washington Department of Highways
"... for his outstanding work in soils mechanics and soils stabilization, with particular emphasis on meeting the needs of counties and cities."

JAMES T. McWILLIAM
Assistant Engineer,
California Division of Highways
"... exceptional work in developing gyroscopic survey methods for rapid road inventory."

1953

PERCY V. PENNYBACKER
Supervising Field Engineer, Bridge Division
Texas Highway Department
"... outstanding contributions in the use of welding for the repair and construction of highway bridges."

1954

ARNOLD H. CARVER
Departmental Communications Engineer,
California Division of Highways
"... for outstanding work in developing a statewide radio communications system for highway maintenance."

1955

J. AL HEAD
Assistant Traffic Engineer,
Oregon State Highway Department
"... for outstanding work in traffic engineering, especially the analysis of urban highway problems and long range planning in this field."

1956

ROBERT C. O'CONNELL
Traffic Engineer,
Wyoming State Highway Department
"... has made numerous contributions to traffic control and safety in Wyoming and was instrumental in the preparation of the State's traffic code."

A. J. SACHSE
Senior Resident Engineer,
Idaho Department of Highways
"... in recognition of his outstanding engineering versatility in connection with construction of the mile-long bridge and hydraulic fill at Sandpoint."

1957

R. GLEN RYDEN
Chief Computer,
Arizona State Highway Department
"... award based on his outstanding work in pioneering the use of Univac for engineering calculations."

1958

ALBERT H. POLLARD
Supervising Field Engineer,
Texas Highway Department
"... for outstanding work in adapting radiography to the non-destructive testing of welds in field and shop."

1959

W. O. WIDDOWS
Assistant Maintenance Engineer,
Oregon State Highway Department
"... outstanding work in the experimentation and development of more efficient striping equipment."

JOSEPH D. MEYERS
Engineering Geologist,
Arizona Highway Department
"... important contribution in developing methods used in making an inventory of aggregate materials in Arizona."

1960

W. A. KING
J. M. RYLANDER
Senior Resident Engineers,
Texas State Highway Department
"... for the development of a method to locate and classify sub-marine soils by Sonar."

•

The "Dr. L. I. Hewes Award" is presented annually at the conference of the Western Association of State Highway Officials. The recipient is selected by the Executive Committee of WASHO from official nominees presented by the highway departments of member states. These nominees are selected by each state highway organization as the outstanding engineer who has made a worthy contribution to the highway development of the West. A cash award of $500 goes to the recipient, together with a suitable certificate.

Tacoma stadium built in 105 days

VIRTUALLY NO ONE for miles around, including engineers and contractors who periodically observed progress, believed that Cheney Stadium at Tacoma, Wash., would be ready for the opening game.

Ben B. Cheney, prominent Northwest lumber executive and sports leader, signed the contract to construct the 8,000-seat stadium. Exactly 105 days later the entire plant—from hot dog stands to the scoreboard in center field and the colorful billboards on the fence—was ready for the umpire's inaugural call, "Play ball!"

Immediately after the contract was signed on December 31, 1959, Cheney engaged the engineering firm of Anderson, Birkeland and Anderson to undertake the design of the stadium structure. The Earley Construction Co., also of Tacoma, was engaged to construct the stadium. The grandstand is fabricated of 1,600 prestressed concrete pieces made by Concrete Technology Corp. of Tacoma.

The tight time-table was one of the main problems in the construction program, according to Arthur R. Anderson, structural engineer who is nationally recognized as a pioneer in the use of prestressed concrete. Design work had to be coordinated carefully with the construction timetable.

The prestressed concrete roof sections were designed to withstand pressure from snow amounting to 25 lb. per sq. ft. At the same time, the design had to compensate for a possible 100 mph. wind blowing off the playing field into the grandstand, creating uplift forces.

After the Earley Co. had awarded the fabrication of the prestressed concrete pieces to the Concrete Technology Corp., the concrete firm promptly established a rapid-fire, assembly-line technique of production at its manufacturing plant in Tacoma's industrial area. Then, as quickly as the parts were fabricated, they were moved by truck and stockpiled at the stadium about 9 mi. away.

While columns, seat beams and roof sections were being cast at the plant, grading and excavation was being completed at the site of the baseball park. Concrete footings also were being cast in place at the site, where foundation material was a solid bank of hardpan.

After each footing was cast in place, a precast concrete pedestal was placed over it and both were joined by grouting. The pedestal provided support for each of the main columns. This design was selected to support a heavy vertical load and to resist lateral forces, earthquake or wind.

The grandstand is composed of 26 bays, each 20 ft. wide, which extend through three wings separated by expansion joints. The timetable permitted two weeks to erect the lower portion of the structure, the box seat area.

Main elements of the box seat sections are the 24-ft. prestressed serrated beams resting on precast pedestals. These support six rows of box seats. The L-shaped seat elements are 3 in. thick, 36 in. wide and have a rise of 12 in. These L-shaped slabs are pretensioned with four $\frac{3}{8}$-in. diameter 7-wire strands.

A curtain of welded wire fabric was placed in the L-shaped slabs which projected outward from all edges. Once the slabs were in place, the overlapping wire fabric was tied together. The joints were filled with dry-pack grout, thus providing continuity in the slabs.

The precast box seat sections also contained metal base plates which were inserted in the slabs. The box seat railings, made from $1\frac{1}{2}$-in. pipe, were welded to the embedded base plates. Only five weeks after the contract for Cheney Stadium had been signed, the entire box seat section of the 5,000-

seat grandstand was completed. Work was undertaken next on the upper portion of the grandstand. The principal members for this construction included the main column, a 50-ft. serrated seat beam, and the 42-ft. cantilever roof beam.

Cantilever roof

The main columns are connected to the footing and its pedestal. The lower end of the column and the pedestal both contain steel bearing plates which are centered by means of a steel pin. Sandwiched between these plates is a ¼-in. lead pad which creates a hinge connection at the base of the column.

The sloping serrated 50-ft. grandstand seat beam was connected to the main column by means of steel plates and 2½-in. diameter pins. Two steel plates extended like a fork from the main column, engaging one plate in the end of the seat beam. Holes in the plates were lined up and the pin was inserted. Space occupied by the hinge later was filled with concrete.

The seat beam also was connected to the back of the box seat sections by welding. The grandstand seat beams were supported temporarily by timber shores.

Precast spandrel wall panels, 4 in. thick and 8 ft. high, were fitted between the columns at the rear of the grandstand. Upper and lower sections of the walls contained 1½-in. diameter ducts, which were lined up with sleeves in the columns, thereby providing a continuous passage through which tendons were threaded the entire length of the grandstand. These tendons consisted of eight ⅜-in. diameter high tensile steel strands. They were tensioned after being placed in position and the space around the tendon was filled with cement grout pumped in under pressure.

The 42-ft. cantilever roof beams were constructed with a bottom flange 12 in. wide, providing a seat for the roof slabs. The roof slabs are pretensioned channel sections 4 ft. wide, and they span 20 ft. between the roof beams. Thus, they were placed on the flanges easily. The roof beams were supported temporarily on shores. Tendons imbedded in the roof beams were threaded into the ducts at the top of the column.

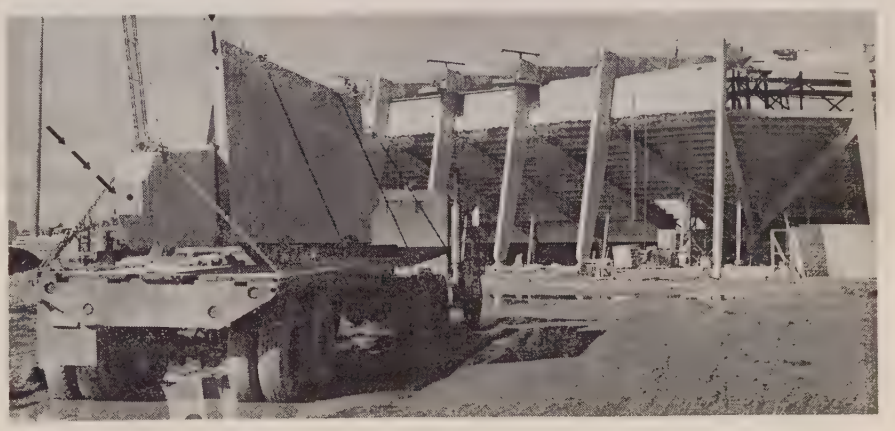
Beam-to-column joints were dry-packed with high strength cement mortar. After the joints reached the required strength, the tendons were pulled up with hydraulic jacks and anchored to the rear of the column, thereby coming together as one piece.

A 2-in. hole was cast in the columns by inserting a rubber hose in the form encasing it in the concrete. The hose was removed when the concrete had set. This formed an ideal downspout concealed in the column to carry water from the roof to the ground.

Architect for the ball park was E. H. Mills. Subcontractors also included the Woodworth Construction Co.; H-K Western, Inc., mechanical; Carl T. Madsen, Inc., electrical; and Lige Dickson Co., grading and excavation.

The total cost of the stadium was about $870,000, which includes the site, drainage, grading, grass, top soil, lighting, seats, etc. The cost of the grandstand alone was about $640,000. The contractor worked a 40-hr. week. J. R. Pilcher was general superintendent for Earley Construction Co., with Edmund B. Varey as chief engineer.

BRUSH AND SHRUBS on the ball park site, owned by the Tacoma Park Board, were cleared off fast with flame throwers operated by infantrymen from nearby Fort Lewis. Note extinguisher.



PRESTRESSED CONCRETE sections numbering about 1,600 were used in the grandstand. Arrows show precast ducts in the spandrel and main columns through which tendons were threaded.

FIRST BAY of upper portion of grandstand is erected with aid of temporary shoring. Arrows indicate tendons used to post-tension into one unit the cantilever section and the upright section.

BRUSH CONTROL is a constant battle, as trimming merely stimulates growth. What's needed is cutting to the ground everything along the road over 30 in. high and spraying the stumps with powerful chemicals.

Road building problems of the Olympic Peninsula

Dense undergrowth, 150 in. of rain a year, poor soil and poor aggregates make Washington's "rain forest" a difficult place for highway construction and maintenance. Unusual procedures have become routine for engineers and contractors alike.

WASHINGTON'S OLYMPIC PENINSULA and neighboring Grays Harbor area, though abounding in natural beauty and tourist attraction, are an extreme problem when it comes to roadbuilding.

The entire area, stretching from Tatoosh Island in the north, the westernmost point of the continental United States, to the Aberdeen-Westport section in Grays Harbor County in the south, is subject to the heaviest rainfall in the country. In the "rain forest" near the top of the peninsula, over 150 in. of rain have fallen in one year. The yearly average in Grays Harbor is nearly 83 in.

These heavy rains, carried to the mainland by the warm ocean winds, have combined over the centuries to grow lush vegetation which, in places, is impenetrable. Consequently, the soil of the entire area is deep with the accumulated fall of leaves and decayed vegetation.

One of the primary reasons confronted in this area is the lack of proper soil and aggregates, so necessary for highway construction. Washington's highway department soil engineer, Carl E. Minor, states: "Experience has shown that Olympic Peninsula gravels are completely unsatisfactory for base courses unless they are treated in some manner. We have found that the addition of 4 to 6% portland cement to the crushed ¾-in.-minus gravel is necessary.

"Degradation under traffic, particularly when the materials are saturated, as they usually are, is caused by the rock particles rubbing against each other as the entire roadbed structure is flexed slightly under traffic. The addition of portland cement apparently prevents the rock-to-rock movement and thus reduces the problem of degradation markedly. The presence of the cement likewise tends to reduce the plasticity of any fines that are created after the material is in place on the roadbed."

Asphalt cement as a modifying or stabilizing agent for these gravels has also been used. Since the asphalt stabilized base has been in place only since the fall of 1959, a true test period has not been given. There is considerable hope, however, that it will also resist the inherent degradation of the aggregates.

These gravels that are responsible for most of the trouble are found on the western slope of the Olympic Mountains, and have been formed principally from eocine rock. Collectively, the gravels in this extreme northwestern part of Washington are known as Hoh Sandstone with allied sediments.

The Hoh Sandstones were composed originally of quartz granules with feldspar waste as the predominant cementing medium. Since the formation of the sandstones, the feldspar in the fines has been altered so that it contains a substantial percentage of clay minerals.

As Minor points out, aggregate degradation is usually associated with breakage of the larger particles during placing and rolling. While this happens in this area, he does not feel that the breakage of the larger pieces during construction is responsible for subsequent roadway distress. Aggregate degradation in the Olympic slope area comes principally from the manufacture of fine particles as the rocks abrade against themselves. For example, the fine material produced in the Los Angeles Rattler Tests on this rock is seldom plastic. If the rock is allowed to act as its own abrading medium, the fines have a completely different character and will be almost always plastic if the aggregate has a tendency toward harmful degradation.

Elsewhere, aggregates are not the only problem encountered in the soil. The soil itself, rich with decayed vegetation, is soft and plastic. To the south, in the Grays Harbor area, the topography is extremely hilly, and breaks sharply into the higher reaches of the tide flats. On the margin of the tide flats the hills have been cut in

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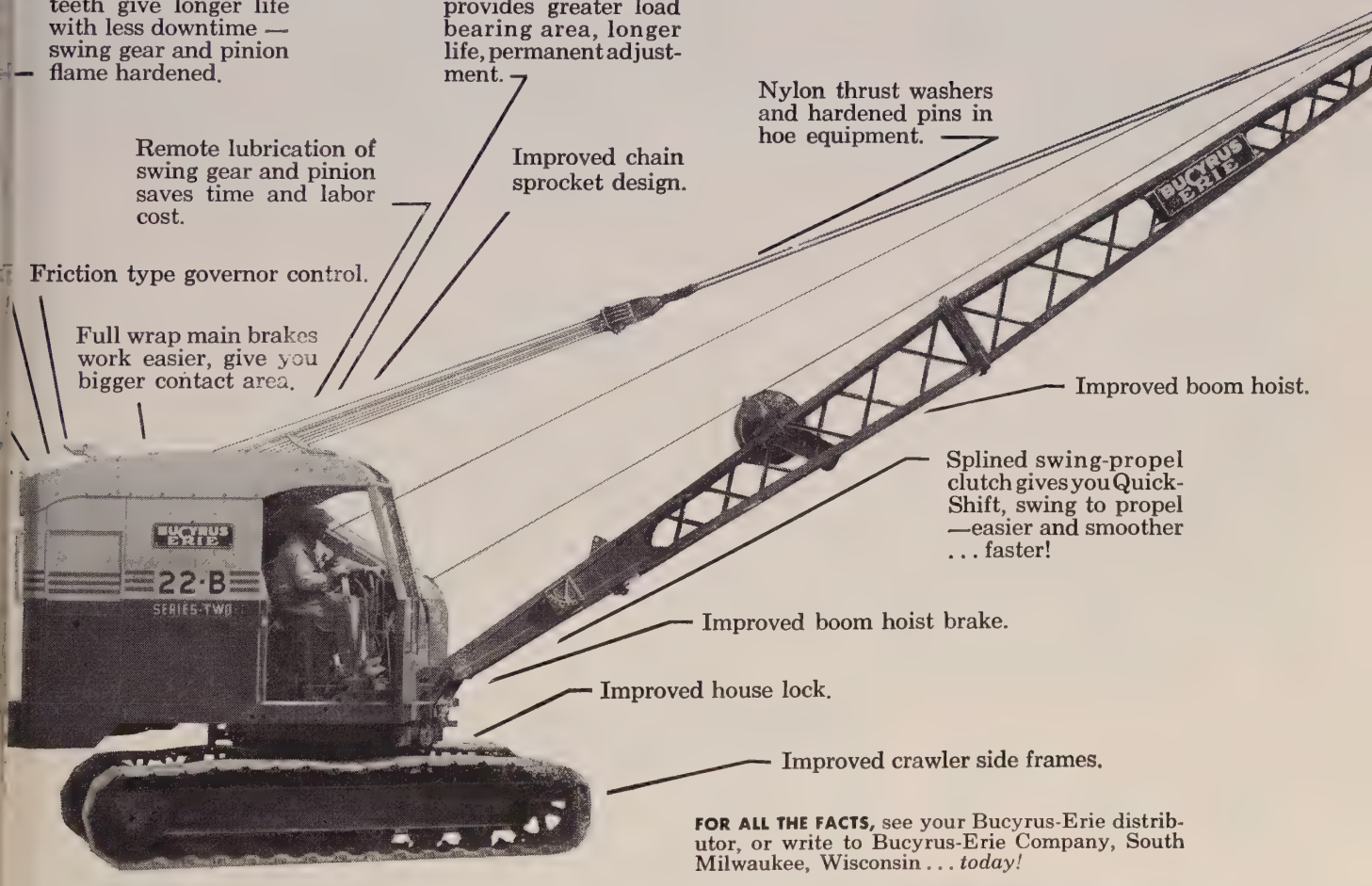

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places by wave action to form nearly vertical cliffs.

The lower reaches of the hillsides have been found to be quite wet as a result of seepage from the higher levels, and in many cases bad slide conditions exist. In sections where roads must be built across the tide flats, from three to four feet of decomposed vegetation and silt must be removed before the site is available to support even the minimum roadway requirements.

Unusual remedies

The combination of these conditions naturally influences the planning for highway projects located west of the Cascades in Washington. According to E. C. "Duke" Simpson, construction engineer for the highways department, "Routine planning for the projects in this area involves many items that would be considered highly unusual for projects elsewhere."

Earth embankments usually must be built from soils having a natural moisture content well above the optimum for compaction to standard specification requirements. Aeration equipment such as heavy-duty rotary tillers, plows, discs and scarifiers are provided for in the contract to facilitate drying the soil during periods of good weather. These are paid for on the equipment time basis.

Density requirements for embankments are kept to the minimum considered necessary for satisfactory results. This usually is 90% of the maximum density as determined by the specified test ASTM Designation D-698.

However, the moisture content requirements at the time of compaction sometimes are relaxed to allow as much as 5% moisture above optimum.

Selected use of soils is another method used by the roadbuilder in this area. Whenever suitable granular soils or dry natural earth is available, it is required that these materials be blended with the other soils if possible, or that alternate, thin layers of these soils be placed with the wetter soils. Maximum use of these methods is made to reduce aeration or wasting of wet soil.

In some cases it is necessary to waste excessively wet soils and to borrow more suitable material. This operation is avoided except under extremely adverse conditions.

Design and surfacing of pavements is directed toward providing maximum drainage under the pavement by use of open-graded base materials, confining subgrade soils by use of sand cushions to prevent intrusion into the open subbase materials, and improving base course stability by using either cement-treated or asphalt-treated bases immediately under the pavement.

During construction, effort must be made to maintain the cuts and fills at all times in such condition that rapid drainage of water from the roadway will occur. This involves keeping the cut grades sloped to the outfall side, temporary ditching from low areas, exaggerated crowns on embankments during placement, compaction of loose soils immediately after placing, and other measures which reduce the damage and delay caused by rainfall.

As the job progresses, local soft spots are removed by excavating and wasting the wet material or by drying and stabilizing by adding portland cement.

Contract time on most of these contracts is based on working days rather than calendar days. Bad weather days during which, in the judgment of the engineer, suitable work cannot be accomplished are classed as non-working days and the contract is automatically extended. Under this method, the contractor is assured ample time to complete the work involved.

Maintenance problems

The average cost per mile to maintain 759.6 mi. of highway in the three divisions in this area was $1,619. As a comparison, the cost-per-mile to maintain three fairly comparable divisions in the eastern part of the state was only $1,073. The difference is, of course, primarily in volume and weight of traffic, as well as in adverse weather and poor soil. "While there is a certain amount of clay present in that soil in the eastern part of the state," J. L. Stackhouse, the state highways maintenance engineer, points out, "the rainfall is much less, and therefore the stability of the soil is not so great a problem the entire 12 months of the year."

One of the principal problems encountered in this wet coastal region is that of surface maintenance. Where the foundation courses under the wearing surface and the wearing surface itself are designed for traffic using the highway, little trouble is experienced with surface maintenance. However, many of the existing roads were built to carry today's loads. This is especially the case on the older roads and highways. Many of these roads do not have adequate foundation to carry their loads and do not hold up. This problem is increased by the exceedingly wet weather during the summer months when the heavy tourist and logging traffic occurs.

The problem of patching in wet weather has been partially overcome by the use of hot asphalt concrete mixtures which can be placed for temporary patching even during rain. The practice of seal coating large areas has been nearly discontinued. Seal coats cannot be constructed during rainy or wet periods. Traffic is so heavy that the cover aggregate does not have a chance to adhere to the underlying asphalt cement before it is disturbed

TEE CULVERTS are used to cope with debris from logging operations. When end of culvert becomes clogged, water rises in pool to upper opening. Shown is George Farquarson, maintenance superintendent at Hoquiam.

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and becomes loose and is thrown, damaging vehicles.

Shoulder maintenance in western Washington, and especially in the coastal region, has become less costly as more sections are designed and constructed with shoulders paved or oiled.

Drainage and brush control

Drainage facilities such as culverts and small bridges are designed to carry the maximum runoff water in nearly every case; however, due to the cuttings and debris left by the heavy logging operations in this area, maintenance personnel have trouble keeping the culverts open during periods of heavy runoff and continued heavy rainfall. When a pipe culvert or box culvert becomes blocked, silt is deposited with the debris, which makes it difficut to find the culvert if the water has reached a high point on a fill section. This problem of debris has been partially solved by adding a tee-shaped pipe section to pipe culverts so that as the opening at the grade becomes blocked, the water will fill up to the vertical opening of the pipe, which is not so likely to become dammed with limbs and other debris. This type of clogging, which constitutes a big maintenance problem, is uncommon elsewhere in the state.

Brush control, in this region of abundant vegetation, is another big headache. The maintenance division has found, through years of experience, that cutting the alder, vine maple and the multitude of brush along the highways only increases the growth during the next several years. The present practice is to cut all brush more than 30 in. in height, remove or burn the cuttings, and immediately spray the fresh cut stumps and the ground around the stumps with a weed killer chemical compound composed of 2-4-D, 2-4-5-T and diesel oil mixed in water. This has been found highly successful in preventing the root buds from springing up around the cut stumps.

For small brush and noxious weeds, an application of 2-4-D kills the seedlings before they can get started. It has been found that on newly graded projects, before the grass covering can develop, the seeds of alder and maple, prevalent in this area, will germinate very rapidly. If not controlled, these wide slopes and fill sections soon become a thick forest of growth. However, due to mechanical methods, and the department's spray program, the expense of controlling brush has been kept to a minimum.

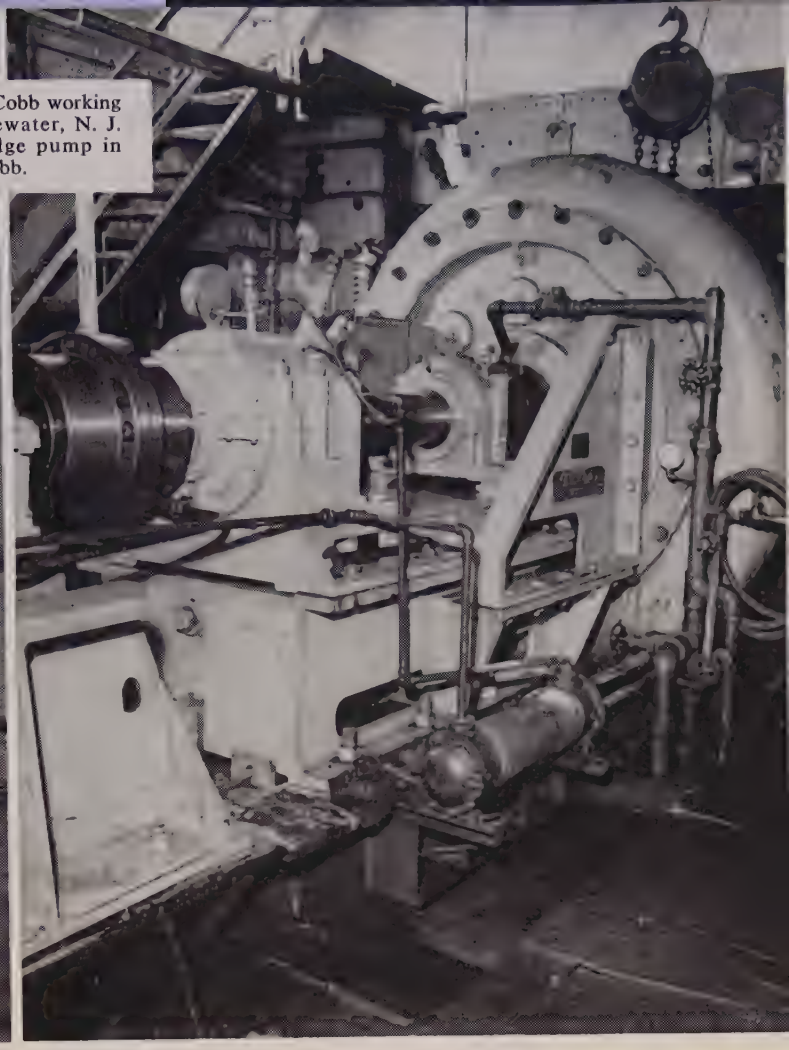
Each year the department uses new types of equipment developed by manufacturers or devises new methods and systems to outwit and thwart the combinations of Mother Nature which make roadbuilding in this area such a painstaking task.

Washington highway contracts exceed awards of last year

PLANS announced by the Washington Highway Commission call for awarding about $40,000,000 in highway construction during the second half of the calendar year. Such awards will bring the total for 1960 to about $12,000,000 more for the calendar year than for the total awarded in 1959.

During the first half of the current year, contract awarding was at a lower rate than 1959 due to the cutback in Federal funds and the resulting interruption of the established state highway program.

Left: View of dredge C. H. Cobb working around dock area in Edgewater, N. J.
Right: Amsco 50 S3B dredge pump in pump room on the C. H. Cobb.



Left: General view of Star Rock Products plant at Anaheim, California.
Right: View of Straub 20 x 36 crusher at Star Rock Products. Rocks up to 18″ may pass through grizzly and outer crusher.

WASHO

(Continued from page 41)

estimate which is to be presented by the Bureau of Public Roads when Congress convenes again in 1961.

1960-61—A critical period

They considered the remainder of 1960 as particularly critical, if further incidents should develop that would provide more fuel for the Blatnik Committee. Should this committee be convinced that irregularities are isolated cases, with the program generally administered and carried forward with honesty and efficiency, there would be no threat to the present federal-state relationships.

On the other hand, if the work carried out and the reports for the remainder of 1960 were not particularly clean, there might be serious difficulty for the highway program starting next year. Opponents to these programs continue to exist and could gain strength and numbers with any serious criticism of work on the Interstate and its 90 per cent financing from the Federal Government. Such opposition could move in either of two directions, both of which would seriously affect the program as it exists today. First, these opponents could be strong enough to demand a slow-down in the program, and possibly, an interruption while further studies were made. This would have the effect of a stretch-out, disrupting progress and delaying completion and operation of the Interstate system, as now planned. The other alternative might be a Congressional demand for a superagency to run the Interstate program in detail, taking much authority from state highway departments and creating considerable disruption in the present relationships.

Both of these speakers, as well as others from national agencies, including Clare Miller, vice president of the AGC, urged all highway interests to produce an exceptionally fine record for the remainder of 1960 and to avoid any incidents which indicated that the long established relationship between the Bureau of Public Roads and state highway departments was not the best for concluding the Interstate program. The seriousness of this situation was indicated by the fact that the audience maintained its sharp attention through this entire session.

Hewes Award

"The Dr. L. I. Hewes Award," presented at WASHO Conferences for the past nine years, and sponsored by *Western Construction*, went to W. A. King and J. M. Rylander, senior resident engineers of the Texas State Highway Department. Their contribution to highway progress in the West was the development of a method for locating and classifying sub-marine soils by Sonar. The method enabled a survey to be made that developed the necessary quantity of hydraulic fill material required for the construction of a new causeway almost 12,000 ft. long, with long approach fills.

Construction session

According to usual custom, the Conference broke up into group meetings following the general sessions on the first day. These meetings provide discussions of direct interest to all registrants from those interested in acquiring right-of-way to problems of cost accounting.

The group session on construction is of most direct interest to the largest number of readers of *Western Construction*. Further, its panel discussion on "Where and how can we economize in road building" presented a group of experts familiar with all phases of the highway program from the Interstate to forest highways.

J. W. Trask, Assistant State Highway Engineer, California, pointed out that the motoring public is demanding highways for more speed and comfort, and at the same time complaining about the cost of these highways. His strongest point of rebuttal is the fact that by demanding highways built for speed, the motorist is doubling the cost of his fuel as compared to minimum consumption at 35 mph., and still complains about wanting highways to cost less so that he can spend dollars faster for gasoline. Actually, the cost of highways could be materially reduced if the motoring public did not require such high standards.

A. G. De Long, Construction Engineer, New Mexico, presented several points in his panel presentation covering field conditions that frequently require changes in plans and specifications. These changes will reduce ultimate costs, but such adjustments must be carried out with complete and prompt line of communication with the home office. He also expressed his opinion that the erection of large traffic signs at minor intersections handling principally local traffic appears to be uneconomical, not only requiring extensive state funds, but a subsequent maintenance load.

E. C. Simpson, Construction Engineer, Washington, stated that highway costs were showing a remarkably small increase during the last several years, as compared to other costs. He indicated this results, in large measure, from the improvements in size and variety of construction equipment He also indicated that Washington has taken very active steps toward exchange of information between contractors and highway engineers. These meetings and resulting changes in specifications and procedures, wherever possible, have also tended to keep down costs. For example, one of the important developments has been including adequate access for the contractor in the securing of adequate rights-of-way. The providing of approved and adequate sources of aggregate available for all bidders has tended to standardize bidding with the elimination of a factor of uncertainty. This also applies to the providing of sufficient area for plant set-up and equipment storage. Finally, the separation of contracts based on the class of work involved has made it possible for contractors specializing in these fields to perform the bulk of the contract work, leading to more realistic bidding, better job control and higher efficiency.

L. J. Ross, Planning Engineer, Idaho, concentrated his remarks on the savings that could be effected with proper planning before the award of contract. This relates particularly to adequate organization and control in analyzing alternate routes.

W. E. Sutton, Assistant Highway Engineer, Wyoming, reminded the group that factors such as future traffic loads, money available, and maintenance are all to be considered in an overall approach to "economy." Wyoming has found that traffic and traffic loads increase on secondary highways as soon as constructed, with the need for improvement and strengthening after a relatively short life. This factor of added traffic must be considered in the construction costs.

The pertinent remarks of Forrest Cooper of Oregon will be reported in the next issue.

Belt moves aggregate at Ice Harbor

Contractor is using a conveyor on a suspension bridge to move concreting material across the 900-ft. width of the Snake River. Capacity of 1,000 tons per hour. Wind bracing is design feature.

By

CAPT. QUENTIN D. QUIGLEY
Asst. to Resident Engineer
U. S. Army Corps of Engineers
Ice Harbor Dam, Washington

ICE HARBOR lock and dam, at river mile 9.7 of the Snake River, is being constructed under three major construction contracts: South shore work, consisting of the powerhouse, erection and service bays, 1,750 ft. of non-overflow dam, a 1,600-ft. permanent fish ladder and 7½ bays of spillway dam has been completed and installation, as a part of the powerhouse completion contract, is presently 80% complete. The last major construction contract for the project consists of an 86x675-ft. navigation lock, a 1,000-ft. permanent fish ladder, 2½ bays of spillway dam, a short transition section of non-overflow dam between the spillway and south lock wall and the north shore earth-fill abutment. The $20,000,000 north shore contract was awarded to Guy F. Atkinson Co. in May 1959 and construction began immediately.

The contract, as awarded, included 662,550 cu. yd. of mass concrete and 32,400 cu. yd. of structural concrete. A total of 11 different concrete mixes have been designed by the North Pacific Division Laboratory for this yardage. In addition to the 370,000 bbl. of cement and 22,000 tons of pozzolan, an entraining agent and water, it is anticipated that the following quantity and size of aggregates will be required.

Gradation	Quantity (Tons)
Sand	317,545
¾″ to No. 4 Sieve	245,305
1½″ to ¾″	199,968
3″ to 1½″	306,535
3″ to 6″	209,250
Total tonnage	1,278,603

Since project specifications require that all aggregate, except a portion of the 6-in. cobbles, be obtained from a Government owned pit about 6 mi. southwest of the project site, the problem of moving either the aggregate, or wet concrete, to the dam had to be solved. Other specification requirements such as: (1) live aggregate storage of 1,000 cu. yd. of each size at the mixing plant site, (2) rinsing screens for coarse aggregate to remove dust and provide cooling during hot weather, and (3) rescreening of all coarse aggregate just prior to delivery to the mixing plant bins, complicated the problem. It was also specified that the contractor provide an automatic central-mix concrete plant with a capacity of at least 1,500 cu. yd. in 8 hr. "Automatic" was defined as

including mixing and mix selection.

The solution

The contractor, to meet the requirements of the specifications, and at the same time install the most economical aggregate-batch plant layout, investigated several solutions to the problem. Two solutions, a vehicular bridge to haul aggregate, or a suspended conveyor belt system seemed to meet all specifications requirements; therefore, a more complete cost analysis was compiled for these two schemes.

In the final analysis, the higher salvage factor of the conveyor system in comparison to the salvage factor of the vehicular bridge played a large part in the selection of the conveyor system. An added factor might be injected at this point. The contractor had previously constructed a shoo-fly bridge, hung off the downstream side of the spillway bays, leading from the tailrace deck to the top of the north shore cofferdam cells which pro vided him with a line of communication from south shore to north shore. Sustained heavy traffic of aggregate hauls over this route could cause damage to the completed tailrace deck; therefore it had been rejected early in the study, as a solution to the aggregate problem.

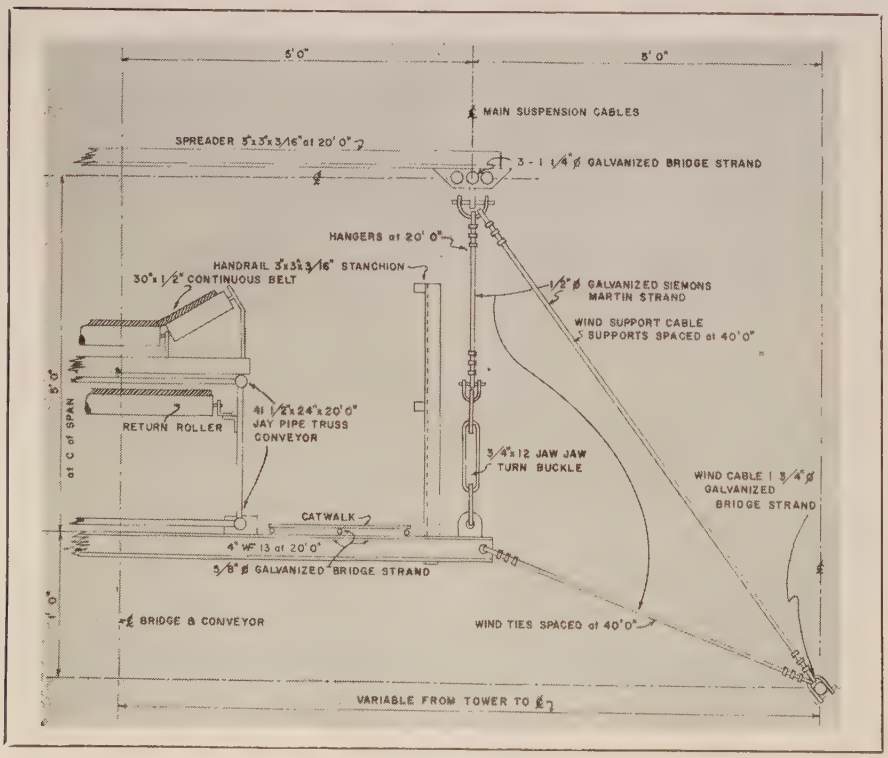
The aerial photo shows the project site with the completed aggregate handling facilities in the foreground. In actuality the layout contains the separated facilities of truck unloading point, live aggregate storage tanks, rinsing screens, and batch plant, all interconnected with endless 30-in. belts. Cement and pozzolan storage, situated off the picture to the left is connected directly to the batch plant by air slides.

On the south shore the truck unloading point was constructed by using 10x12-in. timbers to build a 15-ft. height of crib above the 10x24-ft. Noble double compartment hoppers. By ramping both ends of the crib, this method reduced the turnaround time to about 1 min. for the 30-yd. bottom dump rigs used for aggregate delivery.

The hoppers, each equipped with a 30x60-in. Syntron vibrating feeder, discharge onto the first conveyor belt that moves the aggregates 250 ft. horizontally and 75 ft. vertically to the top of the live storage tanks. This belt, driven by a 50-hp. 440-volt motor operates at a speed of 300 fpm. and discharges on a horizontal, track-mounted, reversible 30-in. belt which distributes the aggregates to the proper tank. Controls for conveyors No. 1 and No. 2 are located at the top of the truck unloading point and can be handled by one man.

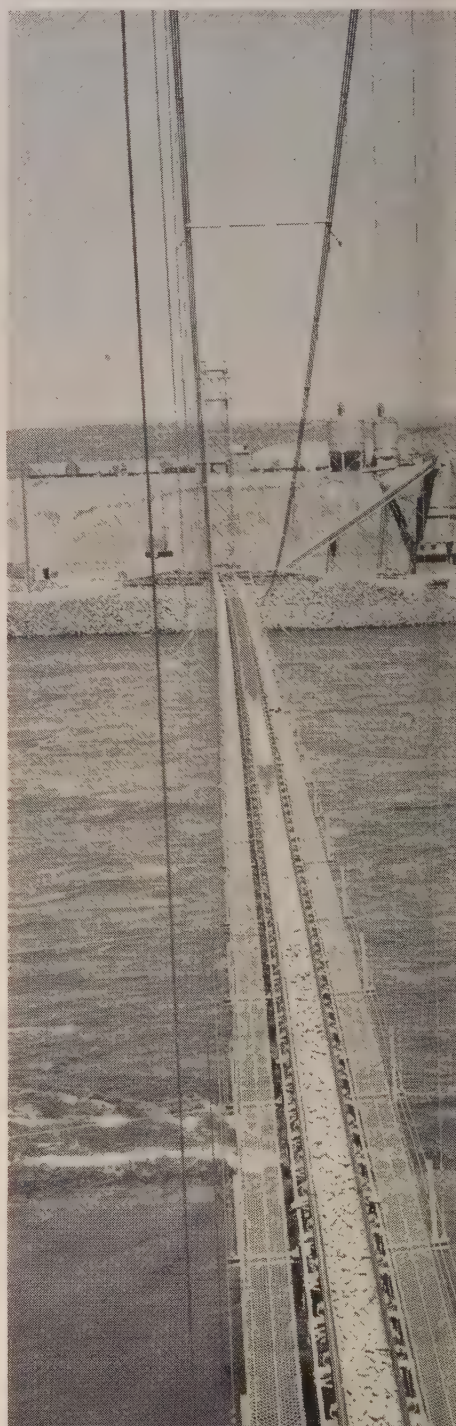
Conveyor No. 3, the main span of the system, begins under the live storage tanks and terminates at the rinsing screens on the north shore. It, too, is driven by a 50-hp. motor and operates at 300 fpm. About 930 ft. of this main span is designed and constructed as a suspended bridge. Primary support for the 30-in. continuous belt is a standard section of 41½ x 24-in. x 20-ft. Joy Pipe Truss Conveyor. At each truss connection a 10-ft. floor beam, fabricated from 4 WF 13 stock is bolted to the bottom chord of the trusses. These floor beams are connected to the main suspension cables as shown in the accompanying drawing. The main sus-

(Continued on page 64)



DESIGN DETAILS OF THE SUSPENSION SYSTEM FOR THE CONVEYOR CROSSING

CROSSING the Snake River this 930-ft. suspended span carries a 30-in. conveyor belt and is stabilized for sway by extra wind cables (see drawing for design details).



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Ice Harbor

(Continued from pages 57 and 58)

pension cables, 3 of which are used on each side of the bridge, are 1¼-in. galvanized bridge strand steel that had been prestretched and premarked before delivery to the job site.

In place of a stiffening truss, normal design for most suspension bridges, 1¾-in. wind cables were installed both upstream and downstream. This cable, too, had been stretched and marked before delivery; however, to add rigidity to the structure, it was installed under a loading of 75,000 psi. Wind cable supports, placed on 40-ft. centers from main suspension to wind cable are fabricated from ½-in. galvanized Siemans-Marten strand as are vertical hangers to the floor beams and wind ties from the floor beams to the wind cable. The relationship of these ties can also be seen in the drawing.

Support of the entire suspended section consists of two 100-ft. towers fabricated from 30 WF 108 stock at the job site. The towers are side-guyed with 13/16-in. galvanized bridge strand cable. Anchorage consists of the following: four 20-ton concrete blocks at the ends of each wind cable, four 19-ton guy anchors, one 225-ton concrete anchor on north shore for main suspension cables and two 97.5-ton anchors on the south shore for main suspension cables.

At the terminal of the trans-river conveyor all coarse aggregate is routed through the rinsing plant while the sand, by means of a flop gate, bypasses this operation.

The overall system has provided the contractor with a fast and relatively simple means of aggregate supply across a major United States river. Moving at design speed of 300 fpm., the system delivers approximately 1,000 tons of aggregates per hour. To date, with little maintenance involved, sufficient aggregates have been moved across the river to mix and place approximately 85,000 cu. yd. of concrete, or 12.2% of the entire North Shore contract. If this progress rate continues, Ice Harbor lock and dam will be completed on, or before, its target date of December 1961 and will begin to furnish its 270,000 kw. of power to the Northwest Power Pool and serve as a 35-mi. link in the slack water navigation system from the Pacific Ocean to Lewiston, Idaho, a distance of 484 river miles.

Junction Dam

(Continued from page 29)

cluding sprinkler nozzles around the top and spray bars along the bottom. Three days time is allowed between pours, and concrete must test 3,000 psi. in 14 days.

Concrete is prepared in a Noble batch plant of 60 cu. yd. per hr. capacity with a Smith 4-yd. mixer mounted beneath the batching hopper. The plant is fed by a Michigan 125 loader dumping on to a long conveyor belt. Bucket trucks devised by the contractor each take a 4-yd. charge.

Equipment

- 1 38 B Bucyrus-Erie crawler crane
- 1 25-ton Lima truck crane
- 1 Caterpillar D8 tractor
- 1 Caterpillar No. 12 grader
- 7 concrete trucks
- 1 power wagon with A-frame
- 1 Michigan 125 loader
- 2 Gardner-Denver 600 cfm compressors
- 1 Gardner-Denver 125 cfm compressor

The arch dam will be completed in September, with the final drilling and pressure grouting of base and abutment walls. Holes of 100-ft. depth will be drilled every 20 ft.

Personnel

For Fruin-Colnon, Bob Brenner is project manager, Lowell Emert is superintendent, John Beale, project engineer, Bert Abernathy, office manager, and Clint Miller, master mechanic.

Subcontractors are Ryerson Steel Co., supplying reinforcing in the top 30 ft. of the dam; Boyles Bros., Salt Lake, pressure grouting; and Marin Sand and Gravel, supplying the aggregate.

Resident engineer for the Bechtel Corp. is W. E. Stinchfield; R. K. Deming, assistant resident; C. L. Jeffs, office manager; and W. W. Wolcott, project engineer. Project manager is David S. Culver.

Sacramento Municipal Utility District staff includes Paul E. Shaad, general manager, Clyde A. Spencer, project engineer, and J. J. Mattimoe, engineer.

Compensation insurance for Western highway projects

A brief review of basic points, reminding contractors of legal aspects, rate making, variations among states, and the importance of safety in establishing favorable premiums.

By RALPH L. WARD
Construction Safety Specialist
Employers Mutuals of Wausau, Wisconsin

WORKMEN'S COMPENSATION insurance costs make up an important part of a contractor's overhead in the performance of highway construction work. How large a part of overhead is represented by these costs is determined by a number of factors. Some of these, such as the ones related to workmen's compensation laws, are generally beyond the contractor's control. Some of the factors—those that are involved in compensation rate-making methods and procedures—are only indirectly influenced by a contractor's decisions.

But the most critical factors are those that are influenced by the contractor's direct action and individual effort. These concern types of work engaged in; frequency and severity of accidents within these groupings; and the extent to which accident controls are applied.

Laws in every state

Every state has a workmen's compensation law. In addition, there are Federal workmen's compensation laws.

Although all the states agree as to the principle of workmen's compensation, no two of them have exactly the same benefits. The laws meet particular conditions. Each state's law sets forth the manner in which a workman who is injured during the course of his employment shall be compensated. The varying amounts of compensation and the difference in the benefits provided under the laws of the various states is the primary reason for the spread that exists in compensation rates for the same type of work in the different states.

Not only are there differences in benefits, but also in regard to persons who are to receive compensation and under what circumstances. For example, many workmen's compensation laws provide coverages for minors. However, in some states, there are additional or penalty benefits provided, even to the extent of double compensation for persons in this category. In some instances, minors enjoy special benefit provisions by law. It is, therefore, necessary that contractors exercise extreme care in permitting persons to work who are legally classified as minors.

Injury outside the state

Another feature of compensation laws relates to their requirements for the compensation of workers injured outside of the immediate jurisdiction of the state. It sometimes happens that a worker's job may take him from one geographical area into another while working for the same contractor. When an injury occurs under such a situation, the question arises as to how the compensation involved is payable. This happens because the laws of many states provide that the compensation benefits follow a worker as he moves about. Sometimes the answer to the question requires consideration of many circumstances, such as the place of employment or hire, his residence, and the location of the contractor.

The reporting of injuries and the penalties or fines for failure to report are also established in most state laws. However, in most instances, except for the preliminary report, contractors rely upon their insurance companies to relieve them of the burden of complying with these requirements.

All states require the contractor either to obtain insurance or to give proof of his financial ability to carry out the requirements of the compensation law.

State funds or private

In four states of the Western region — Nevada, Oregon, Washington, and Wyoming—the laws provide for monopolistic state funds. In these states contractors are required to insure in the state fund. In some states contractors may qualify as self-insurers. This is not permitted in Nevada, Oregon, Washington and Wyoming. In some of the states, such as Arizona, California, Colorado, Idaho and Montana, there are competitive state funds, which in effect means that a contractor may purchase his workmen's compensation insurance either from the state fund or from a private insurance company.

There is a wide variation in benefits among the states. These variations concern determination of dependents in the event of fatal injuries. There are many differences in the statutory requirements regarding medical care and benefits. There are limitations on the duration of medical aid, as well as on its amount. Only in one of the Western states is the medical treatment unlimited as to time and amount. In some states the limitations can be altered as a result of hearings and decisions by the administrating authority.

In all states, the amount of benefit to be provided under compensation law for various degrees of disability from temporary to total, and permanent, are governed by three factors: (1) the rate or percentage of wages; (2) duration or length of time in terms of weeks that the payments are to be made and (3) maximum or total amount of benefit that may be received. In some cases, benefit payments made for temporary disability are supplemented by payments provided for permanent partial disability, whereas in other states they are deducted from the allowances.

With regard to these and other requirements of state workmen's compensation laws, there is not much a contractor can do to directly change their influence upon the cost of workmen's compensation insurance. Legislative changes are usually slow in developing.

Rate making process

Workmen's compensation insurance rates are not made by insurance companies, but by an organization set up for this purpose in 1915 and known as the National Council on Compensation Insurance. The Council operates in most states, and those that have independent bureaus cooperate with

Compensation Rates By Classifications

	A	B	C	D	E	F	G	H	I	J	K	L
CALIFORNIA	6.04	2.69	4.73	. . .	4.88	14.31	6.90	. . .	13.95	7.64	8.28	8.67
COLORADO	5.75	3.43	4.76	6.02	2.83	8.92	5.48	1.38	10.93	10.93	6.17	4.92
IDAHO	6.25	4.47	3.47	5.52	2.39	11.23	6.14	1.80	15.58	11.72	7.95	5.08
MONTANA	7.39	5.53	6.08	7.67	3.52	13.57	6.83	2.10	20.20	13.85	10.06	7.80
UTAH	5.61	2.92	. . .	. . .	. . .	. . . .	4.78	1.10	. . . .	6.61	5.68	5.48
NEW MEXICO	9.83	3.67	3.73	6.04	3.86	12.76	8.46	2.16	9.51	9.51	9.03	7.47

SOURCE: National Council of Compensation Insurance

WORK CLASSIFICATIONS

A. Sewer construction
B. Excavation
C. Street or Road Construction—Clearing or Earth Excavation
D. Street or Road Construction—Rock Excavation
E. Street or Road Construction—Paving or Repaving
F. Pile Driving
G. Concrete Construction—Bridges
H. Concrete or Cement Work—Walks and Driveways
I. Iron or Steel Erection—Metal Bridges
J. Iron or Steel Erection—Miscellaneous
K. Caisson Work
L. Quarries

The states of Arizona, Nevada, Oregon, Washington and Wyoming have state fund insurance. Rates are available only through the insurance department of these states.

the Council in making their rates. The national organization establishes rates from statistics and injury experience which are collected and tabulated on the basis of the various types of construction operation in the several states. The rates which are developed are in effect a measure of the hazard involved with the various types of work in the areas where they were conducted.

Because the rates are determined from the cost of medical care and compensation for injuries in various types of work, they are, in effect, averages of the cost of injuries in different types of work. These are generally referred to as "manual rates" and are almost always based on units of payroll. Combinations of payroll units and compensation rates for various types of work produce premium charges which make up a part of a contractor's overhead costs.

Although there are various rating plans and rules for the modification of manual rates whereby an individual contractor can, in effect, "set his own rates," he can only indirectly bring about changes in manual rate levels by cooperating with and encouraging other members of the industry to improve the safety of operations.

In the accompanying table the manual rates for the several types of work included are given for 6 of the 11 Western states in which rates are established by the National Council on Compensation Insurance. The figures for the rates shown in the tabulation not only reflect the differences in the compensation laws of the several states but also reflect differences in degree of exposure to injury as well as degree of controls exercised on these exposures in one state as compared to another. The spread in these rate levels is a direct indicator of the seriousness of injuries and their cost in each of the work classifications. They are often referred to as average costs of injuries for types of work in $100 units of payroll.

Effect of safety practices

Although workmen's compensation insurance laws and the rates that are formulated out of injury experience in order to meet their requirements are fundamental factors in compensation insurance costs, they are of secondary importance in the matter of reducing insurance costs in construction operations. The laws determine the benefits that shall be paid as compensation for injury. The contractors engaged in the various types of construction work determine the level of injury costs by the manner in which their operations are directed and controlled, and this, in turn, is responsible for compensation insurance rates.

In highway construction, there are several types of work, usually grouped in four or five divisions. These are: Clearing and grading of right-of-way; preparation of subbase; paving and finishing of roadway services; erection of structures for intersections and interchanges; and incidental operations.

All of these operations involve different degrees of hazard, the net effect of which is principally reflected in the rate levels of the various classification codes for construction work.

Because in each construction classification code there are degrees of difference as to the specific nature of the work, it follows that the choice of one type of work, rather than another, is one way in which a contractor's compensation costs are influenced.

A contractor can determine that there is a proper classification of work as well as a correct allocation and distribution of his payrolls to the types of work that he is performing. One of the services provided by the insurance company is assistance in obtaining proper classifications as well as in the auditing and distribution of payrolls to the proper codes.

In summary, the critical factors in compensation insurance costs upon which a contractor does have opportunity to exert influence are concerned with the complexity and diversification of operations, injury occurrence and accident prevention efforts. And the most critical of these is the latter one, although accident prevention efforts often receive the least consideration. It has frequently been proved, however, that the benefits from even a modest but consistent effort in accident control far outweigh the investment involved.

The approach to the reduction and control of compensation insurance costs must be through direct action to influence the critical factors that determine these costs. This can be done most profitably by concentrating upon three areas: (1) within the contractor's own organization, (2) within the contractor and insurance company partnership, and (3) with all other contractors engaged in similar and related operations.

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WESTERN CONSTRUCTION NEWS

$52,000,000 hydro project starts

EQUIPMENT is being moved in for the beginning of work on the Oroville-Wyandotte Irrigation District's project in Northern California. With a bid of $52,636,785, a group known as Oroville Project Contractors received the contract and will carry out the work which includes four dams, three small diversion dams, about 17 mi. of tunnels and 21 mi. of power and irrigation canals. This joint venture group consists of Atkinson-Ostrander Co., L. E. Dixon Co., The Arundel Corporation, and the Hunkin-Conkey Construction Co. A lower bid had been submitted by a group headed by Henry J. Kaiser Co., but this bid was withdrawn when the district questioned some of its provisions that seemed to make it appear "irregular" from the legal viewpoint.

Design and construction will be directed by Bechtel Corporation, which has been active in plans for the project since 1958. Prior to that time, preliminary studies and the general concept of the major program were carried out under the direction of Frank Bonner, consulting engineer. His work dates back to 1950 and a license for the project was secured from the Federal Power Commission in 1952.

Since 1958, Bechtel has been carrying out field investigations at the various construction sites and has developed the detailed plans and specifications. This work has been carried out under the general direction of J. George Thon, manager of hydro engineering, with Harold K. Pratt as project engineer. Field operations will be under the direction of E. A. Draeger as project manager, reporting to T. A. Lang, manager of hydroelectric projects.

Financing of the project has been made possible by a 50-year contract between the district and the Pacific Gas & Electric Co. for purchase of the entire power production. The three hydroelectric powerhouses in the program will have a total rated capacity of 90,000 kw. and will generate 434,000,000 kw. hr. in a year of average runoff.

The project is located on the South Fork of the Feather River and extends and improves the water storage and distribution system now operated by the Oroville-Wyandotte Irrigation District. Revenue bonds to finance the program, and later to be retired through the power contract, have been sold to a syndicate in an amount of $65,157,000. The balance of the bond issue, above the construction contract, will be used for land acquisition, administration, engineering, and financial costs.

J. C. Woods is manager-superintendent of the irrigation district with headquarters in Oroville.

Pomeroy-Kaiser contract

J. H. POMEROY & CO., and Bechtel Corporation have been awarded a multi-million dollar contract by Columbia-Geneva Division of U. S. Steel Corp. for preparation and partial construction of a vast taconite iron ore mining and beneficiation facility near Lander, in western Wyoming. Contract work, to begin immediately, will be done for Columbia-Geneva by Pomeroy-Bechtel Taconite Ore Joint Venture. Design and detailed engineering have been completed by Bechtel Corporation, under terms of an earlier contract.

Completion of the joint venture contract is expected by mid-1962. Amount was not revealed.

Colorado reviews progress on its highway program

MARKING the fourth anniversary on July 1 of the accelerated National Highway Program, the Colorado Department of Highways outlined its accomplishments for the citizens of the state, through a joint announcement by its governor and Mark U. Watrous, chief engineer. The 4th of July holiday was a logical time to review the benefits of

CONCRETE PLACING STARTS ON THE GLEN CANYON DAM PROJECT
PLACEMENT of the 5,000,000 cubic yards of concrete that will go into construction of Glen Canyon Dam across the Colorado River started on June 17, when Secretary of the Interior Fred A. Seaton tripped the first 12-cu. yd. bucket. It was placed at lowest bedrock and marked the start of full-scale concreting operations. The 5,000,000 cu. yd. required to construct the dam would be enough to build a four-lane super highway, 44 ft. wide and 4 in. thick, from Chicago to Phoenix, a distance of 1,800 mi.

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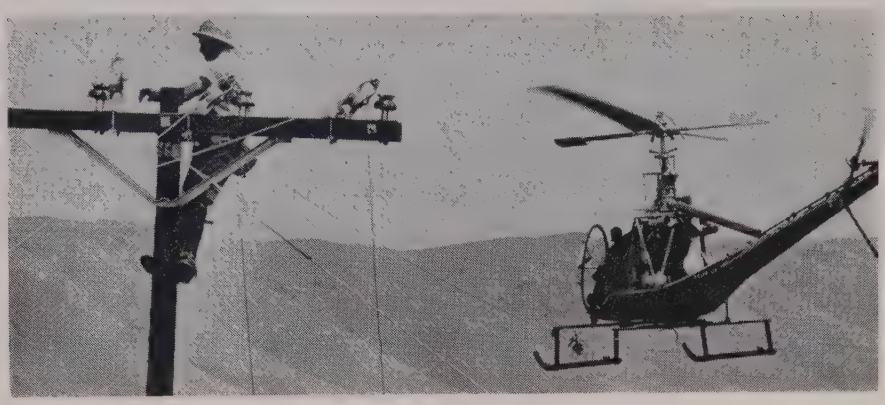

STRINGING POWER LINE TO AN AGGREGATE PLANT BY HELICOPTER

A POWER LINE 2½ mi. long was recently erected in only 6 hr. of flying time on a project for Wasco Electric Coop, The Dalles, Oregon. Columbia Helicopters, Inc. of Portland supplied the Hiller 12E helicopter and service. Scene of the aerial construction job was the hilly Columbia River plateau country near Rufus, Ore., where a sand and gravel plant is going in to supply aggregates for John Day Dam.

First stage of the operation called for the helicopter to set 33 poles in predug holes along a right-of-way climbing from sea level to 1,000 ft. Thirty-two of the poles were complete with crossarms and insulators and measured up to 45 ft. Elapsed flight time varied from 2 to 10 min. for each pole.

Wire laying took 2 hr. 56 min. flight time for the Hiller, stringing 2½ mi. of four conductor line, one wire at a time, for a total of 10 mi. of wire laid.

According to a Wilson Construction Co. spokesman, use of the helicopter resulted in a savings of $2,000.

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the highway program as motorists concluded their holiday travel and were able to observe the improvements.

The report of the chief engineer pointed out that during the four years Colorado had brought 220.5 mi. of highway up to Interstate standards at a cost of $64,000,000. About 89 additional miles are now under construction on the Interstate System, and engineering studies and purchase of rights-of-way are in progress on an additional 122 mi.

Turning to the ABC system, the summary indicated that 1,203 mi. of new and improved highways have been completed at a total cost of $91,000,000 and work is under way or authorized for an additional 200 mi.

No-Joint Pipe files suit on patent infringement

THE No-Joint Concrete Pipe Co., Yuba City, Calif., filed a complaint for patent infringement on June 7, 1960, against R. A. Hanson, and R. A. Hanson Co., Inc., of Palouse, Wash. The action charges the defendants with infringement of the No-Joint Patent No. 2, 731, 698.

No-Joint Concrete Pipe Co. has engaged in the installation of cast-in-place concrete pipe since 1951.

Seattle moves ahead on a big hydraulic project

THE CITY of Seattle has taken another step toward securing a license for constructing the Boundary hydroelectric project. This step consisted of filing a brief to support its application before the Federal Power Commission.

Briefly, the plan has had the following history: City Light (power and light agency of the City of Seattle) originally filed for a permit to study the project in 1953. In 1957, having completed engineering and feasibility studies, the agency applied for a license to build the project. Proceedings held by the FPC, following the application for a license extended for more than a year, up to February 1960. These proceedings extended over such a long period because of opposition presented by Public Utility District No. 1 of Pend Oreille County and local mining interests. The PUD proposes to build a low dam at Z Canyon, about 1 mi. upstream from the site of the Boundary project. The opposition from mining interests is based on a contention that the reservoirs behind either a low or high dam would flood valuable mineral holdings.

Recommendations of the FPC staff will become known this month and a further 30-day period is provided for the filing of additional briefs. Oral arguments will then be heard before the examiner, who will render his decision and the matter will then go to the Commission itself for final determination. The project proposed by City Light would have an initial installation of 600,000 kw. or nearly equally to the total existing generating facilities of the agency.

Kaiser interests to build sewage project in Hawaii

THE Kaiser interests in the Hawaiian Islands are making plans to construct the first large scale private sewage system in Hawaii. Assuming that approval of the project will be made by the City Planning Commission, a program estimated to cost about $10,000,000 will be instituted in building disposal works and sewer lines to serve the area where the new community of homes will be constructed.

According to present plans, the system would be privately operated for 30 years at which time the city could exercise an option to purchase.

BuRec reports on project to pump from Columbia

A Bureau of Reclamation feasibility report on the proposed Western Division, The Dalles Project in north-central Oregon, has been forwarded to the Congress with a request for prompt enactment of authorizing legislation, the Department of the Interior announces.

Commissioner of Reclamation Floyd E. Dominy said the project would provide facilities for pumping water from the Columbia River up to fruit-growing bench lands on the south bank of the Columbia in Wasco County near the city of The Dalles. The project will supply irrigation to 3,080 ac. of new lands and also water to 2,340 ac. of lands presently irrigated with an inadequate supply primarily from ground water sources.

The total estimated cost of the Western Division is $5,649,000. Major project works include a main pumping plant, booster and relift pumping plants, equalizing reservoirs, closed-pipe distribution and lateral system, drainage and electrical facilities. Water should be delivered to farms under pressure for irrigation by sprinklers.

Industry

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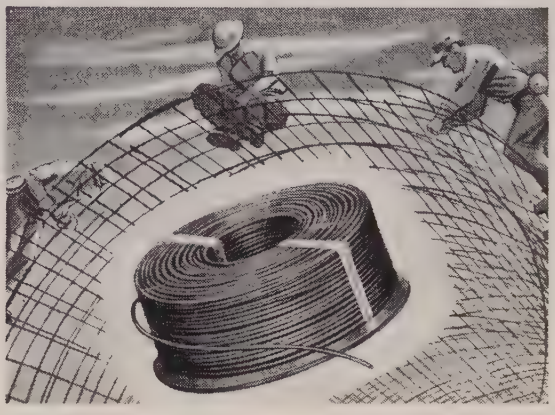

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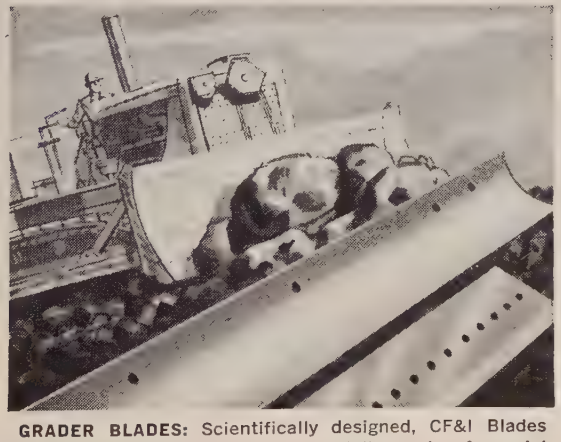

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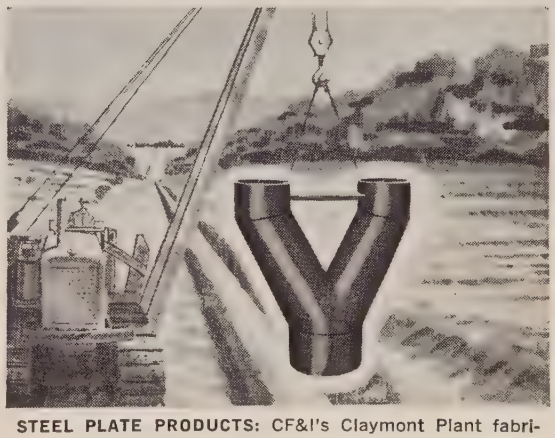

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ALASKA Newsletter

By CLIFFORD S. CERNICK, Fairbanks

CLOUDLESS SUMMER — So far as the construction industry is concerned, this year has been one virtually without major problems. Last summer, it was different; a costly walkout balked work on scores of jobs. There was unrest, bitterness and unemployment in the North. This year, happily, the construction scene is sunny. Except for a few minor exceptions, the labor-management situation has been remarkably stable. Employment has hit a peak, reaching a point where there are some highly-skilled jobs going begging. Alaska's economy, hard-hit by last year's labor dispute, is regaining its strength like a prizefighter coming back to his feet after a near-knockout blow. It has been a healthy, vigorous season so far—and shows every indication of continuing that way until winter comes again and shuts the jobs down just as tight—in most cases—as any labor dispute can do. As this is being written, the 1960 construction effort is "getting its second wind" so to speak. A giant highway construction program is rolling. The big job at Clear is ahead of schedule and slated for completion next summer. All in all, it has been a bright summer for construction in Alaska.

A TRIP TO CLEAR—Recently, I made a trip to Clear to get a construction story for *Western Construction* and a series of articles for the Daily News-Miner. While the article—which should be in these pages before long—will cover actual construction phases, I thought some general impressions of the big base might be interesting to readers of this column. More than 1,200 construction men are now on the job at Clear, with the payrolls growing daily. Most of the men are working a 54-hour week. (Some of them had dreams of "7-14's"—seven fourteen-hour days, but these were pipedreams.) Most of the men are housed in barracks-type buildings, not unlike military barracks. They eat at a mess hall and they buy their cigarettes, candy, paperback books and magazines at a commissary.

RECREATION — There's recreation of a sort. In the commissary, a large sheet stretched across a wall in front of several rows of folding chairs serves as a "theatre." Some of the men scraped out a baseball diamond with a bulldozer and occasional after-work games are held. A "swimming pool" was excavated and it looked fine until a couple of the boys tried it. The water was ice cold. There is no swimming at Clear. The one thing the men dislike most, of course, is the almost total absence of women. Only about five women are employed on the base; they get a lot of flattering attention from the 1,200 construction men. Looking at it coldly and realistically, apart from a whopping weekly paycheck, life at Clear is mostly work, eat and sleep.

THE BIG EXODUS—Because the Clear base itself offers nowhere the scope of recreational activity that most construction men crave, there's a big exodus to Fairbanks and Anchorage on Saturday, the end of the work week. By midnight on Saturday, the town of Fairbanks is jumping and cash registers are ringing merrily. Although most of the boys work hard for their cash, they spend it on an "easy-come, easy-go" basis. Larry Bernardi, project manager for Baker & Ford at Clear, told me the construction men on the base can hardly wait to get to Fairbanks on weekends. "They swarm out of here like their lives depended on it. Sometimes the place looks like it's deserted on Sundays."

DRINKING PROBLEM — The scrapes some construction men get into when they go to town and the elbow bending they do certainly has an effect on their work. Clear foremen tell me that Monday morning crews are hardly ever up to full efficiency. Some of the men, in fact, don't make it back to the base at all. Others make it all right but are definitely in no shape to deliver a full day's work. However, because of the isolation of Clear, and the lack of any really satisfying recreation, the situation is looked on with considerable understanding by construction supervisors. This is not meant to imply that construction men are a bunch of guzzlers; the really heavy drinkers are in the minority. However, there is drinking, both off and on the base—and it is a problem that must be faced by construction supervisors in remote locations.

BOOZE ON THE BASE — Drinking on the base is no problem, but there have been a few instances of trouble which can be blamed on booze. I was told about two knock-down-and-drag-out barracks battles which were the result of drinking. Most of the men, however, like to drink in the more congenial atmosphere of a bar. Yet, some of them are known to cache away a jug in their footlockers. The plane that brought me to Clear carried a well-wrapped package that sounded, when unloaded, suspiciously like beer. It was consigned to one of the construction workers on the base.

NO MONKEY BUSINESS — One of the things which impressed me most about my tour of the Clear base was the "no monkey-business" attitude in effect there. A number of workers hired early this season figured this remote base would be a good place to loaf at high pay. They had a rude awakening and were left with the choice of either getting down to work or getting out. They discovered Clear is no joyride. Instead, it's a down-to-earth, get-it-done major construction job, vital to the defense of the free world.

Shirkers, prima donnas, bad apples and agitators have been weeded out of the work forces with surprising rapidity. What is left after these categories are eliminated makes for teamwork and job efficiency. One of the passengers on the plane back to Fairbanks from Clear was a welder who kicked up a fuss because his shift was changed and decided that, in retaliation, he'd go on a one-man slowdown. "I lasted only three days," he said. "It's sure no place to fool around, is it?" I said. "No, it isn't," he replied, and was silent the rest of the trip.

GETTING THE JOB DONE — My general impression of the overall project was highly favorable. Contractors were pushing the job

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28 ft. diameter penstocks at Niagara Station near Lewiston, N. Y.

CB&I is constructing 25 penstocks for the gigantic Niagara Power Project of the New York Power Authority. These huge structures will rechannel a portion of the rushing Niagara River into the 25 scroll cases being erected by CB&I. The man-made waterfalls will energize one of the free world's largest hydroelectric plants.

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to completion ahead of schedule in the face of numerous problems. There's a maze of purposeful activity going on at Clear. The thousands of daily operations which are bringing the completion goal closer, step by step, are being carried out with fine coordination and administrative skill. Though more than a thousand men were scattered about on thirty or more different job sites on the base, working at 15 or 20 different skills, there was no impression of confusion or lack of coordination. Each contractor and sub-contractor at Clear has a job to do and knows what it is. And each individual on each crew seems to know what is required of him.

GIANT TAKING SHAPE—Most impressive of all was the nature of the overall project—the huge antennas, massive buildings, tunnel-like walkways and giant warehouses. Passageways which link the various buildings along the perimeter of the radar base are being inclosed. These passages are wide enough and high enough for vehicular traffic. Everywhere one looks—from one corner of the base to another—there is constant activity, the ceaseless roar of heavy equipment and the movement of materials. The tons of electronic equipment to come, conspicuous now by its absence, will give a suitable finishing touch to the big job. The progress that has been made so far on what was a 10-square-mile, bear-infested wilderness only a few months ago is nothing short of amazing. This observer couldn't help feeling a sense of deep pride in the way this big, complex job is being whipped into shape through modern construction know-how and highly skilled construction personnel.

CONSTRUCTION NEWS NUGGETS—The Bureau of Public Roads turned over the bulk of its responsibilities to the State Department of Pubilc Works on July 1, on which date the state assumes the main task of road-building in Alaska. The majority of the 850 persons who were working for the Bureau have since transferred over to the state where they hold down similar positions . . . The big Sitka pulp mill, put up at a cost of about $66 million, is now complete and has been dedicated. Construction on the mill started in the fall of 1957. It is now operating at full capacity and employs some 440

workmen, with another 75 on logging operations . . . A circular shopping center, one of the few of its kind in the United States, is scheduled to open in Fairbanks this fall . . . Right-of-way acquisition difficulties caused some delays on scheduled road construction in the Interior . . . Laurance S. Rockefeller visited several cities in Alaska in June, keeping an eye out for investment opportunities . . . A ferry across the Tanana River at Nenana has been opened and a bridge is planned for 1961 or 1962. Work is being pushed this summer on a highway between Nenana and the Clear construction project. This, ultimately, will be a link in a major Fairbanks-Anchorage route which takes the most direct route between the two cities.

Steam power plant to be doubled in capacity

THE PG&E plans to double the size of its Morro Bay Power Plant. The project will add 325,000 kw. of electric generating capacity to the plant, raising the total to 655,000 kw. and making Morro Bay the second largest steam power station on the PG&E system. Only Pittsburg Power Plant, largest in the West, will have more capacity.

Work on the Morro Bay project, which will cost more than $40,000,000, is scheduled to begin next January, and be completed in the winter of 1962-1963. The building containing the new unit will be added to the south side of the existing plant, approximately doubling the size of the structure. The new unit will require construction of an additional sea water evaporator similar to those installed in the original plant completed in 1955. It will have a capacity of 72,000 gpd., making the big generating unit's steam boilers self-sufficient for fresh water.

Cooling water for the new generating system will be drawn from Morro Bay through an intake structure to be built on the south side of the one built in 1955. Cooling water will be returned to the ocean through a tunnel paralleling the one which serves the present plant's circulation system.

PG&E intends to fuel the new unit with fuel oil and natural gas. The gas will be brought from the Kettleman Hills region through a 67-mi. long $4,000,000 pipeline.

HAWAII Report

By ALAN GOODFADER, Honolulu

AFTERMATH OF THE TIDAL WAVE—The special session of the state legislature to consider tidal wave relief measures, in its final hours as this is written, has passed and sent to Governor William Quinn a bill giving the County of Hawaii a $2.5 million Hilo redevelopment loan as the key measure in plans to rehabilitate that stricken city. The loan would assure the Federal government that the county can meet its share of a $9,500,000 crash federal aid redevelopment program that will set up an urban renewal project covering about 550 ac. of Hilo.

The project will include the area devastated by the tidal wave and an adjoining slum area. It is planned to make the slum section into a resort hotel area, reserving the devastated area as a vast park on the Hilo waterfront. The federal government already has started preparatory work on the project, which will receive federal disaster aid under a little-used section of the urban renewal law.

Besides the loan, the state legislature has made outright grants totaling more than $1,800,000 in various types of aid. Among other things, the grants would provide for business loans, unemployment compensation, emergency housing and improvement of the state's disaster warning system. Construction arising out of rehabilitation activities will include a $300,000 state industrial park, a $500,000 emergency low-cost housing development, a state single-family housing subdivision and, later, a retail shopping center.

SEAWALL, PERHAPS—Also in the aftermath of the tidal wave, authorities are debating the advisability of constructing a seawall across Hilo harbor. It would cost around $7,000,000. Opinion is divided, however, on whether it would do any good in preventing devastation.

UNUSUAL JOB HAZARD—Work on a missile control center in the Mokuleia area of Oahu almost ground to a halt recently when workers uncovered several stone images and sacrificial rocks left by the practicioners of the ancient Hawaiian religion. The workmen balked at going into the sacred area. A Kahuna (Hawaiian priest) was brought in to consecrate the stones with prayers and a luau (native feast) was held at which a pig was sacrificed—just in case. Now, work is progressing again. The stones, many of them carved, are being preserved for the local Bishop Museum and the study of anthropologists.

BOOM STILL BOOMING—The City Building Department of Honolulu sees indications that Honolulu again is heading toward a record construction year. By June 1, the department had issued building permits for work estimated at $74,600,000, or $30,000,000 more than estimates at this time last year. Last year's building permits totaled $129,000,000 for the year. If the current rate of construction continues, the total will hit $180,000,000 this year. The permits don't include military construction on Oahu or any construction on the other islands.

FEDERAL PLANS BIG—Plans announced in Washington indicate a huge amount of federal spending for construction here, as well as substantial boosts in federal aid for local work. The Senate has passed a Hawaii omnibus bill that would set up $12,375,000 for highways under the Interstate Highway System. Hawaii was not included in the system when it was a territory. The Senate Appropriations Committee has approved two large sets of projects. One would appropriate $30,000,000 for construction of an East-West Cultural Center at the University of Hawaii during the next three years. The other includes $2,624,000 for major public works here as part of the public works appropriations bill.

The major projects are $100,000 to plan a seawall at Hilo, $1,216,000 for work on a second entrance channel at Honolulu Harbor, $808,000 for enlargement of the turning basin at Kahului, Maui, Harbor, and $500,000 for flood control in the Kawainui Swamp in rural Oahu. The Department of Health, Education and Welfare has approved almost $3,000,000 for Oahu school construction, embracing four school additions.

The General Services Administration has chosen a downtown Honolulu site for a $23,500,000 new Honolulu Federal Building. The site is at the Army's Ft. Armstrong. If the Army gives up the site, the GSA would replace a present commissary there by building a $900,000 one at Oahu's Ft. Shafter. The federal government says it needs room to enlarge cramped quarters at the present Federal Building. The Senate Agriculture Committee has approved $7,700,000 of watershed projects in Oahu's Waianae districts. The projects would harness water in four streams and several drainage areas. All that's needed now for final authorization of the watershed projects is approval by the House committee. Groundbreaking is expected this fall.

BIDS AND CONTRACTS—Morrison-Knudsen Co., Inc.—apparent low bidder with an offer of $1,414,305 to build the last two of six Nike-Hercules missile sites on Oahu . . . Pacific Construction Co.—apparent low bidder at $692,000 for construction of a new Pearl Harbor Open Officers Mess, to replace a mess gutted by fire more than a year ago . . . Moses Akiona, Ltd.—apparent low bidder at $398,307 to build two weapons firing ranges at Oahu's Schofield Barracks . . . F&M Contractor—awarded a $116,620 contract to build additions at the Lahainaluna, Maui, high school.

NAMES IN THE NEWS—Frank B. Perkins, long-time California building industry executive, has been named manager of commercial developments for Blackfield Enterprises of Honolulu. Blackfield, which has concentrated on housing developments up to now, is moving into construction of hotels, apartments and other commercial buildings. First project is to be a 100-room hotel in Waikiki.

EMPLOYMENT BOOST—The State Employment Service said more than 200 construction jobs were among the record 1,030 filled in April. This compared with a total of 845 jobs filled during the same month a year ago.

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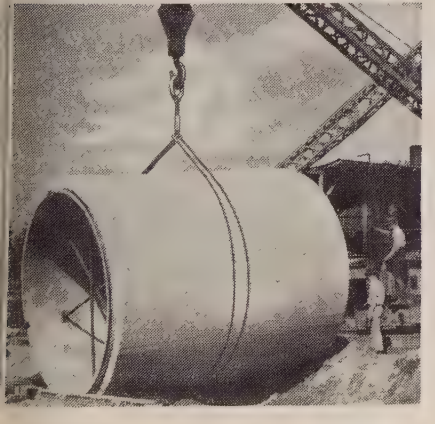

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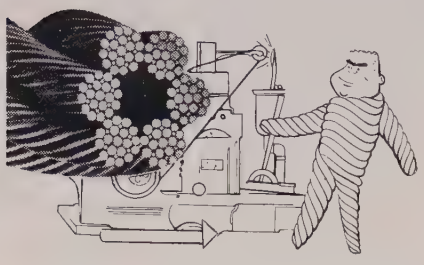

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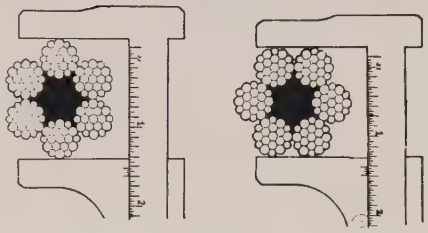

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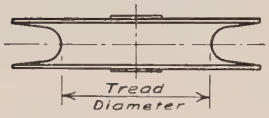

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Low bids and contract awards

ALASKA

Patti-MacDonald, Anchorage, submitted a low bid of $4,522,800 for construction of Providence Hospital project at Anchorage. **S. S. Mullen, Inc.** of Seattle submitted a low bid of $1,038,242 for constructing 2 bridges and grading 3.1 mi. of the Tongass Highway near Ketchikan. **William A. Smith Contracting Co.,** Kansas City, Kans., submitted a low bid of $268,870 for construction of the Kings River bridge on the Glenn Highway. **Green Construction Co.** of Fairbanks submitted a low bid of $318,693 for construction of the Sheep Creek bridge, south-central Alaska. **Alcan Pacific Co.** of Anchorage submitted a low bid of $658,807 for grading, surfacing and construction of a bridge over the Cripple River on the Nome-Teller road. **American Service Inc. and Pacific General Construction Co., Inc.,** Anchorage, received a $278,000 contract to build a defense communications station near Soldotna on Kenai Peninsula. **Alcan Pacific Co.** of Anchorage received a $439,000 contract to construct a communications station at Neklasson Lake, located between Wasilla and Palmer. **Promacs, Inc.** of Seattle, Wash., submitted a low bid of $373,761 to excavate for a small-boat harbor at Dillingham.

ARIZONA

Givens Construction Co., Phoenix, submitted a low bid of $787,050 for earthwork, lining and structures, Wellton-Mohawk main channel and Snyder Ranch channel, Gila project; **Givens** also submitted a low bid of $348,759 for grading, surfacing and construction of 2 bridges on the Gila Bend-Casa Grande highway in Maricopa County. **San Xavier Rock & Sand Co.,** Tucson, submitted a low bid of $307,645 for grading and surfacing on 5 mi. of State Route 84 near Coolidge in Pinal County. **Kenneth A. Ethridge Contracting Co.,** Tucson, submitted a low bid of $276,078 for grading, surfacing and 1 bridge on the Oracle Junction-Globe highway in Pinal County. A low bid of $234,447 was submitted by **Haumont Contracting Co.,** Phoenix, for 7.9 mi. of grading and surfacing on the Pine-Winslow route in the Coconino National Forest, Coconino County.

CALIFORNIA

Winston Bros. Co., Johnson, Drake & Piper, Inc. and Green Construction Co., Minneapolis, Minn., in a joint venture, submitted a low bid of $11,617,104 for Spring Creek power conduit, Tunnels No. 1 and 2 and Rock Creek siphon, Central Valley Project, Trinity River Division. **L. C. Smith Co. and Concar Ranch & Enterprises, Inc.** of San Mateo received a $4,133,017 contract for grading, paving, traffic separations and interchange structures, Mountain View-Alviso road in Santa Clara County. A $3,493,413 contract was received by **Daley Corporation and R. M. Price Construction Co.,** San Diego, for constructing a 4-level interchange, 8 traffic separation and ramp structures, 1 bridge, grading and paving, in city and county of San Diego. **Fredrickson & Watson** of Oakland received a $2,605,000 contract for construction of roads and utilities at the Navy Missile Center, Point Mugu; also a $1,672,268 contract for grading and paving to construct 4.5 mi. of 4-lane freeway on U. S. 101, near Greenfield, including traffic separation bridges and related work, Monterey County. **Maino Construction Co., Inc.,** San Luis Obispo, received a $1,639,891 contract for construction of frequency control facilities and meteorology building at the Naval Missile Center, Point Mugu. **Allen M. Campbell Co., Inc.** of Santa Ana received a $1,612,000 contract for construction of 3-story administration and classroom building on campus of Polytechnic College, Pomona. **Dan Caputo Co. and M. J. B. Construction Co., Inc.** of Stockton received a $1,533,700 contract for grading, surfacing and separation structure on 1.6 mi. on U. S. 99, east of Stockton, San Joaquin County. **Robert E. McKee, General Contractor, Inc.,** Los Angeles, submitted a low bid of $1,430,700 for general work at the Youth Training School, San Bernardino County. A $1,189,788 contract was received by **Edward Keeble Construction Co.,** San Jose, for grading, surfacing and 3 bridges on 3 mi. of 4-lane freeway north of Granite Creek road in Santa Cruz County. **John C. Gist** of Sacramento received a $773,035 contract for widening the Sacramento River Bridge and grading and surfacing approaches, on U.S. 99 in Redding, Shasta County. **Milburn & Sansone Construction Co.,** Riverside, received a $734,043 contract for grading, surfacing and constructing 2 bridges on 1.9 mi. of the Riverside Freeway in and north of city and county of Riverside. A $384,900 contract was received by **Stanton Biggs** of Fresno for fills and retaining walls at 14 shoreline locations on State Route 1, north of Big Sur in Monterey County. **Stolte, Inc.** of Oakland received a $383,328 contract for grading, surfacing and constructing 1 bridge over the Tuolumne River in Stanislaus County. A low bid of $369,100 was submitted by **E. C. Young,** San Diego, for grading, surfacing and related work at Colorado River Bridge, east of Blythe, Riverside, County. **Griffith Co.,** Los Angeles, submitted a low bid of $282,696 for 2 mi. of grading and surfacing on Sepulveda Boulevard in Los Angeles County. A $271,714 contract was received by **Mercer, Fraser Co.,** Eureka, for grading and surfacing sections on U. S. 101, Mendocino and Lake counties. **Gallagher & Burk, Inc.** of Oakland received a $249,147 contract for a 164-ft. traffic separation bridge over the Nimitz Freeway in and near San Leandro, Alameda County. **Brighton Sand & Gravel Co.,** Sacramento, received a $217,003 contract for channelization, traffic signal and related work at eight intersections on U.S. 50 east of Sacramento in Sacramento County.

COLORADO

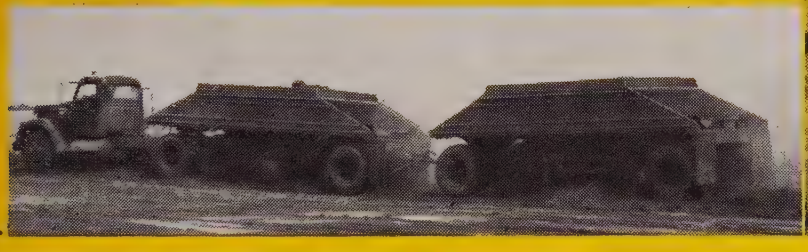
Western Paving Construction Co., Denver, received a $940,468 contract for grading, concrete pavement and construction of twin interchanges on U.S. 6, city and county of Denver. **Broderick & Gibbons, Inc.,** Pueblo, received a $617,949 contract for grading, surfacing and structures on 1.4 mi. on U.S. 85-87 in city and county of Pueblo. **Peter Kiewit Sons' Co.,** Denver, received two contracts for roadwork in Boulder and Weld counties: $274,894 for grading, structures and surfacing on 3.3 mi. between Lyons and Hygiene Jct. in Boulder County; and $165,803 for construction of a road to a missile launching base in Weld County. **H. E. Lowdermilk Co.,** Englewood, received a $571,471 contract for grading, structures and surfacing on 4 mi. between Climax and Leadville on State Highway 91 in Lake County. **C. L. Hubner Co.**

C-B MONEY MAKERS ON THE MOVE!

1.	C-B HEAVY DUTY SEMI BOTTOM DUMP TRAILER	Up to 45 TON Capacity	25 TON Legal
2.	C-B HEAVY DUTY BOTTOM DUMP TRAIN	Up to 30 TON Capacity	28 TON Legal

Fast, More Profitable C-B Bottom Dump Equipment

1.



2.

3.

Here's the equipment that takes load after load of the heavy stuff and hauls it with ease on or off the highway at speeds that will amaze you. Money making speed haulers for big aggregate and earth moving jobs.

Speed loading—Semis or Trains take a full flow of material in minimum time from overhead storage facilities, stationary or moving belt type loaders (1), clamshell, dragline or shovel (3).

Full opening, unrestricted bottom dump gates, air actuated and driver controlled from the cab, unload "on-the-move" in just a matter of seconds. The train in illustration No. 2, is shown unloading on the move for windrow operation. Gates are air actuated and driver controlled from cab.

Whether your operation calls for large earth moving equipment, or fast, over-the-highway rigs, you will find the equipment that best fits your requirements, from the complete C-B line. Call or write for full details.

C CB

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SUCCESSOR TO: CHALLENGE MANUFACTURING CO., AND COOK BROS. EQUIPMENT CO.

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of Denver submitted a low bid of $407,746 for grading, surfacing and structures on 15.8 mi. between Muddy Pass and Kremmling in Jackson and Grand counties. A low bid of $349,573 was submitted by **Colorado Constructors, Inc.,** Denver, for 2.7 mi. of grading, structures and surfacing between Gunnison and Parlin in Gunnison County. **Domenic Leone Construction Co.,** Trinidad, submitted a low bid of $164,291 for grading, surfacing and stabilizing east and west of Timpas in Othero County.

IDAHO

Hoops Construtcion Co., Twin Falls, submitted a low bid of $1,126,574 on Alternate No. 1 for highway construction in Payette, Canyon and Cassia counties. **Earl L. McNutt,** Eugene, Ore., submitted a low bid of $604,723 for roadway, drainage structures, channel changes and related work in Idaho County. **Carl E. Nelson,** Logan, Utah, submitted a low bid of $203,875 for grading, surfacing and structures in Fremont County. A low bid of $105,998 was submitted by **Twin Falls Construction Co.,** Twin Falls, for 4 mi. of grading and surfacing on the Cemetery North Road extension, Minidoka County.

MONTANA

Holland Construction Co., Bozeman, received a $1,565,955 contract for grading, surfacing and structures on 9.7 mi. of the Deer Lodge-North and South section of the Granite and Powell Interstate Road and Bearmouth-Deer Lodge Road in Powell County. **W. R. Cahoon Construction Co.,** Pocatello, Idaho, received a $808,983 contract for construction of dual bridges on the Yellowstone River Bridge-Billings section in Yellowstone County. **Montana Engineering & Construction Co.,** Helena, received a $351,363 contract for construction of 6 prestressed concrete bridges and 2 reinforced concrete bridges on the Deer Lodge-North and South section of the Granite and Powell County Interstate Road in Powell County. A $307,075 contract was received by **Husman Bros., Inc.** of Sheridan, Wyo., for grading and surfacing on 15.3 mi. of the Hammond-Rideway road in Carter County. **Myrl Clark** of Yankton, S. Dak., received a $265,926 contract for 11 mi. of grading and surfacing on the Broadus-Wyoming Line road in Carter County. **R. J. Sundling,** Livingston, received a $208,941 contract for 8.2 mi. of grading, surfacing and related work on the Billings-South road in Yellowstone County. The **O'Neil Construction Co.** of Havre, received a $193,891 contract for 4.3 mi. of grading, surfacing and draining on the Box Elder-West road in Hill County. **Interstate Contractors,** Great Falls, received a $538,522 contract for construction of Gore Field runway extension at Great Falls.

NEVADA

Isbell Construction Co. of Reno received a $469,953 contract for grading, surfacing and structures on U. S. Highways 50 and 395, in Douglas and Ormsby counties.

NEW MEXICO

Mulvaney Construction Co. of Albuquerque submitted a low bid of $137,035 for earthwork, clearing and structures for irrigation rehabilitation of Albuquerque Unit 4, Middle Rio Grande Project. A joint venture by **Macco Corp., Raymond International, Inc., The Kaiser Co. and Puget Sound Bridge & Drydock Co.** submitted a low bid of $22,115,829 for construction of 12 Atlas missile base sites at Walker Air Force Base at Roswell.

OREGON

Goulter Construction Co., Seattle, Wash., received a $689,272 contract for construction of the Modoc Creek section of the Eastside Road at Hills Creek Reservoir on the Middle Fork Willamette River. **Chadwick & Buchanan** of Long Beach, Calif., submitted a low bid of $1,445,980 for dredging the downstream approach to the Bonneville Dam navigation lock in the Columbia River. **Miller & Hutchins Contractors, Inc.,** Roseburg, received a $191,800 contract for construction of upstream slope reinforcement for Hills Creek Dam on the Middle Fork Willamette River. **Peter Kiewit Sons' Co.,** Omaha, Nebr., received a $2,388,635 contract for grading, surfacing and 4 structures on Grants Pass-Evans Creek section of the Pacific Highway in Josephine and Jackson counties. **Gibbons & Reed Co.,** Portland, received a $1,758,023 contract for grading, 3 bridges and power line relocation of the Dodson-Bonneville section of the Columbia River Highway in Multnomah County. **C. R. O'Neil** of Creswell received a $578,447 contract for 5.4 mi. of grading and one structure on the Lake of the Woods Highway in Jackson County. **Durbin Bros.,** Eugene, received a $442,463 contract for construction of the Cummings Pass-Fossil section of the John Day Highway north of Fossil in Wheeler County. A $253,510 contract was received by **John L. Jersey, Inc.,** Portland, for grading, surfacing streets in Portland, Multnomah County. **Hannan Bros. Co.** of Portland submitted a low bid of $295,364 for constructing a pumping station and canal in Multnomah County Drainage District. **John M. Keltch** of Pasco, Wash., submitted a low bid of $151,285 for earthwork and structures for Unit 2, Tule Lake Division, Klamath Project, Ore. and Calif.

UTAH

Strong Co. of Springville received a $773,747 contract for grading and surfacing on 4.8 mi., from Alton Junction southwesterly toward Glendale in Kane County. **L. C. Stevenson** and **Grant Hansen,** Altamont, submitted a low bid of $497,302 for work at Fort Thornburgh Diversion Dam and Rock Point Canal, Vernal Unit, Central Utah Proect. A $345,573 contract was received by **Cox Brothers Distributors,** Manti, for 6.3 mi. of grading and surfacing on U.S. 40, from Heber toward Duchesne in Wasatch County. **J. M. Sumsion & Sons** of Springville submitted a low bid of $148,906 for 12.6 mi. of surfacing between Thompson and Cisco in Grand County. **W. W. & W. B. Gardner, Inc.,** Salt Lake City, submitted a low bid of $96,310 for 2 mi. of grading and surfacing streets in city of Salt Lake. **Theo Wood Construction Co.,** Salt Lake City, submitted a low bid of $459,909 for earthwork, pipelines and structures, North Davis Laterals, Unit 1, Weber Basin Proect. **Skyline Construction Co.** of Salt Lake City, submitted a low bid of $1,077,000 for construction of Junior High School in Kaysville.

WASHINGTON

Scarsella Bros., Inc., Seattle, received a $469,243 contract to grade, drain and construct concrete slab bridge on 4.1 mi. of State Highway 2 in King County. **N. A. Degerstrom, Inc.,** Spokane, received a $309,506 contract for grading and surfacing on 3.9 mi. between Dodge and Central Ferry in Garfield County. A $247,065 contract was received by **Fiorito Bros.** of Seattle for reconstructing 1 mi. of highway and a concrete girder bridge

on State Highway 1-A in the town of Arlington in Snohomish County. **Northwest Construction Co.,** Seattle, received a $2,110,909 contract to grade and pave streets in city of Seattle. **Johnson, Bushboom and Rauh** of Spokane received a $1,819,515 contract for general construction of women's residence halls, Washington State University. **Woodworth Co.,** Tacoma, received a $964,199 contract for construction of Yakima Avenue Bridge at Tacoma. **Patti-Macdonald** of Seattle submitted a low bid of $1,482,000 for construction of Sedro Woolley medical building.

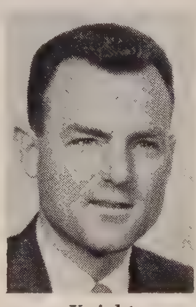
WYOMING

Charles M. Smith, Thermopolis, received a $397,000 contract for construction of a bridge and approaches on the Grand Loop Route in the Yellowstone National Park. **Read Construction Co.,** Cheyenne, received a $286,444 contract for grading, surfacing and miscellaneous work on Paradise Valley road in Fremont County. **A. H. Read Co.,** Cheyenne, received a $139,005 contract for grading, surfacing and related work on access road, south of Chugwater in Platte County. **Roth Construction Co.** of Rapid City, S. Dak., received a $391,231 contract for 4.4 mi. of grading, surfacing and related work on Buffalo-Gillette road in Johnson County. A $354,195 contract was received by **Husman Bros., Inc.,** Sheridan, for grading and surfacing on the Buffalo-Gillette road southeast of Buffalo in Johnson County. **Eagle Construction Co.,** Loveland, Colo., received a $550,902 contract for grading, surfacing, structures and related work on the Yellowstone Park-Cody road west of Cody in Park County. **Woodward Construction Co.,** Rock Springs, received a $308,589 contract for grading and surfacing on 2.5 mi. of highway south of Glendo in Platte County. **Knisely-Moore Co.,** Douglas, received a $207,527 contract for constructing twin structures, over South Bear Creek, one bridge and grading and surfacing, between Glendo and Wheatland in Platte County. A $194,716 contract was received by **Lawrence Steele & Son,** Rapid City, S. Dak., for grading, surfacing and structures on 4-lane divided highway between Buffalo and Gillette in Johnson County. **Rasmussen Bros.** of Sheridan received a $94,722 contract for reshaping, surfacing and related work on the Recluse-Bay Horse road in Campbell County.

ENGINEERS and CONTRACTORS

Portland Cement Association has opened a newly-created New Mexico district office in Albuquerque and appointed **Bernard "Barney" C. Smith** district engineer. The new office will be part of the Rocky Mountain Region and will have headquarters at 120 Madeira Dr., NE. A registered professional engineer in New Mexico and a member of the American Society of Civil Engineers, Smith has been with PCA as a general field engineer for New Mexico since 1953.

Lochow



Knight

Further changes in its field personnel are also announced. **Robert H. Lochow** has been named to succeed **Albert L. Blackwell** as district engineer for New Jersey, with headquarters at Trenton. With PCA since 1949, Lochow first served as general field engineer and then as paving engineer for the Seattle, Wash., district.

Charles H. Knight, Jr., takes over Lochow's former post as district engineer for the states of Washington, Oregon, and northern Idaho, with offices in Seattle. He has been with the Association for four years, serving as general field engineer, and as district conservation engineer for the Los Angeles area. Prior to joining PCA Knight was with the California Division of Highways, the C. F. Braun Co., and Nigg Engineering Corp.

* * *

Col. Edwin J. Withers, assistant division engineer of the Corps of Engineers at San Francisco, has been assigned as assistant chief of staff with the U. S. Army in Japan.

Otto K. Mangum has been named project manager of the Bureau of Reclamation's Parker-Davis Project, headquartered in Phoenix, Ariz. Mangum succeeds **Erick A. Benson** who has transferred to the Columbia Basin Project in Washington as power supervisor of Grand Coulee Dam. Mangum held the position of chief of the transmission division at Parker-Davis at the time of his promotion.

* * *

William M. Jaekle has been appointed general manager for Southern Pacific Co.'s Pacific Lines, with headquarters in San Francisco, succeeding **William D. Lamprecht,** who was named vice president of system operations. A member of the American Society of Civil Engineers, the San Francisco Engineers Club and other professional orgnaizations, Jaekle has been with the S.P. since 1934.

* * *

Announced from Boise, Idaho, is the retirement of **H. W. Morrison** as president of Morrison-Knudsen Co., Inc. He will, however, continue as chairman of the board of the world-wide construction organization. Succeeding him as president of the company is **J. B. Bonny,** who has been vice president and general manager of M-K since 1947.

Other executives receiving new titles are: **James N. Wells,** vice president in charge of the Los Angeles district, who has been named executive vice president in charge of operations; **James D. McClary,** vice president and assistant general manager, now becomes executive vice president, administration; **Carroll F. Zapp,** vice president and secretary, now vice president and general counsel; **Thomas L. Smith,** company attorney, elected corporate secretary.

* * *

Named as district engineer at Sacramento, Calif., is **Col. Herbert N. Turner.** He comes from Portland, Ore., where he was deputy division engineer of the Army Engineers' North Pacific Division. Turner succeeds **Col. Howard A. Morris,** who received another assignment.

ALASKA'S new district engineer, *Col. Christian Hanburger*. He succeeded *Col. W. C. Gribble, Jr.*, who held the post for the past two years. Colonel Hanburger has been an officer with the Army Corps of Engineers for 23 years, serving in many parts of the world.

CALENDAR

Sept. 27-30 — Prestressed Concrete Institute, annual convention, Statler-Hilton Hotel, New York City.

Oct. 10-13—American Mining Congress Mining Show, Convention Center, Las Vegas, Nev.

Oct. 10-14 — American Society of Civil Engineers, annual convention, Hotel Statler, Boston, Mass.

Oct. 14-16 — California Association of Engineering Geologists, annual meeting, University of California, Berkeley.

Oct. 31-Nov. 2—American Concrete Institute, regional meeting, Pioneer Hotel, Tucson, Ariz.

Nov. 28 - Dec. 2 — American Association of State Highway Officials, annual convention, Detroit, Mich.

1961

Mar. 5-8—American Road Builders Association, annual convention, Chalfonte-Haddon Hall, Atlantic City, N. J.

The new No. 12 Series E Motor Grader spreads untreated base and handles cleanup for Massey Sand and Rock Company

THE NEW NO. 12E SETS THE STANDARDS

Widening U. S. 60-77-99 to a 4-lane limited-access highway, Massey Sand and Rock Company of Indio, California, recently added a new No. 12E Motor Grader to its Cat fleet. The improvements, effective with this new series machine, showed up immediately. As Tom W. Carter, manager of the firm, puts it: "The increased productivity of the new No. 12 was very noticeable. You can depend on new Cat products to give greater operator comfort and better productivity."

One of the big reasons for the new performance standards of the No. 12 is the new compact 115 HP engine. Incorporating the latest developments in metallurgy and design, this modern engine has greater lugging ability for the tough jobs, long life and easier servicing.

Caterpillar engineers did not stop with just a compact diesel. There's a new vertical starting engine to give easier, all-weather starting. The dry-type air cleaner is now standard—it removes 99.8 per cent of air-borne dirt every service hour, cuts maintenance.

Of course, the new No. 12 retains the dependable Caterpillar oil clutch that gives up to 2000 hours without adjustment; mechanical controls that engage easily; and plenty of throat clearance between moldboard and circle for improved rolling action.

See your Caterpillar Dealer. He'll show you—on your job—that the No. 12E lives up to what users are saying about it. He can also show you the 150 HP No. 14, the No. 112F with 100 HP and the No. 112E with 85 HP—they're built to be the best for the job.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

CATERPILLAR

THE NEW NO. 12 MOTOR GRADER BUILT FOR THE TOUGH JOBS

SUPERVISING the jobs

N. Paduano, earthwork superintendent, **D. W. Moen,** structural superintendent, **Harold Johnson,** carpenter foreman, and **Gene Stainer,** ironworker foreman, comprise the key supervisors for the joint contracting firms of Baugh Company and N. Paduano Bulldozing on a $233,128 project. Job covers clearing, grading and draining 1.3 mi. of highway and one reinforced concrete bridge on State Highway 2 and 15 in King County, Wash. Under construction since May, contractor expects to finish in October.

* * *

Jake Compton of J. C. Compton Co., is in over-all charge of a recent award to his company in the amount of $363,070 for a highway job in Curry County, Ore. Superintending this job for the contractor is **Robert Williams.** Started last May, the work involves crushing and placing base rock, binder asphalt, crush and stockpile plant-mix aggregate, and oil on the Thomas Creek-Brookings unit of the Oregon Coast Highway. Work will be finished in October.

* * *

M. S. Dunsmore, grading superintendent, **Leon Henry,** engineer, **H. M. Kaiser,** gravel superintendent, and **Jess Dockery,** hot plant superintendent, comprise Smith Construction Co.'s key personnel on a $667,471 contract covering grading, surfacing, four culverts and related work on 6.7 mi. of U. S. 14 in Crook County, Wyo. About 300,000 cu. yd. of grading and concrete pipe, 90,000 tons sub-base, 47,000 tons soil cement and 13,500 tons plant-mix and seal are involved in the construction, under way since April, scheduled for completion in mid-September.

* * *

Earl Barnard is project superintendent on a $729,638 contract being executed by John Delphia and Fred J. Early, Jr. Co., Inc. on Route 120 east of Stanislaus County line in Tuolumne County, Calif. Project engineer for this 4.3 mi. reconstruction and realignment, which includes rock and dirt excavation, cement-treated base and asphaltic concrete pavement, is **Bill Stewart.** Resident engineer for the California Division of Highways is **Mel Rowan.** Under way since April, this work will finish in October, according to **R. H. Heitman,** project manager for the contractor.

* * *

R. A. Jenkins is supervising a $167,164 recent reward to Warren Northwest, Inc. covering paving maintenance on the Hampton-Sage-Hen Hill section, Central Oregon Highway. Jenkins is aided by the following foremen: **E. L. Bush,** crusher, **George James,** street, and **Harold Layton,** plant. The same men are in charge of a $228,043 contract for similar work in the same general area.

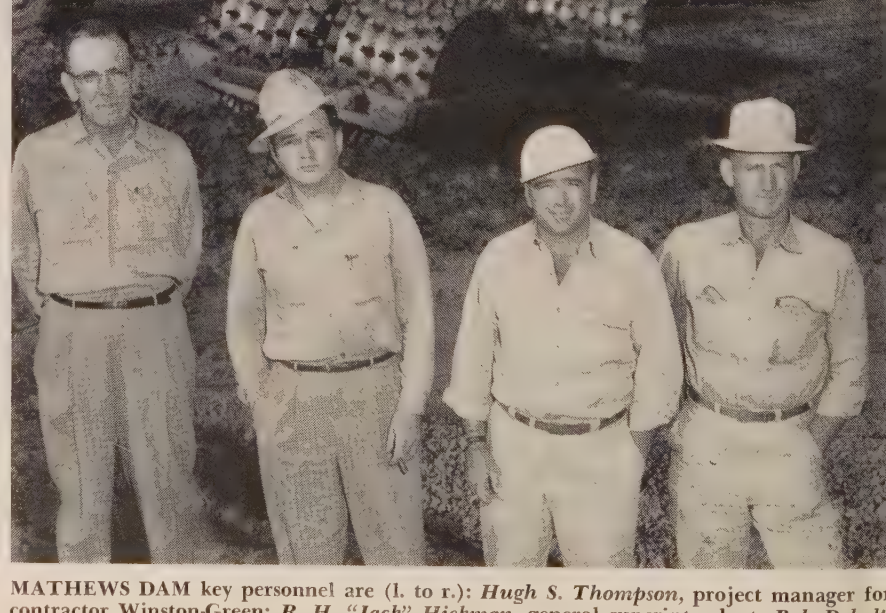
Paul Lutes, Bob Lakey, and **Lyle Hartwig,** project manager, project engineer, and superintendent respectively, head the construction crew working for Williams & Burrows on construction of Newell Dam, an earth-fill, with related concrete structures at Santa Cruz, Calif. The $1,576,776 contract got under way in March and will be finished in November this year.

* * *

W. P. Maddox, superintendent, **Don Keith,** project engineer, and **Arley Suggitt,** general foreman, comprise the key personnel employed by Technical Constructors, Inc., which with a bid of $963,088 received contract for construction of a 73 x 93-ft. reactor building 45 ft. high, of structural steel frame and steel roof deck construction, at the National Reactor Testing Station in Idaho. Project is expected to be finished by mid 1961.

* * *

John Tiger is supervising construction of 1.1 mi. of 8-lane freeway viaduct including ramps, grading and allied work in city and county of Los Angeles, Calif. Known as the Santa Monica Viaduct, the contract went to the Griffith Company on a bid of $8,737,889. Job engineer is **Mike Sheffield. Hal McGregor** is bridge superintendent. Acting as foremen are **Mel Cruze** and **H. Funk,** while



MATHEWS DAM key personnel are (l. to r.): ***Hugh S. Thompson,*** project manager for contractor Winston-Green; ***R. H. "Jack" Hickman,*** general superintendent; ***Bob Debolt*** excavating and grading superintendent; and ***Howard Ballentine,*** equipment superintendent. Debolt has recently been transferred to another project, replaced by ***B. H. Ferguson.*** Article reviewing this project starts on page 32.

Model 202 KOLMAN shown here making sand for ice control on New England roads — one of numerous jobs it handles easily and profitably.

"FAR EXCEEDS OUR EXPECTATIONS"

"A Lot More Machine Than We Expected"

These comments are typical of reactions from new owners of Model 202 KOLMAN Portable Conveyor-Screen Plants. The modest price of a KOLMAN 202 belies its quality features and rugged design. You have to see it to believe it! But many satisfied users in all phases of construction work now give testimony to these facts — they'll tell you it's a real pleasure and quite a surprise in these times to get "more than we expected" for their equipment dollar.

Why does the 202 KOLMAN Plant offer so much for so little? First, because of its sound, **practical design.** There's no waste on "trimmings"; yet every desirable feature is there, from the durable box type frame with full belt protection to the convenient, accessible, underslung motor. Next, this plant is extremely **versatile** — there is a wide choice of vibrating screen sizes and models, both single and multiple deck. Feed accessories are available for either "push feeding" or "top feeding". And it's all **fully portable** without disassembly, except for multi-deck screens, which should be removed for transporting.

Topping all these features is the truly amazing performance of the KOLMAN Vibrating Screen — heart of the whole plant. You'll get maximum production from it in all types of work, and your plant will be properly balanced because the KOLMAN Conveyor and KOLMAN Vibrating Screen are designed to work together.

SEE YOUR NEAREST KOLMAN DEALER

ARIZONA
PHOENIX—Arizona Cedar Rapids Co.

CALIFORNIA
LOS ANGELES, BAKERSFIELD, SAN DIEGO, RIVERSIDE, SANTA BARBARA — Brown-Bevis Industrial Equip. Co.
OAKLAND—Spears-Wells Machinery Co.

COLORADO
DENVER—Faris-Moritz Equipment Co.

IDAHO
BOISE, POCATELLO — Intermountain Equip. Co.

MONTANA
BILLINGS, GREAT FALLS, MISSOULA — Miller Machinery Co.

NEVADA
LAS VEGAS — Clark County Wholesale Mercantile Co.
RENO—Reno Equipment Sales Co.

OREGON
PORTLAND—Balzer Machinery Co.

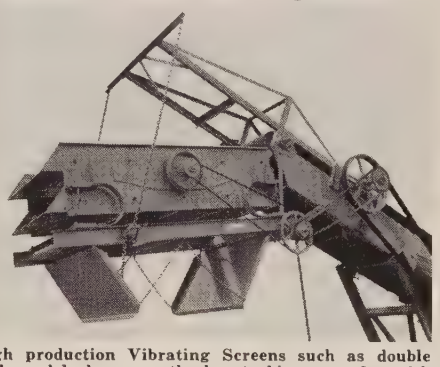
UTAH
SALT LAKE — Rasmussen Equipment & Supply Co.

WASHINGTON
SEATTLE—Sahlberg Equip., Inc.
SPOKANE—Intermountain Equip. Co.

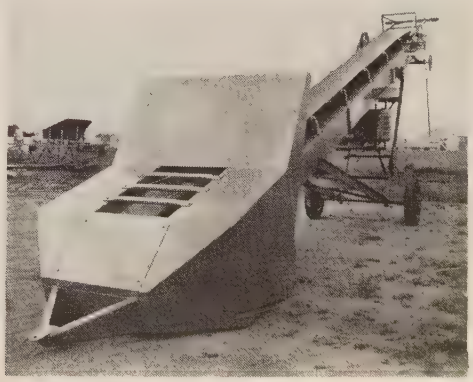
WYOMING
CHEYENNE, CASPER, ROCK SPRINGS and SHERIDAN—Wortham Machinery Co.

KOLMAN MANUFACTURING COMPANY
5670 West Twelfth St., Sioux Falls, S.D.

This complete Model 202 includes single deck screen, power unit, head pulley clutch and Feeder-Hopper for "top feeding" with shovel, dragline or loader.



High production Vibrating Screens such as double deck model above are the key to bigger profits with KOLMAN 202 Plants.



The Gravity Feed Dozer Trap; illustrated above, and Feeder-Trap Combination with built-in plate feeder are primarily for high speed "push feeding" with bulldozers.

. . . for more details, write No. 40 on Reader Service Postcard

Dan Wright is master mechanic. Work started in April, and according to **J. F. Porcher,** project manager, it should be finished about November 1961.

* * *

Homer Holmes and **Joe Henslee,** job superintendent and engineer respectively, head the list of personnel constructing 4.3 mi. of 6- and 8-lane freeway on U.S. 40 and 1 mi. of 4-lane divided highway on Route 21, near Cordelia, Solano County, Calif. Contract includes 4 bridge widenings and 7 new bridges, and was awarded to Gordon H. Ball & Gordon H. Ball, Inc., on a low bid of $3,812,194. Other key personnel are **Al Lee,** structures superintendent; **Tony Kruse,** structures engineer; **Bill Thompson,** grading foreman, **George Bulaich,** labor foreman, and **Paul Stewart,** master mechanic. Slated for completion in November 1961, job has been under way since May.

* * *

R. M. Rigney as superintendent is in charge of construction now under way at the Naval Air Station, Miramar, Calif., consisting of grading, paving and related work. Service Construction Co. was successful bidder at $376,900. Excavating superintendent is **Rollie Peterson;** concrete superintendent, **Gregory Martinez.** Work started in June; will be finished in January.

* * *

Carl Elander is project manager for M-B Contracting Co., Inc., which successfully bid the rearward communications and support facilities to be constructed for the Alaska Air Command at Clear, Alaska. Project engineer for the $2,859,151 undertaking is **James Sroufe. R. D. Bergt** has charge of the office. Carpenter superintendent is **H. G. LaRue;** dirt superintendent, **E. C. Criner;** steel foreman, **Jack McLain.**

* * *

John E. Farrington, superintendent for Weitz Company, Inc., is in charge of a $2,580,333 award to this company for construction of a bulk grain terminal at Long Beach, Calif. The job started in May and will probably run until March 1961.

Henry List, superintendent, assisted by **"Slim" Alt,** heads the list of job personnel working on the South Sacramento Freeway contract in the amount of $4,409,406 being executed by Gordon H. Ball & Gordon H. Ball, Inc. The following are other important people working on the project which involves 7.7 mi. of highway together with frontage roads, ramps and 3 bridges and 3 pumping plants in the city and county of Sacramento, Calif.; **Jack McConnell,** job engineer; **Ernie Flint,** master mechanic; **Ed Gard,** parts man, and **Frances Drake,** secretary. Scheduled for completion in October 1961, work has been going since June.

* * *

J. V. Beach, superintendent, with the aid of **J. J. Montrose** and **Joe Solaegui,** foremen, is in charge of constructing a portion of highway on Route 80 west of Golconda in Humboldt County, Nev. This work is being done by Silver State Construction Co. at a contract price of $3,694,174. With June 1961 the target, work started this past June.

* * *

Tor Lyshaug, project superintendent, **Cliff Emmons,** assistant superintendent, and **Harley Smith,** engineer, are Donald M. Drake Co.'s chief supervisors in the placing of 235,000 tons of riprap for repair to the south jetty at the mouth of the Columbia River in Oregon. Drake was awarded the contract at $1,327,750, commenced work in June, and expects to be finished next March.

* * *

Floyd Hardenbrook, project manager, **Ed Furstenwerth,** general superintendent, **Tryg Martinsen,** steel superintendent, and **Al Farrar,** office manager, are chief personnel of B-E-C-K Construction Co. and McLaughlin, successful bidder for construction of communication facility, rehabilitation of water and sewer systems and other work at the Shemya Air Force Station in Alaska. Bid price was $1,726,444. Scheduled for completion next March, the job started in July.

* * *

Roy R. Johnson is project manager on a recent $445,806 award to Cherf Bros. Inc. & Sandkay Contractors, Inc., covering construction of diversion dams on Leon and

Park creeks, feeder canal and monolithic concrete siphon, part of the Collbran Project, Colo. Project supervisor is **D. J. Thompson**; superintendent, **George Friesen**; concrete superintendent, **D. J. Griggs.** Job has been going since May and will end this December.

* * *

Lloyd Loetterle is project manager on a $2,627,711 recent award to Peter Kiewit Sons' Co. to construct eight 2-story concrete barracks buildings including utilities at Camp Del Mar, Marine Corps Base, Camp Pendleton, Calif. Job superintendent is **John Gully**, while **Les Dutcher** is in charge of the office. Under construction since May, the new facilities will be ready about September next year.

* * *

J. C. Hubbard, general superintendent, and **Clayton E. Peterson**, job superintendent, are Etlin Peterson Construction Co.'s head men on a $660,433 contract to construct a bridge over the Powder River and miscellaneous work on 4-lane divided highway between Buffalo and Gillette in Wyoming. A year-long project, work started in May, with **Robert J. Laycock** as job foreman.

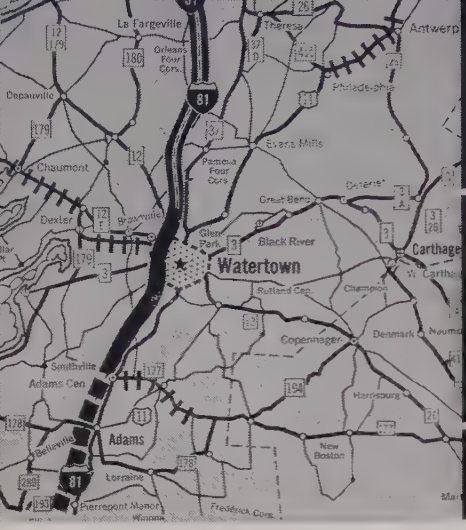
Hubbard and Peterson are the head men on another recent award to this contractor: a twin separation structure also in Johnson County, costing $139,230. **J. R. Ellis** is job foreman on this work which will finish in September.

* * *

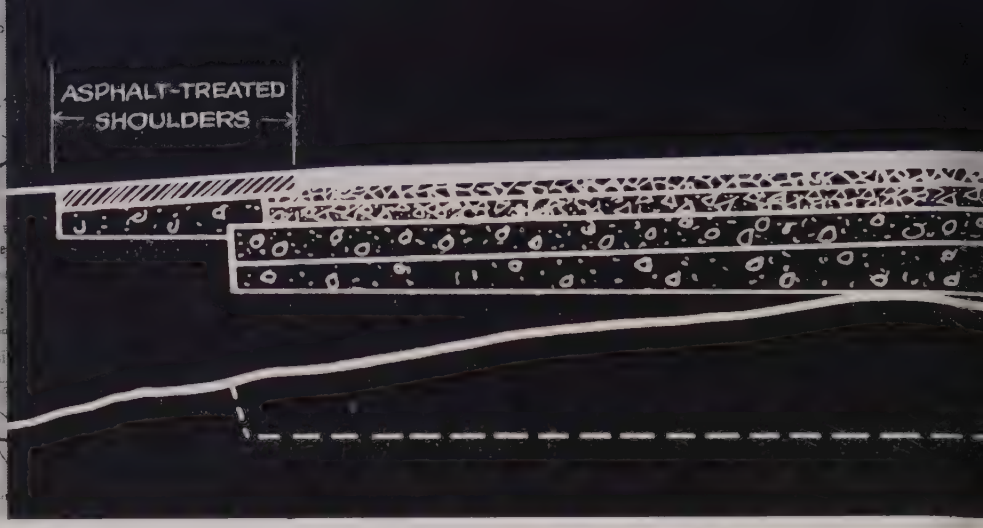
Roy F. Johnson, project manager, **J. D. Thompson**, project supervisor, and **Tom Sundford**, superintendent, are key men on a grading and surfacing job recently awarded to Cherf Bros. Inc. and Sandkay Construction Co. Located in Grant County, Wash., the $141,536 job covers 1.4 mi. of new road on which work started in May, scheduled for completion in September.

* * *

Ed Matz, general manager, **Jack Downey**, general superintendent, and **Vic Steinhert**, equipment superintendent, are key men for L. M. White Contracting Co., recent awardee of a $153,756 contract for 1.5 mi. of grading, surfacing and sidewalks in city of Casa Grande, Ariz. Job started in May; will end in September.



Map shows location of Interstate #81 in Watertown area.



Cross-section diagram shows composition of single 24-foot roadway on four-lan Interstate & Defense Highway #81. Note Asphalt-treated shoulders.

Look what they're doing with DEEP STRENGTH Asphalt Pavement in Upstate New Yor

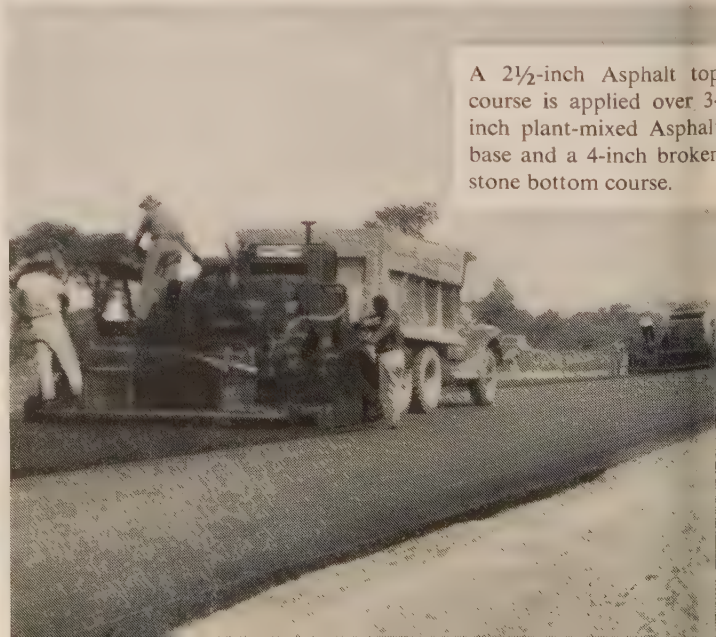
Advanced Asphalt Pavement design, ove prepared subbase, solves problems in area where frost depth goes to 48 inches

Boulder-strewn glacial till near Watertown presented New York State Highway Department engineers with unusual problems. Here, winter temperatures often reach 20° to 25° *below* zero. The frost depth extends to 48 inches. In cuts, severe frost action sometimes forces boulders *through* the pavement with subsequent break-up and failure.

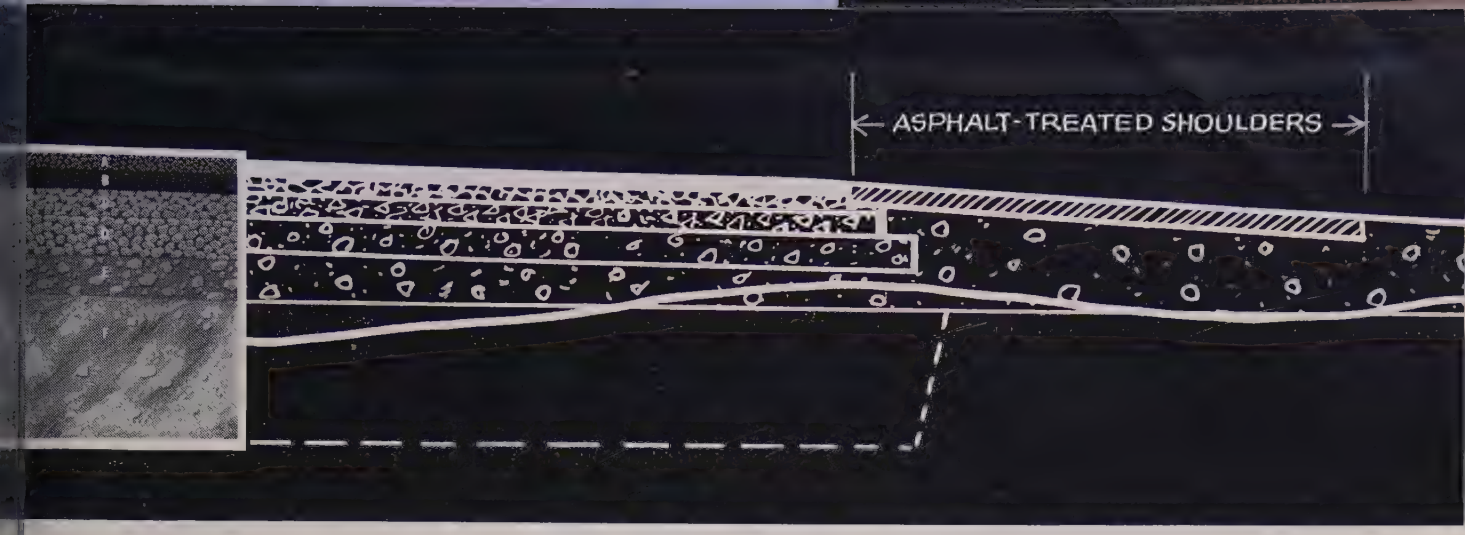
The cross-section and diagram on this page show how DEEP STRENGTH Asphalt pavement design solved the problems. Notice how the precepts of new DEEP STRENGTH Asphalt design are carried out. They include Asphalt base, Asphalt-treated shoulders, depres median for good drainage and flat slope embankme for better safety. Capillary moisture action and fr damage are prevented by building the road struct with selected materials.

When designed like this—for DEEP STRENGTH Asphalt pavements will carry the heaviest traffic lo without distress . . . with minimum maintenance c For example, the DEEP STRENGTH Asphalt-pa New Jersey Turnpike carried over 46 *million* vehi during 1959.

In cuts, engineers excavated below frost level and prepared subbase using suitable locally available materials.

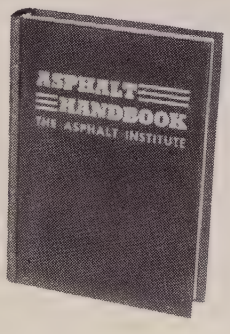


A 2½-inch Asphalt top course is applied over 3- inch plant-mixed Asphal base and a 4-inch broken stone bottom course.



AVE MONEY, TOO! Modern low-maintenance DEEP STRENGTH Asphalt pavements often cost s to build than Asphalt pavements designed to other ndards. That's because the Advanced Design Criteria en permit Asphalt base to be substituted for some of more expensive Asphalt concrete surfacing, and allow duction in total structure thickness when used in place untreated base.

EW HANDBOOK . . . a new ition of the *Asphalt Handbook* corporating all the Advanced Design iteria implied by the term DEEP TRENGTH Asphalt Construction on will be available at the Asphalt stitute office serving your area.



THE ASPHALT INSTITUTE
Asphalt Institute Building
College Park, Maryland

THIS IS DEEP STRENGTH

A
2½-inch Asphalt concrete surface course

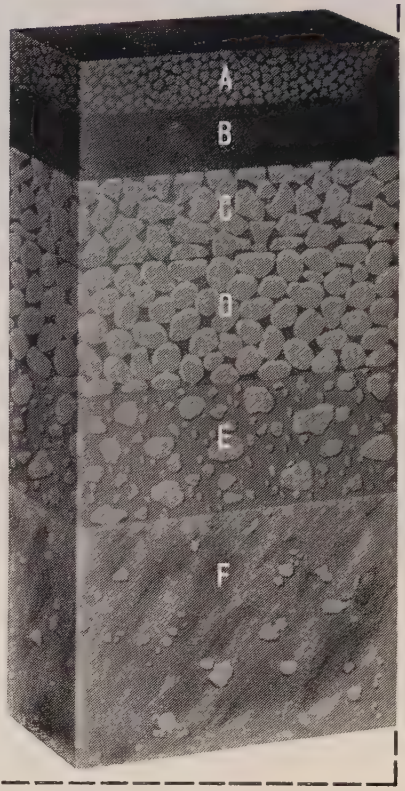
B
3-inch Asphalt base course

C
4-inch base course of broken stone

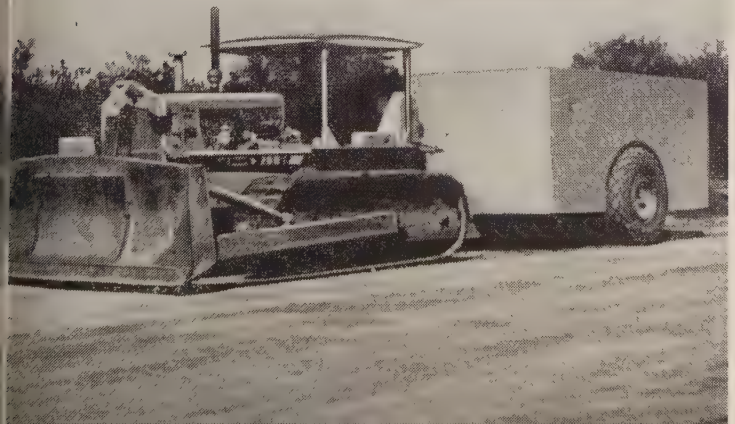
D
6-inch graded gravel subbase

E
6-inch bank-run gravel foundation course

F
Excavated to 48 inches below pavement grade in cuts—locally available backfill material compacted with "super" compactor

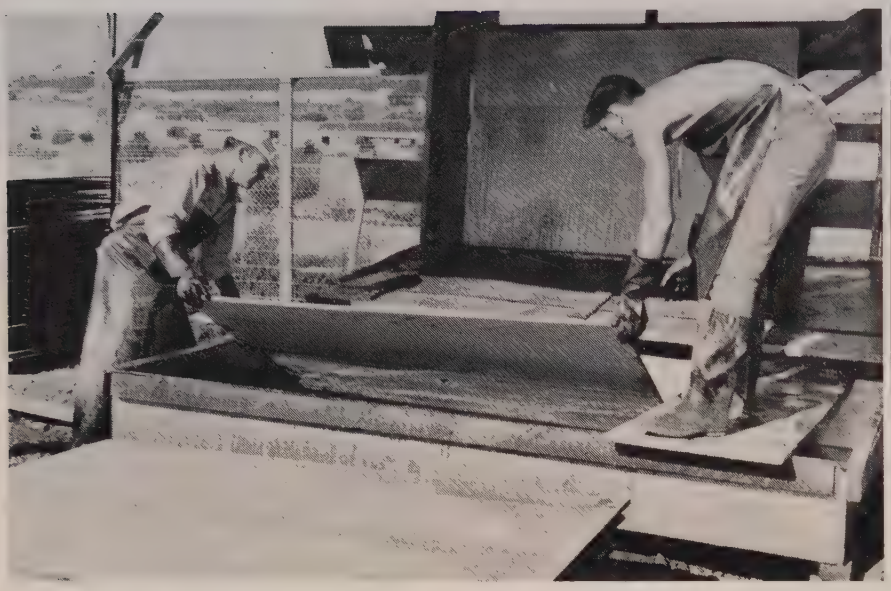


50-ton rubber tire "super" compactor used on all supporting courses to assure smoother riding under all traffic weights to come.



Asphalt-treated shoulders provide good surface drainage; white calcite chips insure better traffic-lane demarcation. Depressed median permits proper subsurface drainage.

CONSTRUCTION BRIEFS



METAL trough holds coating solution in which plywood form panels are dipped. Wet panels stand on notched rack, rear, to drain. Process is five times faster than old method.

Dipping speeds form coating for dormitory construction

PLYWOOD concrete form panels are coated at least five times faster than formerly with a dipping technique worked out by Engstrum & Nourse, San Francisco building contractors.

The system can be used either in a contractor's yard or on a job site. It recently helped speed construction of dormitories for San Francisco State College. The buildings total 127,000 square feet of area, and required 8,000 cu. yd. of concrete for two six-story structures.

An 18-gauge trough of galvanized steel, 5 x 10 x 1 ft. deep was set up on the building site under a rough sheltering roof. At the rear of the trough is a sloping metal shelf equipped with three notched stringers which will support up to 25 panels.

On this job Engstrum & Nourse used ¾ and ⅝ B-B PlyScord in 4 x 6 and 4 x 10-ft. sizes. Two men worked at the dipping trough. It first was filled to a depth of several inches with Burke Form Sealer dipping formula. Then panels stacked in front of the trough were dipped one at a time and allowed to soak up the solution for as long as three minutes. Brushing panels required up to 15 minutes each and did not produce as thorough a result, particularly on edges.

After dipping, the panels were stacked to drain on the rack—the drippings running back down into the trough. At the end of a run, the panels were re-stacked horizontally in an adjacent pile, and stickers inserted to permit all surfaces to dry. By the following morning they were ready for repiling without stickers, and ready to use on the job.

Several hundred panels were so treated, according to job requirements. The same panels were reused for all six levels of the buildings.

MASTER MECHANIC®

Apprentice training plan reviewed by EMSA members

EMSA'S apprenticeship and training program came out of its organizational greenhouse to face its first fight for survival during EMSA's general membership meeting in June.

What happened to the much-talked-of scheme at the hands of the 65 members present is what must eventually happen to all programs suggested by the governing nucleus of any group . . . it was alternately attacked and questioned by men who had experienced failure with similar efforts in the past. Conceived by EMSA's board of directors, which will act as the Apprenticeship and Training Committee once the program gets off the ground, the idea was presented to the membership as a loosely-defined, long range program requiring joint cooperation between the contractors, the union and EMSA.

EMSA Equipment Maintenance Supervisors Association Los Angeles

The members, most of whom had had a month to mull the scheme over, sharply questioned president Moodie, secretary Vern Morgan and board member (Peter Kiewit Sons) Leo Reiser on the organizational plans, costs and expected benefits of the training program.

Aided by L. H. (Lou) Finke, area supervisor for the State of California's Department of Apprenticeship Standards, the officers and Reiser fielded the shots carefully, yet candidly.

Q. Who are we going to teach and how are we going to teach them?

A. We're planning to start out with training mechanics—leave the operators until later. The apprentices will come from employment applications. They'll have to be qualified according to certain minimum standards like age and education minimums.

"The training will be two phase—part of it classroom study, the rest of it on-the-job and probably for four years, though details of this haven't been worked out. The classroom work will be handled by the apprenticeship's standards division of the state's Department of Industrial Relations. This is a statewide program and is tax-supported. Their industrial training staff teaches a curriculum jointly worked up by ourselves, the contractor groups and the union.

"The apprentices are full-time employees of one of our firms. This constitutes their on-the-job training.

Q. "How much is this going to cost us?

A. "Very little. We'll have to have some letterhead printed, some record cards printed, buy some record books and take care of postage. The formal training is paid for by the state and the on-the-job portion taken care of by the respective employers.

Q. "What will a union do about these non-union apprentices working in our shops?

A. "The union will be on the committee that directs this program. They're anxious to see this idea get under way and will make clearance arrangements with our people just as they have with other trades that have apprenticeship programs.

Q. "How much are we going to have to pay these apprentices while they work during their apprenticeship training?

A. "This hasn't been decided. The apprenticeship committee will have to establish a graduated pay program for these fellows. The best guess is that they'll start out at between 50% and 65% of journeyman's wages and gradually work up as they complete their training.

Q. "How do you expect to keep them from breaking their training?

A. "We've got to sell them on the value of staying with it. But even if they quit after they're half way through, they're better off and so are we, than they were before they had any training. This is one of the risks that has to be taken.

Q. "What if he leaves and goes to one of our competitors here in town?

A. "Well, your competitor will get a little bit better man than he would have otherwise. And maybe the competitor will lose a man who's on the training program to you. This is an industry-wide program and we've got to look at it that way.

"As a matter of fact, we've been thinking of making it mandatory that an apprentice stay with a given firm for only one year. We all have different ways of doing

APPRENTICE program discussed by Vern Morgan, left, EMSA secretary; L. H. Finke, California Department of Apprenticeship Standards, and Bob Moody, president.

things and it would be good for these fellows to see different types of operations.

Q. "Why should we hire an apprentice, who probably won't be able to do a darn thing around the shop for quite a while, when for a little bit more we can get a pretty good mechanic?

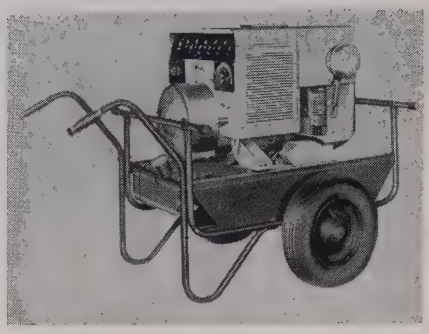
A. "Because we can't get a pretty good mechanic—we can't even get very many fair mechanics for top money."

Then, to drive home this all-important point, secretary Morgan asked for those members to stand who have enough good mechanics on the payroll. Significantly—and predictably—no one stood up, and the meeting was adjourned.

Portable welder supplies auxiliary power

A major upgrading of portable DC welder design including a 2,000-watt boost in AC auxiliary power and addition of optional electric starting, has been announced by the **A. O. Smith Corp.**

The 3,500 watts of 60-cycle, single-phase AC power makes the new machines more versatile power sources for lighting, motors, tools,



and other electric equipment. And a special generator design, incorporating start windings in the main generator, provides all models with inexpensive electric starting. Optional rope start or "Redi-pull" automatic recoil starters are also standard.

The engine's generated DC welding output is a full 200 amperes, suitable for welding with E 6010 and other electrodes common to field construction. Operator has continuous current control between main tap settings of 45, 55, 70, 85, 100, 115, 135, 155, 175, and 200 amps. with a fine control that delivers exact heat for welds on any metal.

The new welders handle all types of AC and DC electrodes from 1/16 in. to 5/32 in. diameter, and most 3/16-in.-diameter electrodes up to the capacity of the unit. Two or more welders can be connected in parallel for extra heavy welding jobs.

In addition, the engine-driven welder has a two-wheel dolly of welded tubular steel construction, equipped with 4 x 8, two-ply tires and sturdy rubber hand grips.

. . . Write No. 153

Simple press loads caulking guns

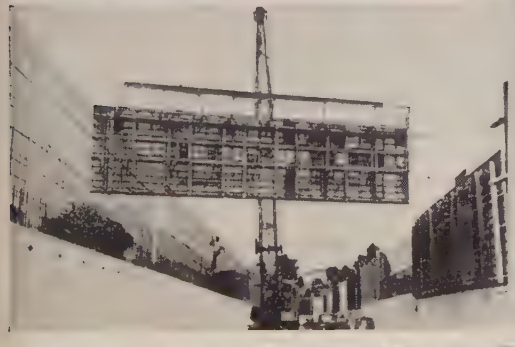
Since the introduction of polysulphide type sealants, there has been a need in the construction and maintenance industry for a single and inexpensive device for transferring the mixed material from a gallon can into the caulking gun. **A. C. Horn Companies** is now

marketing this equipment under the trade name "Hornflex Loader."

The Hornflex Loader is light weight and completely portable and does not require electricity or air compression for its operation. The unit is transported to the work area and assembled on scaffold, saw horse, or planks.

The Hornflex Loader is designed to accommodate a standard one-gallon unit of Hornflex, and can be used to fill disposable cellophane Thrift-paks, polyethelene tubes (for air operated guns) or directly into the barrel of Horn's standard No. 50 Counterbalanced Caulking Gun. The use of Cellophane Thriftpaks increases efficiency by effecting a tremendous saving in both time and labor. Twelve Cellophane Thriftpaks are furnished free of charge (when specified) with each gallon of Hornflex ordered. Loader is now available.

. . . Write No. 154



CONCRETE FORMING PROBLEMS

PROFITABLY SOLVED

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Over the years thousands of contractors have rented UNI-FORM Panels to form concrete and save money on almost every conceivable type of job, from house foundations to mammoth industrial projects. Renting UNI-FORM Panels is simple . . . You send us a set of plans and we will send you a rental proposal based on what you would need. You will get a tailor-made forming system delivered to your job. But the big advantage is that you will be able to use a forming system that will out-perform any other method you might use. Write today for the complete story on UNI-FORM Panels or send us a set of plans; either way we will be glad to hear from you.

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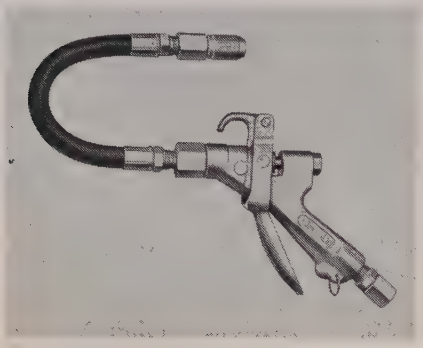
. . . for more details, write No. 47 on Reader Service Postcard

New control valves for lubricants

LINCOLN Engineering Co. has developed a new line of heavy-duty control valves for smooth, effortless dispensing of motor oils and fluid lubricants.

Constructed of durable, rust-proof, lightweight forged aluminum, the valves are designed with large portages and straight-through flow for minimum restrictions of the lubricant. Shut-off check and seat are of corrosion-resistant Nylon.



Designed for operating pressures up to 5,000 psi., the new Lincoln control valves are available with rigid or flexible extension nozzles.

. . . Write No. 155

Magneto analyzer tests condensers

A magneto analyzer for testing all makes of coils and condensers on ignition used on outboards, chain saws, garden tractors, power mowers, utility vehicles and industrial equipment has been introduced by **Wico Electric Co.**

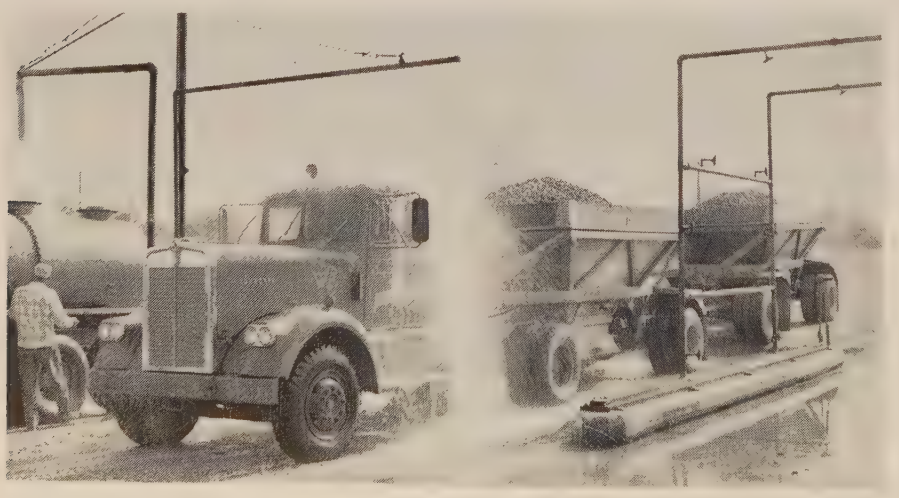
Coils may be tested for continuity, shorted turns and insulation breakdowns, while capacity, low leakage and shorts can be readily checked on condensers.

. . . Write No. 156

Bit grinder for job-site sharpening

A grinder which permits sharpening of drill bits at the job site is announced by **Gardner-Denver Co.** Three types of grinders are offered for portable, bench or pedestal grinding. Known as G-2, G-4, and G-6 series grinders, they will sharpen any detachable bit up to and including 12-in. diameters. Design features include fixture positioning of the bit to provide perfect renewal of the cutting surface and gauge. 110-deg. proper cutting angle is maintained and indexing fixture makes grinding simple for either Cross or X bits.

. . . Write No. 157



CONVERTIBLE HOPPERS GET SHOWER

Consolidated Rock Products Company of Los Angeles sprinkles down a load of crushed #2 rock at its Irwindale, Calif. sprinkling station. This has a double purpose, to keep the material from falling off or blowing on to the road and to keep dust out of the air. The new Fruehauf aggregate hoppers shown above unload on the move by means of cab controlled, air operated clamshell gates. An unusual feature of the hoppers is the removable aggregate containers which can be replaced with cement hopper "cans" to convert to cement hauling operations.

Building underground silo to house the 90′ Titan, contractors at Moses Lake, Washington, use Gardner-Denver air compressors and rock drills to speed hard-rock drilling

Rocky roost for the Titan Ballistic Missile

THE PROJECT

Underground launching base for the Titan ICBM at Larsen Air Force Base, Moses Lake, Washington. Putting muscle into America's missile program is a fast-paced, precision project. To help meet rigid construction schedules, Gardner-Denver air power and rock drills speed blast-hole drilling for the removal of huge tonnages of hard rock. To help meet demanding specifications of the Titan base construction, Gardner-Denver equipment drills precision holes deep into solid rock.

GARDNER-DENVER EQUIPMENT ON THE JOB

3 ATD3000 "Air Tracs"® equipped with DH143 rock drills —for drilling 4½″, 5″ and 6″ anchor bolt holes to depths of 27′.

2 ATD3000 "Air Tracs" equipped with DH123 rock drills— for drilling 10′ rounds in the shafts.

Air power supplied by Gardner-Denver RP900 and RP600 rotary portable compressors.

THE CONTRACTORS

MacDonald Scott and Associates, prime contractor.
Murphy Bros. Construction, subcontractor.

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

Irrigation pipe carries air for logging road construction

LIGHTWEIGHT sprinkler irrigation pipelines have a new construction job assignment. Equipped with special industrial couplers, aluminum pipelines are serving as compressed air lines for loggers building access roads to harvest timber.

One of the first companies to put the new Pierce Quick Pipe to use was the Hegewald Timber Co. which is harvesting second growth fir in the rugged mountains north-

east of Stevenson, Wash. Rudie Hegewald is building four miles of access road up steep mountain slopes at a cost of $50,000 a mile. With portable aluminum Quick Pipe he can work far ahead of his air compressor, drilling and blasting for the 18-ft. roadbed.

Hegewald had laid temporary aluminum lines across steep gullies to reach his work area on sharp cutbacks in the road. The 30-ft. sections of 3-in. aluminum tubing are lightweight and easy to handle. Lengths of hose connect the compressor and drilling machine to the pipeline. When a sharp turn is necessary, a short length of hose is inserted into the line to make the bend.

Quick Pipe has been used on the project for more than six months and the crew has found that the pipeline can be laid over rough and uneven terrain without leakage and loss of air pressure. They use a working pressure of 100 psi. in the line and have not had leakage or "blown" couplers.

Their only trouble was damage to several lengths of pipeline when it was loaded onto a truck for movement to a new location and the truck driver backed into a bank with the load, bending and damaging the ends of the tubing. Repairs were quickly made and the pipeline was put back into service.

Quick Pipe couplers and fittings for industrial air and liquid pipelines are manufactured by the R. H. Pierce Manufacturing Co., pioneer manufacturer of sprinkler irrigation systems. The rolled steel fittings are fabricated for use with 2-in. to 6-in. diameter steel or aluminum pipeline. Weld-on, press-on and thread-on fittings are available to contractors and construction firms which want to utilize the couplers with their present supply of pipe.

Quick Pipe provides fast, positive coupling of temporary pipelines at substantial savings in time and labor. Pipeline diameters to 4 in. can be operated at working pressures to 300 lb. per sq. in. with a three to one safety factor. The recommended maximum working pressure for pipe sizes over four inches in diameter is 200 lb. psi.

Green paint slated for steel bridges

MANY of the steel bridges on California's highways will soon be painted green to present a more pleasing appearance and to blend with natural colors of adjacent terrain and foliage. The Division of Highways has adopted specifications for new green paints, which unlike previously used greens, will be durable enough for California's varied climate.

In coastal regions, where bridges are subject to attack from salt-laden moisture, a new vinyl-type green paint will be used. In the interior of the state, steel bridges will be painted with a new green paint similar to that used in the past but with revised pigment components.

Nearly all of California's steel highway bridges are now painted with an aluminum paint which is a silver color.

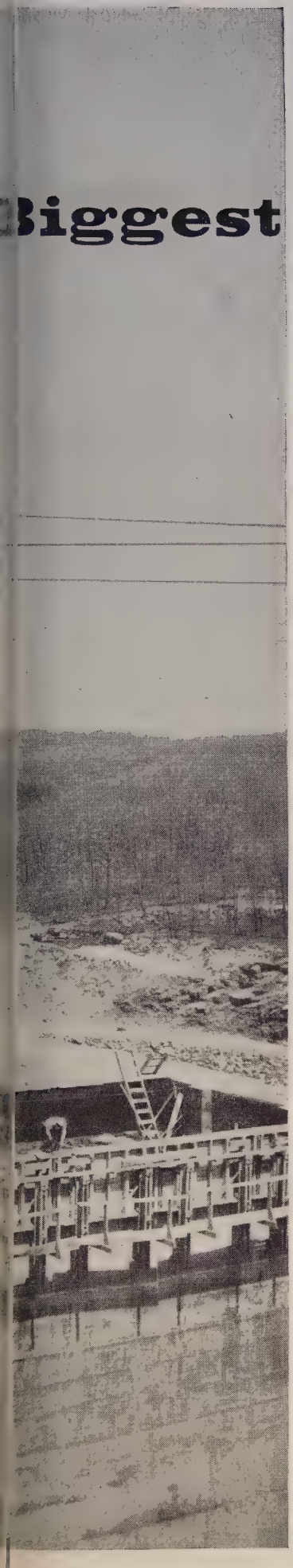
Prestressing tanks with wire wrap

TWELVE new underground, steel-lined, prestressed-concrete tanks will shortly go into service for storing aviation fuel for the Air Force at Ozol, Calif. These tanks are absolutely leakproof and were designed to withstand atomic explosions.

Each tank has a 15-in. thick floor slab, 9-in. thick prestressed concrete wall, and 9-in.-thick concrete roof. Each is continuously lined with ¼-in. steel plates welded together. The walls are prestressed to withstand outward forces which will be exerted by tank contents and exterior loadings. Prestressing was by the Herrick Iron Works of Hayward, Calif. under a license from The Preload Company, Inc., New York, N. Y. Prestressing consists of wrapping the tank with layers of prestressed wire.

The Preload prestressing wire was wound around the tank, being drawn in the process so that it was applied under tension of 150,000 psi. The Preload wire-winding machine was suspended along the outside wall from a carriage which ran along the outer edge of the roof. This carriage was securely guyed by radial cables to the center of the roof. The compressive stress imparted to the tank wall by the wires varies from 234 kips per vertical foot at the bottom of the tank to 34.5 kips vertical foot at the top.

A ¾-in. coat of pneumatic mortar was applied to protect and bond the wire and this in turn was covered with a waterproof coating. After completion of the tanks, the site was graded to provide a 4-ft. covering of earth over the tanks.



Biggest Dam in Jersey

...C.I.T. Is On The Job, too.

Perhaps a 240-yard-per-hour concrete-batcher, a private electric railroad to transport concrete and a three-story high monorail to pour concrete *isn't* unusual equipment—as the Berlanti Company told us. But *we* think it takes an unusual combination of men and machines to erect a 700′ high dam.

The job? The Charlotteburg Dam in New Jersey, a 700′ high structure which will seal off the Pequannock River and provide a 4,000,000,000 gallon reservoir for the city of Newark.

The Berlanti Construction Company of Harrison, New York, needs all this special equipment and more: complete machine and carpentry shops, shovels, bulldozers, a 20-ton truck frame for pouring and the usual fleet of trucks. 70% of the Berlanti equipment is C.I.T. financed. "For the past 25 years C.I.T. financing has helped us conserve working capital," relates President Louis Berlanti. "In this way our capital is released for more profitable investment in new projects, instead of paying off heavy equipment. C.I.T. representatives like Tom McPhillips know our needs as well as we do."

How Job-Engineered Finance Plans Help Contractors

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

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

MACHINERY AND EQUIPMENT FINANCING

615 South Flower Street, Los Angeles 17, Calif.
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Northern Life Tower, Seattle 1, Washington

CIT CORPORATION

. . . for more details, write No. 50 on Reader Service Postcard

NEW LITERATURE

To obtain free copies of literature described in this section, write the corresponding numbers on reply postcard.

Shovel bulletin

Manitowoc Engineering Corp. has published a 2-color, 8-page brochure on the 1¼-yd. model 2000 shovel which is also convertible to crane, dragline, and trench hoe applications. The booklet contains a large number of photos used to illustrate the stable crawler base, the exclusive Manitowoc Power-Flo train, upper deck features, simple counterweight removal, and ease of shipment on trailers or rail.

. . . Write No. 158

Lorain 820A

A 12-page bulletin covers the 47-ton model 820A made by **The Thew Shovel Co.** which may be equipped as a 2-yd. shovel or as a crane, dragline, clamshell or hoe. It gives details of design and construction including air controls and the 10-year warranty on "Shear-Ball" connection.

. . . Write No. 159

Concrete floor care

A. C. Horn Companies, a Division of Sun Chemical Corp. has issued two brochures on the care of concrete floors. A clear seal leaflet is concerned with the curing, sealing, hardening and dustproofing of concrete floors by use of this transparent, quick drying, synthetic liquid and includes complete product description, method of application, etc. The second bulletin describes Super-Bonsit, a latex emulsion added to concrete topping in place of most of the mixing water to produce an economical surfacing compound.

. . . Write No. 160

Details of ¾-cu. yd. crane

A 20-page two-color brochure describing the Lorain Model 26 has been released by the **Thew Shovel Co.** Given are details of the machine's application as a shovel, crane, clamshell, dragline, hoe, log loader, pile driver, and magnet. The construction and the use of the machine are thoroughly explained with many large photographs of component parts and job scenes. The booklet is indexed, and the text is clear and to the point.

. . . Write No. 161

Uses and abuses of wire rope

Union Wire Rope Corp. has compiled a 28-page book with a vast amount of rope and sling saving information, which every user of wire rope and slings can profit by reading. The abuses and correct uses are interestingly illustrated with lively cartoon caricatures.

. . . Write No. 162

Waterstop manual

Gates Rubber Co. has published the Kwik-Seal Waterstop Technical Manual, a comprehensive design manual for industrial contractors. The 24-page manual contains 51 drawings and photographs. Subjects include size and shapes of the waterstop, comparative data for rubber and plastic waterstops, handling and storage of the material, design data for both "little" and "considerable" movement joints, application data for the installation of Kwik-Seal Waterstop and how-to-splice this material in five minutes.

. . . Write No. 164

Caterpillar tractor bulletins

The D6 Series B tractor is described in the 12-page brochure recently released by **Caterpillar Tractor Co.** Features illustrated and described are the new diesel engine rated at 93 flywheel horsepower, a dry-type air cleaner, exclusive Cat oil clutch and lubricated track rollers and idlers. Specifications are listed along with attachments and tools for logging, agriculture and other applications. A similar booklet is available on the D4 tractor. The D4 has high ground clearance and ability to perform on soft footings that bog down wheel tractors. Copies of both may be obtained from Caterpillar Tractor Co.

. . . Write No. 163

Tandem roller catalog

An 8-page catalog has been released covering the **Galion Iron Works & Mfg. Co.**'s 5-8, 8-10½, and 10-14 sizes of Roll-O-Matic tandem rollers. Complete specifications and compression data are presented and the advantages of various construction and operation features such as duel controls, hydraulic steering, and torque converter are discussed.

. . . Write No. 165

Portable power tools

Syntron Company announces the publication of a 12-page brochure on portable power tools. Complete data and specifications along with over 70 illustrations fully describe Syntron's self-contained electromagnetic hammers and drills, gasoline hammer paving breakers and rock drills, pulsating magnet form vibrators, and vibrating concrete floats.

. . . Write No. 166

Model D Tournapull

A 16-page bulletin is available from **LeTourneau-Westinghouse Co.** on their Model D Tournapull scraper. The 143-hp. engine with choice of transmissions is described; bevel gears, clutch and the main case are discussed with specifications given.

. . . Write No. 167

Clamshell and dragline bucket

A 32-page illustrated catalog covering all types and sizes of clamshell and dragline buckets and stone grabs has been published by **Williams Bucket Division, The Wellman Engineering Co.** The booklet gives detailed information describing the principles of bucket operation and selection as well as complete, easy to read specification charts.

. . . Write No. 168

Batch controllers and recorders

Johnson automatic electro-mechanical controllers and recorders for concrete batching are described in a 6-page brochure available from **C. S. Johnson Co.** Many units are discussed, among them the 60-mix controller-recorder for cement, water and multiple aggregate batchers; a 120-mix controller-recorder for single material batchers; automatic beam scales for inexpen-

's the answer to a fabricator's need: Aircomatic quality welding
stick electrode maneuverability. The new Airco MIGet Gun con-
s its own welding wire (up to 1100 feet of aluminum) . . . now has
feed control on the gun itself . . . equipped to operate 50 feet
n control box, up to 200 feet from power source . . . weighs less
n 4 pounds loaded with aluminum wire.

NOW— Aircomatic® welding anywhere with Airco's new MIGet Gun ...backed by the *most experience*

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Airco also produces a complete line of manual and automatic gas shielded arc welding equipment — Heliwelding for light and medium gauges, Aircomatic for heavier gauges and for cutting . . . and also everything you need in gas welding and cutting equipment, industrial gases, arc welders. Call your nearest Airco office or Authorized Airco Distributor. Look in your Classified Telephone Directory under "Welding Equipment and Supplies" for your nearest Airco representative.

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. . . for more details, write No. 51 on Reader Service Postcard

sive precision batching without mix selection; an automatic deal head for fast, accurate weight setting; an electronic batch recorder which prints all charts and records on one roll; a standard beam box for manual weighing of four materials; and electronic batch controls for ready-mix or concrete block and pipe plants.

. . . Write No. 169

Reference booklet

Caterpillar Tractor Co. has issued a 20-page quick reference bulletin on the major Caterpillar construction equipment products. Items discussed are motor graders, track-type tractors, bulldozers, scrapers, rippers, pipelayers and many others. Brief specifications accompany illustrations.

. . . Write No. 170

Tips for placing concrete

An instructive 4-page bulletin which gives the facts on placing concrete with the Model M-15B, a powered concrete buggy made by **Prime-Mover Co.,** is available from the manufacturer. Diagrams and drawings show how to compute productivity depending on length of haul, how to lay out the job for several pours, how to make "horse" and "mat" runways which can be repeatedly re-used, and how labor costs are reduced by use of the Model M-15B. A leaflet is included which gives full details and specifications of the M-15B.

. . . Write No. 171

A catalog of nails

A catalog which illustrates and describes many of the 10,000 different types and sizes of nails, showing the specific uses, has been published by **American Steel and Wire Division,** U. S. Steel Corp., the world's largest producer of nails. The catalog, called "American Nails" ranges from a giant 15-in. boat spike weighing more than a pound and a half, to tiny pins used for attaching small name plates, which are as fine as a needle and weigh in at 45,000 to the pound.

. . . Write No. 172

Concrete curing compounds

A four-page, two-color brochure describing concrete curing compounds has been published by **A. C. Horn Co.,** subsidiary of Sun Chemical Corp. Details, advantages, uses, and specifications are given for Horncure 30 D & C, a 100% resin base; Horncure 40 W, white pigmented; Horncure 50 D & C, wax resin base; and Horncure 60 D & C, wax resin base. Data is also given on a semi-automatic hand sprayer, which is offered free with a purchase of Horncure.

. . . Write No. 174

Conveyor idlers manual

Hewitt-Robins Inc. has issued a 48-page engineering and product information handbook on belt conveyor idlers. Included are details of construction, comparison of 10 competitive designs, selection, procedure and examples, engineering tables, dimensions and specifications. The catalog illustrates and describes the basic types of idlers used in all types of service—troughing, impact, transition, return, flat belt, impact feeder, return trainer, feeding and picking are but a few of the many noted. Detailed information is presented on most of the standard 134 styles of idlers which Hewitt-Robins manufactures.

. . . Write No. 173

Data on open-web joists

A 4-page bulletin giving full engineering data on S Series and L Series open-web steel joists that meet Steel Joist Institute specifications is available from **Ryerson Steel.** Information is included which describes the services the company can provide to contractors with joint problems.

. . . Write No. 175

Manuals on motor graders

Motor graders with torque converters and power shift transmissions are covered in two manuals produced by the **Huber-Warco Co.** One describes the 6D and 7D and the other details the 5D-190, which is rated at 195 hp. The manuals total 26 large pages and go into detail on the various features and advantages of the machines. Important advantages are summarized, and key components are pictured and described. The three machines have tail shaft governors, which automatically adjust engine rpm. to meet any load condition.

Literature Briefs . . .

"Quick-Way" Truck Shovel Co. has issued a 6-page leaflet on its truck cranes and shovels from 8½ to 25 tons. *. . . Write No. 176*

Standard and extension type column clamps are the subject of a 4-page bulletin from **Baker-Roos, Inc.** Detailed dimensions given.

. . . Write No. 177

No-Joint Concrete Pipe Co. has published a 6-page brochure describing No-joint cast-in-place concrete pipe. *. . . Write No 178*

B-27 Mobile Drill is discussed in a 4-page bulletin from **Mobile Drilling, Inc.** Specifications and typical applications described.

. . . Write No. 179

"The Complete Ferguson Line" is the title of a pictoral brochure from **Shovel Supply Co.** showing blades, wheels, rollers, etc.

. . . Write No. 180

Madsen Highway-Airport Base Stabilizer Plant is described briefly in a bulletin from **Madsen Works, Baldwin-Lima-Hamilton Corp., Construction Equipment Div.**

. . . Write No. 181

Minneapolis-Moline Co. has issued four new specification sheets covering their industrial wheelers, crawler loader, Wheeloader, and crawlers. *. . . Write No. 182*

"Concrete Mixer Application Data Book" is designed to assist ready-mix concrete and construction companies in truck selection and other equipment. The 36-page booklet offers complete information on the transit concrete application of trucks. **Ford Division of Ford Motor Co.** issues the booklet.

. . . Write No. 183

Koehring-Johnson tilting concrete mixers for heavy construction are described in a 4-page brochure available from **C. S. Johnson Co.**

. . . Write No. 184

Internal concrete vibrator, Model HIV-1 is illustrated in a 2-page piece from **Wacker Corp.** Machine operates on 50 volts for safe handling by operators on wet ground.

. . . Write No. 185

Finisher-float bulletin No. 60153 describes **Chain Belt Co.'s** Rex combination finisher-float for concrete surface finishing. Detailed descriptions and illustrations are given.

. . . Write No. 186

Four-color bulletin describing power, speed, and handling characteristics of six Michigan line tractor shovels is published by the **Construction Machinery Div. of Clark Equipment Co.**

. . . Write No. 187

This Armco Bin-Type Retaining Wall prevents fill for wider highway from encroaching on important irrigation canal.

Armco Retaining Wall Simplifies Widening Interstate 90

In building new Interstate 90 in western Montana, the wide right-of-way requirements created a problem at one point. Here, the new four-lane highway passes between a steep hill and an important irrigation diversion channel in the Clark Fork River. Conventional fill – built up wide enough to accommodate the right-of-way–would have encroached on the channel. The solution: a 350-foot long Armco Bin-Type Metal Retaining Wall. It holds the steep fill, prevents erosion, relieves the right-of-way "squeeze."

Highway builders have been using Armco Retaining Walls for important earth control jobs for more than 20 years. Their unique design features a series of interconnected bins. Sturdy, deeply corrugated metal members are bolted together at the job site. Fill dirt is tamped into the bins to provide stability. No formwork is required, and there is no danger of cracking or breaking. For complete data, write us for catalog. Armco Drainage & Metal Products, Inc., 2180 Milvia St., Berkeley 4, Calif., P.O. Box 751, Federal Station, Portland 7, Ore., Member, Corrugated Metal Pipe Association of Michigan.

Tamping fill material in bins provides necessary stability.

ARMCO DRAINAGE & METAL PRODUCTS

Subsidiary of ARMCO STEEL CORPORATION

OTHER SUBSIDIARIES AND DIVISIONS: Armco Division • Sheffield Division • The National Supply Company • The Armco International Corporation • Union Wire Rope Corporation

. . . for more details, write No. 52 on Reader Service Postcard

NEW EQUIPMENT

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

Finisher-float machine by Heltzel

The new Flex-Plane with a gas-electric drive and other design features has been announced by **Heltzel Steel Form and Iron Co.** With this model, the operator selects the desired ratio of screed speed to machine speed for every different concrete mix or slump. This is a special advantage of Flex-Plane, which combines the finishing of concrete pavement with [illegible] under the direction of a single operator.

The finisher section is self-contained and can be [illegible] and used independently. Width can be adjusted from 12 to 20 ft. Final finish produced has demonstrated smooth riding qualities with a minimum of final hand finishing. The gasoline engine powers an electric motor which supplies power directly for separate traction and screed drive motors. The final-finish float has a surface contact area 30 in. in width. The float does not reciprocate but trowels [illegible].

Write No. 188

Large rotary trowel covers 11 sq. ft.

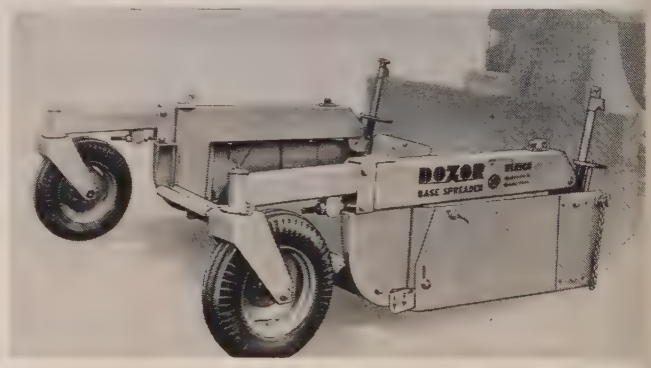
A large size rotary troweling machine, designated the G 46-B, has been announced by **Stow Manufacturing Co.** The unit is designed primarily for large areas, since it covers 11 sq. ft. of concrete surface per revolution, which is 83% more than a 34-in. machine. The G 46-B comes equipped with float and finish

blades as standard, and has a double handle for extra support and easy handling. The machine is a 4-bladed trowel and the spider arms are locked to the tilting plate so that all blades rotate in the same plane at all times. A stationary guard ring of sturdy design is a special feature. The operating control on the handle has a safety feature which stops the machine immediately when the operator lets go of the handle. The pitch of the blades can be varied while the machine is in operation by adjusting a control on the handle.

. . . Write No. 189

Base spreader attached to bulldozer blade

With a high-production output, a new design of base spreader has been introduced by **Ulrich Manufacturing Co.** Designated Model 18, the new spreader, with adjustable hopper and spreading widths, is designed so that one unit can easily be used, without modification, on any Caterpillar tractor equipped



with bulldozer. A screw-jack is used to adjust cross-members in a few minutes time to fit specified spreading jobs from 8 to 18 ft. wide. Optional wing-gate extensions will allow additional widths. The spreader mounts directly on the dozer blade through the use of large threaded clamps. The dozer blade serves as the strikeoff as in other Ulrich spreaders, and depth is adjustable from 1 in. to any requirement.

. . . Write No. 190

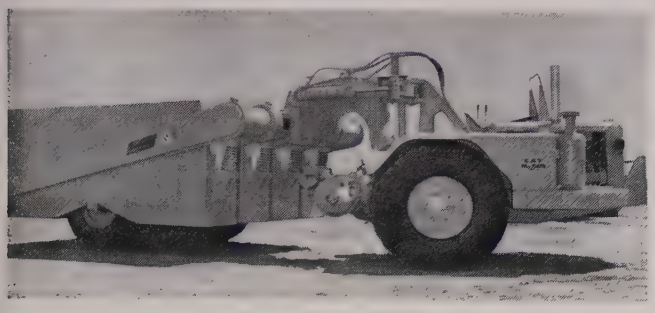
Bolt design saves up to 40%

With a new design, **Russell, Burdsall & Ward** announce a high strength bolt with larger head and shorter thread length to substantially increase the present advantages of high strength bolts. Savings up to 40% in bearing-type connections over present bolts are made possible by the new head and thread design. The design has been approved after extensive testing. Advantages include larger bearing area under the head, requiring only one washer, shorter thread length, increasing the shear area of the bolt and retention of the same head dimension to eliminate need for a different wrench.

. . . Write No. 191

Heavy-duty roller with Cat tractor

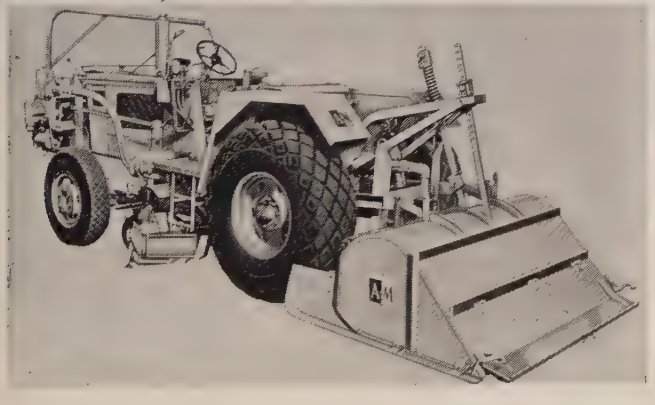
A 50-ton pneumatic tire roller, designated the C-50, has been announced by **Yuba-Southwest,** which is teamed up with the Caterpillar No. 619 tractor. The two are joined with a fully detachable draft beam and the roller provides independent oscillation of the



weight boxes to assure uniform compaction. This independent oscillation also is designed to eliminate dangers of tire blowout and tip-over. With the new hauling unit, the roller offers high efficiency with high speed performance and recognized low operating costs. *. . . Write No. 192*

Improved models of traveling mixers

Major improvements have been announced by the Construction Equipment Division of **American-Marietta** for its Pulvi-Mixer and Trav-L-Plant (illustrated) line of rotary mixers for soil stabilization and highway construction. These are announced as redesigned versions of the well known original "Seaman Mixers," and are not new machines. The design changes which have ben made increase performance and add factors of safety for the operators.



One of the most obvious changes is the modern appearance of the new equipment with low, square hood and fenders. This change has been made to increase the accessibility to all parts of the engine and the drive system. It has also increased ventilation during the operation of the machine. The improvements in line of safety feature a catwalk running the side of the operator's station, and increased visibility over the hood and the fenders. Improvements have been made in the power steering of both machines in line with simplicity and easier maintenance. Tire sizes have been changed to utilize more standard sizes which are widely available. *. . . Write No. 193*

Third wheel for "grid" roller

A third wheel which increases compaction width by over 50% when added to the Model D Tamping and "Grid" rollers is available from Tractor Equipment Division of **Hyster Co.** The attachment increases compaction width from 6 ft. to 10 ft. It is hinged to the side

of the basic unit, providing flexibility on uneven ground. The roller tongue is relocated on a special bracket, placing it on the center of the frame for towing. The roller can be quickly converted back to its original width by removing the hinge pins and rebolting the tongue.

. . . Write No. 194

Wheel loader has 2-ton capacity 4-wheel drive

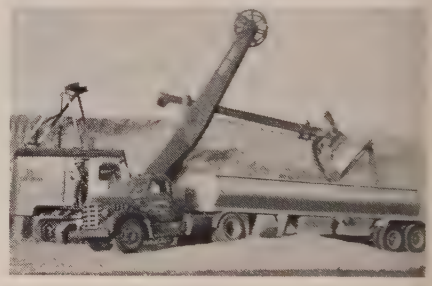
A new 4-wheel drive front-end loader with a carrying capacity of 4,000 lb. and a static lifting capacity of 9,500 lb. is announced by **Allis-Chalmers.** The new Model TL-12 has power reversing Tracto-

matic transmission with a lever on the steering column to control both forward and reverse movement without stopping the machine to clutch and shift gears. The lever hydraulically engages the two multiple disc, dry-type clutches, one for forward and the other for reverse. The use of two clutches prolongs clutch life. Four forward speeds are provided to 21.2 mph., and four reverse speeds to 27.9 mph. The TL-12 is available with either Allis-Chalmers 77-hp. gasoline or 76.5-hp. diesel engines. Shipping weight of the diesel powered loader is about 11,550 lb. The hydraulic system is fully enclosed and protected. It has a maximum dumping clearance of 8 ft. 4 in., and four buckets are available ranging from 1 to 2 cu. yd. capacities. Power steering and 4-wheel-hydraulic power boosted brakes are standard equipment.

. . . Write No. 196

Bottom-dump trailers offer curved or straight sides

A wide choice of bottom-dump trailer models and components is offered by **Fruehauf Trailer Co.** for highway hauling of dry bulk materials. Model list includes curved side trailers, either open or closed. Closed versions are sold through three 20-in. hatches. The closed unit has a 22-cu. yd. capacity. The open top model, available with sin-



gle axle or tandem suspensions, has a capacity of 10 to 30 cu. yd. The vertical side models are heavier than curved side units and have flat panel construction. Their payload capacity is unlimited. The trailers are available in steel, aluminum, or stainless steel, and have a wide variety of dumping gates. Among these are windrow and spreader type, clamshell gates, and butterfly valves.

. . . Write No. 197

Solve your cold feed problems

Many elements of cold aggregate feeding problems, particularly for high-capacity continuous or batch-mixing asphalt plants, are solved in **Barber-Greene's** Model 817 "Add-A-Bin" feeders. Each bin is a complete unit, readily permitting combinations of two, three, four or more units. Each has a basic ca-

pacity of 8 tons, which can be increased with extensions to 32 tons. The bins have B-G belt feeders which permit total and proportional control of the aggregate feed. Individual gear motor drives on each feeder or a single gasoline engine, driving each feeder through interlocked lineshaft drives, makes this feature possible. Three bins can be combined on a single axle portable chassis for over-the-road hauling at 25 mph.

. . . Write No. 199

Ditch cleaning buckets for backhoe

A series of shallow-contoured buckets up to 5 ft. in width have been developed by **Hydraulic Machinery Co.** Applications include ditch cleaning, topsoil stripping, loading ripped blacktop, and other

slabby materials and backfilling. The buckets can be used on either the Hy-Hoe 380 backhoe, or the smaller 250 model. Bucket can be reversed in 10 minutes to adapt to shovel operation or stockpiling. Struck capacity of the 5-ft. model is 13 cu. ft.

. . . Write No. 200

Concrete additive cuts water requirements

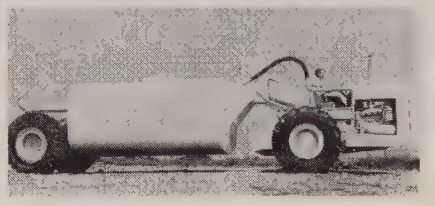
A chemical compound which reduces water requirement and retards setting of concrete without entraining air is announced by the **A. C. Horn Co.'s** Division of Sun Chemical Corp. The new material is called Symentard. The chemically active material reduces cement gel formation, densifies the mix, retards the rate of hardening, re-

duces segregation, contributes to workability, and speeds placing of concrete. As temperature rises and water requirements increase, the proportion of Symentard can be increased resulting in greater water reduction to keep the water-cement ratio uniform. Below 65 deg. F. one half pound of Symentard is added per bag of cement. About 85 deg. F. one pound is added. The water content, workability, and setting time of the concrete remains uniform.

. . . Write No. 201

Water tankers feature new valve system

A positive air-controlled valve system for use on its line of water tankers has been announced by **Klein Welding Service.** The valves have finger-tip control from the driver's seat. Other features of the tanker line include high capacity



1000 gpm pumps on the standard model and 3 in. spray heads for even disbursement of water over a wide area. Other sizes of pumps are optional. Pull-tankers are available in sizes from 1,000 to 8,000 gals., along with tank trucks of 1,000 to 4,000 gal. capacity, and water towers which handle from 2,000 to 20,000 gals.

. . . Write No. 202

Screen roller speeds hand finishing concrete

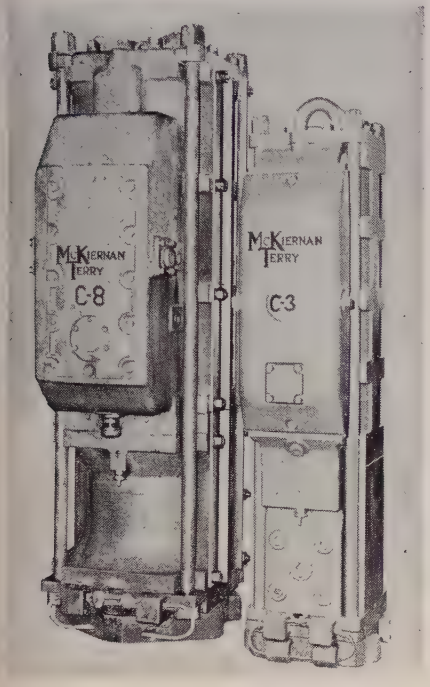
A cylindrical screen roller used to push down rock and aggregate from the surface before hand troweling of concrete slabs has been developed by **Stow Manufacturing Co.** Pulling the cylindrical screen back and forth across the slab after it has been rodded, pushes down the aggregate and brings the wet mortar to the surface for easier, faster finishing. The roller does the

work of 5 or 6 flat concrete tampers and is ideal for use on slabs of 3-in. to 6-in. slump when screeds are not used. The roller prepares the surface for machine trowelling and often is used to save slabs that would otherwise get away from the contractor. The unit is also used for putting non-skid safety surfaces on concrete loading ramps and other areas. The roller is 15 in. diameter by 24 in. long with a 10-ft. handle and weighs 40 lb.

. . . Write No. 203

Pile hammers operate with air or steam

Two new units have been added to its line of C Type double-acting pile hammers by **McKiernan-Terry Corp.** The new units are designated C-3 and C-8. Both follow the design of the basic C-5 with its patented operating cycle allowing a high rate of energy output at low steam or air consumption. The line features self-seating valves and high-speed operation combined with low striking velocity. The

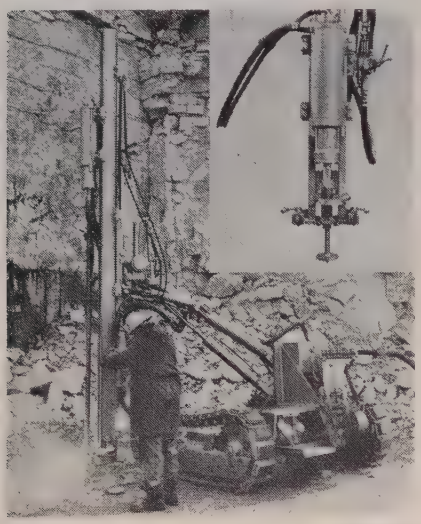


units are furnished with the differential pressure lubricator essential in the company's recently announced dualtube lubrication system. The 85,000-lb. C-3 delivers 130-140 blows a minute, working with either a 500 or 600-fpm. air compressor, or a 1,350 lb. per minute steam generator. The C-8 operates with a 900-ft. air compressor or 2,600-lb. steam generator. It delivers 77 to 85 blows per minute and weighs 18,750 lb.

. . . Write No. 205

Versatile crawler drill tows its own compressor

Two sizes of high speed pneumatically powered crawler drill assemblies are announced by **Le Roi Division of Westinghouse Air Brake Co.** The LDC-500R model, mounting a new striking bar type 5 in. drifter permits drilling of 4 in. holes in as little time as normally required for 3½-in. diameter drilling. The LDC-400R mounts a similar type 4 in. drifter, which is recommended for 2½ to 3 in. diameter holes. Both models of the new Trac-Newmatic drills have forward, neutral, and reverse rotation for quick drilling, extracting of tight steels and working with coupled steels. Wide pattern drilling is possible because the operator can swing the feed support arm over the crawlers from center line to 60 deg. right. Breast holes can be drilled as high as 10 ft. 6 in. An air motor driven hydraulic pump powers and controls the raising, lowering, and swinging operations of the feed and support arm and the sliding action of the cone. A new vane-type motor, designed to meet all drilling speed and power requirements, powers the feed. Crawlers are driven by individual 7½ hp, reversible air motors. Trac-Newmatic tramming speeds range up to 2 mph when pulling a Le Roi 600 cfm rotary compressor. With compressor in tow, grades of 10 per cent are easily handled.



. . . Write No. 206

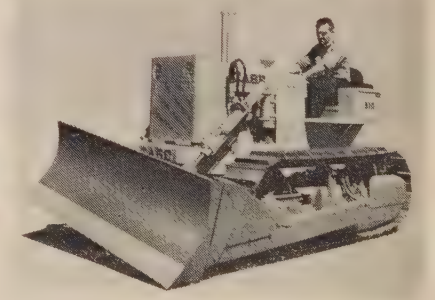
Big crusher uses low horsepower

A 48x42 in. jaw crusher with an exceptionally small flywheel which starts with a 30 hp normal duty motor and operates at full load on a maximum of 150 hp has been developed by **Straub Manufacturing Co.** Excess power required to elevate the eccentric-jaw is eliminated in this crusher by a swinging jaw mounted on a hinge pin in the center line of the crushing zone. Increased leverage plus elimination of excess weight on reciprocating parts permits a smaller flywheel. Photo shows unit in operation at 275 rpm with crusher mounted on skids, not fastened to floor.

. . . Write No. 207

Dozer blade tilted or angled with power

Dozer blades which can be hydraulically angled or tilted have been developed by **J. I. Case Co.**, for use on its 42 hp utility crawlers. The 310 angling dozer allows the operator to angle the blade 25 deg. right or left from the cab and on the move. Power to angle blades is supplied by two double acting cylinders mounted on the A frame



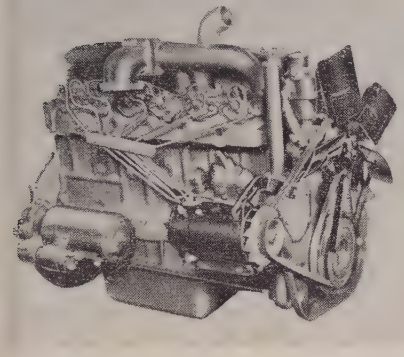
behind the moldboard, where they are protected from brush and rocks. The Model 310 tilting blade can be tilted 11 deg. right or left, again from the tractor seat. Power is provided by large hydraulic cylinders mounted on the left push arm and attached to the upper rear corner of the blade. A telescoping steel cover protects cylinder from brush and rocks. A special swivel bracket permits blade to tilt and prevents

twisting strains to reach the two hydraulic lift cylinders. Both these power blades are mounted on Case 310 utility crawler developing 29.07 drawbar hp. and delivering up to 5,815 lb. pull and push. Tractor features a 4-cylinder Case engine with shuttle-shift transmission.

. . . Write No. 208

Lightweight diesel truck engine

A 10 hp diesel engine weighing only 902 lb. is announced by **International Harvester Co.** The D-301 engine has a piston displacement of 301 cu. in., is naturally aspirated and delivers 110 hp at 3,000 rpm. The 6-cylinder engine is designed for many types of light load truck

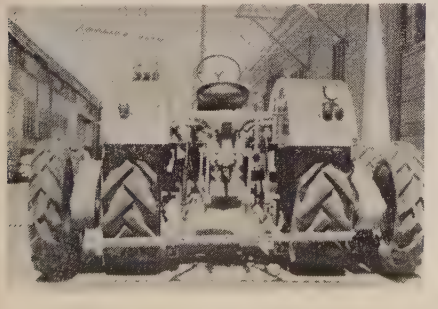


operations and similar applications. The new unit features direct electric starting and a simplified fuel system designed to obtain maximum power from low cost No. 2 diesel fuel. It delivers high torque output at low speed, has aluminum pistons, a heavy-duty crank shaft and reinforced crankcase for long service life.

. . . Write No. 209

Extra power wheels for standard tractor

Bogie drive wheels which can be installed in tandem pairs outside of the regular drive wheels of nearly any standard wheel tractor are



marketed by **Young Iron Works.** The extra wheels are chain driven from the main axle, and are slightly off-set, one pair a little forward, and the other a little behind the two main tractor wheels to extend its driving wheel base. Recommended for pulling tampers, dusters, and similar equipment and for heavy work on surface highways, the bogie, increases flotation and stability and in many cases enables the machine to do the work of a crawler. The "live" bogies follow the contour of the ground to provide additional traction and reduce wheel spinning.

. . . Write No. 210

Hydraulic dozer blade for M-F tractors

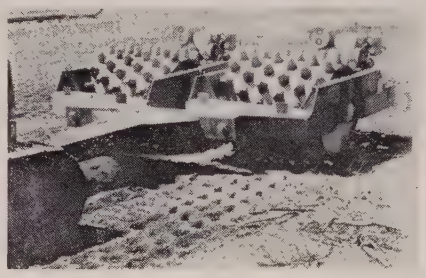
A dozer blade which can be raised or lowered hydraulically and mechanically angled to right or left is developed by **Massey-Ferguson** for its line of wheel tractors. The No. 5 angle dozer attachment has a 25 in. moldboard height with 6 in. reversible cutting edge and a choice of 72 in. or 84 in. widths. Raising and lowering of the blade is done by double acting hydraulic lift cylinders with down pressure.

It can be mechanically angled at 17, 24, or 28 deg. either right or left, and can also be offset 7 in. on either side. The attachment is frequently used in conjunction with a trenching tool.

. . . Write No. 211

Vibrating sheepsfoot roller

A comparatively small sheepsfoot roller with vibrating action



which can be towed in single, double, or triple units by a small crawler tractor is announced by **Vibro-Plus Products, Inc.** Called Terrapac, Model CF-30, the new unit out-performed the standard 5-ton sheepsfoot by a ratio of 9 to 1 in company tests. The vibrating action of the new unit breaks up lumps, brings water to the surface and speeds compactive process. The roller achieves a ground pressure of 5,000 to 6,000 psi.

. . . Write No. 212

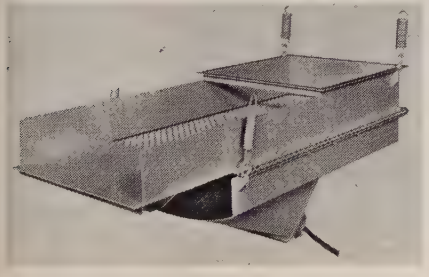
Roller tire pressure changed on the run

An attachment which enables the operator to change inflation pressure of tires on the run is announced by **Bros Inc.** Made for the Bros SP-730B self-propelled pneumatic tire roller, the inflation device is available on new rollers or as a modification kit for all SP-730B rollers now in the field. The new feature eliminates stops for changing ballast for stage compaction of weak or wet subgrade materials. At the low tire pressures, contact areas of tires are substantially greater under full ballast loads providing maximum area for

roller support in low bearing strength soils. For compacting asphalt surfaces, the initial or breakdown pass on hot asphaltic materials can now be made at low tire pressures to set the material and then maximum densities can be produced by increasing tire pressures. Inflation kit includes compressor, gages, control stand, air seals, air line and protection covers for each tire. . . . *Write No. 213*

Vibrating feeder separates sand and gravel

A versatile vibrating screen feeder which can be used to separate mixed loads of solid materials or solids and liquids is announced by **Cleveland Vibrator Co.** A Cleveland pneumatic vibrating drive located under the feeder vibrates both the lower and upper tray which is a porous steel screen. Rapid vibratory action sifts the sand



from the gravel in the upper tray. This same action moves both sand and gravel along the trays to individual bins. Vibrating feeders and conveyors may be either floor mounted or suspended. Springs are used only to supply flotation, not to amplify vibration. The entire unit has only one moving part. Both intensity and frequency of vibration can be regulated by adjusting the air supply to the vibratory unit. . . . *Write No. 214*

Bucket drill attachment for small cranes

A self-contained big bore drill which attaches to any standard ¾ .

yd. crawler or 1-yd truck crane is announced by **Calweld, Inc.** The attachment, Model 150-C, uses its own power unit for digging and is independent of the crane power source. One man operation from the crane cab is obtained through hydraulic controls. The unit digs and drills holes from 12 in. to 120 in. in diameter. Features include a

hydraulic drill positioner and boomstop combination which provides accurate angle drilling at a 1 to 3 batter. The kelly bar is of heat-treated alloy steel. Telescoping models permit drilling to a depth of 150 ft. without the need for additional drill stems. Several bucket accessories are available.

. . . Write No. 215

Pickup pulls batching plant

A mobile aggregate batching plant with full 6-yd. capacity which can be transported with a pickup truck is announced by **Engineered Equipment, Inc.** The Nomad unit has a 9-ft. 2-in. charging height easily accessible for front-end loader since there is no protruding frame. Main transportation trucks are easily retractable for quick set-up time and automatically provide a full 12-ft. 6-in. discharge height for feeding truck mixes. Front wheel assembly features automotive type steering. As an option the unit can be furnished with a fifth wheel for truck tractor towing. Available with standard dial or beam scales. Decumulative E/E conveyex type weighing is also available with compartmentized weigh batcher.

. . . Write No. 216

Batter washer eliminates wedging

A slotted steel haunched plate which permits placement of a bolt at any angle up to 45 deg. in either

direction is developed by **Richmond Screw Anchor Co., Inc.** The batter washer has been designed to hold a Tylag at an angle up to 45 deg. without need for expensive wedging. This is made possible by a slot in the haunch at the top of the batter washer which allows the bolt to swing freely to the desired angle. Nail holes are provided for easy attaching to wales or strongbacks. Small cleats on the underside prevent slippage when the batter washer is not nailed. The units are available for use with ½-in., ¾-in., 1-in. Tylags.

. . . Write No. 217

Blasting primer for ammonium nitrate

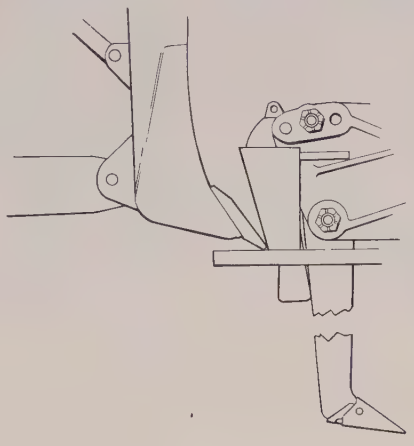
A blasting primer for use with ammonium nitrate-fuel oil blasting agents which is said to be safer and surer than dynamite is announced by **Propellex Chemical Division of Chromalloy Corp.** Called Saf-T-Boost Initiator, it requires no tying, splicing, or taping, and is suitable for decking, stemming, or any other blasting technique. The primer with 29 lb. of ammonium nitrate-oil mixture can replace a 30-lb. dynamite primer for less than half the cost, with equal or

better results. The new material is resistant to freezing temperatures. Packed in a cardboard container, it weighs 13 oz. and is 3 in. in diameter by 2 in. high. Two ¼-in. holes through the primer permit quick and easy threading of the initiating cord. Fifty-grain Primacord is most commonly used. It delivers a detonation velocity of 20,000 fps. The Propellex material withstands the roughest treatment without detonating and does not explode in fire.

. . . Write No. 218

Push block for tandem ripping

A push block that attaches directly to the ripper shank and can be installed without welding or cutting is announced by **Caterpillar Tractor Co.** Made to fit either No. 8 or No. 9 rippers, the block is mounted on the rear of the straight shank. It is pinned at the top through the rear clevis pin hole and requires neither welding nor cutting for installation. In operation, the blade of the second tractor is placed in the "V" formed at



the junction of the vertical block and a horizontal plate. The block extends below the plate and contacts the rear of the ripper shank at a point nearly at ground level. This low contact point reduces bending force on clevis pins and beam. The unit weighs 1,350 lb.

. . . Write No. 219

Bull horn has range of one mile

A power-assisted megaphone which can cut through severe construction noise levels and has a range up to one mile is marked by **Audio Equipment Co. Inc.** Called

"Super-Hailer," the one-piece waterproof unit has a 16-watt output. Transistor powered amplifier runs on 10 self-contained "D" size flashlight cells. The unit is all aluminum construction and weighs 6¾ lb. It is 16 in. long.

. . . Write No. 220

News of DISTRIBUTORS

Ed Arbak made sales manager of N C Machinery Division

Ed Arbak, parts manager for Northern Commercial Co., has been appointed general sales manager of the firm's Machinery Division, Caterpillar dealer for western Washington, Alaska, and the Yukon Territory. Arbak is well known throughout the Northwest because of his long association with Cat dealers. Prior to joining Northern Commercial he was parts and service manager for the former Caterpillar dealer in Tacoma.

In making the announcement, Truman Sage, general manager of the Division, stated that "We have created this new position in a move to more completely integrate our Alaska and western Washington sales efforts, thus improving our service to customers in our territory." Working closely with Arbak are sales managers Pat Bell for Alaska, Al Batschi for Washington, and Eldon Erickson, engine sales manager.

Hamilton Engine adds salesman

Donald G. Hale has joined Hamilton Engine Sales, Inc., Portland, Ore., as salesman. He comes from Houston, Tex., where he was employed as a sales representative.

Newly appointed B-E distributor

Contractors' Equipment & Supply Co., Albuquerque, has been appointed distributor for Bucyrus-Erie crane-excavator and the "Hydrocrane" lines in New Mexico, excluding Hidalgo, Grant, Luna, Dona Ana, Otero, Eddy and Lea counties. Offered is sales and service on the full line of B-E convertible crane-excavators; dragline buckets; 10, 15, 25, and 45-ton "Transit" machines, the 5 and 12-ton capacity, truck-mounted, all hydraulic "Hydrocrane" and attachments.

New Hi-Way distributors in West

Two new Western distributors have been appointed by Highway Equipment Co., Cedar Rapids, Ia. At Reno, Nev., General Equipment Co. will handle the Hi-Way line of ice control equipment, self-propelled and towed-type chip spreaders and asphalt pavers in most of Nevada state and portions of Nevada, Placer and Eldorado counties in California. The same Hi-Way equipment will be distributed by The Sawtooth Company, Boise, Idaho, in all of Idaho south of and including Adam, Valley and Lemhi counties.

Unit names Arizona and California distributors

Unit Crane & Shovel Co. recently appointed two new dealers to handle its full line of shovels and cranes in this Western region. Flack Arizona Co., Phoenix, will cover all of Arizona. Robinson-Coney Co., San Francisco, will cover an area embracing thirteen counties in the northern portion of California. Both distributorships offer complete sales and field service for all Unit users.

New company handles Radicon line

Appointment of another Western gear distributor for David Brown, Inc., San Leandro, Calif., is announced. A newly organized company specializing in power transmission equipment, Semon Bearing & Industrial Supply, 819 South Park, Tucson, Ariz., will handle Radicon gear-motors for the southern Arizona counties of Pima, Santa Cruz and Cochise. The new firm is under the direction of Ralph Helms, general manager.

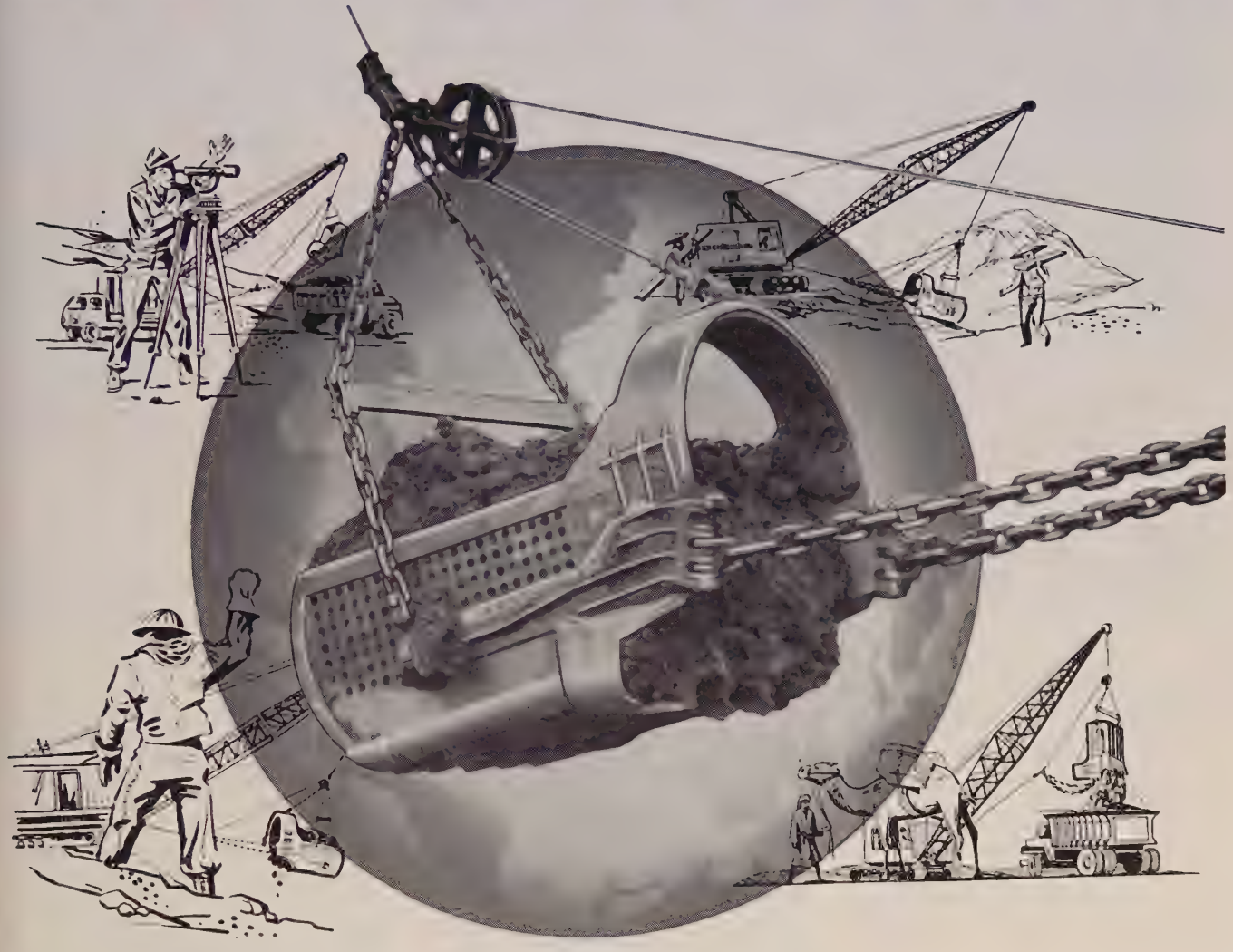
Champion announces district representative

Burke Concrete Accessories Co., San Francisco, has been appointed a distributor for Champion vibrators in Northern California. This equipment is a product of Champion Manufacturing Co. of St. Louis, Mo. Phillip C. Pendleton, newly appointed district representative of Champion in Northern California, will be working with distributors on sales of all the company's products.

Massey-Ferguson area dealers named

Massey-Ferguson has added 27 new names to its list of Western area dealers handling its industrial equipment. They are: In Montana —Billings Machinery, Inc., Billings; Townsend Farm Equipment Co., Townsend, and Haas & Associates Implement Co., Fort Benton. Colorado—Parker's GMC Truck & Farm

HENDRIX
DRAGLINE BUCKETS



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Hendrix Lightweight Dragline Buckets

HENDRIX MANUFACTURING CO., Inc.
MANSFIELD, LOUISIANA

. . . for more details, write No. 67 on Reader Service Postcard

Supply, Eads; Seedorf Motor & Implement Co., Yuma; Walsh Lumber Co., Walsh, and Wray Equipment Co., Wray. Nevada—Inland Service & Supply Corp., Las Vegas. California—Crescent Equipment Co., Crescent City; Farmers Tractor & Equipment Co. of Imperial Valley, Inc., El Centro; Lampson Tractor & Equipment Co., Geyserville; Mid-Valley Implement Co., Merced; Wm. N. Box, Union City; S & M Equipment Rentals, Goleta; Woldemar Tractor Co., Petaluma, and Tracy Tractor Co., Tracy.

In Washington—Grange Supply Co. of Odessa, Inc., Odessa; Montesano Feed & Equipment Co., Montesano, and Walla Walla Implement Co., Walla Walla. Oregon—Hood River Supply Assoc., Hood River; Peterson Farm Equipment, St. Helens; Ace Equipment Sales, Portland; Barney Machine Works, Prineville; Clackamas County Tractor & Implement, Beaver Creek; B & R Equipment Sales, Eugene, and Emigrant Equipment, Pendleton. Wyoming—Hank's Car Market, Buffalo.

Personnel changes on Jenkins staff

Glen R. Gunderson, widely known in Western trucking circles as a staff member of J. T. Jenkins Co., has been named manager of the San Francisco branch of this large Kenworth truck distributor organization. Headquartered in Los Angeles, the Jenkins company has represented Kenworth Motor Truck Co. of Seattle for more than 25 years, and Gunderson has served on its staff for 15 years, recently as sales engineer.

Other personnel changes affecting the San Francisco office are: James E. Cowen has been transferred as resident representative at Ukiah, Calif. Walter Nichol, field service manager, has been assigned as sales representative at San Francisco. Dale Petit succeeds him as field service manager. Roy Smith has moved from the firm's Phoenix, Ariz., branch to Redding, Calif., as resident sales representative. E. A. Christern continues to serve as the company's sales representative in the Sacramento, Stockton, and northern Nevada areas, headquartering at San Francisco.

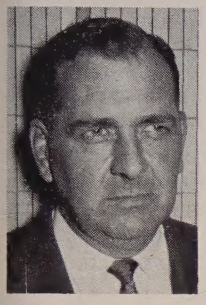
Cummins Service transfers two

Two men, Clarence H. Wand, Jr., and Norman Corbet, have been transferred to the Bakersfield, Calif., staff of Cummins Service & Sales, from the Los Angeles headquarters. Wand recently was pro-

moted to the newly created position of assistant branch manager. Corbet has just become Cummins salesman for Kern County, taking over most of the accounts serviced by Dick Armstrong. The latter now will cover western Kern and northern Santa Barbara counties.

Bob Madden rejoins Air-Mac

Air-Mac, Inc., announces that Bob Madden has re-joined its Construction Equipment Division and will call on customers in Tacoma and southwest Washington, and



Bob Madden

also handle many Seattle accounts. Madden has had many years of experience with this distributor's leading lines: P&H shovels and Rex concrete equipment.

MANUFACTURERS

Pacific Corrugated Culvert promotes Atwood to district mgr.

William H. Atwood has been appointed district manager of Pacific Corrugated Culvert Co.'s operations at Redding, Calif., serving contractors in the northern eleven California counties. Atwood comes from the company's Irwindale, Calif., headquarters where he has been office engineer for the past two and a half years. He brings to his new position experience compiled in various posts with the U. S. Corps of Engineers, County of Los Angeles, and city governments.

Challenge Cook promotes two

J. E. Hall, president, Challenge-Cook Bros., Inc., Los Angeles, announces two new appointments. Frank W. Kirksey has been made company project manager for all construction hauling equipment. Kirksey was formerly the Southern California regional sales manager. Walter P. Uschyk, who for the past

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Write Box 8A,
WESTERN CONSTRUCTION
609 Mission Street, San Francisco 5, Cal.

Kirksey

Uschyk

five years has been with Challenge-Cook working on sales and as assistant manager of the Los Angeles Division, has been appointed to the post of manager of the Los Angeles Truck and Equipment Division.

Copco adds to California sales staff

Addition of Norman W. Blad to its San Carlos, Calif., district construction and mining equipment sales staff, is announced by Atlas Copco Pacific Inc. Blad joins the world-wide Copco organization from six years supervisory experience on Utah and Nevada construction projects. He will be based at Redding in Northern California's mountainous area, where several major hydroelectric projects are under way on which Copco rock-drilling products are used.

Schaab made Heil district manager

The Heil Co., Milwaukee, Wis., announces the recent appointment of Joseph T. Schaab to the position of district manager of its Seattle, Wash., sales office, which serves the states of Alaska, Washington, Oregon, Idaho, and a portion of Montana. Until this recent appointment Schaab was a district sales representative.

Goodrich plans Denver expansion

Construction is scheduled to be completed late this year on a 7,470-sq. ft. expansion to the offices and warehouse of The B. F. Goodrich Co. at 2500 W. 8th Ave., Denver, Colo. This will provide more distribution facilities for Goodrich products in the area.

New location

The San Francisco office of Traylor Engineering & Manufacturing Division of Fuller Company has moved into the Fuller offices in San Francisco, at 564 Market St. Edward B. Greef is in charge of Traylor sales in California, Nevada, Arizona and New Mexico.

C. I. Bohmer joins Hercules Galion Products

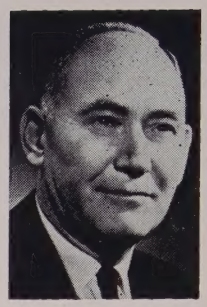
C. I. Bohmer has been appointed equipment manager of Hercules Galion Products, Inc. Bohmer joins his son, Robert A. Bohmer, who has been product manager of the firm's Transit Mixer Division since its inception in 1955. According to A. Dangler, Jr., executive vice president of the Galion, Ohio, manufacturer, the senior Bohmer will place special emphasis on the establishment of new transit-mixer markets, bringing to his new post a vast experience in the transit-mixer field.

Clark establishes West Coast depot

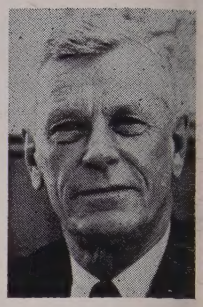
A new West Coast parts depot designed to speed delivery of parts of infrequent usage to Michigan owners west of the Rocky Mountains has been established by the Construction Machinery Division of Clark Equipment Co. Located at South Eight and Wright avenues, Richmond, Calif., the new depot will ultimately carry several thousand parts of this nature.

Robert Bradley heads IH division

Robert B. Bradley has been elected vice president and executive head of International Harvester Co.'s Construction Equipment Division. Bradley, president of International Harvester Co. of Canada, Ltd., succeeds Harald T. Reishus, retired. Bradley joined IH in 1929 as a salesman and since then has held important posts both here and overseas. Reishus started with Harvester in 1923 in district sales. In 1944 he was manager of the Eastern sales region and when the Construction Equipment Division was formed that year he was appointed general manager and executive head. He was elected vice president in 1953.



Bradley



Reishus

Mixermobile ownership passes to Gus Wagner

Gus H. Wagner has become sole owner of Mixermobile Manufacturers, Portland, Ore., the company that introduced mobile concrete mixing equipment and the Scoopmobile line of self-propelled loaders used in heavy construction. Gus Wagner purchased the interests of his brothers, Harold and Eddie, and will continue as president. Stan Wagner, his son, is general manager, and another son, Vern, has been named vice president and plant manager. Loren Martin, Pacific Northwest district representative, was named general sales manager.

Kaiser Steel opens New Mexico office

Kaiser Steel Corp. has opened a sales office in Albuquerque, N. Mex., headed by Keith M. Meserve, who has been transferred from the Denver sales office. The new office, located at 336 Korber Bldg., will provide more complete service to the company's Rocky Mountain and Southwest customers.

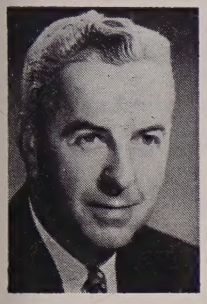
Wiley A. Robertson dies

Wiley A. Robertson, former service manager for Maxi Corporation, died recently at the age of fifty-one. He had established a

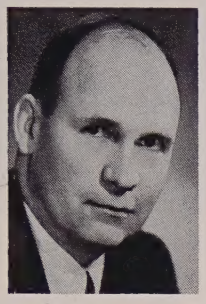
wide friendship throughout the Western states while with Maxi, and more recently as parts manager for the Western regional office of Insley Manufacturing Corp., Alhambra, Calif.

Top level appointments; Western expansion by Euclid

Appointment of V. L. Snow as general manager of Euclid Division of General Motors Corp. is announced. He succeeds R. Q. Armington who resigned to devote full time to his family manufacturing interests. Snow has held various sales and engineering positions since joining Euclid in 1935 as a member of the engineering design department. He has been director of engineering since 1958.



Snow



Armington

Another Euclid announcement concerns the establishment of a new depot. Construction is now under way in Portland, Ore., of a regional parts center to service Euclid distributors in Northern California, Oregon, Washington, Idaho and western Canada. The building will be ready for occupancy this fall.

Two appointments by Rucker

Two engineering appointments are announced by The Rucker Co. Alan G. Hughes has been named as inside sales engineer at the company's headquarters office in Oakland, Calif. He has a background of more than seven years in sales engineering. Max C. Thompson, with nine years of experience in engineering, has been added to the Rucker staff as inside sales engineer in the Portland, Ore., office.

Jonathan Jones dies

Jonathan Jones, 78, retired chief engineer of the fabricated steel construction division of Bethlehem Steel Co., died recently at Bethlehem, Pa.

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