

NEEDED: Better application of today's equipment and methods by Western highway builders

SPEED is needed. Time is money for engineer and contractor alike. There's more and more work coming up. Use the right rig in the right place, and get to the next job sooner.

DEPENDABILITY is needed. A machine beats manpower only when it's running. When one rig is down, others are stalled too. And it takes costly manpower to get that labor-saving device going again.

PROFIT is needed. Know what your equipment can do. Learn what it costs to run. Bid the job honestly. Pick your operators carefully. Stick to that maintenance program. Run a safe job. You don't need new equipment when you're not doing your best with what you have.

EQUIPMENT IS THE KEY to highway construction that is economical for the owner and profitable for the builder. The record-size jobs of any year prove it. And the bidders on the rest of the work come to have no choice.

Quantities are always inching up. Bigger jobs require bigger production capacity. Contractors have asked for it. And whenever they get it without increasing personnel, the effect is that bigger equipment alone has made the difference. On the basis of unit production this means more economy. You get it with more machines and fewer men.

BETTER APPLICATION of equipment thus becomes the first goal in highway contracting, and the theme of this issue of **Western Construction**. Here are equipment and methods development facts from the West. You can see for yourself what the other fellow is doing and what he is thinking—about methods, equipment, and materials—today and for the future. And you can check what's on hand right now for doing a better job.

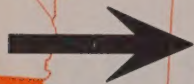
WHAT'S DOING? Section One (begins next page) hits the high spots of today's Western highway construction. Here, in 13 articles, are examples of Western techniques in crushing, ripping, precast erection, bituminous patching, cement-treated base . . . see for yourself.

WHAT'S WANTED? Section Two (begins page 102) goes a step into the future with Western highway builders and maintenance men. Where there's general agreement on a need—and it matches your own view—then you can bet that it will be fulfilled.

WHAT'S AVAILABLE? Section Three (begins page 136) is a road show on paper. Here are 28 pages for you to wander through, without getting bunions, and yet you'll see the latest and best machines for every phase of highway work. From low-boys to get your plant on the job, to rollers that iron out the last wrinkle. And in between are all the production items themselves—for excavating, processing, pushing, loading, hauling, spreading, compacting, batching, laydown, finishing, and rolling again.

WHAT'S DOING

PAGES 26-101



....today's Western highway construction — On-the-spot reports from jobs all over the West

"... A contractor might have bid the work on a smaller crusher plan, but he would have had to excavate lots more to compensate for waste in the big cobles."

Page 28

"... When you consider that 26 jackhammers were used and only 4 wagon drills, the amount of drilling on steep slopes becomes apparent."

Page 31

"... California specs permit the contractor to choose between mixing the cement treated base on the road or in a plant. The road-mixed method has proved most popular."

Page 53

"... Why tow it when you can tote it? Idaho asked that question after giving portable patchers for asphalt a thorough trial."

Page 65

"17.2.4.1 The contractor may use any type of roller equipment he may deem necessary to obtain a required compaction."

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HOT-MIX PAVER passes over welded wire fabric in test resurfacing of U.S. 40 near Vallejo. Steel rail suspended from front of paver irons out fabric for laydown. Attachment at right rear of machine catches spill-over hot mix and distributes it as edging.

WHAT'S DOING

SURFACING—Controlling cracks in asphaltic concrete overlays with wire reinforcement.

CALIFORNIA has joined the growing list of states and municipalities which are experimenting with the use of welded wire fabric and other steel reinforcement for the control of reflection cracking in bituminous resurfacing. Late last year the state's Division of Highways resurfaced a mile-long stretch of the westbound lane of U. S. 40 near Vallejo, using variously, welded wire fabric, bituminous road mesh, and expanded metal mesh in separate test sections.

The experimental project, conducted by the Division of Highway's Materials and Research Department headed up by F. N. Hveem, was under the immediate supervision of District 10 Highway Engineer John Meyer, and stemmed out of several preliminary laboratory trials of reinforced bituminous construction in the Sacramento yards.

Old paving problem

The existing non-reinforced portland cement concrete pavement, constructed in 1935 with 20-ft. joints, was rather badly cracked and required extensive patching, especially in the travel lane. Prior to resurfacing, the original slabs were subsealed, and a tack coat applied to the surface.

The metal reinforcement was placed directly over the tack coat. This was then covered with two 1½-in. courses of California Type A which is a dense graded hot mix with

maximum stones of ½ in., topped by a 1-in. course of open graded mix also with ½-in. maximum stones, purposely coarse to provide a more non-skid surface.

Two sections, each 600 ft. long, were reinforced with welded wire fabric. One length used fabric style 6x6-10/10, that is, the spacings were 6 by 6 in., of number 10 gage wire, and weight 21 lb. per 100 sq. ft. The other section was reinforced with 3x6-10/10 fabric which is the style that has been employed generally throughout the country on other test installations. Style 3x6-10/10 weighs 30 lb. per 100 sq. ft.

The sheets of fabric, 11½ ft. wide and 8 ft. long, were laid out on the pavement across the full lane width and were overlapped and fastened on the longitudinal wires with hog rings. In the case of the 3x6-in. fabric, the 3-in. spaced wires were placed perpendicular to the center line of the highway, previous tests in other states having indicated this position to be more effective in controlling crack formation and in preventing "rippling." The fabric was laid continuously over the two 600-ft. sections.

Four of the test sections, each 400 ft. long, were covered with various types of expanded metal mesh. The individual sheets of various sized diamonds ranged from ½ to 1½ in. and were of different gages. They were delivered to the job in 2x8 or 4x8-ft.



WORKERS PLACE sheets of welded wire fabric on two 600-ft. sections of the mile long project. Hog rings fasten longitudinal wire together to join individual sheets. Expanded metal mesh of various weights and

size squares was used on other test sections. Purpose of the reinforcement is twofold for the 3-in. overlay: it will reduce reflective cracking from underlying concrete and prevent rippling.

sheets. In each section one size and gage was laid in both 2 and 4-ft. widths. These sheets were not laid continuously, but were placed over the individual joints and cracks in the existing pavement. They were securely fastened to the pavement by means of a standard stud driver, which fires a stud through a disc and into the pavement.

On two other sections, large sheets of bituminous road mesh, 11½ ft. wide and 8 ft. long, were used. This mesh is made from expanded metal, but in this case, the diamonds are very large. In one section the diamonds were as much as 6x12 in.; in the other, 3x8, weighing 20 and 30 lb. per 100 sq. ft., respectively. The sheets were overlapped the width of one diamond and were fastened together with hog rings. The 3x8 mesh was laid in a 600-ft. section on both travel and passing lanes. The 6x12 was laid in two sections of the travel lane, totaling 180 ft.

Special paving attachments

The hot mix was laid over the entire one mile project, 3,500 ft. of which is reinforced, with a standard Barber-Greene paver. In the case of the small expanded metal sheets (over joints and cracks only), no changes were made on the paver. For paving over the full lane-width, continuously-laid, welded wire fabric and bituminous road mesh sheets—hold-down devices were added to iron the wire out against the pavement just ahead of the conveyor screw of the

paver. Five 9-ft. long steel rails were used for the purpose, being fastened at the front of the paver, and trailing along like sleds under the hopper. The three inside rails between the tracks were made up especially to fit

under the hopper and weighed 198 lb. each. The single rails outside each track weighed 180 lb. each.

The various test sections have been well pinpointed for future study, with black-on-white marker signs in U. S. 40's medial strip identifying the start and end of each section, the type of reinforcement, and whether in the travel or passing lane. For control purposes, non-reinforced sections separate the test sections from each other.

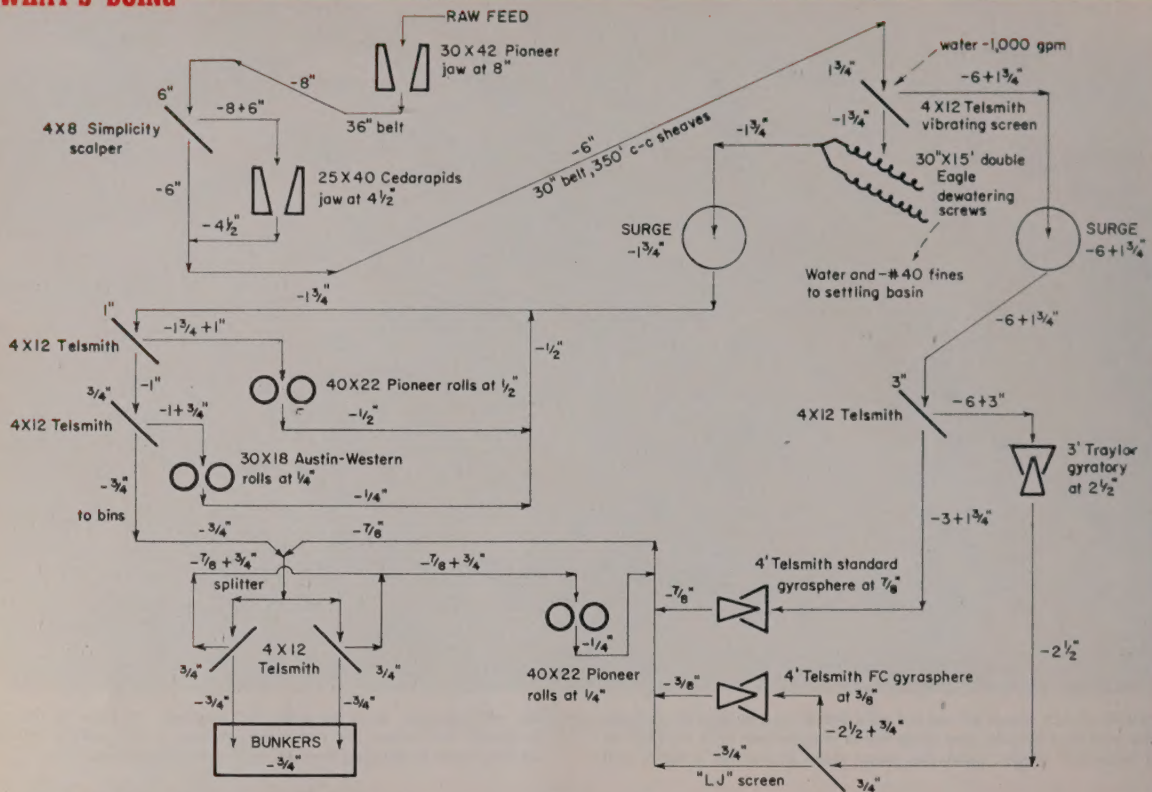
Results will be watched

The actual "in-service" performance of the Vallejo test sections which carry heavy traffic loads between San Francisco and the Sacramento Valley to the east, will be closely studied during the coming years. These results, coupled with the results of earlier installations of steel reinforcement (mostly welded wire fabric) in asphaltic concrete, probably will be cited to prove or disprove the economic justification for reinforcement in terms of reduced maintenance and longer service life.

Contractor for the U. S. 40 job was Lee Immel of San Pablo, California. L. E. Daniel was the resident engineer and Vaughn Marker represented Headquarters Construction Department. Actively associated with Materials and Research Engineer F. N. Hveem in a close study of the project were Ernest Zube, supervising materials and research engineer, and John Skog, associate chemical testing engineer.



PINPOINTING just where each test section starts and ends for future study are these well-marked identifying signs.



CRUSHERS — Eight of 'em set the price (\$967,337) and the pace (9½ months) on this Oregon expressway job.

ROCK CRUSHING for the biggest job of its type in Oregon state highway history is being done by Newport Construction Co. in Portland at some unusually low unit prices. For 349,000 cu. yd. of 2½-in.-minus base course material the price is \$1.48, including a 6-mi. average haul. Reasons for the favorable contract price, which saw Newport leave \$93,000 on the table at a letting last August, are a king-size rock processing setup and the employment of 12 specially built 10½-yd. on-highway bottom-dump trailers.

What's involved

The work is a 9.3-mi. stretch of the Portland - Salem Expressway, just south of the Willamette River, and it might as well be a fair-sized dam if rock quantities were the measure. In addition to the 2½-in.-minus, there is 42,000 cu. yd. of ¾-in.-minus leveling course rock, and 60,000 cu. yd. of ¾-to-¼ and ¼-to-0 aggregate for plant mix. Newport's contract covers production and laying of this material on a roadbed graded by others. The binder course and 4 in. of plant mix have been subbed to Warren Northwest.

The size of the contractor's rock plant, shown schematically on these

pages, is less remarkable when considered against several governing conditions. These show it to be just plain smart business for Newport.

One point is the timetable for the work. The contract was awarded only last August, but no base course could be laid before this spring. And yet all paving must be ready for traffic by October 15. A bold approach was the answer on this point.

Also, the contractor is working a riverbank pit that presents some difficult materials problems—good-sized boulders and niggerheads on one hand, and a terrific excess of 40-minus material on the other. This latter is characteristic of this reach of the Willamette River valley and has made troubles in drainage and excavation, in slope stabilization, and roadbed compaction, for highway engineers and contractors all up and down the line of the new expressway.

Because of the time element and to assure bidding on an economical basis, the state highway department emphasized big plant capacity in the specifications. A 30x42 jaw is the minimum acceptable crusher size for taking the raw feed. A contractor might have bid the work successfully on a smaller crusher plan, but he would have had to excavate lots more

material to compensate for waste in the big cobbles.

The fines are another story. They have been a recurring problem for various contractors, including Newport, who have worked this same borrow pit in the last 2 years. Specifications now provide for the first time that a large percentage of the 40-minus material be removed.

What's the answer

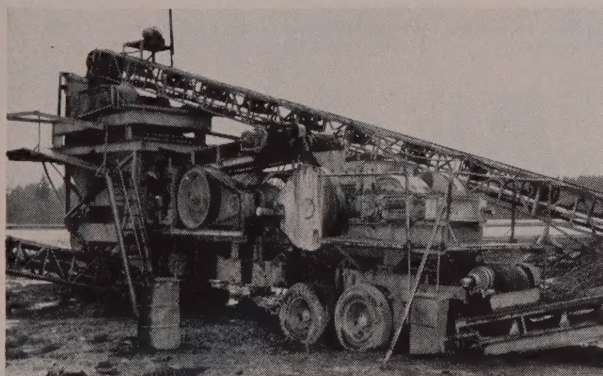
And the answer is straightforward: washing. Newport's first screen tower incorporates an input of 1,000 gpm. of water. It doesn't do a concrete aggregate washing job, but enough to eliminate the excess 40-minus silty sand that is so unstable. Material smaller than 1¾ in. passes the screen and drops into a pair of Eagle washing and dewatering screws. A flume to a settling basin takes the 40-minus out right there.

The setup is so simple, involving only a 100-hp. 2-stage pump and a bulldozed dike forming a settling basin, that hindsight now leads Newport to think that washing could have been an economical answer on earlier work. Though not then required by the specifications, it might have avoided choking and difficulties in classification elsewhere in the

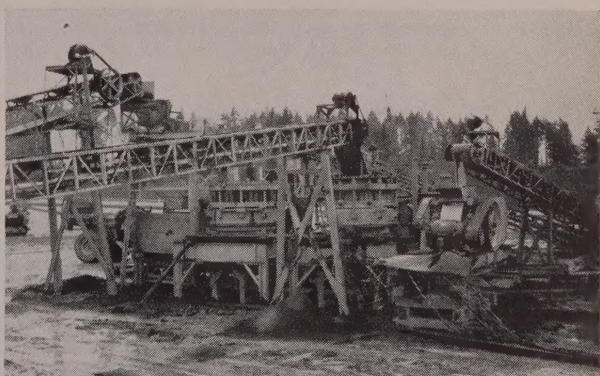


PLANT PANORAMA even shows drizzling Oregon rain and mud that kept Newport from spreading base material until well into May. This

elevation "looks into" bottom of plan on opposite page, drawn and photographed during production of leveling course.



TWO SETS OF ROLLS operate in a closed circuit to reduce 1¾-in.-minus to ¾-in. minus leveling course material.



TWO GYRATORY CRUSHERS grind 3-in. rock to near-spec size and a set of rolls (right) reduce oversize from bunker screens.

processing plants on the earlier contracts.

Newport's operations began in January, after 4 months for setting up, and since then the plant arrangement has been altered twice. First, all 60,000 yd. of "B"-mix rock was processed, then 42,000 yd. of leveling course material. This work was just about wound up in the middle part of April. One more switch in the crusher settings and conveyor positions would ready the plant for the processing of 349,000 yd. of base material. Production from the plant is on the order of 150 yd. per hr., something between 1,000 and 1,200 yd. per shift.

What's different

Other than the processing scheme itself, the plant units are also of interest. The machinery components—crushers and screens—are of familiar commercial manufacture, but nothing else is. Like Rogers Construction Co. and Babler Bros. and other Northwest contractors performing this type of work, Newport prefers to build its own plant units. The reason is a simple one, according to

Marshall Newport, vice president of the firm. It's a matter of cost. Conveyors frames and bunkers include a lot of air in their volume, and shipping them from an eastern manufacturing point would be expensive out of proportion to the advantages to be gained.

This is not true, of course, with small, highly portable—and very compact—crushing plants. But when larger capacity is required, though still short of a completely permanent installation, the semi-portable plant units just aren't to be found commercially. So Newport's plant is a very clever combination of units which are trailer-mounted and which can be moved on the highways with the least amount of dismantling.

The featured piece of auxiliary equipment in the plant operation is the type of hauling unit, the Koehring Dumptor. There is nothing to beat a Dumpy for quick work on a short haul, according to Newport, unless it would be a Tournarocker where its traction and precision spotting offer advantages in dumping.

The Dumpies at the Willamette River are both diesels and gasoline-

operated. Diesel in the excavation pit, working with a 1¾-yd. shovel, where their extra git-up on the steep pit road is a help. The gasoline rigs handle material from the bunkers to stockpile.

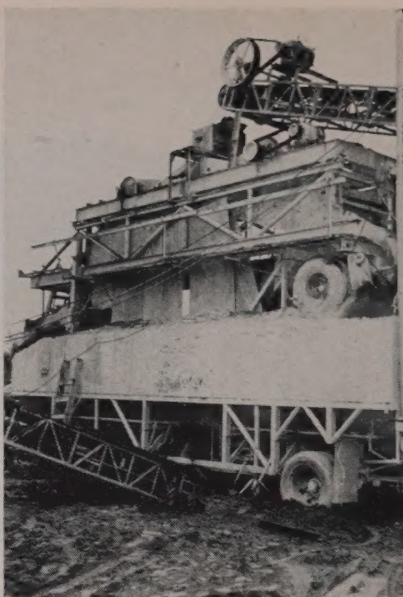
What's new

Newport's work on the grade, just now getting started, will make this job worth observing from another standpoint. And here is where the special hauling units come in. For the 6-mi. average haul of road materials to the job, the contractor has purchased twelve 10½-yd. (285-cu. ft. struck) on-highway trailers from Utility Trailer Manufacturing Co. Built by Western Iron & Body Works of Oakland, the trailer bodies are somewhat similar to bulk cement haulers. Fully assembled and ready to roll, they weigh less than 5,000 lb.

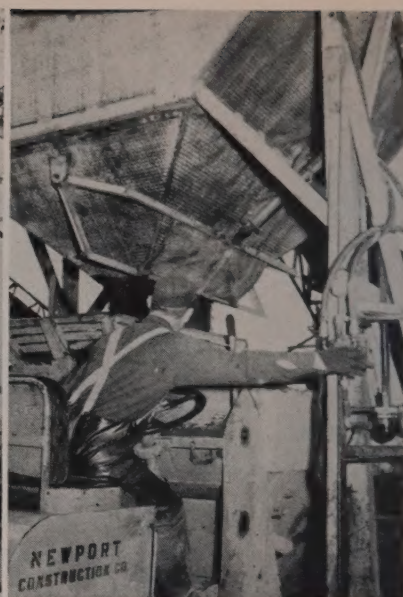
But weight is only one respect in which these trailers show their special design for highway construction. They can be used either as semi-trailers or as full trailers. And one of each type, hauled by a 200-hp. tractor, will make up a hauling unit for Newport and still be within legal



SLICK AND UNSTABLE material digs easily, will make good base after having "bath."



SCREENS on one trailer, bunkers on another give Newport the portability he needs.



HYDRAULIC GATE on delivery hopper saves a man, makes for quicker loading of Dumpy.



SPECIAL BODIES of Cor-Ten make for light weight, permit big payload within legal limits. They'll be pulled singly for short hauls on soft grade early in season, then in doubles later on when grade is firm and haul longer.



FATHER-SON contracting team are Ross (right) and Marshall Newport.



FIELD OFFICE manager Dick Ley gets visit from Cecil Wegner, superintendent.

limits for length on the short portion of existing highway (new and not yet open) that serves as a haul road.

The big functional feature of the design is in the bottom-dump gates. These are transverse instead of longitudinal. As a result, the unit doesn't dump a windrow. Instead it leaves a blanket of material—in this case 8½ ft. wide—that can be rolled without the necessity of intermediate blade work.

Contracts and personnel

Grading has been in two pieces, the south 12 mi. by Roy L. Houck & Son, and the other 12 mi. by R. A. Heintz Construction Co. Base course and surfacing is in three contracts. The southerly 7½ mi. is under contract to Parker-Schramm, the central 6.6 mi. is being done by Porter W. Yett, and the northerly 9.3 mi. comprises Newport's contract.

Structures—24 in all—have been done under five contracts held by Tom Lillebo, Hamilton & Thoms, Johnson & Bryant, Berkmeier & Saramel, and Lockyear & White, Inc.

For the state all this work is being done under the Salem Division (No. 2) of the Oregon Highway Department, with J. D. Walker as division engineer. Maurice Juve is resident engineer, with Glenn Starkey as assistant resident engineer. George Shull is inspector. The bridge department resident engineer is L. L. Jensen.

For Newport Construction Co., Cecil Wegner is general superintendent and John O. Wilson is superintendent. Frank Fleck is equipment superintendent. Plant operators are D. F. Jahneke, R. L. Richards, and Daun Dice. Robert Stoltzenberg is maintenance mechanic.



SHOVELING FROM THE STREAM BED, these two Northwest shovels are handling some tough rose granite. Rugged Euclids haul the rock up and downstream to fill in areas (on the right) for the new road location.

Narrow canyon with steep walls hugged old road at this location, but a single large blast brought the sides down over a 200-ft. distance. Some drill holes had to be 75 ft. deep to do this.

WHAT'S DOING

ROCK EXCAVATION — *Special blasting sticks, portable "stationary" air compressors, and fast rock handling beat spring run-off on this Colorado road.*

WORKING IN FRIGID midwinter was a necessity on a \$400,000 contract held by the Lowdermilk Brothers for 4½ mi. of roadwork on the South St. Vrain River road out of Lyons, Colorado. Their work was on a section that leaves the rolling foothills on the eastern side of the Rockies and enters into some rugged mountain terrain. This is a Colorado Forest highway project under direct supervision of the Bureau of Public Roads.

Rugged canyon—rugged weather

About 1½ mi. of the road section was up a narrow canyon that required crossing and recrossing the river channel, and a good part of the time operating directly in the river

channel. After the contract award was made on February 3 this year, the firm lost no time in moving in to do work on the river section while the water flow was small. Although 300 calendar days were allowed by the contract, the heavy rock work along 1½ mi. of the river had to be done before the spring thaws brought a raging torrent of water down the canyon.

Tough rock

To accomplish this, an impressive array of rock drilling and rock moving equipment was assembled for a contract of this type. Involved was the handling of 35,000 cu. yd. of rock in the form of large boulders in the creek channel, and also cutting into

the canyon walls to widen the road.

Portable "stationary" compressors

To supply air for drilling operations, what amounted to portable "stationary" air compressors were used. All compressors and drilling equipment were manufactured by Gardner-Denver; a brand long preferred by this firm. Two 315-cu. ft. compressors were mounted on individual Cat RD8s for easy maneuvering into tight places. One 500-cu. ft. compressor was mounted on a lowboy while a larger 900-cu. ft. compressor was mounted on a trailer frame. Half way through the job a new 600-cu. ft. compressor was purchased and hooked in tandem with the 900-cu. ft. one. This combination



DIFFICULT-TO-GET-AT places on snow-covered rocks were a jackhammer drill specialty. At such places, special 2-ft. long sticks of DuPont dynamite cut loading time by a third.

gave a steady continuous air supply for a large number of drills.

When you consider that 26 jackhammer drills were used and only 4 wagon drills, the amount of drilling done on steep slopes and breaking up of individual boulders becomes apparent. Rock encountered was solid granite and hard sandstone. For the wagon drills, 6-ft. sectional steel was used with up to 75-ft. long holes being drilled. All drill heads were equipped with Timken carbide insert tips.

Special blasting powder

At the request of Lowdermilk Brothers, all blasting powder was supplied by Du Pont in special 1½-in. x 2-ft. long sticks as compared to the normal 8-in. long stick. This one factor cut loading time down by one-third with a corresponding reduction in cost. There was no extra charge by Du Pont for the longer sticks. Most powder used was 40%, but some 60% was used in the bottom or lift shots.

Operation "upstream"

The overall approach on blasting and excavation on the 1½-mi. stretch was to go upstream. With the small stream flow, sufficient water was able to flow through blasted rock sections that filled up the channel, without there being any ponding upstream. This allowed an orderly ex-



GARDNER-DENVER was the compressor and drilling show here. An older, reliable 900-cfm. unit is mounted on a lowboy and joined with a new 6-cfm. unit. Air pipe leads off to the right where more Gardner-Denver jackhammers were used in drilling large boulders lying in the future roadbed.



CULVERT PLACEMENT occurred an average of every 300 ft. on the 4-mi. long job and had to be closely scheduled with filling operations. Cat D8 bulldozed trench for culvert. Culvert lengths of about 20 ft. were then picked up, delivered, and lowered into trench by use of A-frame on truck.

cavation and filling procedure with minimum stream interference to the work.

In one concentrated canyon section, a single blast brought down both canyon walls. Rock excavation was handled by two Northwest 80D shovels—each loading two Euclid trucks that disposed of the material up and downstream. Each shovel was able to handle nearly 1,500 cu. yd. per 8-hr. shift. Cat D8 bulldozers were used to smooth out the haul roads and the loading area. The unit price bid on the handling of all excavation was 97c per cu. yd.

Culverts everywhere

Culverts occurred an average of every 300 ft. to intercept the side hill drainage. Scheduling operations so that these were put in at the proper elevation and at the right time so as to not tie up hauling operations assumed major importance. Culverts ranged from 24 to 36 in. in diameter and were manufactured by Denver

Steel Co. The culverts were moved and lowered into place in an excavated trench by use of an A-frame mounted on a flatbed truck.

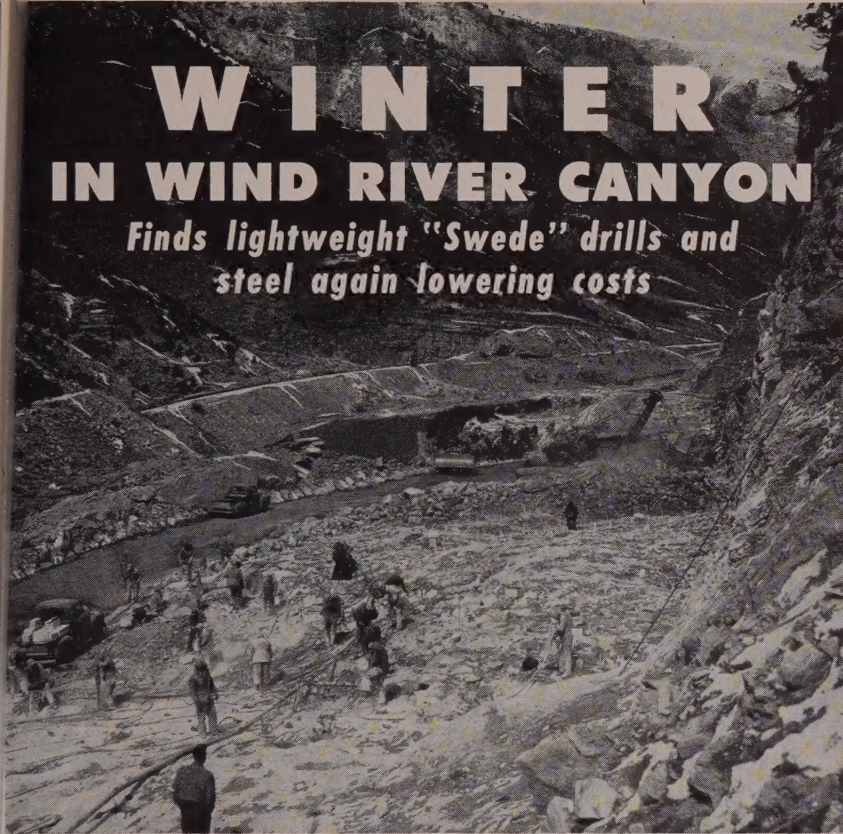
With the hardest part of the job done during the winter, handling the remainder of the 178,000 cu. yd. of unclassified excavation in the gently rolling hills below the canyon will be a good summertime operation. The roadway will have a 2-in. minus crushed gravel sub-base and a 1-in. minus gravel surface processed with an MC asphalt.

Key personnel

Personnel on this project for the contractor include Wayne Lowdermilk, superintendent; R. G. McGilivray, structural superintendent; Frank English, excavation foreman; Ted Kinsman, labor foreman; John T. Guthrie, powder and drill foreman; Lloyd C. Smith, timekeeper. Representing the U. S. Bureau of Public Roads is Don Yarrington, project engineer.

WINTER IN WIND RIVER CANYON

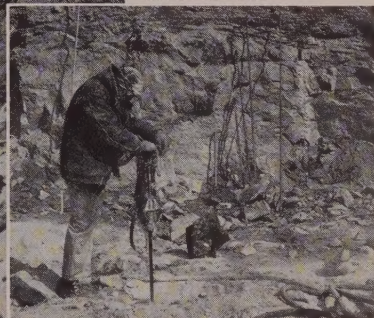
Finds lightweight "Swede" drills and steel again lowering costs



AT WORK WITH ATLAS COPCO
AND
INLAND CONSTRUCTION CO.
of OMAHA, NEBRASKA
A. B. NUSS
FIRST VICE PRESIDENT
M. D. McLAUGHLIN
DIVISION MANAGER
DAN RATLIFF
PROJECT SUPT.



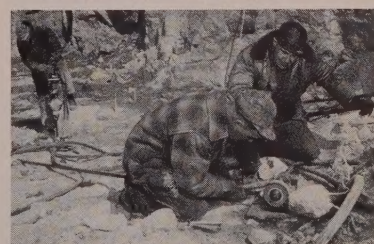
IN THE CANYON, DIORITE-GRANITE-SANDSTONE WALLS TO 7556'



AS LITTLE AS 12 SECONDS FOR STEEL CHANGES



INLAND SUPT. DAN RATLIFF EXAMINES HARD-WORKING "SWEDE" STEEL



ON-THE-JOB RESHARPENING SAVES TIME AND COSTS

Reworking 3 miles of Wind River Canyon highway was, and still is, a tough job. Snow is common during Central Wyoming's long winters, temperatures have dropped to -25° . Nearly 200,000 yards of solid diorite, red granite, and fractured, laminated sandstone had to be excavated. And rock breakage was subject to a set of conditions that severely limited each lift.

Wagon drills would be the conventional approach—Inland Construction Company drew upon 55 years' experience and chose lightweight "Swede" drills* with one-piece "Swede" steel*... exclusively.

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WHAT'S DOING

ROCK RIPPING

No blasting allowed—so rip it out.

WHEN YOU CAN'T blast tough rock because of the nearby location of oil tanks, you have to go in and rip it out the hard way. That was the situation faced by Charles L. Harney, Inc., of San Francisco on their \$609,479 contract to provide approaches and separation structures near Richmond, California.

The contract covers only a short road section about $\frac{1}{4}$ mi. long, but involved the excavation of 54,000 cu.

yd. of hard seamed sandstone. To handle this problem the contractor used his LeTourneau ripper to good advantage. Pulled by a Cat D8, the two prongs of the ripper were able to penetrate in and break up the rock to a size satisfactory for hauling and filling operations. After several passes over the cut area, depth of ripping was about the full length of the prongs, or 18 to 24 in.

Big equipment was used to good

advantage on other phases of the work. Two Cat DW20s worked out well on the timing of a cycle for loading, traveling to fill area, unloading, and return trip. Push loading by another Cat D8 was necessary.

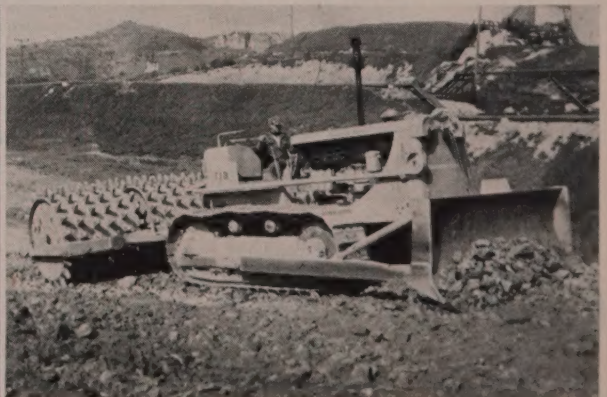
At the fill area, continuous rolling with a sheepsfoot roller and sprinkling to give the fill proper moisture content went on to give the state required density of 95% relative compaction. Enough fines were produced by the ripping operation to give satisfactory grading for the fill material.

About 3,200 cu. yd. of structural backfill was required near a 200-ft. long retaining wall and extending out 10 ft. from the wall. Compaction right next to the wall was difficult to get with the sheepsfoot roller so a 12-ton Buffalo-Springfield roller was used there.

Superintendent for Harney was Harold W. Purser.



HARD SANDSTONE gives up under attack of LeTourneau ripper pulled by Cat D8. Several passes were required for rock breakup.



OIL TANKS near top of picture were cause of no-blasting rule. Good compaction of sandstone was obtained with sheepsfoot roller.

FREEWAY BRIDGE

Contractor uses speedy construction methods for Utah's unusual structure built over hot water.

ONE OF UTAH's first major bridges of a new type design that will be part of a large traffic interchange is being completed by W. W. Clyde & Co. just north of Salt Lake City on U.S. 89-91. Contract price on the bridge structure which has balanced T-type concrete piers and steel girders was \$469,499—awarded last August. Interesting features of the work include 5-ft. thick sand blankets under the approach fills, extensive use of Raymond steel shell piling, and good form-work techniques used on the concrete deck.

Hot ground water

The site of the bridge is located at Becks Hot Springs, an area where hot sulfur waters lie only 4 ft. below ground level. The approach fills were constructed by Clyde under a previous contract about 2 yr. ago. The 5-ft. sand blanket was placed over the subgrade before placing the other fill so that, as expected settlement took place, the ground-water would have a chance to drain off without saturating the upper compacted fill. One year's time was al-

lowed for this settlement before awarding the bridge contract.

Long steel-shell piling

Under the bridge contract, 20,746 lin. ft. of piling were driven under the eight piers and two abutments. The number of piling required at each pier varied from 37 to 43 with 15 used in each abutment. Pile length varied from 43 to 94 ft. Piling were of the hollow-core type, filled with concrete after driving.

Because of the railroad tracks which the bridge spans, distances between piers vary from 80 to 102 ft. in the 808-ft. length between abutments. The piers have a battered circular shaft, 6-ft. maximum diameter, rising from the foundation footing and crossed at the top by a concrete cap braced with haunches.

Steel girders were 4 ft. deep and vary in length from 56 to 125 ft. Splices were made at the quarter points of every other span with allowance for temperature and contraction by sliding pin joints. Six girders make up the 36-ft. 2-in. out-to-out width of the bridge.



ABUTMENT PILES up to 94 ft. long were driven from top of approach fill built the previous year to allow for predicted settlement.

Swinging the steel girders into position had to be a closely timed operation to fit in between passing trains. Two cranes handling a girder would walk over the tracks to position, and then get back in a hurry.

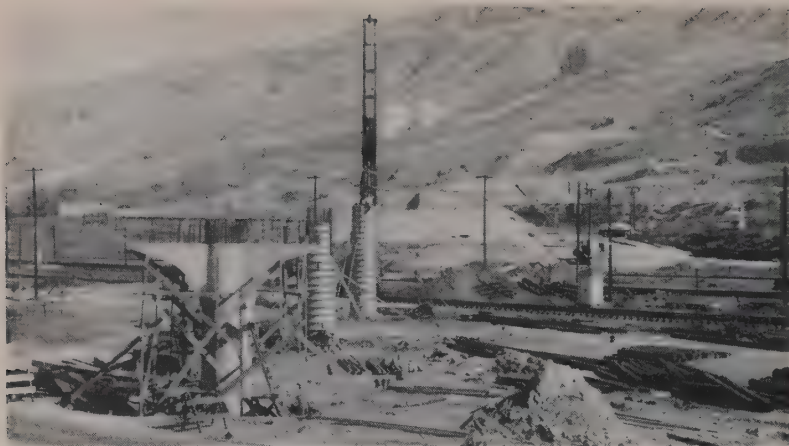
Forming for the 8-in. deck slab was simplified by the 4-ft. depth of the steel girders. Joists were 2 x 6 lumber spaced about 2 ft. apart, and braced to the lower flange of the girders by 2 x 4 kickers. Loose sheets



RAYMOND STEEL-SHELL pile cluster for pier foundation lies in hot, corrosive sulfur water. Water table was only 4 ft. down.



SCAFFOLD HANGING from truck and suitably counterbalanced made it easy to strip forms from the cantilever section of the deck.



T-TYPE PIERS, eight in all, presented tricky formwork problems—6-ft. diameter tapered shafts, variable slope haunches, and cross cap. This is new design for Utah Highway Department.



STEEL GIRDERS 4 ft. deep and up to 125 ft. long were walked into position over the railroad tracks by two cranes. Tight schedule was necessary on erection because of passing trains.



TWO CONCRETE POURS a week were easily handled with up to 125 cu. yd. per pour. Northwest crane with 80-ft. boom allowed swinging 1-yd. Insley bucket to all parts of 36-ft. wide deck.



ERECTION and stripping of deck forms was done without scaffolding. Four-foot depth of girders allowed room for workmen and kickers.

of $\frac{3}{4}$ -in. plywood made up the decking. When the 2 x 6 joists were laid down on the lower flanges of the girders, they served as a platform for the carpenters, thus eliminating the need for any tall scaffolding. When it came to stripping, the joists and kickers were flopped down onto the lower flanges again.

Concrete methods

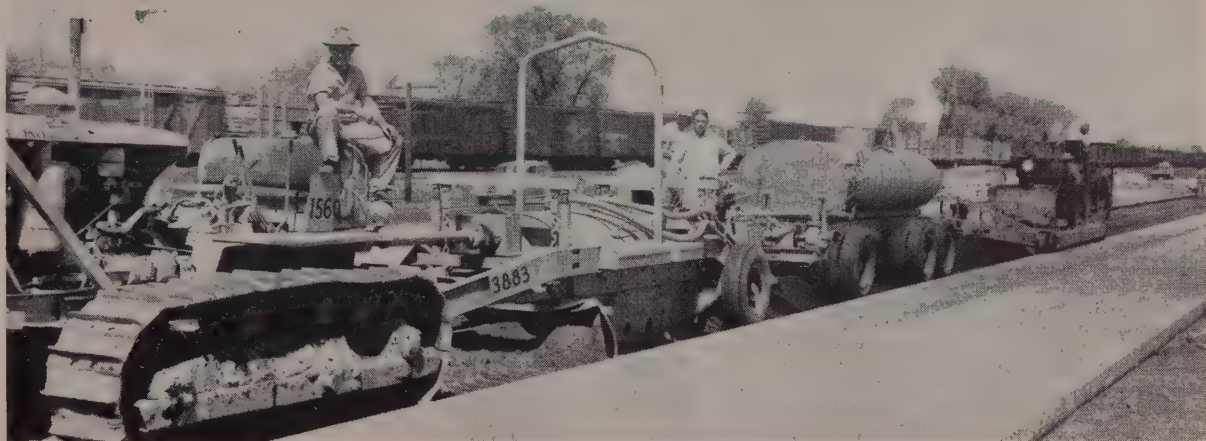
Form placing and stripping for the outside cantilever slab sections of the bridge was handled by a counter-balanced hanging scaffold placed on a flatbed truck.

Transit-mix concrete delivered to the job was placed with a 1-cu. yd. Insley bucket. A Northwest crane with 70-ft. boom and 15-ft. jib was able to swing the bucket to all parts of the deck slab. An average of two pours were made a week varying from 56 to 125 cu. yd. Two gasoline operated Mall vibrators were used. Stripping time averaged about 10 days—requiring that enough lumber for forming one half of the bridge be on hand for a continuous forming and stripping operation.

Fast schedule

Typical of the fast moving pace set by the contractor was that at one time the project was 90% complete against 57% of the contract time. For W. W. Clyde & Co., George Knuteson served as superintendent. For the Utah Highway Department, E. G. Johnson is chief highway engineer; O. Donald Miles, chief designer; O. T. Peterson, chief bridge engineer; W. L. Anderson, assistant chief engineer; R. E. Dobbs, resident engineer.

CEMENT TREATED BASE—The "how" and "why" of California practice may be a guide specification for you.



By **CARL ALZUETA**

Assistant Engineer
California Division of Highways

MORE THAN 29,000,000 SQ. YD. of cement treatments, or about 35% of the total amount placed throughout the United States, have been constructed in California alone. As a result of this extensive construction, it is now possible to review to good advantage the specifications and current practices that have evolved from so much experience in constructing so many miles of these bases.

California now specifies two types of treatments, cement treated subgrade which is a solidification treatment under concrete pavement, and cement treated bases which are intended for structural use directly under bituminous surfacings.

Three classes of base

Cement treated bases are used to obtain a limited slab strength greater than natural materials but less than that of concrete. To conform to the degree of anticipated loading, treated bases are subdivided into three specific classes of A, B, and C with Class A being the highest quality.

Class A and B cement treated bases give a reduction in required total thickness of the structural section, as compared to untreated bases, due to the slab strength and the resulting high cohesion value assigned in the California design procedure. Another economic advantage is realized by being able to utilize cheaper local materials rather than importing expensive quality aggregates.

In all cases where the thickness of

MIXING TRAIN—tractor, mixer, tank truck, towed blade, and roller—characterizes road-mix method preferred in California. The methods (and the equipment) have come a long way since California's practice was last reviewed thoroughly in *Western Construction*, February 1950.

cement treated base exceeds 7 in., the Standard Specifications require that the base be placed and compacted in two or more layers of approximately equal thickness. In this type of construction the Class B base is used extensively for the bottom 4-in. layer. However, it is not confined to this type of construction alone.

Class C cement treated base employs the use of relatively small amounts of cement (1%-2½%). It is used for several different reasons. For example, it may be used to:

1. To improve the resistance value (R Value) of material selected from roadway excavation or imported borrow.

2. Offset the chance inclusion of

adverse clay in the base materials.

3. Provide a more stable working table for construction, particularly where sandy soils are involved.

4. Bring substandard material up to specification requirements.

In general, Class C cement treatments are applied to base materials whose supporting value is slightly less than that required by design. Since the amount of cement is small, the uniformity of distribution becomes a problem in fine cohesive materials. This type of treatment is not recommended where the margin of correction is large.

Treated subgrade

In California practice, cement is added to the layer of material directly under concrete pavement for the purpose of providing an erosion resistant layer. A comparatively low cement content is normally used on this type of work. While no definite compressive strength is required for cement treated subgrade, it is generally recommended that it be designed on the basis of approximately 200 to 300-psi. compressive strength at 7 days. Since this subgrade treatment is not intended to provide additional structural strength for the pavement, high compressive strengths indicate an uneconomical use of cement.

Materials

A wide range of mineral aggregates can generally be used for cement treatments. However, because of construction and economic limita-

RECORD OF SOIL-CEMENT
USE IN CALIFORNIA

Year	Sq. Yd.
1938	127,000
1939	158,000
1940	94,000
1941	1,186,000
1942	1,902,000
1943	540,000
1944	1,275,000
1945	482,000
1946	1,224,000
1947	837,000
1948	2,695,000
1949	2,743,000
1950	4,192,000
1951	4,672,000
1952	5,427,000
1953	7,544,000

Includes roads, streets, airports, and various other types of work.

Source: Portland Cement Association.

tions, usually materials of a somewhat granular nature with sufficient binder are used.

Practically all soils can be stabilized with cement, but not all soils can be stabilized easily and eco-

nomically by this method. Thorough pulverization of the soil and thorough mixing with cement and water are prerequisites to success. Hence, cement treatments are limited to granular and friable soils which can

be pulverized readily. Soils which have a high silt or clay content require more cement and present difficulties during construction, particularly during pulverizing and blending.

Conversely, materials deficient in fines require high percentages of cement to develop the required compressive strengths. In this regard a desirable relationship has been found to exist between the fine and coarse material. For cement treatments this relationship is based on the amounts passing #30 and #200 sieves and is generally expressed as follows: "—not less than 15% or more than 40% of the material passing #30 sieve shall pass the #200 sieve." For example, a material having 20% passing the #30 sieve should have between 3% and 8% passing the #200 sieve.

When Class C cement treated base is specified and fine grained sandy materials are being used, the maximum amount of cement in the specification range should be added. With this type soil, failures have occurred near the surface of the base itself because of lack of shear strength in the sandy material. Incorporating coarse aggregates or portions of an existing surfacing, also improves the shear strength of these bases.

Choice of methods

California specifications permit the contractor to choose between mixing the cement treated base on the road or in a plant. The road-mixed method has proved most popular with the contractors since it permits a much larger daily production.

On certain projects because of local conditions no choice of mixing methods is permitted and the type of mixing is dictated. The average cost of mix and compact, exclusive of the cost of materials, in 1953 was \$0.21 per sq. yd.

Cement treated subgrade is completely road-mixed since it is naturally adapted to this type of operation. Contractors have developed equipment trains that operate from the pavement side forms to shape, windrow, and trim the treated subgrade. Cement treatment is always done after placement of the side forms because of the difficulty experienced in placing them accurately on the hardened surface. The average cost of this treatment exclusive of the cost of materials in 1953 was \$0.24 per sq. yd.

Plant-mixed material

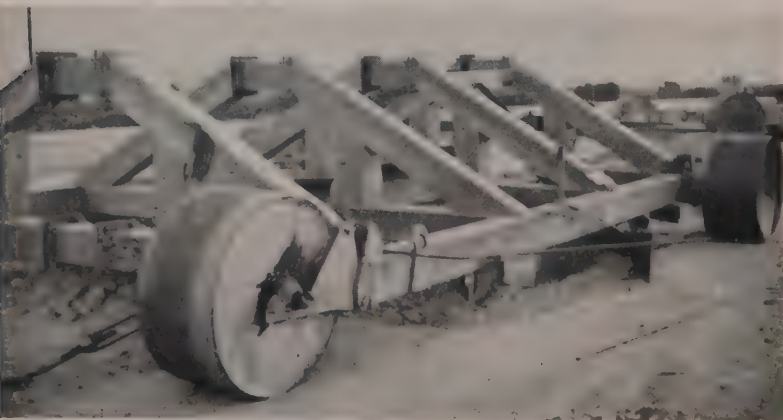
Contractors generally elect to plant-mix cement treated base when it is to be used for shoulders, borders, or ramps, or where road-mixing operations may be seriously hampered by traffic. Variable width construction, in particular, is not suited to road-mixing because of the difficulty encountered in proportioning and controlling the cement and water properly.



BULK CEMENT is cheaper, even with necessity for handling into smaller distributor trucks on job. Economical and effective materials handling is key to success with cement treating.



METERING cement into notched windrow can be tricky. Some trucks plow their own notch. Problem is maintaining even rate of flow despite level of cement in truck bin.



TOWED FRAME was developed by contractor to scarify and windrow material on cement treated subgrade work. Flanged wheels adapt the rig for rolling on side forms.

California specifications require that the aggregates be separated into two sizes, one size to consist of material passing a #4 sieve and the other retained on a #4 sieve. The exact size of the separation screen is not important as long as the finished product conforms to the above requirement. The size of the screen opening the contractor will elect to use will depend upon the amount of

retained moisture and the amount of fines in the aggregate.

Where bulk cement is being used, it should be prevented from hanging up in the weigh hopper and chutes. Vibration may be provided if necessary to maintain a free flow. The mixer should be properly cleaned daily and since build-up of cement and aggregate on mixer shafts, paddles, and liners is rapid, any neglect

even for a short time materially reduces the capacity and efficiency of the mixer.

The horsepower demand in mixing this type of material is considerably more than that for a bituminous mixture. The normal practice is to space the paddles farther apart and reduce the number per shaft, but this can be overdone. If there is any question as to the efficiency of mixing, the

Representative Unit Bid Prices on Recent Projects

The Contract		Cement Treated Base			Cement		Surfacing		
County & Contractor	Thick- ness (inches)	How mixed (roadmix or plantmix)	Quantities (sq. yd.)	Unit Price *	Cement (total barrels) #	Price of cement (per barrel)	Top course	Curing seal	Class CTB
1. Mendocino Co. Granite Con- struction Co.	6	Road	159,700	\$.20	13,960	\$4.65	3-in. plantmix	Asphalt emulsion	A
2. Siskiyou Co. A. Teichert & Son	6	Road	124,000	.15	7,000	4.70	3-in. plantmix	Asphalt emulsion	B
3. Tehama County Rice Bros.	6	Road	120,000	.16	6,100	5.15	3-in. plantmix	Asphalt emulsion	B
4. Yolo County Ukropina-Polich & Kral	4	Road	108,000	.20	5,800	4.45	8-in. PCC	Asphalt emulsion	Cement treated subgrade
5. Marin Co. Guy F. Atkinson	8	Plant	17,500 (tons)	3.00 per ton	4,470	3.75	3-in. plantmix	Asphalt emulsion	A
6. San Mateo Co. Piombo Const.	8	Road	233,000	.22	15,600	3.50	4-in. plantmix	Asphalt emulsion	B
7. Santa Barbara Co. Griffith Co.	4	Road	92,000	.19	3,500	4.30	8-in. PCC	MC-2	Cement treated subgrade
8. Ventura, Los Angeles A. Teichert & Son	8	Road	200,000	.20	18,500	4.50	4-in. plantmix	Asphalt emulsion	4-in. of A & 4-in. of B
9. Riverside Co. Robert Parker Co.	6	Road	71,000	.20	2,900	5.00	3-in. plantmix	None	C

* Does not include cost of cement.

Quantity may also include cement for other purposes.

CLASSES OF CEMENT TREATED BASES

Class of cement treatment	Cement content limits %	Required minimum compressive strength psi. at 7 days	Cohesimeter values to be assumed for design purposes
A	3½ to 6	650	3,000
B	2½ to 3½	300	1,500
C	1 to 2½	-	100
CTS	2½ to 5	200-300*	100

*Desired strength only—not actually a requirement.

(1) Project 4.8 mi. in length. Consisted of placing base and surfacing over previously constructed roadbed. New alignment with no public traffic. Surfaced with 2 in. of dense graded and 1 in. of open graded bituminous plant mix.

(2) Project 4.3 mi. in length. Consisted of constructing graded roadbeds for a divided highway with the necessary roadbeds for out highways and detours, and placing base and surfacing over a selected material. Traffic carried through project but not over lanes under construction. Surfaced with 3 in. of dense graded bituminous plant-mixed surfacing.

(3) Project 7.2 mi. in length. Consisted of placing base materials on portions, of scarifying and breaking up the existing base and surfacing, and of mixing the broken material with cement and recompacting and placing 3 in. of bituminous plant-mixed surfacing thereon. Traffic had access to working areas.

(4) Project 4.0 mi. in length. Consisted of placing base materials and 8 in. of PCC pavement over previously constructed roadbed and of resurfacing

existing highway with bituminous plant-mixed surfacing. Cement treatment and paving operations were on new alignment and experienced little interference from traffic.

(5) Project 4.0 mi. in length. Consisted of grading a 6-lane divided roadway, constructing tunnel and other structures, and of placing base materials and surfacing over a portion of the project.

(6) Project 5.0 mi. in length. Consisted of constructing a graded roadbed for a divided highway with the necessary roadbeds for outer highways and ramps, and of placing base materials and bituminous plant-mixed surfacing. Some traffic interference to the construction operations.

(7) Project 3.4 mi. in length. Consisted of placing base materials and 8

in. of PCC pavement over a previously constructed roadbed. New alignment with little traffic interference to cement treatment and paving operations.

(8) Project 12.3 mi. in length. Consisted of constructing a graded roadbed and of placing base materials and bituminous plant-mixed surfacing, both over base materials and existing pavement. Some traffic interference to the construction operations.

(9) Project 4.8 mi. in length. Consisted of grading and surfacing an additional roadbed with plant-mixed surfacing on cement treated base, and resurfacing existing pavement with plant-mixed surfacing, to provide a 4-lane divided highway. Construction of frontage roads and connections also included. No traffic interference to construction operations.

power should be cut off at the end of the mixing period, and samples obtained from each end and the center of the mixer, and test specimens fabricated from each. Comparisons of compressive strength will serve as a check on the distribution of cement.

Road-mixed method

Under the road-mix method it is essential that windrows of material to be treated be sized immediately prior to mixing. Where material is mixed from a blanket the depth of mixing should be checked. This is required in order to maintain a constant proportion between the cement and aggregate and to provide a uniform consistency.

Cement is spread on the windrow in bags by hand or in bulk by means of a distributor truck. In dumping the bags, the cement should be spread as uniformly as possible throughout the length of windrow that the bag is to cover. Because of lower costs California contractors generally use bulk cement.

Accuracy in the spread of bulk cement by means of mechanical devices may be checked by laying out building paper in the "V" notch and spreading upon it, after which a measured section is gathered up and weighed. It has been found that the spread from certain distributors is influenced by the quantity of cement in the bin over the screw. When the bin is full, larger amounts of cement will be spread than desired; and when the bin is nearly empty, less cement is distributed. It is recommended that the spread be checked at various bin levels.

If the efficiency of mixing or distribution of cement is questioned on a project, three test specimens are taken from material from any one point along the windrow; one from each side midway in the height of the windrow, and one from the center of the bottom face. Class A and B cement treated bases and cement treated subgrade are tested by compressive strength cylinders and Class C cement treated base by stabilometer tests to indicate the degree of uniformity.

Choice of equipment

The following types of road-mixers are being employed by California contractors:

1. The pugmill or auger machine that mixes from a windrow. This type is the most commonly used by the contractors. The pugmill or auger mixers should be carefully checked to see that the material near the bottom of the windrow is being lifted from the subgrade and is receiving thorough mixing.

2. The transverse shaft type that mixes the material by means of revolving paddles. This mixer does not require that the material be windrowed, which means less interference to traffic.

The mixer should be checked for depth and uniformity of mixing. Every effort should be made to add the cement to the mineral aggregate when the latter is dry. Balling of the cement results if the cement is placed on damp aggregates and may require excessive mixing passes to blend in uniformly.

3. The elevating mixer which combines a loader and a pugmill unit. This mixer has the advantage that it can mix large windrows of material, making it possible to treat larger quantities of material in a single pass.

Spreading and compacting

Since cement treatment hardens rapidly after compaction it is generally more difficult to obtain a satisfactory subgrade for the bituminous surfacing. Riding qualities of the bituminous pavement superimposed on a cement treated base are largely influenced by the spreading of the cement treated base, supplemented by the trimming with the self-propelled blade grader. The trimming operation is highly important and should be very carefully performed.

Strength of cement treated materials is largely dependent on the density obtained. To insure good compaction, it is essential that the base be compacted as soon as possible after the material is mixed. Sufficient moisture must be present in the mix to provide lubrication and maximum density. Slightly more than this amount will result in spongy spots during the rolling. Best results are generally obtained with a moisture content just short of instability or "quaking" under a roller.

Tips on operation

If a motor grader is used to spread the cement treated base, it is recommended that a roller be used after the first pass of the grader in order to remove the tire tracks immediately. If the tracks are filled in before rolling, they contain more material than the adjacent areas, resulting in an irregular section and uneven compaction.

Between the operations of compaction and finish surface rolling the surface is trimmed where necessary with a blade grader and the cut material wasted.

Shaping or blading after spreading has been found undesirable as it develops horizontal planes, or laminations, in the material. Every effort should be made to make the initial spread smooth and uniform.

The trimming should be done before the cement treated base has hardened in order to reduce surface tearing to a minimum. A pneumatic-tired roller equipped with a water spray bar provides the final compaction and a close-knit texture to the surface.

Cement treated bases should never be placed in layers less than 4 in. in thickness. Thinner layers laminate

and may develop slippage between the planes.

There have been instances where the bituminous surfacing placed on cement treated bases has slipped because of a smooth, slick base surface texture. This condition is usually encountered with fine grained materials such as sand or disintegrated granite which are lacking in large particles. Under such conditions consideration should be given to roughening the surface texture by means of sheepsfoot tamper or other such roller. Tractor cleats should be avoided since they tear the surface excessively.

Curing seals

Except for Class C cement treated bases, the surface of these treatments is kept moist until the application of the asphaltic emulsion curing seal. Class C cement treated base which has no compressive strength requirement generally does not receive a curing seal and is usually primed as in the case of any untreated base.

Bituminous membranes are applied to cement treated bases for the following purposes:

1. To retain moisture during the curing period.
2. To protect the surface under the action of traffic.
3. To provide a tack coat for bituminous surfacing.

An MC-2 curing seal is added to cement treated subgrade not only for the first two purposes but also (and primarily) to toughen the surface and provide additional resistance to erosion.

Traffic through construction

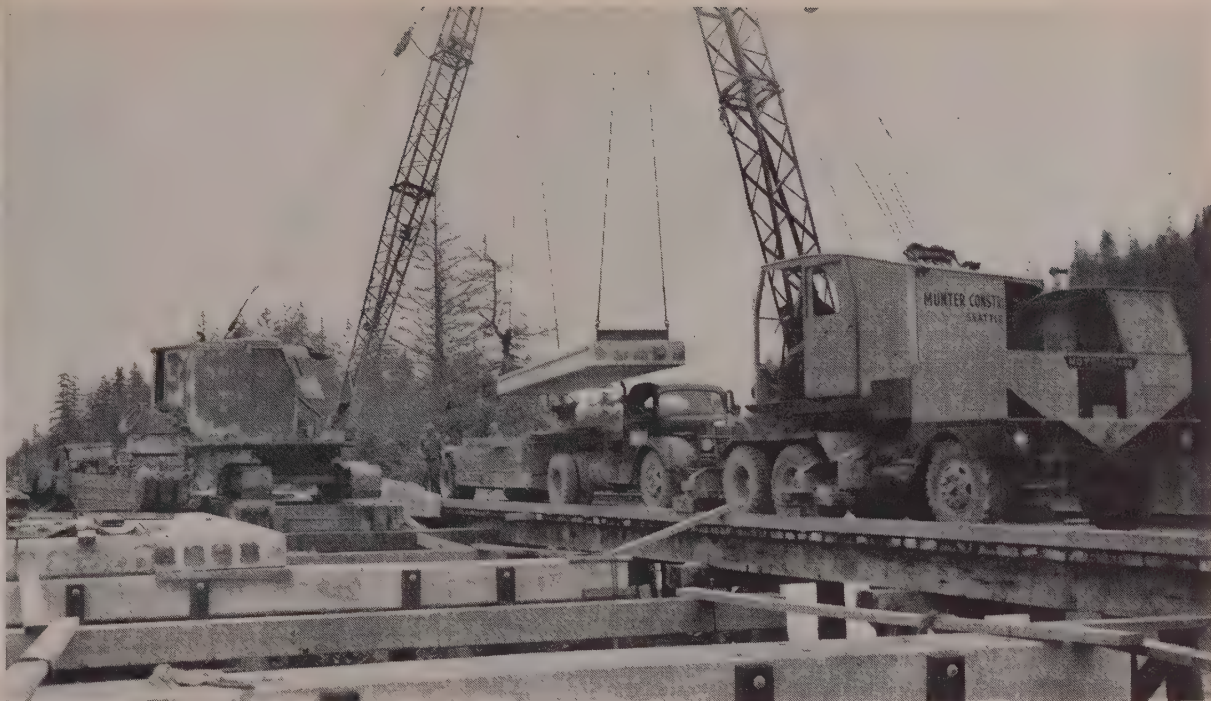
It is considered advisable to close cement treated bases to traffic for a period of seven days of curing; however, this is not always practicable, and the specifications permit immediate use when necessary.

Every effort should be made, however, to keep traffic off the new base until it has developed sufficient slab strength to resist breaking up under the traffic loads. This is of particular importance during fall, winter, and early spring construction seasons when the presence of excess moisture may cause a yielding sub-base.

Where traffic must be carried throughout the winter over a base without the surface cover, it may be advisable to tailgate a 3/4- to 1-in. mat of a bituminous mix material to serve as a temporary wearing course.

Conclusions

Cement treatments offer the highway engineer the advantage of a base with increased supporting power and positive insurance against the bad effects of inadvertently including non-uniform base material. The use of increased cement must, of course, be balanced against the possible adverse effects resulting from loss of pavement flexibility.



ERECTION of 30-ft. span prestressed deck unit utilized full capacities of two cranes, one operating on the old railroad trestle and one on

timbers over false bents. Light cranes required a maximum of counterweight—as can be seen on the rear of the crawler.

WHAT'S DOING

SLAB ERECTION — *Short span design dictated by depth of water at site of Alaska's first prestressed bridge.*

COMPLETION OF THE EYAK RIVER Bridge on the new Copper River highway out of Cordova shows that Alaska is coming along with the rest of the West in the use of prestressed concrete.

Erection problems dictated the design. Paralleling the new bridge was the existing old railroad trestle used long ago by the Kennecott Copper Co. The depth of water at the bridge site made erection by cranes operating in the streambed impossible. So, the maximum weight of precast slab units that could be handled by cranes operating from the new bridge deck was the determining factor.

What's the maximum lift?

Studies indicated that 10 tons was about the maximum lift for a single crane on the 30-ft. span units. For the 45-ft. span units, with a crane at each end, the maximum weight to be safely handled would be 14 tons. The

deck of each 30-ft. span was cast in six units and of the 45-ft. span in eight units, to stay within the lifting weight limitations.

Two alternates

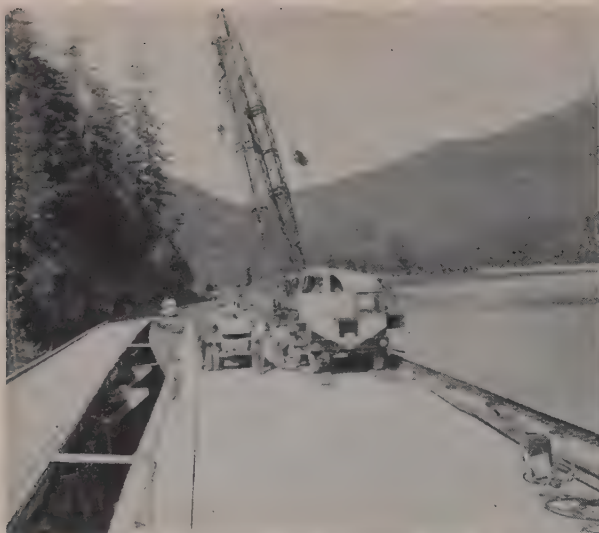
Plans prepared for this project by the Bureau of Public Roads offered contractors the choice of two alternates for construction. The first design consisted of ten 21-ft. treated timber stringer spans and one 45-ft. steel stringer span with reinforced concrete deck slabs on all spans. The prestressed concrete alternate consisted of seven 30-ft. spans and one 45-ft. span. The prestressed portion consisted of concrete slab units. Both designs had in common treated timber pile bents, concrete curbs, and Flex Beam railing with steel railed posts.

When M. P. Munter Co. of Seattle, long a builder of Alaskan bridges, undertook this project—they knew

what they were doing. Munter submitted the only bid for the prestressed concrete construction at a figure of \$145,958. Of the three bids submitted for the timber and steel stringer alternate design, Munter was low there, too, with a bid of \$148,575—a difference of only \$2,600. When the great distances from sources of materials, equipment, and skilled labor is considered for Alaska bridge projects, the small difference becomes more significant—especially when bid by the same contractor.

Local precasting yard

For example, the specifications permitted the contractor to cast the units at any location he chose. A good aggregate source was found only 8 mi. from the bridge site that allowed Munter to precast the units locally and save the cost of shipping that would be required with steel and treated timber. It is possible that on a larger project it would be feasible to



LONG 45-ft. span units were trucked out on false bents and then placed with each crane operating from adjacent completed 30-ft. spans. Old Kennecott Copper Co. railroad trestle to left.



TREATED TIMBER piles, concrete caps, and prestressed slab units make up the bridge which has seven 30-ft. spans and one 45-ft. span. Six slab units make up full bridge width.

precast the units in the States and have them shipped economically to the project.

Two cranes were used for nearly all of the erection of the prestressed span deck units. A heavily counterweighted, crawler-mounted Lima operated on the new bridge—either from timbers placed across the new timber bents and false bents or on top of the newly placed slab units. A Lorain Moto crane operated on the old railroad trestle. A lowboy delivered 30-ft. units on the old trestle where each crane would then lift an end of the units for placing. Erection of the 45-ft. span units was accomplished by the cranes operating on the near end of each adjacent 30-ft. span. The truck and dolly carrying these units was driven out on the 45-ft. span on timber stringers placed on false bents. The cranes then lifted the slab units into final position.

Use of such light cranes meant that extreme care had to be used dur-

ing erection to prevent tipping the cranes over. Tipping forward when lifting a heavy load or tipping backward when the crane was unloaded

ADDITIONAL DATA

Average cost of labor on the job was \$4.05 per hr.

Concrete in one 30-ft. span was 30.5 cu. yd.

Contractor's bid price, less adjustments, was \$7,250.00 for one 30-ft. span—consists of four interior slab units, two exterior slab units including curbs, but not including railing.

and over-balanced by too much extra counterweight on the rear end were the problems faced. One advantage of using light cranes was that stress

calculations showed that the cranes could operate in other positions than the center of the bridge as had been originally required. Permissible stressing of the deck units was not in excess of those stresses permitted by the specifications—wherever the cranes operated.

Important conclusions

Erection of heavy precast concrete units appears to be the principal difficulty connected with the use of this type of construction. That the more permanent of the two types of alternate designs was low in the bidding gives promise of additional future economical use of prestressed concrete for bridge construction in Alaska.

For the Alaska District of the Bureau of Public Roads, A. W. Walker was district bridge engineer and R. W. Ellis was resident engineer of the project.

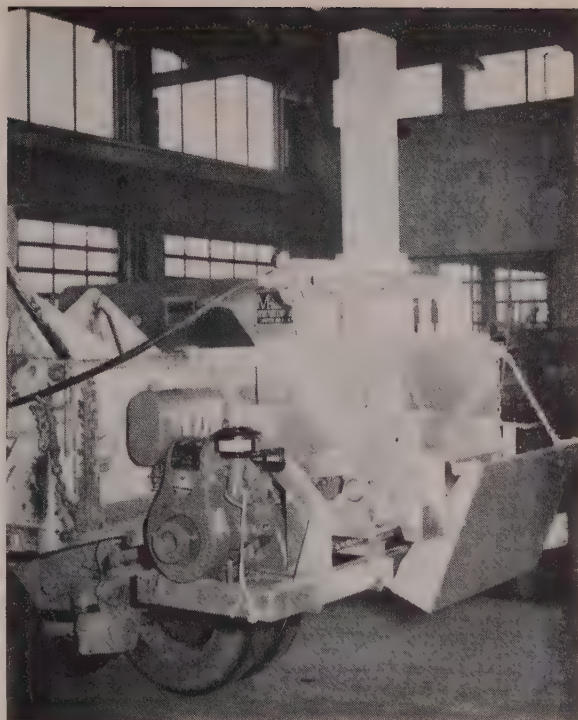
COST DATA FOR TYPICAL 30-FT. PRESTRESSED CONCRETE SPAN

Item	Man hours	Cost	Per cent of total cost	Cost per cu. yd.	Man hours per cu. yd.
Materials and freight		\$2,712	42.7	\$ 89.03	
Equipment rental		364	5.7	11.95	
Labor					
build and strip forms	140	567	8.9	18.62	4.6
placing reinforcing steel	28	113	1.8	3.71	0.9
prepare and place forms for voids	103	418	6.6	13.72	3.4
prepare and place Stressteel bars, conduit, and bearing plates	37	150	2.4	4.92	1.2
place and cure concrete	94	381	6.0	12.51	3.1
posttension Stressteel bars	29	117	1.8	3.84	0.9
sandblast and grout end recesses	25	101	1.6	3.32	0.8
erection of slab units	272	1,100	17.3	36.11	8.9
grout bar conduits	17	69	1.1	2.27	0.6
place mortar in shear keys	15	61	1.0	2.00	0.5
seal longitudinal and transverse deck joints	7	28	0.4	0.92	0.2
form, pour, and finish curbs	42	170	2.7	5.58	1.4
Totals	809	\$6,351	100.0	\$208.50	26.5

WHAT'S DOING

PATCHER—Idaho hangs a hot plant on a maintenance truck tailgate.

NEW and shiny patcher has just been installed in Boise shops. Ready to roll, it's completely self-contained as seen here, except for burner gas bottles carried in dump body.



WHY TOW IT when you can tote it? Idaho asked that question after giving portable patchers for asphalt pavements a thorough trial. The answer was that toting is preferable if you're working with a cold mix and if you want truck maneuverability for rolling the new patch.

And the result is that the Idaho Department of Highways now has a total of 30 "tailgate" patchers assigned among its maintenance forces throughout six districts in the state. Development of the tailgate idea has covered the last three years and ties in with a change made two years ago in the highway department maintenance organization.

What's it all about?

Portable patchers first came out about four years ago. All the models were trailer-mounted, and they were intended for maintenance work on high-type asphalt pavements where a hot-mix patch was desired. The machines caught on fast and their development was reviewed editorially in the Highway Issue of **Western Construction** just two years ago. An article titled "Pulling the patcher to the pothole" covered the capabilities and performance of several machines: Barber-Greene's Mixall, Hetherington & Berner's Moto-Patcher, McConaughay's Multi-Pug, and Wylie's Patchmobile.

The reviews of all these machines emphasized the desirability of patching with hot mix. Basis of the argument was that only this kind of patch is proper for a high-type pavement. Also, the portable patcher, with its built-in heat, permits patching in

weather when normal cold-mix work is impossible.

The experience of Idaho, on the other hand, has shown that there is still a very considerable scope of application for cold-mix patching. If what the maintenance forces of this Northwest state think is at all typical, the future of the portable patcher may lie in a new direction.

Idaho's viewpoint is based in economics. Cold mix is cheaper, pure and simple. The problem is how to work with it in the winter. The portable towed patcher solves this problem, but in a more luxurious manner than necessary. It is built to make hot mix, when all Idaho needs done is heat up and dry the cold mix. As Norman McCrea, Idaho maintenance engineer, puts it: "We can use the sun to dry our aggregates in the summertime. We can make up our premix and stockpile it then. All we need in the winter is enough heat to make the premix workable before applying it. We don't need equipment for drying aggregate and heating bitumen separately."

Trailer troubles

Experience with a single 1950 model Wylie Patchmobile (without a dryer) owned by the state four years ago began to tell the story. The Patchmobile was handy and even the following disadvantages showed what might be done with a somewhat different machine. First, it was a towed plant. It was clumsy to try to roll a patch with the patcher hooked to the truck. And it was time consuming to unhitch it. Secondly, it was built and equipped for hot mixing.

Still, Idaho opinion had not yet gone clear to the point of favoring cold mix exclusively. Proof of this was purchase of a Barber-Greene Mixall. Initially this machine seemed better—at least, faster in production performance. But the old towing trouble began to nag again. And the Mixall required a separate tar kettle for full operation, as well as more men than the patching operation warranted. (This was particularly pointed up by Idaho's inauguration in May 1953 of the patrol system of maintenance. See accompanying box.—Editor.)

Something simpler needed

Because of the Mixall's need for a separate tar kettle, it was more often than not used only to heat up premix from stockpile. In this respect it was a handy wintertime maintenance tool. But it also drove home the fact that all of the existing portable patchers were unnecessarily expensive for this routine maintenance chore in Idaho.

Still, the state wanted portable equipment, even if only for heating premix. So a specification was written—it didn't rule out the trailer type of machine—and bids were taken. Three machines figured in the bidding and all were tested for production capacity against the specification.

The two lower bid machines proved unable to meet the required performance and the high bidder was simply too expensive. Informal checking with other highway maintenance departments, however, revealed that production capacity of

How patrol maintenance works, and what it takes

Idaho's highway maintenance organization chart also points to tailgate patchers. The state uses the patrol maintenance system, an effective method borrowed from Colorado. Guts of the system is that road maintenance is handled by individual patrolmen instead of by gangs. Each man is responsible for all regular maintenance (snow removal is another story) on a specified stretch of road, and he calls upon his maintenance superintendent for assistance only when absolutely necessary.

His maintenance superintendent coordinates the work of perhaps 5 or 6 patrolmen operating out of two maintenance stations, or sheds. The superintendent, in turn, is one of 6 or 7 covering a given district. The state of Idaho has 6 districts.

What are the necessities that cause a patrolman to look for help? A rundown of the special crews operating out of district headquarters provides an answer: shovel crew for heavy ditching work, guard rail crew, bridge crew, sign crew, oiling crew. These jobs will continue to be handled from district level, as the need for them is intermittent.

But the effectiveness of patrol maintenance only begins with the fact that every single mile of highway must be inspected daily. The effectiveness continues only if the patrolmen

can follow up and correct deficiencies immediately. (Under gang maintenance deficiencies could go for as much as 2 weeks without observation, much less correction.) The answer, in achieving effectiveness, is equipment.

More equipment

Idaho initially added many 1½-ton dump trucks to its maintenance inventory, when the patrol system was begun. Every patrolman—with a few exceptions where men work in pairs—has one. (Incidentally, the patrol organization meant a net reduction in personnel.)

Another item that has added to the capabilities of the system is the front-end loader. The goal will be to have one operating from each shed. Only in this way can minor ditch clearing be handled under the patrol system. Otherwise, the calls for a district shovel would be far beyond the capacity of that crew. Or, patrolmen would be working together so often that it would be gang maintenance all over again.

The situation on ditching is paralleled in the matter of patching. The objective here need not be to have a patcher on every truck. But there must be more patchers than one per district, particularly if one man can operate such a plant. And with Idaho's tailgate patchers, one man can.

Premix would be carried in the dump body of the maintenance truck and charged directly into the pug mill by hand. The pug mill and burner would literally hang from the truck tailgate.

Such a machine was built. It was demonstrated in Idaho before groups of state, county, and city maintenance men, all of whom had suggestions. A production model was then turned out under the name of Heat-A-Mix. Still essentially as described above, this machine seemed to be the last word. And the Idaho Highway Department bought six of them early in 1954.

Tailgate model specified

Experience in each of the highway districts during 1954 proved the worth of the tailgate patcher. Emphatic endorsement of the idea came last fall when the state called for bids on 24 more patchers, using this language:

"New, latest current model bituminous treated aggregate heating and mixing machine to meet the following specifications:

"Machine shall be capable of heating and mixing a minimum of 4 cu. ft. of bituminous treated material from a temperature of 50 deg. F. to 200 deg. F. in 12 min.

"Machine shall be gasoline engine operated and so constructed as to be easily attached to a standard dump truck in such a way that truck will be free to roll material in road surface while machine is in operation.

"Mixing device shall be pug mill type with easily replaceable wear surfaces.

"Heating system shall be high pressure liquefied gas complete with all attachments and controls (except gas bottle) and shall be A. G. A. approved."

New competition

Wylie Manufacturing Co. bid the Heat-A-Mix on this specification, of course. The only other bidder was K. E. McConnaughay of Lafayette, Ind. McConnaughay had modified its trailer model, the Multi-Pug, for tailgate mounting.

The steps were generally the same as those taken earlier by Wylie — rearrangement of pug mill, engine, and burner to get the most compact arrangement. McConnaughay's tailgate patcher differs in two essential respects from the Wylie Heat-A-Mix:

First, its burners operate right in the pug mill, rather than in a surrounding jacket. The result appears to be faster operation.

Second, it is cheaper. Idaho took the McConnaughay bid for 24 machines at \$1,200 each. They have been delivered this past spring.

Conclusions

Like other states, Idaho wants to conserve maintenance manpower, and still do an effective job, by the use of power equipment in the hands of individual patrolmen. Like other states, Idaho has an enforced preference for cold-mix patching. And, like other states, Idaho wants to roll its cold-mix patches — without any wasted time.

With these needs, Idaho has inspired the tailgate patcher. And the state highway department now has the mechanized patching facilities to match its maintenance organization.

E. V. Miller is state highway engineer in Idaho. Norman McCrea is maintenance engineer. Tom Pethick is equipment supervisor.

That new look

ONE PROJECT manager at Garrison Dam figured a good way to avoid operator deaths in "jackknife" accidents involving Euclids and similar types of earth movers.

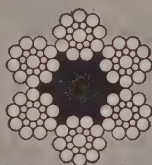
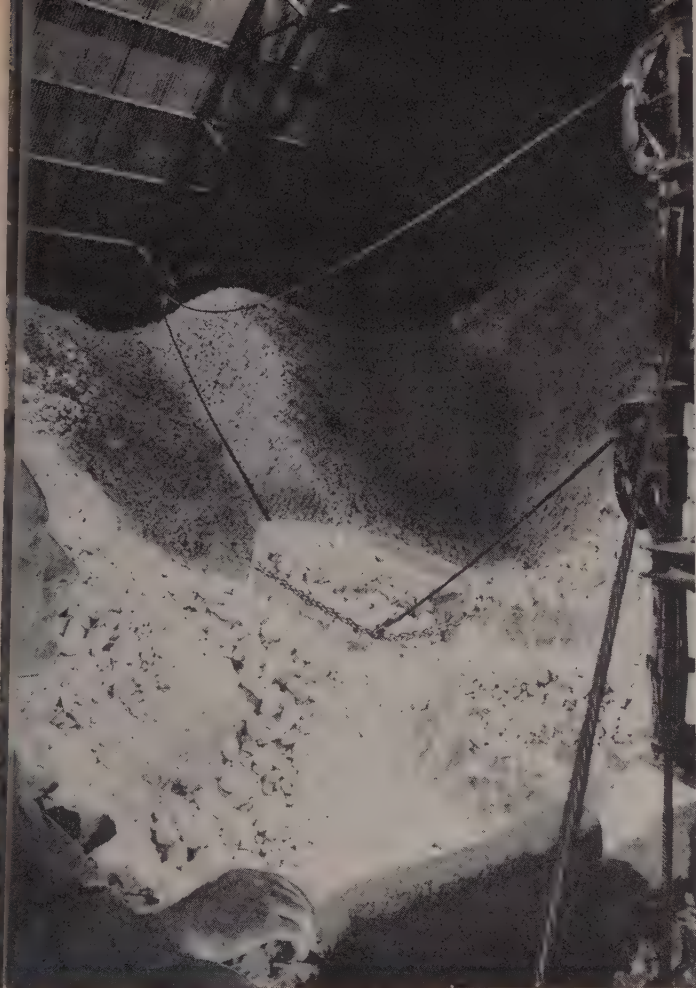
PK-MK's order for 72 Euclids specified cabs built out of boiler plate. Since then 55,000,000 cu. yd. of dirt have been moved without a serious injury. The cabs cost \$150 each and have saved an estimated 12 lives.

the lower bid machines was not too serious an objection. A realistic look at patching procedures shows that hourly rates of production are deceptive since no machine operates continuously. Production capacity is useful only as an index to a more important property—how long it takes to heat up a single batch.

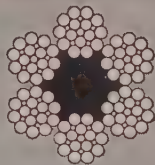
Idaho's eventual decision was to reject all bids. But the manufacturers and their representatives, having been through the demonstration mill on this bidding and having talked at length with Idaho's maintenance people, now went out on their own. In particular Frank Masner of Feenoughty Machinery Co. in Boise, the Wylie Manufacturing Co. distributor, saw a possibility for modifying a Patchmobile into just the right article.

The "tailgate" idea

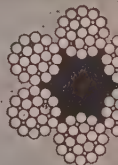
Masner's idea was to use the pug mill almost by itself, with a burner newly mounted to feed its entire heat into a jacket surrounding the pug mill. There would be no bitumen or rock storage or heating facilities.



6 x 19 Seale rope has nine outer wires per strand.



6 x 21 rope has ten outer wires per strand.



6 x 19 Filler Wire rope has ten outer wires per strand.

What can you do better with 6 x 21 Red-Strand wire rope?

What is 6 x 21 wire rope? It is sometimes called 6 x 16 Filler Wire. It is a construction of intermediate flexibility—between coarse 6 x 19 Seale and flexible 6 x 19 Filler Wire. 6 x 21 is a good choice where the operation includes abrasion and at the same time the rope is subjected to considerable bending. On certain types of duty the choice is vital to save time, effort and money.

When to use it? If, for example, your 6 x 19 Filler Wire rope is wearing out too soon because of abrasion, 6 x 21 with larger outer wires may provide much longer life. If severe bending is damaging your 6 x 19 Seale, a change to more flexible 6 x 21 may be profitable.

It is used on certain dragline jobs, vertical shaft hoists, drag and slackline scrapers, inclines, rotary and cable tool drilling rigs, and other equipment.

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MANAGEMENT—Colorado's State Highway Department and Contractors Association meet to head off highway problems. What have they discussed and accomplished?

THERE ARE NO RESTRICTIONS on discussions when this joint committee meets. Discussions by members are free—open—they let their hair down. Subjects are not limited to highway construction problems. All phases of highway work may be discussed, from design through final payment, from administration to equipment rental rates, from specification rating to matters pertaining to public safety and convenience. Legislative matters which affect the interest of both groups are given careful study by the joint committee and discussed in the light of impact to the road construction program.

And here is the composition of the Colorado Joint Cooperative Committee:

Seven members selected from contractors association by its president.

Six engineers from state department of highways, staff division heads. Committee secretary—managing director of contractors association.

Ex officio member—president of contractor's association.

Ex officio member—chief engineer, state department of highways.

This active group meets once each month. Meetings are very informal, but the committee secretary does prepare a program agenda. Any member of the joint committee wishing to present a subject for discussion may do so without inclusion on the agenda, however. Minutes of each meeting are prepared and distributed by the committee secretary also. Presiding chairman is alternated between state and association month by month.

Are meetings worthwhile?

Do these joint cooperative committee meetings pay off? Are they necessary? The answer is a resounding yes. Both sides definitely believe so.

There is never a lack of subjects for discussion. Out of these meetings have come many improvements for both sides. For example, the writing of construction specifications, so they are adequate yet simple to understand, is an undertaking of no

small significance. "To the satisfaction of the engineer" as was quite often used in the older specifications—has been the cause of many a heated argument. Now, wherever possible, specifications are written so that interpretation is unnecessary. At least that is the common goal.

What has been accomplished?

Subcommittees handle each of the difficult problems separately. Out of these joint subcommittees have come many solid recommendations which have won approval of the whole committee without undue delays, such as a standard method of signing road construction projects. Another good example which came out of a subcommittee was a "Schedule for Equipment Rental" which has been used as a model by some other states.

When this joint cooperative committee agrees to the need for changes and conclusions are drawn, such information is sent to each member of the contractor's association and bulletins are issued by the highway department to its engineering organization.

It may be said that some of these informal discussions become quite heated. It may even be said that there is considerable "yak, yak." But

as one of our world statesmen (Churchill) recently said, "Better yak, yak than war, war."

The contractors say—

Here is what Earle W. Devalon, managing director of the Colorado Contractors Association says, "After seven continuous years of the operation of the Joint Cooperative Committee, our member contractors are very pleased with the results which have been produced by this joint committee. We have come to appreciate the problems confronting the highway department in a more clear light through the joint informal discussions. They (the highway department engineers) better understand our problems. It has been good for both."

The highway department says—

Here is what Mark U. Watrous, chief engineer of the Colorado Department of Highways says, "The operations of the Joint Cooperative Committee have proven conclusively that highway department engineers and contractors can work together amicably and efficiently and with the fullest regard for the responsibilities which both bear to the people of the state.

"Of course difficulties arise in a multi-million dollar construction program which is carried on in every section of the state under varied conditions of weather and terrain. It is inevitable that personal differences will crop up and that fundamental questions of procedure will develop. New equipment and new techniques create new problems at the time of their appearance.

"Through the use of the committee, however, where everyone on both sides is free to speak, and where the meeting is held in an atmosphere conducive to reaching decisions based on fairness and equity, the mountains become mole hills. This committee has demonstrated that men of goodwill, who are as willing to listen as to complain, can find a reasonable ground for agreement in the furthering of the interests of the public."

WHEN DID IT START?

The Colorado Contractors Association and the Colorado Department of Highways first formed a Joint Cooperative Committee back in 1948. This was one of the first such committees formed in the entire United States. The July 1952 issue of Western Construction carried a short article by E. W. Devalon, managing director of the Colorado Contractors Association, giving some reasons why the committee was formed. Now, seven years after its inception, here's a brief review of how it has worked.—Editor



COLD ENOUGH for ice to form on the river, so wood frame and canvas igloos were necessary over freshly poured bents to allow heating.

Cranes operating from temporary access road placed over the full width of the river allowed most economical bridge construction.

WHAT'S DOING

CRANES—*Earthfill access road across Rio Grande at Albuquerque solves erection problems for prestressed bridge.*

A TEMPORARY EARTHFILL roadway, extending bank-to-bank across the Rio Grande, has been built in conjunction with the construction of New Mexico's first major precast, prestressed concrete bridge. To be called the Alameda Bridge, it is designed for H-15, S-16 loading and is being built across the Rio Grande 300-ft. upstream from the old 4-ton limit bridge it is to replace. It will link the northern end of Greater Albuquerque, which is east of the river, with the growing suburban community of Sandoval on the west bank.

Why use earthfill road?

The roadway constructed on the upstream side of the construction site is serving two purposes: it provides an adequate work area from which the heavy equipment needed to assemble the bridge can operate; it simplified transportation problems.

The job required a 90-ton pile-driving rig and two 50-ton cranes to handle the 16-ton bridge girders. Because of the presence of quicksand, it was not considered feasible to operate the equipment on the river bed while the river was pushed first to one side and then to the other by construction of cofferdams. Erection of a trestle from which the heavy equipment could be operated also was ruled out because it would be uneconomical to drive the piles to the depth required by the nature of the river bed.

In addition, if the bridge were built first from one side of the river and then from the other, the contractor faced the problem of transporting to the west bank the heavy equipment, and a considerable amount of materials, that exceed the load limits of both the old and the new bridges. To get from the east side of the bridge site to the west, without crossing

either bridge, requires a 20-mi. haul, about 10 mi. of it over bad road.

To overcome these problems, prime contractor Sharp & Fellows Contracting Co. of Los Angeles built the temporary earthfill roadway. To prevent an accumulation of water from flowing over the roadway and flooding the job, corrugated metal culverts were placed under the roadway.

Culvert requirements

Because the roadway was intended to handle only the amount of water provided by the low winter flow, it was desirous to schedule much of the work for completion prior to the spring runoff. However, the contractor felt that if it was not possible to complete the substructure and place the girders by that time, the roadway would be broken and work suspended until such a time as water conditions permitted a continuation. Work be-



CORRUGATED METAL culverts placed under access embankment handled entire winter stream flow of the Rio Grande. View is looking west.



POURING CONCRETE in steel shell piles was easy with transit-mix trucks able to use access road for close approach to work.

gan on the \$316,000 contract on November 15, with 250 working days in which to complete the job.

The 19-span bridge being built for the New Mexico highway department is to be 962 ft. long and 29 ft. wide. It will have a 26-ft. asphalt roadway and two pedestrian safety lanes, guarded by steel plate bridge railings. With the approaches, which include standard concrete pipe culverts over irrigation drains on both sides of the river, the overall length of the project is 2,342 ft. The bridge, 3 ft. 3 in. higher at the center than at the abutments, is designed to permit passage of a flood of 42,000 cfs.

Debris-clogged culverts

The 550-ft. temporary roadway was constructed during November. Draglines pulled from the exposed riverbed all the fill needed to build a 24-ft. wide embankment standing about 4 ft. above the level of the water behind the roadway. To limit the accumulation of water behind the structure, fifteen 30-in. diameter corrugated metal culverts were placed through the roadway to handle the seasonal normal flow of about 1,000 cfs. Cleaning the debris-clogged pipes was difficult because of the slope of the embankment, but the problem was solved by anchoring rafts over the entrances to the pipes. It was then a simple matter for men with cant-hooks to climb onto the rafts and unclog the pipes.

Steel shell piling

With completion of the temporary roadway a crane and a 90-ton pile driver were moved onto it. Piledriving operations were conducted by Raymond Concrete Pile Co. of New York.

Seven 65-ft. steel shell piles form the foundation of each pier and were driven approximately 50 ft. into the sand and gravel river bottom. The

two outside piles of each bent were driven to 2 in 12 outward batters. The five intermediate piles were driven to a 1 in 12 batter in alternate directions parallel to the roadway in order to compensate for impact loadings.

After inserting 44-ft. long reinforcing steel cages, the pile shells were filled with concrete. Each bent is capped with a reinforced concrete beam, 3 ft. by 2 ft. 10 in. in section, poured on the job. The caps include masonry plates for later use in setting the girders on the substructure.

Igloos for concreting

Because the schedule required that the on-the-job concrete work be done during the coldest months, inexpensive sectional wood-frame and canvas igloos were placed over the piers to permit maintenance of a temperature of between 70 and 90 deg. F. for 72 hr. The igloos were handled by crane, but they could be moved by manpower if necessary.

The 114 girders, each weighing 16 tons, are being fabricated by Albuquerque Gravel Products Co.; the 42 1/4-in. wires in each girder are prestressed to 154,000 psi. Delivery of the girders started in mid-March. The T-shaped girders, 32 in. deep, will be assembled six to a pier on 4-ft. 6-in. centers; their combined width will form the concrete deck of the bridge.

Each girder includes five diaphragms; diaphragm bars passing through six girders are tightened during assembly and distribute live loads throughout the span. Transverse expansion joints will be filled with 1-in. pre-molded expansion filler; longitudinal joints of the pre-cast girders will be filled with grout.

As spring approached, in anticipation of an increased flow of water, the roadway was removed between piers 3 and 4, already completed adjacent to the west bank. This was a safety factor operation and done even

though the girders had not been erected at that location.

With arrival of the prestressed girders at the jobsite by mid-March, rapid erection was soon under way. With cranes operating from the access road, as many as 10 girders were erected a day. An average of 8 a day worked out—being somewhat contingent upon the rate of delivery from the Albuquerque yard. By the end of April, 88 of the total of 114 had been put in place.

A reduction in the flow of the Rio Grande in April made it possible to reconstruct the roadway from bank to bank. This allowed completion of erection near the west bank—all materials being delivered from the east bank. Should the river rise again, and be beyond the capacity of the culverts, the roadway would be breached again near the west bank. However, this would not hold up the completion of the remainder of the erection near the east bank.

Planning paid off

This roadway and the manner of its use represents excellent planning and scheduling on the contractor's part. Construction was carried on continuously at a time when water-flow conditions could have delayed other methods of construction. The method used was economical, sound, and paid off.

The contract also includes provisions calling for removal of the old bridge and obliteration of that portion of the present road that will be replaced.

Arnold Dehn is project superintendent for Sharp and Fellows; W. R. Grinnell and Louis McNiel are assistant superintendents. B. M. Long, New Mexico Highway Department, is project engineer. Key men for Albuquerque Gravel Products are Walter K. Wagner, Dave Pierce and Don Ingle.



ROUTING EQUIPMENT over the full width of the embankment as loads are spread is an important factor in getting the most economical re-

quired density. Sheepfoot tampers work across fill also, but tire tracks above show that equipment is doing a good job first.

WHAT'S DOING

COMPACTION—*Colorado takes a big step and leaves choice of methods to the contractor's experience.*

HERE IS AN APPROACH to the ever recurring question—how far should the specifications go in stipulating the type, weight, and contact pressures to be used on compacting equipment—as affecting what the contractor would like to do, what modern equipment is available, and what lower compacting costs might be realized.

The project

Just two miles north of Denver on Interstate U. S. 87, the Northwestern Engineering Co. is constructing 6.3 mi. of modern dual-lane highway under specifications for compaction of embankments and at the base of cuts and fills that are new to the West. As compared to the average job where many types of soils are encountered, the fair uniformity found here was an important factor that made this new type of contract possible.

The project is in an irrigated farm area with drainage to the south and east, following present stream channels. Swamps and seepage areas show alkali. Each of the divided lanes has

42- to 44-ft. out-to-out shoulders with the two lanes separated by a 30-ft. median strip. Cuts range up to 20 ft. and fills up to 28 ft. There will be placed on the natural subgrade soil a variable depth subbase course (12 to 19 in. thick), depending upon the bearing value of the soils as determined by California Bearing Ratio (CBR) values.

Time allowed for observation

On top of the subbase course there will be placed a 4-in. base course of crushed gravel or rock. On top will be a 2-in. bituminous hot-mix wearing surface 24 ft. wide. This wearing surface is not the final stage of construction, but it is believed it will serve traffic satisfactorily for a period of 5 to 6 yr. at which time it is contemplated that a high type rigid pavement will be placed.

Soil is all heavy clay

Preliminary soil profile tests prior to design showed the following: 12 tests showed an A-6 soil (Highway Research Board Classification) with group index rating from 9 to 13; 3

tests showing A-7 with group indices of 12, 13, and 16; and 36 tests showing A-7-6 with group indices of 11 to 16. These are all heavy clay soils. As an example, one A-6 sample (group index 13) had a CBR of 2.6, liquid limit of 39.6, plasticity index of 21.5, and 78% of the sample passed the No. 200 screen. The swell after soaking of this sample was nearly 7%—anything over 3% is considered detrimental and critical under rigid pavements by the Colorado Department of Highways.

Prices and quantities were as follows:

Item	Price	Quantity
Compaction, embankments, cu. yd.	\$0.08	511,000
Compaction, base of cuts and fills, sq. yd.	0.03	462,600
Watering, M gal.	0.50	45,780

Contract price for this project was \$697,958 and it was awarded last October—with 240 calendar days for completion.

The specifications

Now, just how do these new specifications read as affecting compac-



MOISTURE CONTROL on heavy clay soil—typical throughout the project—was a key factor. Typical A-7-6 soil (Highway Research Board

classification) on the 4-mi. long project had up to 78% passing the #200 mesh screen, and requiring 23% optimum moisture content.

tion? Here are excerpts from them that should be of interest to all highway contractors.

17.2.2 Soil compaction requirements.
17.2.2.1 The bases of cuts, natural foundations underlying embankments, and all embankments except those composed essentially of rock shall be wetted and rolled to obtain the specified density. Where the natural foundation is in direct contact with underlying water sources which cannot reasonably be drained, it will be necessary to import the best available granular material . . . which ma-

Bases of cuts—embankments to meet 95% of standard AASHTO test.

terial will be superimposed on the natural foundation to obtain a working platform capable of adequately supporting the construction equipment in use. The process of importing and consolidating this material over such foundations shall continue until it is possible to freely operate normal construction equipment through the work area. In areas of muck removal, the backfill will be considered as embankment and shall be compacted in accordance with the specifications. At all other places and under all other conditions, scarifying, wetting, and compaction of foundation materials shall continue until a minimum field density of 95% is obtained (AASHTO T-99) for all soils except those of the A-1 and A-3 Highway Research Board Classification. For the A-1 and A-3 soils, a minimum density of 100% shall be obtained.

17.2.2.3 In the bases of cuts and the natural foundations under fills, where

the existing densities are such as to require wetting and rolling to obtain densities specified under paragraph 17.2.2.1, the soil shall be loosened to a depth of 1 ft. by scarifiers or other suitable equipment prior to the application of water and the use of rollers. This shall be done in order to achieve uniform density and dispersal of water through the mass of material to be compacted.

17.2.3 Wetting.

17.2.3.1 The wetting of an embankment, the base of cuts and subgrades shall be done with sprinkling equipment of a type which insures uniform and controlled distribution of the water. Material from cuts or borrow pits may be wetted at the source. The contractor shall be required to furnish sufficient watering equipment to insure proper moisture content of all materials being placed as required by plans or directed by the engineer. All wetting shall be done by uniformly sprinkling each layer or course of material being placed. In general, the amount of water used shall be sufficient to obtain optimum moisture

Information advanced on probable water amounts and percentage.

content which is estimated to be approximately 23%. Estimate of the quantity of water to be used in embankment construction is based on the adding of approximately 50 gal. of water per cu. yd. However, the quantity of water to be used may be varied on order of the engineer to meet conditions brought about by storms, droughts, or other causes. The contractor shall be required to supply and use equipment which will

insure uniform dispersion of water through the soil mass and which will maintain shape of the grade during construction. If excavating materials contain excess moisture, the contractor will be required to reduce the moisture content as provided by the standard specifications.

17.2.4 Compaction.

17.2.4.1 The contractor may use any type of roller equipment he may deem necessary to obtain a required compaction. Compaction equipment shall be construed to include trucks, tractors, bulldozers, and all other pieces of construction equipment used in excavating, transporting, placing, and spreading material in addition to any

Routing equipment over area is only statement on method.

rollers used. Each layer of material shall be compacted by routing the equipment over the entire width in such a manner that uniform densities will result. Equipment used for compaction of the upper 8 in. of the subgrade shall leave a smooth surface free of compaction planes.

17.2.4.2 Where rollers are used for compaction, the rate of placing embankment material shall be coordinated with the rolling operations so that the required compaction is obtained.

17.4 Basis of payment.

17.4.1 The compaction of base of cuts and fills measured as provided above shall be paid for at the contract unit price per square yard . . . which price and payment shall be full compensation for all compaction necessary to obtain the required densities, for fur-

(Continued on page 84)



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WASHINGTON — Seattle, Spokane

COMPACTION

(Continued from page 78)

nishing all necessary compaction equipment, and for scarifying, aeration, windrowing, harrowing, mixing, spreading, blading, and finishing involved in producing the compacted and finishing surface.

17.4.2 Compaction of embankment shall be paid for at the contract unit price per cubic yard . . . (remainder of this item reads the same as 17.4.1.).

17.4.3 The wetting of materials of all types measured as provided in the foregoing shall be paid for at the contract unit price per thousand U. S. gallons for wetting complete in place, which price shall include furnishing, transporting, and sprinkling the water and all labor, tools, equipment, supplies, and work incidental thereto.

The reasoning

Most of the following material was presented by William J. Walsh, staff construction engineer of the Colorado Department of Highways, before the 1954 University of Colorado Highway Conference. His remarks apply with equal vigor to today's situation and are here paraphrased.

Don't specify methods

It is a fundamental policy of the Colorado Highway Department not to specify type of equipment and methods of work but to require an end result, leaving the accomplishment to the experience, skill, and ingenuity of the construction industry. There has been one outstanding inconsistency in following this policy, and that has been in the matter of compaction of earth work. This has been set up on a basis that is practically force account. Nearly all good contractors will honestly tell you that they abhor force account. They say it destroys all incentive in the organization to do the job at the lowest possible cost and to devise ways and means for accomplishing the end result at the least cost.

The question arises—what advantages would accrue in the construction of earth work if highway departments were to require embankments and basement soils in cut sections to be constructed with an in-place specification at a unit price per cubic yard, or included in unit price for unclassified excavation as an incidental requirement thereto? Several years ago this matter was brought before the joint cooperative committee of contractors and department engineers. Most contractors were very much opposed to this.

Different soils—different methods

The contractors pointed up the uncertainties of required number of roller passes for the various conglomerations of soils encountered, the uncertainties of the quantity of water required by these ever changing soil

types and weather conditions. One of their principal objections was the non-uniformity of engineering enforcement. They pointed out that on previous experiences they had considerable difficulty with some engineers; that is, some were unreasonable, some lacked good judgment, and others were lacking in experience, and were not sure of their own judgment or how to interpret their findings. The contractors believed that there was not a solid basis for an intelligent bid—any bid, they contended, would be based on little more than guesswork and the end result would be costly to one or other of the contracting parties.

How tough is the engineer?

Contractors were especially concerned about how tough the engineer might or might not be. One of the principal objections raised was the conditions under which prolonged rolling would fail to raise densities up to specification requirements. In such cases, where the contractor would be paid for roller hours, he was not hurt and, after a time, the engineer would order discontinuance of rolling and accept the work at the density obtained, even though it was lower than specified. Under such conditions, it was stated, the contractor would be at the engineer's mercy if the cost of compaction were solely on his own head. The contractor would then have to consider the engineer as a cost factor when preparing his bid.

Today's picture is different

There is no doubt that such objections were valid up to a few years back. However, the picture has now changed. Various improvements of rolling equipment and experience with the use of rollers for the different soil types no longer make it difficult to obtain the densities as normally specified for highway work. Cost information has been accumulated, and contractors have gained a broader understanding of compaction requirements for the various soil types. The uncertainty relative to an engineer's interpretation of results can be eliminated by a rational and positive specification requirement.

Compaction of earth work presents many controversial problems and, under actual construction conditions, leaves much to be desired. The conglomeration of soil types usually encountered on the average construction job, combined with the changing climatic conditions, and moisture variations, make the results to be obtained highly unpredictable. One of the primary points of controversy among highway engineers and contractors is the relative merits of Standard AASHTO Method — 99 and AASHTO Method T-99 (modified).

Colorado's present standard specification for soil compaction requires that the laboratory compaction and density shall be in accordance with

the AASHTO Method T-99 (modified). It is required that the compactive effort shall result in a minimum field density of 90% for all soils except those of the A-1 and A-3 types. For the A-1 and A-3 soils a minimum density of 95% is required. Under practical application, there has been no great difficulty in meeting this specification.

High swelling soils

There is one important exception to this usage of the AASHTO Method T-99 (modified). As a result of field experience and observations, it has been concluded that high swelling soils should not be compacted to high densities. Therefore, when laboratory tests have shown that soils are being encountered with a swell in excess of 3%, the standard AASHTO compaction method has been used. The specifications then require that the construction compactive effort shall result in a minimum field density of 95% for all soils except those of the A-1 and A-3 type, and 100% for the A-1 and A-3 soils.

Give contractors the initiative

Colorado has taken its first step in putting the management function of the contractor's operations back in the hands of the contractor. Restore the initiative to the contractor, and he will find the best way to get the desired results. The superintendent will see that hauling equipment is used to supplement the rolling units. Many state specifications require that this be done, but the difficulty of enforcement is well known to all. If this operation is turned into a profit for the contractor instead of an added cost, the superintendent would see to it that equipment is routed over the grade in such a manner as to get complete coverage, thus aiding the rollers and reducing the cost of the operation. He would see that the grade is kept smooth and crowned for proper drainage and that ruts and pockets that collect and hold excessive moisture are eliminated by constant blading and shaping. So long as the states pay the cost of roller operation, there is no incentive for the contractor to use his own trucks and scrapers for this purpose.

Manufacturers have know-how

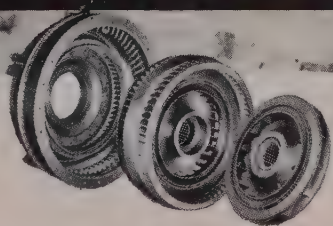
Is it not likely that if compactive effort were left to the ingenuity of the contracting agencies and the manufacturers of compactive equipment, that there will be more rapid advancement, leading to reduced costs, more concise specifications, and better road beds? Are not the contractors and equipment manufacturers the better qualified to select the type of compaction units best suited to accomplish the required densities for the various soils? The Colorado Highway Department has taken its first step forward toward an answer to these questions.



ALLIS-CHALMERS

HD-21 and HD-16

with Torque Converter* Drive



*and the Torque Converter is Twin Disc

Since 1937, Twin Disc Clutch Company has specialized in Torque Converter Drive for powered industrial equipment. Crawler tractors represent one of the most successful applications.

By applying the crawler tractor's horsepower and torque through the cushioned drive of fluid, Torque Converter Drive permits peak utilization of horsepower and prevents engine lugging—provides smoother, easier, more flexible operation with minimum clutching and shifting—promotes faster work cycles and more production per day.



TWIN DISC

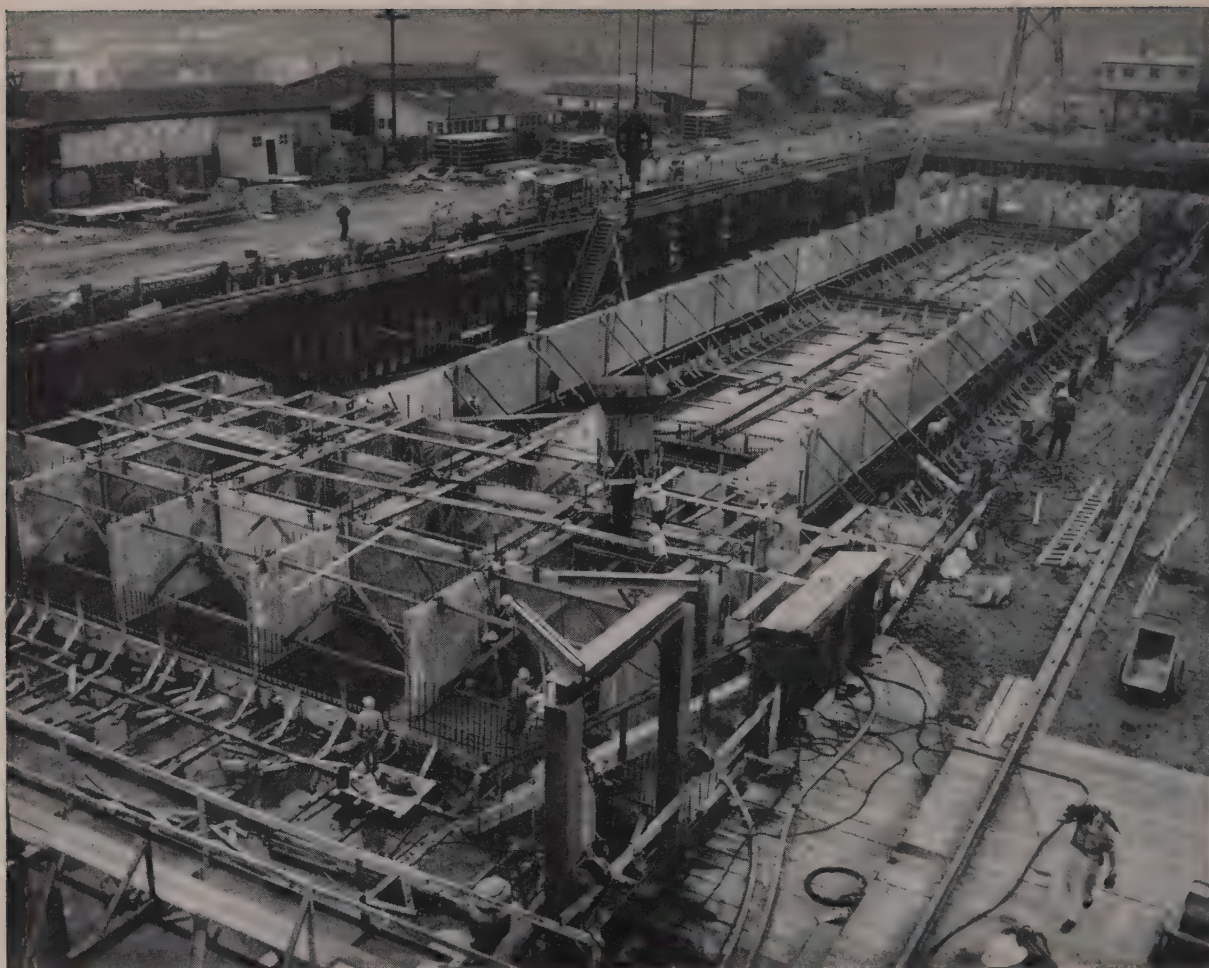
Torque Converters

Twin Disc Clutch Company, Racine, Wisconsin
Hydraulic Division, Rockford, Illinois

The new Allis-Chalmers HD-21 and HD-16 Crawler Tractors are designed and built to meet extremely high performance requirements—while maintaining the rigid Allis-Chalmers standard for longer life and the ability to operate at low cost.

Many outstanding features are being introduced by Allis-Chalmers on the HD-21 and HD-16, including • all-new A-C Diesel engines with “follow-through” combustion, for greater work with low loading of engine parts and extra long overall engine life • new Tru-Dimension track, featuring greater weight and maximum toughness • new “Wrap-around” radiator guard which tilts forward and down for easy accessibility • *Twin Disc Torque Converter Drive as standard equipment on the HD-21; optional equipment on the HD-16 . . . designed by Twin Disc and Allis-Chalmers engineers to meet exclusive requirements of the HD-21 and HD-16.*

Twin Disc Torque Converter Drive was also standard equipment on the HD-21's predecessors . . . for since 1940, it has been a feature on A-C Crawler Tractors.



WHAT'S DOING

SEMI-FLOATING BRIDGE—*What problems led to the design and construction of this first-of-its-kind bridge pier? Here are answers from men who know.*

By **BRUCE V. CHRISTY**

Bridge Engineer
Washington Toll Bridge Authority
and

HERBERT W. HUMPHRES

Senior Materials Engineer
Washington Department of Highways

MAJOR IMPROVEMENT to one of the main traffic routes in Seattle is to be realized within the next 18 months by construction of the First Avenue South Bridge and approach system across the Duwamish River.

Several concurrent construction contracts are now under way on the initial stage of this development.

These include a first bridge of four lanes and a combination of permanent and temporary approaches which will provide appropriate interchange structures for traffic in the north-south and east-west directions at First Avenue South and Michigan Street.

The main river crossing is by means of a double-leaf bascule bridge, 278 ft. center-to-center of trunnions, aligned with First Avenue South, at a skew of 52 deg. with the Duwamish River Waterway. This bridge will replace the existing 2-lane swing bridge crossing the river at a right angle to the chan-

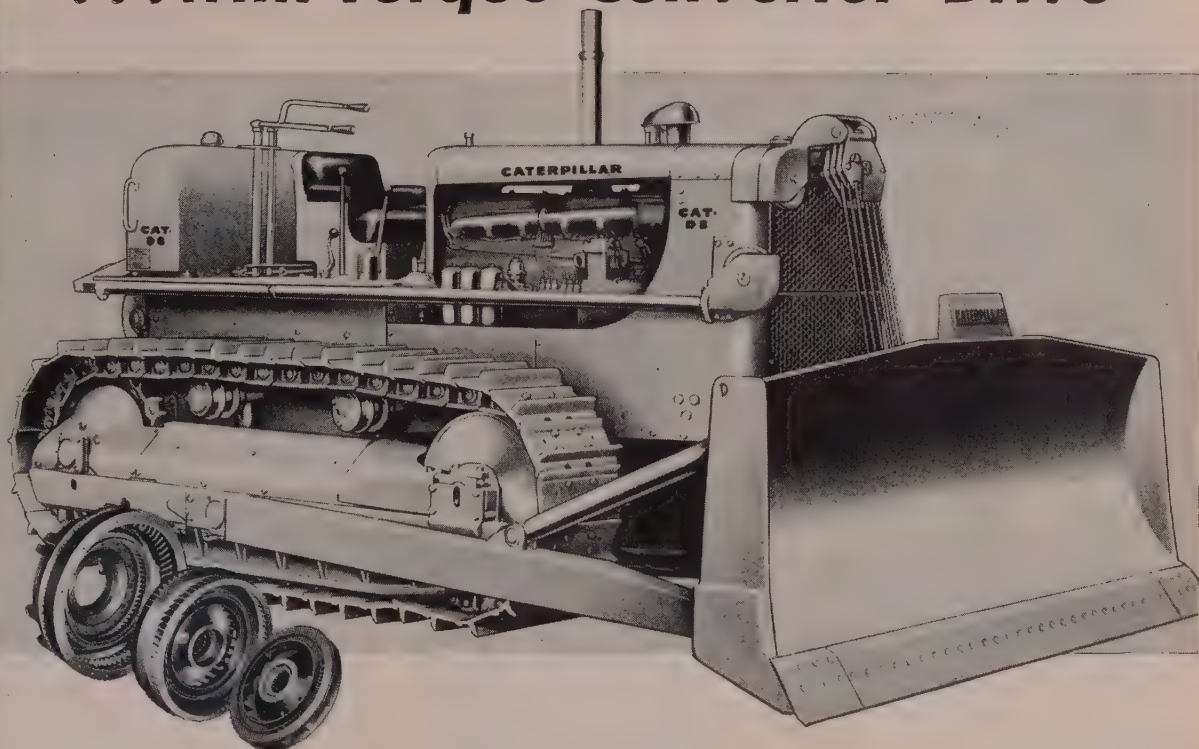
nel. Horizontal channel clearance is 150 ft. and minimum vertical surface clearance is to be 40 ft., as compared to the 20 ft. at the present bridge. Minimum channel depth is to be 35.

Design

In connection with the main bridge foundation design, some concern was felt at the outset regarding the use of the usual type of bascule bridge pier. Results of test borings disclosed deep strata of soft clays and silts, which posed a difficult problem in attempting to provide satisfactory main piers founded on conventional

2 NEW CAT DIESEL TRACTORS D8 and D9

...with Torque Converter* Drive



*and the Torque Converter is Twin Disc

Since 1937, Twin Disc Clutch Company has specialized in Torque Converter Drive for powered industrial equipment. Crawler tractors represent one of the most successful applications.

By applying the crawler tractor's horsepower and torque through the cushioned drive of fluid, Torque Converter Drive permits peak utilization of horsepower — provides smoother, easier, more flexible operation with minimum clutching and shifting — promotes faster work cycles and more production per day.



TWIN DISC

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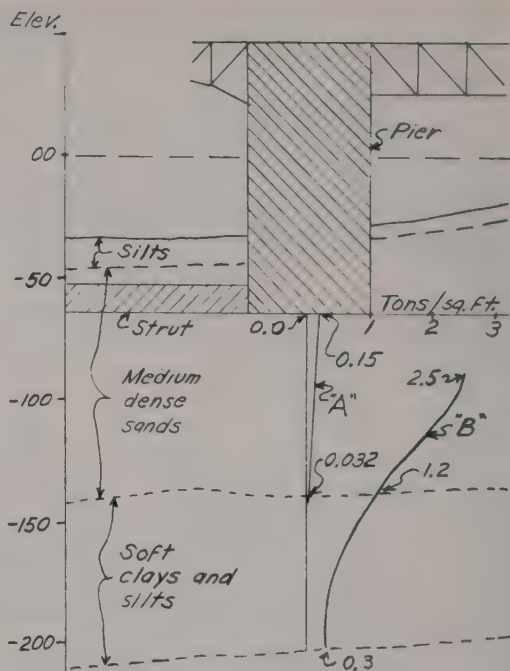
Twin Disc Clutch Company, Racine, Wisconsin
Hydraulic Division, Rockford, Illinois

The new Caterpillar D8 and D9 Diesel Tractors are built to deliver an even higher standard of money-making production, on *any* track-type application in *any* field.

Many advance-design features are engineered into these powerful Cat-built machines, including new Cat Diesel Engines with an all-new fuel injection system; new 7-roller track frames for maximum stability, flotation, and better ride; new "Water-quenched" track shoes for longer life than ever before; Hydraulic Booster Steering for maximum steering ease; new starting engines with more power; "In-seat" starting for greater convenience . . . and *Twin Disc Torque Converter Drive as optional equipment on both the Cat D8 and D9 Diesel Tractors . . . developed by Twin Disc and Caterpillar engineers to match the precise power characteristics of the new D8 and D9.*

FOUNDATION STRESS curve "A" (right) for semi-floating pier shows lower values than curve "B" for pile-founded pier. For pier base at el. —64, design figures are as follows:

Unit base pressure, low tide	1,500 lb./sq. ft.
Existing unit pressure at el. —64 from overlying soil	1,200 lb./sq. ft.
Unit pressure increase	300 lb./sq. ft.
Fluctuation between high and low tides	100 lb./sq. ft.



IN POSITION, pier gets additional loading with erection of precast units comprising "upper stories" of cellular structure. Submerged cells are fully flooded.

bearing piles. While soil conditions, as revealed by the borings, were as expected above elevation —140 ft.—showing clean, medium to fine sands of medium density—the occurrence of soft clays and silts of considerable thickness below this elevation were of principal concern.

Preliminary laboratory tests of specimens from the borings indicated possible maximum settlement of 2 ft. or more under a conventionally designed pier on pile foundation. Obviously, any arrangement of the piling, short of large caisson-type piles of great length, would be likely to result in an intolerable settlement of the main piers over a period of time. The use of such long piles to a probable depth of 250 ft. appears impractical when considering the additional load imposed by a concrete seal—required to balance the upward load due to a hydrostatic head of 70 ft.

Buoyancy vs. gravity

A preliminary pier design, using conventional piles, indicated a maximum vertical load of 15,000 tons. With buoyancy considered, this would produce an approximate equivalent net pressure on the foundation of 2,300 lb. per sq. ft. Considering the obvious difficulties to be encountered in the use of such a conventional design, even with 60% of the load supported by buoyancy, the use of a fully floating foundation suggested itself.

Assuming the pier to be standing

alone, it was attempted initially to provide complete flotation and sufficient lateral stability against overturning. However, this design would have required 9 ft. more draft than used in the final design. Since this, in turn, would necessitate a much greater dredged excavation, and since it was considered somewhat better design to provide some positive load on the foundation sand at all times, a partially floating design was adopted.

"Semi-floating" design

The actual pier depth was determined to provide for a longitudinal connecting strut structure between the two pier shafts—of appropriate cross section for the desired flexural strength—such that the design channel depth would be cleared by the strut. The proportions of the pier and strut assembly were adjusted to insure adequate strength of walls and slabs in the cellular construction of the entire structure and to result in a maximum base pressure of about 1,500 lb. per sq. ft.

A major point of design concerned the transverse and longitudinal stability of the pier against overturning. Initially, pier dimensions were chosen which would provide a substantial margin of stability, considering the pier shaft to be under complete flotation and standing by itself. In the final design, the pier shafts in connecting struts were treated as any ordinary structure on dry ground—the weight being net weight with

buoyancy considerations. Several combinations of assumed live loadings on the bridge and loads due to earthquake shock were considered for the two conditions of high and low water. Maximum unit toe pressures on the "free-standing" pier shafts, due to extreme conditions of loading in the transverse direction, were found to be less than 1,500 lb. per sq. ft. at extreme low water.

Because of the deep, soft strata underlying the pier base—with their relatively weak resistance to horizontal shearing forces—it is believed to be quite improbable that any seismic vibrations may be transmitted by the underlying bedrock, the source of such disturbance. Since, also, in calculating the overturning effects as described above, no account was taken of the resisting passive pressures of the backfill material, it is evident that the toe pressures thus calculated are considerably in excess of the actual pressures. Reductions in unit pressures produced in the underlying soil by use of the partially floating design—as compared with the stresses produced by convention pile founded pier—are quite pronounced. Under these conditions, no adverse settlements are expected.

Tidal fluctuation

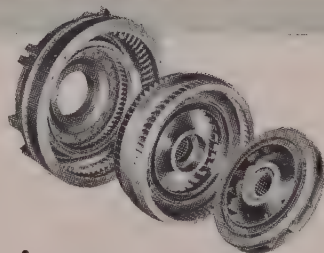
A second consideration is that of provision against vertical movement or substantial change in foundation pressure resulting from variation of

INTERNATIONAL TD-24

with Torque Converter* Drive

For the largest earthmoving projects . . . for laying big pipe faster and surer . . . for attaining new highs in logging production . . . I-H has developed the new INTERNATIONAL TD-24 Torque Converter Crawler Tractor.

Among the many features offered in the new TD-24 are *finger-tip hydraulic control* with INTERNATIONAL's famous Planet Power Steering; *instantaneous high-low range shift*, with all transmission shifting done by just *one gear shift lever*; the exclusive "*Decelerator*" feature, which gives the operator complete control of engine speed at all times; and *Twin Disc Torque Converter Drive as optional equipment . . . tailored by Twin Disc and International engineers to the TD-24's exact characteristics*. TWIN DISC CLUTCH COMPANY, Racine, Wisconsin; Hydraulic Division, Rockford, Illinois.



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CUT-AWAY perspective shows completed trunnion piers and stabilizing strut between them. Thickened rear walls of piers offset moment of cantilevered bascule leaves.



DREDGED SAND from pier site was used for south approach fill (foreground). Contractor's pier allows delivery of transit-mix concrete for pilasters and slabs of upper-story work.

tide level. This variation in hydrostatic pressure is prevented almost entirely by allowing flooding and emptying of the pier cells between low and high water levels through ports in the exterior walls at low tide level. Actually, the balance is not complete because of the reduced floor area of the chamber resulting from the presence of the intermediate cell walls of the pier. The relatively small imbalance results in a maximum possible fluctuation in base pressure of about 100 lb. per sq. ft.

The function of the underwater connecting struts is to prevent differential longitudinal displacement of the pier shafts due to any cause. They will resist through flexural strength any longitudinal rotation of the pier shafts resulting from eccentrically applied live loads. Eccentric bridge superstructure dead loads at the trunnions have been permanently counterweighted by thickening of the rear walls of the pier shafts. Maximum longitudinal displacement of the pier shaft at bridge level, due to rotational effect of live load reaction at the forward shoes plus an assumed seismic force produced by an

equivalent acceleration of 5% of gravity, is calculated at less than 1 in. Maximum effect of live load is calculated to be less than 100 lb. per sq. ft. of soil pressure.

Permanently impounded water in the cellular connecting strut structure and in the lower story of the pier shafts lowers the center of gravity of the system and eliminates flexure in the struts due to net upward buoyant forces.

Construction

Construction of the pier substructure is under contract with General Construction Company of Seattle at a contract price of \$1,387,655. The contractor has followed the design construction with only slight modification. The first stage consisted of integral construction of the lower story unit of the pier shafts and connecting struts in the company's graving dock on the Duwamish River about 3,000 ft. downstream from the bridge site. This unit—of 8,000-tons displacement and 12-ft draft—was floated out of the graving dock on

December 11 of last year and tied up at an adjacent pier. Here, the second stage of construction continued with the pier shafts being built up—sinking the entire assembly as the weight of walls was added. This continued to a total depth of about 25 ft., still leaving 13 ft. of channel depth over the top of the struts.

In the third stage, begun February 21 this year, the assembly was towed to the bridge site. At a pre-dredged location just adjoining the permanent site further upward construction of the pier shafts continued. This procedure went on until the assembly had been sunk to a depth just short of the final design depth, at which time it was swung into final position.

Site preparation

Clamshell dredging, dragging, and necessary hand work was done by divers for final grading of the bottom at the pier location. Accurate control of the fine grading was effected through sounding from the surface. Dredged material from the excavation at the pier location was deposited as fill to raise the grade of the general south approach area to uniform existing surface street grade.

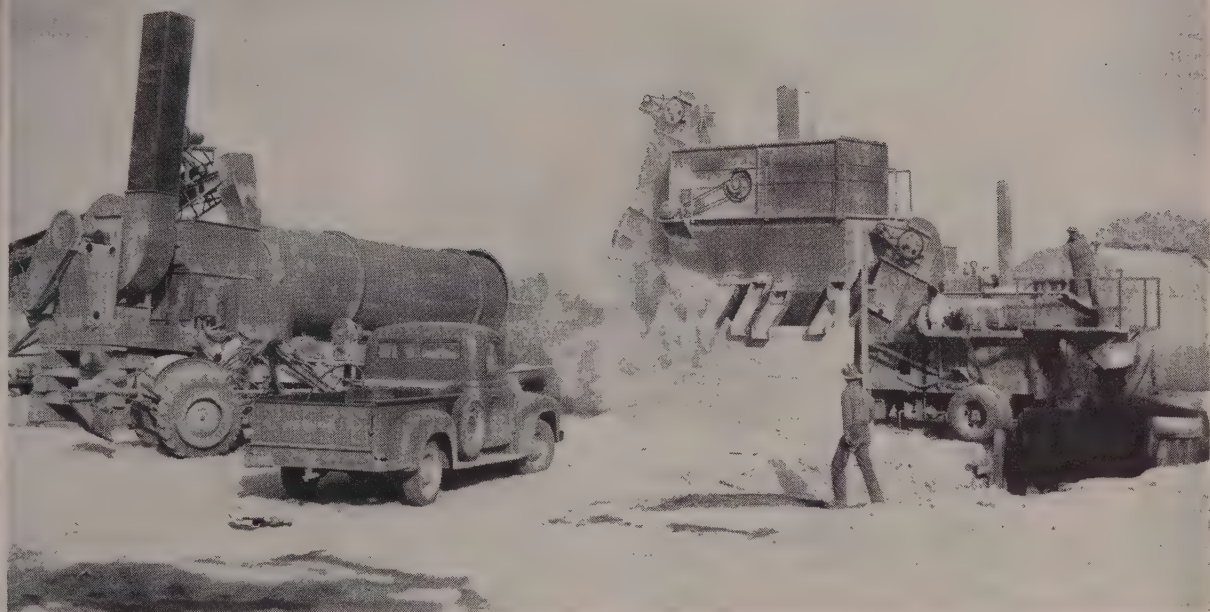
After the pier had been landed in its final position, completed bridge loading was simulated by loading the piers by ballasting with water and other means. As the last of the upper stories of the shafts are constructed, their added weight shall be successively compensated by unloading the water ballast with a view to maintaining the simulated bridge loading on the foundation during the process.

Backfill to design channel grade will be made with additional dredged material taken from the upstream channel adjacent to the bridge. Grout pipes have been installed in the pier shaft cell wall intersections for use in completing whatever filling may be necessary to insure full bearing of the pier assembly on the river sand. Jetting of dredged river sand under the cross struts is intended to complete the backfilling thereunder. When completely backfilled, the struts will be covered with 4 ft. of sand, thus placing the pier base 16 ft. under the finished channel grade.

The adoption of the partial floating design here is believed to be the only application to bascule bridge piers to date.

Personnel

Design of the project was performed by a special temporary group in the City of Seattle Department of Engineering through an arrangement with the Washington State Department of Highways—the latter organization being in charge of construction. Supervision of foundation exploration work was provided by the Department of Highways Soils and Materials Laboratory division.



PUTTING THE small asphalt plant on wheels means moves can be made in hours instead of days. Setup is arranged so that trucks can

get in and out easily (on the right), asphalt delivery is easily accessible, and prevailing winds tend to clean the plant area.

WHAT'S DOING

HOT PLANTS—*Don't sell the small plant short. This interview with a New Mexico contractor tells you why.*

CAN THE SMALL ASPHALT PLANT fit into current and future highway programs? Has it been outmoded by larger plants? Or is there still a place in today's construction program for the smaller unit?

One of the best men in a position to evaluate and answer these questions is Joe Knight. As general superintendent and a partner in United Paving Co. of Albuquerque, Knight has traveled the length and breadth of his home state, filling an important role in its asphalt paving program. New Mexico is predominantly a bituminous state. So in the belief that Knight's answers might apply with equal vigor elsewhere, we asked him the following questions:

Extent of company's work

Q: Mr. Knight, we understand that United Paving Co. has done



PLANT-MIX PAVING from continuous-mix plant goes down at a steady rate on this new divided section that will help speed U.S. 80 traffic in and through Las Cruces, New Mexico.

some important work recently in New Mexico. Will you tell us about it?

A: "I'd be glad to. What we're finishing up here is a fair sample of what we've done over the state this year. We specialize in asphalt paving. This will make 80,000 tons the plant has run this year. We've worked all over the state and done five big jobs. We did work at Wagon Mound, Las Cruces, Silver City, Hobbs, and Albuquerque. That pretty well covers the state."

Q: In doing this work, have you dealt with specifications that were easy, tough, or just intermediate?

A: "It's hardly my place to say whether they were tough. I do know that specifications we worked under were representative of those New Mexico uses generally. No special concessions were granted and none were asked for. Gradation, compaction and stability requirements here are high in relation to those in other states. We take the jobs as they come."

Type of hot plant

Q: Which type hot plant do you use... a batch type plant or continuous mix?

A: "We use the continuous mix

type. It's a Pioneer Continuflo, Model 51. We've had the plant about 3 years."

Quality of product

Q: Do you feel that the accuracy of the finished product is as high as that from a batch-type plant?

A: "I'm convinced it's even higher. What makes asphalt pavements vary is the human equation, not something mechanical. You rid yourself of many variables in the continuous mix plants. I think the answer is as simple as that. Furthermore, I wouldn't be surprised to see a trend toward fully automatic continuous mix plants in the future."

Q: As asphalt plants go, yours is small, Mr. Knight. Does the small plant have any particular advantage over a larger one?

A: "Let me answer your question with a question. Which is better, a small man or a big man? The answer is plain to me that there's a place for both. If you have to send somebody into a firebox to replace fire brick, you'd pick the smallest man in the

HOW IMPORTANT IS STABILITY IN AN ASPHALT ANTI-STRIPPING ADDITIVE?

Dehydro additive has been developed to assure a high degree of stability, both chemically and physically. Dehydro features especially a high degree of heat stability, retaining its effectiveness under all working temperatures, without the formation of undesirable reaction products.

DEHYDRO®

Asphalt Anti-Stripping Additive

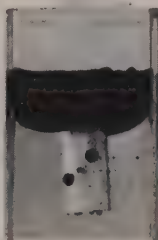
A TRETOLITE COMPANY PRODUCT

Dehydro is an effective complex organic semi-polar chemical which is firmly adsorbed at the asphalt-aggregate interface, insuring a permanent, tenacious bond. This bond is extremely stable, greatly extending the service life of asphaltic road surfacing by preventing stripping and water encroachment.

The Dehydro interfacial bond is immediately effective on contact. The adsorbed film is formed even in the presence of free water, causing the aggregate to become oil-wettable. Aggregate is easily coated without a time-consuming drying step—in fact, gravel freshly removed from a river bottom can be coated without difficulty.



WITH
DEHYDRO



WITHOUT
DEHYDRO

Photos show how Dehydro oil-wets stone in the presence of water to facilitate coating. The containers were partly-filled with water, upon which a layer of asphalt was floated. A silica slide was water-wetted and immersed through the asphalt into the water.

The slide immersed through the asphalt without additive (right-hand photo) was not coated. In the left-hand photo, where 1% Dehydro was added, the slide was coated on contact. Note the lower meniscus of the asphalt layer in the left-hand container—the Dehydro permits the asphalt to wet and adhere to the container wall, whereas in the right-hand container, the asphalt tends not to adhere to the water-wetted surface.



WORKING as a team, resident engineer John Smith (left) and Joe Knight figured they had a job to do instead of a battle to fight.

gang, wouldn't you? You'd do it because he could do that job better. In that case, his size would be in his favor. So it is with asphalt plants."

Small payroll

Q: Can you give us some definite instances where the size of the small plant is in its favor?

A: "It's a lot easier to meet the payroll on a small plant than it is on a bigger one. For instance, we run our paving operation with a crew of only 7 men, including the street crew. We use only three men around the plant: a dryer man, a pugmill operator, and one oiler.

"Plant maintenance costs also favor the smaller plant, too. Our maintenance costs run only about

For complete information on Dehydro additives, write or call

TRETOLITE COMPANY

A DIVISION OF PETROLITE CORPORATION

369 Marshall Avenue, St. Louis 19, Missouri

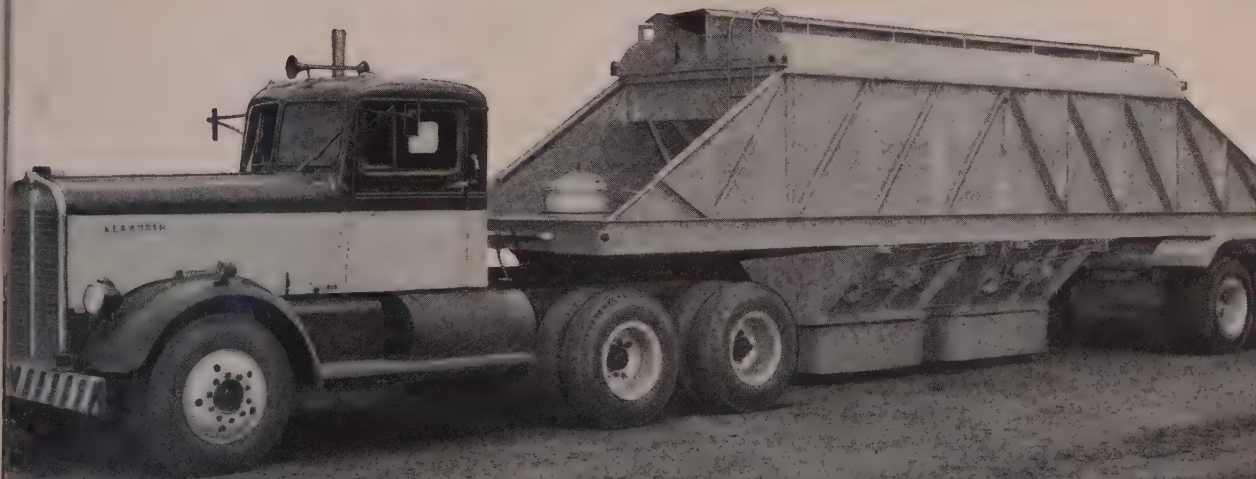
5515 Telegraph Road, Los Angeles 22, California



SURVEY- **then build**

Just as a surveyor determines the exact location, contour and dimensions of a tract of land—so does Kenworth take the measure of a job before building the trucks to handle it. What are the grades, the loads, climatic and road conditions? These are questions Kenworth asks in the field and answers on the drafting board and production line. This policy of advance survey is the basic reason why...

**...There's more
WORTH in KENWORTH**

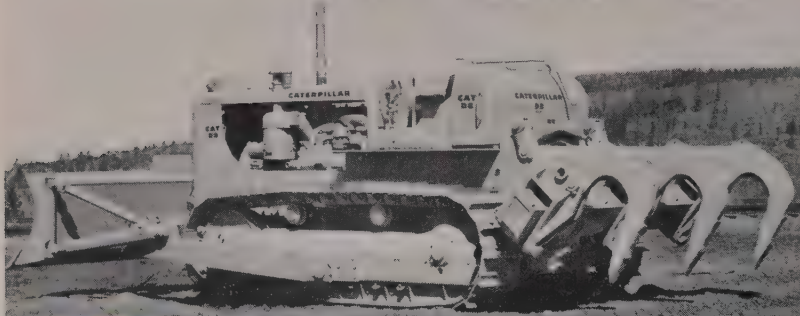


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TRUCKS ★ BUSES

FACTORY AND HOME OFFICE, SEATTLE, U. S. A. DISTRIBUTORS IN THE UNITED STATES AND MOST FOREIGN COUNTRIES

DON'T SHOOT... use this powerful new ROCK-BUSTING TEAM



Rock Ripper ON THE New Cat D8

Lick hard-to-load materials with the most powerful and effective ripping team available today — the ATECO Rock Ripper on a new CAT D8. It's a perfectly-matched combination that puts every ounce of the new D8's tremendous drawbar pull to work shattering hard rock, shale, cemented gravel and other hard materials into easy-loading condition. There's no faster, more economical way to reduce loading time, boost payloads or save wear and tear on your scrapers!

Works wherever your tractor can go

Compact tractor mounting of the ATECO Rock Ripper lets you rip in corners, turn short in narrow cuts. Swivel-mounted standards pivot on turns for effortless steering.

Exclusive rock-shattering action

Special curved standards with replaceable rock-splitting points produce an underground "quivering" action that really shatters rock to easy-loading fragments. Makes an economical scraper job out of many tough rock conditions you'd expect to "shoot" and shovel-load!

Available now for Cat D6, D7, D8; New D8 and D9 tractors

Job-proved, heavy duty construction; rips to 24" depth with 9" head frame clearance. Ideal for ripper-dozer combination; ripper balances dozer weight for increased traction, easier handling. Tractor drawbar takes the pull—no strain on tractor case. Why let hard-to-load materials cut production on your job? Call your Caterpillar distributor now for an ATECO Rock Ripper demonstration!

Speeds tree felling, too. Root knives replace regular ripper standards. Will cut roots 10" to 12" in diameter, down to 30" below surface. Cuts supporting roots so trees can be dozed over in 5 minutes or less.

31

AMERICAN TRACTOR EQUIPMENT CORPORATION

Designers and manufacturers
since 1920

Mark Woodruff
PRESIDENT

9131 San Leandro Blvd.
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BULLDOZERS • ROADBUILDERS • RIPPERS • SCRAPERS • LOADERS

\$250 a month, and bear in mind that we have a 9-month work season. We ran for 3 years on one set of firebox brick, and I believe we'll mix this whole job out on one set of pugmill liners and paddles.

"I know that a small plant is easier to move. Look at the way this plant is set up. See that timber cribbing under the pugmill frame? Every timber is numbered and lettered. Every man knows exactly where that piece goes, and exactly where every part of the plant must go in the next setup. We make moves in a matter of hours, not days.

"We bid this job for \$3.36 a ton, with a small extra thrown in for our asphalt. That's one of the best definite examples I know of, because we were bidding against some of the operators of large plants. Of course, if the job had been real big, it might have been a different story."

High output

Q: Do you sometimes wish that you had the hourly tonnage capacity of a large plant?

A: "I suppose every Chevrolet owner in the country has at some time or other wished for a Cadillac, even though his Chevrolet is taking him where he wants to go, is operating at lower cost, and is saving him money. Sure, there are times when I wish I had a bigger plant to meet certain schedules when work is overly plentiful.

"But, let's don't lose sight of the relevant facts. The percentage of paving time on a hot-mix job, in relation to the over-all construction time, is small. It always takes many more weeks to grade, build culverts, and drain structures; to crush the rock or dig the gravel or manipulate the soil cement if they use that for a base. In relation to the time it takes to do these things the work of the hot plant is short term.

"Our little Model 51 Pioneer is rated at about 65 tons per hr. under average conditions. We get that tonnage. In fact, we've gotten as high as 83 tons per hr. under what you'd call average conditions by keeping enough trucks there to haul the material away; by making sure enough grade is finished on the street, and by keeping our equipment up to avoid breakdowns. That's enough production to do an average paving job in this state. I might add, too, that if you neglect these same fundamental things in efficiency on a 175-tons per hr. plant, you'll very likely wind up with about the same tonnage we're getting out of this small plant."

Expanding work in sight

Q: Do you believe the small plant will still fit into the picture if and when President Eisenhower's comprehensive highway building program goes through?

A: "Certainly. And I believe that

**BRODERICK & BASCOM
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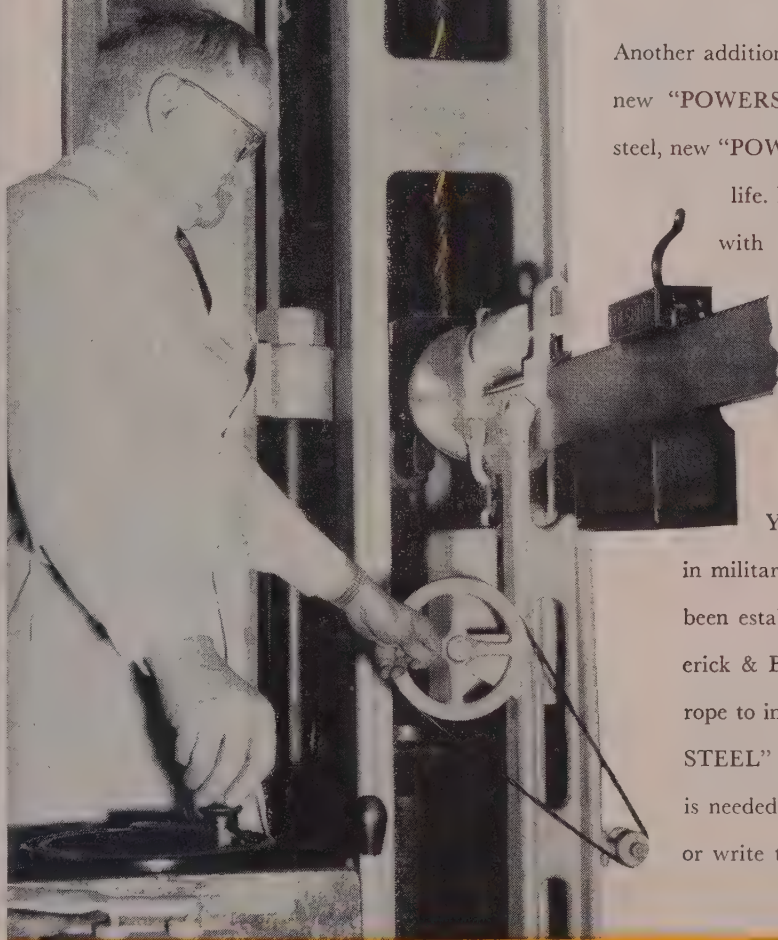
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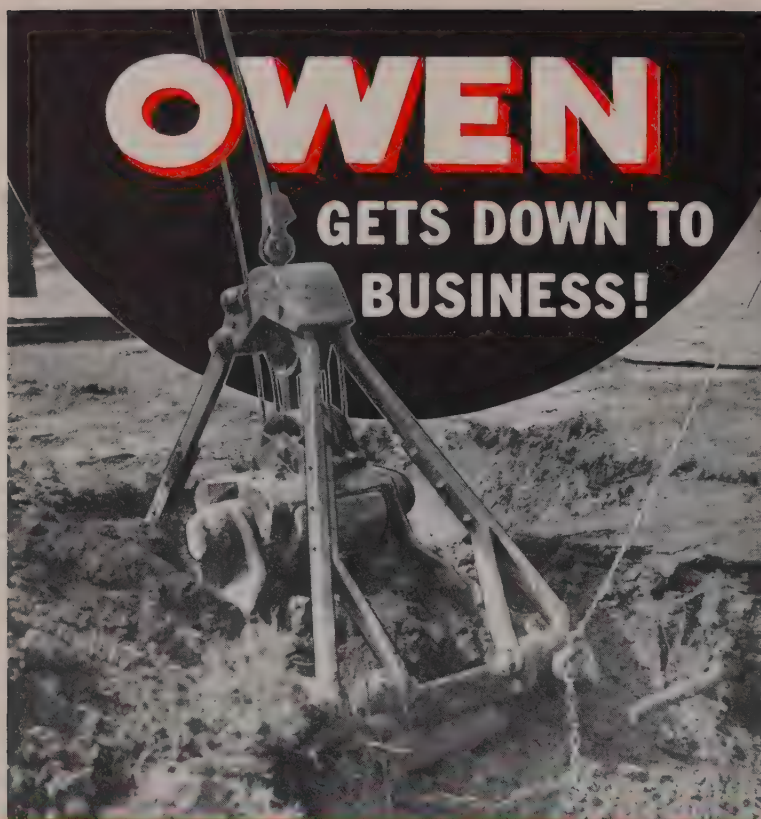
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Senator Chavez of New Mexico, with his wealth of experience in highway matters, will support that program.

"If they do the Eisenhower program the way it ought to be done, it will work exactly the way general programs work now, except on a bigger scale. They won't start paving in San Francisco and run a straight line to New York, or let a job from Tucson to Indianapolis in one contract. The work will be a combination of big and small projects, built in sections to a master plan.

"Obviously there will be work on that program for big and little plants, so that a setup like ours would have a definite place in such a program. And don't overlook the possibility that there will probably be a place for plants like ours in the maintenance of these highways in the future.

"Mobility, economy of operation, and fair output will be required of maintenance plants which pre-mix the bituminous patching or field mix the upper decking. A plant like this is an ideal answer to those needs."

Skilled operators

Q. How about the competence of plant men on a setup of this size compared to a larger plant? Can you get by with men not so experienced?

A. "Not unless you want to go out of business you can't! Simply because a plant is small doesn't mean you can get by with untrained people.

"It takes the most skilled operators we can get to operate this small plant day after day at more than its rated tonnage. The big measure of the success of our plant has been the output we've consistently gotten. Also, I believe inspectors expect every bit as much in the way of precision-controlled mixes on a small plant as they do on a bigger one.

"Bearing those two factors in mind... output and quality, it seems to me that hiring the best help you can is a sound requirement. Our men have been with us for a long time, and they were picked for their jobs chiefly because they were good."

How to make a profit

Q. Summing up, what would you say are the most important things to remember about the operation of small hot plants, Mr. Knight?

A: "The same fundamentals you keep in mind on big plants also hold true on this kind of a setup. You make sure you've got a dependable flow of asphalt and aggregate coming into the plant. You set up to take every advantage you can of haul conditions. You make sure the plant is properly calibrated. You head break downs off before they start by making regular and careful inspections. You hire good men, you make a low bid, and you're in business. That's about all there is to it."

IT AMOUNTS TO QUITE A DAM!



At pit (1)—shovel loads bank-run onto belt to crusher (2), which feeds minus 6-in. to stockpile (3). Material reclaimed from stockpile goes to top of screening tower (4), from which conveyors radiate to coarse-aggregate piles (5) and sand piles (6).



Note large and jagged aggregate on "U. S." belt. The belt starts the material from the pit to the rock plant.



"U. S." belt discharging aggregate onto one of the immense surge piles.

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WHAT'S WANTED

PAGES 102-135



.... What Western road builders say they need to do jobs faster, better, more profitably

"... Look soon for small, powerful drill rigs capable of hitting production speeds well over 150 ft. per hr."

Page 106

"... There is a growing need for concrete paving machinery capable of paving at high speed the super-elevated curves common in modern designs."

Page 112

"... Multi-purpose machines take on special significance in Colorado because of that state's patrol maintenance system."

Page 115

"... Signing and striping has become big business only recently. Joe McGee equipment is still to be found. Oregon so far has only thought about these."

Page 116

"... One cannot stress sufficiently the importance of adequate planning on precast, prestressed jobs. One of the most important factors is well designed forms."

Page 124

"... On his first prestressed structure the resident engineer has an obligation to learn all he can before getting too far into actual construction."

Page 128



VERSATILE EQUIPMENT still gives good old contractor ingenuity a chance to pay off. Here's a serious secondary drilling problem, solved by shop building: a platform on the end of a Pitman Giraffe boom and mounting a Gardner-Denver wagon drill, for sinking holes from any angle. Giraffe's 38-ft. reach was the big boost.

WHAT'S WANTED

EQUIPMENT—What do Western contractors want next? Are they happy now?

TALK TO ANY CONTRACTOR, any good superintendent, or to any engineer with any conception of how the stuff he designs is going to be built. The answer is always similar.

"Manufacturers are doing a fine job of developing equipment by types to do certain jobs," they say. "Once in a while a new need pops up, but it doesn't usually create a whole new type of equipment. What shortcomings there are have to do with better clearances, higher horsepower, or stronger parts. Too little thought still is given to the mechanic's problems."

Make it bigger

George Reber, president of California Welding & Blacksmith Shop in Los Angeles, perfected and now manufactures the Calweld earth boring machine used for drilled-in-place foundations on many highway structures jobs. Reber smiled when we asked him what the demands were in his business.

"There are demands, sure . . . and there are dreams. They still beat us

over the head to come up with some way of moving drilled dirt steadily to the top of the ground, without stopping the bucket. But that's mostly just needling. What they really demand, and what we try to give contractors, is bigger, more powerful models. The recent introduction of our 200-A is an example: it was needed by contractors who had big-diameter drilled-in-place work. Another thing they're asking for is a self-contained drilling package which they can pick up on their crane booms when they need it. And we're giving it to them."

Whatever demands are made by Western contractors for new or different construction machinery will always be governed by certain inescapable problems which seem peculiarly Western. For example, distances are vast. Transportation is a real problem, so construction machinery which tends toward mobility under its own power wins ready acceptance.

Elevation, too, must be considered. A 500-cu. ft. compressor will make

Someday, perhaps, you may read this story

It's a 220-mi. job. Cost . . . \$237,000,000. Contractors with a well-heeled financial pool have joint-ventured the undertaking. Specifications have been fully standardized for this and other road jobs, not only in the 11 Western states, but other parts of the country. Bridges are identical. They've been worked out by bridge engineers who learned to suppress their design individuality, sometime back around 1975. And equipment!

Dirt work, a lot of it borrow, is being flown in by 60-yd. helicopter rigs, free at last from rubber tires, power losses

in hauling, turning, and dumping, and all the other things attendant with over-the-road features of today's equipment. In a tunnel heading, an ultrasonic machine, developed as a takeoff from high-power radar, chews steadily through a granite mountain without explosives and without stopping. A sectionalized conveyor, power driven by electricity from a small atomic plant, gets the muck outside fast. Electrical field controls, far advanced over today's electronics, handle practically everything. Few men are around.

two wagon drills dance a jig at sea level, but the same two wagon drills working at the top of Colorado's 11,314-ft. Monarch Pass will do a lot better job if they have a 600-ft. machine kicking them in the pants. Good machinery design now takes these extremes into consideration. Heads-up outfits like Morrison-Knudsen Co., Inc., or Guy F. Atkinson Co. buy the bigger, rather than the smaller unit. They figure on acceptable performance under extremely tough conditions; plus performance under average to ideal conditions. The trend toward more powerful equipment is almost certain to continue to meet contractors' demands.

Western construction, done in an area where rock formations range from the newest to the oldest—and

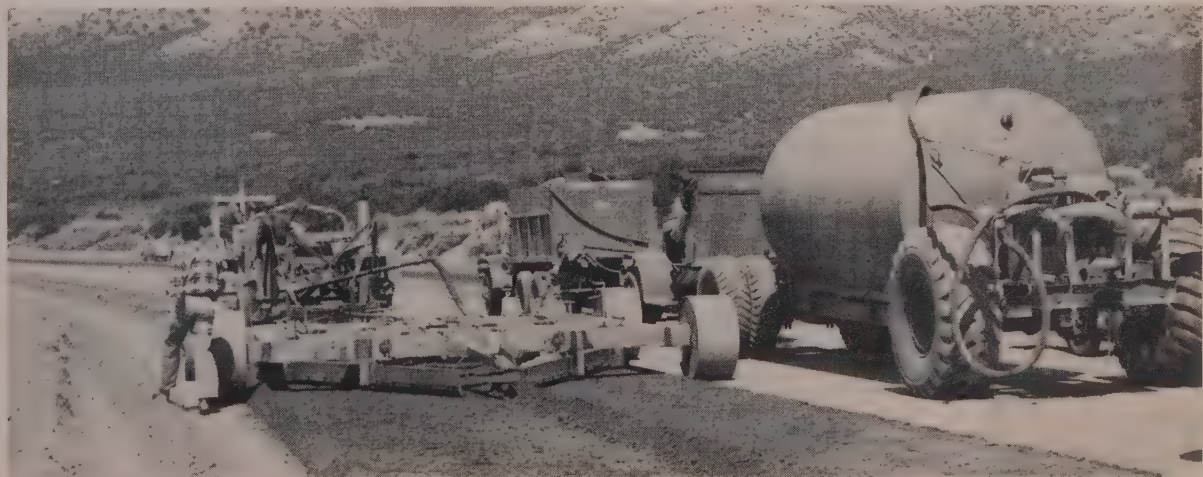
where many formations stand crazily jumbled on end—lends a peculiar sameness to construction of various types. There's little specialization. It takes a powerful Cat to pioneer Western highways, and it takes the same big Cat to rip out the path for a dinky little canal with a 2-ft. bottom.

The problem of finishing off the berms of these little canals after the lining is in is giving many Western contractors gray hair, chiefly because there's no equipment for that job on the market except the Joe McGee rigs they've made themselves. Here, of all places, is a spot for a dual purpose machine. There's no reason why the machine which did this job wouldn't also finish highway shoulders and back slopes. It's a good example of the Western way this

law of sameness can profitably apply.

Another factor is the natural remoteness of many parts of the region, especially in places where water supplies originate. On the jobs far removed from cities and towns, the labor turnover often is high. Possibly this factor above all others makes contractors want to buy powerful, simply-designed equipment with the least possible amount of human labor needed. Automatic controls win fast acceptance if they are simple, easy to operate, and not hard to maintain.

The last factor which doubtless will influence the development of equipment in the next few decades is the human equation, sometimes referred to as stationary inertia or plain cussed stubbornness. It takes many forms, but for purposes of this dis-



WHAT DO CONTRACTORS build for themselves? Here's one example—a drag for leveling soil-cement. Motor graders are just too bulky for

a 12-ft. lane, and their tires introduce compaction planes that are bad for the work. (See also article on page 53.)

cussion it may be said that there's a prejudice at present against too-intricate controls on construction equipment. So long as operators like old Crooked Leg Johnson, Pete Peterson, and others with the same background have their say, manufacturers will make controls simple, dependable, and practically fool-proof.

So far as today is concerned, that's a fairly sound, hardheaded philosophy. Fancy electronic gadgets, for example, work perfectly only within very narrow limits of tolerance . . . much tighter than the average construction mechanic has been trained to follow. Thus, if a monkey-wrench

mechanic gets an adjustment close—and lets it go at that—delays which eat heavily into production invariably follow. And too often, it's the machine, rather than the mechanic, which gets unpopular.

That situation may change eventually, but not too soon, say the experts. Remote control of construction equipment fleets should be as practical as remote control of a drone airplane, but when will the day come when such an advancement will justify its cost? If that method ever is adopted, it will undoubtedly save operator's wages, enhance safety, and boost production, but it will also call for highly trained technicians in the

control towers. It seems a long way off.

What, then, can reasonably be expected along development lines in the next few years immediately ahead? To learn what Western contractors want. **Western Construction** went to manufacturers, equipment distributors, top-ranking superintendents, and operators. The consensus was strikingly similar. Contractors want powerful, easily-controlled, easily-maintained, high-producing machines; equipment that will do specialized work for thousands of hours of reasonably trouble-free life. Operators want powerful, safe, comfortable equipment. Superintendents want equipment that's dependably productive—without a high-producing, cost-cutting piece of equipment, their reputations are shot. What's in the cards for the next few years is simply this: the manufacturers will give them what they demand.

First, more horsepower

The race for higher horsepower in construction equipment is already on, and the stakes are as high as they are in the automobile industry. Tractor engines, for example, are moving steadily toward the 300 range, and some have surpassed it.

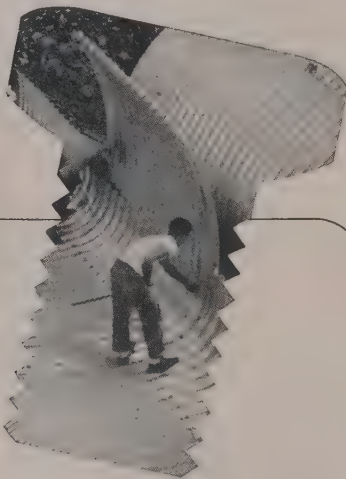
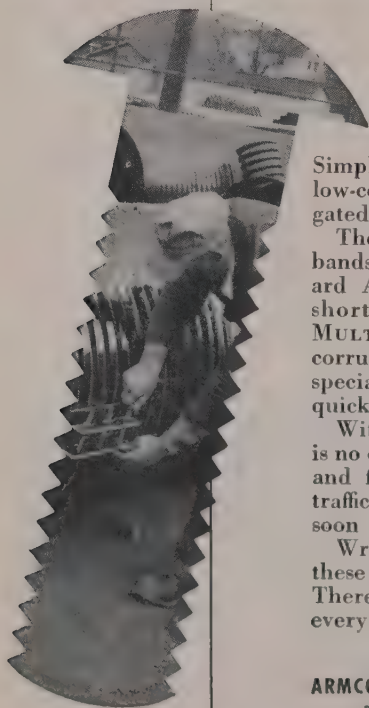
Torque converters for motor graders are being designed, so that applications of high power against blades of the future can be softened against shock in the tough places. On draglines, rock crushers, and other construction equipment the horsepower rating of engines is rising steadily. Practically every manufacturer has horsepower improvements on the drawing board or in production to meet this demand for more powerful equipment.

The move toward greater horsepower is, of course, perfectly justified. Contractors today are asked to do work on a much bigger scale than ever before. Road jobs are bigger, dams and airports are tackled in terrain which might have been impossible 20 yr. ago. The use of human labor of any kind on a construction job today is one of the costs a superintendent must watch most carefully, so the move toward higher-powered equipment—which will do half again or twice as much work as older machines—is perfectly justified.

But don't tell anyone!

When machines capable of boosting the work capacity on a job are brought out, incidentally, contractors tend to guard the secret of their success. Consider the manufacturer of a well-known brand of pneumatic compactor in the 50-ton range. A year or so ago he beefed up his compactor's weight, rigged up a faster and more powerful method of pulling it with a DW21, and improved certain oscillation charac-

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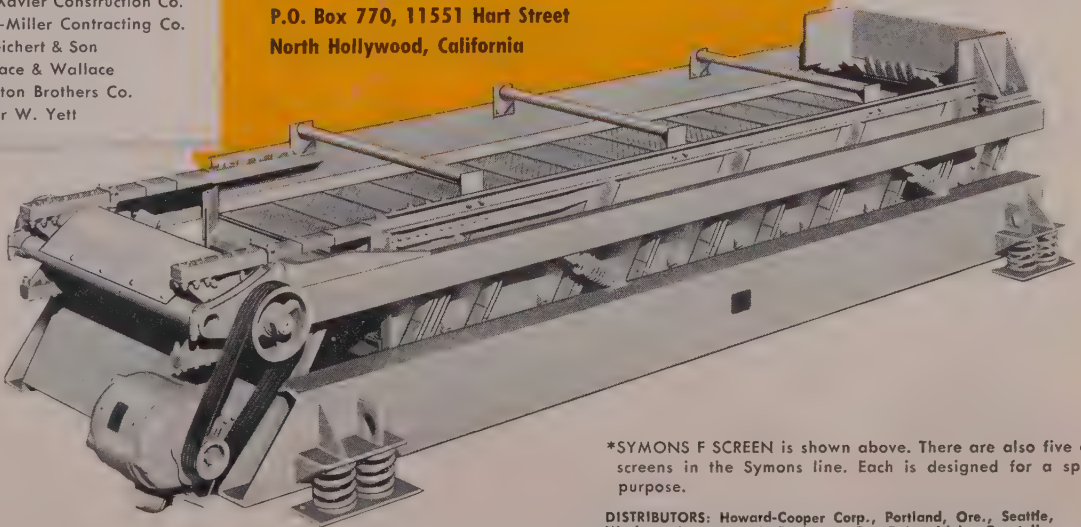
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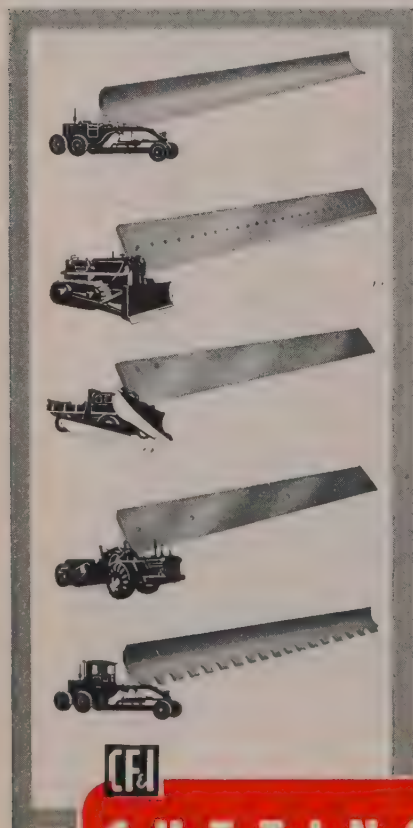
*SYMONS F SCREEN is shown above. There are also five other screens in the Symons line. Each is designed for a specific purpose.

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teristics. The first such units were sent to a large Western dam. The unit quickly demonstrated its capacity to get specification compaction densities in lifts up to 24 in. thick, moving twice as fast as anything had done before. The contractor's compaction costs dropped quickly, so much so that he asked the manufacturer not to advertise the advantages of the new rig to his competitors.

Thus it seems a fair assumption that more powerful equipment will have excellent sales reception as it is introduced.

If present construction work and equipment is a guide to machines coming up, as many industry leaders believe it is, the following trends may reasonably be expected in the next few years:

More talented tractors

Horsepower all down the line should increase, and capacities should get larger by about 25%. There will be an effort made on both crawler and rubber-mounted equipment to improve ground flotation under load, thereby lowering the amount of horsepower loss usually expended in overcoming normal rolling resistance. Torque converter applications should become much more general. The equipment will be better lighted for night operation, and will stress operator comfort more. For example, a cigarette lighter on an industrial tractor wouldn't add too much to its cost and would help to sell operators.

Tractors, while built for brute strength, will probably be tailored to meet individual problems. For example, lowering the center of gravity and raising the horsepower will help Western contractors with one of their perennial grading problems: ripping. When Caterpillar Tractor Co. proof-tested its new souped-up Series E model of the D8 on a heavy grading job north of Phoenix, for example, one of the things its field engineers watched most was the ability of the machine to back into steep places with a ripper. If rock formations can be ripped by powerful equipment, it's usually cheaper than blasting.

Drills and steels

The drill manufacturers, however, can reasonably be expected to take a competitive role in that. Look soon for small, powerful drill rigs capable of hitting production speeds well over 150 ft. per hr. in larger diameter work than is general now. They'll achieve it by incorporating such features as variable drill speed, variable rotation, and variable down pressure on improved bits. The machines may have their own built-in winches for moving into tight spots; certainly their locomotion will improve.

With regard to drilling, one of the contractor's worst problems is steel breakage in drill steel and in couplings where more than one length of

2653

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G40-C Flexible Shaft Concrete Grinder—an efficient, lightweight tool built on a wide wheel base for stability, caster fitted for easy mobility.

AG, AGW Vibrators—heavy-duty vibrators especially recommended for compacting thick floor slabs, walls, piles and foundations.

Stow Vibrating Screeds—strike off a smooth surface that is true to grade, at the same time thoroughly vibrating the concrete.

steel is used. That problem is becoming so acute that steel manufacturers already are probing whatever secrets the metallurgists have. The life of drill steel will be lengthened, and the whole subject of improved metals will probably result in tougher cutting edges, better steel, and longer life on the line for construction equipment.

Of all items in the excavating category, explosives have probably advanced further in excellence than anything else. But there is room for some improvement there, too, particularly in view of newer safety requirements. It's becoming more gen-

In the crystal ball . . .

1. Fantastic Buck Rogers construction equipment is possible, but not probable soon.

2. What contractors buy quick-est is horsepower.

3. Other demands include high production capacity, ease of operation, simplicity of maintenance, less down-time, and precision work of high quality. They're getting it as soon as manufacturers know.

4. Despite peculiarly tough work conditions, Western contractors are getting the job done with conventional equipment.

5. Fancy electronic controls are frowned on unless they're fool-proof.

6. Expect centers of gravity in excavating equipment to come down; power and capacity to step up.

7. Look for metallurgy to whip abrasion and shock problems.

8. Pneumatic compactors and soil blending equipment will become more popular; sheepfoot rollers less so. New principles of vibratory and kneading compaction may soon develop.

9. Automatic asphalt plants are proving themselves . . . still lacking is a paver whose laydown width can be adjusted in motion.

10. There's nothing wrong with construction that American ingenuity, honesty, and the application of the Golden Rule can't whip.

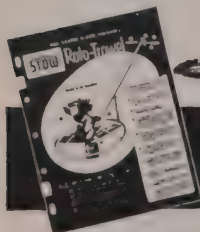
eral for agencies to ask that any powder loaded in a shot be fired the same day, and not be left over where it might accidentally explode in a thunderstorm or for other reasons. The overtime pay which specifications like that impose is a thorn in many a contractor's side. Bigger-diameter powder cartridges, free-flowing powder that's not affected by ground water—anything that will speed up loading will probably be welcomed by contractors.

Equipment on the hauling side of excavating will, of course, have better job characteristics as horsepower goes up. In its low range of speed

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Model 6-C Austin Overshot Loader with grizzly screen loading pit run gravel



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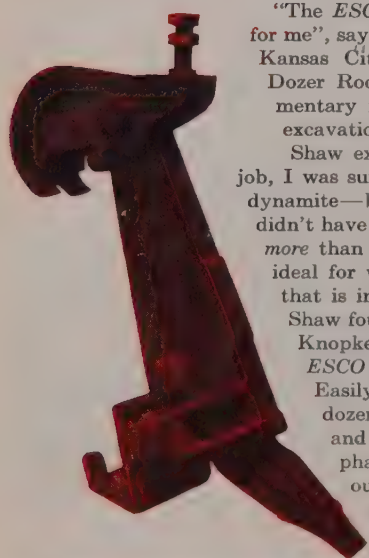
"ESCO

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DOZER ROOTER BEATS DYNAMITE," says Orville Shaw, excavating contractor



ESCO Dozer Rooter Cuts Costs on Rocky Basement Excavation



"The ESCO Dozer Rooter is enough dynamite for me," says Orville Shaw, excavating contractor, Kansas City, Missouri, who recently used the Dozer Rooter to punch through a tough sedimentary rock formation on a large basement excavation job.

Shaw explains: "When I contracted for this job, I was sure I'd have to use a good amount of dynamite—but with the ESCO Dozer Rooter I didn't have to use one stick. The Dozer Rooter more than paid for itself on this one job. It is ideal for working in close quarters, something that is impossible with the pull-type ripper." Shaw found out about the Dozer Rooter from Knopke Brothers' Contractors Supply, an ESCO dealer in Kansas City, Missouri.

Easily installed on any straight or angle-dozer, the ESCO Dozer Rooter can rip and root its way through concrete, asphalt, rock, hardpan and boulders. Find out today how you can save time and money on your jobs with the ESCO Dozer Rooter. Your nearest ESCO dealer can furnish details.

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the hauling equipment of the future will operate on steeper grades and do more of its share of loading. In its higher speed range, the equipment will roll faster than now, with bigger payloads, and there will be smaller power loss because of ground friction.

Compactors

On the processing side of excavation, particularly in earth fills, the trend will probably be toward more consistent use of blending machinery, not only for distributing moisture evenly through a lift, but for assembling the soil structure as uniformly as possible before rolling. Rollers, too, will likely see some change. The use of sheepfoot rollers in important works will diminish. In their place, pneumatic-tire rollers in the 50-ton range should become increasingly popular, especially as manufacturers plan that equipment for operation with conventional units.

Earl Maloon, manager of Southwest Welding's Construction Machinery Division, believes that widespread general use of rubber-tire rollers is just around the corner, and that the trend toward lower tire pressures on these units will stabilize somewhere around 80 psi.

"There's also a move to smaller rubber-tire compactors," Maloon said. "The small 15- and 25-ton models we've placed on some of the jobs are proving that they're the answer to the compaction problem around abutments."

Improvements in base-course machinery have been numerous over the past decade, particularly in crushing and screening equipment for flexible-base construction. Portable equipment capable of high production has demonstrated on job after job how well it's been built. But contractors still want certain refinements.

Crushers

They want crushing plants that meet more nearly the weight and size limitations of over-the-highway travel. They want full flexibility in plant operation, particularly with regard to changing adjustments safely while the equipment is running, to meet pit conditions. They want bearings that won't fail, and screens that will give longer life. They want some sort of sampling device sound enough that it will be written into State specifications to take the human guesswork equation out of the operation.

To a very great extent, modern crushing and screening plants have aimed at these objectives. But refinements of these features can certainly be expected as time goes on.

In the field of stabilization equipment, some contractors still are building considerable equipment for ripping, windrowing, leveling, and

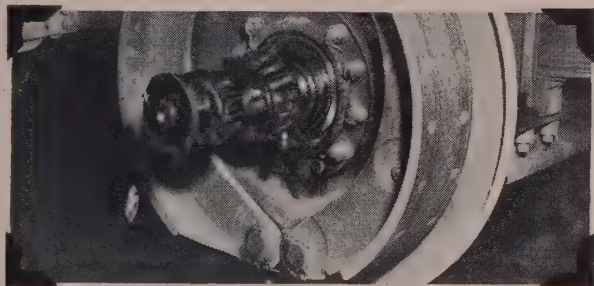
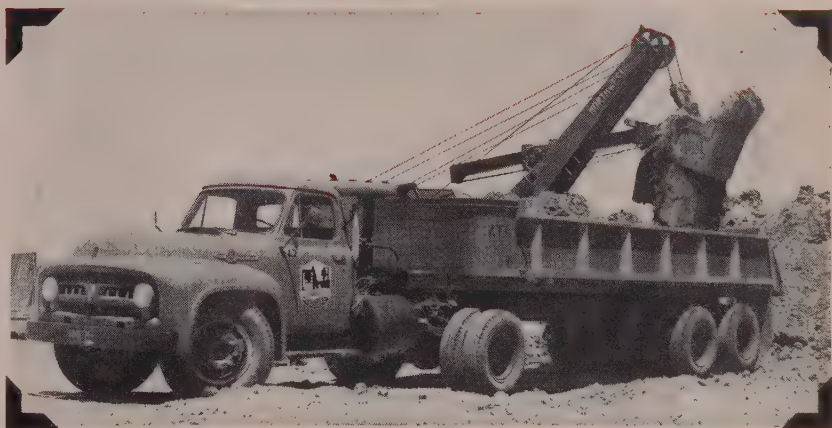
THE ENGINEER'S REPORT

DATA

LUBRICANT *RPM Wheel Bearing Grease*
UNITS *Wheel bearings - 75 trucks*
OPERATION *Hauling in city traffic*
CONDITIONS *Continual shock loading*
FIRM *The Lowrie Paving Co., Inc.,
San Francisco*

No wheel bearing failures on 75 trucks in 7 years!

CLEAN BRAKE LININGS and no wheel bearing failures due to lubrication in assemblies lubricated with RPM Wheel Bearing Grease. That's the 7-year maintenance record on 75 dump and pick-up trucks operated by the Lowrie Paving Co., Inc., San Francisco. Other grease tried in some wheels melted and caused loss of bearings. These trucks haul heavy loads of dirt and hot asphalt through city streets; wheel assemblies are subjected to countless shocks, are kept hot by stop-and-go driving in slow-moving traffic.



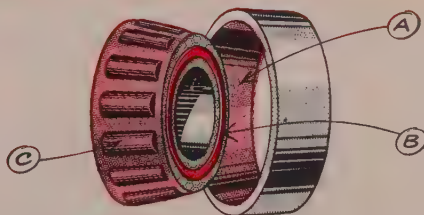
OPERATED 1125 HOURS SINCE LAST PACKING, this bearing assembly still contains plenty of clean grease. Note clean brake linings and backing plate. Even in these hot operating conditions, RPM Wheel Bearing Grease stays all through bearings, does not melt or leak out onto brakes.

REMARKS: The Lowrie Paving Co., Inc., has used Standard Oil Company of California products since 1930, has used RPM Wheel Bearing Grease since 1946. This grease is made with high quality paraffin base oils, contains no harmful fillers. It maintains correct and uniform consistency under all operating conditions, and is stable in storage. Comes in medium and heavy grades.



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How RPM Wheel Bearing Grease protects bearings under all conditions



- A. Provides a tough, resilient lubrication film that protects against heavy pounding and overload pressures.
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rolling. The time seems ripe to forget agricultural training in soil-cement work, and to develop really high capacity, powerful equipment for that purpose. There are several excellent mixers on the market for mixing soil, cement and water, but the attendant operations still lack the right machinery. If some manufacturer can develop equipment for mixing and processing a 6-in. lift of soil-cement for under \$0.04 per sq. yd., that development will have a sizable market.

Part of this trouble stems from variations between states in their roadbuilding methods. California at

this time is trying some 24-ft. construction instead of the traditional 12-ft. and developments on base course work should be interesting.

Since there will likely be an enlargement on the use of asphalt-stabilized bases in the years ahead, mixing equipment capable of handling stiff bitumens will probably be improved. In the whole field of base-course construction there is a fertile field for development, because of increasing attention to that vital part of roadbuilding. The time has arrived when engineers no longer can ignore base-course preparation, even under their concrete roads.

Here again, as in other types of machinery, the need is for high-production machinery, easy to service and adjust and repair. The perfection of a dependable high-capacity laydown machine for plant-mix paving, capable of adjusting for lane width while the machine is moving, would simplify greatly the paving of ramps, transitions and odd-shaped sections demanded in current channelization trends for traffic. If the mileage of plant-mix construction continues to increase, there may also be a 24-ft. laydown machine needed.

Make every operation faster

The first models of full-automatic hot plants have proved so satisfactory that engineers seem certain to ask for more such equipment on their jobs. Automatic hot plants, like their contemporary brothers on concrete batching, eliminate the human factor to do a precise job.

There is a growing need, too, for concrete paving machinery capable of paving at high speed the super-elevated curves common in modern designs. It's a real problem on many of the jobs. Stiff concrete will solve it to a great extent, and build up strength in the process, but not all modern equipment will handle concrete stiff enough not to cause trouble on supers over 10%. If 24-ft. concrete lanes on these high-speed curves become general, drier mixes will certainly follow. That may require vibratory placement and/or compaction of some type, and a general beefing up of today's spreaders and finishers.

Joint sawing, of course, is here to stay. Expect blades with longer life, and a lowering of cost for that operation. As men become more and more familiar with joint sawing, concrete pavements should give consistently smoother riding than ever before.

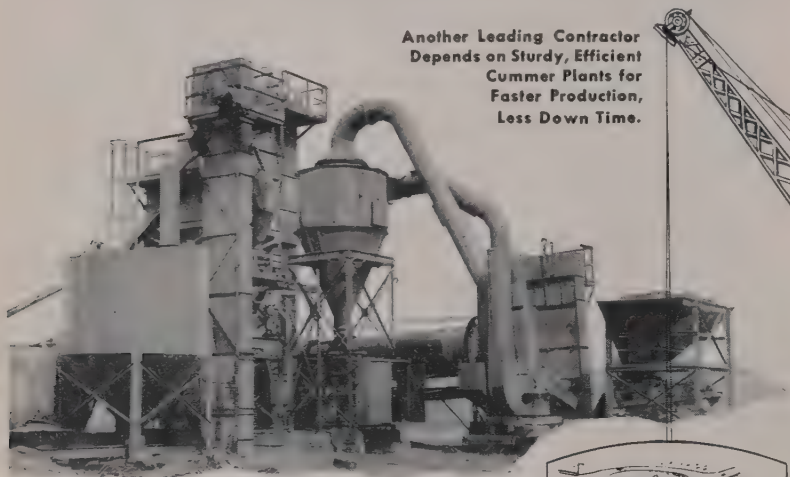
Conclusions

All in all, U. S. manufacturers today are doing an excellent job of making the machines their contractor customers want. Through field contacts, experiments, study, and customer relations, they are incorporating many of the things needed, sometimes at great tooling expense, almost as soon as it comes to their attention. What mechanical deficiencies there are in equipment are there largely because construction is a changing business.

By and large, there are no serious deficiencies in the distribution, sale, and operation of construction equipment. What few abuses in distribution there are seem to be diminishing. Operators, too, are getting better training, and the labor market now is such that they remember their training to hold their jobs.

The picture, generally speaking, was never brighter. And that is why dramatic changes, if they happen at all, will come about rather gradually.

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HERE'S PROOF... that Cummer "True Portability" increases asphalt plant tonnage for Extra Profits!

Don Wells, Inc., widely-known contracting firm of Detroit, Michigan, knows from actual experience that the "True Portability" of Cummer Asphalt Plants is an important factor in successful contract bidding.

Cummer Portable Asphalt Plants are true to their name. They are actually portable—easily and economically—and are state-approved. For that reason, Don Wells, Inc., can go after jobs, whenever available, that involve 8 to 10 thousand tons of asphalt. Without a Cummer Portable Plant, this firm might have to pass up such profitable business.

The Don Wells-Cummer Portable pictured here is completely wired, ready to plug in to a diesel generator set. Lifting hooks are installed for speedy handling. Folding legs (for example, on the dryer) fold up to frame, fold down to grade on timber foundation—concrete is not necessary. Note dust-collecting equipment which discharges reclaimed dust into hot elevator.

Like so many other contractors, Wells says that it gets more than guaranteed minimum capacity—thanks to Cummer's exceptionally rugged construction.

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MAINTENANCE — *The West belongs to the man who hangs a \$9,000 price tag on a tractor that will mow in summer and plow in winter. But that isn't all . . .*

VERSATILITY in maintenance equipment isn't just a seasonal thing. The ideal rig has to be capable of handling many kinds of maintenance chores at all times of the year. This is the gist of comments from state highway departments queried by **Western Construction**.

For instance, Colorado dreams of "a medium-duty, rubber-tired tractor, balanced so that it can push and pull loads. A tractor with a built-in loader capable of loading trucks from a stockpile or windrow. A tractor capable of traveling down the roadway with a light load at 25 to 30 mph. A tractor able (with special attachments) to mow weeds and undergrowth, spray weeds and paint, wash traffic signs, clean ditches and trim shoulders, clean and tack bituminous potholes for patching, do light dozing . . ."

Each of these objectives is a very specialized maintenance function. And Western engineers are therefore not surprised that they have not all been completely achieved in one machine. Still, there is at least a hint that the specialized machines are not completely satisfactory in themselves. If there is a gripe, it is apt to be price tags, though with the reali-

zation that this must be viewed from two widely separate viewpoints. The manufacturer can't escape his costs. The maintenance engineer can't escape his budget restrictions. If it snowed all year, or there were weeds to be mowed all year, the engineer's budget picture would change, and there would be closer agreement!

Two approaches

What is the answer? Can equipment manufacturers, with their broad range of customer needs, cater to the peculiarly narrow functions found in highway maintenance? And do it at a profit?

Or, on the other hand, can a realistic answer be found, in price and in performance, in a single multi-purpose machine that would serve maintenance departments on a year-around basis?

The West's maintenance engineers incline to throw out the first question and look longer at the second. If narrowly specialized machines are needed, it usually comes about that the highway engineers build their own or adapt machinery from another field. The roadside vacuum cleaner is a case in point; it has since been built commercially.

Multi-purpose maintenance machines take on special significance in Colorado because of that state's adherence to the patrol maintenance system. This means patrols, each of two men in a truck, having sole responsibility for all the work on 27 mi. of road. (For what Idaho has done in this respect, and some equipment inspired there, see page 65.)

As much as possible, each patrol has its own labor saving equipment, and its own stockpiles of patch mix, cinders, gravel, sand, and chips. Now, what about a mechanical loader for each patrol? It could load a 2-ton dump truck in less than 5 minutes, where the patrolmen would take 1½ hours. But this happens only twice or three times a day—15 minutes for the loader. You can't spend \$5,000 for that.

Similarly with mowing machines. Used about 4 months per year, and fairly constantly then. But idle otherwise. The result is Colorado's fond hope quoted at the start of this discussion. In summary, says L. T. Waymire, Colorado's equipment superintendent, "a machine (and attachments) with enough uses so that we can justify the money investment."



WINTER OR SUMMER, if the maintenance forces can't buy it, they rig it up themselves. For plowing snow on the Richardson Highway, the Alaska Road Commission enclosed the engine and air-intake breathers on this HD-19. Machine works on warmer air now, and doesn't get stalled by snow clogging breathers.



FOR EXPLORING sand and gravel deposits, and for deep digging on pavement patching, Arizona Highway Department uses a Hopto backhoe on a D4. Machine like this encourages getting clear to the bottom of weakened base, and then some, for replacement with greater thickness of 1955-specification base material.

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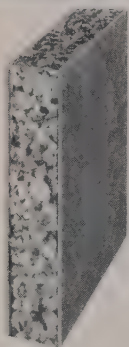
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The average concrete paving job, whether it be an airport runway, a city street, or a state highway or turnpike, requires the use of four groups of Serviced Products. The first of these is **AIR ENTRAINING AGENT** added to the concrete at the mixer to produce a more durable concrete.

◀ Premolded Expansion Joint Fillers

KORK-PAK — an exclusive Serviced development — is the all-purpose concrete paving joint filler. Composed of cork granules bonded together with asphalt between two sheets of heavy asphalt saturated paper. **KORK-PAK** is the *lowest cost non-extruding joint filler on the market*. **KORK-PAK** recovers more than 80% of original thickness after compression, and has a very low rate of moisture absorption. Available in $\frac{1}{4}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{3}{4}$ ", and 1" thicknesses and standard lengths of 5 or 10 ft. Longer lengths available on special order. The Serviced premolded joint filler line also includes Asphalt, Cork, Self-Expanding Cork, and Sponge Rubber types, as well as Longitudinal Tongue and Groove Joint and premolded Dummy Contraction Joint.

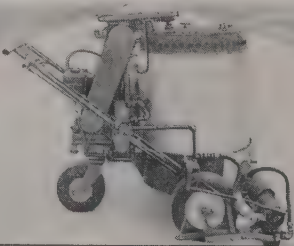


Joint Sealers ▶

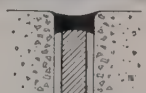
Para-Plastic Hot-Poured Joint Sealer is an extremely stable rubberized asphalt compound that forms a resilient, adhesive and effective seal — keeping the joint completely protected under any and all conditions, of temperature, moisture and traffic. Para-Plastic is pumped directly into the joint from the melting kettle.

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SERVITITE Cold-Applied Joint Sealer is a bituminous rubber sealer so compounded that it can be pumped cold from the drum in which it is shipped directly into the joint to be sealed.



Joints compressed in warm weather temperatures



Joints opened in sub-zero temperatures

◀ Membrane Curing Compounds

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Oregon picks up part of this theme in describing a machine needed for part of its roadside maintenance: "A machine for cleaning drainage ditches in cuts, either a sidehill or a through cut." The difficult thing here is to combine satisfactory performance in reshaping the ditch with ability to pick up the excess material and dump it into a truck. It's a matter of putting together all the degrees of freedom and motion found both in graders and in front-end loaders. How to do it without fatally increasing the number of points of possible maladjustment or failure?

The ideas for combining functions are endless. Bituminous patching alone involves many sub-functions, and putting together the suggestions of many users into one machine seems completely impractical. Perhaps some day will bring forth this item, which was described to a Western Construction editor:

The push-button patcher

A mobile "patch plant" with everything mechanized. A compressor and air tools for breaking out the weakened pavement around the pothole. (Too many maintenance men patch just a small central area because of the work involved in getting out the cracked material surrounding it.) A power auger or other tool that would dig out the unstable, damaged base below the failure. (Too many maintenance men don't dig deep enough; they don't get all the bad stuff out.) A portable hot-mix plant that would turn out the patch material in jig time. (This we have!) Finally a means of doing a really good rolling job on the patch. Perhaps a fifth wheel under the front end, with a jack mounting that would pick up the machine's front wheels and put all the forward weight on the roller.

That's one notion. Not everyone sees the need as being so all-inclusive. Oregon, for example, speaks up simply for a self-propelled pneumatic-tired tandem roller. This would be used by state forces in connection with re-oiling, in the construction of oil mat surface treatments varying from $\frac{1}{2}$ to $\frac{3}{8}$ in. in thickness.

Striping specialties

Suggestions from the Oregon department in another field emphasize the newness of that field. Signing and striping has become big business in highway engineering only recently. Joe McGee equipment is still to be found. Oregon, so far, has only thought about these:

(1) "A medium-size, self-propelled paint machine with sufficient capacity to paint 4 to 5 mi. without refilling. It should occupy no more than 4 ft. of the roadway. The driver should sit low enough to sight down the road to pins, so no extra advance marking crew would be necessary." (This proposal seems made to order for the sports car people!)



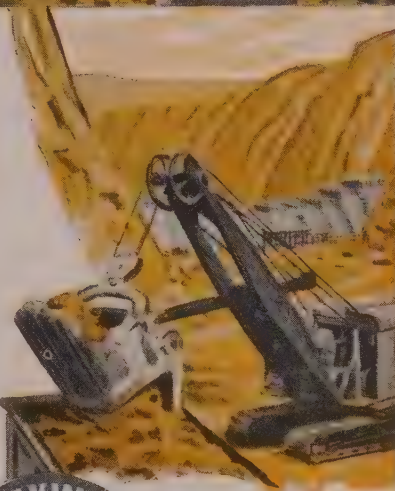
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(2) "A machine should be designed to strip traffic line, other than the sand blasting method. A combination high-pressure steam and rotary-brush cleaning device for curbs and traffic islands should find a ready market. It might also be used with hand attachments to clean signs and equipment."

Improvement ideas, too

The theme of all these suggestions, of course, is conservation of manpower. Recognizing that men will always operate the machines, however, some ideas bear directly on convenience of operation. Perhaps these thoughts have occurred to you too:

From Washington: "One of the most important features of a front-end loader, along the highway or in a sand or gravel pit, is visibility for the operator. He has to see what he's doing before he can do it. Many maintenance men in our department feel that more improvements could be made in the front-end loader to improve its efficiency and safety for the operator."

From Oregon: "Improvement to the windshield swipes over and above the standard equipment furnished on heavy trucks used for snow removal is urgent. Most of the existing swipes now build up snow on the end of the blade, which quite often either burns up the electric motor or strips the gears on the air-operated swipes."

From Idaho: Idaho's snowplowing problems go beyond the windshield itself. The problem is effective lighting of the work area during night operations. When the snow is flying, no existing beam seems to cut it adequately. The department has tried colored lights, mounting them at various points relative to the operator. Right now the lights are white, but the answer may well be something else. (Some help has been derived from painting the truck hoods black. Reflection is cut down in this way; but confusing, and sometimes literally sickening, visual conditions are still encountered.)

Suggested pay off

Observations of this type, gotten out in the open for comparison and study, always prove constructive. The record of needs suggested in the past shows it. For example, sticking with the subject of snowplows:

Idaho has been among the pioneering states in snow removal equipment. It was one of the first to insist on 4-wheel drive for plows. And most recently it has plugged successfully for 4-wheel steer. This is invaluable on rotaries for counteracting the tendency of the machine to bore itself into the bank as it moves along. With 4-wheel steer the machine can move continuously, with no need to back up, move over, and renew its attack on the proper alignment.

Matters of form and procedure, as well as design and performance, also



Big loads, faster, speed new dam for Southern California Edison

Here is one of a fleet of Kenworth 801 earth movers, used by Southern California Edison to excavate and fill at their recently-completed dam in the Vermillion Valley of Central California.

Each of the Kenworths is powered by a 200 hp diesel driving through a Fuller 10-F-1220 Transmission—hauling a rated payload capacity of 36,000 lbs. This 10-speed heavy-duty

transmission has even, short steps (average 30%) between ratios that help maintain rpm at the most efficient, highest economy range.

On job after job, where loads are the biggest and the going is the toughest, you'll find Fuller Transmissions putting horsepower to work efficiently. Next time you order heavy-duty construction equipment, specify Fuller Transmissions.



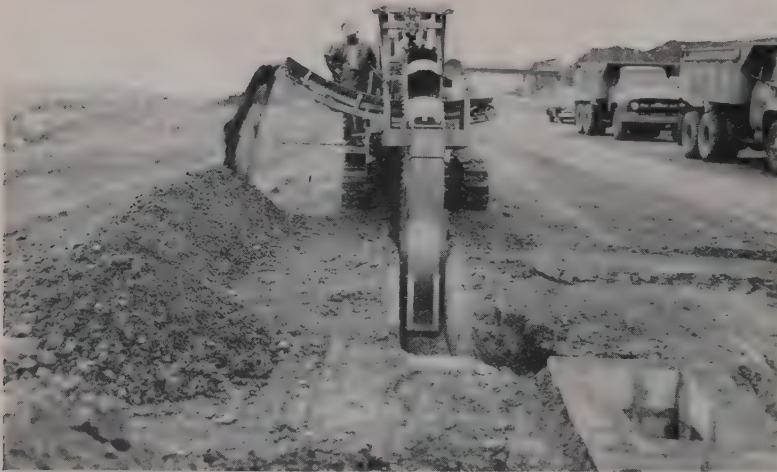
Model 10-F-1220, Fuller heavy-duty Transmission designed for use with engines up to 1220 cu. in. displacement.



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lines . . . and for installation of lighting cables, etc.

This widespread use of CLEVELANDS in the construction of the Ohio Turnpike parallels their extensive application in the building of such famous highways as the Pennsylvania and New Jersey Turnpikes, Oklahoma's Turner Turnpike and the New York Thruway. CLEVELANDS will continue to be important factors in the swift and economical completion of America's huge highway program for the future—the largest highway program undertaken in history.

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rate attention from highway builders. Two states, in particular, have definite ideas in mind relating to the means of evaluating construction and maintenance equipment.

In Oregon, "this department has for several years purchased its machinery and equipment on a specification basis rather than the 'or equal' basis. This policy has without doubt paid us dividends."

In this connection the state also notes, "The manufacturer should be cautioned that any new equipment should be so designed that the machine can be legally moved over state highways intact, or that it could be readily subdivided into two or more units, each of which could legally be transported over highways."

"Back wheel specifications"

Horsepower and chassis ratings are the question marks in Washington's Department of Highways. Standardization of measurement, both in manufacturers' specifications and in literature, would seem to be a solution, judging from these remarks:

"One leading manufacturer rates his engines in the 22,000 GVW at 152 hp. at 4,400 rpm. But at an operating speed of approximately 3,000 rpm. that engine will deliver only 133 hp. And after deductions are made for generator, air cleaner and muffler, the engine puts out slightly less than 125 usable horsepower.

"The maintenance people and the equipment supervisors have found that it's what happens at the back wheel that matters. And specifications are written with that in mind.

"Another source of confusion is the chassis ratings. Generally, trucks are rated on the basis of gross vehicle weight. This tells the buyer what he is getting as far as pay loads and body loads are concerned. But for the same truck some manufacturers publish GVW ratings ranging from 17,000 to 21,000 lb. because some variation in tire size or an added spring leaf would justify the ratings.

"Quite a contraption"

And so there are general ideas and specific suggestions to be found among the highway departments of the West in their search for better highway construction and maintenance equipment. Where it is felt that an idea is physically possible but commercially infeasible, Western engineers temper their outlook with the considerations stated earlier: (1) that the manufacturer must serve a much broader market than any one highway department, and (2) that the good ideas will always prove out and eventually be made available in tangible, performing models.

A Western contractor spoke for the entire roadbuilding industry of the West when he commented: "However, over and above all things, the construction machine of today is quite a contraption. Which, believe me, I wouldn't be without!"

PRESTRESSED CONCRETE—*If you are thinking of bidding a highway structure, here are some words of caution—and encouragement—from an expert.*

By W. J. JURKOVICH

Senior Bridge Engineer
California Division of Highways

INCREASING INTEREST is evident on the part of contractors in the growing field of prestressed concrete bridge structures. Several have been constructed by the California Division of Highways and more are contemplated. The following discussion is presented to give the contractor the benefit of experiences gained from past construction, and no one has to be reminded there is no substitute for experience.

Many projects coming up

The construction of prestressed concrete structures is something new to many contractors and for this reason they are cautious. However, there is nothing unduly complicated involved. I think the following discussion should be of interest to contractors who are interested in this type of construction which, because of its numerous advantages, will be used more frequently in the future.

During the last four years, 16 prestressed concrete structures have been constructed or are under construction on the State Highway System, and at the present time there are about 15 scheduled to be constructed in prestressed concrete.

Technical help available

On the majority of the jobs the general contractor has done all the work in connection with the prestressing operations; usually with technical assistance from companies furnishing the method of prestressing. In most cases this method of operation has proven successful. I think that the general contractor should be encouraged to do all the work in connection with the prestressing operations with his own forces since this phase of the construction is not necessarily a specialists' field. Actually, if the general contractor would hire experienced technical assistance on his first venture into the prestressing field and follow the advice of these people, he will find that the mechanics of prestressing concrete are indeed quite simple.

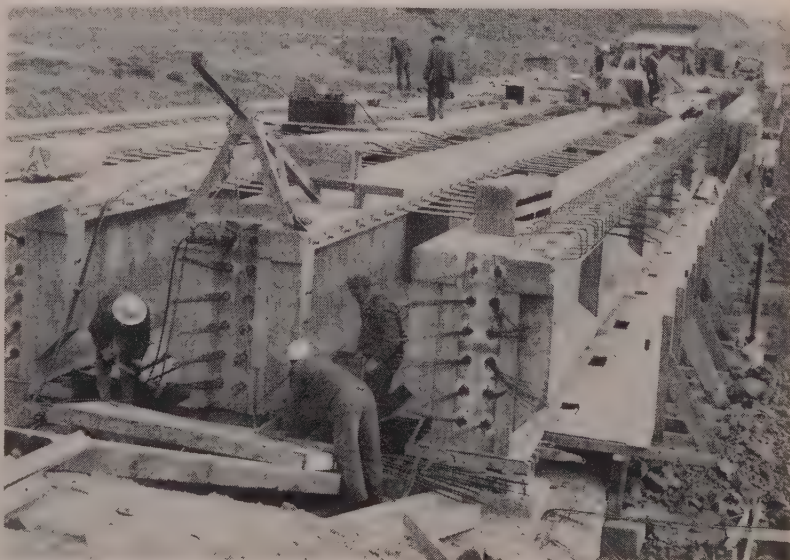
Like any type of construction, prestressed concrete requires adequate

equipment to be economically feasible. This means that an efficient stressing operation requires jacks designed specifically to stress the steel for the method of prestressing used. Likewise, when grouting of the units is required it is absolutely necessary to use equipment properly designed to force grout around the cables.

Here are some interesting examples to illustrate the foregoing. A job comes to mind where the contractor paid for technical advice for preparation of placing the cables and the setup for actual stressing operations. The contractor was advised on sequence of operation for placing the cables. Instead of following this technical advice, a completely unre-



"... forms must be able to withstand multiple uses and be easily erected, stripped, and cleaned. They must be light enough for handling, and strong enough to withstand stress . . ."



"Contractors should note that many problems can be solved if they are careful about selecting the method of prestressing that is going to be used."



"The resident engineer . . . should know more about the subject than the contractor . . . and attempt to assist him as much as possible to work out problems that arise."

hearsed fiasco resulted and at one time the deck of the bridge looked like a platter of spaghetti. How the contractor ever got the cables untangled and positioned in the forms is a mystery. It is needless to say that the cost of placing these cables was a great deal more than it should have been.

As if this wasn't enough, the contractor again ignored the advice for which he was paying and there was quite an acrobatic demonstration when time came to stress the units. Instead of setting up the stressing jacks as advised, he "thought up" his own procedure and after spending almost two days trying to stress a few cables, he finally adopted the advice of his hired technicians and the operation smoothed out into a business-like operation. On a similar job at a later date the same contractor had no trouble with the prestressing operations.

Actually, none of the difficulty encountered on the first structure was necessary. It is commendable as well as good business that the contractor seek out better ways of doing an operation. However, he should first try out the procedure outlined by people experienced in this field and then attempt to improve the method.

Designing the forms

One cannot stress sufficiently the importance of adequate planning on precast, prestressed jobs. One of the most important factors is well designed forms. The forms must be able to withstand multiple uses and be easily erected, stripped, and cleaned. They must be light enough for handling and strong enough to withstand stress resulting from vibrating and handling. If this part of the construction is well planned the actual placing of cables and stressing of the units will be relatively simple.

On one precast job the contractor had steel forms made for the mem-

bers. After some revisions to the original forms no serious troubles were encountered. For the soffits, shallow concrete casting beds were constructed. It appeared that the contractor gave a lot of thought to this phase of the project. All of this work was first-class construction and I believe that it paid off.

However, when it came to grouting the cables he attempted to do the job with a cheap paint pot which by some stretch of the imagination he evidently believed would produce a pressure of 100 psi. as required by the specifications. Naturally, the equipment was not adequate, and he finally had to obtain equipment designed for the job. It appears odd that a contractor would go through the job with first-class equipment and material and then for the least expensive operation attempt to use equipment that was undoubtedly inadequate and consequently expensive.

Some of the problems

It is not intended to insinuate that any contractor would do the things mentioned on purpose since they all result in unnecessary cost. Most of this can be attributed to lack of knowledge of the various phases—and in a few cases—just plain stubbornness on the part of the contractors' personnel. Contractors should note that many problems can be solved if they are careful about selecting the method of prestressing that is to be used. He must not only consider the first cost of the materials to be used, but equally im-

MAIN TYPES OF PRESTRESSING TENDONS

Classification		Method	Country of development
Pre-tensioned steel	Individual wires	Wettstein Hoyer Weinberg	Austria Germany France
	Individual strands	Concrete Products of America	United States
	Made-up cable of wires and sheathed core**	Chalos-Schorer	France- United States
Post-tensioned steel	Cables of parallel individual wire**	Freyssinet†	France
		Magnel†	Belgium
		Button-heads	Switzerland- United States
	Individual strands**	Preload-Linear†	United States
		Leoba	Germany
		Mallet†	France
	Individual bars**	Roebbling	United States
	Large factory spun cables**	Lee-McCall*	Britain
		Stressteel*	United States
		Finsterwalder*	Germany
	Looped cables of parallel strands	Dischinger*	Germany
		Lossier*	France
	Individual wire stressed through die	Leonhardt	Germany
		Preload-Crom	United States
		Preload Circular	United States

* Methods requiring cutting of exact length prestressing steel.

** Methods requiring special manufactured end anchorages.

† Methods depending on wedge anchorages.

Data for this table presented in a paper by Cedric Stainer of Preload Engineers, Inc., Washington, D. C., before the 16th annual highway conference at the University of Utah, March 7-9, 1955.

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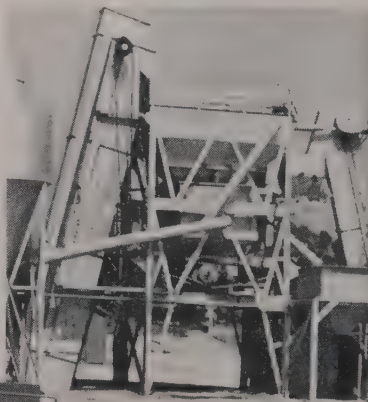
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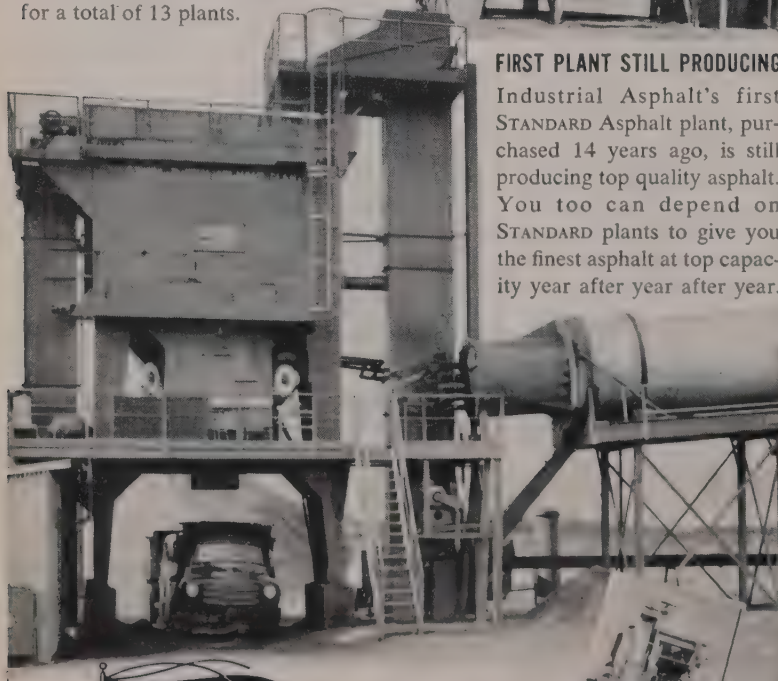
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portant, he must give special attention to the work involved in placing the units and the equipment and mechanics of operation required to stress and anchor them.

California requirements

Since the State requires the contractor to submit shop plans of anchorages as well as the proposed stressing procedure, it is necessary that he also select a company that has the personnel qualified to design this material as required. The shop plans include details required to construct the girders using the method of prestressing selected. These details include the anchorage, bearing plates, type of prestressing steel, number of units, additional mild steel required to hold the units in position, and method of holding units in position. The type of steel used in the anchorages and bearing plates should also be shown on the shop plans.

In addition to the above a tabulation showing the calculations for obtaining gage pressures and elongations to be used during the prestressing operations must be submitted. All of this data can be made for the contractor by the companies furnishing the method of prestressing and should be insisted upon by the contractor as it is required by the State specifications.

What system to use?

Although all systems of prestressing commonly used at the present time can do the work required, it is apparent that some systems have advantages over the others on specific types of construction. This is another angle the general contractor must consider. It is not the intention here to show favoritism to any one method of prestressing. On the contrary, all systems are basically similar.

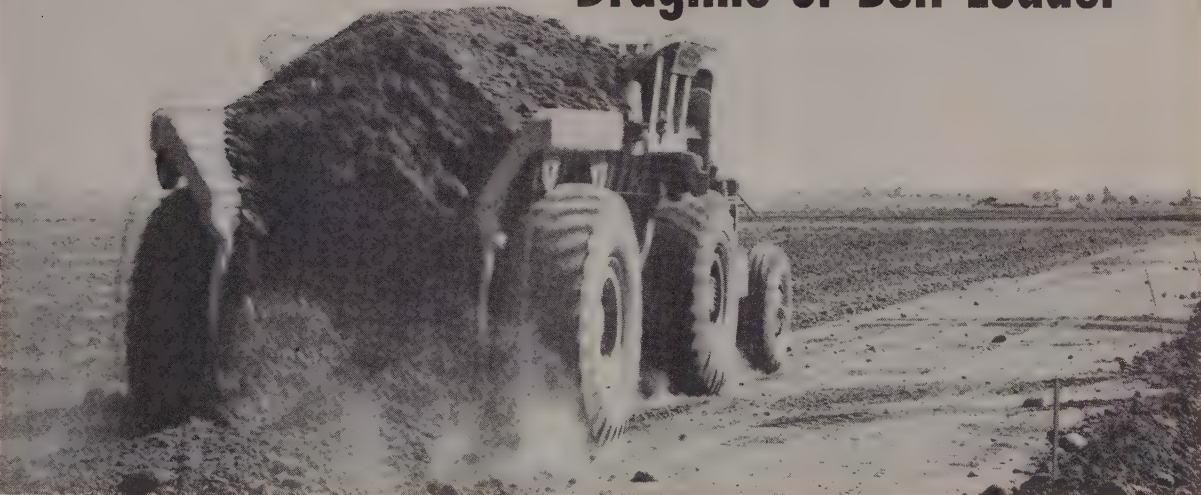
Discussion so far has been concerned with the contractor and the companies furnishing prestressing systems. There should be some discussion regarding the designer and resident engineer also. The designer of a prestressed concrete structure for a state highway project must prepare a design that does not limit the method of prestressing to one company. Accordingly, there are no details on the plans regarding number of cables and size of anchorages to be used. This permits the contractor to investigate the various systems and select the one he feels is most suited to provide equipment and material to do the job according to specifications.

When faced with a problem—

With such an arrangement there can be some unforeseeable problems arise that may cause difficulties in construction. These incidents should be brought to the attention of the designer. After all, the designers always welcome constructive criticism

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and attempt to improve the details whenever possible.

Resident engineer can learn, too

On his first prestressed concrete structure the resident engineer has an obligation to learn all he can on the subject before getting too far into the actual construction. He should know more about the subject than the contractor since the resident engineer has a direct source of information as to the design. He should realize that on a new adventure—the contractor, too—is probably another stranger in the field of prestressed concrete. Consequently he should be more understanding of the contractor's problems and attempt to assist him as much as possible to work out problems that arise. As a result of consultation between the contractor and himself, the resident engineer should forward to the designer all the constructive suggestions he can gather in order that future details and requirements can be revised if possible to make for better construction details.

Most problems iron out

I hope that the impression made on the reader is not one that implies that prestressed concrete is a series of problems causing mental anguish to all concerned. Considering all the projects to date, the problems encountered have been ironed out very well. The purpose of this article is to point out problems encountered and possible methods to avoid them.

While some features of prestressed concrete construction require a little more know-how than the more conventional types of construction, no difficulty will be encountered if the contractor plans his work. Needless to say, he will be headed for trouble if he attempts to bull through the job. This is also true for the more conventional type of construction.

Valuable check list

Here is a list of items that a contractor will find of use in evaluating the system of prestressing for a specific job:

1. Cost of prestressing materials that go into the job. (Includes prestressing steel anchorages and mild steel required to hold the units in the specified position in the forms.)
2. Cost of placing and positioning the units using a specific method of prestressing.
3. Condition and adequacy of equipment that is available for the contractors' use on a rental or purchasing basis for the stressing operation. If possible, contact other contractors that have used equipment furnished by the company concerned.
4. The technical service that the company is to furnish if its system is used should be evaluated closely. This includes supervisory personnel on a part-time basis to instruct the contractor's crew on proper operation, furnishing shop plans as re-

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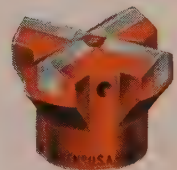
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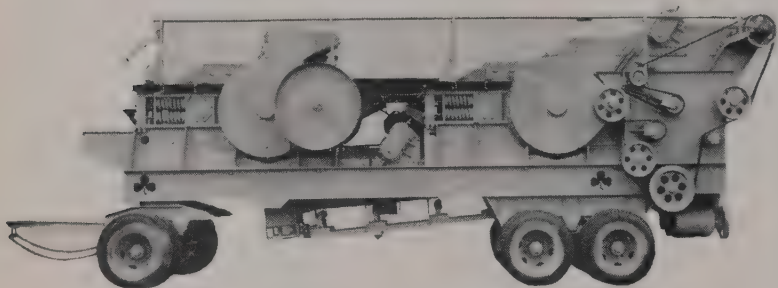
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quired by the specifications, assistance for estimating cost for the contractor to do the actual prestressing and other services as offered by the prestressing company.

Prestressing company guarantees

5. Assurance from the company offering their system that no unusual requirements will be met that may cause difficulties after the job is awarded. For example, it may be necessary to provide for future extension of the prestressing steel. Some companies may have difficulty adapting their system to this requirement; or maybe the area for anchorages is limited and the system may not be able to fit their anchorages in the limited area. Assurance that these requirements can be met should be insisted upon.

How about grouting?

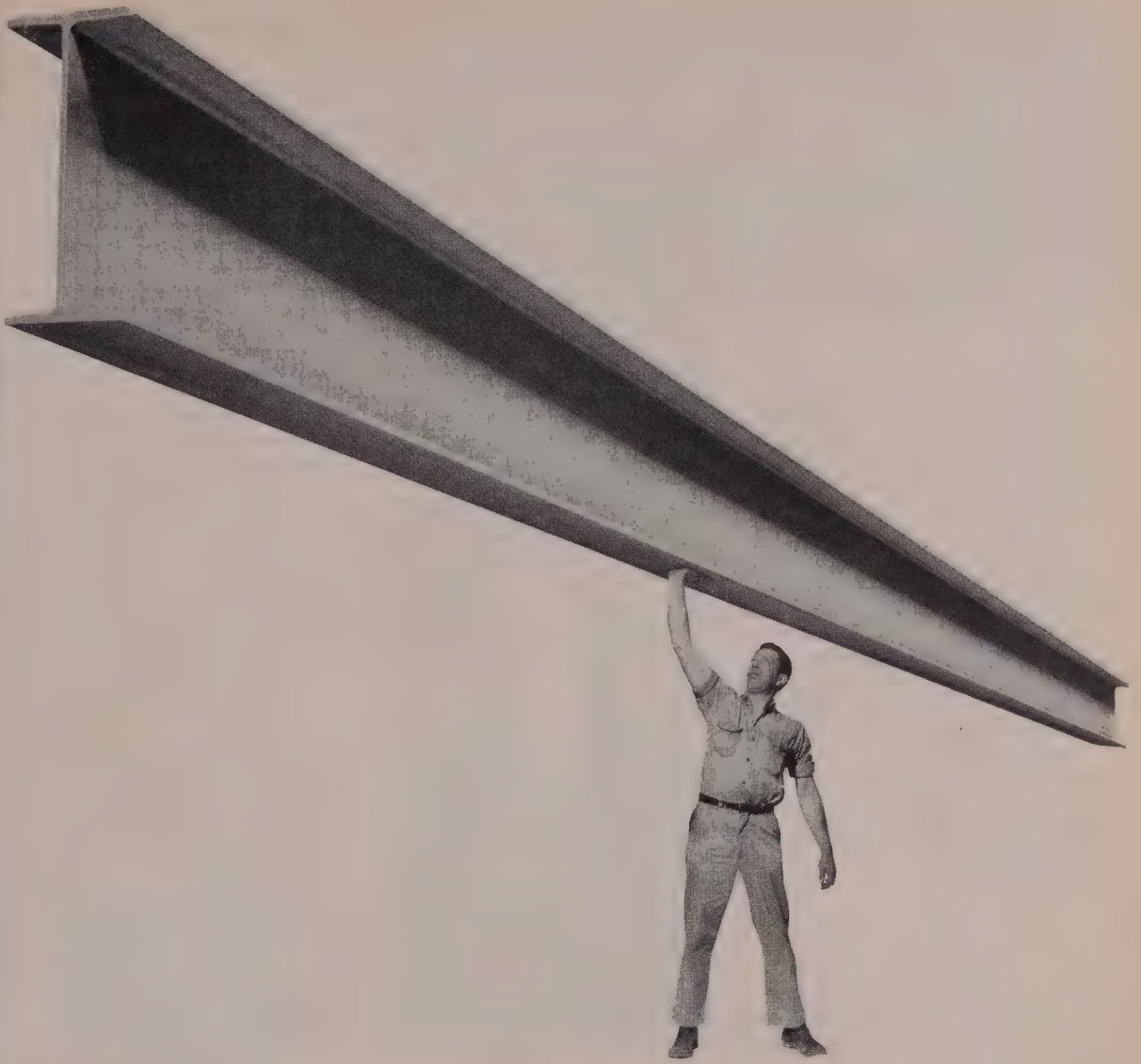
6. In the case of a requirement that the cables be grouted after stressing, the contractor should insist that the prestressing company provide details as well as proven equipment that is guaranteed to do the job as specified. If the units do not have to be grouted, the contractor should investigate the method of protection proposed by the prestressing company for the prestressing steel. This can be a source of trouble before the job is completed.

It is emphasized here that the grouting and/or protection of the units is just as much a part of the system of prestressing as is the stressing and anchorage details and the contractor should insist that the prestressing company provide adequate service in this regard.

7. The contractor and his supervisory personnel should learn just what prestressed concrete is, how it acts, why it requires a better quality concrete than is used for reinforced concrete construction, why a high tensile strength steel is necessary to induce the prestressing force, why it is necessary that the steel stress be measured by elongation as well as by gage pressure, and why there may be a discrepancy between elongation and gage pressure—just to mention a few items.

Cooperation pays off

I think that at the present stage of development the contractor and resident engineer on prestressed concrete structures should schedule a meeting with the designer and, if possible, representatives of the company the contractor has engaged to furnish the method of prestressing. They would discuss at length the proposed operations and requirements. I strongly recommend that the contractor have his supervisory personnel present, to make sure all concerned with the actual work have had a chance to clarify any question they may have.



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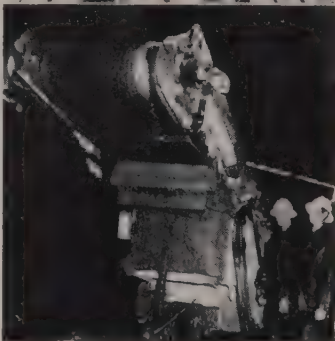
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REGRINDING CRANKSHAFTS using wide top compression rings on worn pistons, and installing valve seat inserts in cylinder heads are a common salvage practice on engine parts. Other practices have become common due to parts shortages in the past and will continue to be popular because they have proved to be practical. In this group are the building up of track grousers, track rollers, idlers and sprockets, and re-grinding track roller shafts using undersize bushings.

Don't try everything

The advisability of building up a track link with welding rod is best determined by local experience. The operation is often successful, says Caterpillar Tractor Co. But some reconditioning procedures are definitely not advisable. Foremost is the repairing of fuel injection pumps. This often results in inaccurate fuel injection timing because of variations in dimensions of fuel pump bodies. Repairmen invariably neglect to compensate for these variations. The discrepancies in timing could easily nullify the savings by increasing the fuel consumption or rate of depreciation of other parts.

Regrinding crankshafts to intermediate undersizes is another false economy in reconditioning parts. It is recommended to use the shaft until it is worn enough that it should be reground to the standard undersize. Regrinding long before the crankshaft reaches this point is unnecessary and a waste of money. It also requires additional labor in the special fitting of bearings.

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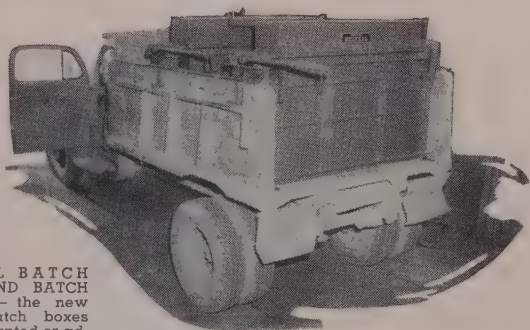
In wire cord tires, filaments of high-tensile steel wire are used instead of fiber. Heavier treads can be used than with fiber cords and the tire bodies can be retreaded repeatedly. In excavation and construction operations where cutting, puncturing, and impact breaks present serious problems, wire cord tires can give excellent service. In slag hauling 97% of wire cords in use are giving an average of 19 months' service. Prior to the use of wire cords, operators reported an average service of nine months from synthetic fiber cord tires.

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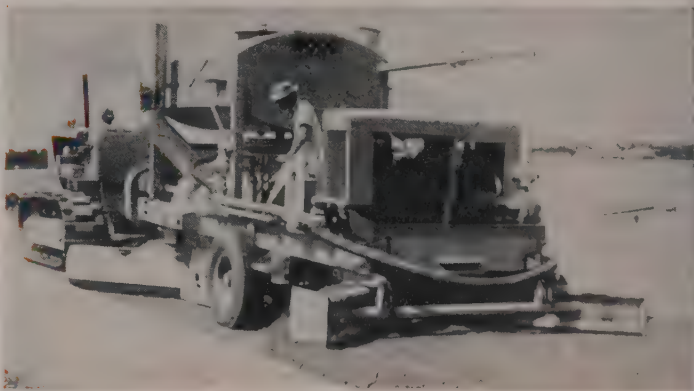
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Cutting	137, 177



TRACTOR—New Cat D9 has weight and power for real dirt moving

Here's a tractor—easy to handle and powerful—to match the increasing demand of contractors for more and more production. It's styled like the five smaller Cat models, but offers a drawbar pull of over 60,000 lb. Here are some outstanding features. Conventional direct drive—six speeds forward, six in reverse, up to 6.8 mph. Torque converter drive—5:1 multiplication unit with three speeds forward, two in reverse, up to 7.8 mph. Weight of tractor alone is 56,200 lb., but fully rigged with, say, an Ateco ripper (pictured above) and a winch it comes to about 70,000 lb. The 7 roller track frame insures good flotation and stability with shoe widths of 24 in.—27 and 30 in. available. For servicing aspects it has: hydraulic track adjustment—steering clutch and brake assemblies removable without disturbing the bevel gear—flywheel clutch assembly or torque converter units removable without disturbing the engine or transmission. Inexpensive No. 2 fuel oil (burner oil) can be used rather than diesel fuel. For push loading more in less time, heavier ripping, clearing bigger trees, pioneering heavier and rougher country—here it is. Caterpillar Tractor Co., Peoria 8, Ill.



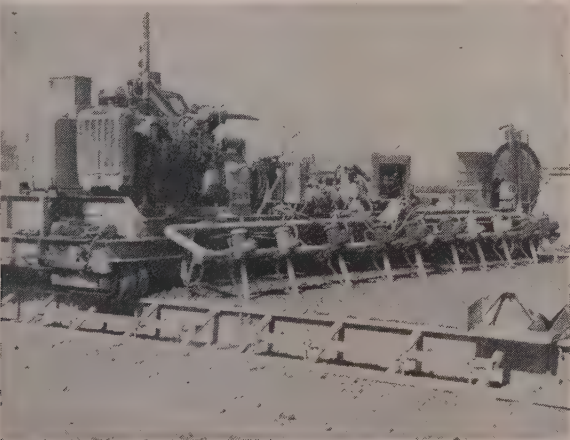
BITUMINOUS SURFACING—350 tons per hour with single-pass unit

Unique wing attachment on the rear of this Model 54 Pettibone Wood Roadmixer eliminates normal, more expensive process of spreading out windrow. This single-pass unit, drawn and powered by a tractor, will produce up to 350 tons per hr. of uniformly mixed windrows, with up to 8 cu. ft. per lin. ft. This company's products are widely used in the West for soil-cement base construction as well as for mixing asphalt with native or imported materials, asphalt cut-back, emulsion, oil, and tar. With a single pass, the Roadmixer picks aggregate cleanly off the subgrade, thoroughly mixes it with cement or binder (while the oil is hot) and lays a uniformly mixed windrow. Rugged, simple construction assures low operating and maintenance costs. Two sizes, from 250 to 350 tons per hr., are available. Pettibone Wood Manufacturing Co., P. O. Box 620, North Hollywood, Calif.



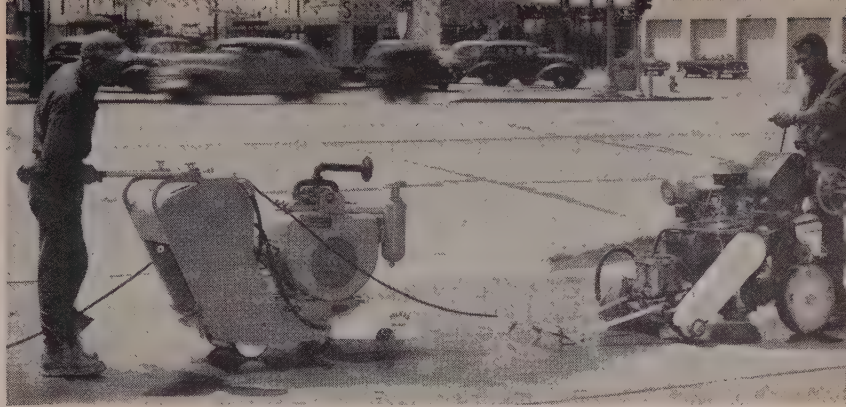
RIPPING—Now your grader can rip shoulders and banks

Many contractors and city and county departments cannot afford to devote large dozers to ripping operations. So Hensley has come up with a tough ripper, the 150-H, that mounts on equipment usually easily available—motor graders, road maintainers and some small dozers. Weighing about 75 lb., the 150-H unit can be set at various depths from 7 to 17 in. merely by removing pins and adjusting shank. It is especially useful for backsloping, ditching, ripping on shoulders and banks and working in close quarters. The ripper can be mounted in pairs, or in single units, any place on the mold-board. **Hensley Equipment Co.**, 800 Peralta Ave., San Leandro, Calif.



PAVING—Full depth vibration of low slump concrete

For those thick concrete pavements now being placed on modern highways and airports, the adjustable Gar-Bro Paving Vibrator, just introduced, offers some high production advantages. Individual vibrators are mounted on a tubular frame for easy spacing and are hydraulically controlled for depth. Complete unit may be attached to a concrete spreader or pulled on a special trailer. Viber 3-in. vibrating heads at 10,000 rpm. assure maximum compaction down to subgrade and close to side forms. **Gar-Bro Manufacturing Co.**, 2415 E. Washington Blvd., Los Angeles 21, Calif.



CONCRETE CUTTING—Brand new Felker model more maneuverable, increases blade life up to 50%

Symbolic of this special highway equipment "road show" section is the new field-specified Felker 254 concrete cutting machine (left) meeting its still-efficient predecessor model. The new model, with noteworthy operational advantages, is being introduced in mid-May after a long testing program. Here's the 254 in brief: Swept-back styling which changes the balance point, increases maneuverability; the new Felker "blade-saver collars" which eliminate the long tubing to the edge of the blade and throw water out from the center along both sides into cut, has increased blade life as much as 50% on certain field operations; new hydraulic control system for raising and lowering the blade, resulting in smooth cutting, self-propelling control unit providing fractional selection of speed ranging from inches per minute to 10 ft. per minute; "Tip-Toe" control for engaging and disengaging power drive; self-priming centrifugal pump instantly placed in operation by a clutch when water is required; retractable handles for easier handling, transportation and storing. **Felker Mfg. Co.**, 1128 Border Ave., Torrance, Calif.



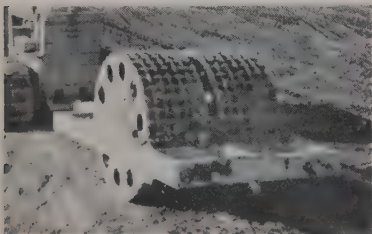
EARTHMOVING—20 yards heaped moves at up to 20 mph.

First announced in February, the new Allis-Chalmers TS-360 motor scraper is a big-capacity (15 yards struck, 20 yards heaped) fast moving machine (at 2,100 rpm., forward speeds are up to 20 mph.) with a 280-hp. diesel engine spearheading a power train that offers more rim pull at all speeds for better loading, hauling, and spreading performance, plus fast acceleration, easy shifting and quick getaway. Contributing to faster time cycle and greater overall production is the slight curvature in bowl bottom and cutting edge and the offset center bit for faster penetration, less loading resistance and better boiling action. The unit has positive forward forced ejection plus high apron lift. Weight, 49,000 lb.; length, 36½ ft.; width, 11½ ft.; turning radius, 31½ ft.; width required on non-stop 180-deg. turn, 49 ft. **Allis-Chalmers Mfg. Co.**, Milwaukee 1, Wis.



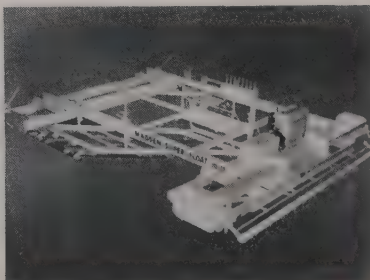
TRACTOR—Here's the Euclid TC-12 "super tractor" with twin 194-hp. diesels

The trend toward bigger capacity and more power is the story of the Euclid TC-12, with 40% greater weight and 80% more horsepower than average tractors currently in use. Outstanding feature of the TC-12 is the use of two 194-hp. GM diesel engines, each driving one of the tracks through a torque converter and semi-automatic transmission. There is no master clutch. Changing from one speed range to another is done under full power. Three speed ranges, forward and reverse, provide speeds to 1.5 mph. in low range, 3.0 mph. in intermediate, and 8.3 mph. in high. With a separate power train for each track, steering is faster and easier—accomplished by putting either transmission in neutral and using the corresponding steering brake. Tight turns are made by reversing one transmission and keeping the other in forward speed. For shipping purposes, the tractor can be separated into two halves. Track gage is 110 in., overall width is 136 in., drawbar height is 23 in. Operating weight is 58,000 lb. Drawbar pull is 69,750 lb. **Euclid Division, General Motors Corp.,** Cleveland 17, Ohio.



COMPACTION—Hyster "Grid" roller compacts, salvages, crushes

The "Grid" roller performs three major jobs in road construction and repair: embankment compaction, salvaging old bituminous pavement, and crushing pit-run rock for base and surface courses. Drawings furnished show how to make reinforced concrete weights which offer easy ballast adjustment in the field. All material which enters the roller through the grids is scraped off and guided by a blade out the open side of the roller. Weight with all ballast is 30,000 lb. **Hyster Company, P. O. Box 4318,** Portland 8, Oregon.



FINISHING—For smooth work on wide slab construction

The Madsen Super-Float, just announced, is a concrete finisher designed to meet the national trend toward 20-25 ft. wide slab construction. It is a long wheel base machine with walking beam tandem wheel mountings at four points. Power hydraulic controls and positive screw setting of the float arrangement provides for convenient operator control. The transmission allows for broad variations in speed. **Madsen Iron Works, Inc., La Mirada, Calif.**

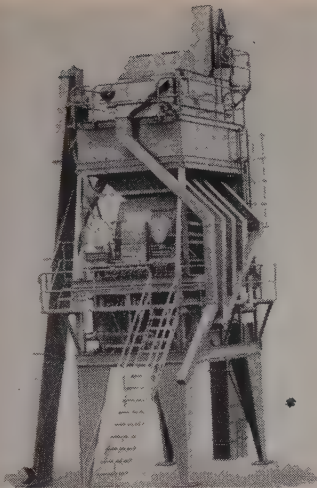
DRILLING—Joy unit drills 4½-in. holes in hardest rock

The new Joy Challenger blast hole drill can sink 4½-in. holes 50 ft. in the hardest rock formations. Its 5¼-in. hammer-type drill is the largest yet developed, and the machine can handle 20-ft. steel changes. The mast and leveling jacks are controlled hydraulically. The crawler-mounted model (shown) is best for the rough moving usually encountered on heavy construction jobs. Drill, mast, brackets, and necessary accessories come in a package unit for mounting on truck or tractor. **Joy Manufacturing Co.,** Henry W. Oliver Bldg., Pittsburgh 22, Pa.



GRADING—190-hp. motor grader for the heavy duty jobs

Huber Warco's 5D-190 is the motor grader to offer a power of 190 hp. Power is supplied by a GM diesel engine through a torque converter and full power shift transmission. This power train eliminates the need for a clutch and reduces shock loading. Ground speed for the machine ranges from 0.85 to 20 mph. It weighs 32,000 lb. A high-arched front axle gives a front end clearance of 32 in. Other features include: mechanical steering with hydraulic booster; high blade clearance; and retractable scarifier permitting 360-deg. blade rotation without removing scarifier teeth. **Huber-Warco Co., Marion, Ohio.**



BITUMINOUS MIXING— Just announced: Barber- Greene's 890 automatic

The new 890 "Batchomatic" is announced as the first bituminous batch plant ever designed, from its original conception, for automatic operation. Features include: a new pugmill principle, taking advantage of a faster mixing cycle, insuring accuracy, and eliminating the human error element; erection efficiency (plant sections can be stacked with ease and speed); a completely different aggregate and asphalt measuring principle; simultaneous weighing of all sizes of aggregate, including filler, simultaneous discharging into the pugmill, by a common gate. Only limit on hourly production is the specified mixing time when this is called for in an established specification. The plant is designed for operation with any of Barber-Greene's dryers, dust collectors, and cold feed systems. Barber-Greene Co., Aurora, Ill.

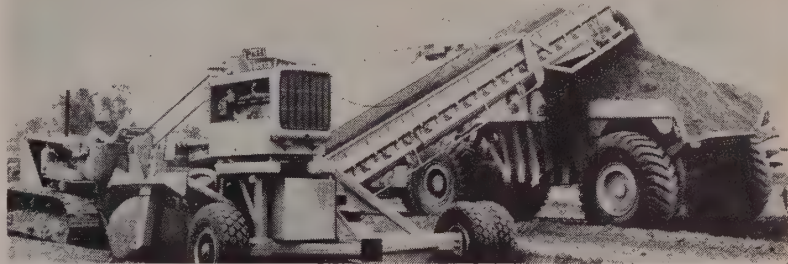
EXCAVATING—Koehring offers ½-yd. shovel for fast digging cycles

Proved by more than 2 years of field tests, the new Koehring Model 205 excavator is equipped with a 16-ft. box section boom and a 12-ft. dipper stick. Full cable crowd at 85 ft. per min., retract speeds of 133 ft. per min., and electric dipper trip help maintain fast digging cycles. The clutches are self-adjusting. The shovel, model 205, lifts up to 10 tons as a crawler crane and 15 tons as a truck mounted unit. With a ½-cu. yd. hoe the 205 digs 17¾ ft. and can handle ½- to ¾-cu. yd. clamshell or dragline buckets. **Koehring Co.**, 3026 W. Concordia Ave., Milwaukee 16, Wis.



COMPACTION—Segmented-wheel roller gives specified density in fewer passes

Buffalo-Springfield's K-45 Kompactor is revolutionary among rollers. It features four roll forms which operate on the "interrupted pressure principle," with heavy steel segments in staggered rows around each roll form allowing the pads to enter loose material with minimum displacement, and to leave the compacted area without disturbing it. All compaction effort is directed downwards, resulting in greater, more uniform densities. Tests have shown that density requirements can often be met with one-fourth the number of passes. **Buffalo-Springfield Roller Co.**, Springfield, Ohio.



LOADING—Sierra elevating loader heaps biggest haulers in seconds

The Model C-30 P&H Sierra Loader works as a team with a diesel tractor of 110 hp. or more, with only one man required to operate the combination. There are only three operations required to put the unit through its paces: raising and lowering both the cutting disc and conveyor assembly are accomplished with the double drum cable control unit mounted in the rear of the tractor; an independent lever, mounted within easy reach of the operator, regulates the power to run the conveyor. A wide range of materials can be handled. Output for loading hauling units ranges from 500 to 1,000 yd. per hour. **Harnischfeger Corp.**, 4400 West National Ave., Milwaukee 46, Wis.

EARTHMOVING—Payscraper carries 18½-yd. heaped load at 24 mph.

Speeding along a haul road is the Model 75 Payscraper, (below) largest high-speed earthmover in the International line. Powered by a 262-hp. diesel engine it moves at 24 mph. with an 18½-cu. yd. heaped load in the bowl. The machine has a multiple disc cable control unit which gives the operator positive control of apron and bowl when loading or spreading. Other features are hydraulic steering, air-assisted clutch, and four-wheel brakes. The hitch assembly is designed to eliminate the danger of nosedives, jack-knives or snaking. **International Harvester Co.**, North Ave. and Mannheim Road, Melrose Park, Ill.





TRAILER—Cable dump unit reduces lifting time and strain

The Hobbs-Schonrock cable dump unit has several exclusive features; with the patented "Booster 5th Wheel" being the outstanding. Incorporated in the mechanism is an automatically operating elevating cam, which provides the power for the initial lift of the dump body. This device increases lifting efficiency, reduces lifting time, and decreases strain on cable, winch, power take-off and on the tractor. **Utility Trailer Mfg. Co.,** Box 3608, Terminal Annex, Los Angeles 54.



GUARD RAIL—Rheem-Beam is tops for easy installation

Two bolts to fasten a bracket to the post, and two more bolts to fasten the guard rail to the bracket are the only necessary items to anchor the Rheem-Beam guard rail in position. A final coat of paint and you have an effective automobile barrier. **U. S. Spring and Bumper Co.,** 4951 Alcoa Ave., Los Angeles 11, Calif.



EXCAVATING—Hystaway quickly convertible for 7 types of service

This machine, because of tractor mobility and high capacity, is useful in pioneer work, drainage excavation, and other miscellaneous excavating jobs coincident with road construction. It can be converted to a dragline, clamshell, crane, pile driver, shovel, backhoe, or bulldozer. The Hystaway has no tail swing; no power is consumed swinging superstructure and counterweight. Many optional attachments are described and a full description of the machine is given in literature available from the manufacturer. **Hyster Co.,** P. O. Box 4318, Portland 8, Oregon.



EARTHMOVING—Big, fast Tournapull offers 10 gear ratios

You can be sure of getting working speeds best suited to underfoot conditions with these gear ratios, ranging from 2.4 to 28.4 mph., offered in the newly designed B Tournapull. The 23-yd. single-engine, self-propelled scraper is powered by a 293-hp. diesel. Its struck capacity is 18 yards—heaped capacity is 23 yards without sideboards. Its fast shifting ability gets the "B" into higher hauling speeds quick. Included in an impressive total of features are its new scraper design, deflector plate, high apron lift, and wheels inside the cutting edge of scraper blade. **LeTourneau-Westinghouse Co.,** Peoria, Ill.

BITUMINOUS MIXING—Versatility in the 20- to 50-ton per hr. range

In Barber-Greene's new 840-B asphalt plant series, large plant versatility is available in a small plant. The basic mixer unit may be fed directly through a ground-level hopper for stabilization work. By adding a dryer, it can produce single aggregate hot bituminous mixes in the set-up pictured here. A gradation control unit may also be introduced to provide accurate screening and separation of aggregate sizes after drying. Every unit of the plant is portable (each towed as a semi-trailer.) Cold feed hoppers pre-proportion aggregate for single or multiple set-ups. **Barber-Greene Co.,** Aurora, Ill.



KOEHRING ½-Yd. 205



digs 17³/₄ feet deep . . . dumps at 8³/₄ foot height

With its long, deep reach, Koehring ½-yard 205 hoe digs 17³/₄ feet below grade . . . has 8' 9" clearance height at beginning of dump to load trucks. Maximum cutting width, with side cutters, is 31 inches. During the hoist-and-swing cycle, close-coupled dipper pulls up tight to boom, avoids spillage. Powerful cable crowd, fast line and swing speeds maintain big-yardage production. Heavy-duty, box-section boom and dipper arm resist side-sway in toughest digging. Operators like the 205's ease of operation . . . you'll like its **EXTRA WORK CAPACITY**. Here are some of the heavy-duty advantages you get that increase production with every 205 attachment:

Big 20-inch main drum clutches.

Only 2 major shafts in upper machinery . . . simple, accessible.

Heavy-duty splined shafts . . . carburized, hardened gears.

4 hook-rollers, eccentric adjustment.

Automatic crawler traction-brakes.

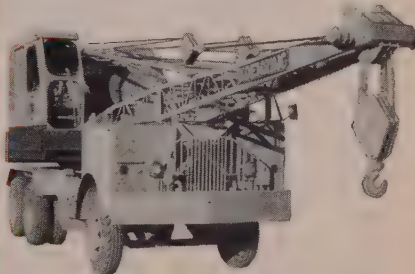
Standard or extra-long crawlers . . . with 16, 20, or 24-inch shoes.

Independent traction . . . optional.

Antifriction power-flow for dig, hoist, swing, travel.



Crawler-mounted 205 brings you: ½-yard dipper capacity as a shovel or hoe . . . ½ to ¾-yard bucket capacity as a clam-shell or dragline . . . 10-ton lift crane.



Truck-mounted 205 has 15 tons lift capacity, 25 to 55-ft. boom, plus max. 30-ft. jib. Travels 32¹/₂ m.p.h. Converts to all standard excavator, crane attachments.

Get the complete story on this new 205. Ask your Koehring distributor for details, or write for bulletin.

K-487 REV-R

SEE YOUR KOEHRING DISTRIBUTOR FOR COMPLETE FACTS

AMERICAN MACHINE CO., Spokane, Washington
PACIFIC HOIST & DERRICK CO., Seattle, Washington
COLUMBIA EQUIPMENT CO., Portland, Oregon
HARRON, RICKARD & McCONE CO. of Southern California
Los Angeles, California
STANDARD MACHINERY CO., San Francisco, California

KIMBALL EQUIPMENT CO., Salt Lake City, Utah
NEIL B. MCGINNIS CO., Phoenix, Arizona
THE HARRY CORNELIUS CO., Albuquerque, New Mexico
SAN JOAQUIN TRACTOR CO., Bakersfield, California
ENGINEERING SALES SERVICE, INC., Boise, Idaho
McKELVY MACHINERY CO., Denver, Colorado

WHAT'S AVAILABLE



TRACTOR—Powerful diesel develops 208 brake hp. at 2,000 rpm.

New 1955 version of the LeTourneau-Westinghouse Tournatractor features a 6-cylinder, 2-cycle GM 6-71 capable of this increased brake horsepower. Further improvements include a double hand throttle and a larger, stronger fabricated steel air tank providing greater air capacity for safety. Transmission is controlled by a simplified air shifting arrangement. Lever type steering eases operation and increases efficiency. Tournatractor's wheel brakes and wheels are now interchangeable with the C Tournapull line. LeTourneau-Westinghouse Co., Peoria, Illinois



EXCAVATING—1½-yd. convertible shovel-crane-dragline

The new Bay City Model 70, with standard equipment including 34-in. wide crawler shoes, weighs 87,000 lb. As a crane, it has a rating of 23 tons at 12-ft. radius with 45-ft. boom. Tandem drums on separate shafts minimize deflection and provide best cable lead with an attachment. Shovel attachment consists of 23-ft. box-type welded boom, 18-ft. straddle-type dipper sticks, and a 1½-yd. rock-type dipper with a one-piece continuous chain crowd having automatic tension adjuster and power dipper trip. Readily convertible to crane, clamshell, dragline, or hoe. Bay City Shovels, Bay City, Mich.

TRUCK—No creeping in this dump-body hydraulic hoist, special Marion feature

A new hydraulic hoist, the Marion HD-66, features two 6-in. diam. cylinders. The HD-66 has been engineered to operate at a low uniform oil pressure throughout the dumping cycle. There are no high surge points at any time during the life. The de-

vice incorporates Marion's equalizing double arm lifts combination oscillating cylinders and roller type mechanisms. The picture shows the HD-66 being tested on a Marion 6-cu. yd. Rock Body. Marion Metal Products Co., Marion, Ohio.



SCREENING—80-tph. plant easy to transport, easy to erect

Here's a lightweight but rugged portable screening plant especially designed by a Western manufacturer for production of concrete aggregates, oil mat materials, chip screening, or cinder and pumice operations. A 42 x 96-in. double-deck vibrating screen is mounted to adjust to proper angle for maximum production. A 25-hp. gasoline power unit lowers into bin for transporting. The 12-ton, 2-compartment bin has an adjustable partition and demountable legs. Belt conveyor is 18-in. x 50-ft. lattice type. Feed trap with integral reciprocating plate feeder has bar grizzly and 18-in. bulkhead. Can be completely set up or dismantled with only a dump truck for hoisting and hauling the bin and towing the feed trap, and an additional truck or pickup for towing the conveyor. Miller & Smith Mfg. Co., Box 6007, Albuquerque, New Mex.



BITUMINOUS MIXING—Semi-portable plant produces 180 tph. of hot mix

This Standard Model RB 5,000-lb. plant is on the job for Madonna Construction Co. at San Luis Obispo, Calif. It is a complete diesel engine-driven asphalt plant, with unit including 5,000-lb. batch capacity mixing unit, 7-ft. diameter x 28-ft. long portable dryer, portable cyclone dust collecting system, plant wiring, low pressure burner for firing dryer, and hot oil heater for heating asphalt and fuel oil storage tanks, individual asphalt and fuel oil storage tanks. Capable of producing 175 to 180 tons per hour of hot asphalt mix. Standard Steel Corp., 5001 So. Boyle Ave., Los Angeles 58, Calif.

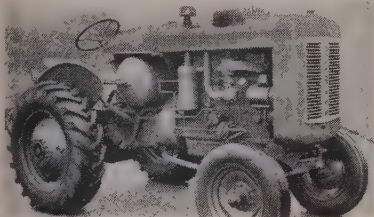


WHAT'S AVAILABLE



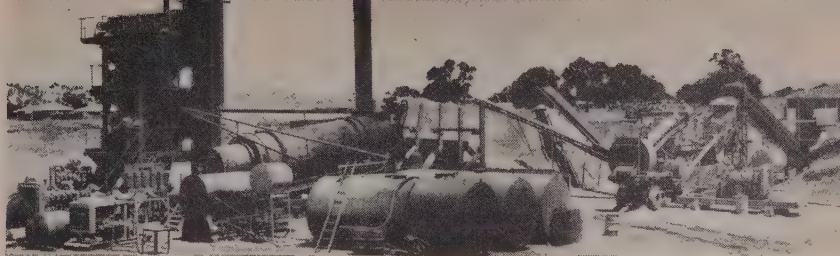
EXCAVATING—Insley "K" handles a variety of jobs

An Insley Type K excavator-crane with backhoe attachment handles trenching jobs easily and can also be equipped with a chain sling to position the pipe sections. The K can be converted easily to crane, clamshell, dragline, or shovel. It can be supplied with crawler, self-propelled carrier, or truck mounting. As an excavator it will handle a $\frac{1}{2}$ -yd. bucket and as a crane it has a lifting capacity of 10 tons. The total shipping weight as a backhoe with standard counterweight, 15-in. shoes and 9-ft. 11-in. crawlers is 25,830 lb. **Insley Manufacturing Corp.**, P. O. Box 167, Indianapolis, Ind.



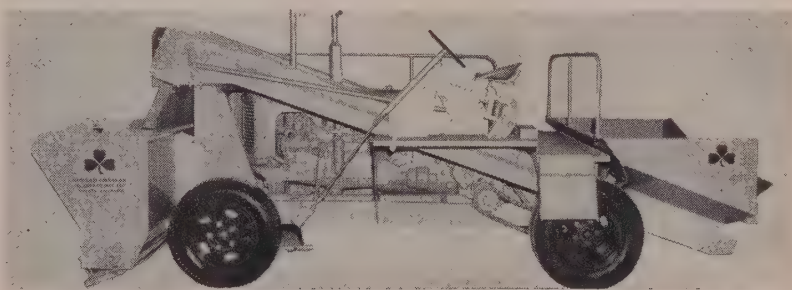
COMPRESSOR—Air power that moves around in a hurry, by itself

Schramm's "Standard Pneumatractor" is a new low priced self-propelled air compressor that, when a portable compressor is needed in the 125-cfm. range, will save highway contractors the expense of towing or hauling, man-hours in moving about on the job, and the extra cost of another tractor on the job. For several years, Schramm has been marketing the Heavy Pneumatractor, capable of mounting a front-end loader and backhoe, and other heavy duty accessories. Customer demand for a similar type unit, for air compressor service primarily, caused Schramm to develop the new unit that sells for less money than most 125-cfm. 2-wheel mounted portable compressors. None of the compressor performance has been sacrificed — only the tractor features have been modified to permit the lower cost (f.o.b. \$3675). **Schramm, Inc.**, West Chester, Pa.



BITUMINOUS MIXING—Extreme portability in 500-ton-per-day plant

Desert Rock Co. of Indio, Calif., reports production of 400 to 500 tons per day from its Standard Model TM 1,000-lb. portable asphalt plant. Photo shows complete plant with skidded combination fuel oil and asphalt storage tank and pumping unit; packaged Cleaver-Brooks steam generator for heating asphalt and fuel oil storage tank; firing dryer, and operating mixer gate. Unit also includes portable cyclone dust collector for control of fine material, and 2-compartment reciprocating feeder for close control of proportioning of aggregates to dryer. This unit has 1,000-lb. batch capacity; 1,500 lb. is also available. Desert Rock uses this plant for supplying specification type hot asphalt mixtures to nearby towns in desert area. Because no outside lifting device is needed to move plant, it can be moved 20 mi. to new location for less cost than hauling by trucks over the distance. **Standard Steel Corp.**, 5001 So. Boyle Ave., Los Angeles 58, Calif.



BITUMINOUS SURFACING—Chip spreading and continuous operation with a 2-man crew

This new chip spreader, introduced by a Western manufacturer within the past year, makes spreading of chips a continuous operation with a two-man crew. It's not necessary to stop the spreader to hook and unhook the trucks — resulting in immediate coverage of applied oil. Eliminated are black streaks caused by foreign particles in cover-coat material. The machine weighs 14,500 lb., is 20 ft. long and 14 ft. wide with spread hopper in place. The spread hopper capacity is 4 cu. yd., and the receiving hopper capacity is 2 cu. yd. Two 20-in. conveyors deliver material from one hopper to the other. **Flaherty Mfg., Inc.**, Pocatello, Idaho.

GRADING—Wide range of blade positions

In a minute, via power controls in the cab, operator can shift from deep ditch cut to high bank cut, or from bank cut to level sub-grade cut, with the new Adams motor graders. Diesel engine power ranges from 75 to 140 hp., with four sizes in the line differing generally only in power and size. Grand-daddy of the line, the "660," is pictured in action. All in the line are equipped with a new constant-mesh transmission, permitting 8 forward speeds ranging from 2.1 to 26 mph. (for quick moving from job-to-job), and 4 reverse speeds from 1.7 to 13.7 mph. With optional series of creeper gears, speeds down to $\frac{1}{4}$ mph. can be obtained for gaining full power in working against obstructions, in cramped quarters, on fine finishing, etc. **Adams Division, LeTourneau-Westinghouse Co.**, Indianapolis.





EARTHMOVING—Carry payloads with 18-yd. Terra Cobras

With a load boiling into the bowl of the Wooldridge Terra Cobra Model TH-0142, the 10-speed transmission enables the operator to match engine horsepower to all load and haul conditions. This 2-wheel tractor, self-propelled scraper is equipped with a dependable Cummins 225-hp. diesel. Air-actuated, direct-connected power control unit is mounted next to the operator to prevent damage from dirt. Positive hydraulic steering is used. **Wooldridge Manufacturing Co.**, Hendy Ave., Sunnyvale, Calif.



EXCAVATING—Nine fast-change attachments for Bantam T-35A

Shown here excavating for a culvert replacement job, the carrier-mounted T-35A is rated as a $\frac{3}{4}$ -yd., 6-ton machine that works with any of nine attachments, such as crane, (lifts 12,000 lb.), dragline (handles 90 yd. per hour), shovel (loads 90 yd. per hour), trench hoe (digs 100 ft. of 5-ft. trench in an hour), magnet, grapple, pile driver, or backfiller. All-job versatility, replacing expensive single-purpose tools, makes the unit ideal for highway construction and maintenance chores. Its crawler-mounted running mate, the C-35A, is easily transportable on any standard 10-ton trailer, and overall width of 8 ft. (with 16-in. pads) eliminates need for special road permits. **Schild Bantam Co.**, Waverly, Iowa.



POST DRIVING—Wood or steel driven true regardless of slope

Little Giant's post driver features full revolving, and its short tail swing permits uninterrupted traffic flow. A ball bearing turn-table eliminates hook or conical rollers and center pin. Job reports show 375 to 450 posts driven daily with a loss of fewer than 10 posts in 160,000 ft. of guard rail. Fully convertible to standard attachments, it's available for mounting on your truck or as a complete-and-ready-to-operate rig from factory to you. **Little Giant Crane & Shovel, Inc.**, Des Moines, Iowa.



DRILLING—Thor wagon drill for holes at any angle

The Thor BW-1 will drill holes in any direction at any angle on level or sloped terrain. A 5-hp. reversible rotary air motor raises or lowers 4-in. drifter on the mast. Saddle and cone arrangement permits the mast to be swung through complete 360-deg. arcs both vertically and horizontally by loosening only two bolts. Wheels swivel to 90 deg. for line drilling, 180 deg. for narrow gage work. **Thor Power Tool Co.**, Aurora, Ill.



TRENCHING—Trenchliner digs 25 ft. of trench per minute

The new Parsons Trenchliner can dig up to 25 ft. of trench per min. A selection of 30 digging feeds is available and six digging wheel widths range from 16 to 26 in. Maximum digging depth is 5 $\frac{3}{4}$ ft. A hydraulic power system raises and lowers the wheel and holds close grade tolerances at any depth. The standard tractor crawlers on the machine are fitted with self-cleaning grousers or street plates. A choice of 60-hp. gasoline or diesel engine is offered. **Koehring Co.**, 3026 W. Concordia Ave., Milwaukee 16, Wis.

How Link-Belt Speeder engineering helps both the shovel-crane and the operator increase earning capacity!



LS-98 with 60' boom and 1 1/4 yard bucket works in sand and gravel pit.

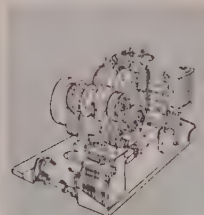
You're ahead on every job — Link-Belt Speeders — whether crawler or rubber-tired — are years ahead of the shovel-crane industry. Only Link-Belt Speeder offers you Speed-o-Matic — the true power hydraulic fingertip control system. Only Link-Belt Speeder offers you so many outstanding design, construction and operator advantages. For facts on every machine in the 1/2 to 3-yd, 10 to 60-ton work range — contact your Link-Belt Speeder distributor or write Link-Belt Speeder Corporation, Cedar Rapids, Iowa.

Two-way speed increase



● Speed-o-Matic, the true power hydraulic control, provides fast, easy, smooth response... ideal control for speed with accuracy. It's also engineered to reduce operator fatigue — enables him to maintain greater output with less effort.

Extra power, stamina



● Anti-friction bearings, splined shafts and precision-machined surfaces at every important point convert more rated hp into actual line pull. All-welded, stress-relieved construction permits use of extra power.

More work-time

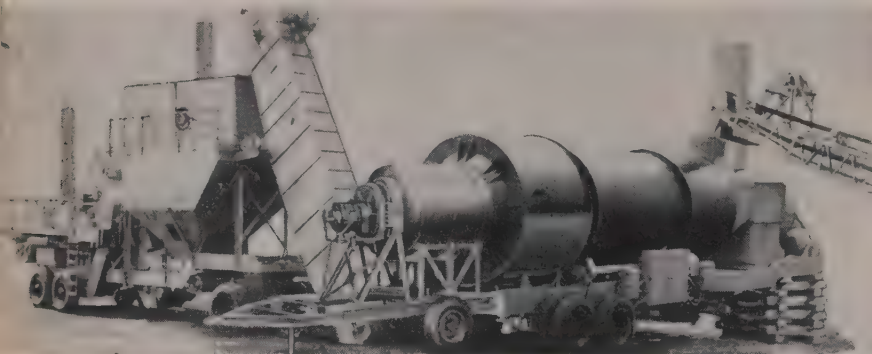


● Speed-o-Matic reduces operator fatigue, losses due to end-of-the-shift let-down. Further, it minimizes downtime. For example, Speed-o-Matic clutch is hydraulic actuated, self-compensating. Eliminates frequent stops for adjustment.

A demonstration can be arranged to suit your convenience. See one of these great machines in action and judge for yourself why they are today's most advanced shovel-crane.

LINK-BELT SPEEDER

Builders of a complete line of crawler
and rubber-tired shovel-crane



BITUMINOUS MIXING—Quick portability and high production built into new Pioneer central hot mix plant

Contractors wanted it, so Pioneer has given it to them in the new Model 102 plant. Hot mix capacity is 100 to 175 tons per hour. For continuous process set-up—diesel, diesel-electric or completely electric—the plant has only two units (compared to usual four in larger plants)—a combination drier-dust collector, and a combination gradation-mixer unit, each compactly assembled in a straight line on a single chassis. To increase portability further, the auxiliary units are all designed for ready loading and towing in line behind the two main units. Although primarily a portable plant, the 102 can be readily adapted to stationary permanent operations (compactness reduces area need.) Best application: jobs requiring large quantities of hot mix in a minimum of time, and small jobs that must be completed in a hurry. Pioneer Engineering Works, Minneapolis 13, Minn.



BITUMINOUS SURFACING—3-in-1 tank offers latest in low cost operation

Efficient for spraying asphalt, tar, emulsions, cut-back or road oils, Model 101 Utility Spray Tank, now has an improved mechanical type circulating spray bar, with positive acting nozzles. Operation is possible with either half of the new bar or with any desired length. Bar comes in shifting and non-shifting types. Model 101 combines three units in one—it has the full circulating spray bar up to 12 ft. in width for small applications, hand spray attachment for patch work, and a pouring pot outlet for crack filling and patching. Littleford Bros., Inc., Cincinnati, Ohio



EXCAVATING—New Bucyrus-Erie 3-cu. yd. shovel

Here's one of the first field photos of the new Bucyrus-Erie 71-B in action. With 27-ft. shovel boom here, the machine is readily convertible to dragline, clamshell, or lifting crane (with standard boom of 60 ft. extendable to 110 ft.) Boom hoisting and lowering is accomplished with a single hand lever. Features include: twin rope crowd, full independent boom hoist, full air control, torque converter drive, one-piece cast steel frame, friction steering, and digging brakes. Bucyrus-Erie Co., South Milwaukee, Wis.



DRILLING—Nothing to tow with the Joy Trac-Drill

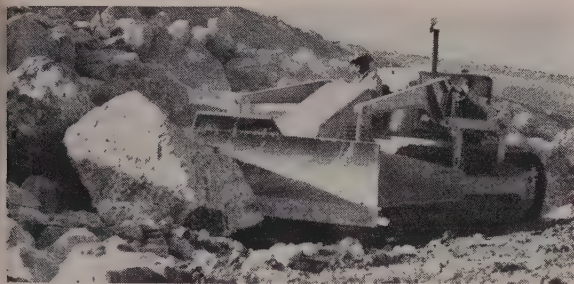
Completely self-contained, including compressor, the Joy Trac-Drill goes anywhere a tractor goes and is in drilling position within seconds. Available in two mountings: front, for construction or quarry work; side, for ditch or drainage drilling. Twin 4-in. hammer drills and chain feeds are mounted on hydraulically actuated booms with power lift and power swing. The booms are available in 8- or 10-ft lengths. The standard feed permits 8-ft. steel changes. Trac-Drill components are available in package form ready for mounting on a used tractor. Joy Manufacturing Co., Henry W. Oliver Bldg., Pittsburgh 22, Pa.

LOADING—Special belt for the Domor permits steeper delivery angle



A special rubber cleated belt developed for the Domor gives extra capacity and permits steeper delivery angle than ordinary belts, and makes it possible to handle a wider range of materials. The Domor, made exclusively for mounting on Caterpillar motor graders, is an efficient loading tool for borrow pit loading, casting, ditching, stripping, or skimming. Ulrich Products Corp., Roanoke, Ill.

WHAT'S AVAILABLE



TRACTOR—Powerful Eimco 105 has best operator visibility

This prime mover serves equally well as dozer or over-shot loader—all attachments being Eimco products, too. Gear shifting under full power in motion, instant reversals, clutches that never need adjustment, and elimination of the master clutch are outstanding features. Tractor is designed heavy enough to carry the additional weight of attachments and to take excessive loads at unusual angles. Independent track control allows opposite track rotations for a spin turn in its own length—handy for quick positioning for push loading. Operator's position up front gives best operator control for this 18-ton, 45,000-lb. drawbar pull-unit. **Eimco Corp.**, 634 S. 4th West, Box 300, Salt Lake City, Utah.



EARTHMOVING—Dump 25 tons where you want it

Heavy-duty Wooldridge dumpers are available like this Model D130 that can be used with Model TH tractor units, or as wagon alone, interchangeable with scrapers on the Terra Cobras. The interchange of two models, 20- and 25-ton capacity dumpers, with corresponding size scrapers using the same tractor units, gives contractors flexibility in handling various earthmoving conditions. **Wooldridge Manufacturing Co.**, Hendy Ave., Sunnyvale, Calif.

COMPACTION—50-ton pneumatic compactor handles thicker lifts with speed

For production compacting where thicker lifts make a difference in the profit column, Shovel Supply manufactures this 50-ton Ferguson compactor that features multiple speed, excess power, and the ability to turn around sharply. Two 2-wheel assemblies are each mounted on trunnions that oscillate on stationary longitudinal shafts. Weight without sand ballast is 20,000 lb. The manufacturer also furnishes compactors with hitches to fit all 2- and 4-wheel rubber-tired tractors. **Shovel Supply Co.**, Box 1369, Dallas, Texas.



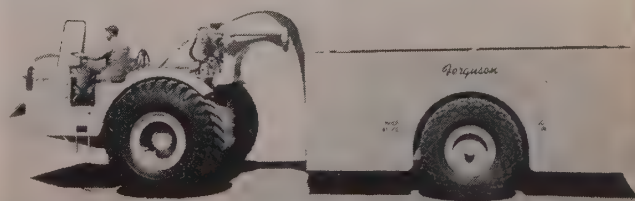
PAVING—Stow package screed assembly gives contractor flexibility

Contractor asked Stow why they could not be supplied with parts to make their own screed (to avoid ordering beams of specified length direct from factory, with subsequent high shipping costs and job delay.) Stow's answer: a package assembly that can be mounted to any wooden beam by the contractor. Package consists of 2-hp. gasoline engine and a vibrating unit called the Power Pak, brackets for engine mounting, and a pair of end rollers, handles and deflectors, and all necessary bolts. In job pictured, firm is putting a third lane on uphill grade. Job was too big to use a 2x4 to strike off, yet too small to bring in a large paving machine, so contractor made up a 14-ft. screed using the Stow package. Only 2 men pulled the screed uphill with a large self-propelled mixer moved ahead of the screed. Concrete had maximum slump of 2 in. **Stow Mfg Co.**, 56 Shear St., Binghamton, New York.



CRUSHING AND SCREENING—Large volume output for a variety of products

Two new models have been added to Universal's line of Twindual Gravel King portable three-stage gravel crushing, screening and loading plants. Both "Junior" and "Senior" models, providing capacities from 100 to 250 tph. of 1-in. minus based on 50% crushing, are now available with larger scalping screens and larger main plant screens with extra-long sand decks for increased output of material. Skid frame bolts to main plant frame to permit easy removal of the complete primary scalping unit to reduce weight for traveling on highway. Three stages of crushing with pre-screening provide gravel producers with large volume output and a variety of product combinations from single plant. **Universal Engineering Corp.**, 625 C Ave. N. W., Cedar Rapids, Iowa





LOADING—Adams "Traveloader" loads anything from windrow or stockpile

Here's a self-propelled front-end loader that moves forward in any of several speeds while revolving feeder places continuous flow of material on conveyor belt to load trucks at a rate up to 10 yards per minute. Rear section of conveyor is adjustable up or down to provide discharge heights for trucks of varying sizes. New attachment is a cross conveyor (illustrated), quickly controlled from cab for loading trucks on either side. Advantages: no loading time wasted in positioning trucks; trucks can travel alongside in working windrows; material can be cast to side of road or down mountain slope. **Adams Division, LeTourneau-Westinghouse Co., Indianapolis 6, Ind.**



BITUMINOUS SURFACING—Plenty of versatility with the Etnyre "Black Topper"

The latest models of Etnyre "Black Topper" bituminous distributors are available with front or rear engine drive, mounted on truck or trailer, with full circulating or turn-up folding spray bar. The tanks range in size from 650 to 4,500 gal. Full or medium heating system, high or low pressure burners—furnished on specification. **E. D. Etnyre Co., Oregon, Ill.**

DRILLING—Heavy-duty wagon drills for blasting rock



A Chicago Pneumatic heavy-duty wagon drill is pictured running blast holes into rock on a freeway job. This drill mounting offers maximum flexibility, peak stability in all positions, and the steady feed and hard hitting drifter action assures maximum footage in all formations. **Chicago Pneumatic Tool Co., 6 East 44th St., New York 17.**

PAVEMENT REJUVENATION—Old pavement becomes select aggregate, mile per day



The Pettibone Wood Preparizer scarifies and pulverizes asphalt or macadam pavement and prepares it into select aggregate for low-cost re-use. It also prepares adobe, clays, and other hard soils for mix-in-place and does soil blending work. The scarifier bar is accurately controlled by a hydraulic jack so that the subgrade cannot be disturbed below the desired depth. Hydraulically controlled tailgate retains material in the pulverizer drum as long as desired for uniform control of aggregate size. The Preparizer will prepare up to 1,000 cu. yd. per hour of soil, or a row of asphalt 22 ft. wide and up to one mile in length in one day. **Pettibone Wood Mfg. Co., P. O. Box 620, North Hollywood, Calif.**



BITUMINOUS MIXING—Fast production and close control with the Madsen 481

The Madsen Model 481 is a 4,000-lb. batch capacity asphalt plant designed to handle the exacting requirements of today's bituminous mix specifications on a fast production basis. A new Madsen twin-shaft pug mill mixer is a feature of the model. Other features include: a new exclusive bin design which eliminates segregation of aggregate; all air-operation of bin gates, asphalt pressure injection and mixer gate; in-built duct work to relieve pressure on mixer weigh-box housings, bin, hot elevator and screen housings to draw off vapors, moisture and dust; finger-tip control of weighing and mixing levers; location of operator station on end of plant; unit construction designed for easy stacking in factory-matched sections for fast field erection. In short, it's built to provide the contractor with a portable asphalt plant having a fast charge-mix-discharge cycle, greater accessibility and low cost maintenance. Plant is oversize so that it may be modified to handle 5,000-lb. or 6,000-lb. batches. **Madsen Iron Works, La Mirada, Calif.**

Handle all these Jobs

**WITH THE VERSATILE
LOW-COST**

Model D Grader

With original cost but one-third that of a large grader, low operating cost and almost unlimited versatility, the Allis-Chalmers Model D Motor Grader is helping contractors cut costs on a variety of jobs.

LOADS OR TRANSPORTS sand, gravel, cement, other bulk materials with $\frac{5}{8}$ yd. rear-mounted hydraulic bucket. Dumping height of 8 ft. 8 $\frac{1}{2}$ in. allows easy loading of high truck bodies.

BACKFILLS ditches, trenches; packs and levels ground; loads excess dirt to trucks. Tandem drive and 8,800 lb. weight provide plenty of traction when working in soft materials.

LANDSCAPES, grades lawns, levels around houses. Maneuverability lets Model D work easily in narrow quarters.

LOADS SNOW with bucket or cleans it with blade or V-type plow to help keep winter building operations on schedule — provides year-round versatility.

BUILDS AND MAINTAINS roads, streets, alleys, driveways; spreads rock; scarifies; cleans up on construction work. Excavates shallow for slab foundations.

ROUGH GRADES for curbs, gutters; finish grades shoulders, sidewalks, between forms; cuts and cleans drainage ditches; removes weeds and brush.



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Stockton, N. Sacramento, Redding
SOUTHERN CALIFORNIA
San Joaquin Tractor Co.—Bakersfield
Shaw Sales & Service Co.—
Los Angeles and San Diego

IDAHO
Southern Idaho Equipment Co.—Idaho Falls and Boise
MONTANA
Mountain Tractor Company—Missoula
Richland Machinery Company—Sidney
Seitz Machinery Company, Inc.—
Billings and Great Falls

NEVADA
A-D Machinery Company, Inc.—Bike
Moore Equipment Company—Reese

OREGON
Pape Brothers—Eugene, Roseburg and North Bend
Haupt Tractor Company—Medford
Wood Tractor Company—Portland
UTAH
Cate Equipment Company, Inc.—Salt Lake City
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A. H. Cox & Company—Seattle
American Machine Company—Spokane
Mid-State Equipment Company—Wenatchee
WYOMING
Studer Tractor & Equipment Company—Casper

FINISHING—Jaeger units key to precision paving speed



Latest paving methods are evident on today's high production freeway work. One big paver and a concrete spreader lay the base to receive steel mesh. A second paver then paves top course which is placed by a second concrete spreader and either one or two finishing machines, followed by longitudinal finisher and floats. As a further improvement the spreader used on top course is equipped with an oscillating screen which insures precision strike-off and accurate metering of material to finishing machines. Where pitched slab or super-elevated curves create the problem of placing and finishing material up-hill, one or both finishing machines can be supplied with diagonally adjustable rear screed which carries material to the high side and compacts it solidly against the higher form. With this set-up production as high as 560 lineal ft. per hr. of 12-ft. reinforced slab, 7,280 ft. in 13 hr., has been reached on the freeway job pictured. The Jaeger Machine Co., Columbus, 15, Ohio.



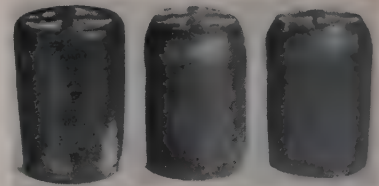
EXCAVATING—Minimum down-time with Clark's air-controlled units

One of Clark's six primary excavator-crane models, the T6K—rated at $\frac{3}{8}$ yd. and $7\frac{1}{2}$ tons—is shown clearing a roadside in Shasta County, Calif. The T6K is the baby of the line: other models cover the range up to $\frac{3}{4}$ yd. and 20 tons. All the models are fully air-controlled, for no fatigue strain on the operator and eliminating entirely the need for everyday greasing. Clark Equipment Co., Construction Machinery Div., Benton Harbor, Mich.

BITUMINOUS SURFACING—Rola's "float on the asphalt," leaves no marks to take out



All models may be controlled to lay from $\frac{1}{2}$ to 3 in. of asphalt on the finishing course, or 3 to 12 in. of cement treated base or asphalt leveling course. Standard models have two cut-off plates, each 1 in. wide, to reduce width of pass to 6 or 7 ft. Front wheels are adjustable to level box



COMPACTION—New type tamper heads take hard use

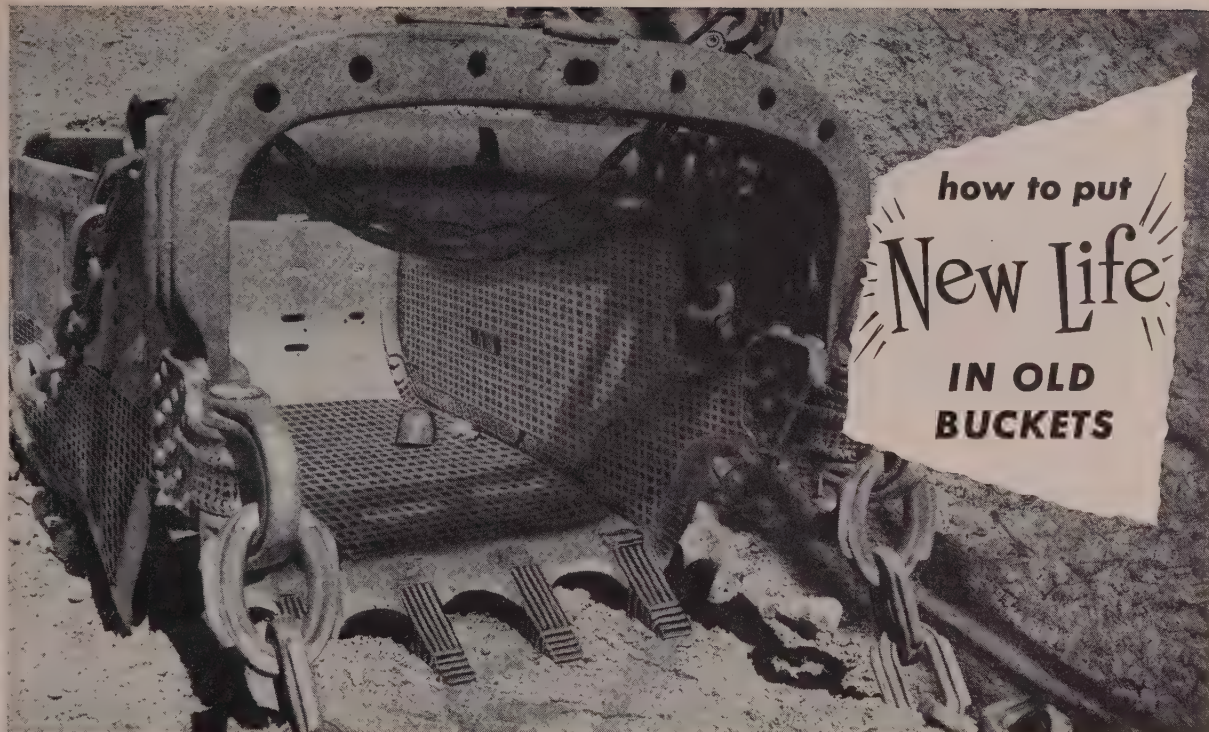
Optimum hardness and maximum wearing surface at a price that effects a 50% saving over the old method of hard facing and build-up procedure are features of the R-Mor Edge tamper heads. Shown above are tamper heads in use in granite for four months on the Guy F. Atkinson Co. Cherry Valley Dam project. Use periods varied from A—1,200 hr., B—1,900 hr., and C—1,900 hr. as compared to normal wear of 500 hr. on other tampers. Tool has unique high head pattern. The company offers replacements, for a complete line of tamper heads and to fit present shank sizes. R-Mor Products Co., 4401 San Leandro St., Oakland 1, Calif.



CRUSHING AND SCREENING—Portable plants have big production with Symons cone crushers and screens

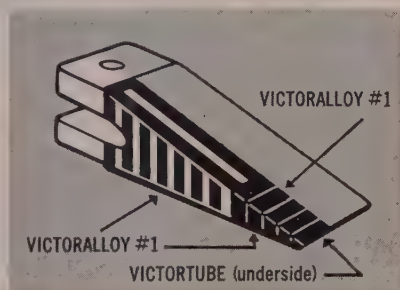
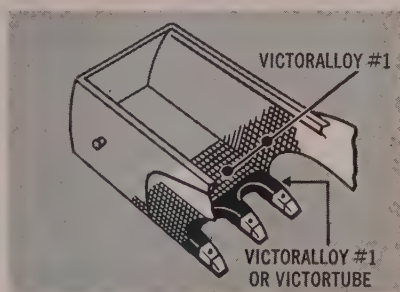
Hauling costs are reduced when you can take the crushing and screening plant to the pit, rather than bringing the pit to the plant. Portable plants have solved this problem. And at the heart of these plants can be found heavy duty, dependable crushers and screens. Here is a good example. Viewed above is a portable plant that was custom engineered by an equipment distributor for his customer. Full technical data are readily available for those wishing to build their own plants—and technical help is easily obtained for special problems from Nordberg Manufacturing Co., Milwaukee, Wis.

or to place material at desired angle to the curb. Trench and shoulder models are adjustable from the maximum width down to 1 ft. A pair of floating guides restrict the material to the required width. Creative Metals Corp., 1290 Powell St., Emeryville 8, Calif.



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IN OLD
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Buckets . . . Apply VICTORALLOY #1 to top and bottom of bucket lips in overlapping beads. Protect other parts or areas showing wear with stringer beads of VICTORALLOY #1. Use 3/16" coated VICTORALLOY #1 at 170 to 190 amperes, a.c. or d.c., or 1/4" at 200 to 225 amperes. If wear is unusually severe, substitute VICTORITE on bucket lips; use 3/16" coated at 120 to 150 amperes, a.c. or reverse-polarity d.c.

Teeth . . . Apply VICTORTUBE to underside from point upward about 2", and VICTORALLOY #1 to upper side of tooth same distance. Use stringer beads of VICTORALLOY #1 on balance of upper and lower surfaces, and on edges. Use 3/16" coated VICTORTUBE at 130 to 160 amperes, a.c. or reverse-polarity d.c., and 3/16" coated VICTORALLOY at 170 to 190 amperes, a.c. or d.c.

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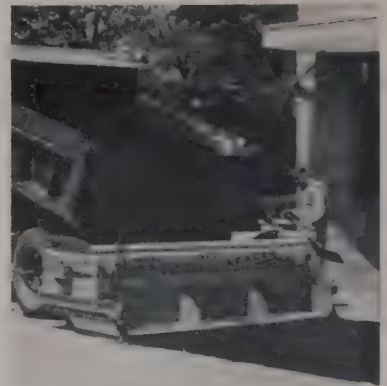
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EARTHMOVING—Euclid goes all out in building a small scraper

The new Euclid S-7 scraper utilizes many of the features proven in other Euclid scrapers: level type hydraulic operations eliminate all but 11½ ft. of a single cable; 4 identical, interchangeable cutting blades; accessibility of all drive parts. Positive ejection has snap at end of stroke to shake loose sticky materials. Capacity is 7 yd. struck, 9 yd. heaped. The unit can make non-stop 26-ft. turns. The S-7 has a power ratio of 20 hp. per yd. of capacity, compared with an industrywide average 16.5. Euclid Division, General Motors Corp., Cleveland 17, Ohio.



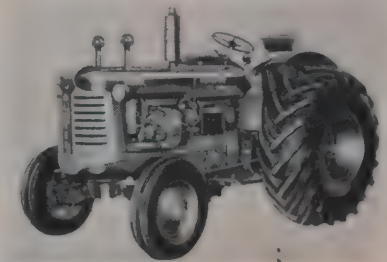
BITUMINOUS SURFACING—10 staggered tires guarantee level spreading

A bituminous concrete and aggregate spreader for either hot or cold mix applications, Model AS, is now available. Of the tow-type variety, the spreader features a staggered wheel arrangement consisting of 10 pneumatic tires which keep the unit level. The screed is fully adjustable in height by controls which permit spreading depths from ½ to 8 in. It can handle rock up to 4 in. in size for base course. There are no wheels outside the hopper so material can be spread close to curbs or buildings. It is available in sizes of 8-, 9-, 10-, and 12-ft. spreading widths. Highway Equipment Co., Inc., 616 D Ave. N. W., Cedar Rapids, Iowa.



TRAILER—Special design for machinery hauling

Here's a 25-ton capacity trailer manufactured by a Western firm to satisfy the demand for a tandem axle tilt-bed trailer for construction machinery hauling. Although light in weight (10,500 lb.) it has the required carrying capacity. The tilting mechanism is cable-operated by use of the winch on the truck tractor. If tractor is not equipped with winch, trailer may be tilted by substituting a hydraulic cylinder furnished as optional equipment. The firm also now has available a 35-ton capacity trailer said to be the lightest (13,050 lb.) machinery trailer of its capacity now on the market. Miller & Smith Mfg. Co., Box 6007, Albuquerque, New Mexico.



TRACTOR—Powerful general purpose tractor on wheels

Totally new is the Oliver Super 99 GM Diesel, capable of developing 72 hp. on the drawbar and 80 hp. on the belt. The 2-cycle General Motors diesel engine starts quickly on diesel fuel alone. No auxiliary engine or special fuel is needed. Its all-purpose features include an independently controlled power take-off and a 3-way hydraulic system. A 6-forward speed transmission and a recirculating ball-type steering gear make this big tractor effective and easy to handle. The Oliver Corp., 400 W. Madison St., Chicago 6, Ill.

EXCAVATING—New Hopto digger cuts cycling time



The new 200DTM-55-36 deluxe truck-mounted Hopto Digger is the most recent addition to the Hopto line of Badger digger-shovel-loaders. A larger, heavier-duty hydraulic system with ¾-in. valves and hoses and 36 - gal. - per - min. hydraulic system shaves several seconds off the 20-sec. cycle of the Model 200DTM-55, which this new model closely resembles. In addition to appreciably reducing the cycling time, the larger hydraulic system minimizes oil heating and gives more efficient operation, according to the manufacturer. The new unit is powered by a Continental F-226 water-cooled engine. Badger Machine Co., Winona, Minn.

WHAT'S AVAILABLE



COMPACTION—*Prototype self-propelled pneumatic roller*

Pictured is the Tampro Model SP-9 rolling a crushed rock base course—introduced in 1954 as the first of its kind anywhere. New 1955 model has these improvements: additional engine horsepower, new improved hydraulic steering system, improved drive wheels, improved grease seals for front oscillating wheels, heavier drive axles and sprockets. **Tampro Mfg. Co., Box 2340, San Antonio 6, Texas.**

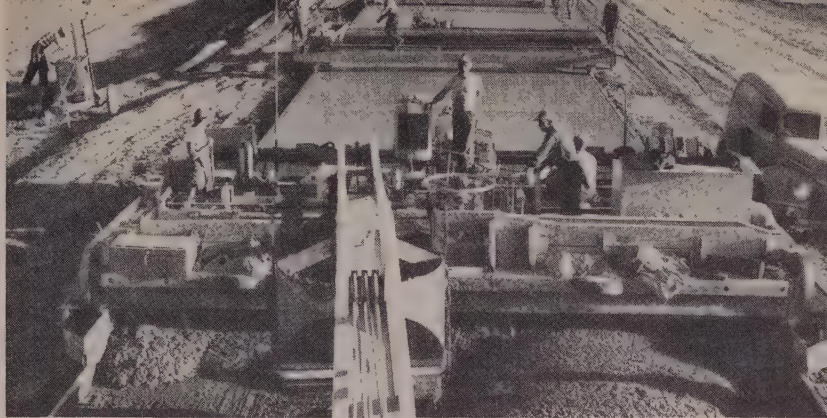


TRACTOR—*Load more, push more with the new OC-12*

Increased power, operating economy, and handling ease are key features of the completely new Oliver OC-12. Two powerful engines are available—a 45.1-drawbar-hp. full diesel, and a 44.3-drawbar-hp. gasoline model. Special attention has been given to operator convenience and comfort, including visibility. Two track gage widths, 44 and 66 in., are available as well as two allied equipment pieces—a 1-yd. hydraulic loader and a hydraulic bulldozer. Weight is 11,000 lb. **The Oliver Corp., 400 W. Madison St., Chicago 6, Ill.**

CRUSHING AND SCREENING—*Designed for rock (175 tph.) and portability*

Universal's 3-stage portable Twindual Pacemaker plants have these new features: skid-mounted primaries (three primary units mount as separate unit on skids to make it possible to meet weight restrictions on the highway); larger screens (20 to 25% greater screening area and extra long sand decks incorporated to allow greater output of cleaner sized aggregate); and optional semi- or all-electric drive. Pacemakers are designed primarily for rock operations. However, because of the large opening primary jaw crushers, they are also widely used in Western gravel pits containing big boulders, and where specs require that pit oversize be crushed. Capacities range upwards to 175 tons per hour of 1-in. minus with 100% crushing in rock, to 250 tons per hour with 50% crushing in gravel. **Universal Engineering Corp., 625 C Ave. N.W., Cedar Rapids, Ia.**

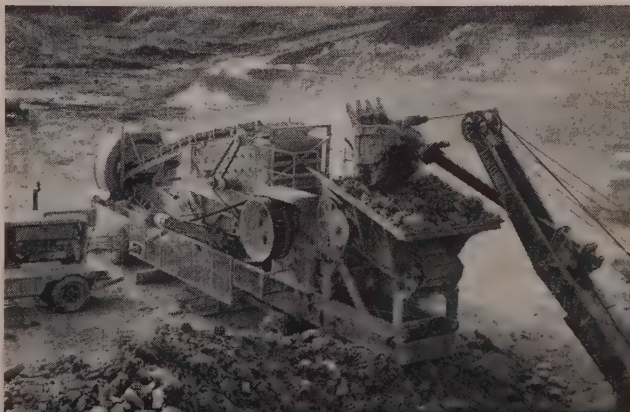
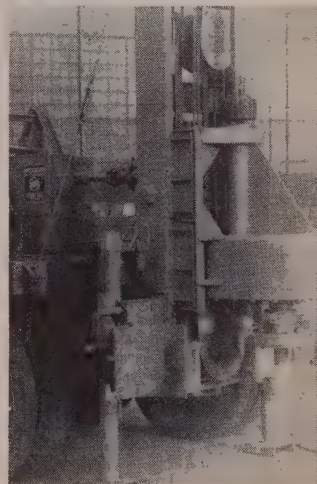


PAVING—*Here's the Blaw-Knox "complete paving package"*

Shown in action is a Blaw-Knox 24-ft. spreader with vibratory attachment, followed by the XE finishing machine, both riding on 8 x 8 1/4 steel self-aligning paving forms. Balance of the Blaw-Knox "complete paving package" used on this 11-mi. Western job includes a MultiFoote 34E dual drum paver, a precision subgrader, a P 3100 3-compartment aggregate bin with twin automatic weighing batcher, an 800-bbl. bulk cement plant with twin automatic batcher, and steel forms for curb, curb and gutter, integral curb and median dividers. **Blaw-Knox, Construction Equipment Division, Pittsburgh 38, Pa.**

DRILLING—*Many-use drill handles augers up to 24 in.*

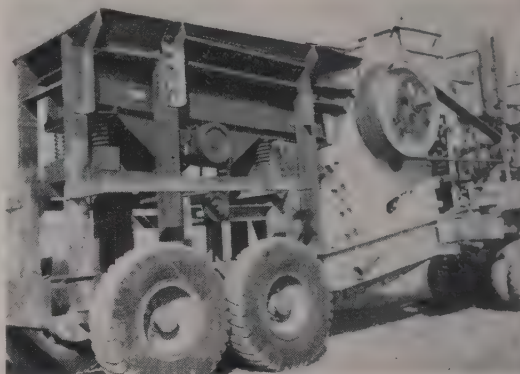
Companion to the 106-8 McCarthy Auger, new drill is not limited to 8-in. diameter augers but will handle up to 24-in. diameter, enabling user to bore foundation holes, large diameter dewatering holes, large fence post holes, over-sized prospecting holes in shale and clay operations and uranium testing, etc. Drill will bore: 24-in. holes to depth of 20 ft., 20-in. holes to 35 ft., 16-in. holes to 60-ft. depths, and 12-in. holes to 80-ft. depth in earth, clay, compacted sand and gravel, hard pan or shale formations. **Salem Tool Co., Salem, Ohio**



COMPRESSOR—Tractor-air compressing combo increases power to 125 cfm.



LeRoi's Tractair is a combination 35-hp. wheeled tractor and 125-cfm. air compressor designed to bring power to otherwise hard-to-get-at places. Governed speed is 1,350 rpm. An "Econotrol" varies engine speed to match air demand thus extending engine life. Rubber-tired, the machine has five traveling speeds with a maximum of 17 mph. Combined with generous clearance, its center of gravity allows it to operate on a two-to-one slope. LeRoi Division, Westinghouse Air Brake Co., Milwaukee, Wis.



CRUSHING—1,000 tons of sand or gravel handled per hour with combined Grizzly-Feeder

With the new Simplicity Grizzly-Feeder, operations of the old type apron feeder and the stationary grizzly are combined to cut operation and maintenance costs drastically and utilize only half the space. Unit is available in sizes from 2 x 8 ft. to 6 x 12 ft., in capacities up to 1,000 tons per hour. Unique double shaft assembly allows the unit to feed on the horizontal when headroom is at a minimum. These twin shafts may be easily timed to vary the angle of throw. Pictured is the unit feeding and scalping material to a crusher in a portable plant. Simplicity Engineering Co., Durand, Mich.



LOADING—Four units in one with the new Drott

With the push of a lever the International Drott TD-9 "Four-In-One" can be changed into a skid-shovel, bullclam, clamshell or bulldozer. The machine features pry-action breakout, with roll-back of load at ground level. A Hydro-Spring reduces shock 70%. The clamshell bucket lifts high enough for any truck. The bullclam can be set to make any depth cut. International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill.



GRADING—Anti-chatter moldboard, 15 mph. speed

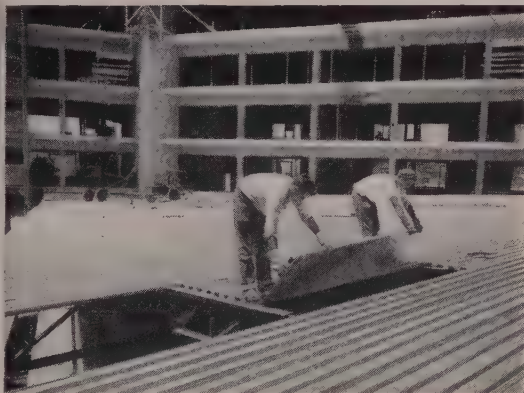
Lull's Model 10 grade offers a positive anti-chatter moldboard that does an excellent maintenance job at higher speeds. With the increase speed of 6 to 15 mph., manufacturer says that maintenance "cost-per-mile" can be lowered 30 to 40%—more road can be kept up with fewer machines and operators. Fingertip pressure controls the moldboard. Lull Engineering Co., Minneapolis, Minn.

BITUMINOUS SURFACING—A trailer or truck-mounted unit for fast maintenance work



Standard Steel's new Model SJ satisfies the need for speed and economy, and the trend toward truck mounting. Converting from trailer to truck mounting is simple; entire towing tongue assembly is quickly detachable. All operations, including burners and burner adjustment valves, are on rear of machine so operator doesn't have to leave rear platform. Freedom of modification is built-in, allowing selection of pump and engine sizes to suit customer's exact requirements. Trailer-mounted unit shown is 600-gal. capacity only; truck-mounted models come in 600- and 800-gal. capacities. Standard also makes asphalt pressure distributors in capacities from 1,000 to 1,500 gal. (special up to 3,500 gal.), featuring the "Miracle" spray bar with valves enclosed entirely within the bar itself, and street flushers in various capacities. Standard Steel Works, North Kansas City 16, Mo.

New Construction in the West



STEEL ROOF FOR BEVERLY-HILTON—The new Beverly-Hilton Hotel in Beverly Hills nears completion as workmen install the steel roof deck which is designed for maximum strength and minimum roof load. The deck sections were fabricated from sparking sheets of 18-gage Bethcon, produced by Bethlehem's continuous galvanizing process. Welton Becket and Associates handled the design and furnishings of this luxurious 450-room structure.



SAN FRANCISCO'S NEW AIRPORT—Newest of the nation's big air-terminal buildings is this ultra-modern 6-story structure flanked by concourses and other facilities for handling up to 5 million passengers annually. Separate floor levels are provided for inbound and outbound travelers. The structural steel was fabricated and erected by Bethlehem Pacific. Architects and engineers were W. P. Day and Associates; General contractor was Clinton Construction Co. Planning was done by Public Utilities Commission of the City and County of San Francisco.



FREEWAY APPROACH—Erection of the steel superstructure for the final link in the Bay Shore Freeway approach to San Francisco's Bay Bridge was recently completed by Bethlehem Pacific. This section and several others were fabricated at Bethlehem Pacific's Alameda Works. The first section of this Freeway won an A.I.S.C. award for beauty of design.



MACY'S AT SAN MATEO—An important unit of the proposed \$20 million Hillsdale Shopping Center is Macy's new department store. Bethlehem Pacific supplied over 1200 tons of reinforcing bars for this three-story, \$6 million store which has a total floor area of 200,000 sq ft. Architect: Welton Becket and Associates. General contractor: Haas and Haynie.



◀ **NATION'S FIRST 345-KV LINE**—Following the Columbia River Valley for 176 miles from McNary Dam to Portland's industrial area, the McNary-Ross line will begin carrying power later this year for the Bonneville Power Administration. These big towers, 918 of them, were fabricated and galvanized at Bethlehem Pacific's tower shops in Seattle and in South San Francisco.

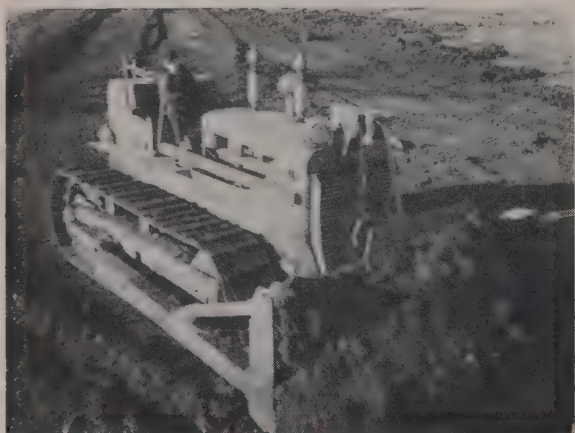
**BETHLEHEM PACIFIC COAST
STEEL CORPORATION**

Sales Offices: Los Angeles, San Francisco, Portland,
Seattle, Spokane



BETHLEHEM PACIFIC

WHAT'S AVAILABLE



TRACTOR—*International's torque converter TD-24*

Grading a roadway is the International TD-24 crawler tractor, powered by a 200-hp. diesel engine. Power steering permits the operator to make gradual turns with power on both tracks. There are two forward and two reverse speeds, ranging up to 6.9 mph. The crawler's hydraulic torque converter system, mounted as an enclosed unit, gives a torque multiplication of 4.83 to 1. A special safety device is the "decelerator." Just the opposite of an automobile accelerator, it is designed to give the operator complete control of engine speed at all times. **International Harvester Co.**, North Ave. & Mannheim Road, Melrose Park, Ill.



COMPACTION—*Vibratory roller for fewer passes*

The new Vibro-Plus operates as a static or dynamic roller with special application to compaction of highway and air field subbases. The roller consists of a drum with a built-in vibrating element and a frame that is spring-suspended from the main shaft of the drum. Although the roller and frame weight is only 3 tons, the vibrating frequency of 1,600 rpm. results in a centrifugal force of 7 tons. Strata substantially deeper than 3 ft. have been compacted. **Vibro-Plus Products, Inc.**, 54-11 Queens Blvd., Woodside 77, N. Y.

FINISHING—*High frequency vibratory screed speeds up the job, low-slump concrete*



Two men can strike off and compact up to 6,000 sq. ft. of concrete slab every hour with one pass of this high frequency finishing screed. The base of the screed transfers the vibrations from a Briggs and Stratton engine to the concrete equally from all points of the bar. The high frequencies finish the concrete, eliminate water spots, and permit use of larger aggregate and lower slump concrete. Models range from 6 to 36 ft. with either gas or electric power. Gross weight of the largest is only 619 lb. **Master Vibrator Co.**, 163 Stanly Ave., Dayton 1, Ohio.



EXCAVATING—*Quick-way makes quick work of dirt clean-up*

A Quick-Way L2 1½-yd. shovel, mounted on 6415 Quick-Way carrier, helps dig out Colorado highways after the recent disastrous dust storms. Shown here cleaning ditches along U. S. 50, east of Pueblo, this unit is one of many used by highway departments such as Colorado and other states for maintenance work requiring mobility, versatility, and speed. **Quick-Way Truck Shovel Co.**, 2401 E. 40th Ave., Denver, Colo.



EARTHMOVING—*31 tons of rock on long hauls at 26.6 mph.*

The Athey PR21 rear-dump trailer, teaming with the Caterpillar DW21, is designed for profit on the tough long hauls. Capacity is 31 tons, or 22½ yd. With its short wheelbase, non-stop turns can be made in 34 ft. (or 27 ft. with body up.) The 14 x 9-ft. top opening, and 9½-ft. average loading height, provide an easy target for loading equipment. The triple-ply body bottom (¾-in. steel top plate, heavy plank filler, ¾-in. lower plate) takes shock and wear. Any material is dumped in 18 seconds, with the body tilting 60 deg., wheelbase shortening while dumping, and safety cable preventing overtilting. **Athey Products Corp.**, Chicago 28, Ill.

Tops For Maintenance!

**Only *one* Tractor
Does *all* The Job!**



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Loader Attachment!

1395⁰⁰

**FOB PUEBLO FOR
D4 - TD9 - HD5**

RUMAC is changed in Minutes—Five to Ten—and
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Fully Guaranteed. Patent Pending.

—RUMAC—
MANUFACTURING COMPANY

P. O. Box 655

Pueblo, Colorado

TRENCHING—Narrow shoulders and slopes no problem for this offset unit



The Gar Wood-Buckeye Model 306 ditcher was designed for digging trench for roadside drainage where narrow shoulders and sloping banks, as well as other obstacles, prevent standard ditchers from operating. The ditcher has an offset digging wheel frame which allows the wheel to be positioned to the left or right of center to dig trench in line with the outside edge of the machine's crawlers. Digging range is 5 ft. 6 in. deep and 24 in. wide. **Gar Wood Industries, Inc., Wayne, Mich.**

PAVING—Vibratory screeds adjust to required length



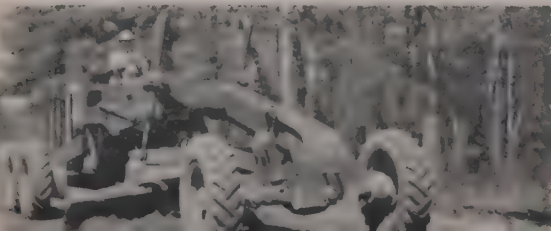
A line of collapsing vibratory screeds is available in three sizes, 14 ft. 6 in., 22 ft., and 33 ft. All are quickly adjustable to any length within their range in 6-in. increments. The advantage of telescoping to the center is that it eliminates beam end overhang and damage to forms and allows screed to operate against existing walls or obstructions. Beam sag is minimized. Adjustment of screeding, surface is possible to $\frac{3}{8}$ in. above or below forms, allowing for maximum flotation of fines. **Creative Metals Corp., 1290 Powell St., Emeryville 8, Calif.**

BITUMINOUS SURFACING—No adjustment for any length of spraybar

This Rosco unit will maintain nozzle discharge through any length of spraybar from 1 to 24 ft. without changing pressure and without any application adjustment whatever. A single lever pressure metering master valve has within it an adjustable by-pass valve requiring only one setting at the specified pounds pressure required for the job. The valve automatically compensates for volume variations of material pumped and maintains the pressure and discharge over the entire length of spraybar. Under this built-in pressure control, bitumen is applied without need of pump metering and discharge need not be measured in relation to pump revolutions. **Rosco Manufacturing Co., 3118 Snelling Ave., Minneapolis 6, Minn.**



GRADING—Torque converter drive for the Austin-Western Super 88

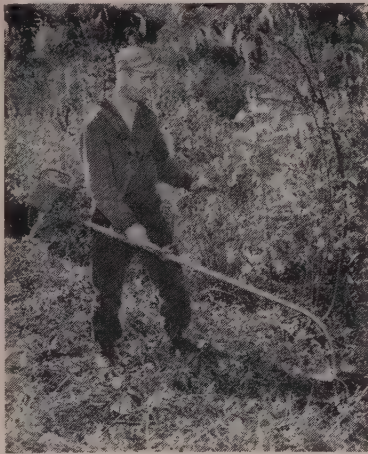


Austin-Western has announced the addition of a torque converter drive as optional equipment for its Super 88 power grader. Smoother transmission of power, no shocks, and no overloads are big benefits. With "shifting" automatic, operator fatigue is reduced. Torque converter drives will be available on all other models soon. **Austin-Western Co., Aurora, Ill.**



CONCRETE BATCHING—Exact control of aggregate and cement in portable Heltzel plant

This Heltzel plant will batch three spread types of aggregate plus cement, weighing out the exact proportion of each accurately and rapidly. Note that the aggregates are loaded into the bin by a crane with a clam-shell bucket. Cement is loaded into a sealed compartment by a bucket elevator. Cement comes from a hopper (out of picture) through a screw conveyor (lower right) into the elevator which carries it into the sealed compartment. Plant goes together like an erector set: can be dismantled and carried to a new location by a contractor's existing equipment. **The Heltzel Steel Form & Iron Co., 3400 Thomas Road, Warren, Ohio**



CLEARING — Combination chain saw and brush cutter

Homelite chain saw owners can now convert their Model 17 saws into clearing units. A new clearing attachment—that takes only a few minutes to put on—enables the operator to fell, buck, and limb all small trees and saplings. One man can keep three busy clearing up limbs and piling brush. A brush cutting attachment (pictured) permits fast clearing of fields, roadways, and other overgrown areas. A flexible shaft delivers the 3.5 hp. to a 10-in. blade. Only a feather touch is required to guide the saw in a scything arc at hard-to-get-at places around obstructions. **Homelite Corp.**, Port Chester, N. Y.



BITUMINOUS MIXING— Self-contained mixer takes 7 tons hot, and 12 tons cold

Littleford's Model 700 Trail-O-Patcher has a capacity of 7 tons of hot-mix or 12 tons of cold-mix. It boasts its own bitumen metering system, aggregate drying compartment, and heated 200-gal. bitumen tank. Twin pugmills are heat insulated with a drying capacity of a rotary dryer 24-in. diameter by 84-in. long. An all weather mixer, machine is designed for maintenance and repair on roads, streets, highways. **Littleford Bros., Inc.**, Cincinnati, Ohio



CRUSHING—Highly portable plant for non-graded material

For producing crushed gravel or rock where the finished product does not have to be graded, try the new Cedarapids "Corporal." The portable unit has a 14- x 24-in. roller bearing jaw crusher, an 18-in. x 23-ft. 3-in. delivery conveyor, and a choice of power unit, all mounted on a gooseneck trailer. Capacity varies depending on type of material, moisture, size of finished product, and breaking characteristics, but under proper operating conditions the crusher can produce 27 tons per hr. of 1½-in. material with 95% crushing. Optional equipment includes air brakes on rear wheels, engine service platform, and screw-type jack supports. **Iowa Manufacturing Co.**, 916 16th St. NE, Cedar Rapids, Ia.

EXCAVATING—No lagging changes needed in converting this crane shovel

Convertibility of front-end equipment in the field without lagging changes is one of the design features of the Marion-Osgood-General 43-M, a 1-cu. yd. shovel. An independent boom hoist and air control are standard equipment. The 43-M is a 1½-cu. yd. dragline, a 20-ton lifting crane and is widely used for clamshell, pile driver, backhoe, concrete bucket, drop ball, and log loading service. It is offered with a choice of three internal combustion power units with or



without torque converter, plus electric power for standard AC and DC voltages up to 550. Independent propel is optionally available. **Marion-Osgood-General**, Marion, Ohio

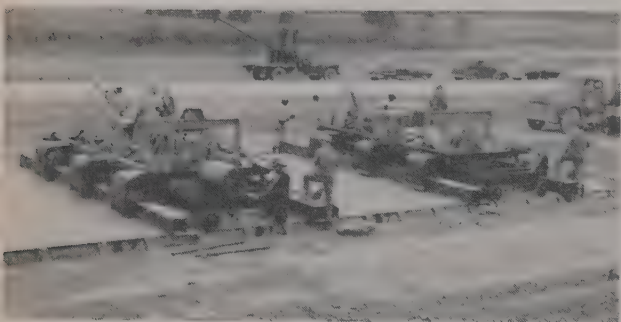
TRACTOR—Big-capacity HD-21 slashes at unit costs

For jobs that need big tractor power, Allis-Chalmers introduced in February the HD-21 diesel-powered, torque converter crawler—a 44,000-lb. unit developing 204 hp. at the fly-wheel. For greater work capacity, smooth operation, clean and complete combustion, and long engine life, the tractor's power plant produces a new kind of "follow-through" combustion giving higher sustained working pressure at the most favorable crankshaft angles. The torque converter-engine-transmission power team provides extra speed with any load, extra pulling power at any speed, and a wider range of speeds with more range overlap, permitting the tractor to work with less shifting than ever before possible. Special heat treating

process makes the heavier trucks wear longer. Cost of tractor-dozzer combinations are reduced through the new "wrap-around" radiator guard which permits hydraulic ram or cable-lift sheaves to mount directly on the new guard. **Allis-Chalmers Mfg. Co.**, Milwaukee 1.



FINISHING—One machine covers all standard paving widths, converts into trailer



The Flex-Plane Detroit Special Finishing Machine is shown at work on a major freeway job. The Flex-Plane machine is built in a size that permits one machine to cover all standard paving widths. Both screeds are carried outside the frame for easy maintenance, and are completely telescopic. The extra expanse between screeds gives the slab surface a high quality finish because it enables the concrete to settle one-third longer before the second screed makes its pass. Retractable transportation wheels make it possible for the machine to be converted into its own trailer by simply moving a lever. It can then be towed away to the next pour by any truck that has a standard hitch. **The Flexible Road Joint Machine Co., 3400 Thomas Road, Warren, Ohio**

LOADING— $\frac{3}{4}$ -yd. Terraload'r has unique powerized bucket



Introduced this past winter, American Tractor's new "500" Terraload'r with the unusual $\frac{3}{4}$ -yd. shovel bucket pictured has many improvements to cut excavating, backfilling, and materials handling costs. The firm also manufactures loading buckets in $\frac{1}{8}$ -, $\frac{1}{2}$ -, and $\frac{5}{8}$ -yd. sizes, as well as a complete line of bulldozers, angling dozers, scarifiers, backhoes, and hydraulic hitches to fit four tractor models ranging from 26 to 30 drawbar hp. **American Tractor Corp., Churubusco, Ind.**



BITUMINOUS MIXING—Batch-type plant will produce 60 tph.

The new Cedarapids H-15 plant has a capacity range of 35 to 60 tons per hr., depending upon job specifications. The pugmill mixer has a capacity of 15 cu. ft. The H-15 is a stack-up, tower-type plant consisting of a hot elevator, screen and bin section, batcher and mixer section, bitumen pump, jacketed piping and valves, stairway, platform, controls and drives. All gates and valves are operated manually through mechanical linkage, except mixer discharge gate which has a hydraulic cylinder. Optional equipment includes mineral filler attachment and electric timing and locking device. **Iowa Manufacturing Co., 916 10th St. N.E., Cedar Rapids, Ia.**



TRUCK—Only 2% downtime with Oshkosh tractors

Moving heavy tonnages of material on tight schedules really pays off when the downtime is only 2% on daily 16-hr. shifts. Other advantages of this Model W-2206 pulling a 35-ton trailer are that the 4-wheel drive increases tire life by 50 to 100% as compared to rear-wheel drive, and that there is no scuffing with resulting power loss when turning. **Oshkosh Motor Truck, Inc., 2300 Oregon St., Oshkosh, Wis.**

EXCAVATING—New American shovel is what users wanted: maintenance is a cinch



Available as a crane (capacity 45 tons), dragline (pulls 2-yd. bucket), or backhoe or shovel (rated at $1\frac{1}{2}$ yards), the new American 700 Series was designed from specs submitted by owners and operators throughout the U. S. That's why easy maintenance is built-in: lubrication fittings are banked in easy-to-reach spots; multiple tooth involute splines make disassembly and assembly simple; every horizontal shaft assembly can be removed without disturbing another; all machinery is arranged to allow ample space inside cab for routine inspection. **American Hoist & Derrick Co., St. Paul 1, Minn.**

Shoring Methods . . .

by Patent Scaffolding Co.

THREE ACCURATE WAYS to speed work with quickly assembled, prefabricated steel units to support forms for poured concrete are helping more and more contractors to gain substantial savings in building time and costs. Equipment for these three methods that will meet various requirements for any type of concrete construction is sold or rented by The Patent Scaffolding Co., Inc.

"Trouble Saver"® Sectional Shoring Adaptable to flat slab, flat slab with drop heads, pan joist and beam construction. Basic section is erected from 5 ft.-wide steel end frames varying in height from 3 ft. to 6 ft., 6 in. "Trouble Saver" Shoring gives safe working loads up to 509 lbs. per sq. ft. with a safety factor of 3. Safe working loads vary according to the spacing between frames and between rows of frames. 20" adjustable legs permit quick, accurate adjustment without the need of cutting, fitting and wedging.

"TubeLox"® Shoring—This tube-and-coupler type shoring is ideal for meeting unusual job conditions such as extreme heights, uneven terrain and odd shapes or levels. Consists basically of 6, 8, 10 and 13 ft.-long interlocking steel tubes used with couplers and bases.

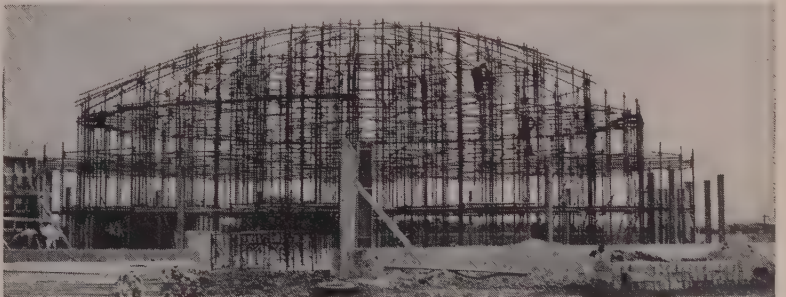
Burton Shores—A safe, sturdy single steel shore that is easily carried, erected and adjusted by one man. Rough adjustments are made by placing steel pin in adjusting holes; close adjustments with 8" long handle. Available in four sizes to provide working heights from 5 ft., 7 in. to 16 ft. Safe working capacities up to 14,500 lbs. with a safety factor of 3.

Free Bulletin—Detailed information on modern shoring for concrete construction can be found in Bulletin PSS-33, available at no obligation from Patent Scaffolding Co. Features on-the-job photos, safe-load charts and installation diagrams.

Builders Supply & Equipment Co. Bakersfield, Calif.
Squires-Belt Material Co. 12th and L Streets, San Diego 12, Calif.
Contractors Service Co. 221 W. Colorado Street, Las Vegas, Nev.
Sierra Machinery Co., Inc. 2211 S. 19th Avenue, Reno, Nev.
Hansen Lime & Stucco Co. 1574 S.W. Temple Street, Salt Lake City, Utah
Superior Equipment Co. 2221 S. 19th Ave., Phoenix, Ariz.
Contractors Equipment & Supply Co. 707 N. Broadway, Albuquerque, N. M.
The United Materials 814 West 14th St., Denver, Colorado
Allied Industries, Inc. 1028 E. 1st St., Spokane, Wash.
Lumbermen's Supply Co. 1222 E. McGaffey, Roswell N. M.



EXTRA HEADROOM for workmen nailing pan joist in place after joist bottoms are installed is provided by inverted 20" extension legs and base plates, found normally at foot of "Trouble Saver" Shoring. General Contractor Lindgren and Swinerton, Inc., uses this sectional steel shoring on Wilson Office Building, Los Angeles.



ROTUND CONTOUR of new National Guard Armory at Lawton, Okla., sloping from 37' high at the center to 16' at the edge, is easily handled with versatile "TubeLox" Shoring. Frederickson and Parks Construction Co. of Oklahoma City used 20,000 ft. of this tube-and-coupler type shoring which is ideal for such unusual job conditions.



SINGLE POST Burton Shores support forms for 4" to 7½"-thick floor slabs on two-story building at Beard School, Orange, N. J. Raised to 9 ft. here, this single post shore is available in sizes permitting working heights to 16 ft. The Fatzler Co., Inc., general contractor, is using 1,250 Shores on this job.

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Los Angeles 1, California
Phone: Pleasant 2-2571

420 Eighth Avenue, N.
Seattle, Washington
Phone: Seneca 7142

WHAT'S AVAILABLE



TRACTOR—HD-16 provides bigger drawbar pull power

The 31,500-lb. Allis-Chalmers HD-16, a completely new crawler tractor announced in April, is available with torque converter drive or standard transmission. Powered by a new 6-cylinder engine developing 150 hp. at 1,800 rpm., maximum drawbar pull of 60,000 lb. is obtained with torque converter drive, and 31,700 lb. with standard transmission. Under overload, the engine torque increases, resulting in additional drawbar pulls at reduced travel speed. Like its big brother, the HD-21, the HD-16 has the new "wrap-around" radiator guard which reduces the cost of tractor-dozzer packages. A new line of matched equipment has been designed especially for the HD-16, including dozers, shovels, scrapers, power control units, and sideboom. Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.



PAVING—Heltzel forms give solid support

Single stake is made of rerolled railroad rail hardened to penetrate rock where necessary. With an air hammer, operator can align and set forms fast. Each form section has five supporting braces to provide plenty of support. The Heltzel Superior Form is available in the standard flange type, or with upturned flange for even more strength. The Heltzel Steel Form & Iron Co., 3400 Thomas Road, Warren, Ohio



BITUMINOUS SURFACING—Jaeger spreader handles base and top course economically

This Jaeger Self-Propelled Aggregate Spreader is laying a 3-in. top course of hot mix on a traffic-compacted base of broken stone previously laid by the same machine. Shovelers are sprinkling loose material to improve skid resistance. Midway in cost between ordinary spreader boxes and expensive bituminous pavers, this type of spreader has proved well adapted for laying highway and airport base and both base and top of secondary roads, parking areas and drives. All types of stone, macadam, and graded aggregates, plant mixed stabilized soil and free floating hot or cold bituminous materials are handled, in widths to 12½ ft., thicknesses to 12 in. On crawlers (or 4 driven wheels if desired on smaller model) the machines have traction to push largest material trucks and capacity to lay materials as fast as trucks can deliver. Accurate strike-off is obtained by carrying the strike-off on long independent runners which "float" on the subgrade. The Jaeger Machine Co., Columbus, Ohio.



EXCAVATING—4-cu. yd. diesel shovel with electric swing

The 111-M 4-cu. yd. shovel makes available the advantages of electric swing on a basically diesel type machine. The diesel power unit operates the machinery in a conventional manner through air controls except for the swing motions which are powered by a generator driven by the power unit. Provision has been made for a minimum of preparation of the machine for rail shipment. The basic machine rides on one car, the crawler side frames and boom on another. Marion-Osgood-General, Marion, Ohio

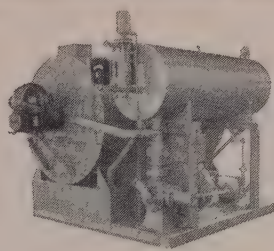


LOADING—Clark provides a size for every job

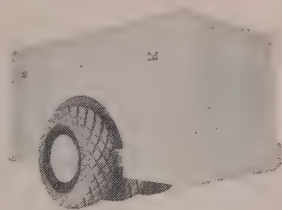
For loading gravel into a truck at a county pit, for stripping top-soil, for loading blended top-soil, for special cut-and-fill, or for casting dirt off right-of-way (pictured)—Clark's new tractor shovels are available in capacities from 15 cu. ft. up to 2¼ cu. yd. Each of the six models in the line feature: short turning radius, 4 forward and 4 reverse speeds, power-operated gear selection (no conventional clutch), hydraulic steering booster, easy servicing features, easy parts interchangeability. Clark Equipment Co., Construction Machinery Div., Benton Harbor, Mich.



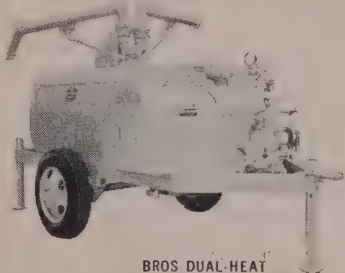
BROS SELF-PROPELLED ROLLER



BROS HOT OIL HEATER



BROS 100-TON ROLL-O-PACTOR



BROS DUAL-HEAT



BROS 13-TON ROLLER



BROS CIRCULATOR & HEATER

Why settle for less than the Best?



Compaction Equipment

Self-Propelled Roller for seal coat, resurfacing and standard lift compaction jobs. Oscillation of all wheel pairs and 50 hp engine in this new BROS roller provide more tractive effort than any comparable roller. Torque converter drive, shuttle 3-speed transmission and high angle turn-around provide faster, surer handling.

35, 50 and 100-ton Rollers for "super-load" compaction. Big jobs like air fields, dams and super highways reach required compaction densities in fewer passes by these pioneers of *deep compaction* — giant BROS Roll-O-Pactors. Work in speeds up to 15 mph.

9 and 13-ton Rollers for base course compaction. These models are available in either straight wheel or the Wobble-Wheel design . . . which adds side-to-side weaving motion to the up and down oscillating axle motion of each wheel. Overlap of wide face tires actually provide full coverage in one pass.

Sheepsfoot and Diamondfoot Tamping Rollers for heavy earth work on embankments, etc. Models available from 2½ to 15½ tons when loaded with ballast. Special relief shank of feet provide easier withdrawal from clayey soils. Worn tips are easily replaced right on the job — *without welding* — by patented removable Tamprite tips.



Bituminous Equipment

Hot Oil Heater for asphalt circulation. This recent addition to the BROS Bituminous line transfers heat 60 per cent faster than steam when used with proper accessory equipment. Keeps heating oil moving fast under accurate control at all times. It's the finest entirely automatic unit available; performance output is governed by the turning of a knob.

Asphalt Circulator and Heater for high temperature asphalt heating and pumping beyond the range of steam. It has 4 distinct pumping speeds and wide heat transfer range. It raises temperature of 10,000 gals. of asphalt 40 to 50 degrees per hour after circulation starts. Semi-trailer and skid-mounted units available.

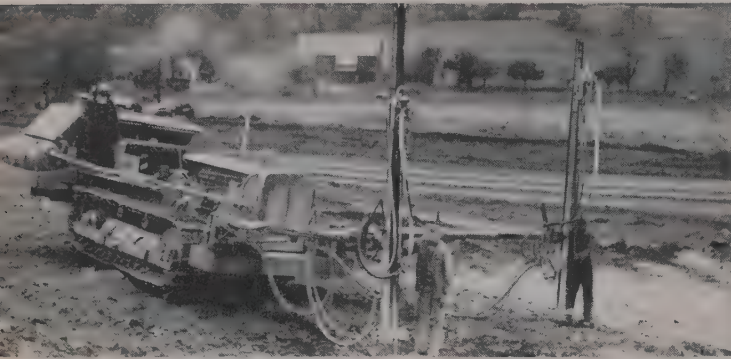
Dual-Heat for asphalt heating, circulating and pumping. A favorite with state highway departments, it quickly provides hot dry steam to "crack" hard-to-start bitumens of all grades. It can unload one car while heating another. Peak efficiency and positive operation under any job conditions.

For complete information on these products, see your nearest Bros distributor or write for literature. Then you'll readily understand why BROS IS THE BEST!

ROAD MACHINERY DIVISION

WM. BROS BOILER & MANUFACTURING CO.

1057 Tenth Avenue S.E. — Minneapolis 14, Minnesota



DRILLING—Real flexibility for highway rock excavation

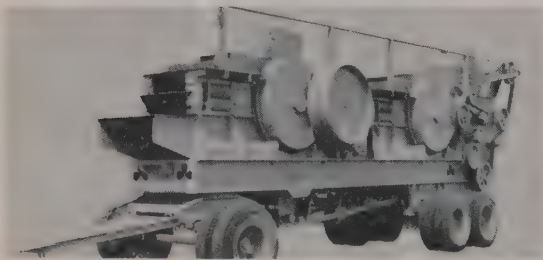
A great many holes can be drilled from one set-up without moving this Ingersoll-Rand Hydra-Boom rig. Shown are the Hydra-Booms with X71 wagon drill towers attached to a crawler on a highway excavation job. The Ingersoll-Rand Gyro-Flo 600 Rotary Compressor, mounted on the tractor, supplies the necessary operating air. The maneuverability and self-contained feature of this rig make it a time saver on almost any rock excavation. The short piping from the compressor to the drills increases efficiency by eliminating leaks and air line friction losses. When the booms are spread apart to their maximum opening, it is possible to drill holes on approximately 22-ft. centers. **Ingersoll-Rand Co., Phillipsburg, N. J.**



BITUMINOUS HEATING—Four times as fast as steam

The Bituminous Booster is a unit used to heat bituminous or other viscous material by means of circulating this material around a direct fired heat exchanger. It is a fast and inexpensive method of heating bituminous materials to high temperatures far beyond the possibilities of steam. More heat released by the fuel burned is transferred into the materials being heated. Available in two sizes, either skid or trailer mounted. Pictured: a distributor using the unit to load and heat oil. **Cleaver-Brooks Co., Milwaukee 12, Wis.**

CRUSHING AND SCREENING—High-production portable crusher is a cinch to move



The difficulty of staying within highway load limits when moving portable crushers has been overcome with the HK Imperial crusher. It is designed so it can be reduced to legal axle weights in 45 min., and can be reassembled in about the same time. The plant consists of a primary and secondary unit with a two-deck 36-in. scalping screen, two 40 x 24 roll crushers, a 3-x-8-ft. screen directly under the screens that receives the finished product to be delivered to bin conveyor. **Flaherty Mfg., Inc., Pocatello, Ida.**

CONCRETE BATCHING—Noble-Mobile batch plant for "on-the-job" concrete

To do away with long hauls of transit-mix concrete, this new portable batch plant offers good capacity production that can be set up easily on that remote job. Here are some of its outstanding advantages: 28-ton, 3-compartment bin—1,000-cu. ft. bulk cement storage capacity—stationary 2-yd. batcher for one-stop truck loading—can be made fully automatic for batching—puts out 60 cu. yd. of concrete per hr.—designed for quick assembly and dismantling on only two over-the-road units, a trailer and a flatbed truck. **Noble Co., 1860 Seventh St., Oakland 20, Calif.**

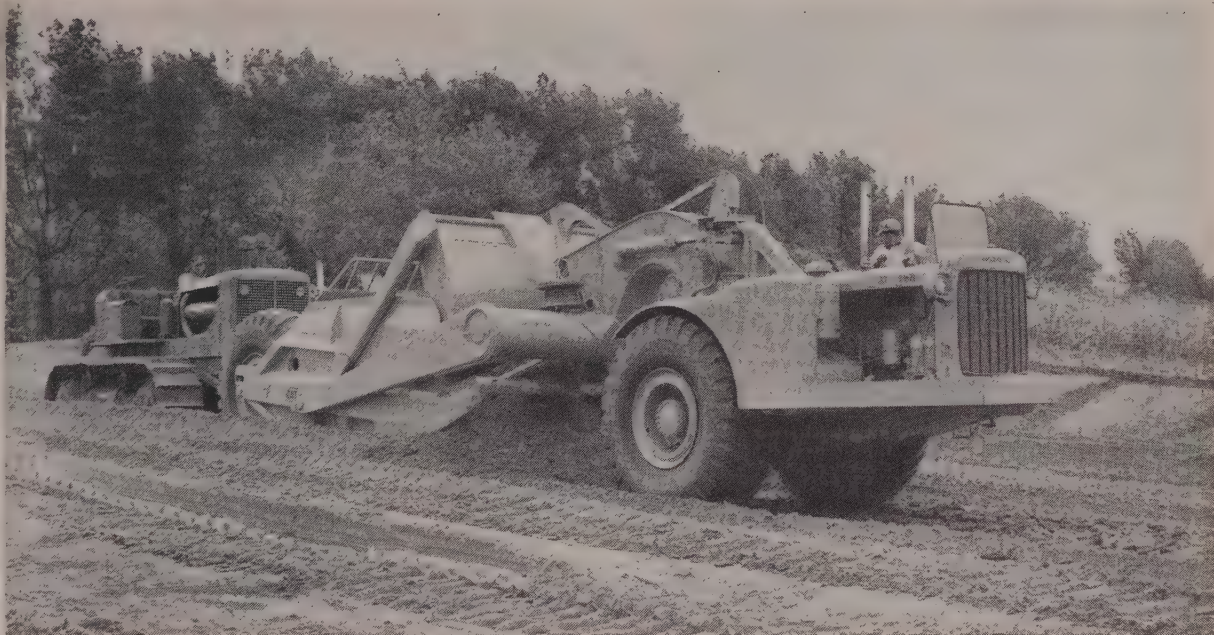


COMPRESSOR—Mobile, dependable air supply with CP Rotaries

With air demands in highway construction jobs subject to constant variance, the battery of Chicago Pneumatic "Power Vane" Rotaries pictured provides air combinations that can be varied to meet air demands and to provide a dependable supply of air power that's ready to go anywhere. CP Rotaries are available in capacities from 125 to 900 cfm. **Chicago Pneumatic Tool Co., 6 East 44th St., New York 17.**



LOAD..MOVE..and FILL at LOWER COST



with **Firestone** NYLON TIRES

FIRESTONE Nylon Off-The-Highway Tires are built to move more loads at lower cost. For any tough operation . . . earth moving, strip mining or rock work, Firestone has a nylon tire that will cut downtime and maintenance costs and keep men and equipment on the job.

It costs you less to run on Firestone Nylon Tires because the treads give maximum traction and they are extra tough to resist

*T.M. Reg. U.S. Pat. Off.

cutting. The sidewalls are double thick to give added protection against cuts and snags. The new Firestone Safety-Tensioned Gum-Dipped* nylon cord body gives the greatest protection against impact breaks . . . flex breaks . . . heat failures . . . and water damage.

Your Firestone Dealer or Store can show you how Firestone Nylon Tires will cut your tire costs.



A TIRE FOR EVERY ROAD, LOAD AND CONDITION OF SERVICE

GROUND GRIP • ROCK GRIP • TRACTION ROCK • ALL NON-SKID • ALL TRACTION • RIB EXCAVATOR

When you buy new equipment or replacement tires, specify Firestone

Enjoy the Voice of Firestone on radio or television every Monday evening over ABC

Copyright 1955, The Firestone Tire & Rubber Co.



COMPACTION—No cross rolling needed with Galion 3-axle tandem rollers

The Galion 3-axle tandem rollers can be operated with the rear guide roll locked or unlocked. With rear roll locked all rolls remain in the same plane, thus concentrating weight on any high spot on the surface. Torque converter drive automatically multiplies engine power in proportion to work need. No gear shift mechanism is required. Forward or reverse speeds are variable from 0.8 to 5.5 mph. A governor maintains any set speed. Wheelbase is 17 ft. 5 in.; net weight fully ballasted is 40,065 lb. Galion Iron Works & Mfg. Co., Galion, Ohio

TRUCK—Mack B-42S chassis mounts load-forward mixers



Intended primarily for conventional loading conditions with dump bodies and concrete mixer units, this 6-wheeled, 4-wheel drive chassis provides optional variations making it possible to mount upon it newly designed load-forward mixers. For this adaptation heavier front axles and steering equipment are available to handle the greater front-end loading. Transmission recommendation for the dumper and mixer service is either the TRDX wide range, 10-speed or the combination of the five-speed direct with the three-speed auxiliary—with selective, constant mesh in each case. Mack Trucks, Inc., 350 Fifth Ave., New York 1, N. Y.

BITUMINOUS SURFACING—Blaw-Knox Paver-Finisher handles any mix

The new rubber-mounted Paver-Finisher is designed to handle any type of asphaltic or tar mix, whether hot or cold, and either sand mixes or the coarser mixes involving heavy aggregate. The unit has also been used successfully in paving pugmill-mixed lean cement content mixture. It is shown in action on a 4-mi. resurfacing job, requiring two 9-ft. courses of bituminous surface mix to depth of 1½ in. before compaction. Entire job was completed by the new machine in working time of 16½ hours (2,766 tons of mix laid at rate of 2.75 tons per min., at clocked speeds exceeding 50 ft. per min. for the entire job). Blaw-Knox, Construction Equipment Division, Pittsburgh 38, Pa.



LOADING & SCREENING—Kolman provides complete unit at low cost

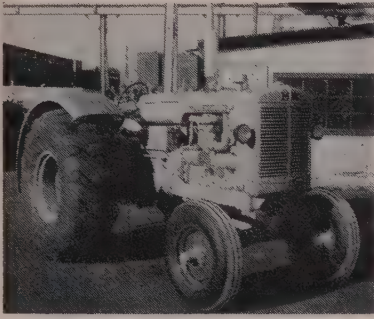
The Model 202 Kolman "Junior" conveyor-screen plant is designed to meet the needs of a small contractor or city and county departments who need a complete gravel loading and screening unit at low cost. The box type construction of this conveyor provides the strength necessary to carry both a vibrating screen and a dozer trap or casting hopper. Kolman Manufacturing Co., West 12th St. Road, Sioux Falls, S. Dak.



EXCAVATING—Long-lasting, labor-saving Little Giants

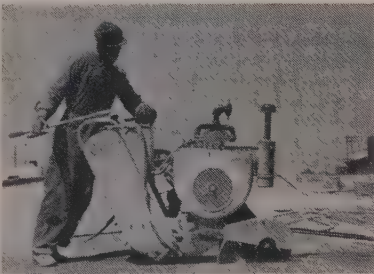
Patented ball bearing turntable eliminates hook rollers and center pins in Little Giant's new cranes, covering the 1/3-, ½- and ¾-yd. fields. Swinging ease is an outstanding feature and patented clutches offer simple, easy adjustment. Shaffer's Concavex self aligning roller bearing cart-ridges are precision fit in all drums and rigidly support drum shafts. Lubricated and sealed with a life expectancy of 15,000 hours. Little Giant Crane & Shovel, Inc., E. 16th & Howard Drive, Des Moines 13, Iowa.

WHAT'S AVAILABLE



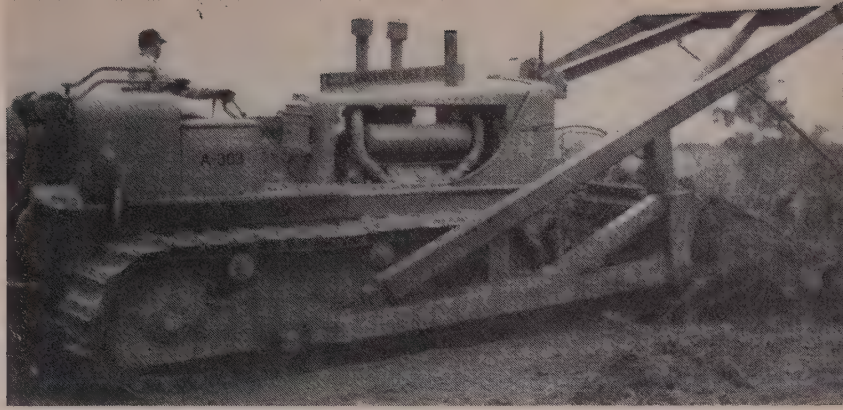
TRACTOR—Minneapolis-Moline introduces the versatile GB

Highly adaptable for drawbar work, the model GB industrial tractor is also suited for use with pneumatic rollers in highway compaction jobs. It is available with either gasoline or diesel engines. The tractor has a two-plate dry clutch. The gasoline GB develops 61 hp. and the diesel 56 hp. at the drawbar. Total weight of the gasoline model is 6,885 lb., the diesel 7,550 lb. **Minneapolis-Moline Co.**, Industrial Division, Minneapolis 1, Minn.



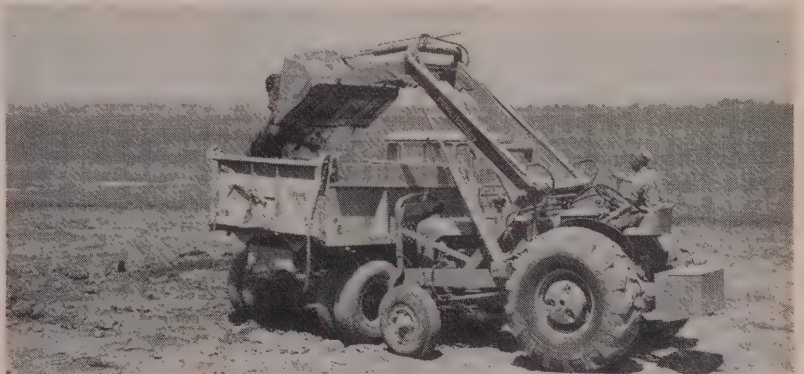
CONCRETE CUTTING—Contraction joints at 12 ft. per min.

The Clipper C-250 concrete saw is shown cutting contraction joints in green concrete. The saw is propelled at any rate up to 12 ft. per min., drawing its power from a 25-hp. engine. With 4 wheels and a pivoting front axle, the blade remains straight in the cut even on rough surfaces. You have fingertip control of the cutting depth at all times. The dashboard controls include positive screw feed, cutting depth lock, cutting depth gage, and water valve. There are seven models of the Clipper saw, priced from \$395. **The Clipper Manufacturing Co.**, 2800 Warwick, Kansas City 8, Mo.



CLEARING—Entire trees out in one continuous operation

Removing entire trees in one operation is claimed for this Rockland Tree-Knockdown Boom. The removable boom, which may be attached to any bulldozer blade or to a Rockland Rake, extends about 6 ft. forward of the rake or blade with the cutting edge of the boom about 10 ft. above the ground. As the tractor is driven forward the boom encounters the trunk of the tree, bending it forward. The rake or blade then uproots the base of the tree. In line with the need for more economical clearing costs on the expanding highway program, this unit clears a complete swath in one continuous operation. **Rockland Allied Equipment Co.**, 3778 West Colonial Drive, Orlando, Fla.



LOADING—Case Powerloader has reach and speed

With bucket capacity of 1 yd., the Powerloader is balanced for digging and loading operations of all kinds. Big tires, front and rear, assure maximum traction and flotation. Unique toggle action on the bucket provides automatic crowd, automatic tilt as the bucket lifts. The bucket clears 10½ ft. in 10 seconds, with plenty of reach for end-loading of trucks. **J. I. Case Co.**, Racine, Wis.

TRENCHING—Curb footing trench in one fast pass

Clevelands cut trench in one fast pass, enabling contractors to keep all phases of the jobs up close. Truck loading is facilitated by a quick-shift reversible conveyor providing two-directional dirt disposal. Accurate control of grade and depth is maintained by a dual-pivoted grade indicator. A wide range of digging wheel and crawler speed combinations, under fingertip control, provides correct power and speed combination for every type of trenching job. **Cleveland Trencher Co.**, Cleveland 17, Ohio





LOADING—Force-feed loading of 10 cu. yd. per min.

The new 7-11 Athey force-feed loader gives a steady loading production of 10 cu. yd. per min., convertible for stockpile-windrow loading (has bulldozer-type moldboard, auger flights turn material into feeder, sideboards may be reversed for conversion from windrow to stockpile work), or for heavy-duty windrow loading (has two grader-type tapered moldboards, toe and heel adjustments to allow for matching contour or road.) Powered by a 101-hp., 6-cyl. engine; has 8 forward and 2 reverse speeds. **Athey Products Corp.**, Chicago 38, Ill.



EXCAVATING—Utility unit travels fast, increases output

UC-68 is a new self-propelled, one-man operated, rubber-tired utility model. Featuring Link-Belt's exclusive Speed-o-Matic power hydraulic control system, its operation is as effortless as possible. Reduction of operator fatigue and minimum on-the-job clutch adjustments have resulted in output increases ranging up to 25% or more. UC-68 travels from job-to-job at speeds of up to 7 mph. It lifts, stockpiles, digs, sets steel, and performs numerous other jobs around the yard or on the job. **Link-Belt Speeder Corp.**, 307 North Michigan Ave., Chicago, Ill.

BITUMINOUS MIXING—Cummer plant guarantees 80-100 tons per hour



Cummer semi-portable asphalt plants, like the one pictured here in an actual installation, have 80-100 tons per hour guaranteed capacity (based on 5% initial water content dried to within 1/2 of 1% and heated to 350°-400°F.). They are "batch" type for perfectly controlled mix throughout, and are designed for electric power. Shafting, sprockets, chains, and belt drives are eliminated because each drive is equipped with individual motor or gear motor. Combustion is by means of gas or oil using high pressure steam or low pressure air as the atomizing agent. Storage tanks, jackets, etc. may be heated by steam, hot oil, or electrically. Cummer plants are engineered to the specific requirements of the individual asphalt plant operator. **The F. D. Cummer & Son Co.**, Cleveland 14, Ohio

PAVING—Production paving at low yardage cost

The Rex 34E Double Drum Paver is designed to handle the whole paving job from the dumping of the batch into the skip to spreading the concrete on the subgrade. It is guaranteed to hold and properly mix 37.4 cu. ft. of concrete on a maximum grade of 6%. Two travel speeds are provided—102 ft. per min. and 147 ft. per min. Outstanding design feature is the Rex Hydrocycle Control—all the operator has to do is set the batchmeter for the proper time; then "Hydrocycle" takes over and operates the entire cycle. At any time the operator can cut into the cycle and take over operation by hand. **Chain Belt Co.**, Milwaukee 1, Wis.



EARTHMOVING—Dependable buckets for moving that gravel

When it comes to loading and unloading the maximum amount of aggregate with dependable equipment, Owen buckets—such as the 2-yd. clamshell in action here—are available in a variety of sizes and designs to suit your job. **Owen Bucket Co.**, 59 and Breakwater, Cleveland, Ohio



BIG TOUGH, and DEPENDABLE

FRUEHAUF'S COMPLETE LINE OF HEAVY-DUTY CARRYALLS

ON OR OFF THE ROAD, these Fruehauf "work-horses" handle the big jobs quickly and easily. Built in standard capacities from 10 to 75 tons, with specials custom-built for loads up to 100 tons, there is a Fruehauf Carryall for every type of heavy hauling operation.

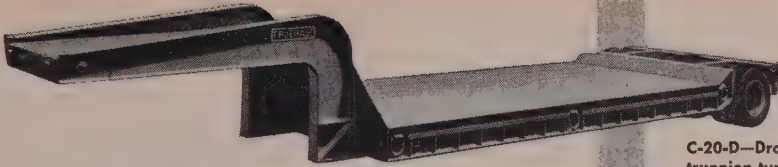
Every unit is ruggedly constructed, with extra-strong, structural steel frames and thick, heavy-duty hardwood platforms, to give a lifetime of dependable service under the roughest field conditions. Scientifically designed by the industry's most experienced Carryall engineers, Fruehauf Carryalls feature an exceptionally low loading height and low center of gravity. These advantages, among many others, insure the greatest ease and safety in direct, immediate transportation of heavy machinery and large installations.

The Fruehauf nameplate on these giants of the industry also means the quick availability of parts and service whenever and wherever you need them—all during the long life of your unit. There are *no orphans* in the Fruehauf family. The Fruehauf name stands behind every Fruehauf Trailer sold.

SOME UNITS CONTINUALLY IN STOCK FOR IMMEDIATE DELIVERY!

FRUEHAUF TRAILERS

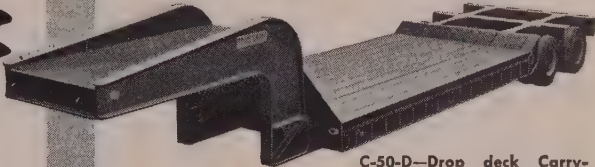
"ENGINEERED TRANSPORTATION"



C-20-D—Drop deck Carryall with trunnion-type axles. For loads up to 20 tons.



C-25-L—Level deck Carryall with tandem walking-beam. For loads up to 25 tons.



C-50-D—Drop deck Carryall with trunnion-type rocking beam. For loads up to 50 tons.



C-60-D—Drop deck Carryall with trunnion-type rocking beam. For loads up to 60 tons.



C-75-D—Drop deck Carryall with trunnion-type rocking beam. For loads up to 75 tons.

World's Largest Builder of Truck-Trailers

FRUEHAUF TRAILER COMPANY

5137 S. Boyle, Los Angeles 58, Calif.

- ☐ Please send me additional literature on Fruehauf's complete line of heavy-duty Carryalls.
- ☐ Have a representative call on me with complete specifications and price information.
- ☐ Please send completely illustrated literature on other Fruehauf equipment for my operation.

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COMPANY _____

ADDRESS _____

CITY _____

STATE _____

DRILLING—Rig on tracks for jobs on steep terrain



The Air Trac self-propelled drill carrier consists of a hydraulically actuated T-bar mounted on two crawler treads, each powered by an air motor. Traction developed is sufficient to haul an 11,720-lb. compressor up to 10% grade. The T-bar supports a chain feed and rock drill. Load distribution on the tracks is self-stabilizing even though one track may be tilted up while the other is tilted down. The T-bar swings through a vertical arc of 86 deg., providing accurate line-up for vertical holes, angle holes, or toe holes. **Gardner-Denver Co., Quincy, Ill.**



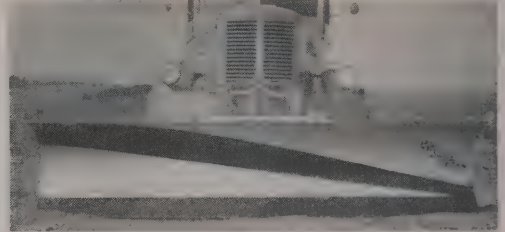
RIPPING—Sharp-pointed teeth take less power in hard ground

Narrow sharp replaceable points on H&L ripper teeth give maximum penetration easily into hard compacted ground, requiring less power with lower maintenance of your bulldozer. Quick-change "Flex Pin" connection makes point changing easy. Heavy housings on the H&L ripper have been eliminated by using a one piece alloy steel heat-treated shank. Weight of the teeth varies from 80 to 275 lb.; digging depth varies from 2 to 12 in. Unit illustrated also has bulldozer corner adapters in place, which pilots ahead of bulldozer, maintain accurate slope in cuts, and cut clearance for bulldozers. Three types of H&L corner adapters are available: to cut $3\frac{1}{4}$ in. below ground level on large bulldozers, to cut $1\frac{1}{2}$ in., and to cut same level as blade. **H&L Tooth Co., 1540 S. Greenwood Ave., Montebello, Calif.**



BITUMINOUS HAULING—Etnyre tanks handle capacity you need

Pictured here is one of the Etnyre line of bituminous hauling tanks manufactured in capacities of 1,000 to 5,000 gal. They may be equipped with tank gage, safety-tread catwalk, access ladder, two manholes, pumping unit, engine, and inside valve operated by handwheel on top of tank. The model shown has a 4,500-gal. tank mounted on a tandem axle semi-trailer with vertical supports and offset tank and frame. **E. D. Etnyre & Co., Oregon, Ill.**



SNOW REMOVAL—No sweating to reverse Wausau snow plow blades

The operator can stay in his cab during a blizzard and use a power reversing mechanism to completely adjust the plow for snow removal conditions. Blades are available to fit a Jeep up to a 12-ton truck or H. D. motor grader. **Wausau Iron Works, Wausau, Wis.**

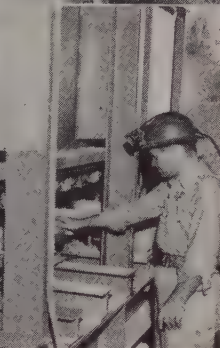
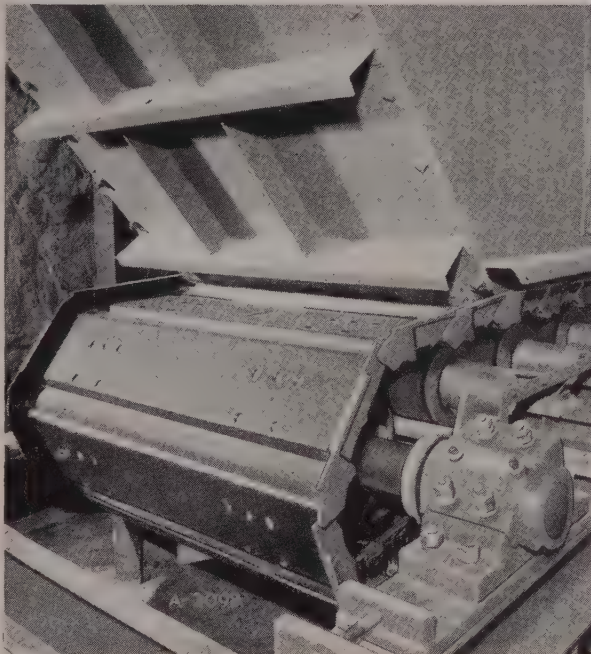
BITUMINOUS SURFACING—One man handles the job with this spreader



One-man hookup and operation is a feature of the "Handy" spreader. The unit has an automatic hitch which allows for truck approach at an angle, with sufficient adjustment to insure leveling of spreader for any size or make of dump truck. An automatic chain and sprocket transmission synchronizes feed roll and agitator with truck speed, and permits forward or reverse spreading without need for manual shifting. When keyboard is closed, transmission automatically assumes neutral position so that agitator operates only when needed. Anything from a powder-fine carpet to 3-in. depth can be spread. **Good Roads Machinery Corp., Minerva, Ohio**

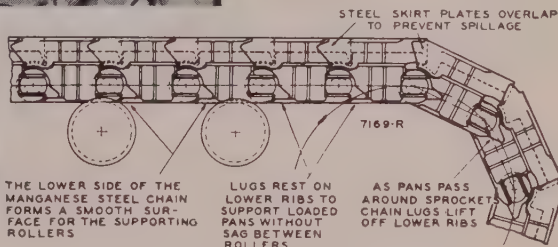
S-A

**"AMSCO"
MANGANESE
FEEDERS**



"AMSCO" Feeders withstand the punishing impact and abrasion of ore loads—often falling many feet—through multi-million ton service. One unit logged over 26-million tons in a seven year period, another has handled 65-million tons in 23 years . . . typical examples of outstanding service in both long life and tonnage.

This "AMSCO" secondary feeder discharges to belt conveyor. An S-A Tel-level control automatically stops the feeder if there is a choke-up.



Elevation of S-A "AMSCO" pans and chain showing knee-action lugs at joints. Lugs permit chain to bend freely around sprockets but prevent sagging between track-rollers, even under load. Bottom of chain forms a smooth surface for the track-rollers.

No Matter How Brutal the Beating, They Come Back for More...MUCH LONGER

Because all wearing parts are made of MANGANESE, the toughest steel known to man

Thousands of tons of ore and rock crash down every day . . . and these smashing, loading impacts continue year after year . . . yet S-A "AMSCO" Feeders unfailingly handle high tonnages from car dumps, primary crushers and loading pockets—feeding to or from scalping screens — meeting every application where feeders must absorb heaviest abrasive punishment . . . with practically no maintenance.

Nothing but Manganese steel will withstand these repeated, punishing impacts, this constant abrasive action . . . that's why in S-A "AMSCO" Feeders,

pans, chains, pins, bushings, track roller, sprocket — in fact *all components subject to wear* — are made of manganese steel . . . and actually become tougher and more abrasion-resistant with repeated shocks.

S-A "AMSCO" Feeders are individually engineered to provide lowest cost-per-ton handling for heaviest-duty applications. Tremendous in size and capacity, they have a life expectancy rated in millions of tons — as proved by their record in mines since 1924.

An S-A engineer will give you complete information — or wire for our Bulletin No. 255.



STEPHENS-ADAMSON MFG. CO.

Factories at Aurora, Illinois • Los Angeles, California • Belleville, Ontario

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

1007 E. Burnside St.
Portland 14, Ore.

151 Mission Street
San Francisco 5, Calif.

714 Joseph Vance Bldg.
Seattle 1, Wash.



CRUSHING AND SCREENING—150-ton per hour plant by Bodinson

Designed, built and erected by Bodinson, plant pictured is now in operation for Concrete Service Co. at Sunol, Calif. It consists of a truck receiving hopper with grizzly bars, and apron feeder loading to main plant conveyor from which material is discharged onto Bodinson 5x12-ft. triple-deck vibrating scalping screen. Oversize is diverted to a Kue-Ken 12x36-in. jaw crusher and a Kue-Ken 3-ft. cone crusher; undersize is fed into Bodinson 72-in. diameter revolving scrubber with sand screen (provision is made at this point for taking off unwashed material for crusher run base when required.) Sand passes into two 48-in. sand classifiers and then via belt conveyor to stock pile (sand flow may be arranged to produce two grades of sand if necessary.) Undersized material is conveyed to Bodinson triple-deck vibrating screen, where it is sized and deposited in stock piles. Bodinson Mfg. Co., 2401 Bayshore Blvd., San Francisco.

EXCAVATING—Koehring excavator in the 20-ton class has all attachments



Model 405, an excavator by Koehring, can be equipped with a full complement of attachments including 1-cu. yd. shovel and hoe dippers, 20-ton lift crane boom, clamshell and dragline buckets in sizes that vary with the weight of the material being handled. Maximum digging depth of the hoe is 22½ ft. The Model 405 can be lightened for road travel by removing crawlers and counterweights. Standard features include self-cleaning crawlers, mechanical power clutches, positive steering. Optional is an automatic power boom lowering device. Koehring Co., 3026 W. Concordia Ave., Milwaukee 16, Wis.



TRUCK—The 1955 GMC line: styling and power

More than doubling the number of truck models offered in 1954, the new General Motors line brings 74 models into the GM family of trucks, from ½-ton pick-ups to 5-ton tractors. Entrance into the V-8 field has resulted in a complete 44-model line with this design. The number of models equipped with Hydra-Matic transmission has been boosted from 13 to 65. With 190-hp. engines, the truck and tractor pictured are ideal for general construction. The gross combination weight of the tractor at left is 55,000 lb., while the gross vehicle weight of the dump truck is 29,000 lb. General Motors Corp., Truck & Coach Division, Pontiac, Mich.



CONCRETE HANDLING—Prime-Movers handle 10 cu. ft. up 20% grade

With more concrete structures being required on the expanding highway program, these units can move concrete in a hurry for maximum production. Only 31½ in. wide and 68 in. long, concrete can be moved into tight places at the rate of 12 to 17 cu. yd. per hr. The Prime-Mover Co., Muscatine, Iowa.

TRACTOR—Caterpillar D8 is now more powerful, easier to operate



A new D8, offered in two models, has been introduced by Caterpillar. The D8 models have different drives, a torque converter (Series D) and a direct drive (Series E). Matching attachments include a rear-mounted double drum and a single drum for the front. The operator can start the tractor from the seat. The fuel tank has been increased to 118 gal., making it possible to work a 12-hr. shift without refueling. The steering clutches are hydraulically boosted. The operating weight of the Series D is 41,265 lb., and the Series E, 40,430 lb. Caterpillar Tractor Co., Peoria 8, Ill.



This 6 1/2-yard Cal-Rex, operated by Le Valley Ready Mix of North Hollywood, is shown placing part of the 30,000 yards of concrete to be used on this San Fernando Valley subdivision.

Now available in 3 1/2, 4, 4 1/2, 5, and 6 1/2 yard sizes Cal-Rex Adjusta-Wate truck mixers

Fleet owners and independent operators alike are taking to the Cal-Rex Adjusta-Wate Moto-Mixer® in a big way. And why not? The Cal-Rex is made right in Los Angeles, tailored to fit the exact operating needs of western ready-mix operations.

The Cal-Rex gives you all the exclusive Adjusta-Wate features that add up to more profit on every job. You get fast, easy charging and discharging . . . thorough mixing . . . greater legal pay loads . . . lower operating costs. And

you'll be able to give greater customer satisfaction by delivering highest quality concrete faster.

You can haul greater legal pay loads, make more trips per day, more trips every season with the Cal-Rex Adjusta-Wate.

Your Rex Distributor will be happy to show you the reason the Cal-Rex is going over big . . . in a profit way! CHAIN Belt Company, 7601 Telegraph Road, Los Angeles 22, California.



Four Cal-Rex 6 1/2-yard Adjusta-Wate Moto-Mixers operated by McPhail Fuel Co., San Rafael, Calif.

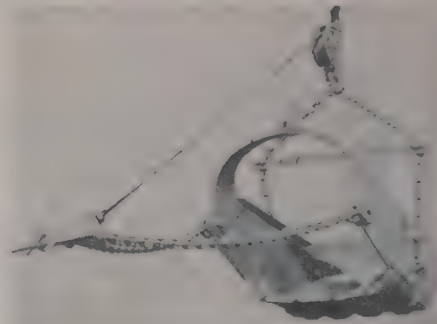


CHAIN BELT COMPANY



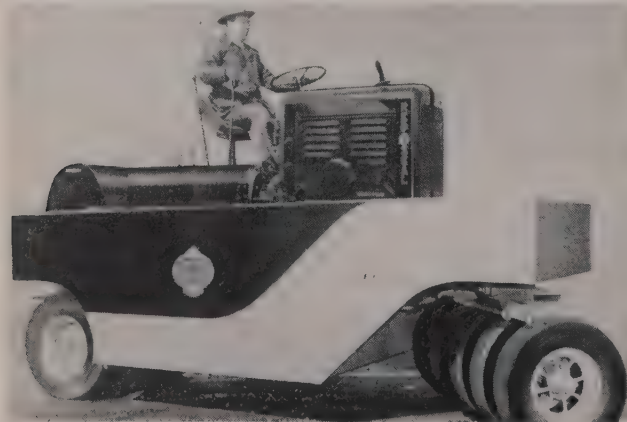
LOADING—Elevating grader handles 1,800 cu. yd. per hr.

For casting, stripping, loading, and terracing from 1,000 to 1,800 cu. yd. per hr., the Warco elevating grader attachment is a handy and useful addition to have for Warco 4D-85 and 4D-115 motor graders. A 30-in. steel adjustable disc feeds onto a 42-in. wide conveyor belt. The standard 16-ft. carrier is readily extended to 19 or 22 ft. by the addition of 3-ft. sections. Disc and carrier positions are hydraulically controlled from cab. Carrier folds quickly and easily for over-the-road travel. **W. A. Riddell Corp., Bucyrus, Ohio**



EARTHMOVING—Light weight bucket

Page Dragline bucket with lip and tooth-points of manganese steel for wear resistance, combines digging ability and decreased deadweight on boom for more payload per pass. Sharp teeth in bases cast integral with lip enable good bucket penetration and clean digging. **Page Engineering Co., Clearing Post Office, Chicago 38, Ill.**



COMPACTION—New 9-wheel pneumatic tire roller

Particularly suitable for mat resurfacing, seal coating, and compaction jobs in the shallow lift range is the new Bros SP-54. Oscillation of all wheel pairs, both front and rear, coupled with all-rear-wheel-drive provides maximum tractive effort with no "dead wheel" to get the roller "hung up." With an 18½-ft. turning radius, there's no lost motion in turning the roller around. There's enough power from the unit's 50-hp. engine to tow a second roller, too (hitch on rear is provided). Torque converter drive contributes to smooth operation. The ½-in. overlap of front and rear tires provides solid coverage over entire surface. Dumping doors provide for easy removal of sand ballast from the 16-cu. ft. body. **Wm. Bros Boiler & Mfg. Co., 1057 Tenth Ave. S.E., Minneapolis 14, Minn.**



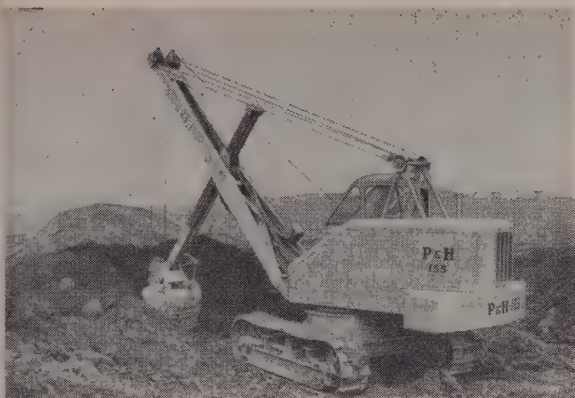
BATCHING—Compact, economical bin for central plants

Standardizing and simplifying their complete bin and batching equipment set-up, Construction Machinery has just announced the new Simplex combination—available in 47- to 97-ton capacity; with two, three, or four compartments; with or without separate cement; only a few pieces to assemble when erecting; equipped with radial aggregate charging gates, dual rubber pinch cement charging gates, and combination clam and rubber pinch discharge gate. **Construction Machinery Sales Co., Waterloo, Iowa.**

GRADING—Shoulder maintainer with real weight on rear strike-off blade



Two blades on the Gledhill grader are at opposing angles as required. Downward pressure can be applied to the rear strike off blade exerting up to one-half the total machine weight. The blade can be quickly lifted to clear sod or obstructions. When the strike-off blade is returned to the down position it will retain the same adjustment as before. Wheelbase is 11 ft. 2 in., weight is 2,110 lb. **The Gledhill Road Machinery Co., Galion, Ohio**



EXCAVATING—New all-purpose ½-yd. shovel by P & H “inches” boom loads

A new ½-yd. shovel, the Model 155, has been added to the Harnischfeger line. All driving machinery is contained in an oil-tight power box made of inch thick steel plates, providing for easy accessibility to all working parts. The machine can be quickly converted to a shovel, hoe, clam-shell, dragline, crane, and magnet. The planetary boom hoist has power lowering for “inching” boom loads. Power may be either gasoline or diesel. The full-vision cab is engineered for convenience and comfort. **Harnischfeger Corp.**, 4603 W. National Ave., Milwaukee 46, Wis.



TRUCK—Mack 30-ton dumper with 275-hp. engine for fast earthmoving

Expressly developed for off-highway operations in mines and quarries and on earth-moving projects, is Mack's 30-ton LRSW, a 6-wheeled, 4-wheel drive dumper. Standard equipment includes a 275-hp. engine, hydraulic power steering, and 10-speed constant mesh transmission. Available options include a 300-hp. diesel engine and torque converter with 5-speed transmission. **Mack Trucks Inc.**, 350 Fifth Ave., New York 1, N. Y.



GRADING—Drag makes short work of chuck holes, mixes materials

This inexpensive but efficient machine for maintenance of secondary dirt, stone, and gravel roads has seven blades that mix the road materials four times, resulting in a surface that's better distributed and better packed. A special strike-off blade levels out low spots and high spots. **Burch Corp.**, Crestline, Ohio

Quality tools that last!

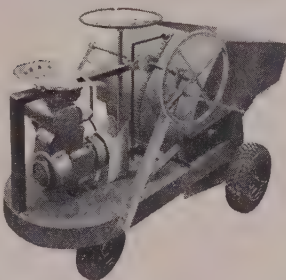
Western Built for Western Use

ROLA-SPEED LINE

New Powered Concrete Cart

you drive it like an automobile!

automotive control — for maximum maneuverability

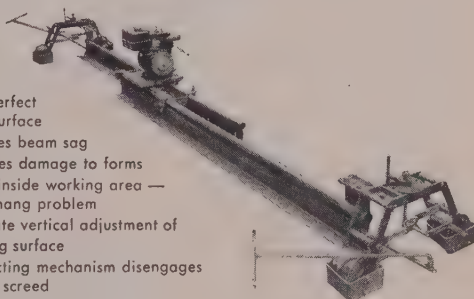


- Easy to operate. No training required
- Positive controlled dumping (stand or sit position)
- Positive braking due to Driving Wheels **under** load
- Excellent traction (even on wet ramps)
- Easy shifting with Constant Mesh forward or reverse

Collapsing Vibrator Screed

full range of sizes (8 ft. 6 ins. to 33 ft.)

exclusive center telescoping principle



- Gives perfect screed surface
- Minimizes beam sag
- Eliminates damage to forms
- Always inside working area — no overhang problem
- Immediate vertical adjustment of screeding surface
- Quick-acting mechanism disengages working screed

Concrete Hand Cart

built for years of rugged duty



- One-piece forged axle — for longer life
- Integrally cast wheels — for tougher service
- Recessed hub — for easy, close quarter handling
- Reinforced tray — for greater wear
- Spot welded body — for easier cleaning

Rola Asphalt Paver

top performance . . . low in cost . . . all standard sizes



- No shoe or wheel marks to rake
 - Side gates provide windrows
 - Wheels have height adjustment for shoulders and crowns
- Exclusive trencher model also available

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EMERYVILLE, CALIFORNIA

“Manufacturers of Quality Construction Equipment since 1932”

TRUCK MIXER—Discharge chute adjuster assures free flow and safety

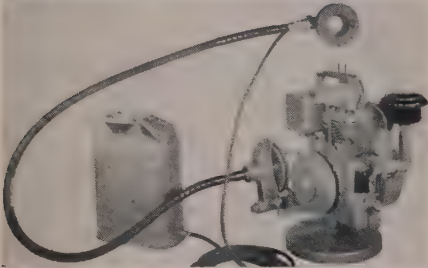


Automatic adjustment of the discharge chute of truck mixers is provided by the Dyna-Chute electric hydraulic power control. One-man, one-lever operation raises, lowers, or holds the chute and assures the free flow of materials. Available for 6 or 12-volt systems, it combines the pump, motor valve, oil reservoir, and solenoid in one unit. In a kit for all average installations. Monarch Road Machinery Co., 1331 Michigan St., N.E., Grand Rapids 6, Mich.



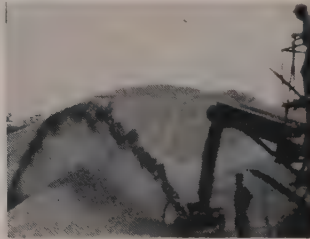
SLIDE PROTECTION—Rocks stay put with anchor bolts

Many dangerous locations along highways in the West can be made safe from rock slides with Bethlehem Pacific Rock Anchor Bolts. By anchoring layers of rock or individual boulders to bedrock, or by stabilizing stratified slabs of rock, the bolts act in tension to prevent rock slides in cuts with high banks and on steep hillsides, saving the cost of blasting and removing the rock. Installation is simple. Bethlehem Pacific Coast Steel Corp., San Francisco 19, Calif.



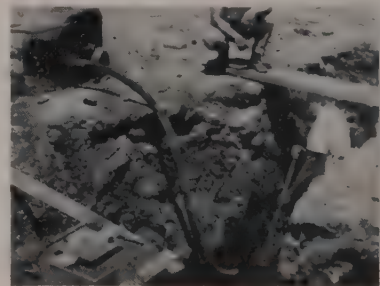
VIBRATION—Gasoline unit designed for versatility

The Mall Model 14GV23 is a 6-hp. gasoline vibrator that needs no air compressor or generator, with 7,000 or 10,000 rpm. head speeds. Shafting comes in 7-ft. interchangeable lengths (machine will handle 3 or 4 or more lengths). If the shaft or housing is damaged, only one 7-ft. length has to be replaced. Shown with an attachment for wet rubbing concrete. Mall Tool Co., 7740 S. Chicago Ave., Chicago 19, Ill.



STOCKPILE LOADER—A neat way to multiply storage area 10 times

An S-A centrifugal loader is shown throwing gravel to storage from the boom conveyor of a portable plant, to multiply potential storage area up to ten times. Loader is standard model with 24-in. belt. Larger size units are available, with 30-in. belt, as are smaller units which attach directly to discharge point of belt conveyors. Stephens-Adamson Mfg. Co., Aurora, Ill.



WATER CONTROL—Keep it dry with C. H. & E. pumps

Ability to pass solid materials and mud as well as water make these 2- and 3-in. diaphragm pumps handy for that dewatering problem. Light in weight, two men can easily handle them. Completely enclosed for weather protection means less maintenance. C. H. & E. Manufacturing Co., 3849 N. Palmer St., Milwaukee 12, Wis.

CONCRETE HANDLING—CraneMobile reaches and moves in a hurry



CraneMobile pictured is placing concrete for bridge piers, using a 55-ft. boom. The rubber-tired unit has a crane mating of 25 tons on a 30-ft. boom at 10-ft. radius. It may be equipped with 110 ft. of boom, plus a 30-ft. jib for the "long reach." The unit can get around in a hurry, with 12 forward speeds to 36 mph. and 3 reverse speeds, and will climb a 40-deg. grade. Bay City Shovels, Bay City, Mich.

POWER—New low cost Onan for the job's electricity



True economy in first cost and in operating cost is promised by Series 25EC and 35ED electric-generating plants just introduced by Onan. The 25- and 35-kw. plants are driven by the new powerful short-stroke Ford engine. Rated at only 0.8 power factor, these units continue to deliver up to 36- and 42-kw. overload capacity after 1,000 hr. of operation. D. W. Onan & Sons, Inc., Minneapolis 14, Minn.



NEW YORK THRUWAY CONTRACTOR ORLANDO SHOWS . . .

how to keep your shovels busy

A. J. Orlando Contracting Co. of Whitestone, New York, won a sub-contract to excavate and move one million yards of earth and rock on the anchor end of the New York Thruway. The job had to be completed before snow and other winter conditions set in—and this meant fast stepping!

To keep cycle time down, dynamic Anthony Orlando set up schedules that would keep the shovels constantly busy with a minimum number of trucks. This was a job made to order for his fleet of Mack six-wheel dumpers, bolstered by five new Mack LJSW-X six-wheelers.

Despite heavy rains and unusually soft going, the contract was carried out at a rapid pace to a successful conclusion. Says President Orlando, "For jobs like this, Macks are the only trucks I can afford to operate."

Macks are the mainstays of many a contractor who must keep up fast and uninterrupted hauling schedules. The famous Mack Balanced Bogie provides sure-footed traction in soft or slippery going. And when it comes to shrugging off punishment, Macks are in a class by themselves.

Have your Mack branch or distributor show you why, like Mr. Orlando, you can't afford *not* to operate Macks.

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

ARIZONA

CROWDED CONDITIONS in Arizona's State Highway Department general office building will be relieved when plans for a \$500,000 building are completed. Property covering one entire block is being purchased for construction of the new building. As Arizona's highway program has expanded in the years since World War II, the department has completely outgrown its present quarters. Under the new setup, the Highway Department will take over complete control of the existing building.

RECENT MAJOR CONTRACT AWARDS and low bids in Arizona include a low bid of \$247,779 submitted by **Flickinger Bros.** of Phoenix for 7 mi. of grading and draining on US 80 on the Phoenix-Yuma highway. **T. C. Holmes** of Phoenix submitted a low bid of \$134,287 for 4 mi. of grading, surfacing, and one bridge in Mariposa County. **Mardian Construction Co.** of Phoenix submitted

a low bid of \$416,605 for construction of two railroad underpass structures and a highway overpass on the Phoenix-Prescott highway. **W. R. Skousen** of Mesa submitted a low bid of \$280,587 for 11.3 mi. of grading and surfacing the Benson-Steins Pass highway near Willcox.

CALIFORNIA

A 302-MI. LONG Westside freeway from Woodland in Yolo County to Bakersfield has been recommended by the California Division of Highways. This recommendation is before the state legislature for approval. Preliminary traffic estimates indicate the need for a high type 4-lane freeway. Cost of the freeway route is estimated at close to \$130,000,000.

BIDS will probably be asked late this fall for extension of the Hollywood freeway. The project is included in the 1955-56 budget for \$700,000. Plan-

ning by the highway department should be completed about October. The extension will run from the intersection of Ventura Boulevard and Vineland Avenue to Moorpark Street.

EFFECTIVE JUNE 1, James B. Black, president of Pacific Gas & Electric Co. since 1935, will become chairman of the Board of Directors. Norman R. Sutherland will become president and general manager and Robert H. Gerdes will become executive vice president and general counsel. PG&E is now the largest gas electric utility company in the United States. In the postwar period alone \$1,500,000,000 has been invested in company expansion.

LOS ANGELES DISTRICT, Corps of Engineers, has started advanced planning work, including preliminary design studies, on the Rubio Canyon diversion channel. This is another important unit under the general comprehensive plan for flood control in the Los Angeles County drainage area. The proposed channel would be near Altadena and would extend for about 1½ mi. from the existing Los Angeles County flood control channel in Rubio Canyon to Eaton Canyon.

UTAH CONSTRUCTION CO. has set up field offices in Oroville for the start of its large amount of construction on Pacific Gas & Electric Co.'s Poe Project. Preliminary work on the tunnel now consists of brush clearing and some access road work. Several hundred men will be employed within the next two months.

OFF-STREET PARKING in Sacramento, to ease the traffic problem, has been proposed in a comprehensive report by the city traffic engineer D. J. Faustman. If the project were approved in its entirety it would cost about \$4,182,000. Construction of two-level garages and acquisition of additional areas for parking are part of the plan.

SAN FERNANDO VALLEY in Southern California may soon become the site of a \$150,000,000 community of 6,000 homes, a shopping center, and recreation facilities. The 875-acre Platt ranch was purchased for \$6,120,000 as the first step in this development. Developers of the property have already constructed other



VANCOUVER IS SITE OF VAST ALCAN EQUIPMENT SALE

Simon Srybnik (left), president of the S & S Machinery Co., inspects construction equipment at one of the mile-long Vancouver, B. C., yards of Aluminum Co. of Canada. Srybnik is managing the disposal of more than \$24,000,000 worth of construction and mining equipment used by Alcan on its Kitimat power and smelter project in British Columbia, believed to be private industry's biggest surplus sale. He is accompanied by Alcan executive **Jerry Dunkelberger**. During the first 10 weeks of the sale, which is expected to last another year, Srybnik's firm rang up more than \$1,000,000. Over 50,000 different items of equipment are up for sale. To dispose of the surplus equipment in an orderly manner, barter deals with foreign countries, rental and lease plans, and time financing are being used to interest both big and small buyers.



LIKE THE SIDE OF A ROOF

On the Waldo Grade project, at the northern end of San Francisco's Golden Gate Bridge, Guy F. Atkinson Company contracted to move 1,500,000 cu. yd. of earth on some really tough grades.

To widen Rt. 101 to a six-lane highway a rocky hillside had to be cut away and the heavy material hauled half a mile down to the fill, in a deep ravine.

Those 20 per cent grades were like the side of a roof. But Atkinson's fleet of CAT* DW20 Tractors and No. 20 Scrapers got the job done. They hauled big loads down the steep slopes and switchbacks, then made their way to the top again after dumping. There have been few more convincing tests of the DW20's stamina and lugging power.

Eleven of the big wheel rigs were used on this \$4,000,000 contract. Other Caterpillar equipment included D8 Tractors for push-loading and bulldozing, No. 12 Motor Graders to work on the haul roads and Caterpillar

Diesel Engines powering compressors. Many successful contractors believe in standardizing on the big yellow machines—service and maintenance are simplified, parts are often interchangeable, and operators are familiar with the equipment. Caterpillar dependability, freedom from down time and long work life are clinching arguments for standardization.

Your Caterpillar Dealer will demonstrate the big production and low operating cost of the DW20 Tractors, and he'll back every machine he sells with on-the-job service and genuine Cat parts.

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

CATERPILLAR*

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WILL DEMONSTRATE**

large communities, such as the 17,500-home Lakewood Park development.

FEDERAL POWER Commission has licensed Pacific Gas & Electric Co. to construct an \$80,000,000 hydroelectric development on the Kings River. The project calls for the construction of three new power plants and enlargement of the existing Balch plant. Generating capacity of the north fork of the river will be increased by 325,000 hp.

FUNDS HAVE BEEN allocated by the California Highway Commission for additional highway construction

—two of the major allocations being as follows: In Santa Barbara County \$160,000 for 11.9 mi. of grading and surfacing near Los Alamos and Santa Maria. The budget for 1955-56 shows \$1,855,000 for this project. In Los Angeles County \$667,000 additional funds can be used on the Harbor freeway for grading, paving, and structures between 88th Street and Gage Avenue, a length of 1.8 mi. Budget allocation for 1955-56 for this project is \$4,600,000.

SOUTHERN CALIFORNIA Edison Co. of Los Angeles recently received a 50-yr. license from the Federal Power Commission for con-

struction of a \$2,600,000 hydroelectric project in Fresno County. The project, capacity of 10,000 kw., will utilize the company's existing Ward Tunnel which connects Florence Lake reservoir with Huntington Lake reservoir near Fresno.

BY NOVEMBER of this year the \$32,000,000 Whittier Narrows project, which will offer flood control on the Rio Hondo and the San Gabriel River—located about 10 mi. east of Los Angeles—will be finished. Should the 1955-56 winter season be anything like the year 1938-39, the project will begin to pay for itself in short order.



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concrete curing compounds

1 HUNT PROCESS CLEAR

For natural color of the concrete. A carefully proportioned blend of materials in a petroleum solvent will not permanently discolor the concrete.

2 HUNT PROCESS "TILT-UP"

For curing and bond breaking in "Tilt-Up" or precast construction. Film disintegrates and oxidizes after curing period leaving surfaces in condition for painting.

3 HUNT PROCESS BLACK

For curing and waterproofing. A blend of asphalts with pigment in a petroleum solvent.

4 HUNT PROCESS PIGMENTED—WHITE & GRAY

For temperature control in the concrete. A curing compound containing high quality pigments which give a heat reflecting film.

HUNT PROCESS CO., INC.

FACTORY AND MAIN OFFICE
7012 STANFORD AVENUE LOS ANGELES 1, CALIFORNIA

CEMENT SUPPLY in Ventura County is short. A dry winter allowed home and school construction to proceed without let-up and accounts for the major reason of the shortage. Southern California cement plants are producing at full capacity but it will be some time before the shortage eases up. To truck cement from Northern California would be too costly for most contractors.

RECENT MAJOR CONTRACT AWARDS and low bids in California include a low bid submitted by Norman I. Fadel, Inc., Altfillisch Construction Co., & Bert C. Altfillisch of North Hollywood for 3.8 mi. of grading, surfacing and one bridge near Palmdale, San Bernardino County. Fredrickson & Watson Construction Co. of Oakland submitted a low bid of \$555,355 for 4.9 mi. of grading and surfacing in Shasta County. Granite Construction Co. of Watsonville submitted a low bid of \$418,268 for 2.4 mi. of grading and surfacing in Lake County near Tule Lake. Charles L. Harney, Inc., of San Francisco submitted a low bid of \$1,158,882 for 1.3 mi. of grading, surfacing and three bridges in Oakland. Huntington Bros. of Napa submitted a low bid of \$203,952 for 2.7 mi. of grading and surfacing near Fort Ross. McGillivray Construction Co. of Sacramento submitted a low bid of \$361,730 for 3.9 mi. of widening and surfacing, and widening of seven bridges in Sacramento County. Mercer, Fraser Co., Inc. of Eureka submitted a low bid of \$613,771 for 5.3 mi. of surfacing near Eureka. C. K. Moseman of Redwood City submitted a low bid of \$1,103,629 for 2.7 mi. of grading, surfacing and construction of a steel bridge near King City, Monterey County. Ray Reed Co. & Conrad Construction Co., Inc. of Santa Paula submitted a low bid of \$232,087 for 3 mi. of grading and surfacing in San Diego County. L. C. Smith Co. of San Mateo submitted a low bid of \$779,137 for construction of a concrete and steel girder bridge in San Mateo County. Stolte, Inc., and Gallagher & Burk, Inc. of Oakland received a \$1,173,108 award for 1.3 mi.

THE ORIGINAL MEMBRANE CURE SINCE 1926

of grading and paving and construction of a concrete bridge in Contra Costa County. **Carl N. Swenson Co., Inc.** of San Jose submitted a low bid of \$488,111 for 12.7 mi. of widening and surfacing in Santa Clara County. **J. A. Thompson, J. A. Thompson & Son, Inc.** of Inglewood submitted a low bid of \$1,103,171 for 3.5 mi. of grading and paving and construction of a concrete bridge in Banning, Riverside County. **Webb & White** of Los Angeles submitted a low bid of \$1,244,951 for 0.5 of grading and surfacing and construction of five undercrossings in Los Angeles County. **Claude C. Wood Co.** of Lodi submitted a low bid of \$214,711 for 15.3 mi. of surfacing in Lassen County.

COLORADO

THE UNITED STATES Senate Interior Committee has approved a bill that would authorize construction and operation of the \$156,541,000 multi-purpose Frying Pan-Arkansas water project in Colorado. This project would import water from the west drainage slope of the Rocky Mountains to the east side Arkansas River Basin. It would supplement the water supply of a number of Colorado municipalities, help irrigate 322,000 acres, provide power generating facilities, and help control floods.

GOVERNOR JOHNSON recently signed a bill authorizing a \$16,000,000 highway toll tunnel under the Continental Divide. Under provisions of the bill, the State would guarantee 100% of the cost and thus permit sale of the tunnel bonds at a very satisfactory interest rate. Still to be selected is a location for the tunnel.

BOULDER'S NEW \$1,100,000 reservoir began to fill up with the arrival of water over a 25-mi. supply canal from the Colorado-Big Thompson project. Boulder's water supply will be about doubled by this new storage facility formed by a dam 48 ft. high and 1.2 mi. long.

COLORADO SPRINGS had a 50% jump in the total amount of building construction last year as compared to 1953. The nation's new Air Force Academy is one of the more important factors accounting for this increase. Building permits for Colorado Springs were nearly \$13,000,000 in 1954.

Construction on the Academy project is continuing with equal emphasis on both the airfield and housing facilities. After being temporarily postponed, bids will be opened this June 7 for relocation of US 85-87, control of Kettle Creek, and clearing and grading of the airfield area.

RECENT MAJOR CONTRACT AWARDS and low bids in Colorado include a \$357,767 award to **C. L. Hubner Co.** of Denver for 3.3 mi. of roadwork on state highway 8 between Aurora and Watkins. **Lawrence Construction Co.** of Littleton received a \$336,183 award for 1.6 mi. grading and paving on the Fort Collins road in Larimer County. **Mazocco Construction Co.** of Boulder submitted a low bid of \$100,000 for 0.6 mi. of grading and surfacing on the Boulder-Idaho Springs route in Roosevelt Forest. **Northwestern Engineering Co.** of Denver received a \$553,000 award for 5.4 mi. of grading and surfacing in Douglas County.

Henry Shore Construction Co. of Littleton received a \$522,248 award for 11.8 mi. of grading and surfacing and structures in El Paso and Douglas counties.

IDAHO

THE IDAHO HIGHWAY Department will be ready with plans for freeway construction through Boise when the time comes. State Highway Engineer Earle V. Miller recently presented five different plans before



NEW MASTER "1-MAN" VIBRATOR CUTS VIBRATING COSTS IN HALF



Only 25 lbs. Easy to handle.

It weighs 25 pounds! It's all in one piece! It plugs into any regular 115 Volt AC or DC electric line . . . and with no heavy engine or motor to drag around, one man handles it easily.

The motor is sealed in the vibrating head, so there's no flexible shaft to get out of whack; no oiling or greasing problems; no kinking troubles.

No field maintenance is necessary: when motor head needs attention, snap it off and snap on a spare.

The vibration actually penetrates farther and leaves fewer voids in the concrete than old-style vibrators.

The price is low. The design has eliminated so much cost, and no special power source is required, but the big saving comes in use. Write for folder or ask your Master distributor for a free demonstration. You'll see exactly how the Master "1-Man" can cut your vibrating costs at least 50%.

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● CAPACITY

In sanitary sewers and storm drains of concrete pipe, maximum hydraulic capacity is assured by the smooth interior of both the pipe and the joints, promoting a steady, even, undisturbed flow with a minimum of friction.

● ECONOMY

Low first cost, low installation costs, low maintenance costs and quick delivery on the job from the plant of your nearest association member — all these factors contribute to the lasting economy of concrete pipe for storm drains, sanitary sewers and other drainage problems.

● DURABILITY

After many years of constant service, thousands of miles of concrete pipe testify to the long life of this modern, convenient form of construction. Made to meet the highest standards of engineering specifications for every type of use, you can look to concrete pipe for exceptional durability.

● STRENGTH

Designed to support all types of loads and fills and capable of resisting the impacts of the heaviest travel, concrete pipe has proved its stamina time and again under the stress and strain of railroad traffic, airport landings, modern freeways, city streets and county roads.

For literature and specifications pertaining to all types of concrete pipe write to Dept. C.

Western CONCRETE PIPE Association

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C-4

the Boise Chamber of Commerce to acquaint them with the state's work. All plans, which concern U.S. Highway 30-20, are dependent upon the Interstate highway plans of the federal government and would not be constructed for some years.

THE NEW \$400,000 bridge across the Snake River at Marsing was completed last month by the Bair-Crick Co. and Henry Hagman, both of Spokane. The 774-ft. long structure has 12 steel girder spans with a concrete deck and is 28 ft. wide. This is one of four bridges now under construction across the Snake River and bids for a fifth bridge at Ashton will be let this summer. The other projects are the Heyburn Bridge at Burley, the Hawthorne Bridge near Rupert, and the Downard Bridge between Declo and Rupert.

RECENT MAJOR CONTRACT AWARDS and low bids in Idaho include a low bid of \$373,194 submitted by W. R. Cahoon Construction Co. of Pocatello for construction of a pumping plant in the north-side division of the U.S.B.R. Minidoka project. Grant Construction Co. of Coeur d'Alene received a \$136,638 award for 4.3 mi. of grading and surfacing in Kootenai County. L. W. Vail Co. of Pasco, Wash., received a \$190,495 award for 15.2 mi. of roadwork on state highway 9 in Idaho County.

MONTANA

PROPOSED DEVELOPMENT of a power dam at Libby, Mont., has been opposed by the British Columbia Government. A United States application for a dam on the Kootenay River at Libby that would flood Canadian land is before the International Joint Commission. As stated by British Columbia Attorney General Bonner, construction of Libby Dam would weaken Canada's future bargaining position in the exchange of Columbia Basin hydroelectric power since their development of the power potential of the Mica Creek Dam would have less value.

M. M. FLINT, district engineer at Missoula, Mont., for the Bureau of Public Roads, will soon have under his direction work involving 5.4 mi. of grading and 0.1-mi. overpasses on the Columbia Falls-Glacier Park highway, part of Montana Forest Highway Project. Contract has been awarded to Tony Marrazzo on a \$1,-188,284 bid. The two overpasses to be constructed are over the tracks of the Great Northern R. R., and work is scheduled to start as soon as special agreements with the railroad company are made.

RECENT MAJOR CONTRACT AWARDS and low bids in Montana

include a \$157,618 award to **S. Birch & Sons Construction Co.** of Great Falls for 9.1 mi. grading and surfacing on the Big Sandy south highway. **Stanley H. Arkwright, Inc.** of Billings received a \$155,409 award for 5.3 mi. of grading and surfacing on the Ryegate-Roundup highway, Musselshell County. **Inland Construction Co.** of Miles City received a \$185,595 award for 10 mi. of grading and surfacing on the Brandenburg-Garland-Miles City highway. **McLaughlin Inc.** of Great Falls received a \$236,672 award for grading and gravel surfacing on the Great Falls-Highwood highway.

NEVADA

UNTIL A FINAL location of the terminals for the super highway through Reno is determined, further development of Highway 40 west of Reno will be stopped. The portion of U. S. 40 affected is from a point west of Verdi to the state line. As is the case in the development of a freeway near any major city many knotty problems affecting right-of-way and access must be determined.

RECENT MAJOR CONTRACT AWARDS and low bids in Nevada include a \$292,430 award to **Gibbons & Reed Co.** of Salt Lake City for 6.5 mi. of road construction west of Wells, Elko County. **Lemke-Clough & King** of Las Vegas received a \$766,246 award for construction of an Air Force radar installation at Tonopah. **Stewart & Hitchcock** of Las Vegas received a \$169,234 award for 10.3 mi. of roadwork on the Berry Creek road, White Pine County. **Wells Cargo, Inc.** of Las Vegas received a \$253,577 award for 5 mi. of roadwork east of Boulder City. **Hoops Construction Co.** of Twin Falls, Idaho, received a \$502,782 award for 19 mi. of roadwork south of Wales, Elko County.

NEW MEXICO

THE GIANT STEEL plate front of El Vado Dam near Tierra Amarilla is expected to be completed next month. The \$215,000 face lifting contract being done by the Korshoj Construction Co. and Claussen-Olson-Benner, Inc., for the Bureau of Reclamation includes cleaning and painting the steel face plate, removing and constructing a new trash rack, and cleaning and painting the penstock tunnel. The face of the dam received a new red lead primer and two coats of aluminum paint.

ON THE BASIS of population New Mexico has more new school buildings under construction than any

other state in the United States. Twenty-two school construction projects, either new schools or additions to existing plants, are under way. In Albuquerque alone construction totals nearly \$3,000,000. Money for the projects amounts to \$4,000,000 in federal funds and various state and local school bond issues.

TWO MAJOR HIGHWAY construction projects in Albuquerque have been approved by the State Highway Commission. Called a "crossroads" plan, one route passes north-south, probably to be financed on the Interstate federal aid system, and the other east-west, probably handled under the federal aid primary system.

SOME BIG PROJECTS coming up for bid opening this month include grading and paving at Kirtland Air Force Base near Albuquerque and construction of utilities at Holloman ADC near Alamogordo.

RECENT MAJOR CONTRACT AWARDS and low bids in New Mexico include a \$466,830 award to **Brown Contracting Co.** of Albuquerque for 3.2 mi. of grading and surfacing on US 66, Valencia County. **G. I. Martin** of Albuquerque received a \$126,868 award for 6.9 mi. of grading and surfacing on the Mountainair south road, Torrance County. **Skousen Construction Co.** of Albuquerque received a \$347,498 award for 9.3 mi. of grading and surfacing on the Gate City west road, San Miguel County. **Skousen-Hise Contracting Co.** of Albuquerque received a \$353,476 award for 1.8 mi. of grading and surfacing on US 66 in Grants.

OREGON

CONSTRUCTION of a new double-track railroad bridge across the Deschutes River near The Dalles has been started by U. S. Steel's American Bridge Division for the Portland District, Corps of Engineers. It replaces an older downstream span of the Union Pacific Railroad and is being erected as part of a realignment of the railroad right-of-way resulting from the building of The Dalles Dam. The new bridge will consist of four 90-ft. and two 80-ft. plate girder spans. It will be 522 ft. long and will require almost 1,000 tons of structural steel. American Bridge is doing the erection work under a subcontract from the general contractor, Lee Hoffman of Portland. The job will be supervised by C. O. Edmonds, veteran American Bridge superintendent who handled the construction of the new Pasco-Kennewick and Umatilla bridges across the Columbia River, both completed in the past year.

THREE CORPS OF ENGINEER dams are to be dedicated in the Pacific Northwest this month. Lookout Point in western Oregon will be dedicated June 25, Albeni Falls Dam in northern Idaho on June 24, and Lucky Peak on the Boise River in southern Idaho will be dedicated on June 23. The Albeni Falls dedication is scheduled to coincide with placing the second power generator on the line.

WISCOMBE PAINTING CO. of Salt Lake City has been awarded the contract for painting tainter gates, trash racks, guides, and intake gates at The Dalles Dam for Atkinson-Ostrander Co. This includes work on the navigation lock, Phase 3 of the powerhouse, and spillway dam. The Wiscombe company is presently painting at Chief Joseph Dam and powerhouse, Box Canyon Dam and powerhouse, Garrison Dam penstocks and surge tanks, and Palisades Dam and powerhouse.

THREE UTILITY FIRMS—Portland General Electric, Pacific Power & Light, and Washington Water Power—have stated they would be willing to finance the entire power costs of John Day Dam on the Columbia River, a bill for which has been proposed by Rep. Sam Coon of Oregon. Construction of the power features of the dam would amount to \$273,000,000 which is about 90% of the proposed \$310,000,000 dam. As Coon states it, the proposal is a case of the government selling its power output before the dam is built, rather than afterwards, as in the case of previous dams.

RECENT MAJOR CONTRACT AWARDS and low bids in Oregon include a \$139,796 award to **Allum Bros.** of Eugene for 3.3 mi. of grading and surfacing near Gresham, Multnomah County. **Tom Lillebo** of Reedsport received a \$159,950 award for bridge construction over the Applegate River between Grants Pass and Wilderville. **Logan Taylor Co.** of Portland received a \$379,934 award for 3 mi. of grading and 2.4 mi. of paving on the Cascade Highway, Clackamas and Multnomah counties. **Miller & Strong, Inc.** of Eugene received a \$252,950 award for 0.7 mi. of grading, paving, and construction of a steel girder span at Ashland.

UTAH

SALT LAKE CITY'S new sewage pumping plant that cost about \$1,000,000, including pipe and installation of lines, was recently put into operation. The new plant will take care of all sewer lines which originate in the southern and eastern parts of the city and all west of Main Street. City Engineer Roy W.

McLeese said engineering studies are now being made to determine the need for a new sewer tank line along Redwood Road as well as enlarging the many overtaxed collecting sewer lines.

INTERIOR SECRETARY McKay recently announced federal approval for construction of the proposed Deer Creek hydroelectric plant in the Provo River Reclamation Project. Congress must provide money first, however. The plant, with installed capacity of 5,000 kw., would cost about \$1,051,000.

A NEW \$8,000,000 steam-electric plant is being planned by Western Colorado Power Co., subsidiary of Utah Power & Light Co., and Colorado-Ute Electric Association under a partnership agreement. Tentative plans call for a site near coal veins in the Nucla area.

RECENT MAJOR CONTRACT AWARDS and low bids in Utah include a low bid of \$538,352 submitted by W. W. Clyde & Co. of Springville for 10.1 mi. of surfacing and construction of two concrete bridges in San Juan County. Enoch Smith & Sons Co. of Salt Lake City submitted a low bid of \$819,982 for 10.4 mi. of grading and surfacing on the Salt Lake Airport-Saltair Junction route. Thorn Construction Co., Inc. of Springville submitted a low bid of

\$290,118 for 7.9 mi. of roadwork on the Emory-Castle road, Summit County. Whiting & Haymond of Springville submitted a low bid of \$576,571 for 3.2 mi. of grading, surfacing, and construction of 2 concrete bridges near Moab, Grand County. L. A. Young Construction Co. of Richfield submitted a low bid of \$374,701 for 10.8 mil. of surfacing on the Tabiona-Mountain Home road, Duchesne County and another of \$761,663 for 15.7 mi. of grading and surfacing on the Buckhorn Flat road, Iron County.

WASHINGTON

HERE IS INFORMATION on some of Seattle City Light's major projects. Gorge High Dam contractor has one shift working now. That company is also preparing housing at Newhalem, widening Newhalem-Diablo Road, starting on a new section of Newhalem-Diablo Highway, and moving in equipment.

City Light has advertised for bids on installation of the turbine and auxiliary equipment for the fourth generator at Ross powerhouse. The contract would also call for additional miscellaneous work, such as construction of the Windy Cut Bridge, raising Diablo tailrace bridge, altering Diablo car lift, car

barge and landing, construction of an access road to the top of Ross Dam, and other miscellaneous work.

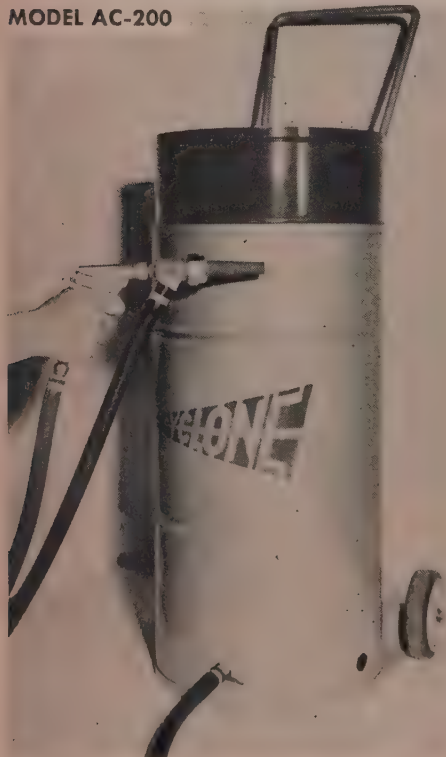
Future City Light construction plans were outlined recently by Utilities Committee Chairman Bob Jones after conferences with Superintendent Paul J. Raver. Two improvements under study to increase power production are construction of a dam at Copper Creek, and the utilization of Thunder Creek by diversion into Ross Reservoir. Projects listed as being necessary in the next three years include grouting of the Diablo Tunnel, rewinding of three older generators at the Gorge powerhouse, and construction of a \$1,275,000 warehouse and service headquarters building.

THE CITY OF TACOMA probably will not call for bids during 1955 to build the proposed hydroelectric dam on the south fork of the Skokomish River in Washington. Actual design work must await the completion of field studies. Henry A. Cole, superintendent of Tacoma City Light, said a license required from the Federal Power Commission probably will not be forthcoming for several months.

PUGET SOUND UTILITIES Council, of which Tacoma City Light is a member, became the first public utility commission in the

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country to sign a contract with the Atomic Energy Commission for access to information on nuclear power. The Council will train engineers who will work closely with federal specialists in studying possibilities for using atomic energy as a fuel in steam plants. Other members are Seattle City Light, Puget Sound Power & Light Co., and the Chelan and Snohomish public utility districts.

THE 8½-MI. long Olympia freeway passing through Tumwater and Olympia is well under way. Work was started on three parts of the new freeway. From Tumwater south to the Israel Road, a contract is under way, and the Lynwood and Custer Way undercrossings are under construction. On this project a total of 21 structures will be built to separate traffic and to provide on and off facilities. Total cost will be \$8,500,000.

Moss Lake, a small lake inside the city of Olympia, is to be drained and the fill will probably take some time to stabilize itself. The first 3-level interchange will be built at the head of Capital Lake to allow traffic to get on and off from State Highway No. 1 to State Highway No. 9, and to and from Capital Boulevard and to and from Tumwater City streets. This is a real design problem estimated to cost about \$500,000.

Engineers on this work for the Washington State Highway Department are Jack Claypool, district engineer; Jack Rogers, locating engineer; Ray Williams, resident engineer.

A RELATIVELY NEW TYPE of construction to the Seattle area will be a multiple-barrel structure to be built for Seattle School District No. 1. The structure consists of a series of bays 33 ft. wide, 127 ft. long, having 3-in. thick shell slabs over each bay. Curvature of the shell slab is a 25-ft. radius with the top of each shell section rising 5 ft. 9½ in. above the top of the edge beams.

ONE OF THE LARGEST test models for a dam ever to be built in the West is to be constructed by the Washington State College for the proposed Pleasant Valley Dam. The actual dam will be 492 ft. high and 1,200 ft. long. The model will be 12 ft. high and 25 ft. long. This dam has been proposed by the Pacific Northwest Power Co. It would cost about \$200,000,000 and provide 850,000 kw. of new generating power.

RECENT MAJOR CONTRACT AWARDS and low bids in Washington include a \$1,474,860 award to James I. Barnes Construction Co. of Seattle for construction of two 4-story reinforced concrete dormitories and remodeling of a third at Washington State College, Pullman. Bocek Bros. of Hoquiam received a \$170,945 award for 0.8 mi. of grading and sur-

facing on state highway 12 in South Bend. Butler Construction & Engineering Co. of Seattle submitted a low bid of \$473,355 for reconstruction of the central wharf, Pier 20, for the Port of Seattle. Clifton & Applegate of Yardley received a \$290,850 award for construction of a bridge on state highway 2, Spokane County. Erickson Paving Co. of Bellevue received a \$299,075 award for 2.9 mi. of grading and surfacing state highway 14, Kitsap County. Paul Jarvis, Inc. of Wenatchee submitted a low bid of \$420,612 for dam alteration and canal enlargement, Kennewick Division, Yakima Project.

WYOMING

A CENTRALIZED TRAFFIC CONTROL project is to be installed by the Union Pacific Railroad between Granger, Wyo., and Pocatello, Idaho. Cost of the work will be about \$9,000,000. Work is to begin immediately and is scheduled for completion in late 1956. An 8½-mi. line change between Moyer Junction and Fossil will be also made.

GLENDON DAM in central Wyoming is coming along at a fast clip even though work just got

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under way late last winter. Representative Keith Thomson of Wyoming has asked the House Appropriations Committee to provide enough money to speed up construction of Glendo Dam so the contractor can finish the job without delaying because of lack of funds.

It has also been recommended that annual appropriations be increased to allow completion of the project at an earlier date. The Bureau of Reclamation's target date for completion of the big multi-purpose \$44,300,000 project is some time in the year beginning July 1, 1956. The project will furnish power flood control and irrigation regulation.

RECENT MAJOR CONTRACT AWARDS and low bids in Wyoming include a \$253,631 award to Asbell Bros. Construction Co. of Riverton for 4.3 mi. of grading, draining, and surfacing on the Chugwater-Cheyenne road. **Big Horn Construction Co.** of Sheridan received a \$328,961 award for 26 mi. of seal coating on the Gillette-Broadus road, Campbell Iron County.

County, and another \$820,255 award for 11.3 mi. of grading, draining, and surfacing on the Sundance-Beulah road, Crook County. **Woodward Construction Co.** of Rock Springs received a \$397,724 award for 12.9 mi. of surfacing on the Green River-Rock Springs road and 11.7 mi. of the Pine-dale-Rock Springs road.

Here and There

THE LATEST COMPROMISE measure on the national highway construction program was a United States Senate Highway Subcommittee plan whereby \$13,200,000,000 in federal funds would be spent in the next five years with the states putting up matching funds totaling about \$8,100,000. Under this plan, the federal gasoline tax would be increased from 2c to 3c to help the financing.

This amounts to a rejection of Eisenhower's highway construction program where \$37,000,000,000 in federal funds would have been spent over a 10-yr. period with the state and local governments putting up \$64,000,000.

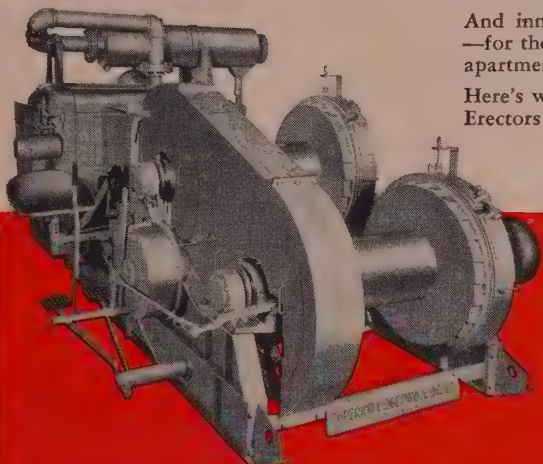
The Senate bill mentioned above was sponsored by Senator Albert Gore of Tennessee. Under his bill the allocation of the money for different types of highways would be as follows: \$10,300,000,000 for super highways and \$11,000,000,000 for primary, urban, and secondary roads. The federal government would pay three-fourths of the cost of the super highways and the state one-fourth. The government and the state would match dollar for dollar on the other roads.

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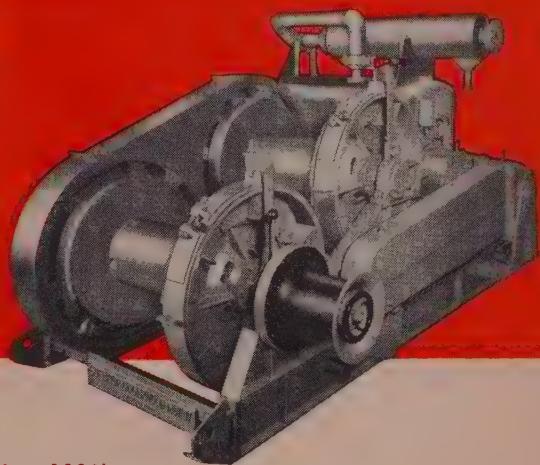
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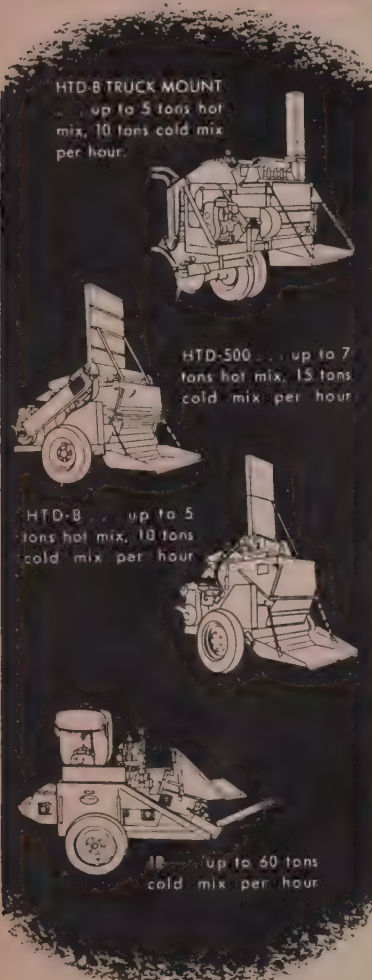


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ALASKA Newsletter

By CLIFFORD S. CERNICK, Anchorage

NEW ALASKA HIGHWAY?—Interest in Alaska is high in a bill introduced in Congress to investigate practicability of constructing a new section of the Alaska highway. Envisioned is a new 550-mi. stretch of road to link Fort St. James in British Columbia with Atlin, also in B. C. Alaskans are excited about the proposal because it would make it possible to link Southeastern Alaska cities with the principal Alaska road system, and right now they are hopelessly cut off. The new route would cut approximately 550 mi. from the present route between the Pacific Northwest and Alaska points. The route would also bring Alaska's larger cities within three days driving time of Pacific Northwest trade centers.

ALASKA BRIDGE-BUILDING—New bridges over Alaska's rivers and creeks make up a sizable portion of the 1955 road construction program in the territory. M. C. Zimmerman, district engineer at Anchorage, says four major bridges will be built in the Anchorage district—over Chickaloon and Mendaltna rivers and over Hicks and Cache creek. A new bridge also is going up over the Susitna River, one of Alaska's "middle-sized" water arteries. A new bridge is going up over Canyon Creek on the newly-constructed Denali highway, and the Bureau of Public Roads is putting a bridge over the Kenai River—one of the territory's best trout streams.

ANCHORAGE DISTRICT road work summary. Your Newsletter writer made a special survey of road construction work in the territory for this issue. In summary, here's what's planned for the Anchorage district of Alaska Road Commission: A 7-mi. stretch of "country road" will be paved between the Matanuska Valley communities of Palmer and Wasilla... There are also plans to pave from Wildwood Army station near Kenai for a distance of 30 mi. toward Kenai (depending on receipt of appropriations)... ARC is putting up a new service shop in Anchorage... A new garage is going up at the Kenai peninsula community of Soldotna... The ARC depot is being moved from Kenai to Soldotna.

FAIRBANKS DISTRICT work, as reported by phone to the Newsletter, includes a contract for grading 42 mi. of road between Northway and the Canadian border, work which is under the contract negotiated by Lytle-Green. Work will get under way as soon as weather permits. Three

bridges will be placed over Scotty creek, Gardiner creek, and Desper creek. David Nygen contractors also have been awarded contracts for the Beaver, Little Gristle and Berry creek bridges. Banner creek bridge will be completed this summer on contract to Nygren. About 25 men are working on construction of a road between Forty Mile and Eagle. Some small improvement work on the Steese highway is also planned but is dependent on the budget.

COPPER RIVER HIGHWAY—John Rosswog of Cordova's Chamber of Commerce reports that the Alaska Chamber of Commerce has given considerable attention to the Copper River highway which will tie in the Cordova area with the main Alaska highway system. Rosswog said a \$2,000,000 appropriation will be asked by the Alaska Road Commission to push work on the road during the 1956-57 fiscal year. Road work so far has proceeded only 39 mi. out of Cordova.

EMPLOYMENT PICTURE—An additional 1,600 persons have been added to payrolls in the Anchorage area alone during the past 60 days, according to information released here by Charles C. Pugh, Anchorage manager of the Alaska Territorial employment service. These added jobs raised total employment in the Anchorage area to an estimated 17,900. Unemployment also increased slightly to 3,200 for the Anchorage area, despite the 1,600 jobs opened.

FAIRBANKS JOB PICTURE—Mrs. Ola Reeves, territorial employment service manager, reports that the spring upswing in Fairbanks-area employment, has started. Unemployment in Fairbanks is down 25% from March figures. There are now 672 men working on Arctic radar network and 175 persons employed on the Haines-Fairbanks pipeline job. Within a month the crew on the pipeline will be increased to 205 men.

CONSTRUCTION NEWS CAPSULES—A survey of potential power sources in the Ketchikan area is being planned by the city of Ketchikan... Ketchikan expects to run out of power by 1960... field survey crews of the Bureau of Land Management engineering division are engaged in laying out townsite and public land lines in the territory. A crew of eight engineers is doing the work... The Alaska Corps of the District Engineers celebrated its ninth anniversary early in May.



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ENGINEERS on the move

R. E. Burnett recently left the employ of the Bureau of Reclamation to accept a job as reservoir construction manager on the St. Lawrence Power Project. His new employer will be the engineering firm of Uhl, Hall & Rich of Boston. Burnett was chief of the construction division, Cachuma Project, Calif., from March 1949 until Nov. 1, 1954, and since that time has been resident engineer on the Ventura River Project, Ventura County, Calif.

* * *

Laurel C. Gibbs recently tendered his resignation as city engineer for Chehalis, Wash. After accepting the resignation the city officials announced the appointment of **Burwell Bantz** as his successor, effective June 1. Bantz had served as Chehalis city engineer once before for 17 years, later becoming Lewis County engineer. In 1941 he became director of highways for the State of Washington, later serving as Tacoma city engineer. Most recently he has been

in the right-of-way office of the Washington Department of Highways.

* * *

When **George C. Koss** was installed as 1955 president of The Associated General Contractors of America, Inc., at the 36th annual convention at New Orleans several Western men also took office. **James W. Cawdrey** of Cawdrey & Vemo, Seattle, was chosen chairman of the Building Contractors' Division. **George C. Looz** of Stolte, Inc., Oakland, Calif., was elected vice chairman of the Heavy Construction and Railroad Contractors' Division. Among the 24 new national directors installed were: **W. C. Foss** of J. A. Terteling & Sons, Boise, Ida.; **Charles L. Harney**, Charles L. Harney, Inc., San Francisco; **Edward O. Earl**, San Xavier Rock and Sand Co., Tucson, Ariz.; **C. L. Hubner**, C. L. Hubner Co., Denver, Colo., and **J. P. Gibbons** of Gibbons & Reed Co., Salt Lake City, Utah.

Lt. Colonel Albert L. Winkler of the U. S. Air Force, who has been attached to the South Pacific Region office in San Francisco for the past four years, has a new assignment at Goose Bay, Labrador, where he will be with the installations engineer. Until this latest assignment, Colonel Winkler was Sacramento district operations officer charged with expediting construction activities for Air Force installations throughout Northern California, Hawaii, and other Pacific islands.

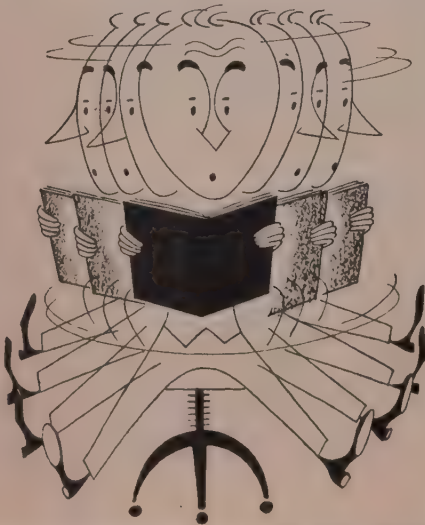
* * *

T. Y. Lin, professor of civil engineering at the University of California, recently returned from a year's study in Europe where he did advance research in prestressed concrete. Recognized as one of the leading authorities on this subject in the United States, T. Y. Lin & Associates have been retained as consultants by Ben C. Gerwick, Inc.

* * *

Fred L. Abbott, a construction engineer employed by the Portland District, Corps of Engineers, recently retired with more than 26 years' service to his credit. He had worked in the fields of construction and operations in both the Portland and the old Bonneville Districts. Abbott operated and maintained the extensive fishway system at Bonneville Dam and supervised repair of the main dam spillway and baffles.

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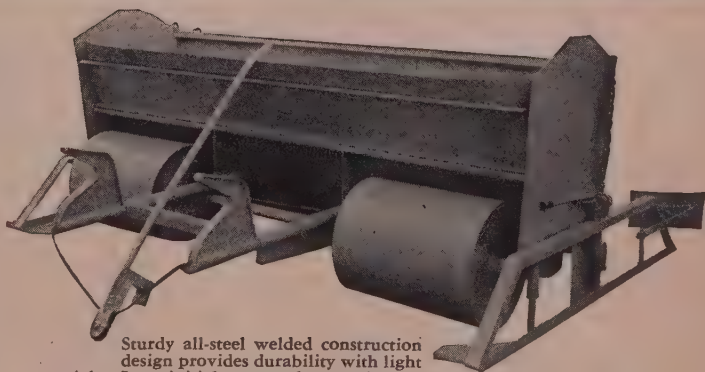
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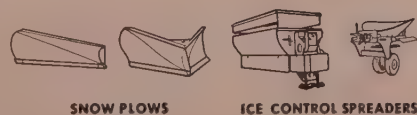
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SEVERAL IMPORTANT personnel changes have been made in the engineering department of the Salt River Power District, Phoenix, Ariz. *C. V. Watters* (right), advanced to a newly made post of supervising engineer of the planning and statistical division. *E. J. Lauerman* (left), named liaison engineer for construction of the new 100,000-kw. steam plant. *Freeman L. Roe* (center), staff consultant, becomes consulting engineer, with his services available to all departments. Changes were announced by *T. M. Morong*, chief engineer, as Salt River Power gets set for next boost in generating capacity. Bechtel will build the new steam plant.

Thomas F. Thompson, chief geologist for the South Pacific Division of the Corps of Engineers, recently resigned to take a position with the **Ralph M. Parsons Co.** of Los Angeles, engineer-contractors. Thompson becomes resident engineer for Parsons at a recently established office in New Delhi, India.

* * *

Harry W. Thompson, former chief, engineering division, Los Angeles District, Corps of Engineers, and well known to the engineering and construction industry in the Southwest, returned to duty recently after a prolonged absence due to illness. He is assigned to the executive office as consultant and technical expert on important engineering problems, with the title of **Special Engineering Consultant to the District Engineer**.

* * *

Harvard W. Birkeland has been appointed head civil engineer for Tacoma City Light's Cowlitz dams project. Birkeland has worked on such major construction projects as Hoover and Grand Coulee dams and also did design work for the new locks at the Panama Canal.

* * *

James H. Polhemus, president of Portland General Electric Co., retired April 30 after serving the company as chief executive since 1904, in accordance with the company's retirement plan. **Thomas W. Delzell**



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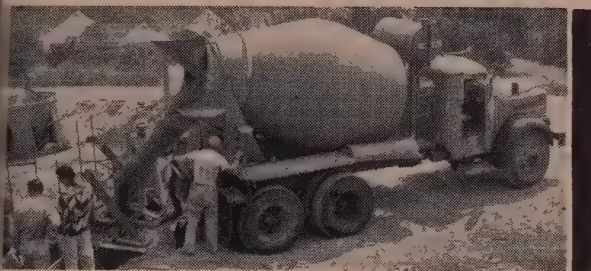
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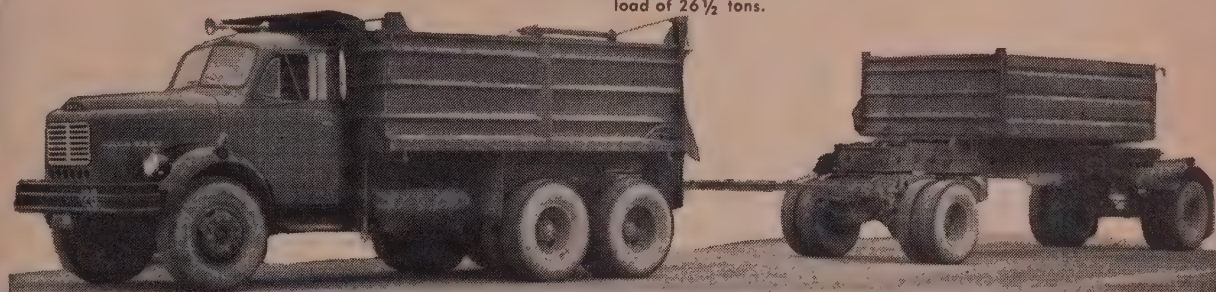


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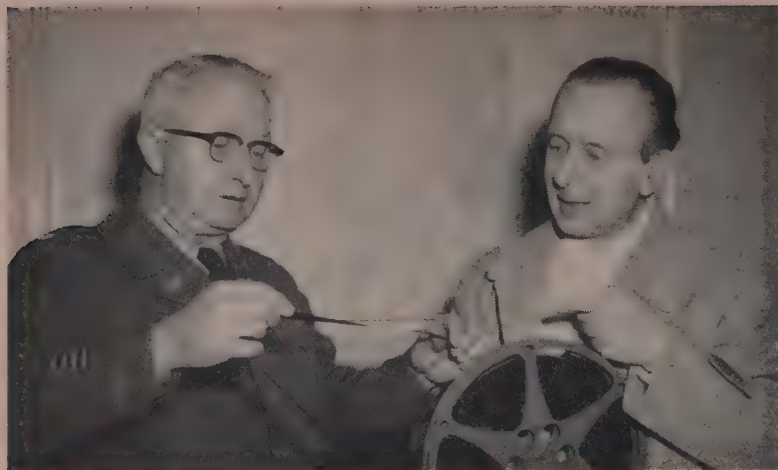
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PREVIEWING the sound and color motion picture of the great \$40,000,000 pipeline which will serve Alaskan military bases, are **Lt. Col. John E. England** and **Frederick E. B. Giermann**, motion picture producer of the Alaska District Corps of Engineers. Colonel England is in charge of supervision of construction of the 620-mi. Alcan pipeline. Stretching from Haines across northwestern Canada up to Fairbanks, the line is being built by U. S. and Canadian contractors and will be completed this fall.

was named as executive head of the company, and **Frank M. Warren, Jr.**, was elected to succeed Polhemus as president.

Edward Helgren is currently employed as construction engineer by the Corps of Engineers on the Jim

Woodruff Project at Chattahoochee, Fla. He was recently a resident engineer with Harza Engineering Co., working in Central America, and prior to that was located at Fort Peck, Mont.

Don Jarele is engineer in charge of

soil mechanics for Dames & Moore who are handling soil investigations at a large subdivision development in San Mateo County, Calif.

Ewell "Tex" O'Bryan is the newest member of the staff of Central California Chapter, Associated General Contractors. He will work as a field representative.

H. C. Holman, consulting civil engineer, is operating as successor to Holman and Siegfried at the original address: 234 West Harding Way, Stockton, Calif.

Lowell J. Stephenson of the consulting engineering firm of Porter, Urquhart & Beavin recently returned to the Ohio office from the San Francisco office in time for the construction season on the Ohio Turnpike, where he is resident engineer on a 17-mi. construction section.

Changes in assignments of engineering personnel in the Montana State Highway Commission recently announced: **Don B. Devore** from division construction engineer for Administrative Division 2 at Great Falls to duty as a senior assistant construction engineer at Helena. **Ben B. Briscoe**, who wished to return to active field construction, from secondary roads engineer to division construction engineer at Great Falls.

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Pacific Coast Aggregates, San Francisco; Blue Diamond Corporation, Los Angeles; C. E. Mitcham, Salt Lake City; Baker-Thomas Lime & Cement Co., Phoenix; Ray Corson Machinery Co., Denver; Mason's Supply Co., Portland; Miller-Richardson, Helena; Hawaii Builders Supply Co., Honolulu.

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Darex AEA is the world's most widely used brand of air entraining agent . . . specifically formulated . . . carefully compounded. Concrete made with Darex AEA places easier, finishes faster, has finer texture, is more durable. And, of course, lower cost concrete.

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"HYDRA-HAMMER"

Meets Every Challenge With

Spectacular **CONTROLLED** Hydraulic Power



Tough jobs like this point up the superiority of OTTAWA's amazing HYDRA-HAMMER. Here a HYDRA-HAMMER, owned and operated by the Dugdale Construction Company, was breaking pavement on the site of Omaha, Nebraska's, new Municipal Auditorium. Four city blocks had to be broken up and thousands of feet of underground utilities rerouted before excavation for the building could begin. HYDRA-HAMMER here trenched for 20,623 feet of telephone cable duct—beat the time deadline despite heavy traffic. That's the kind of result you, too, can count on when you choose Ottawa's Hydra-Hammer for your tough jobs. Unequalled in performance! Unparalleled in service!

CRAMER MACHINERY CO.
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CONCRETE BREAKER- BACKFILL TAMPER

1. Jobs Are Faster, Easier, More Economical . . .

with OTTAWA'S revolutionary self-propelled HYDRA-HAMMER operated by only one man!

2. SAVINGS UP TO 50%

. . . as adapting tools allow the HYDRA-HAMMER to make quick, easy work of such operations as backfill tamping, concrete breaking, asphalt cutting, post driving or filling, rock tamping, ice chipping and many others.

3. Operates from 0 M.P.H. Up

. . . with an infinite variety of creep speeds. Road speed 18 M.P.H. Powered by a 23 horsepower Wisconsin gasoline engine working with a Thomas hydraulic clutch drive and a Warner transmission.

4. EASY TO OPERATE

No skilled operators needed for this multi-purpose, self-propelled tool . . . any man able to drive a truck can learn to operate the HYDRA-HAMMER in an hour. The main hammer falls free, eliminating shock and high maintenance costs.

5. SELF-PROPELLED

This feature of the HYDRA-HAMMER enables it to get from job to job under its own power . . . no extra equipment or manpower such as tow truck and driver needed.

Ottawa

OTTAWA STEEL, INC.

OTTAWA, KANSAS

CUT COSTS WITH A...

GREASLESS MECHANICAL SEAL

CARVER PUMPS . . . the only Contractors Self Priming Pump with Greaseless Mechanical Seal . . . are your best guarantee for maximum performance at minimum operating cost.

No expensive time or material required to service this pump. Trouble-free and maintenance-free, a CARVER PUMP is "Your Best Buy for Better Performance."

Write the factory or see your CARVER Distributor for complete information.

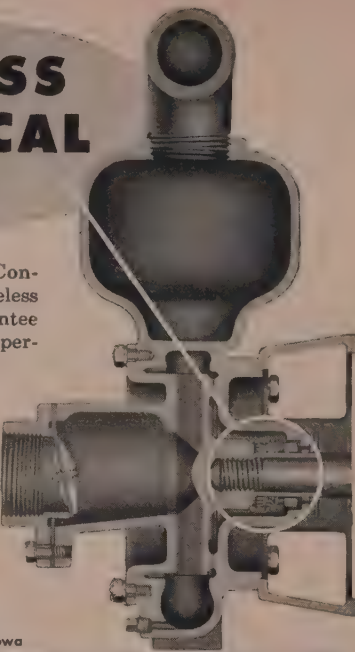
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The quality name in pumps



WISCONSIN-POWERED New Pitman "Giraffe" Gives Men and Tools a Fast, HIGH LIFT...

With a reach up to 40 ft. above the ground and a lift capacity of 1500 lbs., this unique, folding type aerial boom, made by Pitman Mfg. Co., Kansas City, Mo., speeds up many overhead jobs in construction service. Can be used for hoisting men, tools and materials for roofing and similar work, drilling in quarries and construction jobs, working on power lines, setting light utility poles, placing transformers and many other operations. A 2-cylinder Model TFD Wisconsin Heavy-Duty Air-Cooled engine supplies dependable, quick-starting, all-weather power which can also be used to drive compressor or generator . . . again demonstrating the great versatility and adaptability of Wisconsin Engines providing always ready-to-go Lugging Power to Fit the Job and the Machine. . . 4-cycle single cylinder, 2- and 4-cylinder models 3 to 38 hp. You can't do better than specify "Wisconsin Power" for your equipment. Write for Bulletin S-164.



Power
TO FIT THE
JOB

Power
TO FIT THE
MACHINE



WISCONSIN MOTOR CORPORATION

World's Largest Builders of Heavy-Duty Air-Cooled Engines

MILWAUKEE 46, WISCONSIN

W. Allen Grubb, manager of the Northwest Division of American Pipe & Construction Co., Portland, Ore., recently became manager of the Southern California Division at South Gate. A vice president and director of the company, Grubb has been with American Pipe for about 25 years.



Grubb



Blasen

Robert E. Blasen, Spokane, Wash., area manager of Westinghouse Electric Corp., was recently chosen 1955 president of The Associated Engineers of Spokane. Elected to serve with him as vice presidents were: William K. Stockdale, Harold A. Halstead, Sr., Fred A. Long, Ivan Shirk, J. Byron Barber, Edward E. Ralph, Charles J. Melrose, and Ed C. Stephens. Wilbur L. King is secretary-treasurer of the organization.

DEATHS

Frank M. Stocking, right-of-way engineer with the Washington Department of Highways, died Mar. 29.

* * *

Harold N. Abelson, 47, Tacoma City Light engineer who had worked on several major dams in the West, died March 26 in Tacoma, Wash. He had only recently been appointed resident engineer for Tacoma's Cowitz dams project.

* * *

Frederic F. Hall of Hall, Pregnon & Mathen, structural engineers of San Francisco, died March 26 of a heart attack.

* * *

Max W. King, 73, internationally known civil engineer, and a life member of the American Society of Civil Engineers, recently died after a year's illness. In more recent years, he had been consulting engineer under the Secretary of Hydraulic Resources of Mexico.

* * *

Edgar J. Sams, 62, field man for the Arizona state registrar of construction, died recently in a Phoenix hospital after a long illness.

* * *

Earl "Pop" Dixon died April 25 at San Rafael, Calif. He was an old-time tunnel man, having worked for Piombo Construction Co., Bresnan Construction Co., and recently for Guy F. Atkinson on Waldo tunnel.

A truck engine needs a "backbone" like this—



to save you the **BIG** money

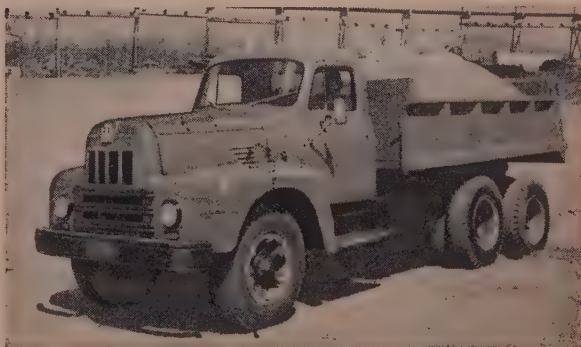
Crankshafts are just one example of INTERNATIONAL all-truck engineering that saves you the *big money*.

Of the five leading makes, only INTERNATIONAL builds a complete line of models that are *all-truck* . . . with no automobile engines or components asked to do a truck job.

You save the most with an INTERNATIONAL that's *all-truck built* to last longer. It earns its keep in lower over-the-years operating and maintenance cost. It pays for itself in use. It saves you—earns you—the *big money*.

Keeping costs down has made INTERNATIONAL the heavy-duty leader for 23 straight years. Let your INTERNATIONAL Dealer or Branch show you the right INTERNATIONAL for your job—built to save you the BIG money.

From fiery forges and precision machines come extra-strong INTERNATIONAL crankshafts. Those used in light-duty models are 17% heavier than the average of comparable forged or cast alloy 6-cylinder designs—for maximum strength and rigidity, long life.



There's an INTERNATIONAL exactly right for every construction job—all-truck built to save you the BIG money. 200 basic models—4,200 to 90,000 lbs. GVW, conventional and COE, 4-wheel, 6-wheel, four-wheel drive. World's widest choice of power and power transmission options.

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INTERNATIONAL[®] TRUCKS



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to save you
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Top TV Comedy! Ronald Colman and Benita Hume in
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International Harvester Builds McCORMICK® Farm Equipment and FARMALL® Tractors... Motor Trucks... Industrial Power... Refrigerators and Freezers

SUPERVISING the jobs

W. M. Ritchie is job superintendent for Lembke-Clough & King, constructing a 4-story structural steel hospital addition in Carlsbad, New Mex. This \$371,695 project got under way Jan. 1 and completion is set for Dec. 1.

* * *

F. W. Wheelwright, superintendent, with **K. M. Wheelwright** and **W. E. Burbidge**, foreman, are key men on a \$819,610 construction contract at Weber Dam in Utah, involving 4 mi. of precast concrete pipeline. Wheelwright Construction Co. is doing the work. Starting date was March and job is expected to run till October 1956.

* * *

Roy F. Johnson, project manager, is in charge of a \$112,919 project for Cherf Bros. & Sand Kay Construction Co. involving 2 mi. of grading and surfacing south of Soap Lake in Grant County, Wash. Job started in mid-January and will probably end this November.

* * *

Pat O'Callaghan is construction supervisor, and **Harold Percival** is job superintendent for Lord Brothers, contractor on construction of concrete viaduct over U.P. main line and spur tracks, pedestrian overcross-

ing, and miscellaneous work in Multnomah County, Ore. Carpenter foreman on this \$129,030 job is **Gillian "Scotty" McClain**. Work has been going since Jan. 20 and is expected to be finished in August.

* * *

George Knuteson is superintendent and **R. E. Dobbs** is resident engineer on the W. W. Clyde & Co. contract for construction of a new



Knuteson



Dobbs

type bridge near Salt Lake City. This Utah Road Commission project is described in this issue.

* * *

Jesse C. Moore, superintendent, with the assistance of **F. R. Acton** and **J. L. Thayer**, grade foremen, is

in charge of grading, draining, surfacing, and miscellaneous work on 0.5 mi. of Cody-Yellowstone Park road from Cody west, in Park County, Wyo., for Taggart Construction Co. Work started on this \$191,368 contract Jan. 1 and is fast coming to an end.

* * *

A. J. Schwitters is general superintendent on construction of a 2-story, reinforced concrete-steel addition to a high school in Kodiak, Alaska, a \$720,000 project which is in the hands of S. S. Mullen, Inc., contractor. **W. L. Bergman** is engineer and **C. T. Collins** is foreman. Work started in mid-March and is expected to be complete by Dec. 1.

* * *

C. S. Muir, general superintendent, and **L. R. Reiter**, superintendent, top the personnel working for McLaughlin, Inc., on a \$236,483 grading, surfacing, and miscellaneous construction road job, Jackson-Dillon, west section, in Beaverhead County, Mont. Work started Mar. 21 and will probably end Aug. 31.

* * *

Donald Boots, general superintendent, heads the crew of Rogers Construction, Inc., which recently received an award at \$219,487 for 2.6 mi. of grading and paving, west unit, Weston-Weston Mountain section of highway east from Weston, Umatilla County, Wash. Crushing superintendent is **Homer Paston**; superintendent on grading is **Claude Cousins**.

* * *

Gus Lorenz is superintendent, and **Bill Booth** is engineer, for Manson Construction & Engineering Co. which has a \$1,250,000 subcontract from Bechtel for work at the Shell Oil Co. refinery going up at Anacortes, Wash. Contract involves a 3,330-ft. long causeway, 644-ft. long wharf, creosoted piling, 73-lb. H-piling in 21 mooring dolphins. Foremen on the job are **Martin Dinesen**, **Adolph Fosness**, and **Irv Wehde**. Started in late September last year, the job is expected to be finished this month.

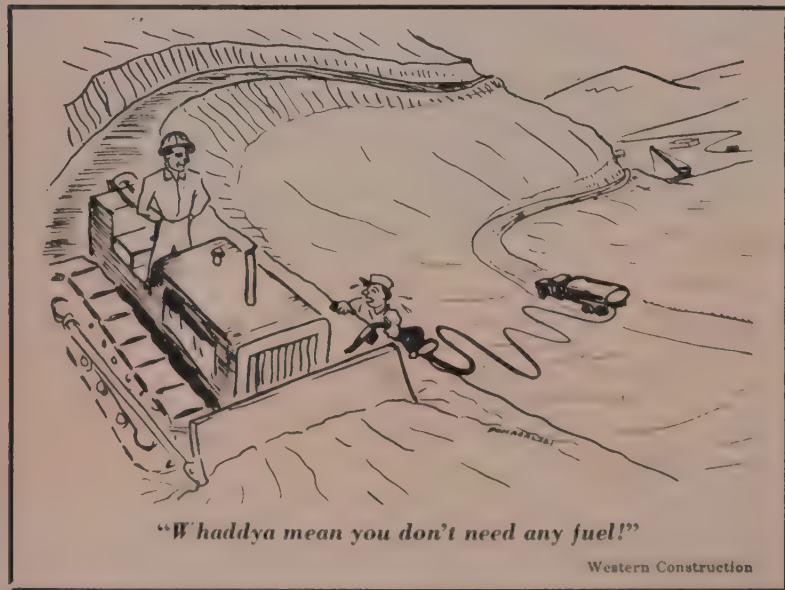
* * *

Norman Thorsell, as superintendent, heads the job personnel working on the \$2,000,000 steel and concrete hall of justice going up at Redwood City for San Mateo County, Calif. **O. D. Walker** is in charge of the office. **Al Kaski** is carpenter foreman, and **Joe Soares** is labor foreman. General contractor is **R. E. Parker**. The structural steel is being done by Herrick Iron Works. **James A. Nelson Co.** has the plumbing, with **Walter M. Hughes** superintending. Structure is expected to be finished by August 1956.

* * *

Robert Schwingler is superintending for Herbert A. Crocker Co. which currently is working on a contract for the erection of a market under lift slab design at San Rafael, Calif.

Down-time By Domagalski

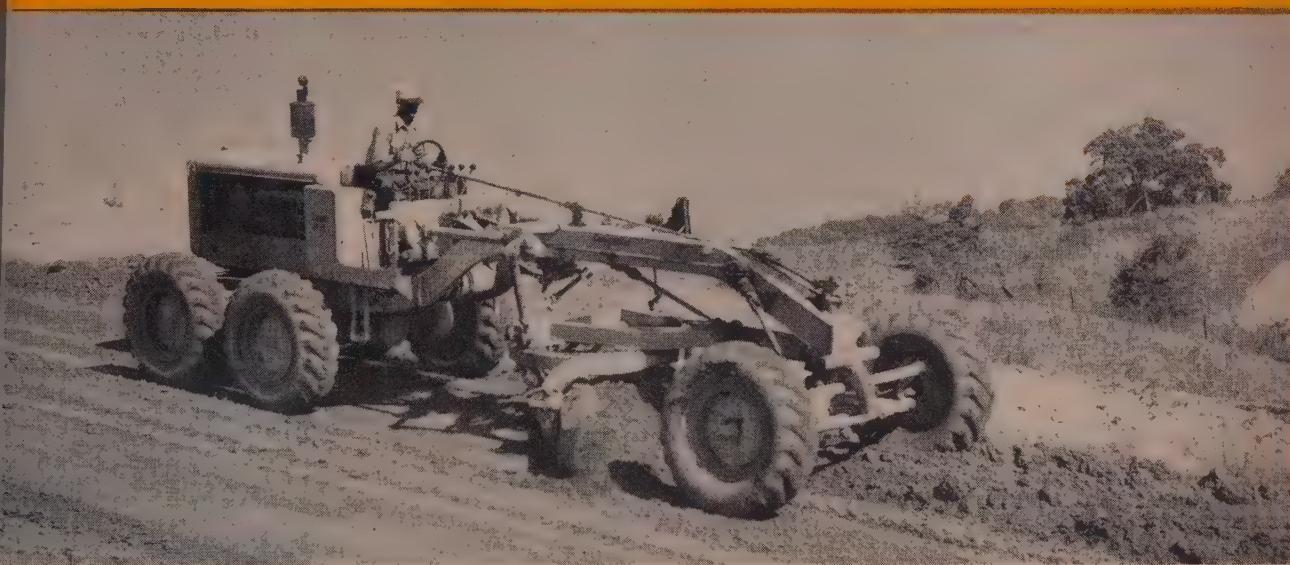


"W'haddya mean you don't need any fuel!"

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When figuring
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THE No. 12
GOES ON THE
CREDIT SIDE



The Caterpillar No. 12 Motor Grader is a big, versatile machine that always is entered on the credit side of ledger books. Particularly when you figure earthmoving costs.

Knutson-Gould Construction Co. of Kansas City, Mo., knew that when it began hauling fill for the approach to the Missouri Bridge at Jefferson City. Here, you see its CAT* No. 12 Motor Grader as the cost-cutting member of a team of equipment moving 260,000 yards of loess and clay.

The No. 12 is maintaining the haul road. By so doing, it is wringing the last cent of economy out of the big tractor-scraper teams. They can haul their maximum capacity at the highest possible speed. The D7 and D8 pusher Tractors are not called away from the borrow pit to help rescue mired-down equipment.

And down time costs are slashed because the road is an *aid* to the tractor-scrapers, not a torture trail that causes breakdowns.

Your Caterpillar Dealer will be glad to show you the No. 12, No. 112 and the No. 212 Motor Graders at work on your job. Have him demonstrate the reasons successful contractors always put Cat Motor Graders on the credit side when they figure earthmoving costs.

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**99% OF ALL CAT
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BUILT ARE STILL IN USE**



FOUR MEN SUPERVISING erection of the \$21,099,319 superstructure of the highway bridge located between Richmond and San Rafael over San Francisco Bay: (from left to right) **J. Phillip Murphy**, project sponsor; **Francis Murphy**, project manager; **Bill Ziegler**, job superintendent, and **Rod Chisholm**, yard superintendent. A review of the work of the contractor, Judson Pacific-Murphy-Kiewit, appeared last month.

C. J. Simpson, superintendent, and his assistant **M. H. Davis**, head the job personnel for Dinwiddie Construction Co. which is erecting The Emporium department store at San Mateo, Calif., at a cost of about \$1,000,000. Others among the key men are: **W. A. Michael**, carpenter foreman; **B. F. Shaver**, concrete foreman, and **William Plambaeck**, door foreman. Timekeeper is **H. D. Gregory**. Civil engineer on the construction of this building, which is expected to be finished by the end of the year, is **J. E. Tallman**.

* * *

F. H. Brown, general superintendent; and **Anthony Bruno**, superintendent, head the crew working for

L. C. Smith Co. which has a contract on the Los Gatos Freeway in California involving 2.14 mi. and 3 concrete structures, a \$1,200,000 job scheduled for completion in December. **Glen Atkinson** is in charge of the office. Other important supervisors are these foremen: **Marvin Zimmerman** and **Joe Pires**, carpenter; **Frank Brumfield**, labor; **Hugo Russell**, **Fred Marsh**, and **Herman New**, grade; **J. H. Bramlage**, master mechanic; and **Phil Pellizzari**, underground.

* * *

P. J. Moore, general superintendent for Cory & Longworth, Inc., is directing the work of building an addition to the present Del Mar Turf Club grandstand at Del Mar, Calif., a

\$350,000 structure which has been under way since February and will soon be completed. Bethlehem-Pacific Coast Steel Corp. is doing the steel erection under a subcontract. **Jess A. Cheely** is general superintendent for this work, assisted by **Hal Mousseau** and **Eddie Ryan**, foremen.

* * *

Cliff McCurdy is general superintendent on the erection of an office building in Los Angeles, Calif., for the Blue Cross Insurance Co., a \$1,150,000 project being executed by Ford J. Twatts Co. **Bob Hylton** is job engineer. The office is in charge of **Maury Graverstine**. Foremen are: **Foy Hodges**, general carpenter; **William Thompson**, general labor; **Don Hansen**, steel, and "Hendy" **Henderson**, electric.

* * *

Thomas H. Brennan is superintendent for Barrett Construction Co. on Lee Bros. Supermarket at Los Gatos, Calif., a \$150,000 contract scheduled for completion this month.

* * *

James Briggs is general superintendent and **Don Jellison** is engineer on the grading at Candlestick Point, San Francisco, a California Division of Highways project awarded to John Delphia at a cost of \$358,595. Work started April 12 and is expected to be finished in October. Subcontractor on the structures is Thomas Construction Co.

Heavy Duty Shoulders for West Virginia Turnpike

Bitumuls® 3" Penetration Macadam Specified

To increase safety and utility, nine-foot shoulders were added to a 30-mile section of the West Virginia Turnpike. To provide maximum stability, Bitumuls Penetration Macadam was specified.

Special Compactor—An interesting feature of the job was a special "articulated" compactor that was developed to prevent "ride-over" and assure a tight interlocking of the base stone.

Macadam Construction—When the base stone was in place and tightly compacted, it was choked, rolled, and "hot" with Bitumuls RS-1 (0.25 gal./sq. yd.). This was followed by a cover of stone chips which was rolled with an 8-ton tandem. Bitumuls RS-1 was again applied (0.8 gal./sq. yd.), and again covered with chips.

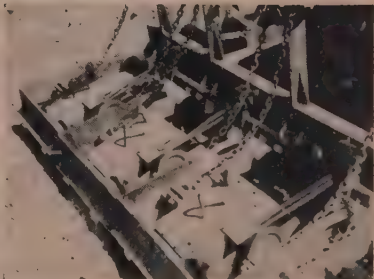
Double Surface Treatment—The finished Penetration Macadam was then given a Bitumuls Double Surface Treatment. This sealed the surface; provided excellent wearing and riding qualities.

Call our office nearest you for full details, or write for our illustrated booklets on all types of Bitumuls pavements.



Completed Penetration Macadam before Surface Treatment.

Close-up of special compactor showing "articulated" design with separate 2-foot sections.



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Earl Barnard is superintendent and W. F. Boone is engineer on \$418,445 grading contract which was recently awarded by the Bureau of Public Roads to Humboldt Constructors, Inc., and John Delphia. Work has been under way since April 21 and is scheduled for completion in November.

* * *

W. S. Kimble is supervising a \$96,200 contract for John Delphia near Novato, Calif. Work consists of grading for the new Loma Verde subdivision addition being constructed by the Trousdale Construction Co. Under way since mid-April, the grading is now about finished.

* * *

Elmer E. "Bud" Kerr is job superintendent on a 4-mi. grading and paving contract near La Moine, Calif., for Piombo Construction Co. Others among the contractor personnel on the \$2,314,554 state highway project are M. H. Griggs, bridge superintendent; Jim Lewis, grade foreman, and Carl Frandsen, carpenter foreman. Contractor started work Feb. 21 and expects to finish in fall of 1956.

* * *

Art Lambert, project manager; Bud Burns, general superintendent, and the following men are among the principal personnel working on the Serra High School going up at San Mateo, Calif., for the Catholic Archdiocese of San Francisco: Frank Zoellern, general foreman; Martin Stanley, carpenter foreman; Leo Blow, labor foreman, and Jack Woodruff, expeditor. Roy Willis is office manager. Bob Lally is superintending for Kleinen Plumbing; Al Figuret for York Electrical, and Sol Cooper for Vagtborg Lift-Slab Corp. Swinerton & Walberg Co., the general contractor, expects to have the job completed in September.

* * *

George Krenkel is supervising work on the World Trade Center located in the Ferry Building, San Francisco, for Engineers, Ltd. H. P. Henselmeier is office manager. Other important personnel are Henry Boltres and Walt Skanderson, carpenter foremen; A. Alvarado, concrete foreman, and Carl Rosenquist, labor foreman.

* * *

Walt Drexler, foreman, heads a \$252,950 contract for Miller & Strong, Inc., work on which started May 1 and will run for 400 days. Contract is for 0.7 mi. of paving and construction of steel girder span to extend the Pacific Highway undercrossing of the S. P. R. R. at Ashland, Ore.

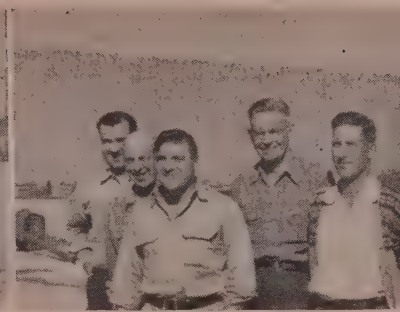
* * *

Darrel A. Wagner, superintendent, assisted by Fred L. Legg, foreman, heads the personnel working for Woodward Construction Co. on a job in Sweetwater County, Wyo. A 90-day job which will probably end by Sept. 1, work consists of surfacing



Stinson

Bartlett



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Sumner

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MacFarland

Conroy



Pearce Dunkel Wiseman Taylor

Merritt-Savin's last season at Folsom

D. E. Stinson, project manager; C. Brovelli, superintendent, and his assistant A. W. Bartlett; L. G. Sumner, project engineer, and J. R. Blinn, assistant project engineer, are top men working for Merritt-Chapman & Scott Corp. and The Savin Construction Corp. on construction of Folsom Dam on the American River, Calif. Among others who are assisting as supervisors are the following: Geo. Blessis, cost engineer; C. W. Henning. Also superintendents: John Helcountant; Ed Rapp, paymaster, and Fred Watson, in charge of purchasing. Also superintendent: John Hellerud, carpenter; Fred Lichtenstern, ice plant; Owen Taylor, ironworker; "Blackie" Scriven, electrical; Afel Johnson, master mechanic; B. E. Wood, safety engineer, and "Doc" Tarr, medical steward. And foremen: Bob Fowler, batch plant; Mike Krumpotic and Eddie Miller, concrete; Steve Krumpotic

and Dean Reeve, clean-up; Peter Conroy, finisher; Fred Binkerd, carpenter; Owen Taylor, F. G. Dunkel and Rex Pearce, ironworker; "Chuck" Wiseman, resteel; George MacFarland, pipeworker; John Souza, teamster; Ed Fornham and Ed Miller, electrical; Charlie Jeffs, excavation, and Paul Holt, filer. Humphrey Courtley, draftsman, and "Dick" Depietri, cost clerk, are also on the job.

Westinghouse Electric Corp. has a contract for the installing of three 60,000-kva. vertical generators in the powerhouse, which work is under the supervision of Matthew R. Laking, field service engineer for Westinghouse. Foremen are Edwin Koski, Anthony Kowall, Claude Hall and Noble Hinkle.

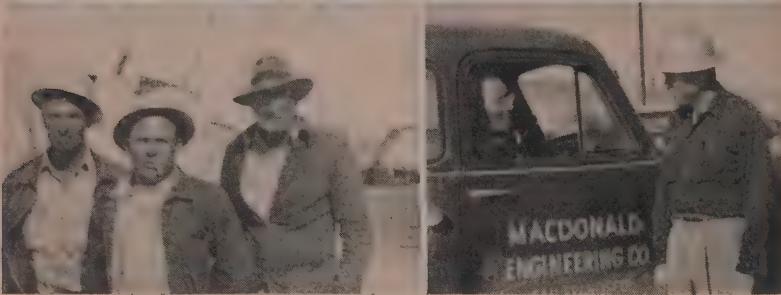
This multi-purpose project of the Corps of Engineers was started in late 1951 and is expected to be completed the spring of 1956.

on 12.9 mi. of Green River-Rock Springs road, and 11.7 mi. of surfacing on Pinedale-Rock Springs road, and gravel surface on .2 mi. of Community Park road.

* * *

Tom Ridge is superintending for Barnhill Construction Co., which is doing a tilt-up wall construction at Salinas, Calif., for Growers Container Co. Foremen on this \$300,000 building are Walt Stop and Dick Selberg.

Ewell A. Smith, project manager E. G. Fredrikson, general superintendent, and Ben Garland, project engineer, are the top supervisors on a large contract for extensive paving hardstands, parking areas, and other improvements at Fort Richardson Alaska. Anchorage Builders, Inc., and Kincaid & King Construction Co., Inc., joint venturers handling the \$1,049,630 job, started work about May 1 and expect to finish the job by



BUILDING A BIG CEMENT PLANT IN THE MOJAVE DESERT

Here are some men running the job of erecting the California Portland Cement Co. plant soon to be completed near Mojave, Calif. — (top, from left) *Charles E. Perego*, general concrete foreman for L. E. Dixon Co., prime contractor; and four members of the crew of Bigge Crane & Rigging Co., subcontractor: *Bill Edwards*, millwright foreman; *Lyle Woodside*, general millwright foreman; and *Ray Green* and *Tom Webster*, also millwright foremen. Bottom: "*Cliff*" *Link*, carpenter foreman; *F. E. Granger* and *Paul A. Beach*, assistant superintendents; *W. M. "Mac" Reynolds*, general superintendent, and *C. G. Jolly*, office manager, all working for MacDonald Engineering Co. of California, another subcontractor. Additional names of contractors' personnel assisting on this project appeared in "Supervising the Jobs" last month.

Sept. 1, 1956. Babler & Rogers is doing the paving under a subcontract; City Electric of Anchorage is putting in the electrical distribution system, and William Olday is excavating sub.

* * *

R. F. Calou is superintending Fredrickson & Watson Construction Co.'s contract for highway work in California, between Route 5 at Dublin and 0.2 mi. north of Contra Costa County line, consisting of 2.2 mi. of grading and surfacing and concrete bridge. **Tom Bond** is office manager. Foremen are **Ted Johnson**, carpenter, and **Tex Strickland**, grading. A \$531,606 job, work started April 1 and is expected to take 160 days. "Just another job," says **O. Fredrickson**, "major domo" of the construction company.

* * *

E. L. Williamson, job superintendent for R. A. Farish Co., is in charge of a \$175,350 job consisting of 2.1 mi. to be graded and surfaced, also a reinforced concrete bridge, near Rumsey, Yolo County, Calif. A 140-day contract, starting date was April 15.

* * *

Lane Day, superintendent; **W. H. Barrett**, superintendent on bridges and culverts; **Dewitt Green**, equipment foreman, and **John Burke** on plants and materials, are among the top men on the San Xavier Rock & Sand Co.'s \$362,184 contract for 3 3/4 mi. of grading, draining, and surfac-

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ing on Route 80 east of Tucson, Ariz. Work got under way April 25, and according to **D. M. Kelly**, vice president and manager of the contracting firm, will finish in about 180 working days.

* * *

Joseph J. Leipziger, president, and **Milton D. Whitney**, vice president, of Foremost Contracting & Engineering Co., are in charge of the company's \$1,043,000 construction of 11 dwellings soon to be erected at Vineland Ave., Ahern St. and Feather Ave. in Puente, Calif. Starting date is July 1; length of job, 150 days.

* * *

H. A. Nelson, project superintendent, heads the personnel on a 180-day job for concrete paving and miscellaneous work at Holloman AFB, Alamogordo, New Mex. Work on this \$788,018 project of **H. B. Zachry Construction Co.** started April 4.

* * *

Monroe K. Piercy is superintending construction of State Highway 1, Mount Vernon to Skagit River in Skagit County, Wash., for **P. J. Anderson & Sons** who recently won the contract at \$396,987. **Ken Reinecke** is in the master mechanic spot. Work involves 500,000 yd. of borrow on 1.2 mi. of Highway 99. Contractor will use D8 tractors, DW21 motorized scrapers and Caterpillar and Le Tourneau carry-alls. Construction started in mid-April and is scheduled to be finished in 270 days.

* * *

Gordon Bunker will be in the engineer spot when Allum Brothers' contract gets under way on 3.3 mi. of grading and surfacing of a section of East Burnside Road near Gresham, Multnomah County, Ore., a 150-day work schedule. Contract price is \$139,796.

* * *

Jer R. Abbott, general superintendent-partner in the firm of Germer, Abbott & Waldron, is in charge of constructing roadbed, a concrete bridge, and appurtenant work in Jefferson County, Ida. **John Burt** is superintending the job and **Laurence Lloyd** is crushing superintendent. Contract is expected to be finished on or before Sept. 15. Cost, \$91,188.

* * *

M. S. Gorton, project manager; **Herbert Anderson**, chief dredge engineer, and **Ray Renk**, fill superintendent, comprise the supervisory personnel of Puget Sound Bridge & Dredging Co. which has a \$296,010 contract for dredging Coos Bay ship channel to a depth of 30 ft. and disposing of excavated material. Work started May 9 and as of June 1 the "H. W. McCurdy," 24-in diesel electric dredge, will be moved from Seattle to Coos Bay, Ore., for the work.

* * *

S. J. Kocar, project manager; **A. E. Robinson**, superintendent; **H. G. Harrington**, engineer and assistant

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Fig. 1. Tacking roof joints in position on 440' x 440' all welded frame work.

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SITE fabrication of structural steel for this new 440' x 440' plant saved as much as \$20 per ton on the cost of steel as compared to buying fabricated building members.

Clips and base plates were first welded to columns. Largest plates were ½" x 14" x 14". Principal steel members were 24" 110 pound wide-flange beams, 39' 3" long; 8", 31 pound columns.

Forty-foot clear-span joists were used, tack welded on 6' 8" centers, and later welded along both sides and top and bottom edges. Steel deck roofing was welded with Lincoln "Fleetweld 5", burning through the 20 gauge deck for a plug weld to the joists.



Fig. 2. "Fixture" of heavy 24" I beam speeds fabrication of window framing. Framing is only tack welded to fixture.

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superintendent, and **R. Swearingen**, office manager, comprise the top personnel working for **J. I. Barnes Construction Co.** on erection of two 4-story reinforced concrete men's residence halls and remodeling a third, at Washington State College, Pullman. This \$1,474,860 project is expected to take 540 days and work has been going on since April 18.

Howard Eastin, recently connected with **A. S. Horner Construction Co.**, has moved to New York where he is employed as office manager by **Uhl, Hall & Rich** who are doing work at **Iroquois Dam**, Massena.

A. W. Schrank, president and general manager of the **Twin Falls Construction Co.**, is in overall charge, and **H. L. Standlee** is general superintendent of construction of roadway and surfacing 2.3 mi. of highway 51, from Bruneau west, and surfacing on 14.2 mi. of **Murphy-Bruneau road**, Owyhee County, Idaho. Oiling superintendent on this \$239,668 award is **A. V. Smith**. Expected duration of job is from mid-May till mid-August.

Robert L. Kenning, project superintendent, and **Harold A. "Pat" Murphy**, project engineer, are key men on a 4.4-mi. job grading and surfacing on **Clayton road**, near **Concord**, **Contra Costa County, Calif.** **Trans-ocean Engineering Corp.** was awarded the contract on a \$547,527 bid. Two

others in key jobs are **Paul E. Fields**, foreman, and **Arnold S. "Ole" Olson**, master mechanic. Job started Mar. 1 and will probably end Dec. 20.

Frank F. Johnson, general superintendent, with **Lyman L. Robbins**, bridge superintendent, heads up a \$296,451 job consisting of 5.6 mi. of grading and surfacing on **S. R. 24**, including 2 bridges, in **Wayne County, Utah**. The following foremen are also on the job: **V. J. Kennedy**, concrete, and **J. M. Cranmer** and **Lee Gillman**, grade. **Strong Company**, the contractor, started work in late March and expects to finish the job by mid-August.

Kenneth J. Rose, superintendent; **Ralph E. Kriese**, grade foreman, and **Kenneth King**, timekeeper, are key men on a grading and draining job in **Arizona** which **Isbell Construction Co.** has under way since the middle of January. Location of this \$315,955 job is about 16 mi. north of **Winkelman**, extending northerly on **Route 77** for about 4 mi. Construction will probably be finished by Aug. 1.

W. J. Harrison is superintending for **Phoenix-Tempe Stone Co.** a \$319,022 contract near **Phoenix, Ariz.** Work consists of about 17¾ mi. of surfacing and asphalt paving beginning at new junction, extending northeasterly over **S. R. 70** on **Flagstaff highway**. Equipment foreman is

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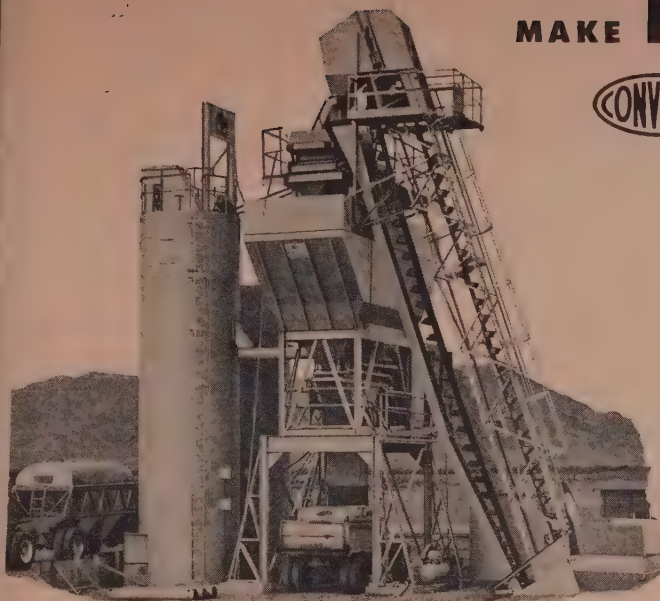


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GLOWING WITH GOOD FEELING of work well done are personnel of Ashbach-Craig Co. of Anchorage, Alaska, supplier of ready-mixed concrete to all contractors working on Elmendorf AFB, Fort Richardson. The firm achieved a record of operating a whole year with only one lost-time injury, and was presented with a plaque by Employers Mutuals, their compensation insurer. **C. W. Ashbach** (third from left), project manager of the concrete firm, accepts plaque from **A. J. Counter**, insurance company representative. Looking on are **Fred Rehbine**, plant foreman (left); and **Alvin Buerkle**, truck driver.

Shepherd, Wilson & Kruege which has currently under construction a 500-man theater, flight simulator building, shops, and various other buildings at Elmendorf AFB, Anchorage, Alaska. Other important men working on this \$1,165,940 project are: **Jake J. Eberle**, purchasing agent, and **Eric A. Paul**, timekeeper.

Starting date of work was April 15; expected completion date, Nov. 15.

L. G. (Bud) Wilder, general superintendent, and **Gene Hamdorf**, construction superintendent, head the crew working for Wells Cargo, Inc., on the \$789,857 construction of a portion of the State Highway system in

Las Vegas, Clark County, Nev. Other contractor men on this job, which is finishing soon, are **Lee Irons**, grade foreman, **Jim Olim**, pipe foreman, and **William Hartman**, paving foreman.

Mel Evenson, project manager, is in charge of construction of Air Force auxiliary facilities at Naknek, Alaska, for Morrison-Knudsen Co., Inc. Others among the key men on this \$4,099,487 project are **Donald Wolfe**, dirt superintendent and **H. M. Hines**, office manager. Started in May, this project is scheduled for completion December 1956.

R. L. Sawyer, carpenter foreman for W. R. Cahoon Construction Co., is in charge of Rupert shop and warehouse, Northside Pumping Division, Minidoka Project, Idaho. Work on this \$47,750 job will soon be finished.

J. C. Ryan, project manager; **Charles Prose**, superintendent, and **E. B. Ryan**, foreman, are three top men working for Arizona Sand & Rock Co. on a \$118,493 contract for grading and paving on Route 90 in Arizona. Length of construction is about 2 1/4 mi. of the Fort Huachuca-Bisbee highway. Started Mar. 1, job is just about finishing.

Frank Rieber, on grading and paving, and **Jack Goldman**, on structures, are superintending a 0.5-mi. stretch of road to be graded and surfaced, and a structural steel bridge to be erected, in Fresno County, Calif. This \$221,020 contract was awarded to Gene Richards, Inc., and D. M. Underdown, who started work Mar. 1 and expect to have the job completed

Rexford B. Stuart is project manager and **James Davis** is superintendent for Curtis Construction Co. which started work Jan. 26 on grading and surfacing of 7.2 mi. of S. H. 11-G in Grant County, Wash. This \$192,161 job is expected to be completed by July 1.

Bert Norris is supervising construction of 3.5 mi. of grading and paving on the Klamath Falls Midland overcrossing section of Midland highway, 3 mi. south of Klamath Falls, Ore., for Peter Kiewit Sons' Co. Contract also includes furnishing 2,000 cu. yd. of crushed rock in stockpile. **Ed Ross** is crusher foreman. Job started Mar. 1 and will probably end July 1.

Cecil C. Baird, superintendent, and **Gordon Bunker**, engineer, are Allum Brothers Construction Co.'s key men on this contractor's \$140,187 3.1-mi. stretch of grading and stone surfacing on the Eugene-Marcola road about 2 mi. northeast of Springfield, Lane County, Ore. This job has a scheduled completion date of July 31.

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Jay Crowley, chief engineer of Reclamation District No. 1500 and Lee Kimball, sales manager of the pump division of Byron Jackson Co., were on hand at this first inspection and check-up of the pumps. These same two men were principals in the original sales transaction made 26 yr. ago.

The pumps furnished in 1929 were equipped with a propeller type of runner, with each pump connected direct to a 200-hp., 277-rpm. synchronous motor. The synchronous motors were arranged for automatic starting and stopping by means of the ordinary start-and-stop push button station, and at that time was the first installation of its kind in the world.

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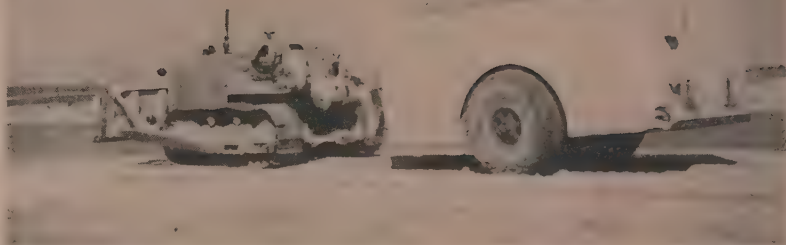
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GRACE COMPACTOR, loaded to 100,000 lb., was pulled by a Cat D8 tractor during compaction tests run at the Air Force Academy site near Colorado Springs, Colo. The compactor was run over this layer of earth 8 times to get maximum compaction.

Air Force Academy progress report

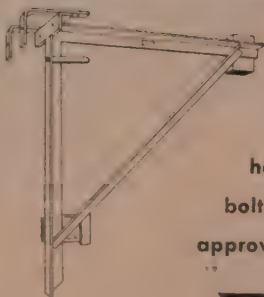
THE FIRST construction equipment has moved into the site of the \$125,000,000 Air Force Academy north of Colorado Springs, Colo., to assist in obtaining information on soil and foundation conditions which will confront contractors building the Academy.

For more than a month early this year the Oklahoma Testing Laboratories of Oklahoma City, Okla., had soil engineers running a variety of tests throughout the area where the runway, taxi strips, aprons, and other portions of the airfield are to be located. This organization is under contract to Skidmore, Owings and Merrill of Chicago, architects-engineers for the project. Construction will probably get under way in June.

Air Force Academy Construction Agency officials estimate that the excavation and earthmoving on the airfield area, the road systems, and construction of some utilities will be completed by the end of this year. Structural work will be started early in 1956. About 1,000 people will be working on the project during 1955. At peak production, in about 2 yr., there will be up to 5,000 employed on Air Academy construction. In most instances the prime contractor will be responsible for all labor, materials, and supplies.

More than 17,000 ac. of land have been purchased for the Air Academy just north of Colorado Springs, where the climate and terrain has been judged ideally suited for this

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Test pits for the airfield

The airfield will include a runway of 8,800 x 200 ft., sufficient aircraft hangars and maintenance facilities, parking area to take care of about 30 T-29 navigational trainers and administrative aircraft.

The Oklahoma Testing Laboratories dug seven large test pits, ranging from 6 to 30 ft. deep, throughout the area to obtain complete information on the type of soil and the fill material available. A Caterpillar D8 tractor with bulldozer and a Cat DW10 tractor-scraper were used to dig the pits.

Besides the load bearing, density and granular tests taken in and about the pits, Oklahoma Testing Laboratories also performed 5,000 ft. of boring throughout the entire site to obtain soil samples.

The Air Academy, whose superintendent is Lt. Gen. Hubert R. Harmon, will have a student body of 2,600 cadets and an overall personnel complement of about 5,000 when under full operations. The facilities will include the (1) cadet area which includes academic and athletic structures, living quarters, and other necessary facilities such as a Chapel, PX, dispensary, theater, etc.; (2) airfield; (3) maneuver area where the rudiments of infantry training will be part of the course; and (4) dependent housing area which includes single family dwellings to house dependents of key personnel.

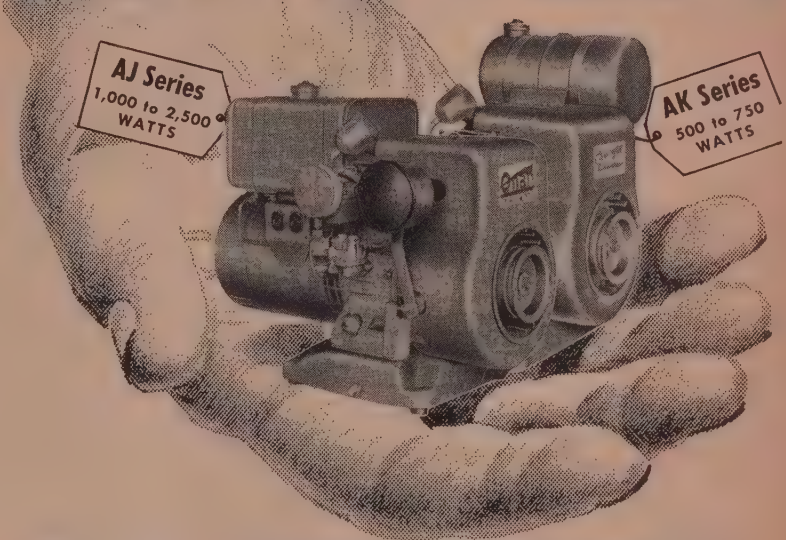
AGC appeal gets results

GOOD COOPERATION all around shows in recent action of the Los Angeles City Board of Public Works, the Associated General Contractors' Southern California Chapter management, and the AGC members in the area.

With a shortage of bids on "some of the city's less attractive street and highway jobs," the City didn't get huffy and go force account. They checked in with the AGC chapter. A quick appeal in the chapter bulletin turned the trick. Picking up their responsibility for making the contract method click, the contractors started bidding again and turned in a response "most gratifying and more than appreciated by the city officials."

Commented the AGC chapter in a later bulletin: "Naturally, with the sweet there is always some bitter. . . . This notice is both a commendation and a reminder of . . . the need for continued vigilance in the future. The procedure of calling for bids will continue only so long as there is a response; when the response is no longer forthcoming, our industry has ducked an obligation and assisted in the deterioration of free enterprise."

ONAN Announces Two New Series of POWER PACKED ELECTRIC PLANTS



MORE POWER, LESS WEIGHT, SMALLER SIZE, LOWER COST!

2,500-watt unit weighs only 154 pounds! Gives you more power per dollar than any other 4-cycle electric plant.

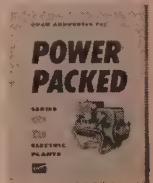
Higher output in a smaller, lighter package give these new Onan units marked advantages for every type of service . . . portable, mobile, primary, or emergency standby.

Wherever you use *portable* electric plants, you can now put more cost-cutting electric light and power to work for you . . . at less cost. In *mobile* applications you can take along more power in less space . . . with less weight. In *primary* and *emergency* standby applications you get more power at less cost with all the Onan advantages of quick starting, long life and easy maintenance.

These new units are *completely Onan-built*, with Onan engines direct-connected to Onan generators in a single compact unit. The new, modern, *short-stroke*, single-cylinder, 4-cycle engines feature extra-large bearings and free-breathing intake and exhaust systems to give you thousands of hours of operation without major servicing. Generators are drip-proof and specially insulated for all-climate, all-season use.

Equipped with carrying frames or two-wheel rubber-tired dollies, Onan AJ and AK series electric plants can be taken anywhere . . . moved around easily on the job.

See your Onan distributor or write for new folder describing all 18 new models



POWERED BY MODERN SHORT-STROKE ENGINES



AK A.C. MODELS
500 and 750 watts, 115 or 230 volts.



AK D.C. MODELS
(Battery chargers) 500 and 750 watts, 6, 12, 32 volts.



AJ A.C. MODELS
1,000 and 2,500 watts, 115 or 230 volts.



AJ D.C. MODEL
(Battery Charger) 1500 watts, 32 volts



D. W. ONAN & SONS INC.

3671 UNIVERSITY AVE. S.E., MINNEAPOLIS 14, MINNESOTA

MASTER MECHANIC [®]

WIRE ROPE TIPS—4

. A series of good ideas as laid out by L. C. Torrell, wire rope engineer for Bethlehem Steel Company.



CORDUROY FOR STEEL ERECTION

Timber matting right up on the girders was the answer on this bridge widening job over the Tuolumne River near Modesto, Calif. Specs said no work was to be done from the existing roadway, so Bethlehem Pacific, the steel erection contractor, worked a truck crane along its own private timber platform.

Three main spans are 80 ft. each. Short spans of 44 ft. each stand above the flood plain, making a total project length of 2,050 ft. Connections are 1-in. high-strength bolts. General contractor was Granite Construction Co.



CRAWLER RUNS ON TIRES IN MONTANA

No heavy, splintery planks for Charles Potter, pipeline construction superintendent of Midwestern Constructors. His International TD-18 crawler crosses U.S. 10 near Miles City, Mont., with the aid of old truck tires rolled into place. Midwestern is laying 230 mi. of 8-in. pipe from Laurel to Glendive, Mont.

IN RECENT YEARS there have been rapid developments in self-propelled revolving cranes. Many uses have been found for this versatile construction tool. Two cable problems arise, however, in connection with their use.

The first is the boom hoist line. On most such machines the boom hoist sheaves and drums are small compared with those for the main hoist line. Drum spooling conditions are not good since multilayer spooling is the rule and criss-cross winding is common. Such an assembly was satisfactory for the older types of cranes where boom angle changes were usually only made for moves from one job to another and almost never with a load on the hook. Now we hear much about live booming with loads on the hook and complaints that rope life is short. In at least one case the boom dropped and was wrecked when the rope broke at the drum where it had been badly crushed and torn by the poor spooling and overwinding after only a short time in service. The best remedy for this condition is flattened strand lang lay rope with either a fiber core or independent wire rope core, and it should by all means be preformed. This has the highest available crushing and tearing resistance. Even then life is not long and safety requires frequent inspections of the portions of the rope winding on and off the drum. Don't try to use the flattened strand rope as a main hoist line. The lang lay construction may twist and give trouble.

The second danger point is found in the boom pendants, especially the connections at the boom point. These machines are commonly supplied with wire rope pendant extensions which match the length of the boom extender sections. The top connection is commonly to a pin which provides hinging in one plane only. Field observations show that these pendants can and do whip and vibrate in any direction so the pendant connections are subjected to both vibratory and bending stresses which have resulted in broken wires and even in dropped booms.

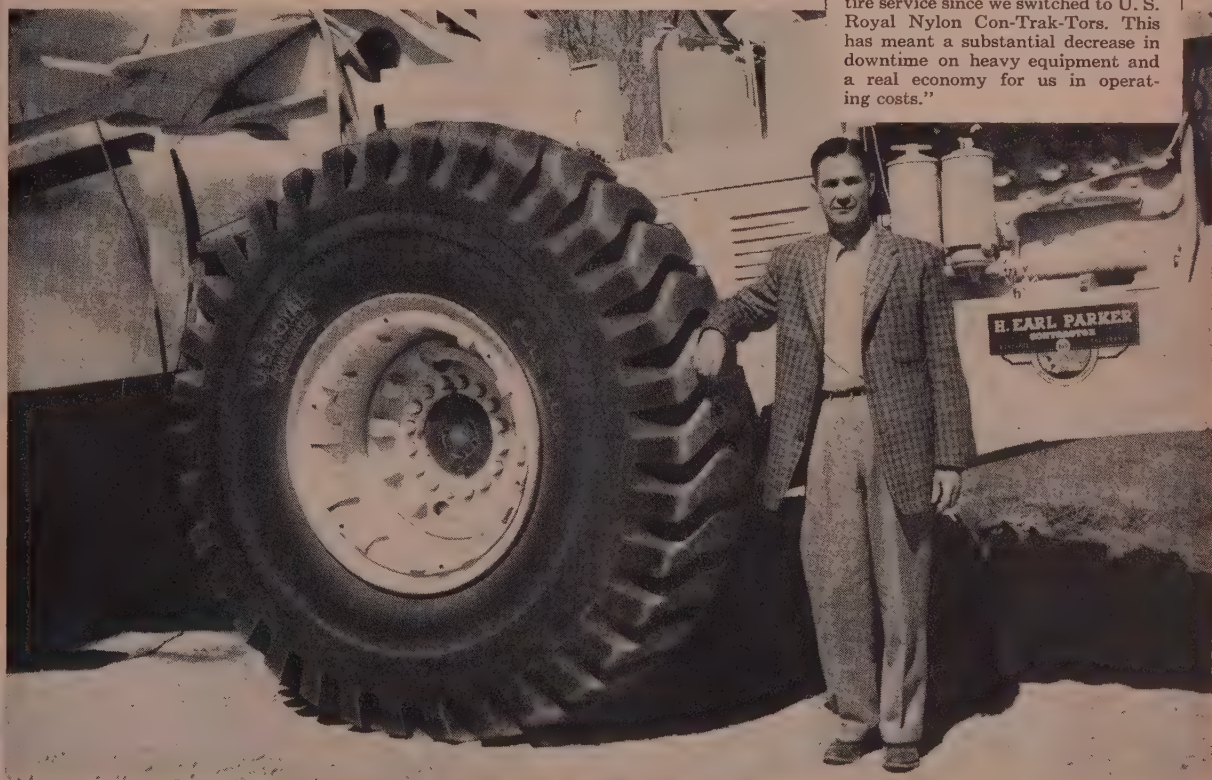
Cable welding unsafe

Welding or brazing of wire rope is generally known to be an unsafe practice. True, individual wires are welded at widely spaced intervals under expertly controlled conditions during manufacture, but this is entirely different from welding on the finished rope.

When wire rope is being made it is subjected to a preliminary heat treatment known as patenting to produce



United States Rubber Company 4-year project pays off—
construction men report they're well ahead with U. S. Royal!



"On rock work, tire service increased 300%"

says H. Earl Parker, Marysville, Calif.

"On tough jobs like Pine Flat Dam, we've had a tremendous increase in tire service since we switched to U. S. Royal Nylon Con-Trak-Tors. This has meant a substantial decrease in downtime on heavy equipment and a real economy for us in operating costs."

Tire Life Greatly Increased!

The U. S. Royal Con-Trak-Tor, an important result of U. S. Royal's 4-Year Truck Tire Project, is increasing service life and reducing equipment downtime for leading construction men like Mr. Parker.

Good reasons, too! The Con-Trak-Tor's Nylon cord carcass stands up to vicious shocks, fights off rocks and snags. It has *triple impact protection*—extra rubber between plies, double shock-pads under the tread, extra-tough con-

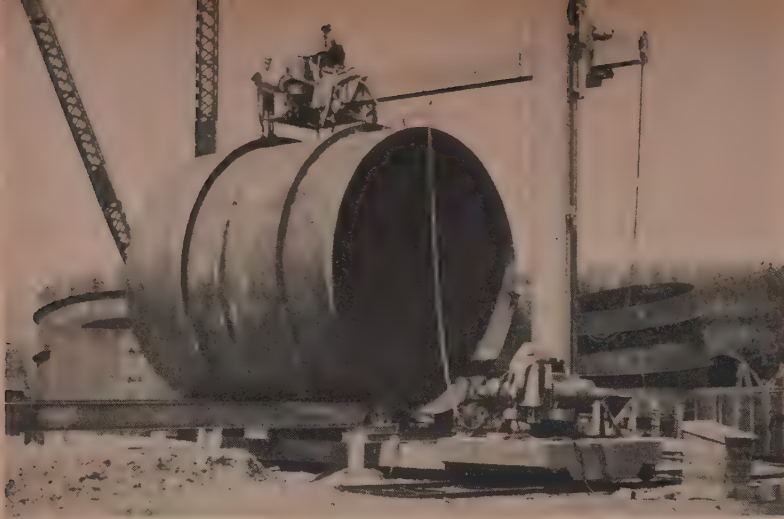
struction at the crown. Its *full lug traction* pulls right through toughest going, just *won't bog down*.

Why not let the U. S. Royal Con-Trak-Tor increase *your* tire service, reduce *your* downtime, lower *your* operating costs? Your U. S. Royal Dealer has this great tire in your size. Have him put it on your wheels—and prove to yourself why construction men like Mr. Parker report they're *well ahead* with U. S. Royal!



U.S. ROYAL

NYLON
CON-TRAK-TOR
FULL LUG



Big welds can be easily made

PENDJIRIS WELDMENT Co.'s RBM welding head manipulator was just right for penstock welding at Littleton Dam in New Hampshire. The specs called for automatic submerged-arc welding of 3,500 ft. of seams on penstock joints, with steel plate thicknesses ranging from $\frac{5}{8}$ in. to 15/16 in.

Welding speed averaged 20 in. per min. and all welds were required to pass to 100% X-ray inspection for

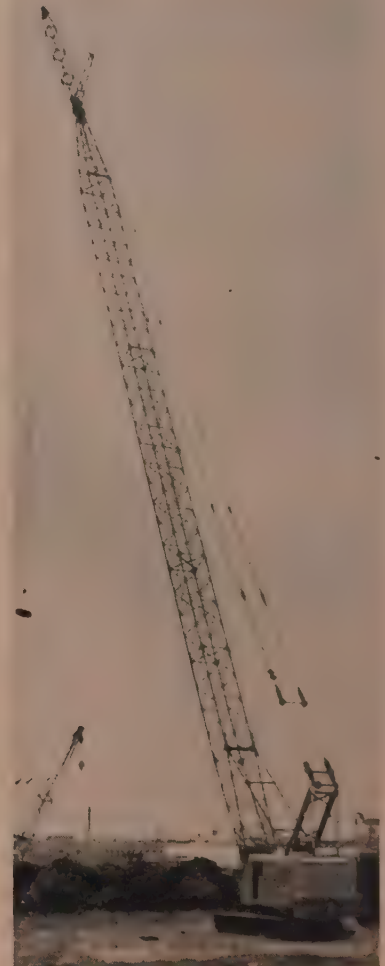
quality. The operation consisted of two-pass welding—one pass inside and one outside.

The RBM manipulator is a self-contained unit consisting of a variable speed pedestal car, rotating trunnion, column, saddle, and variable-speed-drive welding boom with end-mounted automatic welding head. The machine is entirely remote controlled from the operator's pulpit by a push button panel board.

WIRE ROPE TIPS—4

(Continued from page 232)

the most favorable structure for the subsequent cold working. Then it is drawn through a series of tungsten carbide dies until the desired size is obtained. The amount of cold working in these drawing operations is so great that in some cases the finished wire may have almost twice the tensile strength as the heat-treated stock from which it is drawn. Any heat applied to the wire after completion of the drawing, such as by welding or brazing, can nullify all of the beneficial effects of the cold work and could ruin the entire rope. Equally risky is the use of a blow torch for cleaning broomed wires when socketing. An unsafe attachment nearly always results.



230 FT. OF BOOM

One of the longest booms ever mounted on a crawler machine is shown in this picture of a P&H Model 955-ALC. There is 190 ft. of main boom and a 40-ft. jib, giving a total length of 230 ft.

This rig handles a 1½-yd concrete bucket on 190 ft. through a radius of 80 ft., or a 1-yd. concrete bucket on 230 ft. at a radius of 90 ft. The extra-long boom is constructed of welded alloy steel aircraft tubing.

Complete Mobile Asphalt Repair Unit

Single Unit Mixes, Heats and Makes Hot Patches

NO MANUAL HANDLING
From Charging Hopper
To Discharge Chute



A Hot Patch is the best patch—it's easy with PATCHMOBILE

Tow your PATCHMOBILE MODEL PM-215 to the job... and have all the equipment you need for hot asphalt patches! Features rotary dryer, asphalt tank, pug-mill, power asphalt pump, spray attachment, volumetric asphalt measuring de-

vice and tool-heating compartment... all in one unit. Patchmobile PM-215 is equipped with kerosene burners, power fuel pump, or optional propane heating. Also available with skid mounting for stationary operations.

A Few Selected Distributor Territories Available

WYLIE MANUFACTURING CO., INC.

Box 7086 (Zone 12) Oklahoma City



Oliver "OC-12" with hydraulic 1 1/4-yd. loader. This model has the long track frame for added stability. Loader has exceptional bucket rotation and 10' 4" loading height.

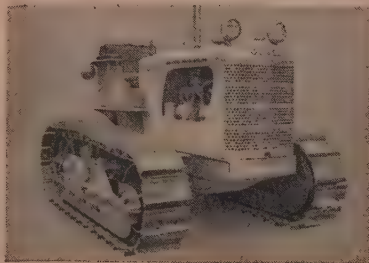
Another great tractor by Oliver ...THE POWERFUL "OC-12" CRAWLER!

It's a rugged, eager worker in the 45 drawbar h.p. class that features advancements in power, economy and operating ease to make every job more profitable.

The "OC-12" offers two engines of exceptional torque span—diesel or gasoline. Both engines have instant electric starting, pressure cooling, by-pass thermostat and full-flow oil system to insure quick starting and long, low-cost service.

The smooth lines of this unit show it is made for easy access and operator visibility. Controls are right where they're the handiest. Down to the key-lock switch, foam rubber seat, overhead-linkage clutch, this tractor caters to operator convenience.

Your Oliver Industrial Distributor will be glad to demonstrate the "OC-12." Give him a call.



The "OC-12" is available in two track widths: 44- and 60-inch—and two track lengths, one with four lower track wheels and one with five. Standard grouzers are 14-inch.



Here is the "OC-12" with hydraulic bulldozer. Hydraulic pump is front mounted. Special protective grille is part of 'dozer frame. Blade has provision for tilt adjustment.

THE OLIVER CORPORATION
400 W. Madison Street, Chicago 6, Illinois



a complete line of industrial
wheel and crawler tractors

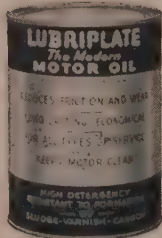
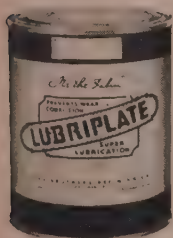
**"LUBRIPLATE,
THE OUNCE
OF
PREVENTION"**

says
VULCAN IRON WORKS, INC.
of Chicago, Ill.

—a leading manufacturer
of pile driving and
extracting equipment

"For many years we have used LUBRIPLATE Lubricants for shop assembly, and have recommended them to our customers through your LUBRIPLATE Tag Plan. Our experience shows that if the proper lubricants are used from the beginning, there are fewer problems and parts replacements later. We consider LUBRIPLATE to be the best possible ounce of prevention."—
H. G. Warrington, Vice-Pres.

**REGARDLESS OF THE SIZE AND
TYPE OF YOUR MACHINERY,
LUBRIPLATE GREASE AND
FLUID TYPE LUBRICANTS WILL
IMPROVE ITS OPERATION AND
REDUCE MAINTENANCE COSTS.**



LUBRIPLATE is available in grease and fluid densities every requirement for every lubricating need.

LUBRIPLATE H.D.S. MOTOR OIL meets every requirement for gasoline and diesel engines.

LUBRIPLATE DIVISION, Fiske Brothers Refining Co.
Newark 5, N. J. or Toledo 5, Ohio.

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Bart-Sayer Co., El Centro, Calif.



TWICE-BENT dowel slides into place in the blockout in this view showing inside of form. Notch on end of blockout permits snug fit for next section.

Plywood blockout cuts form costs

A BETTER WAY of forming for straight runs of poured concrete foundations is being used by McDonald Bros., Los Angeles engineering and construction firm. The cost-cutting technique involves a substitution for the planks now in general use as blockouts forming the floor slab anchor shelf on poured concrete foundations.

The substitute is a three-sided plywood form 4 ft. long. The vertical side of the form is a $\frac{3}{8}$ -in. piece of plywood 10 in. wide. The top and bottom are 1x2's set on edge and nailed at right angles to the top and bottom edges of the plywood board.

After the wall forming is up the plywood blockout forms are tacked into place by nailing into the 1x2's at top and bottom.

As each 4-ft. section is tacked up the dowel bars are placed. Instead of drilling the form and blockouts and sliding the dowel bars through these penetrations at right angles to the wall, an additional bend is given the

bars and one end is slid into the open end of the blockout form and parallel to the wall. A small notch at the end of the form provides the opening needed for the bar to pass through the plywood when the next blockout section is tacked into place.

Considerable savings in time required for stripping the forms is also reported. The 4-ft. sections are merely slipped sideways off the ends of the twice-bent dowel-bars in place of their having to be carried outward from the wall the entire length of a straight bar.

Interference of straight bars with backfilling and also with the freedom of action on the part of other operators is also eliminated by the extra bend allowing the bar to lie close to the wall after forms are stripped.

About 1,000 lin. ft. of blockout forms are sufficient for 4,000 lin. ft. of walls to be formed on the same job. According to McDonald Bros., it takes two men a day and a half to make up this much form.



FORMS COME OFF by sliding them parallel to wall. The bars in this position do not interfere with backfilling or other operations. Before pouring slab the bars are straightened.

BLAW-KNOX STEEL FORMS . . .

simplify construction of Chicago's
new Congress Street Subway



TWIN TUBE SECTION



STATION TUBE SECTION

In Chicago's newest subway, Contractor S. A. Healy is forming the stations with the same forms used for the tunnels, and without removing them from the excavation! An extra panel is simply inserted into the forms as shown above to provide the arch for the stations with minimum trouble.

IT'S ANOTHER WAY BLAW-KNOX HELPS CUT CONCRETING COSTS

This simple solution to the problem of making stations in a subway tunnel is typical of the way Blaw-Knox Steel Forms and Blaw-Knox Engineer's Consultation Service can help reduce the number of necessary steps in your forming operations, save time and materials, and cut concreting costs.

It will pay you to call in Blaw-Knox engineers in the preliminary planning stages of your jobs, to solve difficult forming problems before they're on the drafting board. Write or call today!

WRITE FOR BULLETIN 2430

It contains special Blaw-Knox Steel Forms suggestions and details about the Consultation Service available to any contractor without obligation.

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**BLAW-KNOX
STEEL FORMS CONSULTATION SERVICE**



TOOLS of the TRADES

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

FOR POWER OPERATION of hand pipe tools, a small, light-weight power drive on a folding tripod with an integral tray has been marketed by **The Ridge Tool Co.**, Elyria, Ohio. Legs and tray of the unit, named Ridgid No. 200, fold together and a handle provides for carrying. The chuck grips or releases pipe by the turning of a hand wheel which operates the jaws. Capacity, $\frac{1}{8}$ -in. to 2-in. pipe or conduit, $\frac{1}{4}$ -in. to 2-in. pipe or conduit, or $\frac{1}{4}$ -in. to 2-in. bolts. Ample power for geared tools to 12 in.

OUCH-PROOF chain breaker—A chain breaker that takes the "ouch" out of separating links, eliminates the risk



of finger bruises and ends damage to links is now being marketed by **Mall Tool Co.**, 7725 S. Chicago Ave., Chicago

19, Ill. It works this way: the operator places the chain in the breaker block, lines up the rivet with the punch, pushes the handle and presses out the rivet. Price is \$14.95. Further information will be sent on request.

FUEL INJECTION BOOKLET—"Six Money Saving Facts about Caterpillar Fuel Injection Equipment," is a new booklet published by **Caterpillar Tractor Co.**, Peoria, Ill. Among the features discussed are interchangeability of parts, ease of maintenance, adjustment free design, and the ability to burn non-premium fuels.

TO AID POWER SHOVEL users in picking the right repointer style for dipper teeth, **American Manganese Steel Division** has released a revised guidebook, WA-77. The booklet incorporates late developments in repointer design as well as welding rods for attaching or hardfacing the teeth. Sizes are shown in chart form of all the various styles as well as suggested uses for manganese steel bars, flats and plate. Copies of WA-77 may be obtained by writing to **Ed Wegerson**, American Manganese Steel Division, Chicago Heights, Ill.

AN ENGINEERING SERVICE bulletin, "A Better Air Power System" is now available. It discusses the power

losses in compressed air lines and describes how to find out if more air is being wasted than the repair and renovation of the distribution system would cost. The booklet can help in the design of new systems and contains diagrams of different types of piping networks and tables of friction losses of air in pipe, fittings, and hose. For copies of Form 213A write to **Ingersoll-Rand Co.**, 11 Broadway, New York 4, N. Y.

NEW JIFFY MIXER handles paints, stains, or heavy industrial mixes with blades that are designed to eliminate splash, yet mix completely. The Jiffy



THE GATES FORM-ula

can save you money
...on high walls
or highways!



SAVE through speed! Gates Form Ties require minimum waling...reduce labor time.

SAVE on materials and labor! Gates Form Ties saved up to 30% on the job!

Gates Form Ties used on 20-ft. concrete wall...an addition to the Dearborn Slave Company Plant, Dallas, Texas.

Contractor: O'Rourke Construction Co., Dallas

Use GATES FORM-ula on: high walls—culverts—bridge abutments—foundations—retaining walls!

Use GATES FORM-ula with: Sheathing—metal panels—plastic-coated plywood panels.

Request additional information right away!

GATES & SONS, INC.

80 S. GALAPAGO, DENVER 23, COLO.

attachment fits any standard electric hand drill with $\frac{1}{2}$ -in. chuck, or can be used with a portable air motor. The Model M, priced at \$15.50, can be used for mixing from 5 to 50 gal. right in the original container. The Model J, for quarts, sells for \$2.95. Distributed by **Inertol Co., Inc.**, 27 South Park, San Francisco, Calif.

A SERVICE MANUAL on factory approved tools for maintenance service on Terratractor Tractors is now available from **Owatonna Tool Co.**, 389 N. Cedar St., Owatonna, Minn. The manual, AM-55, shows both manually operated and hydraulic equipment in action removing and installing gears, bearings, sprockets, and other maintenance jobs. Listings are given of components for several new manual and hydraulic tool sets. For complete details ask the manufacturer for manual AM-55.

1,056 GOLDBLATT TOOLS is the title of a catalog for the trowel trades just published. The book is fully illustrated and all items are priced. In addition to troweling equipment, the catalog covers estimating and reference books and miscellaneous journeymen and contractors' equipment. Write to **Goldblatt Tool Co.**, 1910 Walnut St., Kansas City 8, Mo., for your free copy.

"DO-IT-ALL" screw kit, made by **Holub Industries, Inc.**, Sycamore, Ill., contains 100 No. 12- x 1-in. plastic screw anchors, 100 zinc-plated sheet metal type screws and one $\frac{1}{4}$ -in. spiral fluted masonry drill, all in a handy transparent plastic box. To introduce this No. K-6 kit, it is being sold for a limited time at only \$3.95 instead of the regular price of \$6.55.

by using a prime-mover are discussed in a new folder. A list of improvements on the late model prime-mover is given, along with a table of specifications. The Prime-Mover Co., Muscatine, Iowa.

Importance of subdrainage

Discussed in a new illustrated bulletin is the importance of adequate subdrainage structures. It states that 80% of surface failures on streets are caused by underground water. The use of perforated pipe to alleviate this condition is considered in the publication. **Armco Drainage & Metal Products Inc.**, Middletown, Ohio.

Pipe and leak finders

Fisher Research Laboratory, Inc., 1961 University Ave., Palo Alto, Calif., has published a folder describing three of its products, the M-scope locator for finding any metal object buried beneath the ground, the M-scope leak detector, which locates leaks in a pipeline by analyzing the vibrations every leak sets up, and the M-scope water level indicator. The devices are illustrated and described. Prices and specifications are included.

Data on hoists, whirleys, derricks

Construction details, tables of sizes and capacities and description of attachments for medium-capacity hoists (5,500 to 21,000 lb.) and heavy-capacity hoists (25,000 to 80,000 lb.), as well as bull wheel swingers, steel erectors' hoists and air-operated hoists are given in a 12-page booklet available from **Clyde Iron Works**, Duluth, Minn.

Refrigeration machines described

Absorption refrigerating machines which produce cooling from steam, have no major moving parts, and use plain water as a refrigerant, are described in a new 36-page catalog. Important features of the machines are illustrated by documented testimonials. Capacity ratings are listed in tables and physical characteristics for the line of 22 models are shown in a double-page chart. Copies may be obtained upon request to **Carrier Corporation**, Syracuse, New York.

"Rod Finder Guide"

A 16-page "Rod Finder Guide" available from Technical Information Service, **Eutectic Welding Alloys Corp.**, 40-40 172nd St., Flushing 58, New York, gives welding and plant foremen who plan and lay out work a helpful source for finding the right rod for a job. The booklet covers rod and flux as well as electrode recommendations for torch and metal arc joining and overlaying of all base metals. One section lists alloys for wear, corrosion and impact resistant overlays.

UNIVERSAL FORM TIES

a
*Complete Line
From 1 Source*

SPIROLOC Form Ties



Available with
nut washer

SPIROLOC Cone Nut Assembly



The most positive internal spreader and form tie

**Faster Erection . . .
Positive Holding...
Easier Stripping**

- Greater tie strength for heavy construction
- Fewer ties per sq. ft. of form area. **LOWER MATERIAL and LABOR COSTS**
- Positive breakbacks
- Permanent, reusable equipment
- **RENTED . . . SOLD**

Positive Spreader Ties for all types of Concrete Construction

TWISTYES

SNAP TIES



Combination
wedge and bearing
plate...easy
application . . .
won't twist or
fall off — ample
take-up.



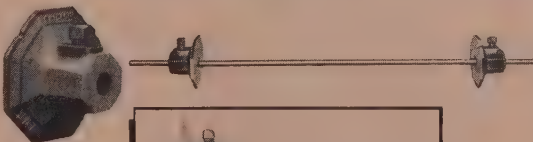
- Low cost ties for job-built or prefabricated forms
- Used with or without walers
- Accurate breakbacks . . . minimum plug required
- Choice of Spreader Washer . . . 7/8" flat is standard
- Rugged Twistye and Snap Tie Clamps have extra bearing surface . . . additional safety factor



Curved ends speed
installation and
stripping . . . long
slope wedge for
ample take-up. Extra
nail holes permit
nailing clamp
in any position.

FORM CLAMPS

The Most Versatile Tie . . . At the Lowest Cost



"Sure-Grip" principle
means positive locking
SAFE . . . SURE Tying

- 2 Form clamps and a mild steel rod make a tie to handle any condition
- Wide clamp base gives more bearing on waler . . . won't "bite" at maximum loads
- Notched base permits nailing to waler

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UNIVERSAL FORM CLAMP CO. Los Angeles, Calif.



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NEW EQUIPMENT

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

Highway mower has everything

The Hydro-Clipper for attachment to nearly all makes of tractors offers five outstanding requirements for a modern highway mower. Repair cost is reduced because of its all-hydraulic drive that eliminates V-belts and universal joints. Its ease of operation includes a self-returning 90-deg. break-



away and exclusive height control. A horizontal flywheel makes it possible to operate the knife at a speed in direct ratio to engine speed. The clipper is a self-contained unit except for the pump—weighing only 475 lb.—and may be attached with only four bolts. Operation as a loader is easy since the same pump operates this as operates the mower. **Triumph Machinery Co.**, Hackettstown, N. J.

Two new Houghs

Two different 4-wheel drive models have been added to the line of Payloader tractor-shovels. Model HU has a 1-yd. heaped capacity. HH offers a 1½-yd. heaped capacity. Exclusive features include a design which permits 40 deg. of bucket breakout at ground level rather than at carry position. For maximum loads with minimum effort, breakout pads used as fulcrum for leverage accomplish powerful pry-out action. **The Frank G. Hough Co.**, Libertyville, Ill.

Trucks add power, cut hauling costs

Seven engines with 12 different hp. ratings will power Dodge's new C-3 Series of trucks. Maximum GVW ratings of these trucks range from 4,250 to 40,000 lb. — gross combo weights go up to 60,000 lb. Specific needs of individual users are met by a variety of axles, springs, transmissions, frames, and other components.

A few of the new features are: increased power, cabs with wrap-around windshields and rear windows for better vision, automatic transmissions, and the expansion of power steering and power brakes into additional models. **Dodge Division**, Chrysler Corporation, Detroit 31, Mich.

For any kind of drilling

Model DS-38 is a new heavy-duty, minimum weight rock drill that will do a quick-change without need of dismantling. With a few accessory parts, it goes from blower to blast type, to wet type with manual water valve, or to wet type with auto-water valve. Three rotation speeds can be furnished. Raised center grip and raised tee handles are optional, and five sizes of collar shank chucks are available. Design eliminates rubbing wear on pawls. **Davey Compressor Co.**, Kent, Ohio

Economy scraper is long on solid features

Earthcavator Company, Inc., Downey, Calif., plans to sell its Gannon Economy scraper at considerably under the going market price for



comparable implements. Constructed of all-welded mild steel plate, this scraper features a curved mold board, high-carbon steel scraping and backfill blades, and 6 adjustable ripping teeth held in position by positive locks. Can scrape, scarify or backfill. Fits Ford, Ferguson, and all 3-point lift tractors.

10-ton rubber-tired roller

Model RT-1300, a rubber-tired roller, has been announced by **Shovel Supply Co.**, Dallas, Texas. It is suitable for the compaction of earthfill, sand, gravel, caliche, crushed rock, and asphalt. It is equipped with 6-ply, wide-tread, smooth tires or standard tread, as desired. The wheels are arranged to provide complete coverage, the rear wheels overlapping the front. Weight empty, 4,500 lb.; ballasted with sand, 10 tons.

Motor grader by Huber-Warco

The first product from the newly merged **Huber-Warco Co.** of Marion, Ohio, is a motor grader with a power of 195 hp. The machine weighs 32,000



lb. and uses 16.00 x 24 tires. All wheels are interchangeable. Cab-controlled blade movement makes it possible for the operator to shift the blade from 90 deg. on one side to 90 deg. on the other in less than a minute. Front end clearance is 32 in. A 30-ft. power-sliding moldboard is standard equipment.

Small asphalt plant enlarged

Increased capacity in its small asphalt plant, Model L-8, has been announced by **White Mfg. Co.**, Elkhart, Ind. From 10 tons per hr. the plant has been enlarged to 15 tons per hr. Now included is a 2-compartment,



reciprocating plate feeder and adjustable gates so that graded aggregate can be fed to dryer. The plant has a 8½-cu. yd. batch-type, pug mixer with a renewable liner, cast steel blades with renewable tips, and a 50-hp. gasoline engine. The plant can be operated by one man and can discharge directly into trucks.

New line of off-road axles

For use in four-wheel drive equipment such as graders, scrapers, and other off-the-road vehicles is a new line of planetary and drive-steer axles. By replacing the conventional differential carrier with a through-drive type, the smaller axles in this line can be converted into tandem units. The drive-steer axle is now being produced in 11,000-, 17,000-, and

HOW TO PREVENT GLARE on air-entrained concrete roads

Glare on untreated concrete increases driver fatigue and road hazard . . . reduces visibility.



AE Dispersed Black makes concrete roads glare-free . . . improves visibility.

Unlike most "blacks" available, Horn AE Dispersed Black will not absorb or neutralize the air-entrainment in a concrete mix. It does not affect the resistance of the concrete to scaling. Horn AE Dispersed Black eliminates glare and, by heat absorption, assists more rapid de-icing. Horn AE Dispersed Black improves highway safety and appearance, winter and summer.



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20,000-lb. capacities. The manufacturer is **Clark Equipment Co.**, Construction Machinery Division, 574 Second St., Benton Harbor, Mich.

Largest Nelson bucket loader

Over 3,000 tons of material per day is the capacity of a new straight-line bucket loader now being produced by **N. P. Nelson Iron Works, Inc.**, of Clifton, N. J. This is the largest ever



produced at the plant. With a rated capacity of 10 tons per min., the B-68 features hydraulic crowd, power steering, hydraulic controls, 20 mph. road speed, an engine of 115 hp., 4-wheel drive, and complete accessibility for maintenance. The chute will discharge at a maximum height of 14 ft. 11 in. Write to the manufacturer for complete details.

WESTFALL

COMBINATION AIR HOSE AND TAGLINE REEL



CONTROLS CONCRETE BUCKET

This combination Air Hose Reel is designed to control bucket by cable while it pays in and out air hose. Cable takes all the hard pull—eliminating any strain on air hose. Spring has uniform tension. Parts are interchangeable with Westfall standard equipment. Installed in 15 or 20 min. making it a great time and labor saver. Tagline can be used separately when not in use with cement bucket.

WESTFALL AUTOMATIC TAGLINE
345 E. Second St., Los Angeles 12, Calif.
Mutual 4694

Combined scalping and feeding

Now in production is an oscillating feeder with a grizzly deck. The dual operations of the old apron feeder and the stationary grizzly are combined, utilizing only half the space previously required. It is available in



sizes from 2 x 8 ft. to 6 x 12 ft. and in capacities up to 1,000 tons per hr. Wearing surfaces can be equipped with replaceable liners, and the unit may be either spring mounted as shown or with spring and cable suspension arrangement. Full details from **Simplicity Engineering Co.**, Durand, Mich.

Lift truck will handle 6 tons

A 12,000-lb. capacity lift truck has been announced by **Hyster Co.**, 2902 N. E. Clackamas St., Portland 8, Ore. Standard lift height of the model is

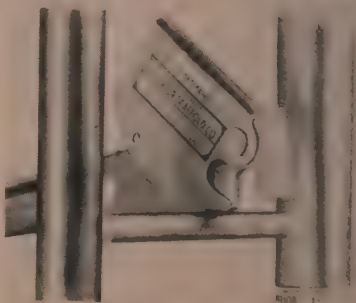


17 ft. 6 in. but optional heights are available from 8 ft. 2 in. to 24 ft. The overall width and wheelbase both measure 86 in. and the turning radius

is 180 in. The truck speed is 19 mph in either forward or reverse. Complete specifications will be sent upon request.

Tubular steel scaffolding

Heart of a new scaffold line is the Auto-lock device. By pressing the head against the adjoining bar it opens automatically, then snaps shut



to insure a fast grip. It snaps open with a flip of the thumb. No nuts, screws, or bolts are required. The Auto-lock head is an integral part which is riveted to the crosses. Details from **Superior Scaffold Co.**, 5624 Bankfield Ave., Culver City, Calif.

Hoist and dump body

The Hoist & Body Division of **Flint Tool and Mfg. Co.**, Holly, Mich., has announced a new hoist and dump body. The hoist has a bolted head for easier servicing. All cylinder assemblies are tested for slippage and power output. The floor of the body is of one piece construction with a 45-deg. angle between floor and sides to eliminate corner drag.

PREFERRED by CONTRACTORS

Less initial cost—Lower upkeep

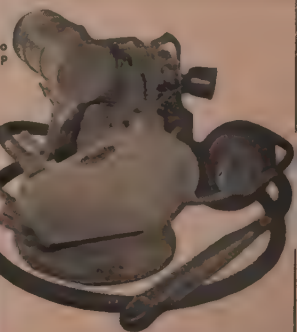
MARVEL CONCRETE VIBRATORS

GV-1, GV-2 & GV-3 Models Now Equipped with Automatic Centrifugal Clutch as Standard Equipment.
Interchangeable Flexible Shafts.

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MARVEL EQUIPMENT CORPORATION
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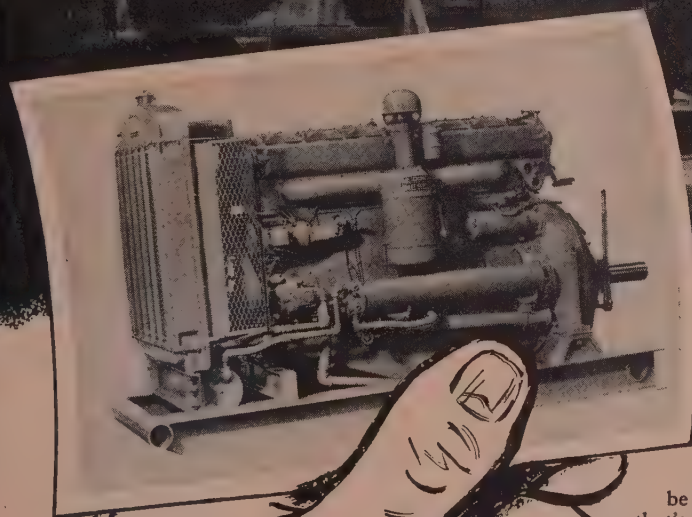
1 1/2 HP to 5 HP



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 Equipment Sales Co., 720 W. 19th Ave., Phoenix, Arizona
 Industrial Engine Service, 5315 Valley Boulevard, Los Angeles, California
 Lively Equipment Co., 2801 Fourth St. N. W., Albuquerque, New Mexico
 Oswald Machine Works, 2936 Hyde Street, San Francisco 9, California
 Glenn Rose Engine Service, 502 South Real Road, Bakersfield, California
 Western Tractor & Equipment Co., 2230 First Avenue, Seattle 4, Washington
 General Machinery Company, E. 3500 Riverside Avenue, Spokane, Washington
 Hall-Perry Machinery Company, 812 East Iron Street, Butte, Montana

MURPHY DIESEL

News of DISTRIBUTORS

Vagtborg moves in S.F.

William O. Miller, San Francisco representative of Vagtborg Life-Slab Corp., announces a new San Francisco office location at 2722 39th Ave., San Francisco 16.

New rep; new distributors

The Prime-Mover Co. announces the appointment of James A. Dougan as district representative for the Pacific Northwest and western Canada. Also announced to handle the powered bulk handling cart of this manufacturer is Loggers & Contractors Machinery Co., Portland and Eugene, Ore., for the territory of Oregon and southern Washington; and Northern Commercial Co. as distributor for Alaska.

Hensley adds 3 Western reps

Hensley Equipment Co., Inc., of San Leandro, Calif., announces the addition of the following dealers: Western Traction Co., Sacramento, Calif.; Pacific Hoist & Derrick Co., Seattle, Wash. and Columbia Equipment Co., Ltd., Vancouver, B. C.

Washington Mchry. gets 2 new lines

Washington Machinery Co., Seattle, Wash., is appointed distributor for Standard Steel Corp.; also for In-sley Manufacturing Co.

Heil appointed

Tricoach Co. has named The Heil Co. as distributor for its Body & Hoist Division in western and central Washington. Pat Sullivan is manager of Tricoach, located at 3407 Airport Way, Seattle.

Air-Mac adds snow plow line

Davenport-Frink Sno-Plows have been added to the lines distributed by Air-Mac, Inc., in the state of Washington and northern Idaho, according to recent announcement by Davenport Besler Corp.

Ricker adds new lines

Ricker Machinery Co., headed by P. S. Ricker, Sr., recently took on the R. G. Evans line of Target masonry saws and blades, and the Santa Anita Manufacturing Corp. line of spray machines.

C. I. T. names new field rep

C. I. T. Corporation, the nation's largest industrial financing firm, has named William R. Lappin as its rep-

resentative for Colorado, Wyoming, and the Dakotas. Lappin will make his headquarters in Denver.

Hershman teams up with B-B-I

Appointment of Paul F. Hershman to head advertising and publicity of



Paul F.
Hershman

the Brown-Bevis-Industrial Equipment Co., Los Angeles, Calif., was recently announced. Prior to joining B-B-I, Hershman was with Daniel, Mann, Johnson and Mendenhall.

New lines for Western Machinery

New lines recently annexed by Western Machinery Co., Phoenix, Ariz., are Acme Iron Works—Ingram rollers; Pak-More Mfg. Co.—collection units, and Champion Manufacturing Co.—concrete finishes, brick and concrete saws.

Arizona sales rep added

R. S. "Bob" Carlson, former service manager for Transo Division of Le Roi Co., is now area sales representative for Superior Equipment Co. in Tucson, Ariz., with headquarters at 1628 E. Drachman. Superior's main office is in Phoenix. A recent addition to the company's lines is the Murphy Diesel Co.

New men; new lines

Lawrence Meade, Carl Hess, Pat Wiley, Dick Dinan, and Sommers recently joined Shaw Sales & Service Co., Los Angeles, in the sales department. Dick Stryker, Rod Hardy, Jack Bedard, and M. Blick are no longer with the company. Shaw recently added to its lines Diamond crushers. Walter trucks, the Seal Press, Inc., and Superior Pneumatic.

Braman-Dickerson news

Fred Pofahl has joined the staff of Braman-Dickerson Co., Riverside, Calif. A recent addition to the equipment distributed by the firm is the Galion motor graders and road rollers.

Montana firm opens branch

Caird Engineering Works, Helena, Mont., has set up a new branch at 4005 West Montana Ave., Billings. Joe Dillon is branch manager, in charge of sales, rentals, parts, and service. New lines being handled by the Caird firm are Huber-Warco and Standard Steel Corp.

New S. F. location

West Coast Industrial Sales Co., San Francisco, Calif., recently moved to 746 Ellis St., Zone 9. The new location gives them 7,600 sq. ft. of warehouse space and dock for loading.

Montana Powder changes address

The first of the year, the Billings branch of Montana Powder & Equipment Co. of Helena, Mont., took possession of its new building at 1024 Fourth Ave. No. in Billings. This new address gives them expanded facilities for display, and parts and equipment storage. The new store is under the management of Bob Schenk. Outside sales representative is W. J. Stewart.

New Arizona Company

A new company, Road Machinery Co., opened its doors for business in mid-January, serving the entire state of Arizona from its location at 716 South Seventh St., Phoenix. It is staffed by the following people: Harold R. Bone, president; Loren A. Dickinson, parts and store manager; George E. Gates and Ed Corn, field salesmen; Zan Pauley service manager, and Ken Hunter, parts department. President Bone has been associated with machinery dealers in Arizona and New Mexico on sales and sales management since 1940.

Accounts represented by this firm are: Barber-Greene; Adams Division of LeTourneau-Westinghouse; Wayne Manufacturing Co. (Wayne sweeper); Joy Manufacturing Co.; American Steel Dredge Co. (Wayne crane); Gorman-Rupp; Macwhytte Co.; Vibro-Plus Products, Inc.; Seal-Press; Standard Steel Works; Concrete Equipment Mfg. Co.; Hy-Way Machinery, Inc.; L. R. Murphy Scale Co., and Southwest Welding and Mfg. Co.

Northwest firm names new reps

R. E. Craney, service manager for Intermountain Equipment Co., Spokane, Wash., is named special representative — crushers and asphalt plants; F. Golling is named special representative—parts and supplies, and Bill Bopp is appointed representative in the Ephrata area.

Vibro-Plus appoints Cheslow

A. "Chez" Cheslow is the new Western regional sales representative for Vibro-Plus Products, Inc., making his headquarters at 259 East Cala-

veras St., Altadena, Calif. His territory covers all of the eleven Western states except Colorado and New Mexico.

New men; new accounts

New additions to the personnel of Coast Equipment Co. are: John Grosso, used equipment sales; Jack Haskett, pump sales; and Keith Little, general sales for extreme Northern California. Accounts recently acquired are: Wm. Bros Boiler & Mfg. Co.; Heltzel Steel Form & Iron Co.; Flexible Road Joint Machinery Co., and Lippmann Engineering Works.

Joseph Crooks named manager

Joseph R. Crooks was recently appointed general manager and treasurer of P. L. Crooks & Co., construction and logging equipment firm of Portland, Ore. For the past 13 years he has served the company as parts manager, service manager, and in sales.

Marlow Pumps N.W. service

Larry Harrington Co., Inc., Portland, Ore., which has represented Bell & Gossett Co. in the Northwest for 18 years, has expanded its facilities and taken on representation of Marlow pumps for the Northwest. Bill Saari, district engineer for the Marlow Pump Division of Bell & Gossett, has joined the Harrington organization and will continue to handle the Marlow line.

Rocky Mountain adds new line

Rocky Mountain Machinery Co., Salt Lake City, Utah, was recently appointed distributor for the Adams Division of LeTourneau-Westinghouse Co. for the entire state of Utah, three counties in Wyoming, and 13 counties in Idaho. This is the same territory covered by Rocky Mountain for LeTourneau-Westinghouse equipment.

New lines for Seitz in Mont.

Seitz Machinery Co., Inc., Billings, Mont., has been appointed distributor for Iowa Manufacturing Co. for the Great Falls and Billings areas in Montana. The firm also recently took on the P&H line of shovels and cranes for all of Montana east of the Continental Divide, but including Helena and Butte.

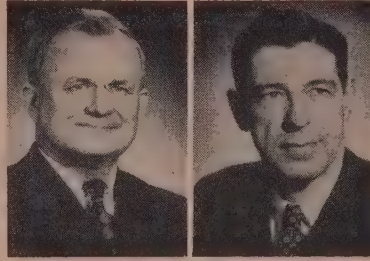
Detroit Diesel sales and service

Detroit Diesel Engine Division of General Motors has appointed G. R. Holly as factory sales representative for GM Diesel distributors and dealers in Arizona, New Mexico, and Utah. H. K. McAfee, who formerly served as sales representative in this area, now confines his activities to a portion of his former territory, with headquarters in Denver. Holly will work with Joseph P. Myszkowski, service representative.

MANUFACTURERS

New Allis-Chalmers prexy

Robert S. Stevenson has been elected president of Allis-Chalmers Manufacturing Co. to succeed William A. Roberts who died April 12, following a heart attack. Roberts



Roberts

Stevenson

joined Allis-Chalmers Tractor Division as a salesman in 1924 and progressed through various posts to the presidency of the company in 1951. Stevenson, who has been associated with A-C since 1933, has been serving as executive vice president since July 1952.

Worthington appointment

L. V. Gilroy has been appointed distributor-supervisor of Worthington Corporation's Concrete Machinery & Contractors' Pump Division, Plainfield, N. J. The new appointment entails responsibility for developing a stronger distributor organization for concrete machinery in cooperation with district representatives and district office managers.

Thomas Industries buys Wright

To further the diversification of products and the expansion of Thomas Industries, Inc., the company has purchased Wright Power Saw & Tool Co. The Wright company will

operate as a subsidiary of Thomas, with all manufacturing facilities transferred from Stratford to Sheboygan, Wis.

New Lincoln Engineering v.p.'s

Lincoln Engineering Co. announces appointment of Carl H. Mueller as vice president in charge of engineering, and John E. Renner as vice president in charge of sales.

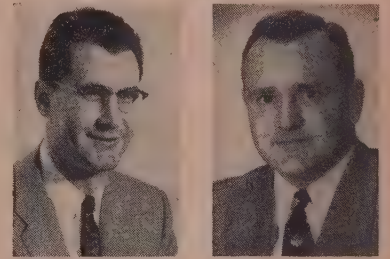
Whiteman buys Champion line

Whiteman Manufacturing Co., Los Angeles, has purchased Concrete Equipment Manufacturing Co., Inc., of the same city. The acquired firm manufactures the Champion line of transit concrete mixers.

Bethlehem Pacific promotions

W. E. Ziegler, contracting engineer at Bethlehem Pacific's Seattle fabricating works since it was built in 1950, has been placed in charge of sales for the Pacific Northwest area, replacing H. E. Swanson, resigned.

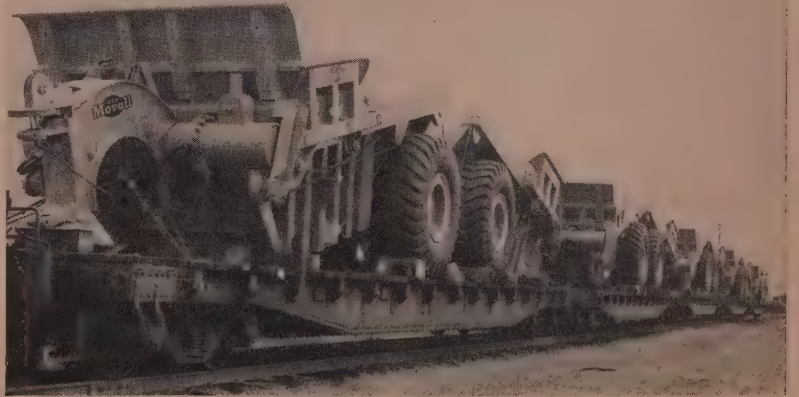
C. D. Howe, manager of bolt and



Ziegler

Howe

nut sales since 1952, has been appointed manager of sales for the company's San Francisco district, succeeding F. J. Anderson who was killed recently at Oakland when the car in which he was riding was struck by a runaway truck. J. A. Crooks has been named assistant general manager of sales.



TWO CALIFORNIA FIRMS got into the St. Lawrence Seaway project with the shipment recently of nine 25-yd. Movall wagons. These all-purpose end-dumps are a product of C & D Manufacturing Co. of Perkins and were fabricated at Yuba Manufacturing Co.'s Benicia plant. They are being shipped to Peoria for installation on Caterpillar DW21 tractors. From there they will continue on to New York where they will be employed by the contractor in the Grasse River lock construction.

CLASSIFIED

Rates are \$8.50 a column inch. Copy should be sent in by the 15th of preceding month if proofs are required; by the 20th if no proofs are required.

For Sale Good Used Equipment

D-8 Caterpillar tractors • HD-20 Allis Chalmers tractors • LeTourneau scraper Models RU-W • LaPlante Choate scrapers Model C-314 • LS-85 LinkBelt Speeder shovel or dragline • HC-90 Link-Belt Speeder crane • 80-D Northwest shovels and draglines • 1201 Lima draglines • 855 P&H shovel-dragline combination.

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FOR SALE

Northwest Model 80-D — standard shovel front with 2 1/2 cu. yd. Esco dipper and powered by Murphy Engine with starter and lights. In excellent condition. Located at Folsom, California.

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Shipped New — Used		Only One Job	
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Also quantity 35 ft. and shorter—Quick Shipment Regardless of job, location. Write, Wire or Phone.

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ELECTRIC, STEAM or DIESEL
CAPACITY 3 TO 20 TONS
SELL, RENT or BUY



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EFFICIENCY
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AMBURSEN DAM CO. INC.
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Sealed bids will be received at the office of the City Manager in the City Hall, Missoula, Montana, until 10:00 a.m., M.S.T., Monday, June 6, 1955, for the sale by the City of one (1) Universal Model 380 Junior Gravel Master Crushing Plant, Serial Number 525X16, and then and there publicly opened, read, proclaimed and tabulated, all in accordance with the specifications for sale by the City of Missoula on file and available to the public at the office of the City Manager. The public is invited to attend this letting.

Bid bond, certified or cashier's check required in the amount of 5% of amount bid.

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Uranium and you, or Watch that borrow pit!

There's nothing like highway construction when it comes to covering the country. A season of activity in the Western states sees almost every type of dirt and rock shot, ripped, crushed, washed, bladed, and spread. Who knows?—maybe there's uranium, the 20th century pay dirt, on your job!

If so, one way to find it is to spend a few off-shift hours prospecting for it. And Fisher Research Laboratory, Inc., has made it easy. This is a firm that is best known for its M-scopes used in pipe finding. But these same instruments and a number of their new cousins are just the thing for the uranium prospector.

If you've got any curiosity at all, or if you'd like to take a whirl at getting rich quick, Fisher is the outfit for you. They'll start you off with a handbook that lays it on the line: "How to be a Successful Uranium Prospector." Here are answers to some of the common questions: What's a Geiger counter? What lands are open to prospecting? Can I purchase equipment on a time payment plan? Can I prospect from a car?

After that—well, Fisher has bibli-

ographies of "heavier" literature. And, as a matter of fact, a pretty complete line of literature on their own detecting equipment. The Scintilla-Dyne, for instance, weighs only 6 lb. complete. Just the thing to sling over your shoulder when you head out across country. Plunk down \$249.50 and it's yours. And so you'll know better what you're after, you can buy a kit of uranium mineral samples for \$5.95.

But to start with, get that basic booklet, "How to be a Successful Uranium Prospector." Write to Fisher Research Laboratory, Inc., 1961 University Avenue, Palo Alto, California.

Landing the big ones at Reno's airport

Isbell Construction Co. has a tidy piece of work outside Reno—extending and strengthening runways at Hubbard Field to take care of heavier civilian and military traffic. But the contractor was landing big ones even before the job got well started. Here's how it happened.

Across the south end of the existing runway was an open drainage ditch. It was an established and

needed facility, and contract provisions were simple: replace it with a culvert, backfill carefully, and pave the runway extension right over the top.

The ditch was overgrown with vegetation, so the first order of business was to clean it out. That's when the discovery was made: dozens of huge, healthy trout up to 3 ft. long!

Isbell's men cleaned out the ditch for sure. And after the fish had all been caught, a little detective work showed what had happened. The ditch was an overflow from a fish hatchery a few blocks away. Over the years fingerlings had gone over the weir into the ditch. Land-locked there, but unmolested and with plenty of food and an ever-fresh water supply, they had done right well. Probably even bigger than Texas trout.

NEXT MONTH

SEWER TRENCHING methods and equipment are on trial in the Salt Lake area. That's where work is winding up this season (a year early) on five contracts that cover an area nearly half the size of Salt Lake City itself. The pipe is large and small, the trenches are deep and shallow, but the ground water situation is almost uniformly terrible. **Western Construction** observed the project when 23 separate trench locations were being worked. You'll learn about it in these pages next month.

PLANHOLDER LISTS—

They're a hot subject in some quarters these days. Some news columnists in California are trying to put the Division of Highways on the pan by bringing up the question of "public information." Actually, that aspect is about the only one that contractors and highway departments haven't considered when deciding whether or not to publish planholders' names. Read the pros and cons of the construction industry itself, gathered from a survey made by the Wyoming Highway Department.

CAST-IN-PLACE piles support the spillway apron lip at Santa Felicia Dam in Southern California. Nothing special there, except they were drilled in sandstone with a 36-in. earth auger. Check the techniques of P&Z Co. in **Western Construction** next month.

Twenty-five years ago in *Western Construction*

"On March 21, a crew of 35 surveyors from the U. S. Corps of Engineers began a 6-month study from which it is expected that the best location for a proposed salt water barrier on San Francisco Bay can be selected."

* * *

"Gumaer & Straalsund, highway contractors of Newport, Washington, and Lewiston, Idaho, have dissolved partnership."

* * *

"A well-equipped asphalt plant, purchased in 1918 from a contractor and improved in various ways since that time, enables the city of Denver to keep its asphalt surfaced streets in repair at reasonable cost. An outstanding feature of the plant is the equipment for grinding and renovating sheet asphalt removed in making repairs."

* * *

"J. F. Ward, Inc., Seattle, will soon complete a contract for the Lake Youngs aqueduct intake at the Landsburg diversion dam, contract price

\$89,196. Principal items include 14,000 cu. yd. excavation at \$0.80; 740 cu. yd. concrete in retaining walls, parapet, and weir at \$14; 550 cu. yd. concrete in linings at \$18."

* * *

"The three variables which fix the unit cost of highway construction are: (1) the available working days to date, since the beginning of the contract period; (2) the actual working days to date, exclusive of days lost because of inclement weather conditions and unavoidable shutdowns; (3) the average daily production to date (the total production divided by the available working days)." —From an article by H. K. Church, Junior Highway Engineer, Bureau of Public Roads.

* * *

"The Harnischfeger Sales Corp., Milwaukee, distributor for P&H construction and industrial equipment, has opened three new branch offices in its Far West territory."

... The Editors

The Reader's In-Digest-ion

A Western regional political fight has been popularized and laid at the feet of Reclamation engineers. Writing of current debate over the Upper Colorado River Storage Project in *The Reader's Digest*, Leslie Miller, former governor of Wyoming, doesn't stop there. Under the title "Dollars into Dust," he goes ahead to condemn 50 years of Reclamation engineering without any regard for the identity of actual or titular leadership and direction of the Bureau during that period.

Commissioner Dexheimer has been stirred by the article to make a most definitive statement, and one that we heartily welcome. It is good to see the defense of Reclamation engineers made by one of their own number, rather than by a purely political figure or disinterested official elsewhere in the Department of the Interior. Especially it is good to see that Dexheimer does not consider the cloak of public service as a muffler or gag.

In a May statement Dexheimer spoke briefly and pointedly on construction cost increases that have plagued Reclamation estimates as they have everyone else's. He explained how Reclamation "pays" and where it pays. He defined again the function of Reclamation in the national scene, forward looking but not visionary. He laid it on the line regarding "invasion" of Dinosaur National Monument by the proposed Echo Park Dam. And in a steadfast tribute to the engineers of his staff he concluded:

"Reclamation engineers have established a worldwide reputation in water conservation by the investigation, design, construction, and operation of the numerous reclamation projects which now dot the Western scene. We do not take lightly the challenge to our integrity by those critics who prefer the scattergun attack to a careful adherence to the facts."

The shovel runner—he makes the dough

The pages of *Western Construction* last month put pretty heavy emphasis on equipment alone as the key to success in highway building. But you can't really stop there, in highway work or any other. Every machine has an operator. It's still men who make or break a job.

Consider the viewpoint of Bill Myers. Here's a man with some 20 years in the industry, about half of it each with contractors and distributors. He knows that success lies in skillful and responsible performance. And these are qualities of men, not of machines.

Myers is now with Columbia Equipment Co. of Portland. And for him the story of success comes down to one man: "Let's look at the operator—he is the boy who makes the dough for management."

"In past years little consideration was given to this man. So it didn't behoove him to take an interest in the care and maintenance of his machine. It was just a case of producing on the immediate job."

"Contractors nowadays are all looking for operators who will produce, and still not abuse their equipment. There is a very slight difference between an operator who is fast and efficient and one who is fast and too rough. A machine is designed to do a specific job. And in most cases it will do that job satisfactorily, with a good operator aboard. But any machine can be on the repair list most of the time if the operator is too rough."

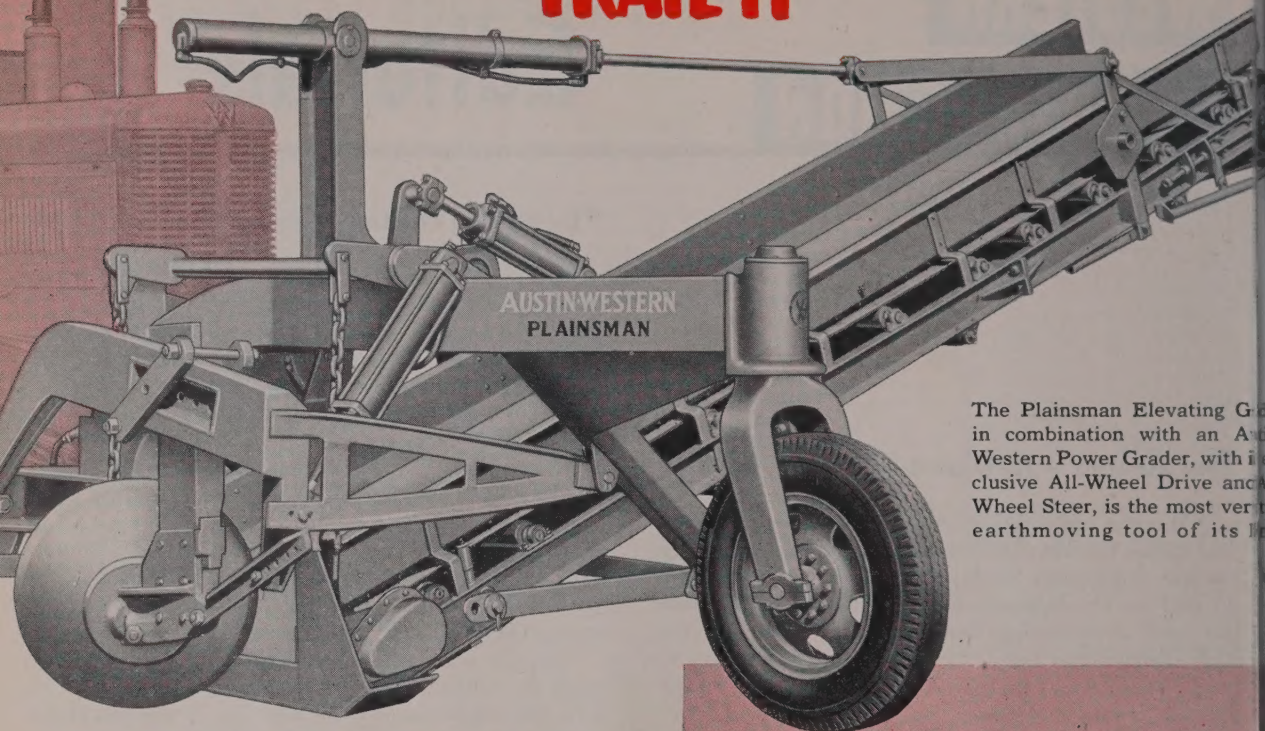
"Operators are often prejudiced against this or that make, and don't like it when called upon to operate a certain machine. I've made quite a study of this type operator and found almost without exception that the machine he doesn't like is the one he knows little or nothing about."

"Many times valuable features built into machinery never get a chance to produce for their owner just because his so-called ace operator won't spend the time and study required to bring these features out. Instead he uses his good standing to add weight to his statement that a certain make machine is no good, when really he is afraid he won't be able to operate it."

That's the way Bill Myers sees it—even if it cuts down his firm's repair business! But less repair work, when it results from better human performance at the clutch or throttle, means healthier customers for Columbia Equipment.

If you're a good man on the clutch or throttle, you're helping your company compete for construction work. You're also making your company a healthier equipment customer. And when you do that, you're helping yourself keep a job.

you've got to **TRAIL IT** for top performance



The Plainsman Elevating Grader in combination with an Austin-Western Power Grader, with its exclusive All-Wheel Drive and Wheel Steer, is the most versatile earthmoving tool of its kind.

Building Roads-Widening Roads - Raising Grades Casting or Loading

The Plainsman is the only elevating grader which can be attached or detached in the field in a matter of minutes, and does not require the removal of the blade and circle assembly, thus leaving the grader intact for all normal blading and scarifying operations. And, the grader can be worked with the trailer attached and the elevator inoperative, thus eliminating the use of a standby blading machine.

All operations are hydraulically controlled, including the raising and lowering of the 19-foot carrier and raising and lowering the plow.

Part of the weight of the attachment is carried on its own supporting wheel, and because the Plainsman is *pulled* rather than *pushed*, it is possible to hold a straight-line cut with the disc plow at all times.

Your nearby Austin-Western distributor will be glad to tell you the whole story.



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