

WESTERN

CONSTRUCTION



SEPTEMBER 1959



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26 feet deep in conglomerate harder than cement. Note the vertical sides and clean bottom.

Another Northwest mucks out blue granite.

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—in going like this!

Teeth melt away — but the Northwest shovel does a job. It's a real Rock Rig! That's what Lee H. Woods and Sons think. Mr. Woods says, "I sat in the seat of shovels for 28 years before going into the contracting business myself and my many years experience have convinced me that when it comes to rock, Northwests are the best of all. That's why I'm one of the toughest rock jobs ever attempted in the West and it took two new 80-Ds."

Look at the picture. This is a conglomerate—harder than cement. It takes a set of teeth lasted only two hours. The ditch at this point is almost 26 ft. deep. There was almost no hand work.

The job is the "Second Barrel" of the water line for the City of San Diego. It runs 16.9 miles and calls for 66" to 72" reinforced concrete pipe. Depths run to 34 ft. There were miles of blue granite that had to be blasted and because of the rugged terrain the shovels often had to work on slopes of 30 to 60%.

It's on jobs like this where that "something extra" built into Northwests pay out. They are always ready to go and they eat up tough jobs.

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Mr. Lee H. Woods and his son Jim.

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WESTERN



CONSTRUCTION

SEPTEMBER

1959

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MANAGING EDITOR

Robert L. Byrne

FIELD EDITOR

Ralph W. Booze, Jr.

ASSISTANT EDITOR

M. A. Carroll

★

PUBLISHER

Jack R. Vanneman

★

DIRECTOR OF RESEARCH

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★

CIRCULATION MANAGER

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★

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S. J. Hunt

★

ADVERTISING SALES

Joseph R. Mayner

Eastern Manager
2899 Lander Road
Cleveland 24, Ohio
Phone: TErrance 1-9782
Ohio, Pennsylvania, New Jersey,
New York, Delaware, the Ne
England states and eastern Michiga

Bertrand J. Smith

District Manager
609 Mission Street
San Francisco 5, California
Phone: YUkon 2-4343
Northern California, Oregon, Was
ington and Idaho.

James J. Elliott

District Manager
The Plan Room Building
1417 Georgia Street
Los Angeles 15, California
Phone: Richmond 9-3278 and 9-32
Southern California.

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609 Mission Street

San Francisco 5, California

Phone: YUkon 2-4343

James I. Ballard President

L. P. Vrettos Vice President

and General Manager

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★

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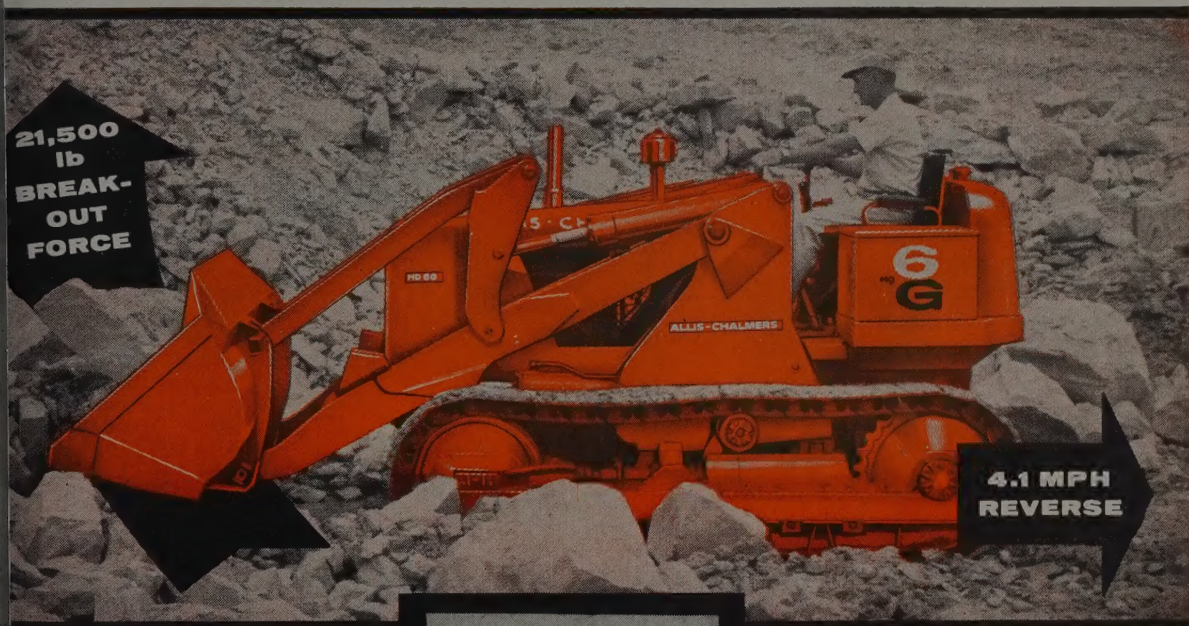
COVER—Construction forces put the final squeeze on the Colorado River to shove it into the diversion tunnel at Glen Canyon Dam. This aerial view, looking downstream, shows the entire size of the dam, including abutments, spillway tunnels, and highway bridge. Photo by Frank Jensen.

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LOW COST

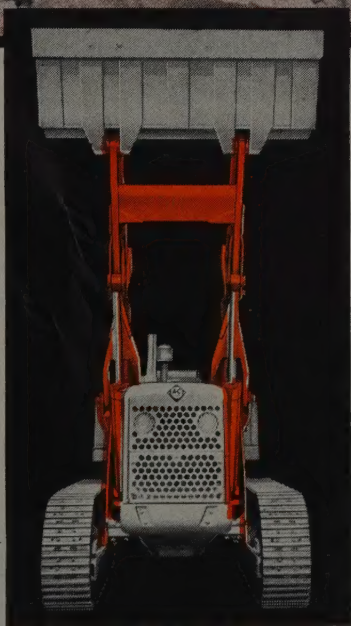
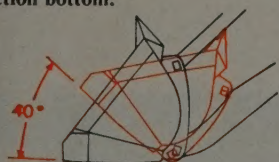
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- * 40° bucket tip-back
- * Fast reverse to 4.1 mph
- * Rugged "in-line" booms and linkage
- * Best dump height, reach in its class



Power pry-out action

The new 6G's curved-bottom bucket exerts a 10¾-ton force at the cutting edge. This unique "rolling-leverage" action is far more effective than the old, toe-and-heel principle of an ordinary, shoe-type bucket bottom. It can break out stubborn boulders, curbs and old pavement easily—get loads *fast* in hardest materials.

Bucket tips back 40° on curved, section bottom.



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Shift from any forward speed to either reverse speed with a single lever—choose the *right* speed for every tractor shovel function. Powerful hydraulics put big loads right to the top, then bring the bucket down in a smooth, swift cycle. Nearly seven feet of track on the ground . . . positive, accurate controls . . . and new "down-slope" visibility let you handle the bucket and tractor with unheard-of balance and precision.

"In-line" strength

Booms and linkage are twin towers of solid-steel strength, straddle-mounted on wide-spaced pivots in the double-walled side frames. Lift and dump cylinders operate in exactly the same line, put dependable hydraulic power to work *straight from the shoulder*.

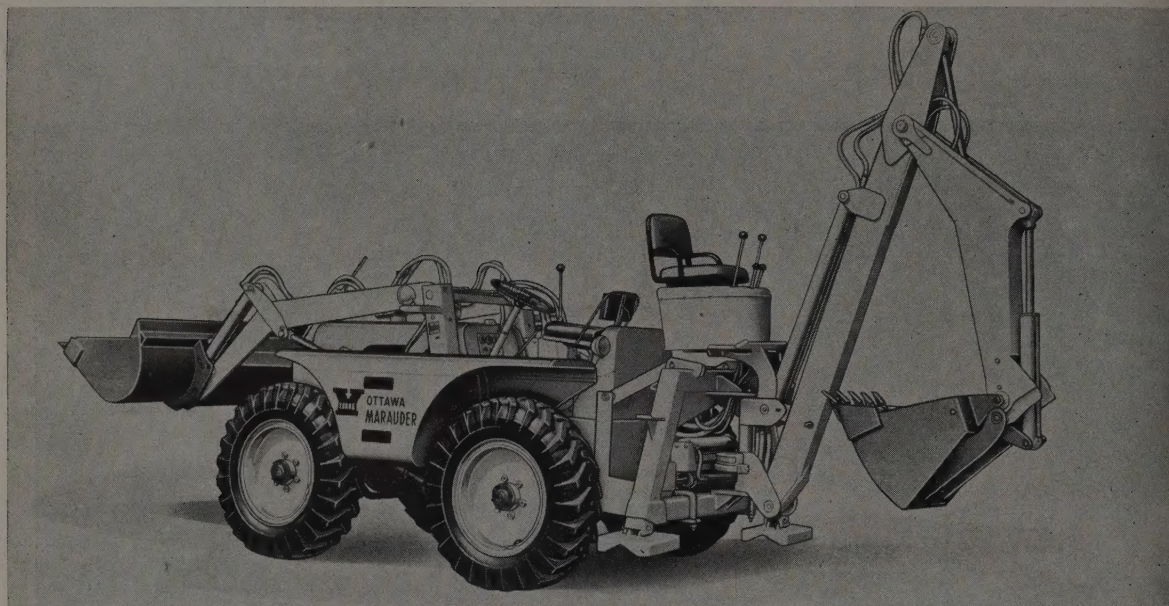
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NEW EQUIPMENT

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



Backhoe and loader is self-propelled unit

Rather than putting accessories on a standard tractor, these pieces of digging equipment were equipped with a carrier

Designed as a self-propelled backhoe and loader, the "Marauder", announced by **Ottawa Steel Division, Young Spring & Wire Corp.** is distinctly not a tractor with attachments. The new unit has been designed as an integral digging and loading machine. The prime mover is a four wheel drive unit capable of speeds up to 25 mph. and a clutch which enables change of direction without shifting. The unit is powered by a Continental engine with sufficient power, weight, and traction for digging under tough conditions, combining these characteristics with speed and flexibility.

The backhoe is an integral part of the prime mover with the Ottawa welded design and a turret type seat that pivots with the boom. A rugged A frame supports outriggers, and the simple two level controls make for easy operation. A wide range of bucket styles and sizes is available. The machine digs 12½ ft. deep in any position of its 190 deg. swing.

On the other end the Marauder loader is again the proven Ottawa unit balanced in weight and capacity for maximum traction and stability. A single lever controls both lift and bucket valves providing simultaneous operation of the lift and dump cylinders as well as simultaneous bucket retraction and lower-

ing. The bucket has an 18 deg. rollback for load retention. Lift capacity is 4500 lb. with 5000 lb. breakout.

The entire Marauder unit comes from one manufacturer under one warranty, and is sold through authorized Ottawa dealers.

... Circle No. 150

Diamond diesels feature many options

Featuring numerous options which permit custom building of individual trucks for buyers requirements, **Diamond T Motor Truck Co.** announces two new diesel series, the 921D and 922D. The massive cab is an important feature designed for safety and driving comfort. Its steel construction provides unusual strength and visibility is outstanding. A choice of five





D6 builds mountain road to Portland Reservoir

Portland, Oregon, gets its supply of pure, soft mountain water from the Bull Run River... 30 miles east of the city. The river has its source in Bull Run Lake near the summit of the Cascades... elevation 3,175 feet. The uninhabited, 218-square-mile area is heavily-timbered, rugged terrain. To repair a dam at Bull Run Lake required carving out 5 miles of new road.

A Caterpillar D6 Tractor with a No. 6A Bulldozer and a Hyster donkey did the job... rough grading, ditching, clearing boulders, skidding logs, spreading crushed rock. All this plus general maintenance jobs such as winching logs from the lake and river.

The versatile D6 outworks any tractor in its size range. It combines high production with low operating and maintenance costs.

The 93 horsepower Caterpillar Engine delivers the push and pull to make the hard work easy; the engine's foul-proof fuel system runs on economy-type diesel fuels.

The D6 is fast... speeds up to 6.6 MPH... and easy to operate. A hydraulic unit takes the effort out of steering, helps the operator work at top efficiency.

The exclusive Caterpillar oil clutch goes up to 2,000 hours—one whole season—without adjustment. When other type clutches need *replacing*, a Caterpillar oil clutch may need an *adjustment*.

All of these features on the D6 combine to give you a profitable return on every dollar invested. And for added versatility... there's a complete line of attachments for the D6.

You could be missing out on a machine valuable to your operation. A demonstration on your job will show you why the D6 is the work horse on so many earthmoving jobs. Call your Caterpillar Dealer soon. He'll give you the full story... top production facts and figures.

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**HIGH-QUALITY MACHINES
WITH A LOW FINAL COST**



NATIONAL GENERAL CONTRACTORS JOINT-VENTURE USE FLYGT PUMPS ON TOUGH DE-WATERING JOB.

When ground water intrusion — at the rate of about 2,000,000 gallons per day — threatened a \$13,000,000 pipeline job for Southern California's famous Metropolitan Water District, joint-venture contractors Morrison-Knudsen Company, Inc. and Macco Corp. brought in eight Flygt Submersible Electric Pumps to help keep the giant project on schedule.

More than fourteen miles of mammoth 96-inch-diameter pipeline on this particular job carries additional water to the rapidly growing California Orange County and southeastern Los Angeles County industrial and residential areas. When the 200 man M-K-Macco work force began excavations along the 4000-foot section of pipeline paralleling Coyote Creek, ground water seepage was immediate. As huge clamshells and draglines carved a ten-foot-wide ditch close to its 18 to 20 foot depth, water intrusion turned the bottom of the ditch into a soupy quagmire of water and mud. Needed! — a de-watering pump which would take a high proportion of solids and run 24 hours a day with little or no supervision.

The answer! — eight Flygt Submersible Electric Pumps were installed by the joint-venture contractors to supplement a regular battery of gasoline-powered centrifugals and diaphragm pumps. Working around the clock, 24 hours a day, the Flygt Pumps cleared the ditch — and kept it cleared. Three 3" and five 1½" Flygt Pumps were used. The larger models were assigned to keeping the ditch dry before the pipe was placed, and the 1½" Flygt Pumps were utilized to keep bell holes water-free, so as to facilitate welding operations, which were carried on both inside and outside the big pipe. The eight Flygts solved the problem — moved water containing a high proportion of solids, 24 hours a day, with little or no supervision!

FLYGT SUBMERSIBLE ELECTRIC PUMPS range in size from 1½" - 85 GPM capacity to 8" - 3000 GPM capacity. Head capacities range up to 210 feet. Higher heads obtainable with FLYGT pumps in tandem. Weights range from 70 to 1200 pounds. Write for complete specifications.

CHECK THESE FLYGT FEATURES

- ✓ Electric, fully submersible, fully portable.
- ✓ Instant pumping—no priming, no installation.
- ✓ Runs dry without damage, resistant to salt water.
- ✓ Takes a high proportion of solids, frost and fire-proof.
- ✓ Practically no maintenance or supervision.
- ✓ Operates unattended, quick, easy to service.

ASK FOR NAME OF YOUR NEAREST
FLYGT DEALER



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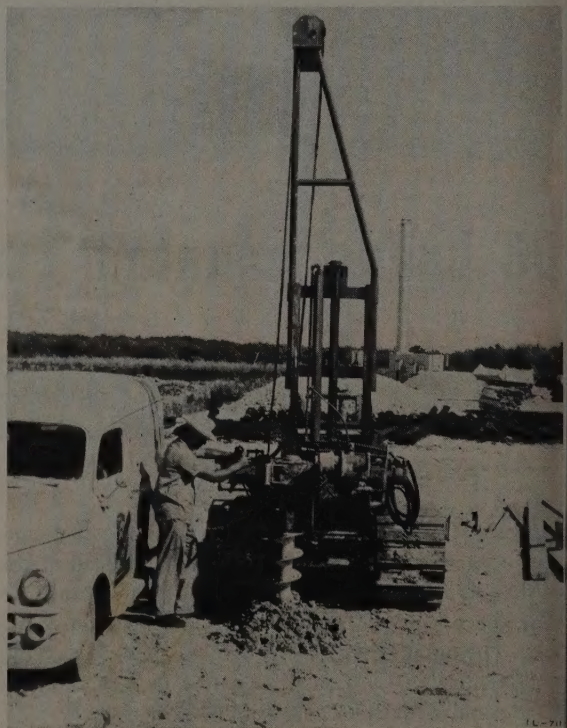
1666 Ninth St. (Corner of Olympic & Ninth)
Santa Monica, California

diesel engines is offered to meet operators' requirements including four Cummins models from 190 to 262 hp. and a General Motors 218-hp. model. Transmissions range from 4 to 12 speeds and are the new semi-automatic systems. Eleven different rear axles are available with capacities from 22,400 to 29,000 lb. Design and axle position take into consideration requirements for legal highway loads.

... Circle No. 151

Compact, all-purpose drill rig by IH

Quickly convertible from one type of drilling to another, International Harvester Co. announces the B-40 Explorer manufactured by Mobile Drilling, Inc. The drill is designed for mounting on International TD-9 and TD-6 crawler tractors. In semi-consolidated material the drill operates as an auger, and 5-ft. flight sections can be used to drill down 75 ft. in clay or gravel, at 4½-in. diameter. The rig can also be used for boring post holes up to 24 in. in diameter in one



5-ft. stroke. Converted for diamond drilling the unit will handle hard rock formations to depths of 250 ft. The machine has a steel beam and tubular frame which bolts to the rear face of the tractor frame. The 1,466-lb. drill is completely self contained and no modification of the tractor is necessary. For traveling the drill frame and tower lower, eliminating clearance problems. The folding frame also permits drilling at any angle from vertical to horizontal. Typical job applications include bell holes for foundations, aggregate prospecting, core drilling, drainage holes for guard rails and general soil sampling.

... Circle No. 152

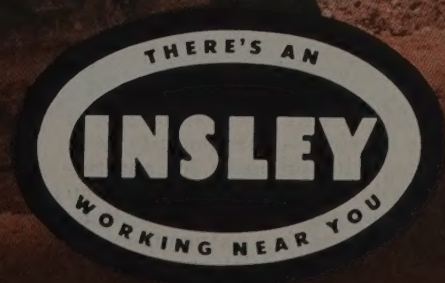
(Turn to page 114 for more new equipment.
New Literature can be found on page 111.)

WESTERN CONSTRUCTION—September 1956

A NEW LOOK with better than ever performance

Now you can have an Insley Type K or Type L machine with a modern WIDE VISION cab . . . and at no extra cost. This better all-round visibility lets the operator do more and do it more safely.

If you haven't looked inside an Insley Type K or Type L lately, you've missed a lot of other design improvements, starting with a spring cushion seat for the operator. Make a date with your Insley distributor today. Let him give you the full facts. The Insley Line includes excavators and cranes from 5 to 45 tons in capacity.



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The WEST from WASHINGTON

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

With Congress beginning to build up to its usual session-ending burst of speed on legislation, mid-August was a poor time for making safe estimates of what the final outcome would be.

Probably the greatest shocker to those who think they know their way around Washington was the action, in late July, of the House Ways and Means Committee. As you know, this group brought out a report that called for virtually a six-year stretchout of the highway program, with a one-year halt on new work next year. That action took everybody (including some committee members) by surprise: there was no indication in the four days of hearings that any such sentiment existed.

The action resulted in an almost unprecedented legislative situation. Normally, the Public Works Committee figures out what it wants to approve, passes this on to Ways and Means, which is expected to find the funds. But in this case, Ways and Means stepped out of its role and in effect told Public Works that it wouldn't attempt to find any more money—that Public Works had best cut its sails to suit Ways and Means' cloth.

Exploded Public Works Committee Chairman George Fallon: "This is terrible. My committee will never go for it."

Cross-checking the action, however, produces this guess as to the committee's reasoning: The cut-back recommendation was a three-way compromise within the committee itself—between extremists on both sides (those who want new taxes and those who don't), and others who were afraid of a Presidential veto on bond-financing plans. Testimony elsewhere on Capitol Hill had indicated that the Treasury is having trouble meeting the unprecedented cash-ins of Series "E" and other savings bonds, and wouldn't welcome any new drain on its resources like \$2 billion for highways.

Construction organizations—which showed up in full force at the hearings—unanimously went along with proposals for any reasonable legislation that would keep the program moving. But highway-user groups, just as unanimously, continued their flat opposition to

any tax increase to finance the program.

Where the oil companies stood wasn't clear from testimony. But it was clear enough that the majority of them still opposed any additions to gasoline taxes. In this, they were joined by the governors of some 32 states.

* * *

The Bureau of Public Roads, already beset by highway program uncertainties, is now undertaking a revision of its contract practices in dealings with consulting engineers.

The prod is the powerful U. S. General Accounting Office, which filed an exhaustive study of BPR activities with House and Senate Public Works committees. The report is in general friendly to the BPR, but is highly critical of accounting practices, methods of right-of-way acquisition and other matters. The practice in some states of stating engineers' cost estimates before bidding was singled out for particular criticism.

Commenting that current practice in employing outside consultants may be providing "too much incentive" for ultra high-type design, GAO reported that BPR was already at work on a revision of policy. A joint committee representing BPR, the American Society of Civil Engineers, the American Association of State Highway Officials, is now considering revisions that would:

Require public statements as to the qualifications of consultants to be used on federal-aid work; putting consultants under state supervision; a revision of the fee base.

"We have noted," said GAO, "that fees for consultants generally are based on a percentage of awarded contract prices, or estimated construction costs . . . More contracts were negotiated at 4 percent than any other figure . . . (but) fees computed on this basis ranged up to \$3,655,000 for a single project.

"This . . . places the consultants in an advantageous position . . . There is an incentive to prepare elaborate plans and specifications and design expensive structures . . . The variation in fees (between the states, because of cost variations) may well be disproportionate

to the differences in engineering effort . . ."

Tied to this fee variation was GAO's criticism of Interstate highway engineering standards, as applied by BPR. "The approved interstate standards are stated in minimum terms," said GAO, "and exceeding the minimum is considered desirable . . . and encouraged."

The report said that consultants collected fees totaling about \$11 million from highway work in the calendar year 1957.

Turning to contractor practices, the accounting office deplored the practice in several states (New York, Nebraska, Colorado, Illinois and Arizona) of announcing engineers' estimates before bid-openings. "In our opinion," said GAO, "this . . . may act to restrict competition and influence bidders' prices . . . We recommend that (BPR) seek co-operation of those states . . . to eliminate this practice . . . Pre-qualification proceedings for contractors in many states were also criticized—mostly for failure of the states to follow up and keep their lists current.

BPR has promised studies and correction of many of these matters.

* * *

Western advocates of states' rights in water matters made a strong showing, but won't get action until the January session, on bills that would have the effect of nullifying a Supreme Court decision and forcing the federal government to respect state laws on water distribution and use.

A double-handful of bills on the subject were before the House Interior and Insular Affairs Committee—chief of them HR 5555. Objective was to overturn the effect of a U. S. Supreme Court ruling made in 1955 and concerning waters of Pelton Dam, in Oregon. In that decision, the high court asserted federal rights to water "originating on lands that had been reserved by the federal government."

The National Reclamation Association, the U. S. Chamber of Commerce, farm groups and others appeared in support of the measure. But a fact of political intervened against action: The committee was still holding hearings in mid-August, and Congressmen were itching to wind up their long session.

* * *

Incidentally, the trend of Congressional thinking on water developments showed clearly in lengthy and heated Senate debate over authorization to start work on Idaho's

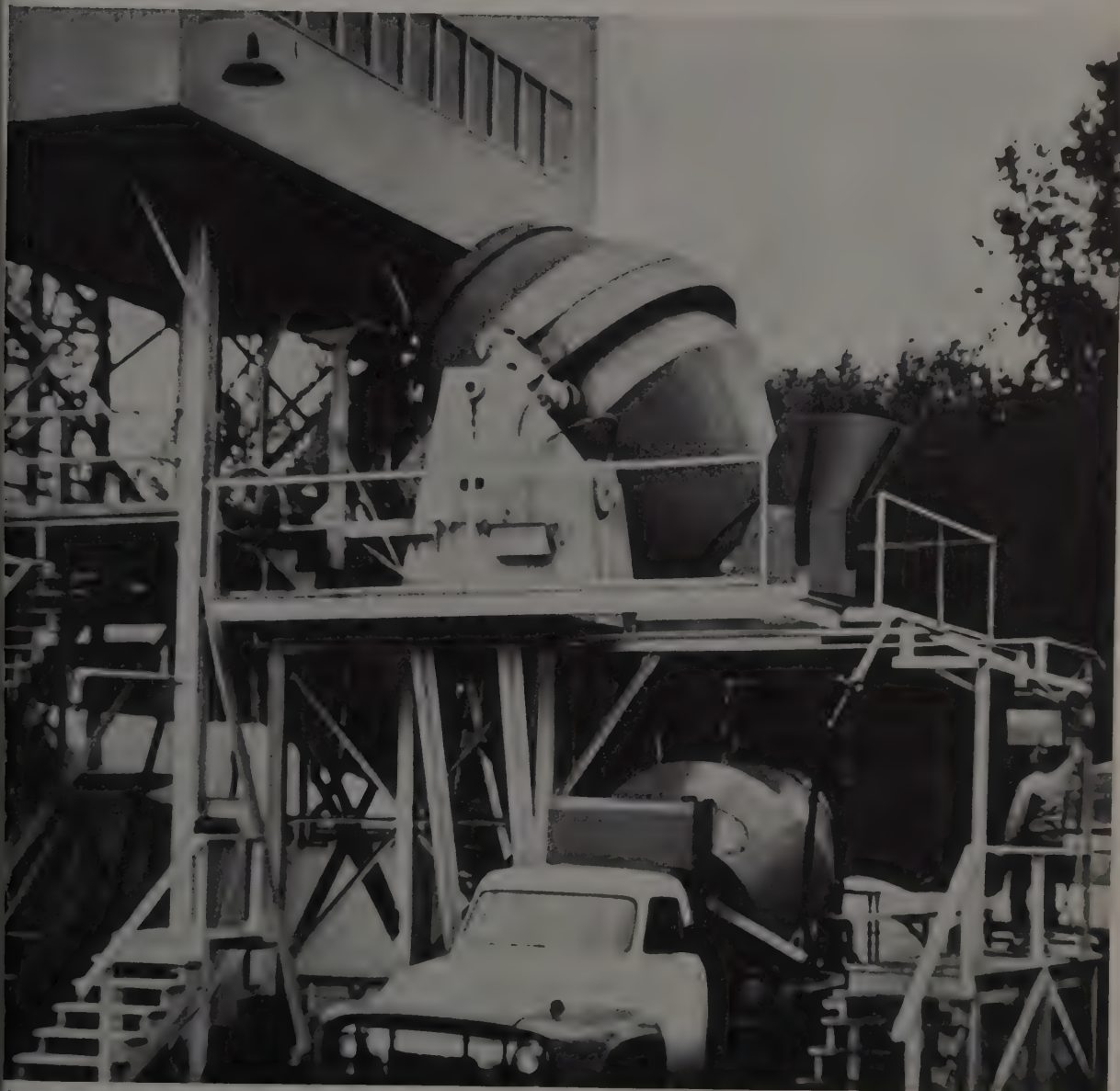
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more, it will save you money and lengthen the life of your fleet by reducing wear on truck mixers, which will only have to run at agitating speeds.

The superior mixing action and sturdy construction of Smith Tilters — from 2 to 10 yards capacity — have made them the standard of the ready mix industry. Ask your local Smith distributor for proof — or write us direct for more information.



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	EIMCO	CAT	CAT	AC	AC	INT.	INT.	CASE
	103	D-4	D-6	HD-6	HD-11	TD-9	TD-15	1000
Maximum Drawbar Pull (zero track slippage)	33,000	10,700	19,000	15,485	21,980	13,240	23,750	24,000
Torque Converter	Yes	No	No	No	No	No	No	Yes
Master Clutch	No	Yes	Yes	Yes	Yes	Yes	Yes	No
Power shift transmission on all speeds, with oil cooled metallic clutches that never need adjustment	Yes	No	No	No	No	No	No	No
Independently reversible track	Yes	No	No	No	No	No	No	Yes
Hydraulic track take-up	Yes	No	No	No	No	No	No	Yes
Heat-treated alloy steel grouser shoes, keyed to the track links	Yes	No	No	No	Yes	No	No	No
One-piece heat-treated alloy steel track rollers, tapered roller bearings	Yes	No	No	No	No	No	No	No
Equalizer bar of heavy duty heat-treated cast alloy steel, allowing full oscillation of crawler tracks with all attachments	Yes	No	No	No	No	No	No	No
Constantly running power take-off drives, front and rear, to standard SAE specs, with rear take-off not affected by track operation, and independent hydraulic pump drive allowing simultaneous use of hydraulic, winch and hoist accessories.	Yes	No	No	No	No	No	No	No
Front operator's seat for full visibility	Yes	No	No	No	No	No	No	No
Ability to operate forward and backward on up to 90% slopes	Yes	No	No	No	No	No	No	No
Tractor guaranteed for one full year of single shift service	Yes	No	No	No	No	No	No	No

FOR PROOF OF EIMCO 103 SUPERIORITY

WEIGHT BARE TRACTOR, POUNDS	15,000	10,910	17,605	12,600	20,500	11,925	22,540	13,200
H.P. — FLYWHEEL	100	63	93	66	99	71	105	90
TRACK GAUGE, INCHES (STD.)	60	60	74	60	74	60	74	60
STD. TRACK SHOE WIDTH, INCHES	16	13	16	13	16	13	16	16
LENGTH OF TRACK ON GROUND, INCHES	88	61	85 1/4	66 3/4	85 3/4	73	89 3/4	79
TOTAL TRACK AREA, SQ. INCHES	2,820	1,589	2,744	1,739	2,744	1,896	2,858	2,528
GROUND PRESSURE, PSI	5.3	6.9	6.4	7.3	7.5	6.3	7.9	5.2
TRACK ROLLER DIAMETER, INCHES	8	8	8	7 1/2	7 1/2	N.A.	10 1/2	6
TRACK RAIL WIDTH, INCHES	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	N.A.	N.A.	1 1/2
NUMBER TRACK ROLLERS, EACH SIDE	6	4	6	5	6	5	6	5
TRACK BOLT DIAMETER, INCHES	3/8	1/2	3/8	1/2	3/8	1/2	3/8	1/2
TRACK BUSHING DIAMETER, INCHES	2 1/2	2	2 1/2	2	2 1/2	2 1/2	2 1/2	1 1/2
TRACK PIN DIAMETER, INCHES	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
SPROCKET PITCH DIAMETER, INCHES	32 1/2	29 1/2	30 1/2	28 1/2	31 1/2	28 1/2	30 1/2	24 1/2
GROUND CLEARANCE, INCHES	17	11 1/2	12 1/2	11 1/2	12 1/2	10 1/2	11	16

N.A. — not available

Above is from manufacturer's data and other sources believed to be reliable, but cannot be guaranteed.

IT'S A FACT . . . not a claim . . . that here is a MODERN line of tractors that makes all other crawler-tractors old-fashioned!

Other exclusive features include Unitized "Stress Flow" Construction, for far greater strength and rigidity; Self-cleaning Air Cleaner that completely eliminates ordinary routine cleaner maintenance and others, far too numerous to list here. Write for details and specifications on all the advanced engineering features of the modern Eimco 103 line of crawler-tractors.

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- 123 — FRONT END LOADER
- 133 — STEEL MILL FEL
- 143 — LOG LOADER

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long-planned Burns Creek project on the upper Snake River.

What bothered some senators — particularly Arizona's Goldwater and Illinois' Dirksen — was this fact: Burns Creek would be a source of supplemental water (100,000 acre feet) for downstream projects like Palisades that are already operating. But its principal revenues would come from the production of electric power — only 1.75 percent of the \$49 million cost would be allocated to reclamation — the rest to power.

Said Goldwater: "I cannot understand why the federal government should build a dam costing in excess of \$48 million whose principal purpose is to supply power. Added Dirksen: "100,000 acre feet of water is an insignificant amount, compared to the storage in that area at the present time (some 4 million acre feet, according to testimony)."

Idaho's Senators Church and Dworshak defended the proposal on the ground that the supplemental water is an "insurance policy" for irrigators, and that the 90,000 kw. of power to be produced is vital to development of the area.

* * *

Congressional exasperation with the fact of growing construction costs has found expression in querulous comments on construction estimating of federal agencies, as Washington's heat and the pressure of adjournment began to mount.

Washington's Congressman Don Magnuson (7th district) had this to say: "The new Air Force Academy is a classic example. When we were asked to approve this glass castle in the Colorado mountains, we were told it would cost \$125 million. That was only five or six years ago . . . but the academy is going to cost \$200 million — there are proposals that would boost that figure to \$300 million.

"The point is made that costs have risen . . . but I submit that an underestimate of these proportions cannot be explained away quite so glibly.

"We on the Appropriations Committee now take it for granted that when the Bureau of Reclamation or the Corps of Engineers gives us a cost estimate . . . we will not recognize the figure a few years later . . . In my opinion, many agency officials are so anxious to convince Congress that their projects should be undertaken that they are ultra-conservative — consciously or subconsciously — when it comes to cost estimates."

A Farewell to Boots and Stetson

ONE BY ONE those trappings which have characterized the Western engineer in both fact and fiction are slipping into the shadows. The public has always visioned the figure of the bronzed and booted man peering through the transit as symbolizing the engineer who mapped and built the West. Much of the glamor and the romance that were represented by that heroic figure are now departing, thanks to science.

In the old days the college freshman awaited eagerly for the course in surveying and its campus field problems where he proudly showed the lesser students that he was truly an engineer. There was that first day when the instructor held up the tape and said, "This is a chain", confusing enough, but thrilling because it represented the basic instrument for measuring mountains and deserts. And the senior could hardly wait for the day when he donned boots and Stetson—badges of his important position—and first hoisted the transit to his shoulder. He knew that his public knew what he was.



But today, the instructor in the class of modern surveying points to the disc of the Tellurometer and says to the freshman class, "This is to measure distances." With jaunty

bow tie and students in clean white shirts, they personify surveying at its electronic best. No longer will these graduates climb the rungs of the ladder from brush-cutter to stake-puncher, to rear chainman and head chainman.

Today these measurers of distance leave their air conditioned offices, board the waiting helicopters and are transported to distant observation points. Stepping out into the mountain breeze, which represents a remaining discomfort, they adjust bow tie and set up the electronic device, pointing it toward the other crew on a distant peak. Dispatching the impulse, they note its return and record a few of these echo-intervals in the notebook. Signaling the helicopter, they take off for the return, commenting that it is good to get out of that awful sun and wind.

Thus has science and progress fashioned a new surveyor and obliterated the symbol that was so typically Western. Progress will be served and the 'copter and its crew of electronic surveyors with notes on their magnetic tape will get results faster, and certainly easier. The only question that remains is whether the public can be trained to recognize this newer generation of surveyors, and not expect the man behind the electronic dishpan to step forward and say, "Take me to your leader."

Jim Ballard

He Bulldozes 9 Hours a Day on 10 Gallons of Gas with a JOHN DEERE CRAWLER-DOZER



Contractor Pete Weatherly of Fort Worth, Texas, owns and operates this John Deere "440-IC" with 602 Bulldozer—is pleased with its low gasoline consumption.

Fuel economy is just one big reason for Pete Weatherly's enthusiasm about his John Deere "440" Crawler-Dozer. The quality of the work it does scores high, too, with this Fort Worth, Texas, Contractor.

"It does a fine job of grading and back-filling, and is particularly handy for grading next to buildings and in cramped places," he reports.

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You can select a John Deere Crawler-Dozer designed to fit your particular requirements—outside mounted, inside mounted with hydraulic lift and down pressure or all-hydraulic control, and gasoline or Diesel power. All units are available on terms of the John Deere Credit Plan.

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WESTERN CONSTRUCTION—September 1955



SEPTEMBER 1959



INTERCHANGE cut at the start of Idaho Interstate project. Spread includes four scrapers with 45-yd. heaped capacity pulled by D9 tractors.

Big equipment featured on Idaho highway job

EXTRA-HEAVY scrapers, big tractors, beefed-up dozer blades, and special push blocks that enable two tractors to gang up on rock ripping are being used by Morrison-Knudsen to cut a 4-lane swath through Idaho's mountains outside Coeur d'Alene.

Officially known as the Cedar Canyon Project, the 4.13-mi. job is part of Idaho's Interstate route which eventually will connect Billings, Coeur d'Alene and Spokane. The \$2,171,771 contract includes 110,000 cu. yd. of earth-moving, with the "earth" ranging from packed soil to solid rock. Most of it will be ripped and hauled by an equipment spread that emphasizes power, high capacity, and speed. Included are:

Caterpillar 491 scrapers with Peterson Tractor Co. modification for extra capacity. Original rated load for the 4-wheel scraper unit was 38 cu. yd. heaped or 28 struck. Scrapers

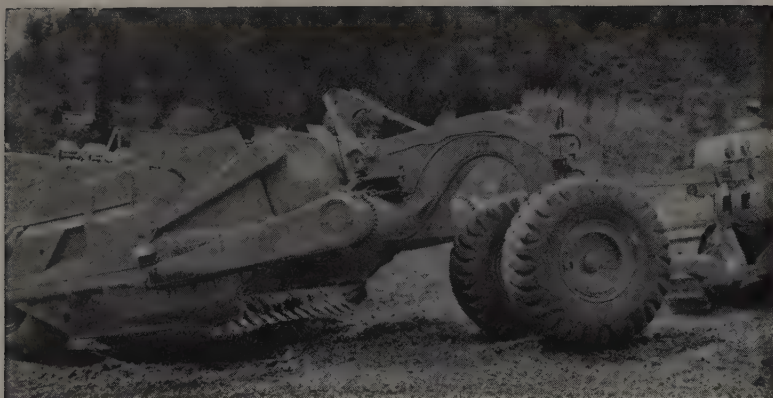
were cut apart at M-K's Boise shops, and extended 30 in. by welding in additional panels. Other panels were added to raise the sides. To support this increased capacity,

sides were tied together with a heavy cable and turnbuckle strung across the inside front edge of the bowl. The various steel shapes necessary to enlarge the bowl are supplied in a kit made by Peterson Tractor Co., San Leandro, Calif. The cable brace is an M-K innovation. Scrapers are equipped with digging teeth instead of the standard solid cutting edge. Hard surfacing beads are run along the lower edge of the bowl, and additional strength applied to the gooseneck.

Extended scrapers have a heaped



ROCK DOZER blade, foreground, has heavy frame and narrow yoke which attaches inside treads. Blade is no wider than tracks. Conventional blade in background.



SHOVEL teeth attached to scraper for rock work. Unit has been lengthened 30 in. at rear by welding in additional panels. Modification was made in contractor's shops.



CABLE brace attached to extended scraper bowl for additional support of built-up side

capacity of about 45 cu. yd. and 35 struck. They are pulled by a D-9, and loaded by one or two D-9 push Cats.

Peterson rock dozing blades, shorter and heavier than standard blades, are used in tough rock areas. Blade is mounted on a heavy, narrow carriage assembly which fits inside the tractor treads. Short blade extends only to the outside edge of the treads, so that all thrust can be applied straight ahead.

Heavy steel push block resembling a barrel chair fits over the ripper shank and attaches to the tool bar for double ripping. In this case, the operator of the pushing unit lowers his blade on the chair to apply both downward and forward pressure to the ripping tooth. The tractors will use from one to three ripping teeth, depending on the resistance of the rock.

Project manager Ernie Sands plans to hold drilling and blasting to a minimum. Anything his tractors can gang up on and move will be ripped. The remainder will get a light shot, less than 1/2 lb. per cu. yd., and then ripped.

The heavy accent on ripping was dictated by the variable nature of the material. Any given cut may contain as much as 60% earth interspersed with the basalt and shale typical of the area.

On the initial cut, and one of the largest, this objective was being met at the rate of 2,000 yd. per scraper per 9-hr. shift. At peak operation, scrapers moved 50 yd. loose material per trip on short hauls. The scrapers have a 45-yd. heaped capacity, and the extra 5 yd. rides on the outside, dragged ahead of the scraper bowl as it dives off the steep slope from the top of the cut to the adjacent fill area.

To collect these 5 bonus yards, Sands likes to keep the haul slopes

as steep as possible. On the big interchange cut, his spread included two D-9 push Cats with blades and rippers, four scrapers pulled by D-9s, D-8 dozer to trim the fill, and a motor patrol which periodically cleans up loose material.

As the fill base moves out into the lake, it is partially compacted by the big rigs moving over it, and completed with a heavily weighted Grid roller. The roller is relatively new, and Clarence Anderson, general superintendent, had high praise for its results. He reported that it developed 99.8% compaction with a minimum number of passes.

Movement of material in rigs with beefed-up capacities requires additional vigilance in preventive maintenance, which is the responsibility of Master Mechanic Glen Moulds. Greasing, inspections, and routine maintenance chores are done during the lunch break when the spread is gathered in a parking area. Two lube trucks and a crew move in to service the rigs. Lunch hours are staggered so the maintenance department can take advan-

tage of this down-time.

Cable breaks occurred relatively frequently on the big scrapers, and the extra loads took their toll. Anywhere from 30 min. to an hour was required to cut out a section of broken cable and get the unit back on cycle. Pickup trucks carried welding equipment to make the cuts and were used to pull new cable through the sheaves. Moulds experimented with new types of cable, and finally settled on a heavy ringbone weave type which eliminated all abnormal breakage.

The Cedar Canyon job is a project of the Idaho State Highway Department. John F. Pearrington, district engineer at Coeur d'Alene, and O. L. Grunerud is resident.

Morrison-Knudsen staff members are: Ernie Sands, project manager; Clarence Anderson, general superintendent; Glen Moulds, master mechanic; Joe Anderson, excavation superintendent; Clarence Fish and Calvin Marsh, excavation foremen; Ellis Bunn, crusher superintendent; Henry Weech, labor foreman; John Suffle, pipe foreman; and Tom Sales, office manager.



KEY MEN on Morrison-Knudsen staff are, from left, Clarence Anderson, general superintendent; Ernie Sands, project manager, and Glen Moulds, master mechanic.

Denver water tunnel at 20-mi. mark

AFTER THREE YEARS of work Blue River Constructors have passed the 20-mi. mark in the driving of the 23.3-mi. long Harold D. Roberts tunnel for the Denver Board of Water Commissioners. It's been a tough job all the way, with ground which varies from solid rock to near mud, and with water flows up to 5,000 gal. per in. Temperatures increase 1 deg. for every 100 ft. of cover, and there is only one point of access (a 916-ft. vertical shaft) in the entire length between the portals. The muck haul at the east portal heading is already 9 mi. long and getting longer. Work now under way by contract dated July 1956 covers everything except driving the east-ly 9,986 ft. of the tunnel which was done by force account in the 10-year period from 1946 to 1956. The west portal of the tunnel is located near the town of Dillon, in Summit County, Colo., with the east portal near Grant, in Park County.

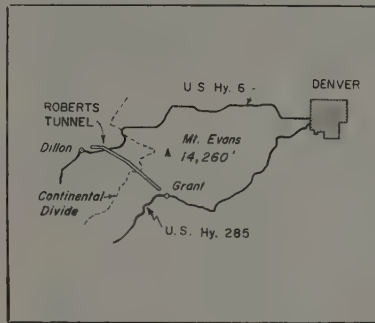
Blue River Constructors is a joint venture consisting of Mid Valley Constructors, Inc. (sponsor), A. Healy Co., Charles H. Thompson Co., J. A. Jones Construction Co., A. S. Horner Construction Co., and Colorado Constructors, Inc. It is estimated that concrete lining work will begin in mid-1960, with completion and cleanup about December 1961. For bidding purposes the project was broken into two parts, one about 14 mi. long and the other about 9.4 mi. long. Blue River Constructors were low on both — \$26,905,380 for Schedule 1, and \$13,488,500 for Schedule 2.

The tunnel is being driven from headings, one at each portal and one each way from the foot of the 16-ft. deep access shaft, located about 8½ mi. from the west portal. The project was financed by the citizens of Denver as part of the \$101,000,000 water plant betterment program.

Engineering details

Upon completion in 1962, water will be diverted from the Blue

Tunnel drivers make steady progress on 23.3-mi. Harold D. Roberts tunnel despite ground-water and some poor rock. Completed tunnel will pierce Continental Divide to help slake growing Denver's thirst. Access shaft 8.5 mi. from west portal is 916 ft. deep.



River, a major tributary of the Colorado River, into the tunnel for transfer to the north fork of the South Platte River and thence by a natural stream channel about 46 mi. to the existing intake of the Denver municipal system, about 25 mi. southwest of Denver. The distance traveled by the water via tunnel, stream channel and conduit to the center of distribution in Denver will be about 94 mi. The tunnel will be 23.3 mi. long with a

concrete lined barrel, circular in shape, having an inside finished diameter of 10.25 ft.

The tunnel is designed to operate under pressure with the west portal lying in a reservoir basin created by an earthfill diversion and storage dam to be built on the Blue River during the years 1959, 60 and 61. The west portal elevation is 8,850 ft. above sea level with an average down-grade of about 1.45 ft. per 1,000 ft. The carrying capacity of the tunnel will be 788 cu. ft. per sec.

The intake structure will consist of a rectangular concrete frame supporting steel trash racks in a typical "bird cage" design. The bars will be rather closely spaced with sufficient waterway area provided to limit the velocity under maximum flow to less than 2 ft. per sec.

The emergency gate structure is located about 450 ft. downstream from the west portal. Its main purpose is to provide facilities for shutting off the flow of water through the tunnel. There will be a vertical shaft with a minimum diameter of 15 ft. and a depth of 208 ft., with the top located well above the high water level of the reservoir. A control house 16 ft. high will cover the top of the shaft. This building will house the necessary controls for operation of the hydraulic emergency gate, equipment and instruments necessary for indicating the reservoir water level. Flow through the tunnel will be measured by a Venturi meter in-

Selected unit bids — Roberts Tunnel

Blue River Constructors

Total bid (two schedules): \$40,393,880 (received June 1956)

	SCHEDULE I		SCHEDULE II	
Excavation, unclassified, open cut . . .	220,000 cu. yd.	\$ 2.70	16,000	\$ 4.00
Excavation, unclassified, in tunnel . . .	373,000 cu. yd.	38.38	190,000	43.85
Excavation, unclassified, access shaft . . .	7,300 cu. yd.	82.00		
Steel tunnel supports	7,200,000 lb.	0.22	1,350,000	0.24
Timber tunnel supports	1,600 M bd. ft.	300.00	300	500.00
Roof-bolting tunnel supports	440,000 lb.	.45	230,000	.45
Pumping water through portals	1,400 mil. gal.	110.00	200	110.00
Drilling feeler and high pressure grout holes	33,000 lin. ft.	4.00	3,000	4.00
Grouting through feeler and high pressure grout holes	900 cu. yd.	200.00	200	200.00
Portland cement	240,000 bbls.	7.00	136,000	6.00

NOTE: The editors wish to thank the Project Engineer's Office of the Denver Board of Water Commissioners for making available the information used in the preparation of this article.



WET TUNNEL—Top photo shows water gushing from drill holes at tunnel face. At right is diamond drill. Second photo shows double breast boarding used to keep water from washing out highly sheared quartzite and granite. Feeler holes and grouting are used where needed.



DIESEL UTILITY CAR is removed from track by special swivel boom mounted on steel set. Hoist at boom end is air-operated. Muck train locomotives are both diesel and battery-operated with changes now being made to combination engines.

stalled immediately downstream from the bottom of the shaft. A small battery-operated inspection car will be used inside the tunnel after completion. This car will be lowered and raised in the shaft by means of a skip. The control gate will be of the fixed wheel type, 7 ft. wide and 11 ft. high, provided with rubber seals on the upstream side.

The 916-ft. access shaft is 16 ft. in diameter, concrete lined. The shaft is compartmented to accommodate construction facilities for handling tunnel muck, tools, supplies, concrete and men. Although it is doubtful if it will ever be used after the tunnel is completed, it will be preserved for emergency use, with a permanent wall around the top with a precast concrete slab cover. These cover slabs will be removable with appropriate equipment but heavy enough to be a deterrent to acts of sabotage or unauthorized entry to the tunnel.

Surge chamber

The surge chamber is located 924 ft. upstream from the east portal and is a concrete lined vertical shaft 428.6 ft. deep, with the bottom 42 ft. having a diameter of 10 ft. 3 in. The balance of the shaft extending to the top of the concrete collar about 5.5 ft. above the ground has a diameter of 20 ft. 6 in. and a height of 386.6 ft. The lower and upper sections of the shaft are separated by a 1¼-in. steel orifice plate with an internal diameter of 5 ft.

This structure is required for future use of the tunnel as a power conduit. Its purpose is to hold pressure within safe limits, pressure variations which would damage the tunnel and the hydraulic turbine and other equipment to be installed later in a 6,000-kw. power plant. It is estimated that pressure changes on the order of 300 to 400% of the maximum static head will be experienced after the plant is installed.

Prior to the time a power plant is added, about the year 1975, it will be necessary to provide facilities at the terminus of the tunnel to control its discharge into the north fork of the South Platte River. The plans for this structure will provide for valves, stilling basin and all the works necessary to control the discharge, dissipate the energy of the water and convey it to the river.

Present construction embodies a separate outlet taking off the main tunnel at a wye branch situated about 124 ft. underground from the present portal.

Construction methods

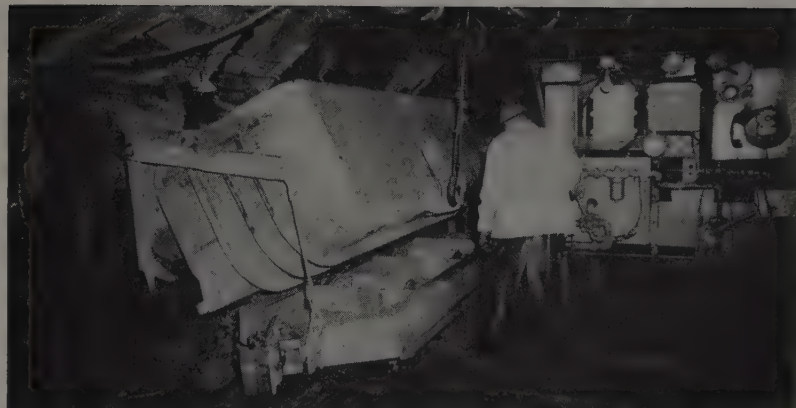
In sinking the access shaft it was found that an orange peel bucket was more adaptable for mucking than a clamshell bucket. A drillumbo with 4 drills and jibs was found satisfactory for shafts of the size used. A battleship type slip form was used to advantage for concreting since it did not have to be removed from the shaft between cycles. It was possible with the equipment and methods used to utilize the entire area of the 16-ft. diameter shaft, thus removing past objections to circular shafts as compared with rectangular shafts. Hoisting systems were used, one for the muck slip and one for a counter-balanced cage. The shaft was sunk with a crane until a permanent head frame could be erected. This saved the expense of a temporary head frame.

Our headings are similar

The methods of driving all 4 tunnel headings are essentially the same, with the usual steps of drill, shoot, muck, set supports, if necessary, and recycle. The contractor is drilling a pyramid cut, with a 1-in. drifter, and a length of feed varying between 3 and 6 ft. Straight carbon drill steel seems to give the best results without requiring any special handling in the drill sharpening shop. Since the ground in this tunnel varies in character so widely, sometimes from round to round, the pyramid cut seems to be the best because of its flexibility.

Ventilation is the governing factor in the methods used to drill, load and shoot, with no complete answers available for all conditions. At present, the alternate blow and exhausting method is used while shooting. The advantage of this type of ventilation over the continuous exhausting one is that a cooling effect at the heading is obtained. This is important on this job since at two of the headings the increasing depth produces a noticeable temperature rise at rate somewhat less than one degree per 100 ft. of cover.

The velocity of the air through the vent pipe, together with its expansion upon discharge near the loading produces a cooling effect that is quite noticeable. Continuous



SIDE-DUMP MUCK CARS are used at all four headings. In top photo air hoist tips car at bottom of access shaft. Muck is hauled to surface by skip. Bottom photo shows how projections at sides of cars causes them to tip as locomotive pushes them past sloping guide rail. Guide rail framework slides between steel angles, is held in position by temporary pins.

ous exhaust does not give this advantage even though it does clear the tunnel of fog.

Mucking with overshot

An overshot loader is used in mucking. By making some minor alterations on the medium size loader customarily used in this size tunnel, a larger size is being used with an increase in loading capacity obtained. This enabled the car size to be increased from 3 to 5-yd. capacity with greater efficiency resulting from decreased switching and loading time. Both diesel and battery locomotives have been used with changes now being made to combination diesel and battery operated machines.

The track is 56-lb. rail, 24-in. gage. A regular railroad system of block signals operated by pull switches is used at all 4 headings.

Conventional steel supports in 6 and 8-in. sizes are being used with bottom struts in rare instances where necessary on account of squeezing ground. Some rock bolting and guniting has been used to stabilize sections of the tunnel driven before this contract.

Pumping equipment

The contractor has pumping equipment sufficient to handle 5,000 gpm. at each heading with a 10,000-gpm. installation at the foot of the access shaft. Feeler holes and grouting are being used where needed, thus keeping the water flow under control at all times.

The underground electrical system is based on a supply of power at 4,160 volts with dry type transformers. This system enables unexpected power demands to be handled.

(Continued on page 70)

Heated paint for striping proves effective in Oregon

Key to more mileage per crew and more painting days per year is the development of an effective method of heating that delivers material to the guns at 150 deg. F.

By **W. O. WIDDOWS**
Assistant Maintenance Engineer
Oregon State Highway Department

Widdows was a co-winner of the 1959 "Dr. L. I. Hewes Award," based on the development he describes in this article.

STRIPING OREGON highways has become a routine operation thanks to the development of a hot spray method by mechanics of the Oregon State Highway Department sign division in 1955. Before the hot spray method was perfected striping was limited to only seven months of the year due to cold weather and wet pavement surfaces. Even during the "good" months there were still too few perfect days to enable the striping crews to paint enough mileage to keep up with Oregon's expanding highway system.

Striping equipment consisted of trucks carrying cylindrical tanks for the paint supply, and the paint was transferred to the striping machine by air pressure. The pressure tanks required a constant adjustment of

gauges for an hour or two each morning. On cold mornings 100 lb. of pressure was frequently required to start operations, eventually being reduced to 30 lb. when the paint thinned and the temperature rose. Further disadvantages of the round tanks included difficulty in installation without taking up too much deck space, and unbalancing the load if placed on one side of the truck.

Change to rectangular tank

To overcome the disadvantages of the round tanks and the pressure supply system, a rectangular tank was built in the department shops to mount transversely on the truck bed. Pressure to feed paint to the spray guns was obtained through the use of an air-operated pump. This forward step was made in 1954. The load on the truck was balanced, whether the tank was empty or full. The paint supply lines to the spray guns were twice the capacity of the guns, so no surging action was given by the pump. A return line from the spray gun supply tank was pro-

ABOUT THE AUTHOR . . .

W. O. Widdows is co-winner of the Hewes Award for highway engineering achievement for 1959. Recognition came to Widdows as the result of his experimentation and development of more efficient traffic-striping equipment. Experiments which began in 1955 proved so successful that the Highway Department's striping equipment was redesigned to use Widdows' innovation. The principal feature of the new system incorporates equipment to heat the paint before it is sprayed on the highway surface, thus allowing much faster application.

Widdows has been employed by the Oregon State Highway De-

partment since 1918, except for a period when he was assistant city engineer at Bend. He is a member of the Northwestern Society of Highway Engineers.

The L. I. Hewes Award is given annually to a Western highway engineer selected by the executive committee of the Western Association of State Highway Officials from a list of candidates submitted by the state departments. The award is given in recognition of an outstanding contribution to highway development, and was originated and funded by Western Construction. This year's award was made at the annual WASHO Conference held in Billings, Mont.



vided so that the paint was constantly being kept in circulation and no tank agitator was necessary.

Success of the new pump and tank operation opened the door to experimenting with heating the paint. Hot spray methods of painting had been used successfully in industrial product finishing. The Oregon Highway Department had used the hot spray technique in the sign shop for several years to paint highway markers and signs. Its advantages were well known, but the problem of applying this principle to striping highways had defied solution when the old round pressure-tank system was in use.

Types of heating tried

Various methods of heating the paint were tried, including heating with copper coils circulating hot water from the compressor radiator, but the temperature was not high enough. The paint also had a tendency to bake on the coils, thereby cutting down the heating efficiency. Immersion type heaters, and heat from the truck engine exhaust were tried but without success.

The new tank with its paint circulating system made possible the insertion of a heater in the circulating lines. Special electric heaters were furnished, according to OSHD requirements, by the Spee Flo Co. of Houston, Texas. This heat unit is capable of delivering 65 gal. of hot paint per hour. Power for the heaters was provided by a 7½-kva. Onan generator mounted on the truck bed in a 24 x 36-in. space.

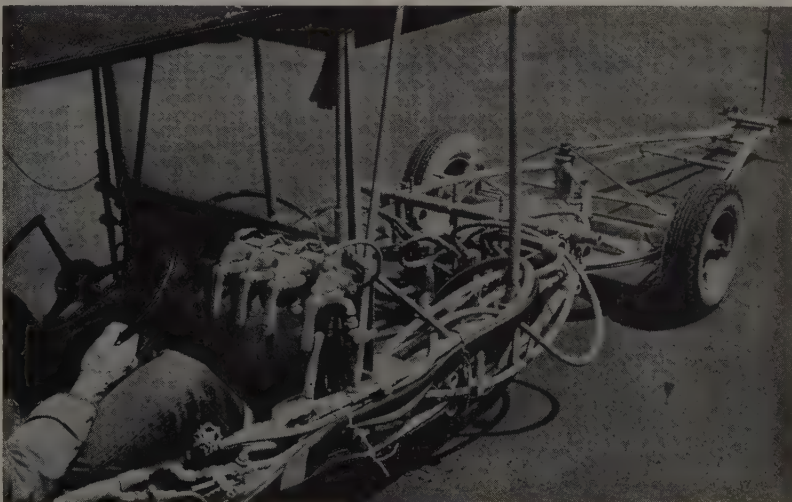
This test vehicle was operated throughout the remainder of the 1955 striping season and all of the 1956 season. Results were more than satisfactory.

Refinements have been made in the original hot spray striping machine, but the basic ideas are maintained in the four machines now used on Oregon highways. One machine is now on its fourth season, two are on their third season and one is on its second. The standardized striping machine now consists of an 18,000 GVW truck on which is mounted a Rotary 125 air compressor to furnish pressure for the spray guns and the 2-in. air-operated gear-driven Fairbanks-Morse pump to transfer paint from 50-gal. drums to the 220-gal. main tank. The air receiver tank is mounted under the truck bed.

A Graco air-operated power flow pump circulates paint from the main tank to the front of the truck



PAINT HEATERS are located on the front bumper. They are electric and capable of delivering 65 gal. of hot paint per hour. Paint is circulated through heaters as a safety measure. Note the floating push bar that is free to move the width of the bumper.



VIEW from operator's seat showing controls and the distance to the "front sight." Using hot paint, the unit moves at a rate of 11 to 12 mph. A nine-man crew is standard, doing their own center-line spotting. Warning cones are required for only ¼ mi.

where it passes through two Spee Flo paint heaters mounted in series. The electric heaters are 3,000-watt elements somewhat similar to a waffle iron in design. Paint is never confined in the elements, but passes to a hot paint tank and strainer. When the paint is not drawn off by the spray guns it is pumped back into the main tank. Paint can thus be heated on the way to the striping operations if the atmospheric temperature is low enough to warrant doing so. The heaters deliver the paint to the spray guns at a temperature of 150 to 160 deg. F.

Also located on the bed of the

truck is the 7½-kva. Onan generator; space for line cone stacks; and space for transporting the striping cart from one location to another.

Operation of the striper

The striping cart is mounted on the front of the truck by means of a floating bar which enables the cart operator to yield the right-of-way in either traffic lane, thus occupying only 2 ft. of the chosen lane. The cart is free to float in either direction from the truck up to the limits of the bumper width. This permits traffic to continue around the striping machine, even



STRIPING PATTERN follows the national standard of painting 15 ft. and skipping 25 ft. Cost of this type of 4-in. stripe is \$30 per mile. Use of hot paint has reduced drying time by 50%.

on narrow roads. Oregon has used the pusher type striping cart for more than 20 years with only one instance of minor personal injury to the cart operator due to an accident.

Spray guns used are the Binks 21 Automatic Paint Gun, with a 57 fluid nozzle and an R30 air cap internal mix set-up, and DeVilbiss P-AGA-502 with 3/16 fluid nozzle, external mix using air cap 326. Only fluid regulation is on the return line where a Graco Back Pressure valve, Model 203-710 series B, is used. A pulsation chamber is used on the discharge side of the pump to smooth out any pulsation which might occur.

Drop-in beads are used in beading, rather than pre-mix bead binder, due to unsatisfactory results from using the pre-mix. Actually, there are no changes involved in application of reflective beaded paint. The viscosity of bead binder is about ten points higher than standard binder resulting in cessation of laying bead binder during cold weather even though the pavement was dry. Hot spray with drop in beading permits striping in cold weather.

Cost of the paint heaters, generator, air-operated reciprocating pumps and the rectangular tank is approximately \$3,000, mounted on the truck.

No special formulation is needed for the paint itself. Five different brands of manufacturers' traffic paint have been used without problems or incidents. There is no danger in heating the paint to 160 deg.

since it is not confined with the heater, but goes directly to the spray guns or is returned to the tank.

Operations are year-around

Use of the hot spray striping method has made the operation a year-around possibility. A new highway section was striped one November when the pavement was dripping wet. The paint stuck to the 9-mi. section, but it is not recommended as a standard procedure.

Drying time has been decreased with the result that warning cones are laid out only 1/4 mi. behind the striping machine instead of 6 to 8 mi. Drying time is generally decreased by about 50%.

Striping mileage has been increased by 30%. Striping crews averaged 6 to 7 mph. with the old cold spray method. Today they average 11 to 12 mph. Crews have painted up to 70 mi. per day on retracing stripes. Cold weather mileage has been increased up to 50% over old methods.

There are other advantages

Other advantages of the hot spray striping system include less time needed for cleaning the tank since the tanks and heaters do not require any special cleaning at the end of the day's run. There is no down-time for solvent adjustment. In cold weather the crew can start heating the paint on the way to the job, thus warming the paint to proper viscosity for spraying time when the job is reached. Stripes

are brighter and penetration of asphaltic concrete is much better.

Oregon uses a nine-man crew in its striping operations. The crew does its own centerline spotting. A pilot truck with roto beam light precedes the striping unit, and a third truck follows to pick up marker cones and carry extra paint and supplies. Paint in 50-gal. drums is stored in Salem and is hauled by semi-truck and trailer to strategic locations throughout the state during the painting season.

Oregon follows the national standard by striping 15 ft. and skipping 25 ft. A 4-in. center stripe is used with a 3-in. shoulder stripe. Costs per mile are as follows:

4-in. plain broken	\$30.00
4-in. plain solid	42.00
4-in. bead broken	45.00
4-in. bead solid	66.00
3-in. bead solid (shoulder)....	55.00

The Oregon Highway Department makes no claim that it can get by with 30% less paint, though it does claim that it can paint one-third more line on an average by heating the paint. On non-beaded paint the coverage is 145 sq. ft. per gal. Beaded paint is laid 50% heavier, averaging 97 sq. ft. to the gallon.

In summing up, the Department feels that a few months operation of the hot spray method more than pays for the additional equipment necessary to heat the paint.

I. A. De France is maintenance and equipment engineer, Oregon State Highway Department, and W. C. Williams is state highway engineer.

Highway safety award goes to Oregon Highway Dept.

OREGON is one of 12 states to receive awards by the Institute of Traffic Engineers in recognition of its traffic engineering program during 1958. Recognition is based on a report to the Annual Inventory of Traffic Safety Activities, in which Oregon was found meeting or exceeding 90% of the recommended performance standards. The award states: "The maintenance of such a high level of traffic engineering performance is evidence to ITE of the importance which the Oregon State Highway Department attaches to this activity in Oregon's continuing fight against traffic accidents."

Oregon has won the award three times in the past four years. Of the 12 states receiving the award, four are western states.



AT GLEN CANYON DAM these two HMS plants (right) are processing more than 95 tons of aggregate per hour. The improved product is

meeting specifications of the U. S. Bureau of Reclamation. Liquid that performs the separation is reclaimed for reuse.

Tighter specs for concrete aggregates answered by —

HMS plants for low grade deposits

High quality aggregate sources are getting scarcer in this Western region. Use of heavy media separation (HMS) on inferior raw materials will meet rigid requirements with assurance of consistent quality. The process is explained and costs are indicated.

By C. E. GOLSON
Sales Development Manager
Aggregate Beneficiation for WEMCO
Division of Western Machinery Co.
San Francisco, Calif.

TODAY three giant dams being constructed in this Western region are using aggregate from sub-standard local deposits. Yet, rigid Bureau of Reclamation and Canadian C.R.A. specifications have not been relaxed in the least for these massive concrete structures.

The three dams — Glen Canyon, South Saskatchewan, and Flaming Gorge — all have one thing in common, they are all using HMS treated aggregate. Economy requires an aggregate source near the dam site where aggregates are not necessarily the best. HMS treatment allows aggregates from these marginal deposits to meet even the most rigid specifications.

HMS, which stands for Heavy Media Separation, is not a new process, but economic considerations, and constantly tightening concrete specifications have recently caused it to come into its own. No other

method now in use to up-grade aggregate gives the same assurance of consistently producing the required quality. Some fail completely to meet modern specifications in large scale operation.

There is no magic to HMS. It is

The old gravel pit is no longer adequate. Engineers want to improve on nature. For years they have been satisfied to have the natural grading improved by accurate screening, until quite recently. Now they are beginning to demand higher quality with the weaker and objectionable material removed.

Although not exactly a recent trend, it has been emphasized by specifications for some of the concrete going into Glen Canyon and Flaming Gorge dams. There will be no reversal of this trend, and the requirement is certain to apply to more specifications and more jobs.

To give readers an authoritative description of the process used to improve aggregate at both these monumental projects WESTERN CONSTRUCTION asked the engineers of WEMCO for this article. It is of equal interest and value for all engineers and contractors in the field of concrete construction.

—Editor

a simple gravity separation. It is based on the fact that a solid submerged in a liquid will float or sink depending on whether it has a specific gravity lighter or heavier than the liquid, regardless of size or shape. Fortunately, most of the deleterious and objectionable materials in natural aggregates such as sandstone, shale, soft stone, some of the cherts and all organic material have a specific gravity lighter than that of sound rock. For this reason gravity separation can be used to remove these unsound elements.



IN a drum type of separator the sound rock sinks in the media, is picked up by lifters on the side of the drum and discharged into a washing screen. Float material overflows from the drum and is discharged directly to the washing screen.



Peter W. Kero, Inc....

Double Decking the George Washington Bridge

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

Suspending a lower level, 6-lane deck from the George Washington Bridge adds up to one of the most complex construction jobs in the country. Redesigning and relocating the approach system, moving buildings from the area, keeping traffic flowing at present capacity—these are the headaches facing contractors on the job. Result by year end 1960: a 75% increase in traffic capacity.

Peter W. Kero, Inc. has the task of widening and relocating the south marginal street and building the new administration building on the Jersey side. Mr. Kero is putting a well-balanced fleet of earth-moving equipment, truck cranes and rock drilling equipment against his segment of the job. At his present speed, he will beat his time schedule by six months. New equipment is a good part of the story.

Sound financing is a must for every successful contractor. As Mr. Kero says: "We like C.I.T. financing

and one reason why is the fact that it relieves bank credits for other purposes."

How Job-Engineered Finance Plans Help Contractors

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

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



Kero dozer shoves fill dirt into position on Center part of the south marginal street area on the side. Big new equipment like this will see the job ahead of schedule.



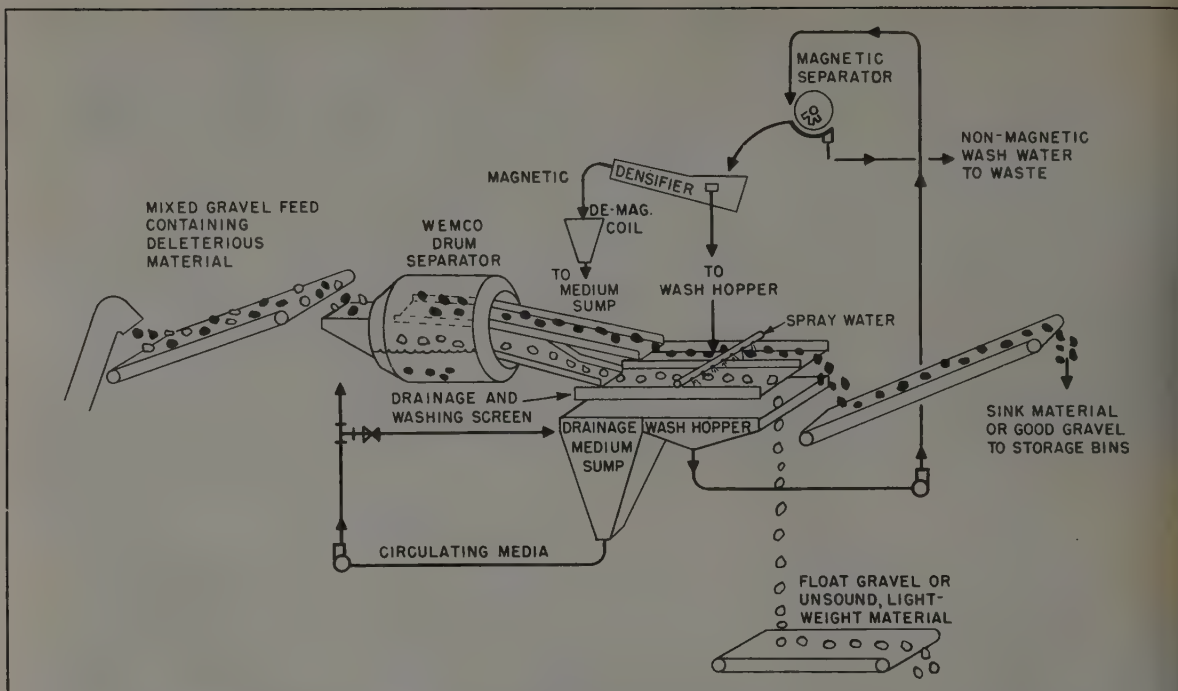
At the temporary site headquarters, Mr. Peter W. Kero, President of Peter W. Kero, Inc., and C.I.T. representative Ken Hanabergh review working plans

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FLOW DIAGRAM SHOWING SEPARATOR, WASHING AND MEDIA RECLAIMING

By properly choosing the media, the unsound particles in natural aggregate will float, and the sound particles will sink. A very close separation can be made by a close control of the specific gravity of the bath.

This is all very fine in theory, but how does it work in actual practice?

One of the first problems that had to be solved before HMS plants could become an operating reality was the development of a liquid of a high specific gravity that was inexpensive enough to make the gravity separation commercially feasible. The answer lay in a suspension of very fine solids in water. The water suspension of highly magnetic substances such as ferro-silicon and magnetite provided the perfect media.

Not only did it have a high enough specific gravity to make the required separation but the magnetic characteristics of the ferro-silicon and magnetite made it possible to recover most of the media for re-use, greatly reducing operating costs due to media loss. Also magnetite and ferro-silicon are easy to handle and store.

When low gravities are required for separation, magnetite is used. Where gravities in excess of 2.40 are necessary, a mixture of magnetite and ferro-silicon is used;

and where gravities exceed 2.80, ferro-silicon is used exclusively.

Key is the separatory vessel

The heart of any heavy media plant is the separatory vessel. Drum and cone type vessels are the most widely used. The drum is used

where high capacity is the primary requisite; while the cone is used where small differences in the specific gravities between the materials being separated or the small size of the particles requires a longer retention time. The cone type vessel gives a longer retention time because of its larger area, and the



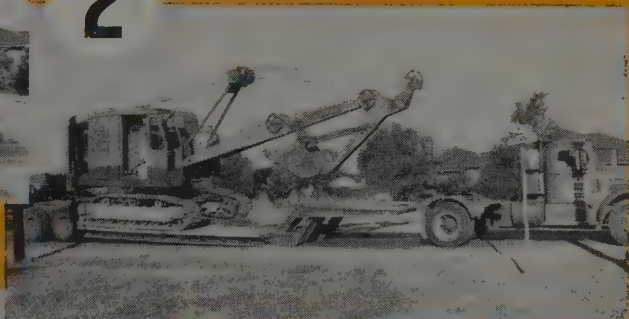
PLANTS of this type are prefabricated and can be placed in full operation within a few days after being received at the site. Plants are also available in a wide range of sizes to meet requirements of capacity. Type and adjustment of media controls the actual separation.

You can make loading safe and simple as

1



2



3



with a MARTIN Folding Gooseneck Trailer

1 Lower the gooseneck to the ground, where it automatically forms a low incline ramp up which any equipment can be driven with ease and safety. No blocks or ramps required.

2 Drive the machine into position, pick up the ramp and winch it onto the 5th wheel, where it automatically folds into a gooseneck and locks in that position.

3 Make necessary travel connections. That's all! The entire unit is loaded in about 5 minutes, safely and simply — by one man.

Heavy, awkward equipment such as pavers and shovels drive directly onto the platform, with no danger of slipping. Low center of gravity permits fast hauling, gives maximum clearance.

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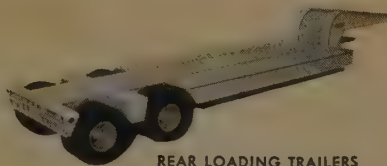


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TILTING PLATFORM
TRAILERS

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depth and volume of media.

Both vessels are available in a variety of sizes and capacities. They are able to cope with variations in feed rate with only minor adjustments. One man can easily operate the plant. The sink and float products flow by gravity to a screen. This screen is divided longitudinally to keep the products separated.

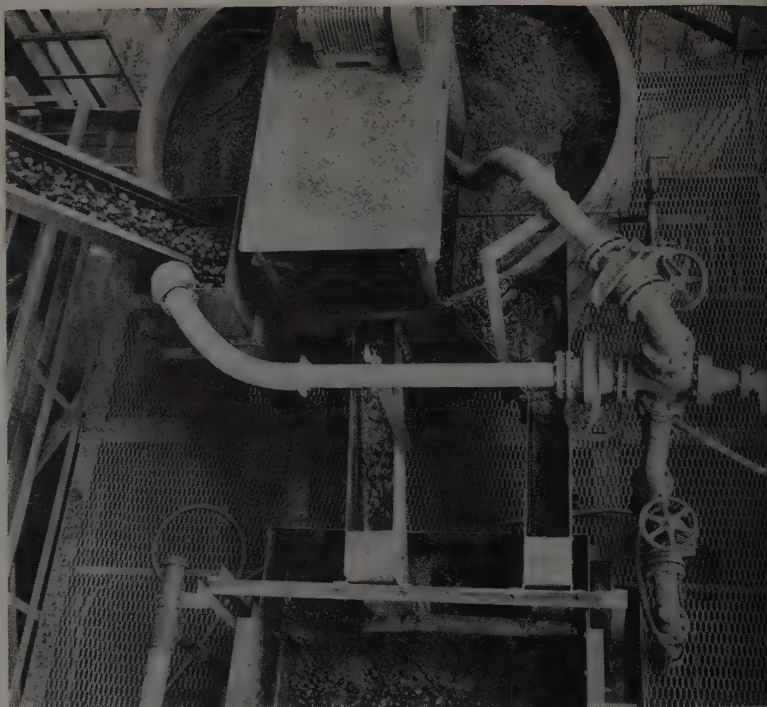
The underlying sump is also divided into two sections. The first part of the screen is mounted over a medium sump where the media draining from the rock is recovered and returned to the separating vessel, thus partly closing the circuit. The second part of the screen is used for washing the rock to remove the rest of the media adhering to it. This section is mounted over the wash water sump, from which the wash water and media are pumped to a magnetic separator for recovery of the magnetite; the balance of the solids are wasted. The recovered media flows into the densifier, which acts as a surge for the media and as feeder for regulating the amount of media returned to the media circuit.

Costs of HMS treatment under actual operating conditions have averaged about 12.5 cents per ton in plants handling 65 to 100 tons per hour. These average costs break down to about 4 cents for labor; 3.5 cents for media consumption; 1.5 cents for power; 3.5 cents for maintenance. At larger installations costs have been below 10 cents.

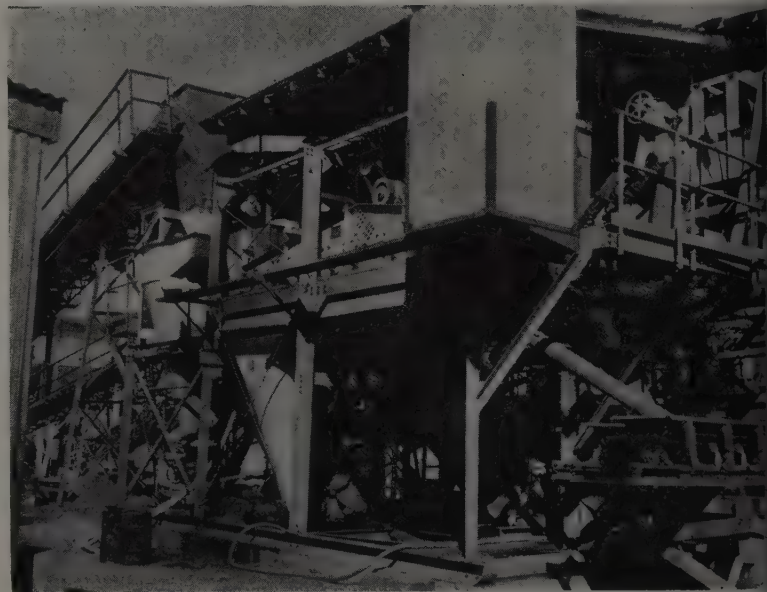
The float or waste material varies according to the amount of unsound fractions in the raw material. Very little sound material is lost in the process. This is one of the problems facing anyone considering installation of HMS; that is, the cost of extracting and treating a waste product must necessarily be added to the cost of the treated material. However, in actual practice it has been found that this reject material is seldom wasted since it can be used as a fill material, or for surfacing access roads, walkways, or for other uses where soundness is not essential.

HMS treatment of aggregate does not degrade the material.

Offsetting HMS treatment costs are the savings effected in the mix requirements. By the use of higher quality aggregates, considerable savings in the more costly components of the mix can be obtained, while still retaining the same ultimate strength of concrete, which after all is the end product desired. In one instance this amounted to 68 lb. of cement per cubic yard of concrete, plus 13 lb. of pozzolan.



A cone-type separator shows the material entering from the left with the two fractions removed and moving by gravity onto the screen at bottom of picture. This type of separator has a longer period of retention.



ANOTHER view of the plant at Glen Canyon Dam using a cone-type separator (extreme-left) to treat the smaller fractions of material (1/4-in. to No. 8).

Cement cost was \$4.75 per bbl. and pozzolan \$23 per ton. So a saving of \$1.01 per yd. resulted from the use of the HMS treated aggregate.

Although first used on aggregate in 1948 the process is now receiving greater acceptance by aggregate producers faced with tighter concrete specifications, and dwindling deposits of high grade aggregate.

gate.

Prefabricated HMS plants can be erected on the job site and be a full production of material meeting the most exacting specifications in a matter of a few days, aiding the engineer and contractor who are particular about the material they use to build for today and for tomorrow.

standbys with GMC TRUCKS!

reason

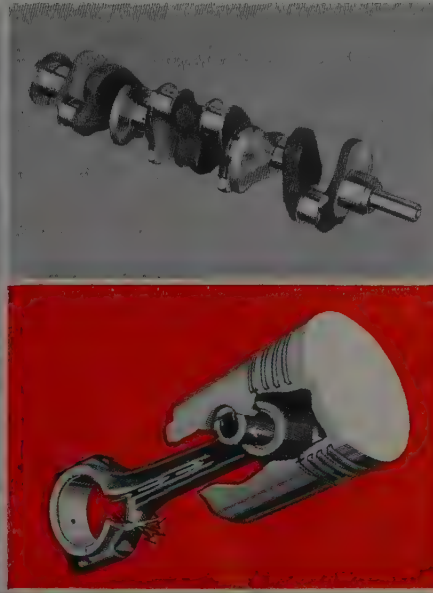
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GMC Trucks have extra long life built-in throughout—and it's standard. Take GMC engines for example—

here's additional life and dependability in GMC engines with "ree-turn", sodium-cooled exhaust valves. Localized hot spots are prevented. Heat is rapidly transferred away from valve heads.

(Upper). Forged, Tocco-hardened crankshafts in GMC engines have extremely hard, long-lasting bearing surfaces and softer cores for high torsional rigidity.

(Lower). Pistons are weight-controlled to within 1/8 oz. for balanced power. Rifle-drilled connecting rods assure positive piston pin lubrication. M-400 bearings last 7 times longer than others.



reason

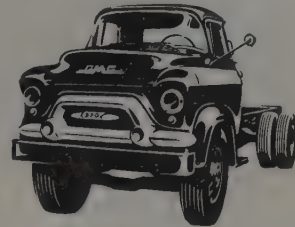
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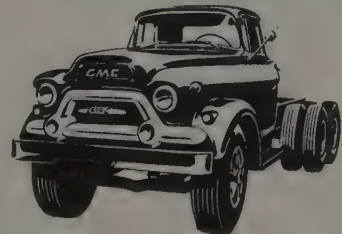
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GMC pickups are offered in over 30 different capacity, body and wheelbase combinations. Available with 4-wheel drive, Power-Lok and all power assists.



GMC Dual-Purpose models have 89-inch BBC, best weight distribution and bigger body capacities. GVW to 46,000 lbs., GCW to 60,000 lbs., Six and V-8 power.



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WESTERN CONSTRUCTION—September 1959



LEFT abutment ridge from upstream. Dragline in foreground is excavating channel for river diversion. Blast crater in ridge will be site

of 260-ft. intake tower. Shovel on skyline spillway cut where 1,000,000 cu. yd. of rock will be removed. Dam will be built in two stages

Big spread readies site for Terminus Dam

More than \$1,000,000 worth of equipment and 160 men are at work on "preliminary" operations to prepare for main earth-moving job scheduled to start in October on the 250-ft. earth-fill dam.



WATER trailer built by Southwest Welding uses DW21 prime mover and running gear. Tank holds 8,000 gal., and auxiliary engine at rear provides pressure for front and rear spray booms.

AS IT LEAVES the Sierra foothills above Visalia, Calif., the Kaweah River conveniently makes a right turn, runs along the base of a ridge which cuts across the canyon, and turns sharply left again to run through a narrow notch. Here the Corps of Engineers is building Terminus Dam, an earthfill structure 250 ft. high and 2,375 ft. long, which will contain 7,100,000 cu. yd. of earth and rock.

Main dam, and a smaller auxiliary dam which will fill a saddle in the ridge, will be composed of an impervious core, two thin transition zones, an internal drain pervious zones, and random rock slopes. Intake structure will be 260 ft. high, with three 5x9 hydraulic gates and a 36-in. valve. The structure will include an elevator and electric controls. Outlet tunnel will be 1,200 ft. long, 15 ft. 9 in. rock to rock, and concrete lined with a 12-ft. 9-in. bore.

Contractors are Winston Brothers Co. and Green Construction Co., who hold the \$9,454,196 contract as a joint venture. The builders have moved more than \$1,000,000 worth of equipment and 160 men into the site to prepare for the major earthmoving phase, which



**Cleans up
haul road**



**Cleans up
in borrow pit**



**Push-loads
scrapers**



Cleans around shovels



Pulls scrapers

**Fills-in
washes**

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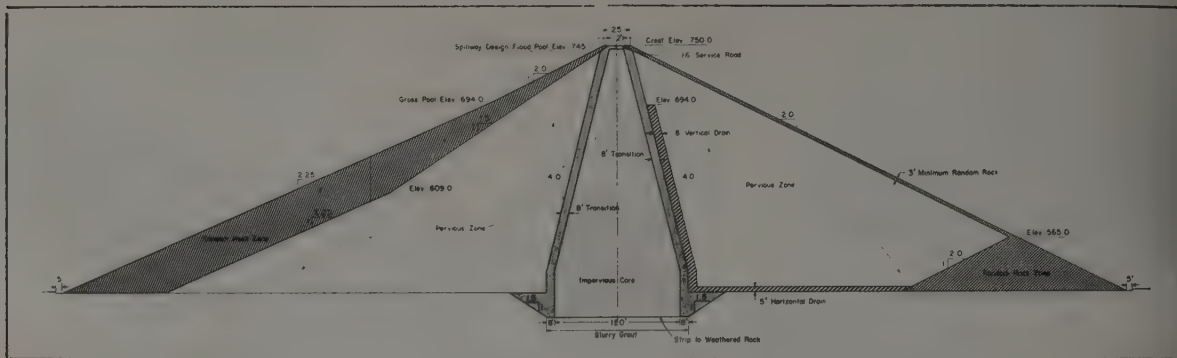


CT-2197-DC-2

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Where quality is a habit



SECTION of main Teminus Dam. Impervious core, center, will contain 910,000 cu. yd. of material. Two transition zones will have 256,500 cu. yd., Pervious zone material will total 3,972,000 cu. yd. Random

rock exterior zones will have 1,430,000 cu. yd. of material. Drain fill, on downstream side of transition zone, traps seepage and leads it out through a 5-ft. horizontal drain to contain 5,600 cu. yd.

is scheduled to begin in October. Preliminaries include these operations:

- Shove the river into a narrow channel against the right abutment to make room for the fill.
- Cut a core trench 136 ft. wide and about 15 ft. deep along center line, and a narrower keyway in the rock on the left abutment ridge; drill grout holes along center line in the trenches. (Grouting will be handled on sub-contract by Continental Drilling Co. which also is performing the same operations at

nearby Success Dam.)

- Strip the left abutment ridge face, digging out voids and small caves in the faulted limestone formation.
- Drive the 1,200-ft. tunnel through the ridge. (Tunnel job also is held by a sub-contractor, Mountain States Construction Co. Main bore should be holed through in September. Concrete-lined tunnel will be completed in 1961.)
- Make the initial cuts on the spillway, which will stretch across the top of the ridge, and will ultimate-

ly involve removal of more than 1 million cubic yards of rock.

- Blast a deep cut out of the upstream side of the ridge to make room for the intake tower and control structure which will form the upstream tunnel portal.
- Level up the fill area itself, and place the first few lifts in the zones flanking the core trench.
- Construct main haul roads and bridges, and skin off borrow areas.
- Set up a gravel plant which will produce 137,000 cu. yd. of sized rock material for the drain zone in the dam.



GRIZZLY welded to top of 30-yd. Athey bottom-dump trailer scalps off oversize rocks as dragline loads unit. Material comes from borrow in downstream riverbed.

Coordinated operations

These are carried out simultaneously in a carefully co-ordinated jumble of individual operations designed to fit together like pieces of an intricate Chinese puzzle.

For example. The 1,000,000-plus yards of rock from the spillway will be used to form a triangular section zone at the toe of the fill, and to face both sides of the dam, and its progress is linked to the growth of the fill.

One of the problems in building the dam is to maintain the flow in an irrigation ditch which crosses the fill area. Temporary pumps have been installed in the river channel below the fill to pump water into the ditch during the construction.

A 36-in. pipe is being set in a rock trench blasted out of the bottom of the outlet tunnel to carry irrigation water through the dam for this ditch in a permanent installation.

Since the outlet tunnel also will be used for diversion, it must be completed and lined by 1961 when the second stage will begin.

Rock blasted out of the upstream



NOW the EUCLID "TWIN" Scraper has EVEN MORE POWER* and WORK-ABILITY!

**Now 563 total h.p.!*



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gives you all the
features you get
in the TS-24 "Euc"**

- 2 engines—
563 total h.p.
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Euclid's TS-24 Scraper, with power increased to 563 h.p., now widens its lead in performance over every other scraper in the field. With a 336 h.p. engine in the tractor and 227 h.p. at the rear, the "Twin" is unsurpassed in productive capacity.

On job after job—small grading work to big road projects—the TS-24 Twin-Power "Euc" moves dirt at lower cost than other scrapers.

Its big power, big capacity and big performance has helped contractors, mines, quarries and industrial users to beat the pinch on profits.

Have a Euclid dealer show you how the "Twin" can bring a better return on investment . . . on your present or future work. He'll give you all the facts and can probably arrange a demonstration for you.

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EUCLID EQUIPMENT

FOR MOVING EARTH, ROCK, COAL AND ORE

portal goes into the toe of the fill.

Not all the material handled in the preparatory phases can be used in the dam itself, and about 20% will be wasted.

In the first stage of construction, the dam will be built to nearly its full 250-ft. height against the left abutment extending out to the present restricted river channel. At the channel end, it will be laid back on a three-to-one slope.

By 1961, the schedule calls for construction of a short cofferdam at the river bend, diversion through the tunnel, and plugging the gap. During the coming two winters when the end of the fill will be exposed, there is some danger of flooding and loss of part of the fill.

In addition to the main dam, a smaller dam will be built in the saddle of the ridge which forms the left abutment, about a half mile to the left. The present road, State Highway 198, runs through a cut directly beneath the saddle. The road is being re-located higher up on the mountain slopes under a separate \$3,500,000 contract held by Isbell Construction Co.

The multitude of operations taking place in the canyon arena are overseen by the Corps of Engineers office, set atop the ridge almost on center line of the dam. This is headquarters for Forrest L. "Joe" Long, Jr., resident engineer and his staff.

Winston-Green office is located about half a mile below the dam site, where the contractor has set up an equipment yard, maintenance shops and office. Buildings are of prefabricated steel. Communications in the widespread project are maintained through a radio network as well as a telephone system.

The gravel plant is set up near the equipment yard, and is stockpiling sized material for a drain blanket 8 ft. wide across the length of the dam on the downstream side of the transition zone which flanks impervious core.

In addition to gravel sources from upstream excavations, material is being stripped from nearby borrow area close at hand. Here a dragline loads two DW20 power units pulling Athey bottom dump trailers, which have grizzlies welded over their tops to scalp off rocks bigger than 8 in. in diameter.

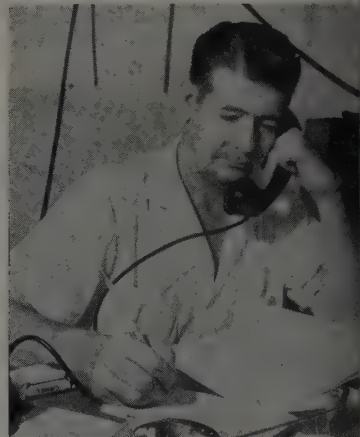
This "size-as-you-go" operation is continued on the fill itself where tractors fitted with rakes patrol the lift, automatically pulling out rock



COMPACTION unit has four articulated cells each bearing on pneumatic wheel. Towed by DW2 prime mover, the 50-ton compactor easily conforms to uneven ground.



KEY MEN Glen Kitley, left, master mechanic, and R. M. "Bull" Latham look over spreads.



RESIDENT Engineer Forrest L. "Joe" Long, Jr., Corps of Engineers, checks on operation

which is over specification size.

Watering and compacting on the fill are handled by two tank units and a pneumatic compactor, all built by Southwest Welding. All

three pieces use DW21 two-wheeled prime movers. The tank units employ scraper type running gear, and have an auxiliary engine to run pumps for both front and rear spraying. Compactor is composed of four articulated cells, each with a rubber-tired wheel.

Earthmover type watering tank were selected for their large capacity (8,000 and 6,000 gal.) and ability to traverse steep grades and difficult terrain.

Compressed air for drilling and blasting operations is supplied from two stationary Fuller compressors of 1,050-cfm. capacity housed in a steel building at the bottom of the abutment ridge. Air is piped up the ridge to the spillway cut and to other points with quick-coupling "invasion" pipe of 6-in. diameter.

Drilling for initial cuts on the spillway is done with an Ingersoll Rand Quartermaster track-mounted drill which cuts a 6-in. hole. The rock will be loaded with a Mario

EQUIPMENT SPREAD

Major equipment units used on the opening phases of Terminus Dam include:

- 2 4-yd. Marion III shovels
- 1 71B Bucyrus Erie shovel
- 1 54B Bucyrus Erie shovel
- 1 30-ton American truck crane
- 1 2½-yd. Michigan loader
- 6 27-ton Euclid end-dump trucks
- 12 30-yd. Caterpillar PW20 with Athey bottom-dumps
- 6 27-yd. DW20 scrapers
- 8 Caterpillar D-8 tractors
- 3 Caterpillar D-9 tractors
- 3 Caterpillar motor graders
- 1 6,000 gal. Southwest water tank
- 1 8,000 gal. Southwest water tank
- 1 50-ton Southwest compactor
- 1 Ingersoll-Rand Quartermaster drill
- 4 Ingersoll-Rand Airtrac drills

(Continued on page 70)

No scoring or pitting of differential gears in 6 years

In Six Years of using RPM Multi-Service Gear Lubricant, not one differential in the entire 20-truck fleet of Yakima Cement Products Co. has shown any scoring or pitting of gear teeth. Despite grueling service delivering ready-mix concrete and other

building materials to off-highway construction sites, lubricant has never failed to do its job. Firm's six-wheel-drive trucks supply sand, gravel, ready-mix concrete, and fabricated concrete products to projects within 100 miles of Yakima, Washington.



Ready-Mix Truck like rest of firm's vehicles, is rebuilt Army surplus 2½-3 ton International. "In the fleet of 21 six-wheel-drive trucks, we have never had a transmission or differential failure due to lubrication, despite our severe operating conditions since we started using RPM Multi-Service Gear Lubricant," says firm's chief mechanic, Art Weber. This lubricant is also used in all mixer drive gear boxes.

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- Special compound forms protective lubricating coating on gears by chemical reaction with metal...resists rubbing action of hypoid gear teeth.
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Building arena for winter Olympics

Huge structure with cable-supported roof posed unusual construction and design problems.

By SAMUEL H. CLARK

District Engineer
American Institute of Steel Construction
San Francisco District

THE ICE ARENA, now being completed in Squaw Valley, Calif., which will serve the VIII Olympic Winter Games, has offered some unusual problems in erecting the steel roof framing. The steel framing was more like that of a bridge job than a building and so perhaps it did not seem so unusual to veteran bridge builder Dewey Sharp, erection superintendent, Pittsburgh-Des Moines Steel Co.

The building is as wide as a football field is long and each half of the roof framing is supported separately by a cable and mast system. It will house 9,000 spectators and has one end completely open. Some of the heaviest snow loads in the Sierra Nevada must be supported on a 300-ft. span. These factors account for many of the unique features of the design—and for the unique building construction procedures. The arena will be the shelter for figure skating, ice hockey and official opening and closing ceremonies for the Olympic Winter Games to be held February 18 to 28, 1960.

Construction of the \$3,000,000 building is being pushed to completion by utilizing every snow-free day since ground was broken in the early summer of 1958. The general contractor, Diversified Builders, shut down its operations during the severe winter months of Jan-

uary through April 1959. Before this shutdown, the main structural steel roof framing was completed. Actually the first column was set in late November, and despite some snow and other delays, the 900-ton framework was in place in early January 1959.

Column bases

The problem of setting the columns in proper position was complicated first by the fact that they were designed with a batter of 4 in 12 from a vertical position. Anchor bolts 2½ in. in diameter were used, and base plates wedged and "dry packed" when proper column position was obtained. Wedges were removed after grout set up in the conventional manner. Tops of the 60-ft. high columns were positioned to within ¾-in. tolerance.

The sequence followed in erect-

ing the cables and girders is shown in the drawing. The "cables" actually consist of 2¼-in. diameter galvanized pre-stretched bridge strand. No adjustment was provided in the design since turn-buckles or shims were felt to be detrimental to the clean-cut appearance. J. A. Roebling & Sons Corporation fabricated the bridge strand.

In order to avoid critical stresses in the column base, which would result from cable elongation due to the heavy snow loads, a special cable and column erection procedure was required. This involved prestressing the columns or deflecting them towards the backstay a predetermined amount in order for the columns to be straight at maximum load.

Roof girder sections were attached to their cables and lifted

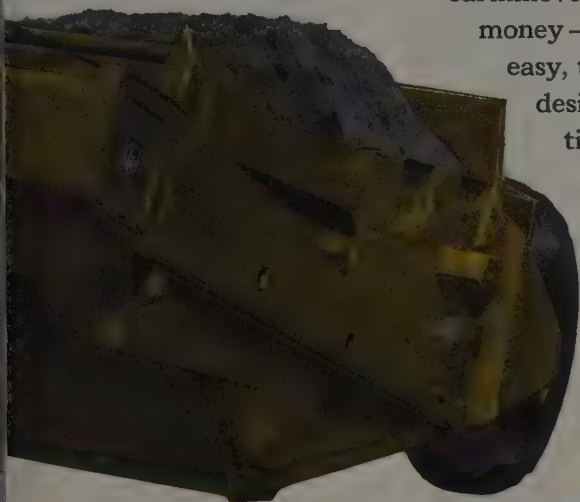


ROOF GIRDERS, extending to left in above photo, are partially in place, suspended by cables from column tops. By tensioning cables at backstay columns were given initial deflection which will be balanced when roof is under full load.

AHEAD

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with one of the two truck cranes used on the job. One 50-ton P&H crane with a 130-ft. boom and a 40-ft. jib handled everything except for a 3-week period when a second crane, a 35-ton P&H with a 100-ft. boom and 30-ft. jib was brought in.

Deflection under load

Under maximum load the ridge can deflect a total of 22 in. at which point the main girder ends meet. The amount of this gap was determined to be such that the uplift value of the cable anchorage piles would not be exceeded. The magnitude of the movement at the ridge dictated the use of a pin at the girder to column base connection. Since the two halves of the roof are completely separate structurally and since the elastic stretch of the cables under snow load is on the order of several inches, an ingenious connection was devised for the ridge of the roof. This provides for a weatherproof enclosure and still allows considerable movement. The joint was designed for a condition of unbalanced live load and also to limit uplift due to wind.

North wall framing

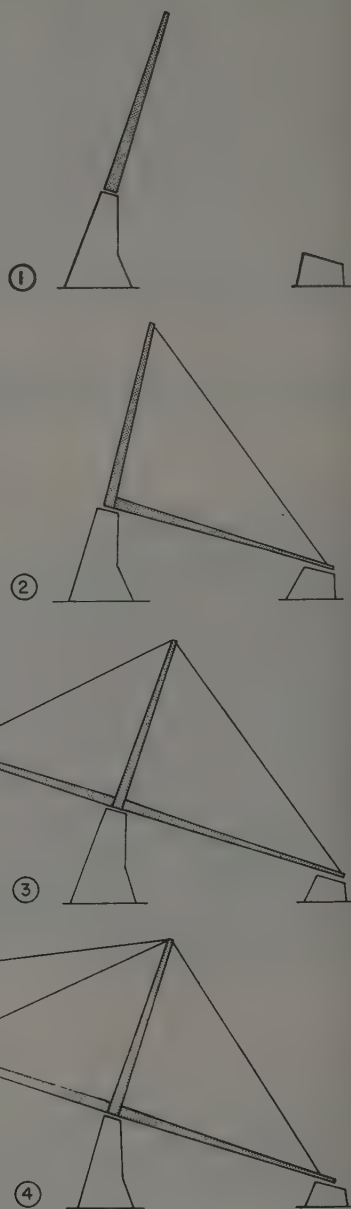
Another interesting detail is the connection of the steel framing for the roof with the end wall, on the north side of the building. Movement of the roof framing, due to a possible temperature variation of 140 deg., and due to varying snow loads, is considerable. The wall is almost entirely enclosed with glass—with the exception of a spandrel of reinforced concrete panels which conceal and support the top of the grandstand inside. Wind design for this tremendous expanse of glass is based on 20-psf. load. This makes deflection of the steel mullions the controlling design criteria. Mullion connections are designed to show the minimum of connection material. All welds are groove welds and are required to be ground on the surface.

While many of the structural features of the arena were influenced by architectural considerations, the framing system is surprisingly economical. The 81,000-sq. ft. roof with 50-psf. live load is supported on a 300-ft. span with 900 tons of structural steel—or 22 psf.

Erection of the north wall framing is expected to be complete before the snow flies this winter.

Foundation design requires the use of step-tapered concrete piles,

SEQUENCE DRAWING shows steps followed in erection of columns and cable supported roof members. Columns were fixed at correct batter by shims, anchor bolts, and grout. In step 2 cables were tensioned to introduce bending stresses in the columns which were nullified when remainder of roof was in place and under full load. Drawing 4 is in effect a half section of the roof framework. Each half of the roof functions independently, with provision for 22 in. of movement at center ridge. Structure has eight bents. Clear span is 300 ft.



which is surprising in this mountainous location. However, pockets of silt in deep alluvial deposits of the valley floor required this in order to avoid differential settlement. The support of the ice rink itself was a problem because of close tolerances required. Rather than using piles, however, in this case a preconsolidation method was chosen and six feet of fill was placed for a period of six months to consolidate this area. A 5-in. thick concrete slab is used for the ice rink itself which has a thickness of 1 in. of ice over the slab with the ice surface smoothness

controlled to a tolerance of plus or minus $\frac{1}{8}$ in. This is extremely important in maintaining proper conditions for the competition.

Walls along the short sides of the arena consist of retaining walls sloping out parallel to the columns. These walls span 32 ft. horizontally between the column piers and hold the earth berm which will be back filled against the building. This berm has an ingenious drainage trench located to catch melting snow which will slide off the roof. Heating pipes are provided in this trench which will insure that melted snow is carried away

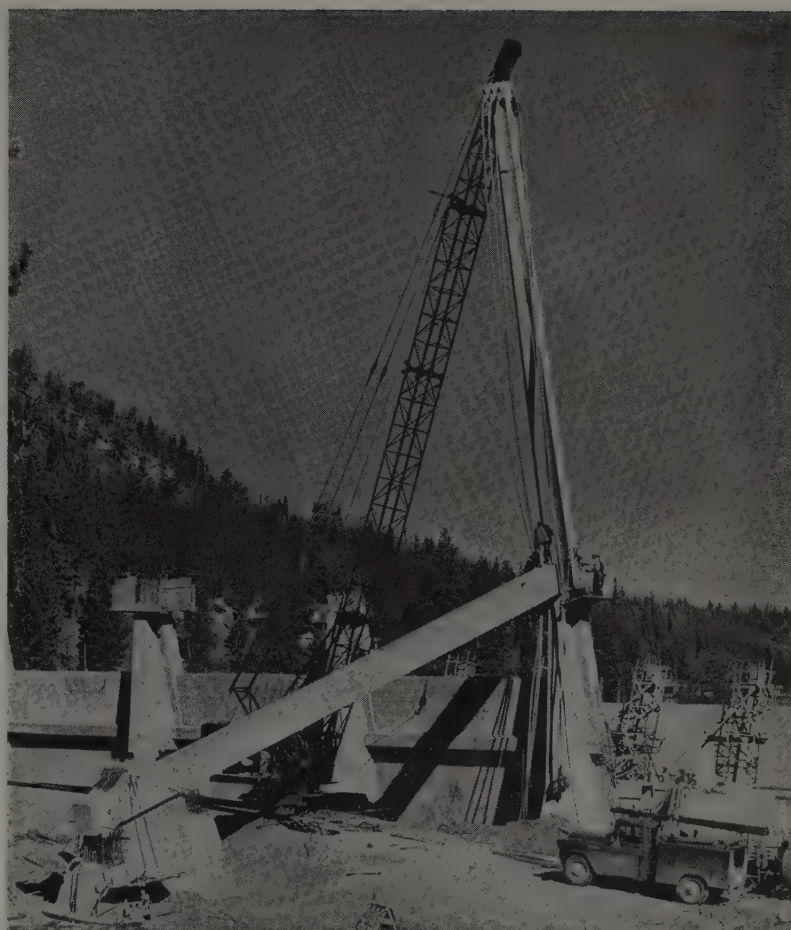
Grandstand design

Permanent grandstand seating in the arena is laid out on the basis of providing an unobstructed view from any seat over the top of a person seated in the second row in front. This calls for a parabolic-shaped section through the grandstand. Reinforced concrete seat units were chosen in this "structure within a structure" which includes space for dressing rooms, snack bars and press, radio and television facilities under the seating. The mezzanine floor, incidentally, has a Sonovoid concrete slab which reduces dead weight. In addition to rooms for the various facilities needed, a space for refrigeration equipment is provided, as well as a 40,000-gal. reinforced concrete brine tank below the equipment room.

Heating and refrigeration system

One of the most unusual features of this building is the design of the heating system to melt snow on the roof by pumping hot air through the cells of the roof decking. According to Charles DeMaria, in charge of the project for H. J. Brunner, Structural Engineers, this reduces the design snow load from 100 psf. to 50 psf., and resulted in considerable saving in the weight of the steel roof framing members.

The heating of the roof system or melting of the snow is accomplished by a reverse cycle heat pump system from the refrigeration unit. A continuous duct extends along near the eave line, and each cell in the steel roof deck gets its share of the heat, according to mechanical and electrical engineers Vandament and Darmsted. In the unlikely event of failure of this heating system for an extended period, the roof has been designed to



MASTS were erected with cables attached. Batter of 4 in 12 was achieved with use of wedges at base plates, with dry pack grout. Cables are 2 1/4-in. galvanized pre-stretched bridge strand.

support snow removal equipment. Requirements other than the snow melting also had to be met by the heating system. Due to erratic temperatures, and extremely cold weather and possible condensation problems, partial heating of the area over the seats is planned. The refrigeration system is designed for the largest expanse of artificially frozen ice ever used. This means a refrigeration plant capacity of approximately 600 tons which produces 9,000,000 BTU's of heat. A complete analysis showed that the system chosen will successfully and economically melt the snow, reduce condensation and also partially heat the building. Ducts between the roof purlins and above the bleachers are used to carry the main heating air, and roof decking cells carry the heated air for melting snow and preventing condensation. The interior of the box girders is also heated with warm air to reduce condensation on these members.

Coordination of the entire project is in the hands of Corlett and

Spackman and Kitchen and Hunt, Architects, Associated, heading up a joint venture group of architects and engineers. Structural engineering for the project is by H. J. Brunner and John M. Sardis.

The winter Olympics

The Olympic Arena is the hub building of what will be virtually a small city. It dominates the entire valley which has been transformed from a wilderness area to a superlatively equipped facility for the Olympic competition. Squaw Valley is a naturally beautiful pocket in the Sierra Nevada at an elevation of about 6,200 ft., located a few miles from Lake Tahoe and the California-Nevada line.

The VIII Olympic Winter Games in 1960 will be the first time that all the events except cross country races can be held in one compact area. Athletes from some 33 countries will be housed in the same "Olympic Village." Facilities for athletes' housing, dining and rec-

(Continued on page 68)

Who did it

CLIENT—Organizing Committee VIII Olympic Winter Games
ARCHITECTS—Corlett and Spackman and Kitchen and Hunt, AIA, Architects Associated
STRUCTURAL ENGINEERS—H. J. Brunner and John M. Sardis
CIVIL ENGINEERS—Punnett, Parez and Hutchison
SANITARY ENGINEERS—Kennedy Engineering
MECHANICAL AND ELECTRICAL ENGINEERS—Vandament and Darmsted
SOIL CONSULTANTS—Dames and Moore
TRANSPORTATION AND TRAFFIC ENGINEER—Arthur C. Jenkins
GENERAL CONTRACTOR—Diversified Builders, Inc.

Lean concrete for Noxon Rapids Dam

Interior mass concrete for hydroelectric project in Montana contains 2 and 2¼ sacks of cement per cu. yd., compared to 3.75 sacks per cu. yd. for exterior concrete.



By D. L. HOUGHTON
General Concrete Engineer
Ebasco Services, Inc.

NOXON RAPIDS DAM is located on the Clark Fork River approximately equi-distant between Missoula, Mont., and Spokane, Wash. The dam is a combination concrete and earth-fill gravity structure having a total length of 5,854 ft. A powerhouse is located directly downstream of the non-overflow portion of the dam. The project has an initial installed capacity of 400,000 kw. in four turbo-generator units with the provision for the installation of a fifth unit having an additional 100,000 kw. capacity. Total concrete placed in the dam

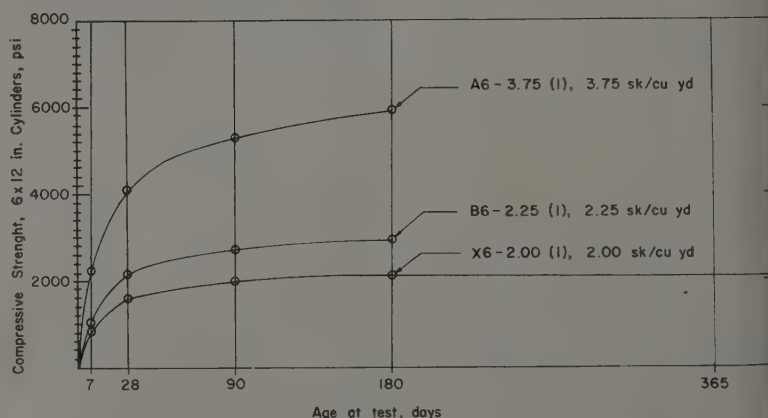
and powerhouse was approximately 540,000 cu. yd. The project is now virtually complete.

The gravity portion of the dam was divided into two classes of concrete, class "A" at the upstream and downstream faces and class "B" in the interior mass. In addition an-

other class of concrete ("X") was specified for the filling of a large void (about 25,000 cu. yd.) in the old river channel. The class "A" face concrete which was basically 10 ft. thick upstream and 5 ft. thick downstream was specified to have a minimum compressive strength at 28 days of 3,000 psi. The class "B" interior concrete was specified 1,800 psi. at 28 days, and the class "X" concrete had no specified compressive strength but had a maximum specified net water cement ratio of 0.85.

Type of raw material

A natural stream-deposited glacial aggregate was utilized in the concrete. The aggregate which was made up basically of quartzites and siliceous argillites was washed and separated into five sizes for concrete. The sizes utilized were sand No. 4-¾ in., ¾-1½ in., 1½-3 in. and 3 to 6 in. An air-entraining agent was utilized but no other admixtures or replacements were utilized in the concrete. Type II, low



Sand

SIEVE SIZE	% PASSING
¾ in.	100
No. 4	99.6
No. 8	86.8
No. 16	60.7
No. 30	44.1
No. 50	23.9
No. 100	4.2
No. 200	1.9
Fineness Modulus	2.81

Coarse Aggregate

SCREEN SIZE	% PASSING
6 in.	99.3
3 in.	77.3
1½ in.	54.7
¾ in.	31.6
¾ in.	10.7
No. 4	0.7

MIX DESIGN CONSTANTS FOR MASS CONCRETE

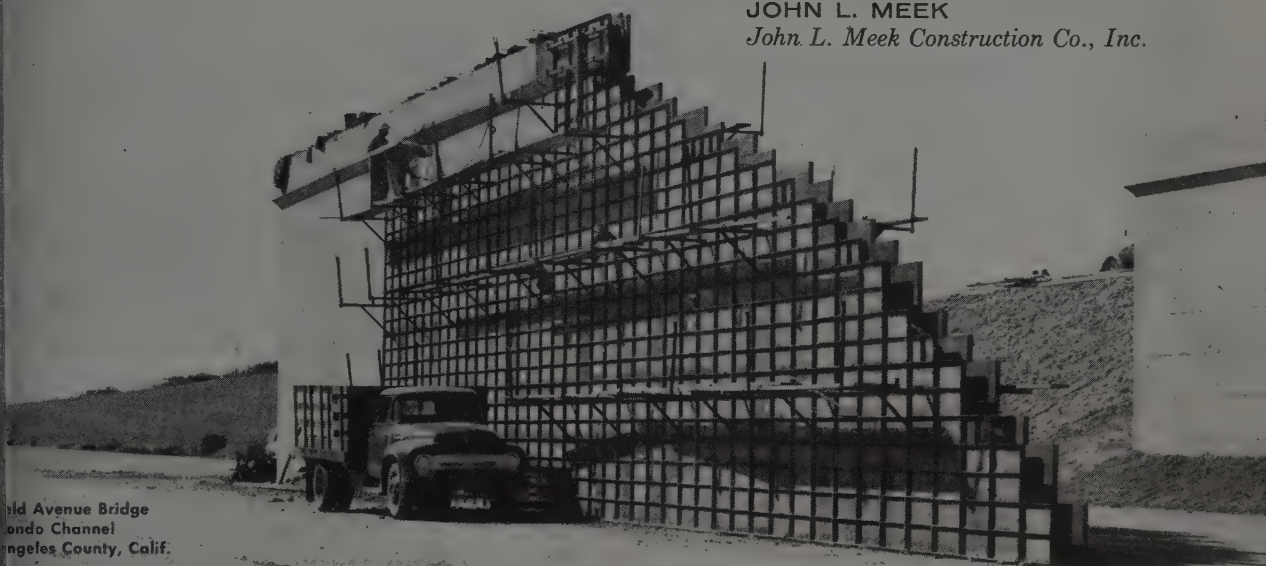
MIX IDENTIFICATION	MAX. AGGREGATE SIZE, IN.	SAND CONTENT, % *	DESIGN CEMENT CONTENT, SK/CU. YD.	NET WATER CEMENT RATIO, W/C	DESIGN AIR CONTENT, ** %	SLUMP RANGE, IN.
A6-3.75(1)	6	26	3.75	0.47	2-4	1½-2½
B6-2.25(1)	6	28	2.25	0.72	2.5-4.5	1½-2½
X6-2.00(1)	6	28	2.00	0.85	2.5-4.5	1½-2½

Notes: * Indicates percentage sand by absolute volume of total aggregate.

** Indicates percentage entrained air volume is of total volume of mix.

any men were **UNI-FORM EXPERTS**
an hour after they began using them"

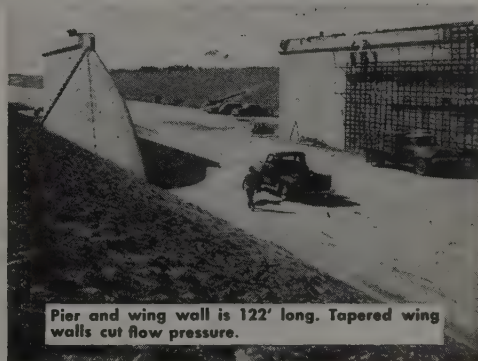
JOHN L. MEEK
John L. Meek Construction Co., Inc.



Old Avenue Bridge
ondo Channel
angeles County, Calif.

Stripping center of 3 piers. Piers were 26' high, with 40" cap. UNI-FORM Scaffold Brackets attach to steel frame of UNI-FORMS.

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UNI-FORM ASSEMBLY IS SIMPLE AS THIS:



1. UNI-FORM Tie Loop is placed into the square tie hole of Panel.



2. Tie Key is set into the Tie loop. This locks tie and Panel into 1 unit.



3. Bring next UNI-FORM Panel into position. Insert Tie Key in other Tie loop. Assembly is completed.

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LEAN interior concrete with cement content of 2.25 sacks per cubic yard placed by bucket and shown ready for consolidation. Slump range is 1½ to 2½ in.

alkali cement was utilized throughout.

The average combined gradations for aggregates and the mix design constants utilized for mass interior and exterior concrete at Noxon Rapids are given in the tables. Average compressive strength attained by this concrete is shown in the chart. The 2 sk/cu. yd. concrete attained a compressive strength of 2,300 psi. at the age of one year. The 2.25 sk/cu. yd. concrete attained an average compressive strength of 2,965 psi. and the 3.75 sk/cu. yd. mix attained 5,945 psi. at the age of 6 months. No one year tests were made for the 2.25 and 3.75 sk/cu. yd. mixtures.

All of the mixtures described exhibited good workability, and were controlled within a 1½ to 2½-in. slump range.

The Noxon Rapids hydroelectric development is being constructed for the Washington Water Power Company of Spokane, Washington. K. O. Strenge is chief civil engineer for the power company. Design and construction management for the development is by Ebasco Service Inc. of New York. R. A. Sutherland is project design engineer. F. C. Schlemmer is construction manager and F. L. Weiss is project manager. The author organized and directed the concrete mix design and inspection and control program for the project.

Morrison-Knudsen Co., Inc. prime contractor on the \$21,000,000 contract, is now performing final cleanup operations. George Piedmont is project manager, Leland True is project engineer, and William Smith is office manager.

OLYMPIC ICE RINK

(Continued from page 65)

reaction, press, three ski lifts, ski jumps, lounges, spectator centers, speed skating and practice rinks, parking for 12,000 automobiles and even complete water supply and sewage disposal systems are included in the tremendous construction undertaking which has been required. The California Division of Highways has proceeded meanwhile with widening of U. S. Highway 40 and State Highway 89, the road linking U. S. 40 to Squaw Valley. The Organizing Committee anticipates that as many as 35,

000 spectators will witness each of the 11 days of competition at the Olympic Winter Games. Parking facilities are to be provided on compacted snow, incidentally, another example of a unique solution to an engineering problem.

Will become state park

After the Games, the California Olympic Commission expects to turn over all the facilities to the State Park Commission; and the arena, the rinks, Olympic Village and the ski lifts and runs will then be operated as a part of the State park system.



This Cat No. 12 Motor Grader is undercutting banks down 28 inches deep in St. Anthony Village, Minnesota. Cutting both sides, it averages about 8 blocks a 10-hour day in compacted hardpan. Owner: J. A. Denens & Son, Inc., Minneapolis, Minn.

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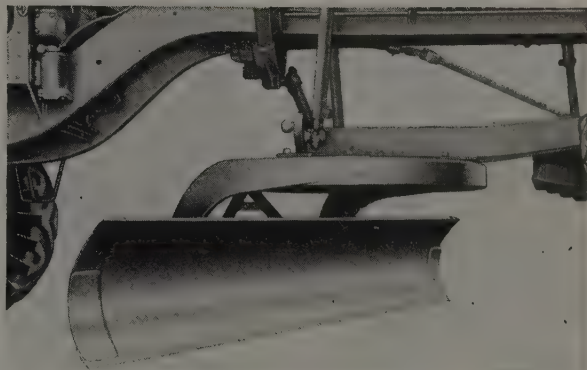
1 Clearance between the top edge of the blade and bottom edge of the circle has been increased to 5 INCHES. This provides improved rolling action, allows more material to move across the blade for greater production.

2 Blade thickness has been increased to $\frac{7}{8}$ inch and blade beams have been increased in length and thickness to handle heavier loads. Lift arms have been lengthened and links shortened to enable operator to obtain all blade angles more easily. Circle reverse gear housing has been redesigned for better clearance as well as to increase the life of components and make service adjustments easier.

3 There's a new, stronger one-piece case for the transmission and final drive. This eliminates possible leakage of gaskets. In addition, transmission bearings have been strengthened for longer gear life.

4 New mechanical controls for reduced kickback, easier engagement. New power control clutches have two teeth, instead of four, and improved contact angles. They're more positive to engage, easier to hold in position.

5 New blade controls feature a positive mechanical lock—exclusive with Caterpillar. When the control is in neutral, the power shaft is locked by a set of gear teeth to prevent creeping.



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**STEP UP
PRODUCTION WITH
THE IMPROVED No. 12**



HEADFRAME at access shaft has separate hoists for personnel, materials, and muck. In photo truck receives load of muck from storage hopper. Access shaft is 916 ft. deep.

ROBERTS TUNNEL

(Continued from page 31)

dled without a shortage of power.

About 550 men are employed by the contractor for the excavation phase of the project.

The design and supervision of construction for this project is being handled by the firm of Tipton & Kalmbach, Inc., consulting engineers of Denver, Colo., under contract with the Board of Water Commissioners. H. J. Dickinson is construction engineer and is in di-

rect charge of engineering supervision. Luke Lindsay and Frank Vinyard are resident engineers.

The Board of Water Commissioners has established a Project Engineer's office with E. L. Mosley in charge to work with the consulting engineers and the contractor on this, as well as other projects of a nature too large to be handled directly by the regular engineering division.

The supervisory staff for the contractor is headed by Ted Adams, project manager, and D. P. Morse, assistant project manager.

TERMINUS DAM

(Continued from page 56)

shovel, and hauled to the fill with a truck spread. Main cut of the spillway will come down 167 ft.

Equipment used in the tunnel operations includes Swedish jack-leg drills footed against the bed of a truck. Rock is loaded with an Eimco track-mounted loader and hauled out of the tunnel with Koehring Dumpsters.

For the Corps of Engineers, resident engineer is F. L. Long, Jr.; office engineer, S. S. Sato; chief in-

spector, R. Hefington; chief materials section, F. G. Hogan; administrative assistant, A. E. Dazell.

For the contractor, general superintendent is F. G. Peterson. Bill Sell is project manager, R. M. Latham and Herb O'Brien, excavation superintendents, and Glen Kitely, master mechanic.

Sub-contractor Mountain States Construction Co. personnel include C. L. McKinney, project manager, and Bill Edwards, superintendent. Key men for Continental Drilling Co. on the grouting sub-contract are R. F. Theiss and Bond Joab.



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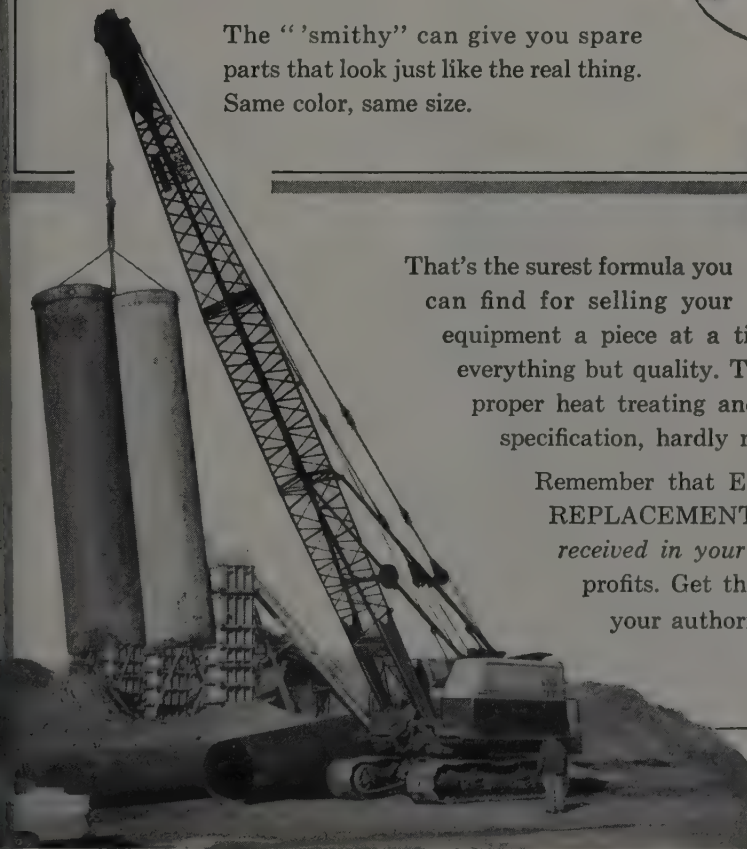
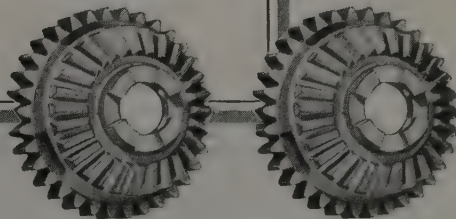
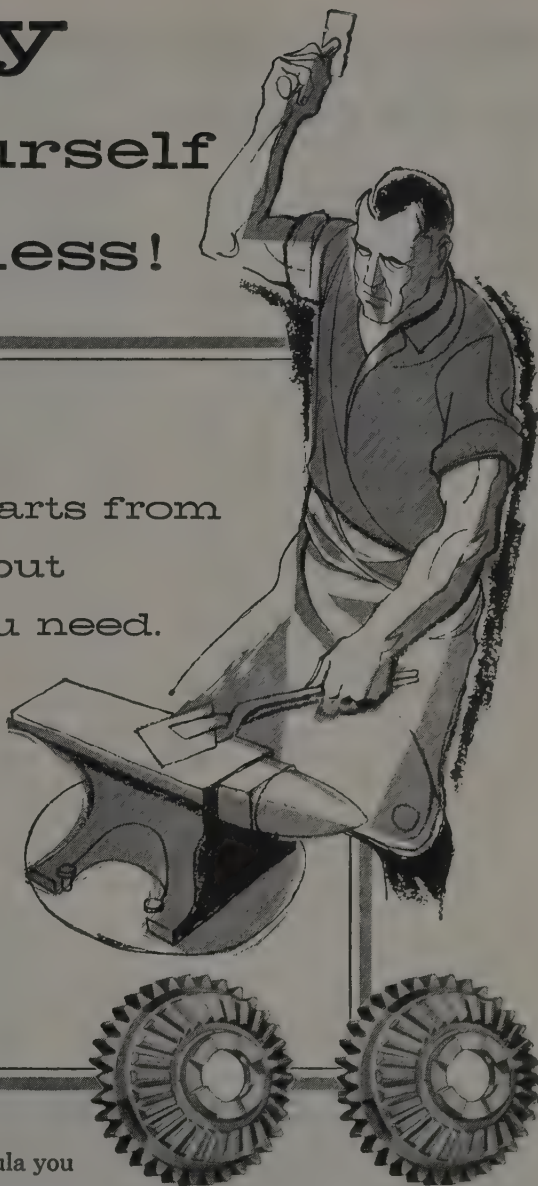
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The "'smithy" can give you spare
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That's the surest formula you
can find for selling your

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Materials handling system for 24,000 tons per day

RIVERSIDE CEMENT CO., Division of American Cement Corp., has begun operation of a new rock crushing and storage facility at its Oro Grande plant near Victorville, Calif. The new facility, built at a cost of \$5,750,000, introduces a completely new method for combining storage and blending of raw materials into one operation.

Designed for a capacity of 24,000 tons in twenty-four hours, the new system is composed of two stages of reduction; an automatic rock sampling station plus a completely automatic stacker and reclaimer.

Besides serving the basic purpose of crushing raw materials, the system shortens hauling distance from deposits to crusher by approximately $\frac{3}{4}$ of a mile, through the use of long belt conveyors which allow for wide separation of crushing facilities from the rest of the plant.

First reduction

Raw material up to a maximum size of 60 in. is delivered in 35-ton capacity LeTourneau-Westinghouse rear-dump trucks to an Allis-Chalmers 60-in., 350-hp. gyratory crusher where it is reduced to minus seven inches and discharged

New rock crushing and stacking plant placed in operation by Riverside Cement Co. represents modern procedures with the latest equipment.

into a surge chamber directly below the crusher. The material is then drawn out of the surge bin by an adjustable Universal speed wobbler feeder and discharged to a 48-in. conveyor belt, on which it travels to a 500-ton surge bin which serves as the connecting link between first and second stage reduction. Shortly before reaching the surge bin, first reduction raw material passes through a sensing coil of an iron detrap unit which controls a bypass chute to remove tramp steel.

The primary crusher is equipped with a Norblo bag-type dust collector to prevent dust from being discharged into the atmosphere. All equipment in the primary crushing department is started individually from a central control panel and is completely interlocked electrically to provide proper sequence of starting. A control panel alarm for the operator indicates equipment failure as well as high rock level in

surge chamber or surge bin. Red and green signal lights operate in conjunction with the alarm system to signal truck operators when to start and stop dumping into the primary crusher. The red "Stop Dump" signal light operates in response to high raw material level in surge chamber or surge bin, failure of any piece of equipment in the sequence, and low pressure or high temperature of gyratory crusher lube oil. High temperature or low pressure in the gyratory crusher lube oil system also initiates a one minute time delay shutdown relay to allow the crusher to empty itself before stopping.

Second reduction

The secondary crushing department produces $\frac{3}{8}$ -in. maximum size rock, and consists of two Pettibone-Mulliken 800-hp. hammermills, each with its own conveying, screening and dust arresting equipment. First reduction raw material (maximum size 7 in.) is drawn from the bottom of the surge bin by two automatically controlled Jeffrey vibrating feeders and discharged to 42-in. conveyor belts. Shortly after leaving the vibrating feeders, the raw material passes over a belt scale where tonnage is weighed and feed rate controlled.

Upon reaching the secondary crusher building, first reduction raw material passes over two Hewitt-Robins 6 x 14-ft. double deck Vibrex screens before it enters the hammermills, and fines go directly to the finish product belt. Discharge from the hammermills is conveyed to a second set of screens where fines are again separated with oversize material being returned to the hammermills.

Control of the vibrating feeders mentioned previously is accomplished through contact making ammeters in each hammermill circuit which signal to the belt scale beam device to increase or decrease feed. The scale beam device adjusts feed by adjusting the field rheostat on the vibrating feeders.

The secondary crushing department is controlled from a central control panel located on the second floor of the secondary crushing building. Start-up of either hammermill and its associated equipment is initiated by a single push button, starting a timing cam switch, which in turn starts all conveyors, screens, dust arresters and hammermill in proper sequence. The system is completely interlocked electrically, and stoppage of



STORAGE area at the Oro Grande plant with the reclaimer working on the nearest pile while the stacker builds another pile in the next line. These machines can be operated by remote control and are interlocked with conveyors.



DECLAIMER working on a blended pile features a bucket-type digging wheel of 300 ns-per-hour capacity. By cutting across the stack this operation tends to mix and blend the material. The machine is started and stopped by indicators on the raw storage bins.

ny piece of equipment will stop l preceding equipment to prevent illage or plugging.

End of shift shutdown is accom- ished by a single button for each ammermill and its associated uipment, which initiates timing lays that allow the system to em- itself before shutting down. Du- icate controls for this purpose are cated at the primary crushing de- rtment and rock sampling sta- on.

Like the primary crusher control

panel, the secondary control panel provides alarm for the operator in case of trouble shutdown in either primary or secondary crushing departments.

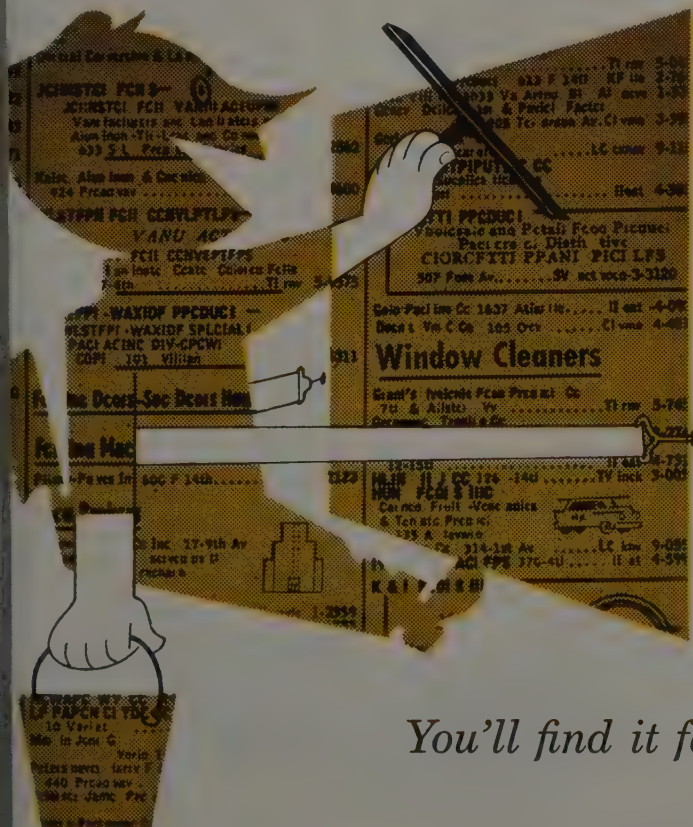
Sampling station

Because of the widely differing compositions of limestone extracted from the plant's quarries, the material is continuously sampled before it enters blending and storage areas. Sampling begins with a Geary-

Jennings sample cutter moving back and forth in the material arriving from secondary crushing. These samples are discharged into a rotary feeder, feeding a Raymond air-swept roller mill, and controlled by pressure differential across the mill activating pneumatic electric control. Mill sweepings are passed through a cyclone separator and discharged through a second sample cutter chute. Approximately eighteen pounds per hour are drawn off by the second sample cutter. This sample is a thoroughly mixed average of rock that has gone into the storage area for a specified length of time. Since the sample represents a measured tonnage of material, it is possible to calculate the amounts of other materials needed to build a blended raw mix pile. A Ramo-Woolridge RW 300 Digital Control Computer will be used to assist in making this calculation, using linear programming techniques to optimize both raw materials selection and pile composition.

Raw material sampling equipment is started individually from a central control station, which again provides alarm in case of equipment failure.

Control of dust at both the trans-



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STACKER delivering material to one or two boom conveyors building piles 36 ft. high and 517 ft. long, or about 35,000 tons. This stacking operation is interlocked with the secondary crushing and must be running before the crusher will start.

fer building and sampler stations is through the installation of Norblo and Western Precipitation Dualaire Collectors.

Stacking and reclaiming

A traveling stacker receives the raw material and delivers it over one or two boom conveyors, which step upward as the pile height increases and simultaneously shorten the stacker travel to slope the end of the piles. The piles are 517 ft. long and 36 ft. high (approximately 35,000 tons).

Stacking thus develops a series of layers the full length of each pile. Other raw materials, such as clay, shale or other suitable argillaceous material, and iron ore may be added at any time to provide a completely blended raw mix pile ready to be delivered to the raw grind department. The system consists of four piles, each containing enough material for seven days plant operation.

Stackers may be controlled locally or remotely. In remote operation the operator pre-sets the stacker controls and thereafter starts and stops it by switching its power feeder.

The entire sampling and stacking operation is interlocked to the secondary crushing department and must be running before the secondary crushing system can be started.

Blended piles are reclaimed by a bucket type digging wheel (capacity 300 tph.), which travels across

as it moves into the pile, thereby cutting a continuous cross section of the "sandwich" pile of rock and other materials. The reclaiming operation thereby serves inherently as a mixing operation as well. The reclaim may be controlled locally or from the sample building control panel. Once the reclaiming belts from the storage area to the raw grind department have been started, the reclaim will start and stop in response to indicators in bins at the raw grind department. Reclaimed raw mix material is delivered off the reclaim by a transverse belt through a bucket wheel and on to a conveyor system for delivery to storage bins at the raw grind department.

Morrison-Knudson gets Stanaker Dam job

A \$1,658,834 Bureau of Reclamation contract for construction of Stanaker Dam, major feature of the Vernal Unit, Central Utah Project, near Vernal, Utah, was secured by Morrison-Knudsen Co., Inc., on the firm's low bid. Fourteen bids were received on the job.

Stanaker Dam, a 140-ft.-high, 1,900-ft.-long earthen structure, will supply supplemental irrigation water to about 14,700 ac. of land and 1,600 ac.-ft. of water annually to supplement the municipal supplies of Vernal, Naples, and Naeser.

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Marion 93-M gulps up 2½ yd. bites of limestone in a California quarry.

Here's good reason why more and more Marion's are being put to work on those "tight fit" excavating and crane jobs throughout the growing West. Contractors have found that Marion's "deliver" . . . whether ripping copper ore from the ground in Colorado, or gently pin-point-steel girders for a new building in California.

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MARION POWER SHOVEL CO. MARION, OHIO

A Division of Universal Marion Corporation

A Marion 43-M with a 1-yd. backhoe completes sewerage project in Seattle area.



This versatile 35-M is excavating foundations for a \$1,600,000 building project on the coast. It carries a 60-ft. boom and 20-ft. jib.



Utah Construction Company changes its name

AUTHORIZATION for Utah Construction Company to increase its capitalization from 2,000,000 to 10,000,000 shares of stock was voted at a special shareholders' meeting of the international engineering, contracting and mining firm. A change of the corporate name to Utah Construction & Mining Co. and the elimination of present stockholders' pre-emptive rights to purchase any additional stock issued also was approved by the shareholders.

Marriner S. Eccles, chairman of the board, said that the amendments to the company's certificate of incorporation had been recommended by the Board of Directors to better enable Utah to realize the maximum potential of its opportunities. The new corporate name will be more fully descriptive of the company's present activities since mining activities throughout the world provide a major share of its income.

The company was founded in 1900 and today is carrying out widespread engineering, construction and mining projects on five continents. It is a Delaware Corporation with headquarters in San Francisco.

Work starts on first plant for seawater distillation

WORK on California's first general purpose sea water distillation plant has begun at a site adjacent to Southern California Edison Company's Mandalay Beach Steam Station near Oxnard. The pilot distillation plant will have a capacity of approximately 100,000 gal. a day. Equipment is being designed and fabricated by Cleaver-Brooks. Its over-all cost is estimated to be about \$250,000. The plant should be in test operation in the first part of November.

It will be an experimental unit and is not expected to produce water at a cost competitive to present sources, including that imported by agencies such as the Metropolitan



"DR. L. I. HEWES AWARD" PRESENTED TO W. O. WIDDOWS

A co-recipient of the "Dr. L. I. Hewes Award" announced at the 1959 Conference of the Western Association of State Highway Officials, *W. O. Widdows*, assistant maintenance engineer, Oregon State Highway Department, receives the official certificate from *W. C. Williams*, State Highway Engineer. Widdows won the award for his outstanding work in developing highway striping equipment and techniques. He describes this method of using hot paint in an article in this issue on page 32. The award is sponsored and financed by *Western Construction*.

Water District. It will be used primarily for research and development and possibly to supply a portion of the fresh water needs of the nearby steam generation station.

An advantage of locating such a plant near a steam generation station is that it can utilize residual heat from the station. Simply stated, the plant will utilize a multi-stage flash evaporator. This is a partitioned and heated chamber in which air pressure is progressively lowered, by condensation of vapor thereby progressively reducing water's boiling point. The vapor is condensed as distilled water.

\$3,023,204 job in Alaska

CHRIS BERG, INC., Seattle, has been awarded a \$3,023,204 contract for construction of a satellite tracking and data acquisition station at Donnelly Flats in Alaska for the U. S. Air Force. The firm submitted the lowest of seven bids on the project when bids were opened by the U. S. Army Engineer District, Alaska. Government estimate for the job was \$3,973,229.

Two more dams for the Colorado

A Bureau of Reclamation report on a proposed two-dam plan for development of the Curecanti storage unit of the Colorado River Storage Project has been forwarded to Congress. The Curecanti unit was included in the original project authorization passed by the Congress in 1956 with a provision that construction of the Curecanti unit shall not be undertaken until the Secretary of the Interior has certified that benefits exceed the costs of the unit. The letter to Congress represents such a certification and follows further engineering and economic investigations.

The Bureau's proposed \$72,500,000 multiple-purpose development calls for dams at Blue Mesa and Morrow Point on the Gunnison River in west-central Colorado near Gunnison. The reservoir would have a total capacity about 1,030,000 ac.-ft., and an installed interconnected powerplant capacity of about 100,000 kw.

Estimated cost of the Blue Mesa unit is \$47,914,000, and the Morrow Point facilities, \$24,536,000.

Here's a demonstration right on this page!



AT THE DRAGLINE, the Cat DW20-PW20 Unit was confined to turning around in a 40-50 foot wide space. Despite the big size of the unit, it was able to make nonstop turns—a great advantage working in close quarters. The wide target of the PW20 helped decrease load time and increase payload.



HAULING, the Cat-built Engine combined with the 10-speed transmission of the DW20 enabled the big rig, with big loads, to negotiate soft haul road conditions for fast cycle times trip after trip. The Caterpillar DW20-PW20 unit's wide base tires provided excellent flotation both on the haul road and at the dumping area.



DUMPING, the PW20's steep sides (18 in. from vertical) and rear door enabled it to shed the sticky material with dispatch. The DW20-PW20 walked away from its load with minimum or no lost time. Use of high-tensile steel in the PW20's construction enabled it to handle heavy payloads.

Get the low-down on the new Cat DW20-PW20 Unit from this time and cost study

THE JOB: Simms Bayou Improvement, Houston, Texas. Date—March 13, 1959. Contractor—Lee and McKnight Contracting Co., Houston.

JOB CONDITIONS: Material—black gumbo and blue clay. Density—3000 lb./yard. Haul length—3,420 ft. (one way). Grades—none (two 90° turns). Haul road conditions—first 300 ft. with 300 lb./ton rolling resistance. Balance of haul road maintained—rolling resistance 150 lb./ton. Loaded by dragline with 3 cu. yd. bucket.

AVERAGE LOAD TIME	3.44 min.
AVERAGE HAUL, DUMP AND RETURN TIME	7.17 min.
AVERAGE CYCLE TIME	10.61 min.
AVERAGE PAYLOAD (LB.)	78,633
AVERAGE PAYLOAD IN BANK	
YARDS AT 3000 LB./YD.	26.31

PRODUCTION ON A 60-MINUTE HOUR

Trips/hour	5.65
Cu. yd./hour	148.65

OWNING AND OPERATING COST PER YARD

	11.85¢
PRODUCTION AT 75% EFFICIENCY	
Cu. yd./hour	111.5
Cost/cu. yd.	15.8¢

The demonstration described and pictured here was made in comparison with competitive units. The new Cat DW20 Series G Tractor with new Athey PW20 Bottom Dump Trailer came through with high production at *lowest cost per yard*. As a result, the contractor purchased a DW20-PW20 Unit.

Consider the facts about this high-capacity rig. The DW20 Series G has a rating of 345 HP (maximum output). It hits top speeds of 35.8 MPH quickly for cutting cycle times. It provides maximum rimpull of 39,565 lb. for unmatched performance on adverse grades. The PW20, constructed of extra strength steel, has a struck capacity of 27 cu. yd.—and a maximum carrying capacity of 40 tons. Here's a matched pair designed to handle *more work faster at lower cost per yard than ever*.

For the complete time and cost study of this job, see your Caterpillar Dealer. Ask for a demonstration, too. That's the best way to judge what the big new DW20-PW20 can do on your job. Name the place and date—he'll demonstrate!

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

CATERPILLAR

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Atkinson low bidder on work for Oahe Dam

A JOINT VENTURE bid of \$19,367,461 from Guy F. Atkinson Co. and Ostrander Construction Co. was apparent low at a bid opening July 30 by the Omaha District of Army Engineers to construct the powerhouse superstructure and surge tank bases for Oahe Dam under construction on the Missouri River near Pierre, South Dakota. Five other bids were received on the big powerplant job estimated by Army Engineers to cost \$19,919,583.

They were: J. A. Jones Construction, Seattle, \$19,652,726; Winston Brothers, Johnson, Drake & Piper, Inc., Green Construction Company, American Pipe & Construction Company, Foley Brothers, Inc., Minneapolis (joint venture) \$19,984,313; Montag Halvorson and Austin & Associates, Portland, Oregon (joint venture) \$20,696,363; Western Contracting Corporation, Sioux City, Iowa \$21,254,930; and Morrison-Knudsen, Peter Kiewit Sons' Company, Al Johnson Construction Company, F & S Contracting Company and Condon-Cun-

ningham Company, Seattle (joint venture) \$22,191,135.

The Oahe powerplant, largest structure in South Dakota, will be of reinforced concrete 116 ft. wide, 670 ft. long, and 150 ft. high. Fourteen surge tanks to be constructed under another contract will add 145 ft. to the height. The successful bidder is required to complete the superstructure and surge tank bases by March 31, 1964.

Kaiser to build gypsum plant

KAISER GYPSUM CO. will build a gypsum products plant near Albuquerque, New Mexico. It will be located adjacent to a high-grade deposit of gypsum at Rosario, between Albuquerque and Santa Fe.

Plans call for rapid construction, with initial production under way next June. The plant's rated productive capacity will be 120,000,000 sq. ft. of gypsum board annually.

The property is being acquired from the Indian Development Co. and Kaiser Engineers Division of Henry J. Kaiser Co. will engineer, design and supervise construction of the project.

Air Force holds 3rd pavements conference

CLOSE TO 300 attended the third pavements conference sponsored by the U. S. Air Force held July 27-31 at the Claremont Hotel in Berkeley, Calif. About 50 papers were delivered by both military and civilian authorities on design, construction, and maintenance of pavements. One of the conference days was spent in the field at nearby Hamilton Air Force Base for a demonstration of equipment used for compaction, joint cleaning and sealing, concrete sawing, pavement marking, etc.

Civilian Westerners who appeared on the program included Vaughn Marker, Division Paving Engineer, Asphalt Institute, Berkeley, Calif., speaking on paving and plant operations; Byron P. Weintz, Chief Engineer, Consolidated Rock Products Co., Los Angeles, whose topic was quality control in ready mixed concrete; Dr. E. D. Botts, Materials & Research Department, California Division of Highways, discussing epoxy resins in repair work; and F. A. Rostler, Director of Research, Gold Bear Oil Co., Los Angeles, speaking on a chemical approach to airfield pavement maintenance.

Because of the excellent turnout at this year's meeting it is possible that the Air Force will hold it annually.

For information about obtaining a copy of the proceedings, and to find out when and where the next conference will be held (not yet decided) write to: Ode E. Co Pavements Consultant, USAF Hq Bldg. T8, 3900 Newark St. N. W. Washington, D. C.

Private hauling road opens for record loads

MONSANTO CHEMICAL Co. has opened a private road connecting its phosphorus plant at Soda Springs, Idaho, and its phosphate mine 11 mi. away. The highway was constructed by Morrison-Knudsen.

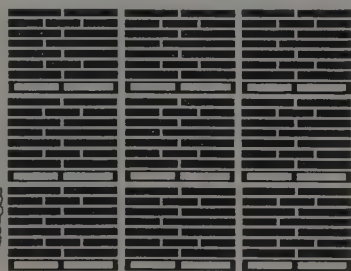
Construction of the road began last September. Its completion enables the use of specially constructed carrier units capable of hauling 75 tons of ore each trip. These units consist of a tractor, two-axle trailer and a four-axle trailer. Each unit, 96 ft. long, has a gross weight of approximately 100 tons and is believed to be the largest highway hauler in the U. S.



GIANT LIGHT POLES FOR A GIANT STADIUM

THESE FIVE 190-ft. standards, which are believed the world's tallest poles for floodlighting, will be used to illuminate the Candlestick Point Stadium in San Francisco—home of the San Francisco Giants baseball team. The standards are shown leaving the yard of Weld-Rite Co. in Oakland, and five railroad flat cars were required for the load. They were considered the longest material ever handled by the Southern Pacific railroad in the San Francisco Bay area. Each standard weighs 33,000 lb. in the 190-ft. length. The entire installation includes ten of these standards and twelve other poles with lengths of 130 to 155 ft. The standards will carry a combined lighting system including 1,125 floodlights of 1,500-watt capacity.

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ALASKA Newsletter

By CLIFFORD S. CERNICK, Fairbanks

THESE SAD SEPTEMBERS—

Each year as September rolls around, we find ourselves feeling a bit melancholy from time to time. In Alaska, September spells farewell to summer. The long bright days have telescoped and the Arctic darkness begins to cloak this vast land. On many Alaskan hills these days, one can see the white bands proclaiming that winter has already come to the higher places. To the construction man, this is the season of "termination dust," the first flurries of snow which mean the job will soon be closing down and his final check for that year will soon arrive. In Fairbanks bars, business is picking up. Mining and construction men are in from the camps. If the bearded prospector is a thing of the past, then there are a bunch of imposters trudging the streets of Fairbanks—some of the color of early pioneer days is still here. And some of the excitement, too. I watched two burly iron workers slugging it out in the middle of the street. A beautiful native girl, source of the knock-down-drag-out battle, watched tearfully from the sidelines. From the nearby saloon came the raucous notes of "Squaws Along the Yukon." In Alaska, life can still be rough and raw—in September and the rest of the year around.

SADDEST OF YEARS—We predicted a record-breaking construction season in our annual forecast this spring, but the way it has actually turned out convinces me that it's time to do some strategic backing up. Labor turmoil in Alaska has, as one carpenter remarked to me, shot the 1959 construction season all to—well, plumb to pieces. Without arguing the merits of the case on either side, I'll state: Both labor and management in the Alaskan construction industry have been badly hurt by a stubborn series of walkouts that have crippled most construction jobs. The strike of just one major craft can have serious repercussions throughout the industry. On June 27 of this year, about 2,500 union carpenters in Alaska were called off their jobs as a result of the break-

down of negotiations. In the Fairbanks area alone, 600 men dropped their tools. This stopped numerous jobs that had, up to that point, been humming along at a good pace. It meant a halt in progress on work estimated at more than \$40,000,000—some estimates were almost double that figure. It threw thousands of men out of work and put a sudden burden on welfare agencies. It caused untold bitterness. At this writing, the dispute is still unsettled. Except for some critical defense jobs—including missile-type jobs at Clear and Donnelly Flats—the men are still out. In the years I have been covering the construction beat in Alaska, there have been many Septembers. Because of the effects of the strike this year, I must say that September 1959 has been the saddest of them all.

THE GOVERNOR AND I—I

first met Alaska's governor, William A. Egan, some years ago back in Valdez when he was known as just plain Bill Egan and ran a small grocery store there. Today, this modest, hard-working man is governor of the largest state in the union; unhappily, he became governor only to inherit the most serious economic disruption in years as a result of the construction walkout. "Unless it can be settled, the economy of Alaska will have been dealt a blow from which it will take years to recover. The very welfare of our state is involved," he said. The governor, while in Fairbanks, made a direct appeal to both contractors and union officials to reopen negotiations and end the costly deadlock. There were half-hearted efforts to comply, but nothing constructive came of them. Both sides have been criticized severely. Alaska's largest newspaper—in Anchorage—editorialized as follows: "There is no question that members of the Associated General Contractors have engaged in practices that are not good for Alaska workers or for Alaska itself. Their skirts are certainly not clean. Neither are the unions paragons of virtue. They have been known to figure in machinations and maneuvers that would not draw the admiration of

their own members. Both sides must overlook much in order to live together productively."

THE STRIKE IN HUMAN

TERMS—Few realize the erosion a strike can cause on the human personality. Only when one sees a pickup truck loaded with a worker's pathetic belongings headed back down the Alaskan highway does one realize that it is so important to find some better, less bitter, more humane, less costly way to settle our labor problems. Many workers' families are having trouble getting together enough money to pay rent, grocery bills and other obligations. Many small contractors are apprehensive over the future. One small contractor on a Fairbanks project defaulted—he went broke. The strain on finances, the tears of futility, the skimpy meals, the shabby clothes, the long treks to another state in the search for work—all these are considerations men tend to lose sight of around the bargaining table. The tragedy of the 1959 construction season lies in its having been wasted. Hours that could have been productive have become stagnant. The innocent, helpless victims of a strike are many; the beneficiaries, so far as I can see, are non-existent.

IN REALMS OF FANCY—

Since I cannot discuss at any length the progress of any actual construction in Alaska because there's not much progress to report, it might be well to clue you in on some of the fanciful construction being pondered for Alaska's future. There are plans for bridging the Bering Straits, melting the glaciers, warming the waters and controlling the winter weather. Nobody, of course, pays much attention to any of these. Now a California aircraft engineer has come up with a proposal which is intriguing if nothing else. Vernal M. Tyler, an engineer with Hughes Aircraft, proposes that a large hole be bored in Mt. McKinley to make a "gun barrel" for launching space vehicles. The hole would be drilled from the bottom, up through the highest peak of North America's tallest mountain, and would include an elaborate series of sub-tunnels and underground chambers. The job Tyler envisions would cost more than \$80,000,000. The work would encompass construction of a 5-mile spur line from the Alaskan Railroad to a plateau at the 2,000-foot level of the mountain. An 1-

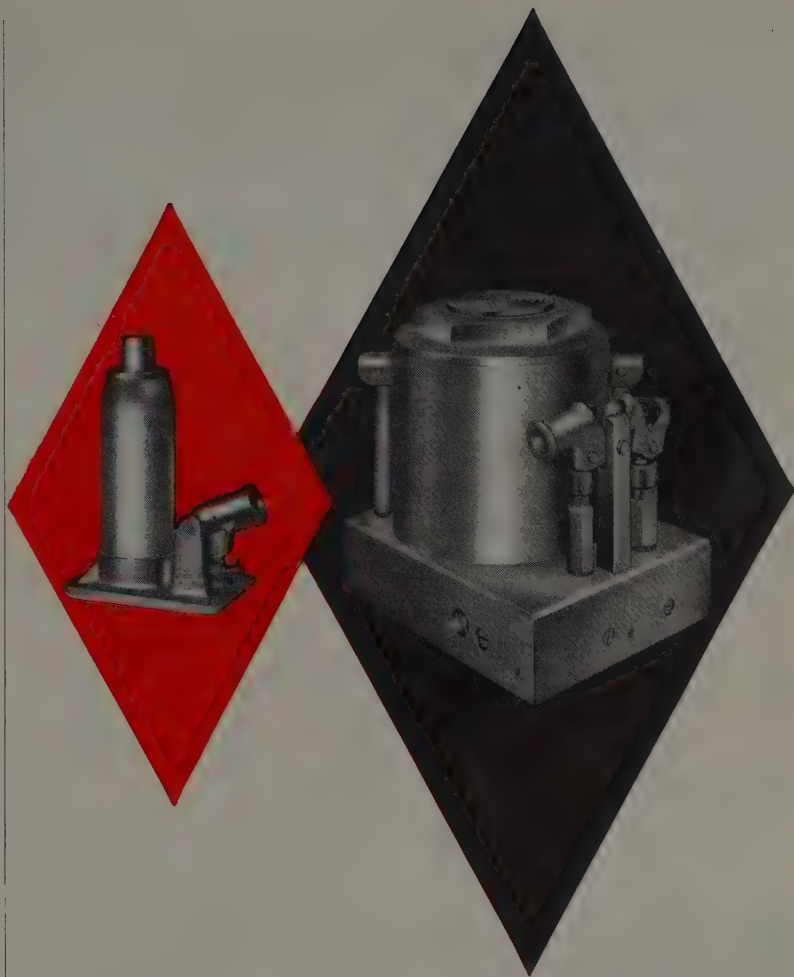
mile horizontal tunnel from the plateau to the beginning of the vertical tunnel at an elevation of about 5,000 feet would be the next step, followed by construction of a vertical tunnel of about 10,000 feet to the top of the mountain. Besides providing a "gun barrel" for launching space vehicles, the tunnel would provide an outlet for hot gasses. That's a good note on which to end this item.

NUGGETS—A number of construction workers will be needed to build sets for the film "Ice Palace" which will be filmed in Alaska soon . . . The AGC used large ads in newspapers to bring the contractors' offer to the direct attention of the union membership. Despite the ads, the carpenters overwhelmingly rejected the offer . . . Work is going ahead, by special agreement of the unions, on three projects at Clear, the 250 million dollar missile detection station near Nenana and a small satellite tracking station at Donnelly Dome near Ft. Greely . . . The million-dollar Corrova building in Anchorage is going ahead on schedule after the owners reached an agreement with unions . . . Some Fairbanks business firms considered withdrawing credit privileges from those on strike, but nothing of the kind has been done so far . . . Fairbanks will soon have a steel mill. A new firm plans to erect a mill here having a production capacity of 100 tons a day. Principal product: re-steel.

Engineers to survey harbors in Alaska

SURVEYS of fourteen Alaskan harbors will be started this summer by the U. S. Army Engineer District, Alaska. These surveys will be used in the interest of protecting the rights of navigation to establish areas and to define boundaries beyond which man-made structures cannot be built. In announcing the planned surveys, Col. W. C. Gribble, Jr., Alaska District Engineer, commented that "the need for defining these areas is becoming progressively more acute as the various communities expand and the waterfronts become more crowded."

The District has been directed to establish the necessary harbor lines to protect navigation channels at Etchikan, Anchorage, Juneau, Douglas, Sitka, Wrangell, Petersburg, Skagway, Haines, Kodiak, Cordova, Valdez, Pelican and Selkovia.



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HAWAII Report

By ALAN GOODFADER, Honolulu

BIGGER BOOM—Two sources have predicted in recent weeks that Hawaii's building boom is good for another 10 years. The first prediction came from the Stanford Research Institute. It says the annual value of construction will rise to 26 to 30 per cent above record 1958 in spurts continuing to 1970. It estimated the 1958 building materials market here at almost \$100 million. And The Bank of Hawaii, in a report on "the State of Hawaii," said the annual dollar value of construction completed will top \$350 million by 1970. Bankoh says the emphasis will shift here from luxury homes and apartments to lower priced homes and apartments in the residential field with expansion expected in resort hotels, office buildings, manufacturing and processing plants, defense installations and public construction. It also sees a spread of construction activities to the neighbor islands of Oahu in the last half of the decade. Both Bankoh and the Research Institute warn that the advance will be irregular, with builders needing more cement and metal products and comparatively less residential construction materials.

AT THE MOMENT—Meanwhile, this year's construction activity continues to race to a new record. The Bank of Hawaii says construction and tourism "appear certain to show such strength as to maintain the economy at boom levels during the third and fourth quarters." Construction continues to absorb more workers. It showed a 34.8 per cent gain over 1958 with a total of \$64,146,000 from January through April. And the Honolulu Building Department says construction permits (an indicator of civilian construction on Oahu) appear ready to top the \$100,000,000 mark this year for the first time. Permits issued in June totaled nearly \$17,900,000 and brought the total of the first six months to \$62,500,000. This compared with \$57,000,000 in the same period last year.

APARTMENTS GO BIG—A major factor in this year's construction growth has been the rise here

of luxury apartment houses. Up to June 1, more than \$12,000,000 had been spent on apartments of all types on Oahu. This was double last year's figure for the same period. And more are coming. Among the larger announced recently are: A \$2,500,000, 14-story, 104-unit co-operative apartment, an \$8,000,000, 150-unit cooperative apartment building, and a \$400,000, 200-unit apartment building, all in Waikiki.

HOTELS, TOO—The bustling tourist business has crammed Hawaii's tourist hotels and brought new plans for construction to the drawing boards. The Pacific Construction Co. is working on a 50-unit six-story addition to the Waikikian Hotel. This originally was planned for only 40 units. A four-story 105-room hotel in the Kona area of the Island of Hawaii is under construction. Plans have been announced for a \$200,000 motel-type resort, an 80-room \$650,000 hotel on the Island of Maui, and a \$3,000,000, 300-room hotel on the Island of Kauai. And a \$3,000,000, 200-room hotel already is under construction on the Island of Kauai. And the Sheraton Hotel chain has vague plans for another Waikiki hotel.

CAPEHARTS CLIMB—Capehart military housing to be completed here by the end of 1960 is expected to total more than \$78,000,000. An additional 864 units costing \$12,000,000 to \$15,000,000 is expected to be started soon. This will be added to 3,096 units under construction now and 1,801 units already completed.

OTHER MILITARY SPENDING

—Announcement of new military projects also is adding to the construction picture here. More than \$2,000,000 will be spent this year on Pacific missile range facilities on Oahu and other Pacific islands. On Oahu, \$386,000 for an unspecified type of building and \$123,000 for a communications building are earmarked at the Kaneohe Marine Air Station. Kaneohe will be the

western Pacific headquarters for the missile range.

MORE COMING—To this may be added the following federal aid projects approved by Congress: \$4,796,000 for oil storage and electronic facilities at Pearl Harbor; \$274,000 for a sewage plant at Waiahia Naval Air Station; \$7,000 for a liquid oxygen transfer building at Kaneohe Marine Air Station; \$47,000 for buildings at Schofield Barracks; \$275,000 for drainage work at Lualualei Naval Air Station and \$729,000 for Air National Guard facilities on Maui and Kauai. In addition, the Senate has approved spending of \$1,299,000 for a new taxiway at Hickam Air Force Base. And the Hawaii Aeronautics Commission expects to get \$750,000 a year for two years in federal aid for expansion of the Honolulu International Airport.

SEWAGE AID—The U. S. Public Health Service has granted the City of Honolulu \$250,000 toward a \$1,800,000 sewage treatment plant to be built at Pearl City—just outside metropolitan Honolulu on Oahu. The City now is negotiating for plant site. The sewage grant is the sixth Hawaii has received. The total more than \$1,000,000.

TROUBLE COMING—J. F. Carabiano, national Carpenters Union executive board member, has warned the Hawaii General Contractors' Assn. it faces economic action if it doesn't sign a master contract with the building trade unions. The unions have been trying for years to negotiate such a contract here.

MORE ON THE BATTLE

Henry J. Kaiser has won a round in his battle with the Dillinghams family over who will be the first to start producing cement locally. The Honolulu City Council has given Kaiser permission to quarry coral on 208 acres of land at Maunaloa on west coast of Oahu. The coral is to be used in cement manufacture. However, Kaiser is barred from crushing rock at the site. The approval was a compromise approved by the Dillinghams. They had opposed Kaiser's first quarry crusher proposal on the grounds that it would be detrimental to their plans to build a tourist resort.

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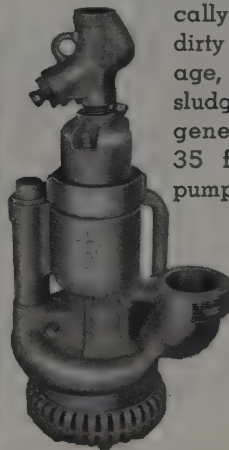
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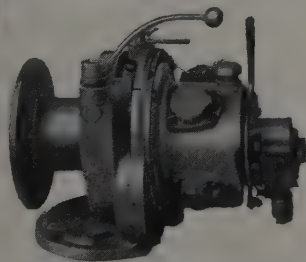
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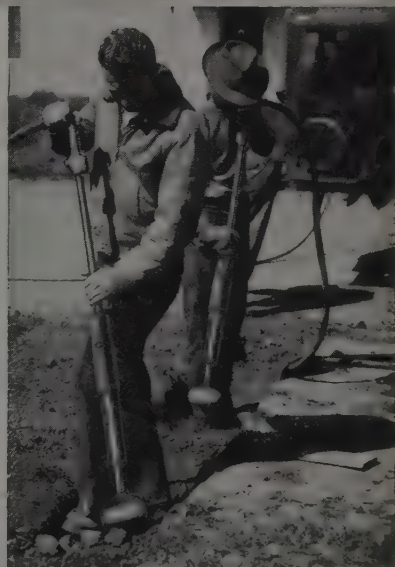


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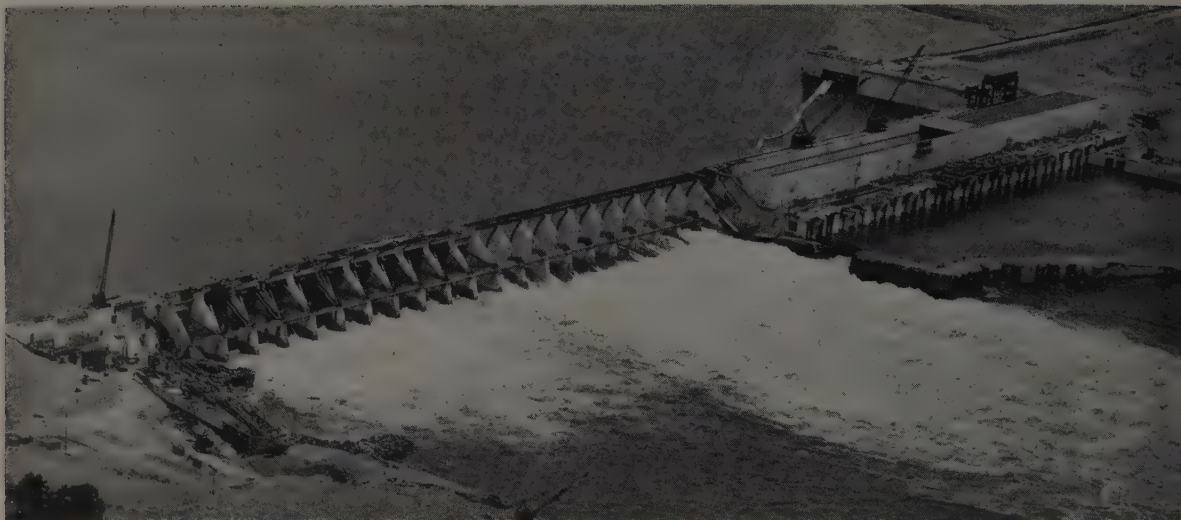
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PRIEST RAPIDS DAM AFTER THREE YEARS OF CONSTRUCTION

ABOUT 16 months ahead of its construction schedule, the Priest River Dam project is shown at 80% completion after three years of work by Merritt-Chapman & Scott. Award of contract for the \$92,000,000 Columbia River job was made by the Public Utility

District of Grant County, Washington, in July 1956.

Features of the project (left to right) are a fish ladder on the west bank, followed by 22 spillway sections, then the powerhouse, 1,025 ft. long, and on the far bank, the fish passage facilities.

Railroad ballast gets asphalt seal coat

PLACING an asphalt seal coat on 2 mi. of main line track in California represents an important field experiment conducted by the Atchison, Topeka & Santa Fe. The first of several test sections on the Santa Fe was a 1/2-mi. stretch of track near Barstow. Observations will be made during the next decade and it is hoped that maintenance costs will be reduced by 50%.



THE BARSTOW project was the first of six scheduled by R. N. Beeder, chief engineer of the Santa Fe system. This extensive field experiment follows 15 years of study by the Association of American Railroads and The Asphalt Institute. The distributor car used was designed for treating railroad ballast (upper left) with outrigger bars that can be retracted. The asphalt used was 85-100 grade applied at the rate of 1.25 gal. per sq. yd. Penetration was about 2 in. into the stone ballast. A special shield keeps the asphalt from the rail during spraying.

IN ADDITION to the test section near Barstow the Santa Fe will apply the treatment on a 5-mi. section in Arizona and another section in New Mexico. Two passes of the spray car were required to coat the ballast completely. The two passes were required because the distributor did not have the required capacity when the work train was traveling more than 2 miles per hour, which was the lower limit of its practical speed.

BEHIND the distributor the cover aggregate was spread evenly over the treated ballast to complete the operation. Spreading was done from a railroad hopper car with specially designed equipment (lower left). In addition to reducing labor costs of maintenance, the asphalt treatment is expected to reduce the infiltration of water into and through the ballast, and to prevent fouling with dust and debris. The asphalt is also expected to extend the life of ties, by its protective coating. Finished test section is shown below.





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6000-LB. BATCH CAPACITY

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Our Plant No. 2 alone, has turned out in excess of 300 tons per hour

— says Dave Rogers, Daley Corporation, San Diego, California

Here are some of the engineering features and specifications of the MADSEN Asphalt Plants shown above:

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Model 481 6000-lb. Batch Capacity
Model 481 8000-lb. Batch Capacity
- **GENEROUS AND OVERSIZE ANTI-FRICTION BEARINGS THROUGHOUT**
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- **DUST COLLECTOR** — Madsen 12' diam. Cyclone with #100 Madsen Exhauster.
- **MINERAL FILLER EQUIPMENT** — Commercial Dust Unloading Hopper, Unloading Screw, Elevator and Dust Storage Silo.
- **WET SETTLING EQUIPMENT** — Madsen Model 7812 Triple Wet Tube Dust Washer... meets air pollution requirements everywhere.
- **CONVEYCO FULLY AUTOMATIC BATCHING SYSTEM** — (Optional with Madsen Asphalt Plants).

More than 300 T.P.H. from one MADSEN Asphalt Plant — that's the kind of production that makes money! And, when you line up two big MADSEN Plants together, as the Daley Corporation has, you're in the bituminous mixing business in a big way.

Here's what Dave Rogers says about their MADSEN Plants — "Our two big MADSEN Plants running simultaneously can produce all the tonnage we need. Generally, we keep our 8000-lb. plant rolling steadily turning out batches for our own contracts — highways, airports, etc. That leaves our 6000-lb. plant free to handle our 'grocery store' business. This 6000-lb. plant is equipped with MADSEN's 'Auto-Cycling' system with fast and automatic operation of mixing, asphalt injection, dumping to truck and closing of mixer gate automatically. Mix specifications can be changed a dozen or more times a day if necessary with no loss of time."

"MADSEN's careful design, oversize construction throughout, with no 'weak spots' anywhere in the plant — together with the big-tonnage output, easy accessibility and low maintenance costs, plus excellent factory service... these are the advantages that sold us on MADSEN," says Mr. Rogers.

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CONSTRUCTION IN ALASKA INCLUDES RAILROAD BUILDING

Building of the Clear Ballistic Missile Early Warning Station by the U. S. Army Engineer District in Alaska required the relocation of about 8 mi. of the Alaska Railroad. The work shown is being carried out by W. A. Smith Contracting Co. with the job started in May on frozen ground. Actual track laying was done during the summer with procedures and equipment different from those used 40 years ago during the building of the original line. This work represents the first major route change on the railroad since 1953, when a new alignment was cut through the mountains.

Storm drain job in Phoenix

CONTRACT for construction of a large storm drain in connection with the Phoenix Interstate Freeway has been awarded to Arizona Concrete Pipe Co. on a low bid of \$527,178. The bid was the lowest of seven. The work extends for a distance of about 2.5 mi. and involves some widening of the existing roadway in addition to the storm drain. The low bid was about 15% under the engineers estimate.

Additional contracts on Oroville Dam project

WITH money made available by the last session of the California Legislature, more construction activity will get under way on the railroad relocation around the Oroville Reservoir site.

Contracts for Tunnels 2 and 3, and for grading work on railroad relocation were awarded last month. This work will be north of the proposed combination highway-railroad bridge over the West Branch of the Feather River. Estimated cost of the tunnel jobs was \$8,700,000.

Later this year bids will be called for the West Branch Bridge estimated to cost almost \$12,000,000. With the completion of this structure in about two years, the relocation of the Feather River Highway will be available for use. With

the exception of this important bridge link this highway relocation is now complete.

An article reviewing features of tunnel driving appeared in the issue of April, 1959. The same issue contained a general review of progress on the overall project and a detailed description of the concrete arch railroad bridge over the North Fork of the Feather.

Low bids and contract awards

ALASKA

A \$4,628,415 contract for construction of 138 new family quarters for the U. S. Air Force at Eielson was received by Alcan Pacific Co. of Anchorage.

ARIZONA

Ashton Co., Inc. of Tucson submitted two low bids for roadwork in Maricopa and Cochise counties: \$1,234,660 for grading, surfacing, bridge, and pumping system on the Phoenix Interstate Freeway in and near the city of Phoenix, Maricopa County, and \$307,137 for 6.2 mi. of grading, draining and surfacing on the Ft. Huachuca-Bisbee highway in Cochise County. A low bid of \$903,891 was submitted by Southern Arizona Contracting Co., Tucson, for grading and surfacing

Pier project at Portland

THE Portland Commission of Public Docks has awarded a \$2,249,000 contract for building a bulk unloading pier at Terminal No. 4 to C. M. Corkum Co., Portland. The facility, unique on the Pacific Coast, will be completed by mid-1960. It will consist of the pier and a completely modern 900-ton per hour bulk unloading tower, now under construction by Dravo Corporation, Pittsburgh.

The Commission considered 12 bids, ranging from Corkum's low to a high of \$2,800,000. Majority of the bids were well within the Commission's engineering estimate. The pier will provide two deep-water berths with a minimum depth of 35 feet. The project includes a 100-car capacity rail holding yard adjacent to the pier and several acres of open storage. Plans for the facility provide a barge basin. Present operating plans are focused upon overland transportation to consignees. Provision has been made for a later conveyor belt and barge basin to permit direct discharge to barges when the need develops.

Design and engineering of the project was carried out by the Commission's engineering staff. Actual construction began in October, 1958, with dredging of the berth and land leveling. Spoil was deposited in the project area to provide sites for rail tracks and open storage.

on 10.4 mi. on the Casa Grande-Tucson highway in Pinal County. Isbell Construction Co., Phoenix, submitted a low bid of \$427,739 for grading, surfacing and widening on the Globe-Show Low highway in Gila County. Lyle Price, Contractor, of Cottonwood, submitted a low bid of \$137,127 for grading and draining on the Show Low-McNary-Eagar highway in the town of Pinetop, Navajo County.

CALIFORNIA

Yuba Consolidated Industries, Inc., Judson Pacific-Murphy Division of Emeryville submitted a low bid of \$5,769,000 for the substructure of a bridge to be constructed across Carquinez Strait, between Benicia and Martinez in Solano and Contra Costa counties. A \$1,969,445 contract was received by Cox Bros. and J. E. Haddock of

Stanton for construction of runway 3-21 extension at the missile center, Point Mugu. **Gordon H. Ball, Inc.** of Danville received a \$1,211,000 contract for construction of parking aprons at the Marine Corps Air Facility at Santa Ana. **Maino Construction Co., Inc.** of San Luis Obispo received a \$1,144,900 contract for construction of a steel Telemetry Building and Range Operations Building at San Nicholas Island, Naval Missile Center, Point Mugu. A \$797,770 contract was received by **M. J. B. Construction Co.,** Stockton, for grading and surfacing to widen 3.2 mi. on Route 1 south of Davenport in Santa Cruz County. **Floyd R. Grubb** of Salem, Ore., submitted a low bid of \$574,999 for earthwork and structures, Trinity River Division, Central Valley Project. A \$447,064 contract was received by **Granite Construction Co.,** Watsonville, for resurfacing and widening on a 5-mile section south of Ukiah in Mendocino County. **Guy F. Atkinson Co.,** South San Francisco, submitted a low bid of \$417,425 for 8.8 mi. of grading and surfacing south of Gorman in Los Angeles County. **A. Teichert & Son, Inc.** of Sacramento received a \$357,193 contract for widening and resurfacing 5.9 mi. of Route 24, northwest of Sacramento in Sacramento County. **Thomas Construction Co.,** Fresno, submitted a low bid of \$314,789 for 2.2 mi. of grading and surfacing north of Canyon Dam in Plumas County. **Tomei Construction Co.,** Van Nuys, received a \$308,089 contract for resurfacing, traffic signals and highway lighting, city and county of Los Angeles. A \$276,183 contract was received by **M. J. Ruddy & Son** of Modesto for reconstruction and widening on 6.6 mi. on County Road 1294 near Farmington in San Joaquin County. **Healy Construction Co.,** Palmdale, received a \$265,946 contract for realigning 2.2 mi. of Route 89 north of Canyon Dam in Plumas County. A \$191,855 contract was received by **H. F. Lauritzen** of Antioch for construction of a 2-lane bridge over Cache Creek on U. S. 40 near Woodland in Yolo County. **Flores & Perry** of Hanford received a \$176,927 contract for grading and surfacing on 2.4 mi. of Route 49 west of Coloma, El Dorado County. **Rice Brothers, Inc.** of Fresno submitted a low bid of \$159,219 for 2.6 mi. of grading, widening and surfacing in Coalinga and Three Corners, and 2 bridges to be widened in Fresno County.

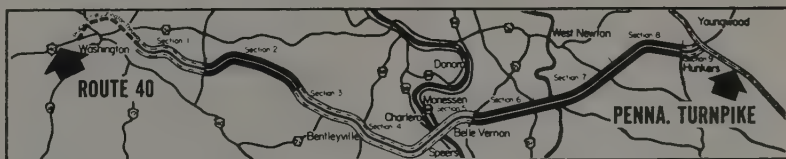
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Route 31 is an important 43.17 mile link connecting the Pennsylvania Turnpike and Interstate Route 40. For bid purposes it was divided into sections. Based on accepted bids, 21.74 miles were constructed of concrete; and 21.43 were constructed of asphalt. All sections were specifically designed for comparable service since all must carry the same traffic load.

The total accepted bid price for the 21.74 miles of concrete was \$3,273,056.51. The total accepted bid price for the 21.43 miles of asphalt was \$2,300,450.08.

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COLORADO

H. E. Lowdermilk Co. of Englewood received two contracts for work in Roosevelt and Routt National Forests: a \$575,000 contract for 5.7 mi. of grading and surfacing on the Marvin-Phippsburg route in the Routt National Forest, Rio Blanco County, and \$519,000 for 6.8 mi. of grading, surfacing and related work on the Nederland-Raymond route in Roosevelt National Forest in Boulder County. **A. S. Horner Construction Co.** of Denver submitted two low bids for roadwork in El Paso County: \$536,830 for Unit 2, Pikeview Interchange, grading and paving approaches; and \$168,712 for structures, Uintah Street underpass and railroad overpass. **Domenic Leone Construction Co.**, Trinidad, received a \$583,000 contract for grading and surfacing on 6.3 mi. of the Greenhorn highway in the San Isabel National Forest, Custer County. **Gardner Construction Co.** of Littleton submitted a low bid of \$375,164 for structures and grading west of Saguache in Saguache County. A low bid of \$303,547 was submitted by **Harrison Construction Co.** of Denver for grading, surfacing and structures on 4.3 mi. on State Highway 62 and 145 in San Miguel County. **E. J. Rippey & Sons** of New Castle submitted a low bid of \$211,224 for grading and surfacing on 6.4 mi. of State Highway 149 in Mineral County. A low bid of \$189,156 was submitted by **Smith & Lucas** of Colorado Springs for interchange structures and approaches, Junction No. 1 and Highway 50 at Monument in El Paso County. **Colorado Constructors** of Denver, submitted a low bid of \$161,879 for structures, grading and surfacing on 1 mi. of State Highway 70 and 185 in Arapahoe County. **Latimer Construction Co.**, Denver submitted a low bid of \$519,348 for construction of Colfax-Federal Interchange and related work in city and county of Denver. **Pioneer Construction Co.**, Pueblo, submitted three low bids for roadwork in Fremont, Gunnison and various counties: \$418,380 for structures and surfacing on 4.6 mi. of State Highway No. 6, west of Canon City in Fremont County; \$350,471 for 4.8 mi. of grading, surfacing and structures in and near city of Gunnison, Gunnison County; and \$256,962 for asphaltic surfacing overlay on 45 mi. of State Highway 2.

IDAHO

A \$3,475,000 contract was received by **Diversified Builders, Inc.** of Paramount, Calif. to construct a sodium boiler plant and fuel facility for the Experimental Breeder Reactor II plant at the National Reactor Testing Station.

MONTANA

McLaughlin, Inc., Nilson-Smith, S. Birch Inc. and S. Birch & Sons of Great Falls received a \$2,629,104 contract for grading, surfacing and related work on 8.3 mi. of the Sun River-Great Falls road in Cascade County. A \$359,248 contract was received by **Wickens Bros.** of Suffolk for 4.2 mi. of grading, surfacing and draining on the Armells Creek-Hays-Harbor road in Phillips County. **Dillworth Construction & Maronick Construction Co.** of Helena received a \$355,006 contract for 7.2 mi. of grading, surfacing and related work on the Helena-Flesher Pass-Lincoln road in Lewis and Clark County. **Montana Bridge Co.**, Billings, received a \$231,507 contract for bridge construction on the Sun River-Great Falls road in Cascade County. **Ca-hoon Construction Co.** of Pocatello, Idaho, received a \$226,504 contract for bridge construction on the Wisdom-Divide road in Deer Lodge, Beaverhead, and Silver Bow counties. A \$195,552 contract was received by **United Construction Co.**, Miles City, for 7 mi. of grading, surfacing and structures on the Carlyle West and North road in Wibaux County. A \$144,402 contract was received by **Montana Engineering & Construction Co.** of Helena for structures on Superior-East.

NEVADA

Silver State Construction Co., Fallon, received a \$657,795 contract for construction of a portion of the State Highway System east of Eureka on U. S. 50 in Eureka and White Pine counties.

OREGON

S & D Construction Co. of Portland submitted a low bid of \$319,765 for construction of Alternate A, 6 undercrossing structures, Twin Buttes-McKenzie River section on the Pacific Highway in Linn and Lane counties. **Inter-City Sand & Gravel Co.** of Eugene submitted a low bid of \$307,021 for Alternate B, 6 undercrossings, Twin Buttes-

McKenzie River section, Pacific Highway, Linn and Lane counties. **F. H. McEwen**, Eugene, submitted a low bid of \$255,590 for 8.8 mi. of stonebase and paving on the North Umpqua Junction-Diamond Lake section of the Cascade Lakes road in Douglas County. **Babler Bros., Inc.** of Portland submitted a low bid of \$153,981 for surfacing, oiling, and grading 6.9 mi. on West Fork, Silvies River-Wrights Point of the Frenchglen highway in Harney County.

UTAH

W. W. Clyde of Springville submitted a low bid of \$2,558,284 for structure, grading and surfacing on 3.9 mi. of Interstate 15 in Salt Lake County. A low bid of \$1,153,403 was submitted by **Gardner Construction Co.**, Littleton, Colo. for construction of overpass structure, grading and surfacing in city of Ogden, Weber County. A low bid of \$457,962 was submitted by **Gibbons & Reed Co.**, Salt Lake City, for 2.2 mi. of grading and surfacing on U. S. 40, Salt Lake County. **Strong Co.** of Springville submitted two low bids for roadwork in Uintah, Duchesne, Garfield and Kane counties: \$797,215 for 8.1 mi. of grading, surfacing and related work on U. S. 40 near Fort Duchesne in Uintah and Duchesne counties, and \$598,315 for construction of surfaced road and seal coating on U. S. 89, near the Utah-Wasatch county line in Garfield and Kane counties. **Thorpe Construction Co., Inc.** of Springville, submitted a low bid of \$348,677 for 10.6 mi. of grading, surfacing and structure near Minersville in Beaver County. A \$300,400 contract was received by **Contracting Corporation** of Salt Lake City for 1.4 mi. of grading and surfacing on No. 1 Park Highway in Zion National Park, Washington County. **General Contracting Corp.** of Salt Lake City submitted a low bid of \$187,953 for grading, surfacing, and structures in Piute County. **Nelson Brothers Construction Co.**, Salt Lake City, submitted a low bid of \$143,432 for 6.8 mi. of grading and surfacing on State Road 261 in San Juan County.

WASHINGTON

Fiorito Bros. of Seattle received a \$1,000,054 contract for construction of Longview Wye interchange ramps and east approach to Pic-

neer Bridge in Cowlitz County. A \$311,951 contract was received by Dale M. Madden Construction Co. of Seattle for military road overcrossing in vicinity of Star Lake road in King County. Quigg Bros., Inc. and McDonald, Inc. of Hoquiam received a \$239,280 contract for construction of interchange and overflow channel structures in Yakima County. Bocek Brothers of Hoquiam received a \$222,658 contract for grading and surfacing, Frances overcrossing to Pluvius overcrossing in Pacific County. C. E. Oneal, Inc. of Ellensburg received \$206,250 for grading and surfacing on 1.1 mi. of the South Lake Shore road in Chelan County. A \$166,682 contract was received by Calabrese & Sons, Mercer Island, for 2.3 mi. of grading and surfacing from Dollars Corner north in Clark County. J. W. Hardison Co. of Yakima received a \$133,333 contract for construction of Hiawatha Valley interchange ramps in Grant County.

WYOMING

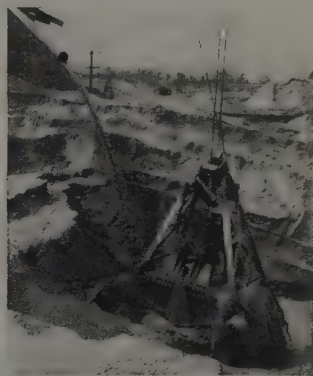
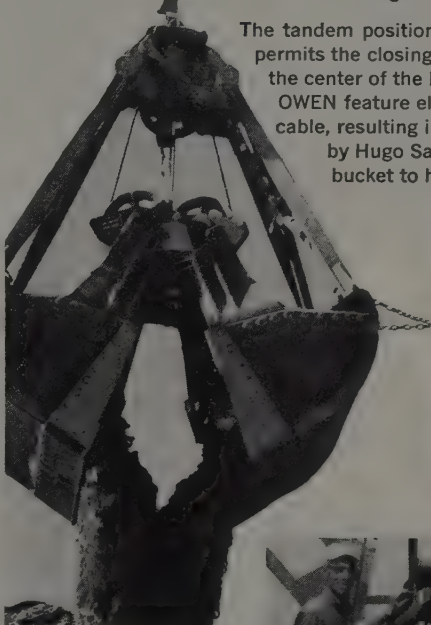
Platte Valley Construction Co., Grand Island, Nebr., received a \$893,196 contract for grading, surfacing and related work on 7 mi. of the Lander-Muddy Gap road in Fremont County. W. E. Berling, Inc. of Meeteetse received a \$582,880 contract for 4.1 mi. of grading and surfacing on the Jackson Lake road in Grand Teton National Park, Teton County. Blount Bros. of Montgomery, Ala. submitted two low bids for work at F. E. Warren Air Force Base, Cheyenne: \$562,601 for nose cone facilities and technical supply, and \$314,425 for microwave and communications duct facilities. Westwood Construction Co. of Denver, Colo., submitted a low bid of \$363,961 for construction of liquid oxygen facility at F. E. Warren Air Force Base, Cheyenne. Summit Construction Co., Rapid City, So. Dak., received a \$308,799 contract for grading, surfacing and related work on 15.4 mi. of the Orin Junction-Lusk road in Niobrara County. Asbell Bros. and Wyoming Paving of Riverton received two contracts for roadwork in Campbell and Natrona counties: \$306,967 contract for grading, excavation and surfacing on 11.9 mi. of the Gillette-Savage road near Gillette in Campbell County, and \$243,390 for grading, surfacing and related work on 4.8 mi. of the Casper Mountain road in Natrona County.

OWEN BUCKETS

new center line reeving doubles cable life

"Our new OWEN Bucket is great. That new center line reeving more than doubles our cable life," says Kenneth Muster, Supt. for R. F. Muntz, owner of the Hugo Sand and Gravel Co. of Kent, Ohio.

The tandem positioning of the lower closing sheaves permits the closing line lead to pass directly through the center of the head of the bucket. This exclusive OWEN feature eliminates excessive bending of the cable, resulting in increased cable life experienced by Hugo Sand and Gravel. It also permits the bucket to hang plumb from the crane boom.



"Our operation is tough on a clamshell, but all these improved OWEN features have greatly reduced our maintenance costs and cut down-time," claims Mr. Muster.

This OWEN Clamshell, with all moving parts lubricated . . . with all arm and sheave pins, plus the main shaft, having triple lip grease seals . . . has heavily cut the high maintenance expense of handling this sand suspended in water that comes directly from the wash plant.

Send us your requirements.
OWEN Engineers are at your service at all times.



The OWEN BUCKET Co.
BREAKWATER AVENUE, CLEVELAND 2, OHIO

BRANCHES: New York • Philadelphia • Chicago
Berkeley, Calif. • Fort Lauderdale, Fla.

. . . for more details, circle No. 45 on Reader Service Postcard

ENGINEERS and CONTRACTORS

Col. Edwin J. Withers has been assigned to the Army Engineer Division, South Pacific, as assistant division engineer. With offices in San Francisco, Col. Withers will assist in the administering of an



Col. Edwin J. Withers

annual \$200,000,000 military and civil works construction program throughout California, Utah, Nevada, Arizona, parts of New Mexico, Colorado, Wyoming, Idaho and Oregon.

* * *

Louis Chittim, formerly district engineer of the Butte District of the Montana Highway Department, has assumed the post of right-of-way engineer. Richard B.

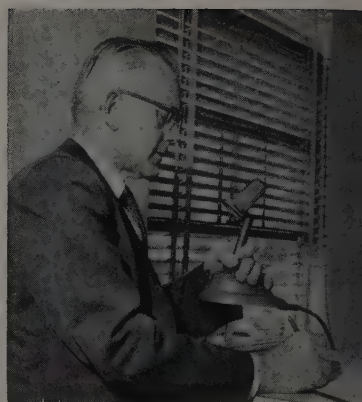
Dundas has succeeded to Chittim's former post, while George W. Tippitts, office engineer, has moved into the position of division engineer vacated by Dundas.

* * *

A. Norman Murray, ASCE, assistant regional director of the Bureau of Reclamation at Sacramento, has been appointed to succeed A. M. Barton as chief engineer and general manager of the California State Reclamation Board. Barton retired from the position on August 1.

* * *

Pecos H. Calahan, San Francisco, prominently identified with the engineering and construction fraternity of the West for many years, died recently at the age of 73. A one-time secretary-treasurer of Southern California Chapter, AGC, and for many years secretary of the State Board of Registration for Civil and Professional Engineers, he was secretary of the California



ELLIS DELBON, Stanislaus County (Calif.) road commissioner, demonstrates the radio system which he says is invaluable in dispatching equipment over the county's 1,750 miles of roadway. The County maintains 236 pieces of equipment, and spends about 35% of its budget for road maintenance. Radio is a key factor in reducing maintenance costs to free more funds for new roads.

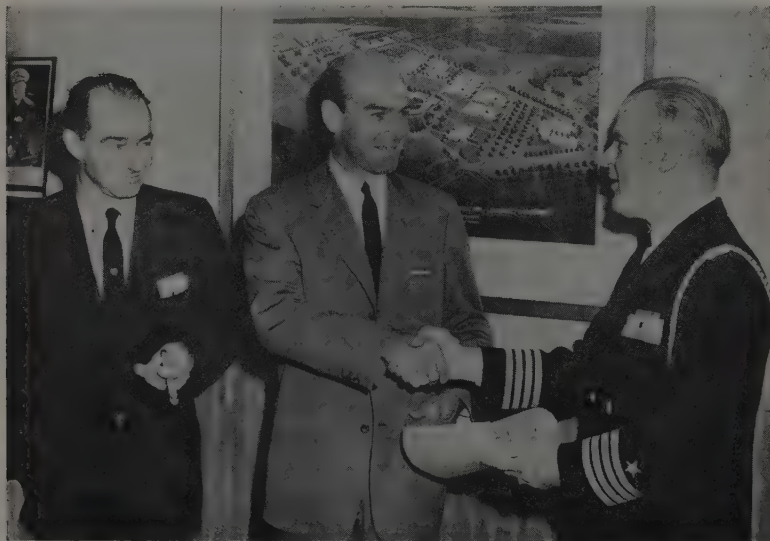
State Legislative Council of Civil and Professional Engineers at the time of his death. He was active in the affairs of the American Society of Civil Engineers, Structural Engineers Association of Northern California, the Engineers Club of San Francisco, American Association of Engineers and other professional groups.

* * *

Professor Warren Raeder, head of the Department of Civil Engineering at the University of Colorado, retired July 1. His successor is Roland C. Rautenstrauss, a graduate of the University and a member of the engineering staff for the past twelve years. Besides his regular teaching program, Professor Rautenstrauss has been directing school for the training of personnel of the Colorado Department of Highways in the use of new methods and equipment.

* * *

Arnold L. Henny, civil engineer and chief of the relocations section of the engineering division of the Portland District, Corps of Engineers, retired July 31. He had been with the Corps 30 years. Prior to this he had been with the Bureau of Reclamation and worked on the Minidoka project and at Denver. A member of the Colorado State Board of Engineering Examiners, he was recently reelected its president.



ROBERT N. POMEROY (center), president, and William A. Pomeroy, executive vice president of J. H. Pomeroy & Co., accept official Navy Certificate of Commendation from Captain F. S. Keeler. The award was given for outstanding "support in connection with the Navy's ballistic missile program" at Sunnyvale, Calif. Headquarters of the international engineering and construction firm are at San Francisco.

new model H-50 PAYLOADER®



5000 lb. carry capacity... $\frac{3}{4}$ to 2 yd. buckets

The model H-50 is the successor to the model HU in the "PAYLOADER" line of 4-wheel-drive tractor-shovels, and is another example of the continual development program that has maintained Hough leadership in tractor-shovel design and performance. It contains a number of improvements that give it outstanding performance for a machine in this size range.

BALANCED DESIGN Hough "balanced-design" provides correct weight distribution plus a proper balance between power, drive train components and hydraulic system consistent with the handling of maximum tonnages.

MORE POWER The H-50 gives you a choice of gasoline or diesel engines, and more horsepower in both types—92 hp gasoline, 90 hp diesel. These bigger engines provide more power for both propulsion and hydraulics without "lugging down".

EASY, FULL-POWER OPERATION Power-shift transmission with three speeds forward and reverse, plus easy power-steer and 4-wheel power brakes assure fast operation with minimum operator effort... promote a high production rate the full shift.

PROTECTED FOR LONG LIFE Sealed front brakes, complete filter protection for engine and hydraulic systems, hypoid differential with power-transfer feature, and planetary final drives are some of the many design details that will assure low maintenance, reliable service and long life.

MORE ATTACHMENTS... MORE USES The widest choice of attachments are available, including these exclusive ones: Drott 4-in-1 bucket, Wain-Roy Backhoe, Vibratory compactor, Ram Black-top spreader... also blower, "V" and blade plows, angling back-filler, back-rip scarifier, winch and others.

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COSTS WITH

NEW **5** Yd. **LIMA** LOADER

5 MACHINES IN 1!
Converts in field to
shovel, crane, dragline
or pullshovel

FLEXIBLE!
Digs, scoops, swings
and loads in
full circle

ELIMINATES
WASTE MOTION

CUTS WIDE
8-Ft. SWATH



NEW **LIMA** UNIT GIVES TOP LOADER PRODUCTION WITH SHOVEL EFFICIENCY . . .

serves as excavator, materials handler

The new Lima Loader, with giant 5-yd. bucket, moves more dirt and materials faster and more profitably.

These are the reasons—long horizontal crowding action; big 5-yd. capacity bucket; full swing versatility; high-speed digging and loading from stationary position.

NO WASTE MOTION—Powerful 9-ft., 10-in. horizontal crowding action assures maximum loading at every 5-yd. bite . . . even when handling wet materials. Bucket is completely filled without moving machine; results in less travel wear, lower maintenance and fuel consumption.

For maximum versatility, the Lima Loader is mounted on basic Lima 64 crawler type machine. It operates at top efficiency, hour after hour, from a stationary position, no time-wasting maneuvering with each load. Unexcelled full-swing digging and loading at any point of the compass means high production . . . higher profits!

Actually the Lima Loader is 5 machines in 1. It can be speedily converted in the field to a 1¼ or 1½-yd. shovel,

40 or 50-ton crane, 1¼ or 1½-yd. pullshovel, or variable capacity dragline.

Other important operational features of the Type 64 Lima Loader include hydraulically controlled bucket which raises to 25-ft., 6-in., permitting 16-ft., 10-in. clear dumping height at 18-ft. radius. The bucket tilts to 52 degrees for complete emptying, 8-ft. wide bucket, with removable teeth, cuts accurately and evenly on sloping banks as well as level ground. Independent travel, optional equipment, but recommended with loader. Torque converter matches power to digging resistance; eliminates engine stalling.

PRECISION AIR-CONTROLLED

The main and auxiliary machinery is precision air-controlled for amazingly easy operation without fatigue.

See your nearest Lima distributor today or write Baldwin-Lima-Hamilton Corporation, Construction Equipment Division, Lima, Ohio, for full information on the 5-yd. Lima Loader—the newest addition to Lima's famous line of high-quality construction equipment.

Our Seattle Office: 1932 First Avenue South, Seattle 4, Washington; Our La Mirada Office: 14120 E. Rosecrans Ave., La Mirada, California; Feenaghty Machinery Co., 112 S. E. Belmont Street, Portland 14, Oregon; Modern Machinery Co., 4412 Trent Avenue, Spokane 10, Washington; N. C. Ribble Co., 1304 North Fourth Street, Albuquerque, New Mexico; Bay Cities Equipment, Inc., 2792 Cypress Street, Oakland 7, California; Bay Cities Equipment, Inc., 1178 West San Carlos Street, San Jose, California; McGaraghan Supply Company, 529 Broadway, Eureka, California; Evans Engine & Equipment Company, 4300 - 11th Avenue, Northwest, Seattle, Washington; Smith Booth Usher Company, 2200 S. San Gabriel River Parkway, Los Angeles 54, California; Evans Engine & Equipment Co., Inc., Post Road—Box 894, Anchorage, Alaska; Faris-Moritz Equipment Co., 3790 Colorado Blvd., Denver, Colorado; Shasta Truck & Equipment Sales, South 99 Highway, Redding, California; Reno Equipment Sales Company, 1510 West Fourth Street, Reno, Nevada; Western Machinery Company, 820 North 17th Avenue, Phoenix, Arizona; Western Machinery Company, 1111 West St. Mary's Road, Tucson, Arizona; Western Machinery Company, 2300 South Main Street, Salt Lake City 15, Utah; Western Machinery Company, P. O. Box 197, 590 West 19th Street, Idaho Falls, Idaho

LIMA Construction Equipment Division, Lima, Ohio
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Among the executives of Stone & Webster Engineering Co. who recently were elected vice presidents are William R. Prang, West Coast district manager, and Donald N. McCord, an S. & W. construction manager. A member of the engineering organization since 1931, Prang has been in charge of the Los Angeles office since 1955. McCord has been with the firm for eighteen years, during which time he has supervised many well known projects including the extension to Rock Island dam and hydroelectric plant near Wenatchee, Wash.

* * *

George D. Atkinson, supervisory engineer at the Shasta field operations office of the USBR Central Valley Project, has transferred to Page, Ariz., as chief of the electrical engineering branch at Glen Canyon Dam now under construction. Succeeding Atkinson at the Shasta office is Felix Dashen.

* * *

Abbot H. Hanks, Inc., oldest laboratory of its kind in the United States, established in San Francisco 93 years ago to serve the mining industry but now mainly active in construction and other fields, has a new home in San Francisco at 1300 Sansome St. In the last year branches have been established in San Rafael and Santa Clara, largely to serve the needs of the construction industry, including foundation soil investigation, inspection of structural materials, sampling, etc. Herbert D. Imrie is president of the company.

* * *

Paul E. Shaad has assumed the duties of general manager of the Sacramento (Calif.) Municipal Utility District. He succeeds James E. McCaffrey who has retired for reasons of health. Shaad has been assistant general manager since November 1954.

* * *

John V. Spielman, supervising engineer with the Safety of Dams section of the California Department of Water Resources, has retired from the Southern California district office at Los Angeles following a distinguished career as a specialist in the design, construction and inspection of dams.

Cat DW21-PR21 units handle rock "on the double" on U. S. 10, Montana

When Albert Lalonde Company, Sydney, Montana, was awarded a \$1,537,337 contract on a four-mile section of U. S. 10 on the Interstate System, three Cat DW21 Tractors with Athey PR21 Rear Dump Wagons were purchased for hauling the rock. A. M. Stolzenburg, Superintendent, tells why: "We ran three seasons with them in rock jobs. Now that we're back in rock again, we bought some more. They're big, rugged and an easy shovel target, have a low center of gravity and are maneuverable."

Note how these features met the conditions on this job. The units had to work in limited room on benches and steep haul roads. Material handled for fill included hot rock and sandstone. On haul lengths averaging 100 yards, the units handled 275 cu. yd. an hour. At the start of the job, they worked 8 hours a day; to finish it, 16 hours a day.

New DW21 Series G now 345 HP

Now a new DW21 Series G is matched to the 22.5 cu. yd. PR21 for even faster production on the toughest jobs. Compared with the model it replaced, it has

new HP—345 (maximum output) for an increase of 8%. It also has 12% higher rimpull. This increased rimpull provides up to 20% faster travel speeds under similar haul road conditions. Equally important, the horsepower increase was achieved without any sacrifice whatsoever in the excellent torque characteristics of the Cat Super-Turbo Engine.

Get the complete facts on the Cat DW21-PR21 from your Caterpillar Dealer. Ask for a demonstration. Pick a tough job—see for yourself how this giant handles the hard work!

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

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LOAD FAST! PR21 offers a big target. Short on-stop turns of DW21-PR21 unit speed potting under shovel and work on a narrow bench. PR21's special steel withstands impact, abrasion and corrosion.

ROLL FAST! Two of three DW21-PR21 units on the job. DW21 combines high travel speed with excellent torque characteristics. The PR21 has a 22.5 cu. yd. heaped and 62,000 lb. capacity. All this adds up to fast cycles, top production.

DUMP FAST! PR21 has hydraulic hoists for quick and complete dumping of any material. DW21's hydraulic steering facilitates maneuvering. Wide-section, tubeless tires provide maximum flotation and sure traction.



SUPERVISING the jobs

William S. Hasse is supervising a \$241,488 contract for Gardner Construction Co. Located in Pueblo County, Colo., the job consists of a bridge and approaches between S. H. 96 and 50. Carpenter foreman is Paul Hurlburt. Under way since July, work will be finished in October.

* * *

Richard Babler is acting as superintendent on a \$139,119 award to Babler Bros., Inc., for 4.9 mi. of grading and surfacing on the Sand Creek-Silver Lake road in Klamath County, Ore. Jack Robinson is clearing subcontractor. Now nearing completion, the job has been going since the first of July.

* * *

Bill Paukovich, superintendent, and Bill Thomas, foreman, are key men working for Brannan Sand & Gravel Co., successful bidder for surfacing and grading on 1.8 mi. of highway in Jefferson County, Colo. Bid price was \$377,419. A 90-day job, work is now in the finishing stage.

* * *

Bill Robbins, superintendent for Givens Construction Co., is handling a \$168,372 contract covering grading, surfacing, draining and structure on 2 mi. of the Apache Trail highway near Globe, Ariz. Scheduled for November completion, job started in August.

* * *

Larry Mahan is superintending a \$275,216 job for S. Birch, Inc., and S. Birch & Sons near Lincoln, Mont. Assisting Mahan as foremen are Bill Ille and Larry Heilman; also Al Morton, crusher foreman, and George Gulbranson, plant foreman. The 16.5-mi. stretch of grading and surfacing on the Ovando-Rogers Pass road in Lewis and Clark County will be finished this month.



M. E. PETERSEN, project manager for Yuba Consolidated Industries, Inc., is in charge of the steel fabricating work at Trinity Dam. Located near Redding, Calif., this huge earth-fill dam is being built for the Bureau of Reclamation under a prime contract with Trinity Dam Contractors, a joint venture firm.

Thomas N. Beall, project manager, and Frank Anderson, superintendent, are key men on construction of miscellaneous projects at the National Reactor Test Station in Idaho. The \$166,330 contract for the work is held by Arrington Construction Co. Other supervisors are Cleo Ross, carpenter foreman, and Andrew Gladney, railroad. Work started here in mid-June and according to Beall will be finished early in December.

* * *

W. W. Hudson is project manager, and George Eckart, superintendent on a \$4,912,329 recent award to Morrison-Knudsen Co., Inc., for 4 bridges, drainage facilities, grading and surfacing on 7.5 mi. between Myers Flat and south of Dyersville in Northern California. Three other important contractor men are Gordon Robinson, project engineer, Wayne Crawford, office manager, and Jim Cheska, master mechanic. M-K started work in July; will finish the fall of 1960.

M. M. Braund, general superintendent, Robert Spykehoven, chief engineer, and Ray Farmer, general carpenter superintendent, are key men on construction of three buildings for the U. S. Air Force at Clear, Alaska. This is a \$3,595,049 contract being executed by the joint venture Patti-MacDonald Construction Co. and Morrison-Knudsen Co., Inc., and is for surveillance scanner buildings and passageway of concrete and structural steel, and H. H. Robertson's insulated metal siding and roofs. Structural steel superintendent is William Wickstrom. Ralph Born is labor foreman. Office manager for the large project is David Fields. The job will be finished next July.

* * *

Robert E. Smith is project manager for Cherf Brothers, Inc., and Sandkay Contractors, Inc., successful bidder at \$2,155,892 on 1.2 mi. of grading, surfacing, bridges and overpasses in city of Tacoma, Wash. The job has been under way since June, with Les Barnes in the shift-foreman spot, and Ross Saxton mechanic foreman.

* * *

Ed Surufka, superintendent for Charles MacClosky Co., heads the job personnel on a \$416,621 contract to widen bridge and construct



Surufka Sell Brown

approaches at East Tracy overhead in San Joaquin County, Calif. The following are acting as foremen: Reuben Sell, concrete; Don Brown, equipment; Stan Howell, carpenter, and Lester Johnson, mechanic.

* * *

T. G. Moore is supervising a \$285,786 project in Quay County, N. Mex., for Armstrong & Armstrong, the successful bidder. Foremen on the job, which is for 8.6

Some useful tricks in pile-driving

Here are ingenious solutions to the problems of driving 60' long, 12" H-piles for bridge piers, in an area where soft ground made it necessary to eliminate driving guides so as to reduce weight. The rig consisted of a Lima crane and Vulcan #1 hammer, with a Jaeger 600 cfm rotary air compressor to supply the wallop.

1: USE CAGE TO STABILIZE FREE-HANGING HAMMER:

Weight of heavy pile driving guides was eliminated by enclosing the hammer in a cage equipped with a collar to slip over the top of the pile.

2: POSITION PILES WITH NOTCHED BEAMS, HELD BY BLOCKS:

Piles were placed between two beams laid along long members spanning the pile pit and held by large concrete blocks. Steel bars in the beam notches maintain correct alignment.

3: WHEN A BATTER IS DESIRED, USE FREE HAMMER TO TILT PILE:

Weight of hammer, on top of pile, tilts pile to desired angle while bars hold lower end of pile in place.

4: USE STEADY, LOW-COST JAEGER AIR

On the above job, piles were driven to point where 35 blows were needed to drive 1". Depths varied from 35' to 105'. A Jaeger "600" rotary compressor was used because it maintains steady air pressure under the

widely fluctuating demands of pile driving, and produces each 500 cu. ft. of that air with less than 1 lb. of fuel. Full load speed is only 1700 rpm compared with 1800 rpm in all other rotaries which use the same

GM 6-71 diesel engine.

Ask your Jaeger distributor about these efficient rotaries for your work — or send for latest catalog. The Jaeger Machine Company, 233 Dublin Avenue, Columbus 16, Ohio.

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THE SAWTOOTH CO.	Boise and Twin Falls, Idaho
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CENTRAL MACHINERY COMPANY	Great Falls and Havre
WORTHAM MACHINERY CO.	Cheyenne, Wyo.

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mi. of grading, surfacing, and related work on U. S. 66, are T. C. Carr, bridge; Albert Sauls, grading, and Paul Taylor, crusher. Under way since July, work will be finished the end of the year.

* * *

H. W. Haneke, superintendent, is in charge of a \$648,590 recent award to F. R. Hewett Co. for surfacing and asphalt paving on 12.5 mi. of P.S.H. 3, from Loon Lake to Cottonwood Creek in Stevens County, Wash. Other superintendents are H. W. Wachtor and R. M. Ward, crusher, and William Zachow, truck. The job has been under way since June and will be finished in November.

* * *

W. B. Mabry, general superintendent for B. L. Metcalf, successful bidder on erection of a 4-story pour-in-place concrete hospital at Pacoima, heads the contractor personnel on the \$1,621,344 project. Under way since April, work will be completed in a year's time.

* * *

Marshall H. Bell is Davis & Butler Construction Co.'s superintendent on work covered by a recent contract awarded the company at \$1,669,358 for earthwork, pipe and structures for Bonham and Cottonwood pipeline, a part of the Collbran Project in Colorado. First steps in construction were taken last June. Working the summer months only, contractor expects the job to be finished about September 1961.

* * *

George Ongman, general superintendent, Hugh Stephens, job accountant, and Joe Kremen, superintendent of excavating and demolition, comprise the top personnel working for MacRae Brothers Co. on demolition of buildings, rerouting of utilities, excavation for freeway, and construction of two reinforced concrete overcrossings on the Seattle Freeway. Work on this \$594,506 undercrossing project started last May; will be finished in March 1960.

* * *

E. F. Lambert, project manager, and W. W. Winger, superinten-

dent, are key men working for Stearns-Roger Manufacturing Co., which is constructing an exhaust duct and stack system for the Flight Engine Test Facility at the National Reactor Testing Station, Idaho. Scheduled for completion next March, construction started in June.

* * *

Richard Van Weelden, job superintendent for Givens Construction Co., has charge of a grade, drain and surface job on the Flagstaff-Valle Airport highway northwest of Flagstaff, Ariz. Givens received the contract on a low bid of \$513,320, started construction in August, and will be finished this November.

* * *

J. K. Riggle, project manager, heads the list of contractor personnel constructing two pumping plants, earthwork, and lining and structures for 8 mi. of laterals and drains on the Columbia Basin Project in Washington. Superintending for the Triangle Construction Co. and George L. Thompson, the prime constructors, is Merle W.

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SAFE

Complete detonation . . . no unexploded caps or powder. Cannot be set off by friction, sparks, ordinary shock; even a direct hit by lightning did not detonate Primacord.

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Contacts every cartridge, even in deck loads. Initiates entire charge almost simultaneously. Can be hooked up to fire front line first, giving relief of burden and better fragmentation.

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Lowest overall cost because you get full efficiency from the explosive—no waste; and better fragmentation with less powder. Only one cap required—no cap in the hole.

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Have you used equipment to sell, or do you need used equipment?

Your ad in the classified section of WESTERN CONSTRUCTION will reach 18,000 construction men in the West, and at a cost of only \$15.50 per column inch.

Send your copy today, enclosing check, to WESTERN CONSTRUCTION, 609 Mission Street San Francisco 5, California. (If proofs are required, the closing date is the 5th of the preceding month of publication, or the 10th without proofs).

Boettner. George H. Cummins is field engineer. Supervising concrete operations under a subcontract is **Howard L. Fosnot**.

The major earthwork on the project, known as Wahuake Branch Canal, is subcontracted to **George W. Lewis Co.**, whose operations in the area are managed by **R. C. Lewis**. General foreman for Lewis is **Johnny N. Hyatt**. Excavation for structures, backfill, and pipe-laying is subcontracted to **Johnson & Mitchell**. **Dave G. Johnson** supervises their work. Reinforcing steel will be furnished and placed by **Columbia Basin Steel & Iron**, with **Dick Schafhauser** acting as field foreman.

Job started June 23, and according to **J. K. Riggle** of the Triangle company, it will be finished about February 1960. Contract price, \$589,262.

* * *

E. L. White, general superintendent of construction and project manager for **Sully-Miller Contracting Co.**, is in charge of a state highway contract awarded this firm in the amount of \$1,186,166. **John A. LaComb** is superintending the job,



Dumas LaComb White Gilmore

which consists of grading, paving and widening 6.5 mi. of S. H. 2, at Los Angeles County line in La Hara and Fullerton, Calif. Assistant job superintendent is **Ed Gilmore**, and **M. K. Gatlin** is field mechanic. The office is in charge of **R. I. Dumas**. Work started in July and is expected to run till June 1960.

* * *

William "Red" Taylor is Sletten Construction Co.'s superintendent in construction of overpasses over the Great Northern Ry. and the Northern Pacific in Helena, Mont. The \$569,389 award is for dual

810-ft. bridges over the G. N. mainline and N. P. yards. **Thomas O'Brien** is carpenter foreman on the project, which has 26 concrete bents, 38 ft. high; 14 prestressed spans (longest 60 ft.); 5 spans, plate girders (longest 177 ft.). Under way since July, project will be finished next July.

* * *

J. D. Rinker, superintendent, with the assistance of **Claude L. Stuart**, foreman, is in charge of a \$173,294 contract being executed by **Olympia Oil & Wood Products**

Co., Inc. Site of the work is from Pacific County line to Joe Creek in Grays Harbor County, Wash., and consists of 11.8 mi. of grading and surfacing, and paving with asphaltic concrete. A 1-year undertaking, the job will be finished July 1960.

* * *

Merrill Dubach is supervising a \$1,010,234 recent award to **Gordon H. Ball and Gordon H. Ball, Inc.**, covering grading and PCC paving on 5.2 mi. of highway east of Winters, Calif.



contractors' best friend

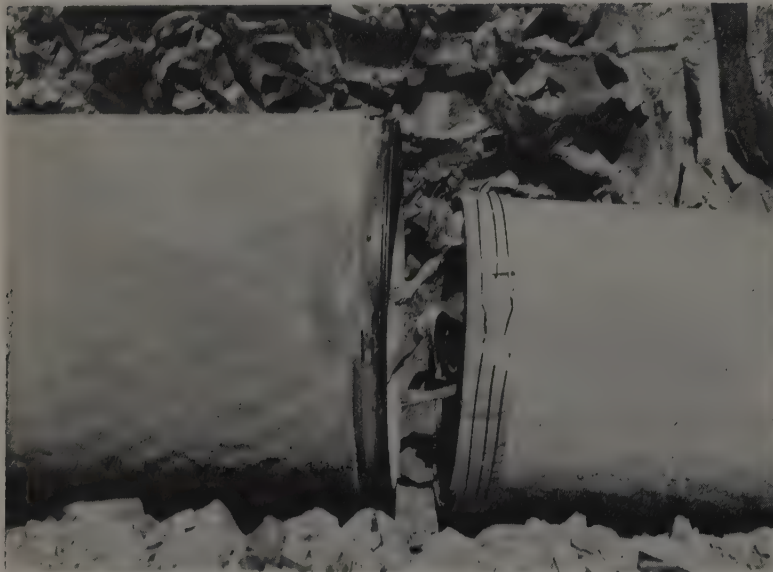
You've got a tiger for heavy work on the job when you rig with **USS Tiger Brand Wire Rope**! Every rope is precision-engineered to stay on the job longer and cut down-time to the minimum. Whether it's for your clamshells, scrapers, 'dozers or other equipment, your **Tiger Brand** supplier has the right rope for the job. Shouldn't it be on your jobs? It's the world's largest-selling wire rope! Call your **Tiger Brand** supplier now... and save money job after job!

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**Columbia-Geneva Steel
Division of
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CONSTRUCTION BRIEFS



New steel pipe joint for San Diego line

A FASTER and more economical method of joining large diameter steel water pipe, by employing a rubber gasket joint instead of field welding, has been developed by engineers at Kaiser Steel's Fabricating Division plant at Fontana, Calif.

The rubber gasket joint can be used in coupling pipe ranging from 36 in. to 120 in. in diameter or larger. The joints permit rapid installation in the field and provide a watertight coupling which will give unlimited years of service without maintenance.

The body of the joint is a steel spigot ring which has been expanded and sized. It is about $4\frac{1}{2}$ in. wide and is welded onto the spigot end of the steel pipe section at the fabricating plant. The opposite end of the pipe section is belled by placing the end of the tube over a mandrel which has radius sections or shoes that are thrust against the inside of the tube by a tapered

wedge operated by a hydraulic ram. This gives an equal pressure around the circle of radius shoes and forms a precise, truly concentric bell.

Rubber gasket joint pipe, in diameters ranging from 66 in. to 75 in. is now being installed in the 60-mi. water transmission line under construction for the San Diego County Water Authority in Southern California. The 32-ft. 15-ton sections are being laid by the general contractor, Young & Anderson, of Brea, Calif., who has contracts for laying 29 mi. of steel pipe on this job.

Recently, nearly 26,000 ft. of 54-in. Kaiser Steel rubber gasket jointed pipe were laid for the Terra Bella Irrigation District in Southern California. The new pipe joining method permitted the contractor, Peerless Concrete Pipe Corp., Santa Ana, to install up to 1,320 ft. of pipe in a 8-hour day.

Installation of pipe employing the rubber gasket joint is relatively

easy. First, the gasket is positioned on the spigot end of the joint after the gasket seat has been cleaned. Next, the inside of the bell of the section already installed is cleaned and coated with a layer of vegetable oil soap to provide lubrication for assembly of the joint inside the bell.

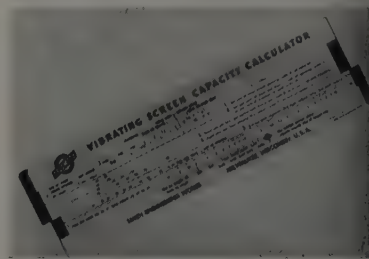
The spigot end of the new pipe section is then inserted into the joint and guided into position. After inspection, mortar is applied to the inside area where the sections join to provide a smooth surface to the water flow. A similar protective coating is applied to the outside area of the joint.

In the photograph, note the paper and three bands of steel strapping used to contain the mortar placed on the outside of the joint.

Slide rule for vibrating screens

Smith Engineering Works, manufacturer of Tel-smith equipment, is offering a slide rule to figure vibrating screen capacities.

This handy slide rule will help an operator select and buy the best



and most economical size of vibrating screens to suit his particular conditions. It takes into consideration the kind of material to be screened, size of screen openings, percentage of oversize in the feed, percentage of feed less than one-half size of screen openings, whether top, second, or third deck, shape of screen openings, and screen slope. This slide rule gives you, in a few seconds, tons per hr. per sq. ft. through screen cloth and capacity of any size of screen.

To get this free slide rule, write Smith Engineering Works, Milwaukee 1, Wisconsin, on your letter head, stating your position.



Horizontal shoring you can depend on!

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Profit-thinking architects, engineers and contractors from coast to coast have learned through experience that Beatty-Pecco Horizontal Shoring means *dependable results*. Time after time, job after job . . . perfect concrete slab pours. Quality steel throughout. *Engineered* to reduce time costs — and increase safety and stability.

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TECHNICAL DATA: Permissible spans: 8'9" to 27'7"

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New — heavy duty V-800 Horizontal Bridge Girder for spans from 24 ft. to 84 ft. — now available.

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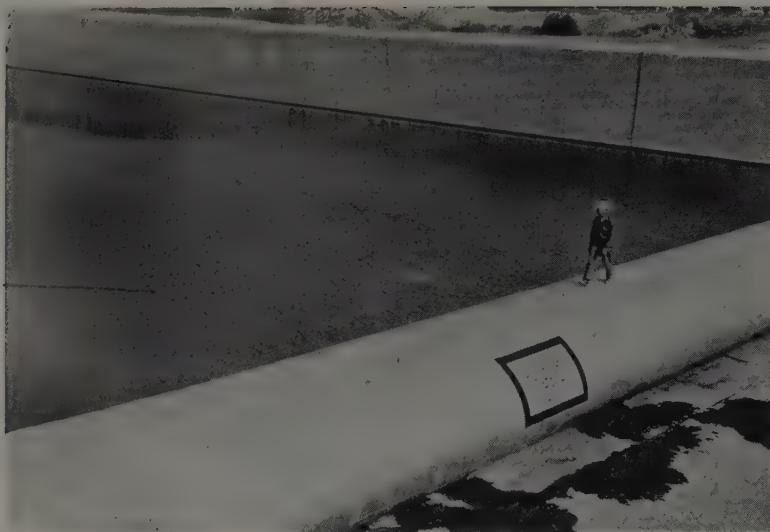
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. . . for more details, circle No. 51 on Reader Service Postcard



This dam collapses on purpose

MOST DAMS are built to control floods and store water, but The Firestone Tire & Rubber Co. has manufactured and installed in the Los Angeles River an unusual structure designed to be collapsed at the first indication of flood danger.

This unique dam—a giant nylon bag coated with neoprene—was developed to serve dual requirements of the Los Angeles Department of Water & Power in providing the city with water and of the U. S. Army Engineers in protecting the city against floods.

For many years the department had maintained a wooden dam at this location to divert Los Angeles River water into nearby basins, where it seeped into the ground, raising the water-table. The water was later recovered by pumping.

During winter months, when flood danger is imminent, the dam had to be removed to prevent the river water backing up and overflowing its banks. During this period, the flow could not be diverted, resulting in the loss of valuable water which ran off into the Pacific Ocean.

The Firestone dam can be left in place the year around. It can be collapsed in 10 min. should flood danger arise. As soon as a flood recedes, the giant bag, which is 150 ft. long and 8 ft. in diameter, can be inflated again by pumping water into it.

It takes about 25 min. and 50,000 gal. of water to inflate it to its

maximum height of 8 ft.

So huge is the balloon that it had to be constructed in sections. No machinery exists which is large enough to vulcanize such a giant piece of rubberized fabric.

Firestone made the dam in 30-ft. sections which were later cemented together to form one enormous piece. Loxite, an adhesive developed by the rubber company to

patch rubber life rafts, was used to cement the sections together.

Constructed of two plies of nylon fabric coated with a heavy "skin" of neoprene, the dam is bolted to the concrete bottom and retaining walls of the river.

Now that the practicality of the dam has been determined, it is expected that other installations will be made in the area.

Books compare equipment

A SET OF TWO books, called Construction Equipment Encyclopedia, are being published in order to provide contractors with a handy comparison of construction machines made by various manufacturers. The first volume, now available, is devoted to Clearing, Earth Moving, and Tractors. The second volume, which will be ready in a month or two, will cover Grading, Paving, and Building Equipment. The books present specifications on equipment in parallel columns for easy comparison.

A group of members of the Idaho branch of the Associated General Contractors organized the company, Phillip Heppner, Inc., which is editing and publishing the books.

For a free brochure which gives all the details, including the tables of contents of both books, use the Reader Service Card in this issue.

... Circle No. 149

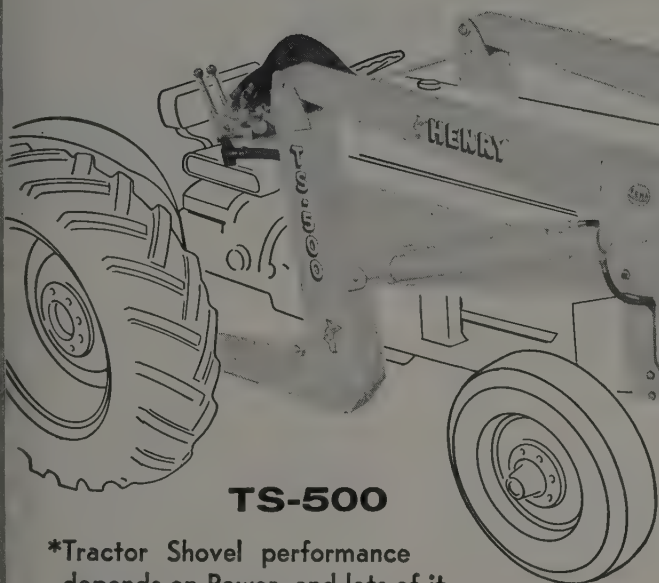


BURNING THROUGH CONCRETE WALLS

A dramatic process known as powder-cutting is speeding a remodeling project at Huntington Memorial Hospital in Pasadena, Calif., by slicing through reinforced concrete walls 16 in. thick. The process, developed by Linde Company, Division of Union Carbide Corp., employs a special water-cooled torch which produces a fantastically hot flame of up to 12,000 deg. F. The torch combines an ignited mixture of oxygen and iron powder and is cutting 9 x 5-ft. doorways in the thick concrete at the rate of 8 sq. ft. per hr. The powder-cutting process eliminates the noise, vibration, and dust that might have endangered patients and critical instruments had conventional demolition methods been used. The concrete cutting job is being handled by Concrete Flame Cutters, Inc. of Burbank for The William Simpson Construction Co., general contractors. The architects are Anthony Thormin and Associates.

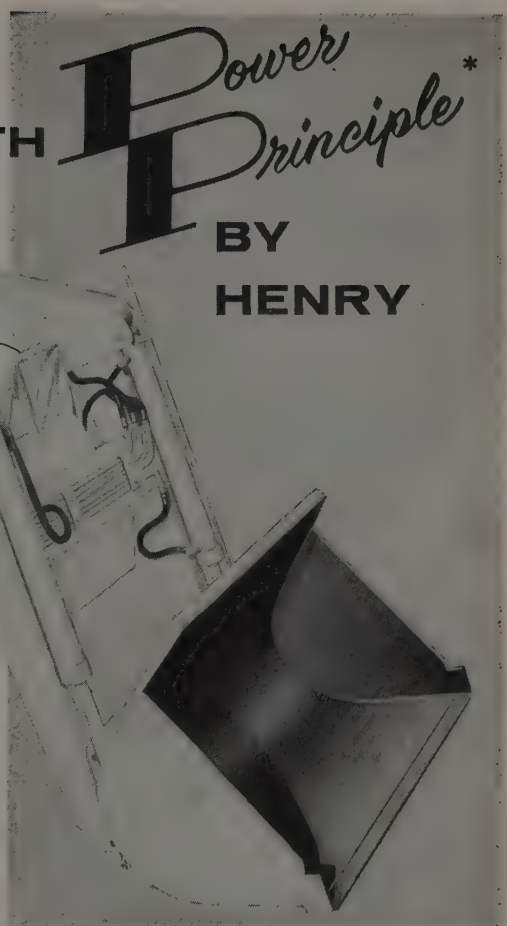
INCREASE PROFITS WITH

**Power
Principle***
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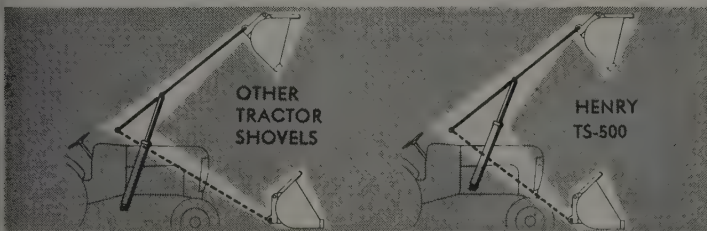
TS-500

*Tractor Shovel performance depends on Power, and lots of it. POWER PRINCIPLE design puts the power at the top of the lift, through the expert application of a basic leverage principle.



2 IMPORTANT REASONS WHY HENRY POWER PRINCIPLE MEANS MORE PROFIT FOR YOU

1. The HENRY TS-500 has more lifting power for greater job efficiency.
2. The bucket is kept closer to the tractor at ground level, preventing undue strain on the tractor's front axle, for dependable operation.



MARK IV

with Power Principle
The HENRY MARK IV is the perfect companion for the TS-500 to provide maximum profits for a wheel tractor operation.



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Ferris-Killion Implement Company
Great Falls, Montana

The H. C. Shaw Company
Stockton, California

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Fresno, California
Phoenix, Arizona

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

"SO WE LUBRICATE IT WITH LUBRIPLATE"



says: BAUER-SMITH DREDGING CO.
of Port Lavaca, Texas

"We cannot afford to take chances on the lubrication of the gears that drive the cutterhead of our dredge "SHARY" so we use LUBRIPLATE No. 4 in the gear case. This husky unit operates semi-submerged. It is the biggest gear drive ever built by LUFKIN. We also use LUBRIPLATE No. 630AA exclusively for general greasing aboard the dredge."

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LUBRICANTS WILL
IMPROVE ITS OPERA-
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THE MODERN LUBRICANT

... for more details, circle No. 53



Fast forming for air building

A COMMON CONSTRUCTION tool, the prefabricated concrete form, has helped to solve one of the nation's worst dilemmas: in-flight plane traffic control.

The patented forms were used by J. H. Pomeroy & Co., Inc., of San Francisco in building the nation's first Air Route Traffic Control Center building at Fremont, California.

Construction speed was vital so Project Manager Henry Schultheiss set the job up on a crash construction schedule.

One of the worst bottlenecks in the job was over 3,000 cu. yd. of concrete, which was called for in a large basement, in floor slabs, and in ultra-heavy walls. While the walls are thick and rectangular, they are very badly cut up with electric conduit installations, block-outs, and other things which impeded with over-all speed.

Schultheiss gave serious thought to setting up a carpenter yard and building his own forms from plywood, but after careful study he went instead to Symons Clamp & Manufacturing Company's West Coast office in nearby San Leandro. His best economic solution was the rental of 20,000 sq. ft. of forms. The complete Steel Ply line was used, including 3, 4, 6, and 8-ft. panels—all 2 ft. wide—plus a complete line of fillers, inside and outside corners, and ties.

One of the hardest things to form was a built-out corble, or brick haunch which juts out from the basement walls below ground line. It was decided to form them by building the haunches out of plywood and fastening them to the prefabricated panels at the proper point.

There was not a single failure of form ties which held up under

tremendous hydrostatic load pressures. For example, the crews used the form panels up to 16 ft. high and placed the entire 18-in. thick wall at such a height in about 4 1/2 hr. The ties had 2-ft. spacing horizontally and 1-ft. spacing vertically. There is no perceptible deflection in any of the stripped walls.

At the peak, a force of only 20 carpenters was used. The form panels were erected fast, went into place precisely and accurately, and stripped easily despite the fact that most stripping had to begin at the bottom where the forms were actually under tension.

Schultheiss estimated that the forms saved a month's construction time over other methods.

Project personnel

For J. H. Pomeroy & Co., H. Schultheiss was project manager. Oscar Bramblett was assistant project manager, and Charles F. Thompson was project engineer. Brewster Ferrel is General Service Administration construction engineer. Paul R. Rowland is Federal Aviation Administration resident engineer.

Kaiser completes steel plant expansion

COMPLETION of a \$2,000,000 expansion of facilities at Kaiser Steel Fabricating Division plant, Napa, Calif., has been announced. The 18-month expansion doubles the plant's pipemaking capacity and makes it one of the largest plants in the world for manufacture of line pipe for oil and gas transmission.

How to cut seepage from storage ponds

LTN
This sounds like bentonite. Etc.

THE 4,000,000-gal. pond system on the new Indian Bend Golf Course just north of Scottsdale, Ariz., was losing water through seepage at the rate of more than 600,000 gal. in every 24-hr. period. Between 15% and 20% of the water, which was pumped from wells into the pond system, disappeared into the earth every day. The pump was working 10 hr. out of every 24 just to stay even. Then the owners added to the pond 4,000 gal. of a viscous, milky liquid from two tank trucks. They stirred it into the water with a small motor boat until the pond resembled a huge saucer of milk. Then they sat back and waited. By the following evening seepage had dropped 60% to a rate of only about 240,000 gal. per 24-hr. period.

The milky chemical compound used is SS-13. This new chemical seepage stopper can be used effectively on contractors' earth water storage ponds. In the case of Indian Bend Golf Course, a \$4,500 job, water savings will cover the cost of treatment within six months — with additional savings in electricity and wear and tear on the pump. Cost of treatment varies from job to job because of varying problems of labor and location. Laboratory tests made with soil samples from the bottom of the pond indicated a possible seepage reduction of 94%.

SS-13 was developed by George Brown, owner of Brown Mud Company of Torrance, Calif., and his associate in the same company, J. Harlan Glenn. Both men are experienced chemists and specialists in chemistry pertaining to soils. Brown Mud Company makes drilling mud for use in drilling oil wells. Brown, Glenn and Harold L. Bone, Phoenix, Arizona, who own the SS-13 Sales Company, are conservative in their claims in spite of successful tests made by Arizona's Salt River Project. Everything, they say, looks good so far in canal treatment, but the section near Phoenix, Arizona, being tested has only been treated for eight months. However, other tests behind them show no loss of effectiveness for more than eighteen months.

why it's so important to check Lippmann before you buy any portable crushing equipment

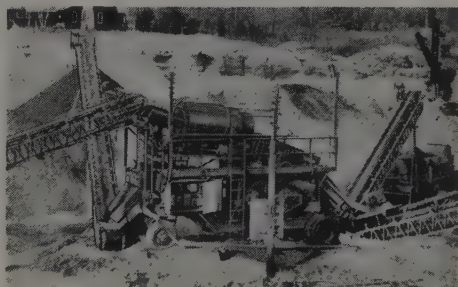


LIPPMANN PORTABLE CRUSHERS

give you up to 28% more jaw crushing surface, 25% greater stroke — than competing units of same primary feed capacity. That's your answer to higher production, a real bidding edge, and a good profit on job after job. Single or 2-stage; capacities to 600 t.p.h.

LIPPMANN WASHING PLANTS

produce up to 33% more ton-per-hour than other "comparable-size" makes, according to side-by-side comparisons in the field. Reasons: up to 28% more effective screen area ... up to twice the scrubber surface area. Two sizes, capacities to 130 tons per hour.



LIPPMANN PORTABLE CONVEYORS,

with exclusive "wrap drive" and improved weight distribution, reduce allowable wheel-base for broader-base stockpiles. You build up to twice the stockpile volume for any given length of boom! Standard sizes: 30 to 80 ft.

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... for more details, circle No. 54 on Reader Service Postcard

MASTER MECHANIC

New way to clean equipment

A new approach to equipment cleaning and maintenance is offered by a high-pressure gun now on the market. Called the X-O Kleen Gun, it is operated by diesel or gas engine exhaust and requires no electricity or piped water.

Being highly portable—the complete kit weighs only 15 lb. and



can be carried in one hand—the gun goes wherever the equipment goes, providing on-the-spot cleaning to speed maintenance and cut down-time.

It consists of 14 ft. or more of flexible stainless steel tubing fitted with a specially designed cap; this cap adapts to any size exhaust stack, from the largest tractor down to an ordinary pick-up truck.

The gun, which sells for around \$100, is distributed by Seaboard Sales of Washington Inc.

... Circle No. 153

Medium size welder

General maintenance and repair shop needs were both in mind when the Miller M-295 welder was designed. Result is a versatile and low cost 40-v., 60% duty cycle at 200 amp. machine that fills the gap between the very small and the very large welders long available.

Features include: fast, precise current settings through moveable shunt; two ranges of from 25 to 115 and 80 to 295 amp.; high open circuit voltage; forced draft cooling;

Cam-Lok connectors and heavy-duty "On-Off" panel switch; attractive baked enamel case with rust preventive prime coating; 25¼-in. overall height.

Wired for either 230 or 460-v. service, the M-295 is also available with power factor correction, special voltages and complete accessory package including skids and either steel- or rubber-tire running gear.

Complete specifications will be sent promptly upon request to Miller Electric Mfg. Co., Inc.

... Circle No. 154

Ceramic hardfacing material

A new process for hardfacing—spray-welding a ceramic powder—has just been announced by Republic Hardfacing Corporation.

According to the manufacturer, spray-welded Cermet stops the burning effects of exhaust gases, erosion, "necking," and corrosion on engine valves. It actually fuses with the parent metal, will not crack or spall under severe shock, heat, wear, or abrasion. In photo of two valves subjected to intense heat, the Cermet-protected valve at left shows no wear.

Severe burning and erosion can destroy an entire valve head. By completely covering the head surface with Cermet, the manufac-



turer claims the valves get all-round protection—outlast and outperform any regular valve on the market.

By using the same process to spray-weld other hardfaced alloy powders, you can also rebuild a variety of worn parts such as spindles, transmission shafts, blades, dies, and pump sleeves.

... Circle No. 155

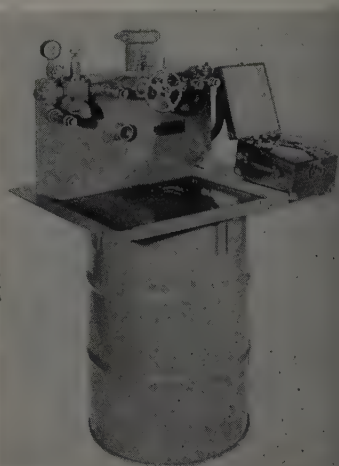
EMSA chapter notes

THE REGULAR monthly meeting of the San Francisco Bay Area Chapter of the Equipment Maintenance Supervisors Association was held as usual on the first Tuesday of the month at Omstads in San Leandro. James G. Fagan of the American Manganese Steel Division of American Brake Shoe Co. gave an interesting talk on alloy hardfacing as used in the construction industry.

Hydraulic system test bench

A low cost hydraulic system test bench which can be used to check repaired parts in the shop and trouble-shoot operating conditions in the field is now available.

Designed by Schroeder Brothers, McKees Rocks, Pa., manufacturers of hydraulic, electrical and pneumatic equipment, this double-duty



"Barrel Bench" is supplied either as a built-up unit or in component parts for customer assembly.

The bench consists of a worktable equipped with strainers, suction filter, micron filters and drains, with which a standard 55 gal. drum can be used as a reservoir.

Instrumentation is provided by a portable circuit tester measuring flow, pressure and temperature.

A pump drive unit, driven by either electric motor or internal combustion engine, completes the bench test assembly. Circle number for more information.

... Circle No. 156

NEW LITERATURE

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

Compressed air filter catalog

An 8-page booklet recently issued by **Logan Engineering Co.** describes the company's Aridifier, a mechanical cleaner for use on compressed air and gas lines. Installed between compressor and air tool the cleaner removes 92% or more of oil, moisture and dirt from the compressed air. Featured in the booklet is a cutaway view of the cleaning unit showing the four counter-rotating rollers which expel oil and dirt from the air stream by centrifugal force. A number of applications for the new unit are shown. Booklet also provides several tables of data on air requirements, sizes, dimensions and pressures. . . . Circle No. 157

Manitowoc shovel catalog

An 8-page catalog describing the new Manitowoc Model 3100, 2½-ton shovel has been issued by **Manitowoc Engineering Corp.** Features discussed include disc type clutches, forced air ventilation, multi-stage torque converter, simple power design involving only 14 gears and unions, and self removing counterweight. . . . Circle No. 158

Excavator bulletin

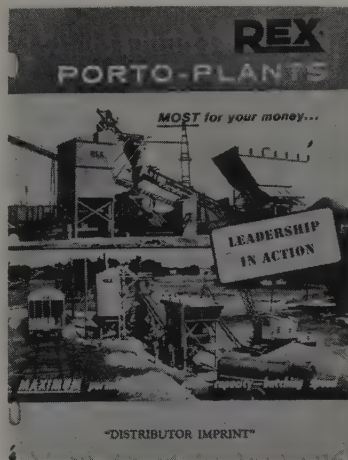
Rugged construction of the Traxxator lift mechanism is shown in perspective drawings which illustrate a new 8-page booklet titled "Designed for Action" recently issued by **Caterpillar Tractor Co.** Other features of the Traxxator are described in the bulletin include speed and dependability, operator ease, visibility, bucket indicators, hydraulics, tilt-back, and stability. The two-color booklet also covers side-dump buckets and the three sizes which make up the line. . . . Circle No. 159

Engine catalogs

Two colorful catalogs covering the **Allis-Chalmers G-226 and G-29** engines and power units have been published by **Allis-Chalmers Corp.** Both catalogs tell the design, engineering, and performance capabilities of the units with the help of numerous illustrations including a center spread devoted to a cross section of the engine with descriptive notes. . . . Circle No. 160

Portable batch plants

Complete information on **Rex Porto-Plant Model 16125** and their components is provided in a new



bulletin issued by the **Chain Belt Co.** Information covers portable aggregate bins, portable cement storage bins, batching equipment, portable belt conveyors, screw conveyors, and control systems. . . . Circle No. 161

Bituminous plants

Eight page catalog sections with detailed specification supplements have been issued by **Pioneer Engineering Works** covering six models of bituminous and batch mix plants. Included is the **Pioneer Model 51** for 40 to 60 yd. production per hour, **Pioneer Model 81** of 60 to 80 yd. per hour capacity, the **Model 102** completely mobile plant, the **Pioneer auto batch plant** of 4,000 to 5,000 lb. capacity, the **Pioneer Model 6B** auto batch of 6,000 to 7,500 lb. capacity, and the **Model 425** stabilizer plant. The literature includes action photographs, detailed drawings of typical set-ups, and full specifications. . . . Circle No. 162

Wire rope brochures

Seven products of the **Wire Rope Division of Jones & Laughlin Steel Corp.** are described in five separate 4-page pamphlets. Products include **Centerfit** wire rope, **cable laid slings**, **PlastiKore** and **SpringKore** wire rope, **JalKlamp** and **JalLoc** slings, and **oil field manila**

rope. Each of the two-color pamphlets describes the various applications for which the product is best suited, and provides specifications for strength and size in table form. A brief guide on how to order wire rope is also presented. Proper application of the products is stressed in support of the national "Safety in Lifting" program now being carried out by **J. & L. Wire Rope Division**. . . . Circle No. 163

Dump trailer catalog

A 12-page catalog, "Let's Talk Trailers," has been issued by **Galion Allsteel Body Co.** to describe its line of trailers, hoists, and accessories. Among the equipment options described are a variety of light, medium, and heavy duty bodies and hoists, plus a wide selection of chassis designs, suspensions, and hydraulic mounting kits. Covered are both smooth body and corrugated types, which include a number of exclusive design features. Among the special hoist features covered are heavy duty hydraulic pumps, cylinders of advanced design, double acting wiper rings on each sleeve, and extra wide bearing rings at top and bottom of cylinder sleeves. Construction details and accessories also are covered. . . . Circle No. 164

Hot weather concrete

Nine vital steps for producing quality concrete in extreme hot weather are outlined in a 1-page publication of **The Master Builders Co.** Recommendations cover before, during, and after placing operations and explain preparation of forms, erection of shades, ordering and scheduling, ready mixed concrete, protection of concrete during finishing, curing and care of test cylinders. The guide is printed on heavy paper for durability, and is suitable for posting at job sites. . . . Circle No. 165

Vibrator catalog

New catalog sheets covering the complete line of concrete vibrators, parts, and accessories, as well as external vibrators to speed dry material flow, have been published by

KEEP KEYS ON THE JOB SITE...AND SAFE, TOO!

No more lost time because of lost keys! With a KEY-SAFE, equipment keys can be kept safely locked-up at the job site... instantly available when needed.



Extra-long shank fits over any stationary object... such as steering wheel. Aluminum box is double-walled and ribbed for extra strength.

THE MALLOY CO.

P. O. Box 3267, Dept. R
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1 KEY-SAFE \$4.95

3 or more \$4.75 each

Quantity discounts also available on orders of 6 or more units.

Please send me _____ KEY-SAFE

NAME _____

ADDRESS _____

CITY _____ STATE _____

Enclose check or Money Order. We pay Parcel Post. NO C.O.D.'s PLEASE.

Money back guarantee.

... for more details, circle No. 56

the Viber Co. The line includes pneumatic, electric, and self-contained gasoline powered concrete vibrators, electric external vibrators for bin mounting, as well as pneumatic ball type units for moving bulk material.

The company also has published an informative 8-page booklet on the operation and maintenance of external vibrators in the manufacture of concrete pipe, subjects covered including mounting, arrangements, operation specifications, design and construction, clamping arrangement, and maintenance.

... Circle No. 166

Scraper brochure

Engineering features and operating advantages of the TS-260 motor scraper powered by the new AC 16000 diesel engine developing 230 hp. are described in a 16-page 2-color brochure issued by Allis-Chalmers Manufacturing Co. Pictures of the scraper, its power plant, power train, and many of the important complements are contained in the booklet.

... Circle No. 167

Tractor catalog

All major components of the HD-6 crawler tractor are illustrated and described in detail in a new sixteen page color catalog issued by Allis-Chalmers Mfg. Co. The booklet includes a 2-page cut-away drawing of the entire tractor, listing twenty particular features of this model. The HD-6 is powered by a 66.5-net hp. diesel engine and has a gross weight of 12,600 lb. The catalog includes specifications as well as pictures and descriptions of accessories and equipment.

... Circle No. 168

Motor graders

Caterpillar Tractor Co.'s three motor grader models Nos. 14, 12 and 112 are described in an 8-page booklet titled Top Performers. The biggest of the line is the No. 14 with a 150-hp. turbocharged engine. The No. 12 has 115 hp., and the economy No. 112 is rated at 75 hp. The booklet also covers the optional Preco control attachment which functions like an automatic pilot in maintaining the desired blade slope.

... Circle No. 169

Traffic control devices

Use of aluminum for various types of traffic control signs ranging from street markers to giant

Be a scaffolding expert

Two cleverly written cartoon-illustrated booklets titled "Be Your Own Scaffolding Expert" have been issued by Tubular Structures Corp. of America. Totalling 26 pages, these two booklets comprise a course of instruction on scaffolding and its uses. Starting out with simple structures and explaining how they are put together, the information progresses to complex moveable cantilevered scaffolds and interior construction of all types. Presented in a light vein, the material is easy to read, amply illustrated. Procedures are outlined in step by step form.

... Circle No. 170

overhead sign structures is discussed in a new book, "Aluminum Traffic Control Devices," issued by Aluminum Co. of America. Typical types of traffic control devices discussed include flat sheet sign tubular posts, fasteners, sign posts, message films, and extruded sign systems. Actual installation photographs in all types of atmospheres are pictured. The 24-page brochure also includes details of two newly offered combination extruded sheet signs and Alcoa's non-tamper-resistant fasteners.

... Circle No. 171

Safety barricades

The full line of steel safety barricades, flasher lights, and warning flags manufactured by Traf Equipment Co. is described in a new 12-page catalog. Units covered include steel panels painted diagonal stripes for added safety, adjustable steel standards, caution signs, flags, flasher lights, and m. hole guards. Also covered is the company's new "Safety Flash" barricade system of five individual sign panels with built-in flasher light systems. Each is mounted on a separate standard, and each carries a separate warning message such as "Caution," "Not So Fast," "Slow Down," and one that says "Hey You."

... Circle No. 172

Flasher lights

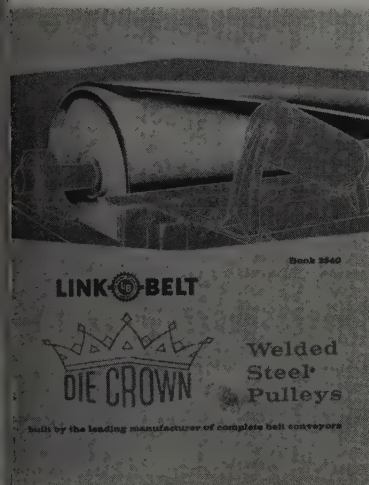
A special cone-shaped nut which fits any 1/2-in. drive socket is used in mounting Fageol flasher lights to discourage thieves and vandals.

dals. This feature, along with the company's timing mechanism and heavy duty batteries, is described in a series of new catalog sheets covering the three improved flasher safety light models made by R. D. Fageol Co. Individual two page bulletins are available on each light. These are the HD-1-7, uni-directional 7-inch lens; HD-2, a two-way 4-in. light; and the new HD-2-7, a two-way light with king size 7-inch lens. The company also offers a miniature catalog including specifications on all three lights.

... Circle No 173

Welded steel pulleys

Detailed engineering and selection data on the new die crown welded steel pulleys are contained in a booklet No. 2540 issued by Link-Belt Co. It describes a new



hydro-expansion-formed belt conveyor pulley that increases conveyor life, has 25% greater strength, is concentric to within .030 inches, and is free from crown welds. The pulley is formed in a die by hydraulic pressures for accurate control of crown contour and pulley diameter. The publication also provides information on lagged pulleys, shaft and pulley assemblies.

... Circle No. 174

Crane booklet

Model C-350 crane-excavator is described and illustrated in a new 2-page catalog issued by Schield Bantam Co. The brochure covers the complete line of Bantam-built front end attachments as well as track sizes, side rails, and wide extensions available. Four pages are devoted to standard and optional features.

... Circle No. 175

multiply manpower

WITH

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POWER BUGGIES



WATSON-CMETCO Power Buggies at work on Peter Kiewit Carquinez (Calif.) Bridge approach job.

YOU'LL PLACE MORE CONCRETE FASTER, AT LOWER COST, with job-proved CMETCO Power Buggies on the job. Here's why:

- * **UNEQUALLED MANEUVERABILITY**—51" turning radius, easy automotive-type steering and controls, and instant reversing make CMETCO Buggies fast and easy to handle even on narrow ramps and tight, tricky platforms.
- * **PLENTY OF POWER** to handle full loads on steep ramps. Load is centered over dual drive wheels for extra traction.
- * **EXTRA CAPACITY**—10½ cu. ft. struck, 13½ heaped.
- * **FAST, CLEAN, CONTROLLED DUMPING**—bucket is nicely balanced for easy, accurate dumping control and is designed for clean self-purging dumping that eliminates hand scrape-outs.
- * **NO OPERATOR TRAINING REQUIRED**—Anyone can handle CMETCO's simple automotive type steering and controls!

YOU'LL BE HOURS AND DOLLARS AHEAD with WATSON-CMETCO Power Buggies on your job. Why not get the facts now? Write today for complete information and name of your local WATSON-CMETCO distributor; please address Dept. W9

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BETTER EQUIPMENT FOR PLACING AND FINISHING CONCRETE...

12
DEALER
INQUIRIES
INVITED

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TOLEDO, OHIO

Power Buggies • Telescoping and Economy Vibratory Screeds • Rola Pavers and Trench Boxes • Wood and Steel Tilt-Up Hardware • Bull Floats • Hoppers • Elephant Trunks and Chutes • Tampers • Hand Carts

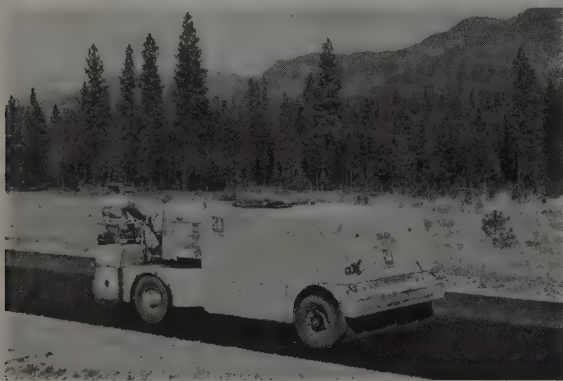
... for more details, circle No. 57 on Reader Service Postcard

NEW EQUIPMENT

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

Self propelled pneumatic compactor

A heavy-duty rubber tired roller of new design, to meet modern compaction requirements, has been put on the market by Seaman-Andwall Corp. The unit, with a weight range from 7 to 20 tons, is self propelled and has power steering. Among the design features are greater visibility and maneuverability, easier transporting to the job, high capacity compaction and more accurate rolling. A new principle which applies direct

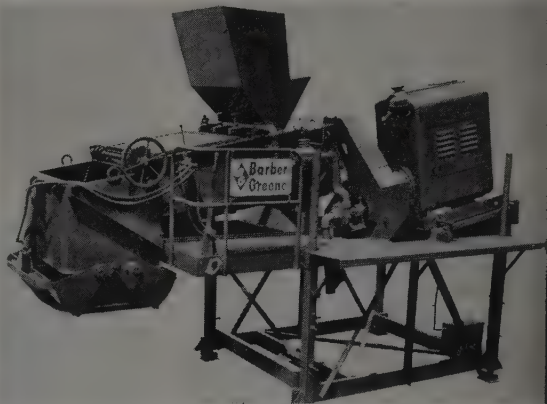


vertical pressure through the front wheel drive eliminates usual pushing action, surface shear, scuffing and material displacement. These advantages are true even in turning. The roller has six forward speeds—1.5 to 20 m.p.h.—and two reverse speeds. This enables the new compactor to be moved swiftly under its own power from job to job. The machine can make a full 180-deg. turn on a 21-ft. roadway, and this can be done easily with power steering. The operator sits at right angles to forward travel in a better position to observe the rolling operation. Acceleration and brakes are operated through foot pedals. Empty, the total weight of the roller is 15,000 lb., and with dry sand ballast the weight is 42,000 lb. The power is provided by a 75-hp. Continental gasoline engine. Diesel power is also available.

... Circle No. 176

Portable plant stabilizes material

With more highway specifications requiring stabilized material to be plant mixed, Barber-Greene Co. announces its Model 824 Stabilization Plant. This is a low cost, highly portable unit capable of handling up to 300 tons per hour, depending on the type of material. It also is suitable for other uses wherever the job does not require the capacity of the company's larger plants. The Model 824, with a material handling system, provides positive and accurate control of proportioning, uniform mixing and a minimum amount of segregation from plant to job. Using a twin shaft pugmill mixer the plant can be used with almost any type of stabilizing agent and materials. The pugmill is equipped with water spray bars and an accurate metering-pump combination. In general,



the design features of the Model 824 are similar to those of the larger Barber-Greene plants. The mixer can be equipped with wheels, axles and towing tongue for maximum portability. Erection is simple with the plant being raised into position on four telescoping jacklegs.

... Circle No. 177

Link-Belt has low cost truck crane

Announced as a 30-ton truck crane in the 25-to price range, Link-Belt Speeder Corp. introduces its HC-78A Zephyrcrane in the $\frac{3}{4}$ -yd. class. In addition to the reported price advantage this unit is announced as the only truck crane of its capacity with an 8-ft. overall width, making legal highway travel possible.



Take a giant step
to fast, easy,
low-cost surveying
with the **ALL NEW**
MICRO-DIST

A new concept in
precision electronic
surveying

WIDER RANGE

500 ft. to 50 miles

GREATER ACCURACY

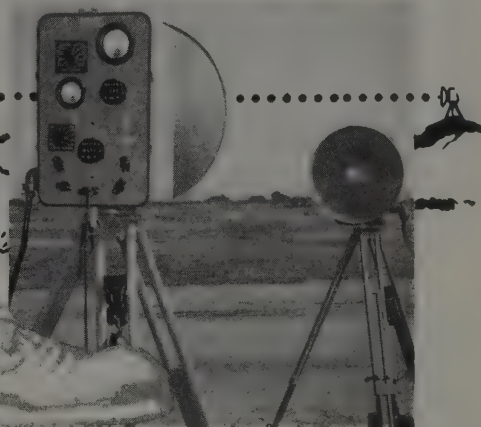
3 ppm $\pm$ 1 inch

GREATER FLEXIBILITY

Stations interchangeable

GREATER SPEED

Direct readout;
calibration free



PLUS THESE FEATURES:

Water-tight for all-weather operation!

Headset communications!

Lightweight for extreme portability!

Write or call today for information



Electronic Engineering

With a Dimension for the Future

5575 Kearny Villa Road, San Diego 11, California

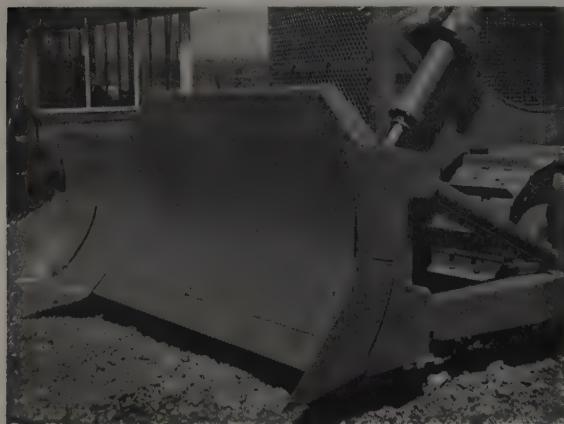
... for more details, circle No. 58 on Reader Service Postcard

without special permit. Complete weight is slightly over 60,000 lb., and it can travel legally in most areas without removing major components. Operating machinery follows the design found in all Link-Belt Speeder models, which means hoisting or lowering of a load plus independent booming and swinging. Even when the optional third drum is added it operates completely independent of all other machine functions. Among the several optionals are jibs up to 40 ft. long, safety boom limiting devices and 10 or 12-part boom hoist lines.

... Circle No. 178

Semi-U Blade provides high production

Designed for heavy duty road building, pioneering and land clearing, the 40-deg. Semi-U Blade an-



nounced by Wood Tractor Co., has been engineered to use the working capacity of modern tractors. The units are available for use on Allis Chalmers, Caterpillar and International Harvester tractors as well as Eimco and Oliver units. The heavy duty corners of the blade dig into the side hills with the ability of an angle blade, but without the structural weakness of an angle blade. In pioneer work the material cut from one corner drifts across the face of the blade to discharge on the opposite side. The corners, extending in front of the mould board, keep material from spilling and hold an extra volume of load.

... Circle No. 179

A new Wagner unit for the IH T-340

Designed for the new IH T-340 crawler tractor, the Wagner No. 465 loader and No. 65 backhoe are built for sustained, heavy-duty operation. With a rated capacity of 3,500 lb. at full lift, the low profile No. 465 loader features an automatic hydraulic self leveling action which permits the bucket to return from full dump height to a pre-set digging angle using boom control only. The big 64-in. width of bucket provides a capacity of $\frac{7}{8}$ yd. when fully heaped. The solid plate lifting arms are located close to the tractor for maximum thrust at digging level and hold the load at an effective distance away from the tractor at full lift for greater reach and clean dumping. The frame is of unit-welded tubular design and anchored to the axles for proper distribution of loads and stresses. The new IH T-340 is a 31-hp. crawler powered by a gasoline engine and weighs 5,600 lb.

... Circle No. 180

**FAST • FAST • FAST
DELIVERY!**

Remington

DUPONT

A phone call to your Gregory Industries office is the sure way to get time-saving, money-saving service on Remington studs and power loads.

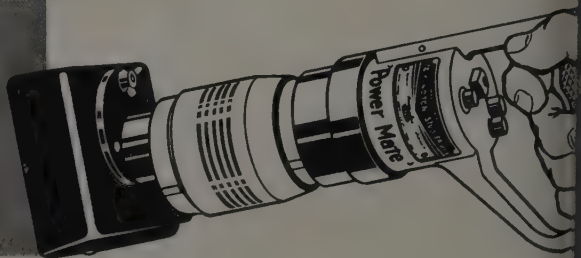
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GREGORY INDUSTRIES, INC.



Manufacturers of NELSON Stud Welding Products

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STUD DRIVER PRODUCTS

Ask for a demonstration of the versatile Remington Stud Driver that cuts fastening costs up to 80%. Rental units available for your job.

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DENVER

2135 S. Kalamath West 6-3439

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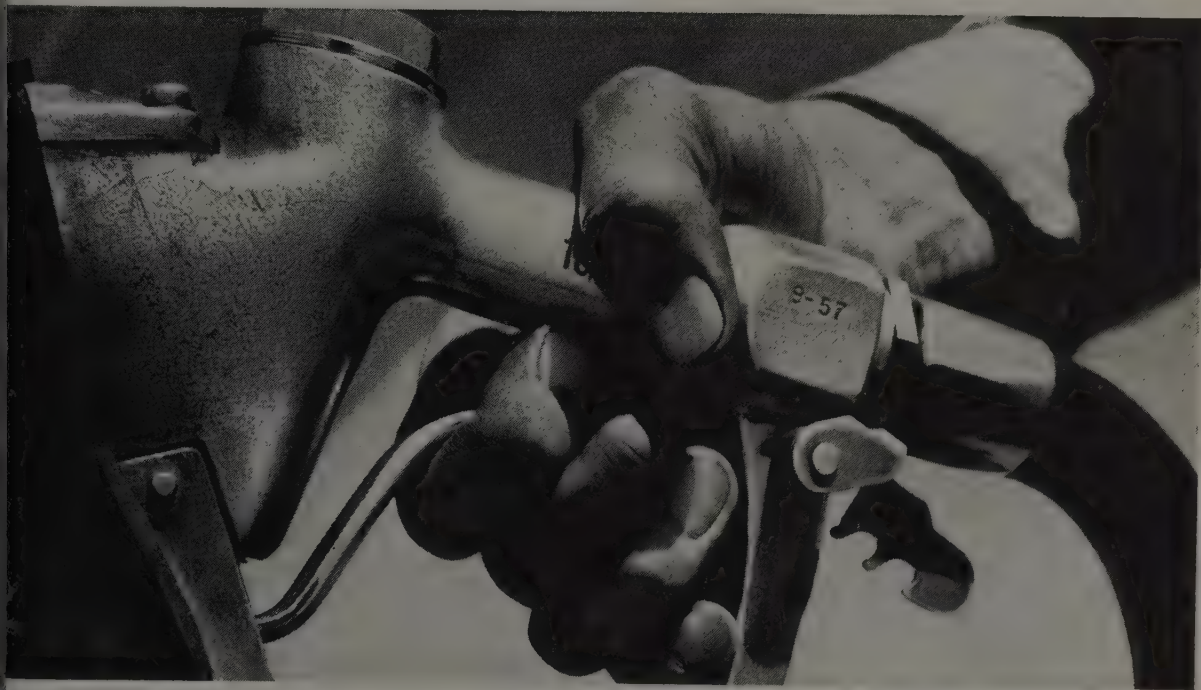
WESTERN CONSTRUCTION—September 1958

PERFORMANCE!

GET THE PERFORMANCE

YOUR ENGINES WERE BUILT TO DELIVER

WITH NEW 7600 GASOLINE!



If you'd like to get top performance out of your engines—Union's new 7600 regular gasoline is the fuel for you! 7600 is the West's Finest regular gasoline with octane high enough to give knock-free operation to 4 out of 5 vehicles on the road.

And because new 7600 regular contains Union's exclusive additive NR76 to clean carburetors chemically, you'll reduce engine maintenance measurably.

Call your Union Oil representative for immediate delivery of new 7600 gasoline. It's powered like a premium but priced like a regular!

UNION OIL COMPANY
OF CALIFORNIA

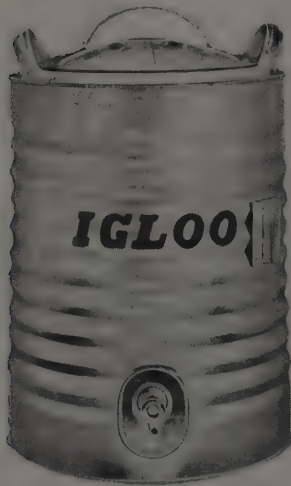


Union Oil Center, Los Angeles 17, California, U.S.A.

... for more details, circle No. 60 on Reader Service Postcard

Need a 10-gal. water cooler?

A 10-gal. water cooler, 23¼ in. high and 15 15/16 in. in diameter weighing 22 lb., is available from



Igloo Corp., large manufacturer of portable water coolers. The interior is divided in two portions, one for ice and one for water. Complete details, specifications and catalog sheet on this cooler and others in the Igloo line are available on request.

... Circle No. 181

Compound for patching concrete

A compound for patching and surfacing concrete and as a protective topping for concrete has been announced by Products Research Co. Called PR-940, it is an aggregate-filled 2-part modified epoxy which cures at room temperature and can be easily troweled into spalled areas of concrete to form a patch. It has excellent resistance to abrasion, weather, non-oxidizing acids, strong bases, alkali salt solutions, petroleum products and water. Full details are available.

... Circle No. 182

Truck for compaction water

Designed primarily for the application of compaction water in highway construction, a powered



water-wagon called the Water-Cator is now available. The units come in two models and are adaptable to fit any make truck of sufficient power. A hydraulically driven pump, a self cooling feature, is submerged directly in the tank itself which eliminates outside engines and unnecessary piping. The unit can be fitted in either two or four adjustable spray heads incorporating positive shutoff plus direction and volume control. Water flow is controlled by starting and stopping pump with control valves in the truck cab. This provides for fast unloading due to ample pump capacity for good spray pressure. Weight distribution is basically the same as on any standard wagon or scraper. Model 300 has a 3,000-gal. capacity while the 580 can handle 5,800 gal. The manufacturer is Koehring Co. of California.

... Circle No. 183

New 125-ton crane

The world's largest lift crane with a 125-ton capacity at 17-ft. radius has been developed by Manitowoc Engineering Corp. The new Model 4000 has a heavy rotating base with huge hook and house



rollers for smooth swings carrying heavy loads. The undercarriage has long, widespread crawlers to provide a solid lifting foundation. Features include a self-locking double drum boom hoist that cannot "free-wheel", extra friction surface, disc-type swingers and torque converter as standard equipment. The unit is equipped with a new Manitowoc "T" section 125-ton capacity boom. Extra long tubular booms also are available for maximum reach. Compact design makes it possible to ship the unit on a standard railroad flat car without extensive dismantling.

... Circle No. 184

See your local OLIVER Distributor for complete information

ALASKA

Anchorage, Bashaw Equipment Co., Inc.

ARIZONA

Phoenix, Guerin Implement Co.
Tucson, Southern Arizona Machinery Co.
Yuma, Sturges Implement Co.

CALIFORNIA

Avenal, Rufus McIlroy
Blythe, Munson Equipment
Brawley, Gardena & Tustin, Schneider Tractor Co.
Calistoga, Flynn's Tree Service
Coachella, Coachella Valley Tractor Co.
Colton, Condosta Tractor Co.
Cotati, H-C Equipment Co.
Dinuba, The Richland Co.
Eureka, Rogers Machinery Co., Inc.
Fowler, Fowler Farm Supplies
Fresno, Pursley Machinery Co.
Lancaster, Robertson Implement Co.
Lodi, Bechthold Tractor Service
Los Angeles, Brown-Bewis Industrial Equip.
Los Banos, Tri-County Implement Co.
Madera, Shafer Implement Co.
Merced, Polzine Farm Equipment
Modesto, Equipment, Inc.
Porterville, Farmers Tractor & Equip. Co.
Sacramento, Flood Equipment Co.
Salinas, Ashton Implement Co.
San Diego, Kenton Equipment Co.
San Leandro & San Jose, M.F.D. Inc.
Santa Maria, Sanchez Equip. Sales
Shafter, Frank Russell Mfg. Co.
Stockton, H & M Tractor Co.
Tracy, Caron & Oliver Equip. Center
Tulare, Jim Ingle Co.
Ukiah, Banzhaf Farm Machinery Co.
Woodland, Yolo Tractor Co.
Yuba City, Oliver Equipment Co.

COLORADO

Denver, Liberty Truck & Parts Co.
Pueblo & Colorado Springs,
Colorado Road Machine Co.

IDAHO

Boise, Engineering Sales Service, Inc.

MONTANA

Helena & Billings, Caird Engineering Wor
Kalispell, Farm Supply Co.

NEW MEXICO

Albuquerque, Central Mexico Equipment Co., Inc.

OREGON

Albany, Herrold & Jensen Implement Co.
Island City, Valley Implement Co.
Maupin, Kenneth Snodgrass
Portland, Oregon Tractor & Equip. Co.
Roseburg, Paul Casey Equipment Co.
Salem, A. C. Haeg & Co.

UTAH

Salt Lake City, Arnold Machinery Co.

WASHINGTON

Chehalis, Buck & Son Farm Equip. Co.
Seattle, Fray Equipment Co., Inc.
Spokane, Inland Diesel & Machinery Co.
Walla Walla, Melcher-Ray Machinery Co.
Yakima & Wapato, Yakima Implement Co.



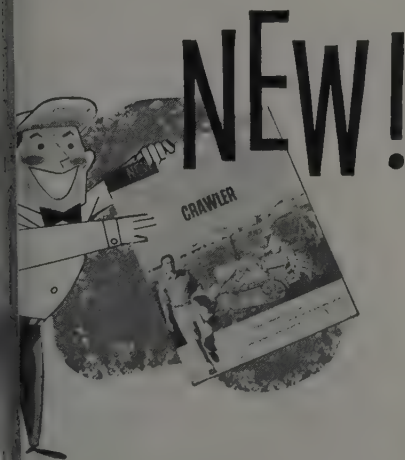
THE OLIVER CORPORATION
Industrial Division
19300 Euclid Ave., Cleveland 17, Ohio

OLIVER

Sanfilippo's OC-4 with 72½" dozer does it all—land clearing, assists in basement digging, back filling, final grading on this commercial building job.



My OC-4 with 'Spot-Turn' saves me 2 hours in 8!"



Jack Sanfilippo is a keeper of accurate records. As owner of his own excavating company in Keyport, N.J., he finds it pays to be. The facts prove that with his OC-4 he can now do in six hours what took eight with an older tractor not having the OC-4's "Spot-Turn" steering advantages.

That's a 25% gain in production and profits—just by the addition of one OC-4. Splendid close-quarter maneuverability with shortest turn-around radius accounts for most of it—with the OC-4's higher measure of diesel power doing the rest. Not only that, but Sanfilippo's earnings are even greater when you consider his unbelievably low fuel operating cost—just \$7.65 for a 40-hour week!

Come see...come try the OC-4 for yourself—the compact, big-job tackler that's *first* in its crawler class for drawbar pounds pull and *lowest* in its class for price!



THE OLIVER CORPORATION

Industrial Division, 19300 Euclid Ave., Cleveland 17, Ohio

a complete line of industrial wheel and crawler tractors and matched allied equipment

T23-9

Please send a copy of your new 16-page, color catalog on the OC-4 tractor.

Name.....
(Please print)

Company.....

Address.....

City..... Zone..... State.....

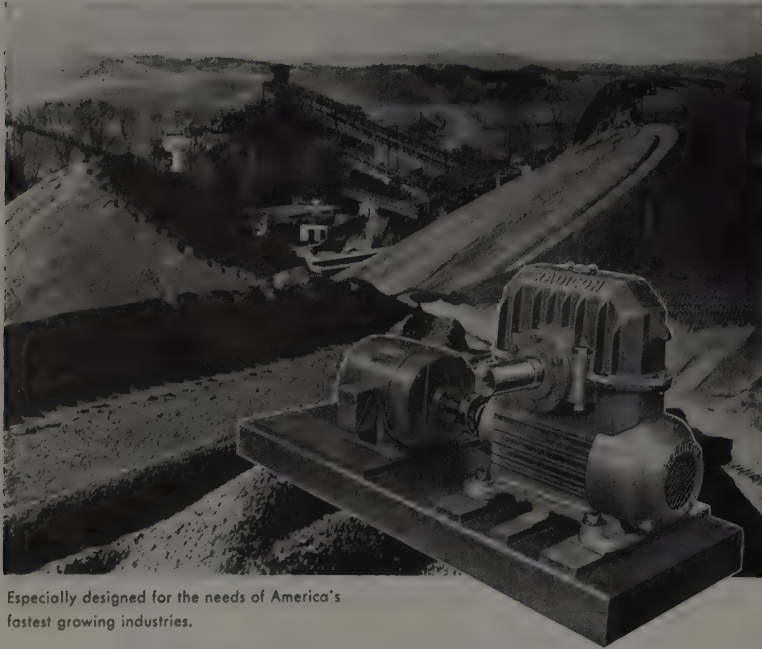
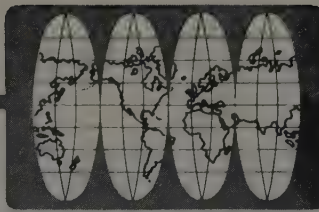
It's the new look in tractor catalogs: the all-new OC-4 bulletin. It's heavy on job-application pictures and data...shows the OC-4 tooled-up with a dozen different work-speeding, income-boosting equipment angles! It's sound business reading that carries a compelling message for any tractor user. Mail coupon.

Ask your Oliver Distributor for a demonstration of the OC-4's work power

for more details circle No. 61 on Reader Service Postcard

DAVID BROWN

at work
around the world



Especially designed for the needs of America's fastest growing industries.

Just Position and Set Six Bolts... the new **RADICON** COMPLETE DRIVES

"Eliminate drive design problems with the versatile new Radicon Complete Drive—just position—set six bolts and you're ready for service."

There's *no* do-it-yourself involved. Simply select the drive (easy as a gearmotor)—and set! Radicon reducers and motors are already carefully shimmed and aligned on heavy fabricated steel base plates of double box construction, firmly ribbed for rigidity. This means minimum stress at the flexible coupling—low maintenance, with complete versatility for service.

Fan-cooled Radicon Speed Reducers, such as type RHU in the above Complete Drive, are being specified for replacement and OEM in many industries these days. They have learned that Radicons are designed, not for show—but for rugged work in all extremes of temperature, dust, dirt and rain.

Immediate delivery 3" to 12", all standard ratios from 5:1 to 60:1. Radicon complete drives supplied by all authorized David Brown factory branches and distributors.



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Gear Products for: Mines, paper and pulp mills, chemical plants, food processors... conveyors, hoists, agitators, screens, deckers, filters, canning machines, and other industrial equipment.

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Electronic surveyer

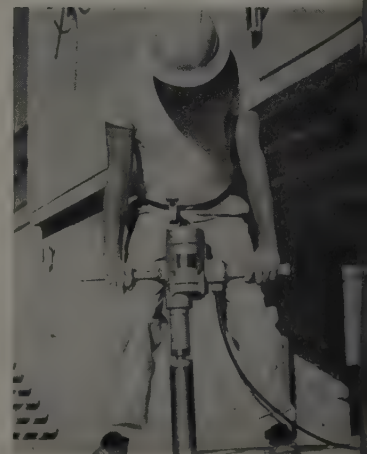
A compact electronic measuring device, accurate to within 1/2 in. over five miles of unobstructed terrain is being marketed in the West by Surveyors Service Co. The instrument is a Geodimeter, Model 4, made by a Swedish firm, Svenska



AB. The Geodimeter projects a highly collimated beam of light to a distance reflector and receives a return beam through multi-prism reflectors to determine the distance the light waves have traveled. Designed especially for surveyors and mapping parties, Model 4 is only 12 in. square and weighs 35 lb. It sells for about \$4,500. This compares to the previously introduced Model 3 which calibrated for distances of 20 miles or more and is priced at more than \$10,000. Operating instructions and detailed prices available. ... Circle No. 18

High speed concrete drill

A combination of hammer impact and rotary cutting action produces drilling speeds of up to 1 in. per minute with the new "Jack Drill" developed by the Bill Jac





Here's LOW COST Loading-Screening

WITH NO SACRIFICE OF STRENGTH OR CAPACITY



Model 202, 40' x 24", 6' x 36"
Model SB-60 Screen, Model VH-4,
17 to 30 HP Wisconsin gasoline
air-cooled engine, attached Recip-
roating Plate Feeder, Hopper and
roof type grizzly bars.

KOLMAN
MODEL 202
CONVEYOR

Rugged Box-Type Construction Permits Amazing Low Price

The Model 202 meets the demand for a conveyor in the low price field stout enough to carry a large single or double-deck vibrating screen and loading trap in a completely portable conveyor-screen plant.

"Box-Type" Construction

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

The under-slung power unit provides easy access for servicing and operation.

Folding Feature

The 202 is available with the Head Pulley Clutch feature which allows the belt to be stopped and started while the vibrating screen remains in operation.

The KOLMAN Model 202 is rugged enough to carry a loading trap and large vibrating screen without additional support. It will take the kind of punishment that is dished out to a portable outfit—and will cost you far less money to own and operate. Available in 18" or 24" belt width, in lengths up to 50".

SEE YOUR NEAREST DEALER NOW

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KOLMAN MANUFACTURING CO.

5670 West 12th St., Sioux Falls, S. D.

Please send free literature on—

- ☐ Model 101 Heavy Duty Conveyor
☐ Model 202 Junior Conveyor
☐ Vibrating Screens ☐ Feeders
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Quote size or capacity

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Industrial Equip. Co.
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BOISE, POCATELLO—Intermountain Equip. Co.

NEVADA
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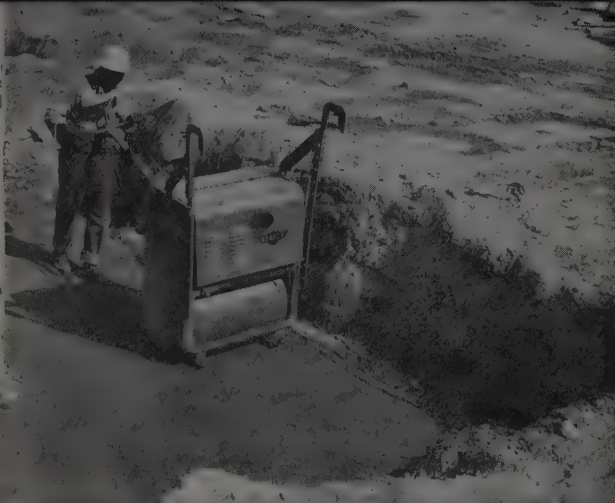
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ESSICK

VIBRATING COMPACTORS



Essick VR-28-W Self-Propelled Vibrating Compactor on Golden State Freeway

COSTS CUT IN HALF . . . PRODUCTION TRIPLED . . . SPECIFIED DENSITIES EXCEEDED . . .

ESSICK 28" VIBRATING COMPACTOR OUTPERFORMS OTHER EQUIPMENT ON SOIL OR ASPHALT

Charlie Brown of the Chas. T. Brown Construction Company states: "We were working on the Golden State Freeway in Los Angeles, compacting backfill around bridge abutments and drainage pipes. At the start of the job, compaction costs were running about \$1,300 per month per compaction unit which consisted of a compressor and three pneumatic tampers.

"Having successfully used Essick Vibrating Compactors on other projects, we felt that we could get better densities at less cost in the confined areas of this job with the Essick 28" self-propelled vibrating model.

"We put the Essick VR-28-W to work and cut monthly costs to about \$650 per compaction unit (about one-half), tripled our production, and exceeded our best past compaction performance. Being self-propelled, the Essick 28" Vibrating Compactor is just the ticket for backfill operations on soil and in hard-to-get-at locations. It gives the most compaction at the least expense, and exceeds specifications in record time."

Many Contractors are finding that the 865 lb. VR-28-W, with its High Frequency Vibration, exceeds the compaction of a sixteen-ton static roller on soil. This multiple purpose tool has also revolutionized highway maintenance by putting down better asphalt patches at greatly reduced costs. Carrying hooks make it completely mobile, and being self-propelled, it will go just about anywhere compaction is required.

SEE YOUR ESSICK DEALER FOR A DEMONSTRATION



9 Models of Vibrating Compactors from 13" to 72" widths

Also 14 Models of Tandem Rollers from 1/2- to 14 Tons

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850 WOODRUFF LANE
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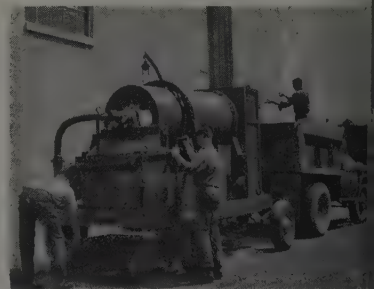
. . . for more details, circle No. 64 on Reader Service Postcard

Scientific Instrument Co. The pounding-action of the tool operates at the rate of 4,000 to 7,000 impulses per min. while the drill bit revolves at 650 to 1,200 rpm. to cut holes from 1/2 in. to 4 in. in diameter. The drill weighs only 30 lb. and operates on 115 volt-current, or from a small portable 1.5-kw. gasoline generator either AC or DC. Pounding action replaces the star drill and mallet usually used to crush rocks in the concrete. The "Jack Drill" averaged 1 in. per minute when tested on 6,000 psi prestressed concrete of 3/4 in. aggregate. It also cuts through reinforcing bars and hi-carbon twisted wire mesh imbedded in concrete. The new tool eliminates fracture damage to surrounding concrete when large diameter holes are made.

. . . Circle No. 186

Portable asphalt plant

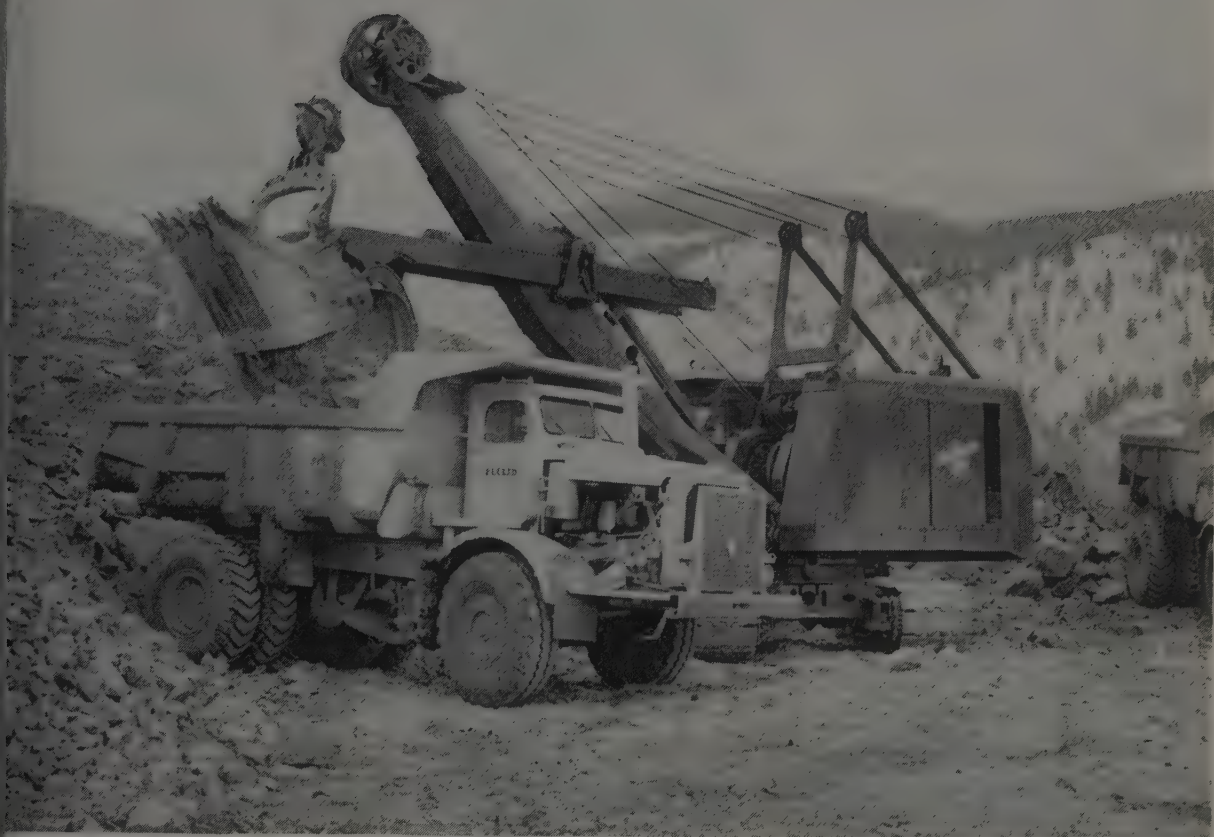
A self-contained truck mounted asphalt plant is announced by White Mfg. Co. The unit is designed to produce paving and patch material at the job site for road maintenance or driveway and park-



ing lot work. Designated L-6B it is rated at 6-8 tons per hour, producing hot mix at 300 deg. The unit is made up of a rotary dryer, a 5-cu. ft. batching hopper, and a 500-lb. pug-mill mixer, as well as asphalt storage tank and metering device. Powered by a 30-hp. gasoline engine, it is available as a portable truck-towed unit or as a semi-permanent installation using a feeder and bucket elevator to charge the dryer. . . . Circle No. 18

Self-propelled tamper

A light weight vibrating tamper which delivers 5,000 impacts per min. has been introduced by the Wacker Corp. The Model VPO 1,500 vibrating plate weighs 13 lb. and is powered by a 3-hp. engine delivering a 1,700-lb. impact



JOB RECORDS PROVE

Firestones keep tire costs down!

Count on Firestones to reduce your hourly costs—no matter where you work 'em! Every Firestone is job-engineered to match the punishment of the toughest jobs. They're built with Firestone Rubber-X, the longest-wearing rubber ever used in Firestone tires! Exclusive Firestone S/F (Shock-Fortified) nylon or rayon bodies shrug off bruising shock and impact. Specially designed Firestone treads and sidewalls roll through conditions that often ruin ordinary tires. Call your Firestone Dealer or Store and ask about the full line of Firestone tubeless or tubed off-the-highway tires. He'll recommend the tires that are built for your job! And, remember, Firestone off-the-highway tires are backed with on-the-job service!



Rock Grip Excavator
Wide Base

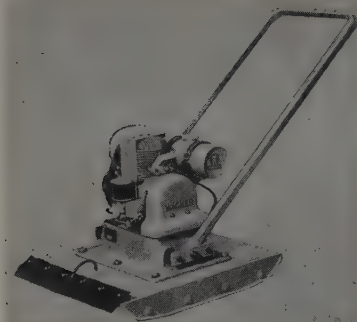
Rock Grip Excavator

When ordering new equipment always specify Firestone tires—available tubeless or tubed.

Firestone

BETTER RUBBER FROM START TO FINISH

Copyright 1959, The Firestone Tire & Rubber Company



at the rate of 5,000 per min. It has a built-in water attachment to prevent asphalt adhesion. The unit is designed for working in close quarters around curbs, gutters and areas adjacent to walls and abutments. Plate size is 19" x 24".

... Circle No. 188

Power steering for D8 tractors

An improved power steering accessory which can be used on all Caterpillar D8 tractors prior to Model 14A is announced by Rivinius Inc. The Live Power steering attachment is a hydraulic system consisting of a double hy-

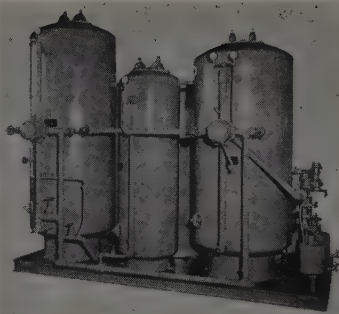


draulic cylinder connecting both steering clutch adjusting rods, a heavy-duty control valve, hydraulic pump and reservoir, and necessary hoses and hardware. It transfers complete clutch control to fingertip levers. Field installation is relatively simple. It is not necessary for the tractor to be equipped with a steering clutch changeover.

... Circle No. 189

Water purification plant

Pure water for construction camps is delivered at rates up to 3,600 g.p.h. by self-contained water purification plants marketed by Garratt Engineering & Equipment Co. Plant consists of three tanks mounted on a steel base with appropriate piping and regulators. Included are the hydrochlorinator,



alum and soda ash feeders, sand and gravel pressure filter and carbon filter as well as water softener and brine tank, which is optional equipment. The purification unit automatically chlorinates, filters, removes odors and tastes, and softens the water. Average dimensions are 5 ft. wide, 8½ ft. high, 10 ft. long. Weight of the 1,350-g.p.h. unit is 11,000 lb.

... Circle No. 190

Liquid leveling hose

A 50-ft. plastic tube which, when filled with colored liquid, provides an easy means of leveling



distant points has been marketed by Hydrolevel under the brand name of Leveleasy. The unit consists of a tough vinyl tube of slightly more than ¼ in., a vial of color which can be mixed with water to fill the tube and a plastic container in which the tube is coiled.

... Circle No. 191

High output magneto

Model XHE Hi-Lo Tension Magneto which provides more output and more power than the standard type is announced by Wico Electric Co. The unit combines the advantages of high voltage and low tension but requires only one coil per engine. It includes a heavy



YOUR TROJAN DISTRIBUTORS FOR SALES, PARTS AND SERVICE

**INLAND DIESEL &
MACHINERY COMPANY**
Spokane, Washington

**GARLINGHOUSE, FREMON
& COMPANY**
Los Angeles, California

**INTERMOUNTAIN
EQUIPMENT COMPANY**
Pocatello, Idaho

**INLAND SERVICE &
SUPPLY CORP.**
Las Vegas, Nevada

**SIERRA MACHINERY
COMPANY, INC.**
Reno, Nevada

**WESTERN MACHINERY
COMPANY**
Salt Lake City, Utah

**NORMONT EQUIPMENT
COMPANY**
Great Falls, Montana

**CONTRACTORS' EQUIPMENT
& SUPPLY COMPANY**
Albuquerque, New Mexico

TRACTOR SUPPLY COMPANY
San Diego, California

**ROAD MACHINERY
COMPANY, INC.**
Phoenix, Arizona
BRANCH: Tucson

**MACDONALD EQUIPMENT
COMPANY**
Denver, Colorado

**MANITOU EQUIPMENT
COMPANY**
Portland, Oregon

**CONNELL MOTOR TRUCK
CO., INC.**
Stockton, California

**CENTURY-WHITE TRUCK
CO., INC.**
Casper, Wyoming

HERE'S A ONE MACHINE FLEET



TROJAN 404 MAINTAINS ALL TOWNSHIP ROADS WITHOUT ASSISTANCE

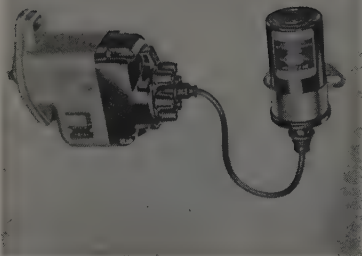


A "one machine fleet" best describes the everyday performance of the Trojan Model 404, purchased by the Township of LeRoy, New York. Mobility, plus Trojan's thirst for work, has shrunk the size of the Township and taken over jobs normally handled by other types of equipment . . . Hank Sheridan, superintendent of roads for the Township says, "Right now we're using our rig for loading haul trucks here in a gravel pit. Tomorrow we might be using it to pull out trees 20 miles from here; or cleaning up fence rows 15 miles from the trees; or any of a number of other duties this multi-purpose rig has taken over . . . Working in conjunction with our portable crusher, the Trojan 404 proved so productive we had to hire another truck to back up the three we already own." The Trojan 404 is doing a job for LeRoy, it can do the same for you . . . Contact your local distributor—let him demonstrate Trojan ability.

THE YALE & TOWNE MANUFACTURING COMPANY
TROJAN DIVISION BATAVIA, NEW YORK SAN LEANDRO, CALIFORNIA

TROJAN[®]
TRACTOR SHOVELS
YALE & TOWNE

... for more details, circle No. 66 on Reader Service Postcard



duty transformer coil encased in an oil filled metal jacket which prac-

tically eliminates electrical failure from ozone and high voltage breakdown. The magneto is available for most gasoline and dry fuel burning, 6-cylinder engines. It is provided with either base or flange mounting.

... Circle No. 192

Space helmet for cool head

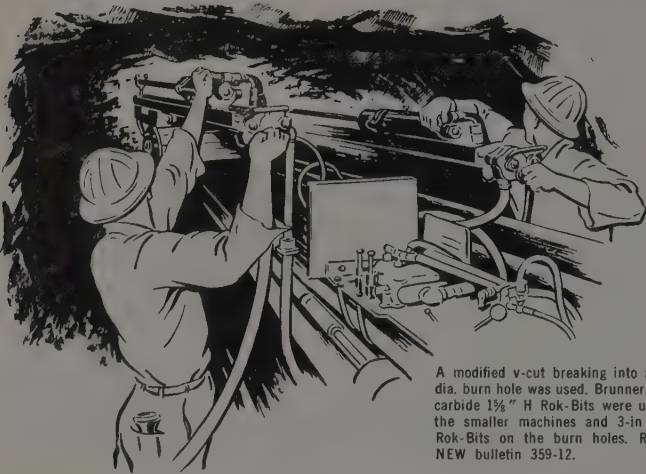
Principles of space suit design have been adapted for the construction industry in the form of an air conditioned helmet with clear plastic visor manufactured for equipment operators by Jamie-



son Laboratories Inc. Helmet, called "Whitecap", circulates cool filtered air around the driver's face. Made of light fiberglass with shatterproof face-plate, it is connected to a small air-conditioning unit by a lightweight flexible vinyl hose. Refrigeration unit is hermetically sealed, powered by a 1/8-hp. DC electric motor. The unit is set on a 9 x 23 in. base which is mounted on the equipment. Air passes through a centrifugal type filter before reaching the cooling coils so that all foreign materials are removed first. Developer of this revolutionary headgear is H. W. Jamieson, who has a distinguished background in electronics and space age technology. In a five month test of the space helmet air-conditioners by the U. S. General Services Administration, productivity of operators was increased by about 10% which the company says is more than enough to pay for the air-conditioning units. Literature available.

... Circle No. 193

SHOOTING FOR DRILLING RECORDS...



A modified v-cut breaking into a 3-in. dia. burn hole was used. Brunner & Lay carbide 1 1/2" H Rok-Bits were used on the smaller machines and 3-in X-700 Rok-Bits on the burn holes. Request NEW bulletin 359-12.

... better use Brunner & Lay Rok-Bits

RECORD TUNNEL DRIVING AT MAMMOTH POOL POWER PROJECT PROVES IT



Project personnel include: Boyd C. Paulson, project manager (above); Steve E. Wilmoth, general supt.; Paddy O'Dowd, Jack Robertson, and O. "Heavy" Holman, tunnel supts., Utah Const. Co.; Harold Barber and Neville S. Long, engineers, Southern California Edison Co.

Solid blue granite doesn't slow Brunner & Lay carbide Rok-Bits. In driving the 8-mi. Mammoth Pool power tunnel, the Utah Construction Company's crews set a hard-rock record of drilling 390 ft. of the 20-ft. dia. horseshoe tunnel in six 24-hr. days. Brunner & Lay Rok-Bits were used 100%.

Whether out to set drilling records, or simply to improve your footage, Rok-Bits give you the best kind of start. For details, call your Brunner & Lay dealer, or our nearest plant. Brunner & Lay, Inc., 9300 King St., Franklin Park, Ill. 77 progressive years. Plants and conversion shops: Albuquerque, Asheville, Birmingham, Dallas, Denver, Dorchester (Boston), Long Island City, Los Angeles, Philadelphia, Portland, Sacramento, Seattle, Yardley (Spokane), Lachine, P.Q., Vancouver, B.C.

Brunner & Lay Products

CARBIDE ROK-BITS • INTRASET STEEL • DRILL RODS • COUPLINGS, ADAPTERS & EXTENSION STEEL
Standard or ROPE thread • MOIL POINTS, CLAY SPADES, ASPHALT CUTTERS, etc.

Giant tire rims

The world's largest tire rim, weighing more than a ton has been added to the rim line marketed by Goodyear Tire and Rubber Co. The big rim, developed for use with the company's 44.5-45 tire will



be used on special purpose vehicle and big construction machine which are still on the drawing boards. Size designation for the big earthmover rim is 37.00-45. Another new rim size 28.00-39 has been add-

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



**Fast,
Positive
Clean-out**

**GarWood
-St. Paul-**

Another reason why Gar Wood-St. Paul hoists deliver...

TOP PERFORMANCE UNDER TOUGHEST CONDITIONS

The higher dumping angle...up to 55°...assures faster, cleaner dumping of any material. Fast, positive clean-out speeds the work cycle and ends damage from jockeying to loosen the load. Result: more loads handled per day with less wear and tear on all your equipment...truck, body and hoist.

Gar Wood-St. Paul hoists, built by the world's oldest and largest manufacturer of truck equipment are "job proved" to outperform in every application.

Specify these "job-proved" hoists and rugged matching Gar Wood-St. Paul dump bodies for the finest truck equipment combination you can buy.



Front mounted telescopic hoists by Gar Wood-St. Paul are anchored top and bottom for greater safety and longer life.

See your Gar Wood-St. Paul Distributor!

Erwin H. Johnson, Inc., Great Falls, Montana; Fruehauf Trailer Company, Portland, Oregon; Studer Tractor & Equipment Co., Casper, Wyoming; The Sawtooth Company, Boise, Idaho; Fruehauf Trailer Company, Spokane and Seattle, Washington; Leonard Motor Company, Inc., Albuquerque, New Mexico; Allison Steel Manufacturing Company, Phoenix, Arizona; Sierra Machinery Company, Inc., Reno, Nevada; California Truck & Industrial Equipment, Bakersfield, California; Ruckstell California Sales Company, Fresno, California; Utility Trailer Sales Company, San Diego, California; Win Ward Company, Pomona, California; Gar Wood-Los Angeles Truck Equipment, Inc., Vernon, California; Woeber Auto Body & Manufacturing Company, Denver, Colorado; S. & M. Supply Co., Grand Junction, Colorado; Pearce Equipment & Steel Co., Salt Lake City, Utah

**GarWood
INDUSTRIES, INC.**

Wayne, Michigan
Richmond, California

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

ed to the company's line and all rims from 29 in. in diameter and up are being made stronger and heavier. The big rims are being equipped with a new locking device that secures all rim parts and completely eliminates the possibility of slippage. . . . **Circle No. 194**

V-8 engine for scraper

The first V-8 diesel engine in a production earth-moving scraper has been announced by LeTourneau-Westinghouse Co. The engine



is a GM 8V-71, 8-cylinder, 2-cycle diesel offered as optional equipment on the L-W 20-yd. C Fullpak Scraper. Engine is rated at 270 hp. at 2,100 rpm. Acceleration is increased by 30% over the standard powered scraper. The engine

is a four-valve type with four exhaust valves for each cylinder. Practically all parts are interchangeable with other GM series 71 diesels. The V-Power C Tournapull has a step gear transmission with five forward speeds to 27 mph., a heavy-duty 16-in. air-assist clutch, readily accessible components, and a 28% larger radiator. The V-Power C Tournapull with C Fullpak Scraper is priced at \$42,613. . . . **Circle No. 195**

Brush burner

A high velocity fan with steel cowling which directs a stream of air onto a brush or stump pile to



force fast, complete burning has been marketed by **Fleco Corp.** The new unit, called Model FFP Fire Fan, is powered by a 3-hp. Briggs & Stratton engine which turns a 24-in. 6-blade fan, producing an air velocity up to 32 mph. The fan is rated at 12,000 cfm. Adjustable vents permit the full flow of air to be directed to a specific area. A self-priming pump sprays fuel oil onto the pile in a carefully controlled flow for additional burning efficiency. A nozzle and 21 ft. of hose are supplied. The unit is available on skids or can be mounted on a truck or jeep. . . . **Circle No. 196**

Tractor-compressor combination

An improved model of the 125 Tractair, combination tractor-compressor, has been announced by **Le Roi Division, Westinghouse Air Brake Co.** The new model is equipped with a Le Roi single-stage, piston-type compressor built integrally with a 42-hp. engine. It provides 125 cfm. of free air compressed to 100 psi. This is sufficient power to run two heavy or

Maximum SAFETY

plus SAVINGS

1. Matched set of angular contact bearings.
2. Practically friction free.
3. Seal keeps grease in, foreign matter out.
4. Faster hoisting due to non-spinning loads.
5. Faster load placement due to easy load turning.
6. Faster rigging due to elimination of cranky wire rope performance.
7. Elimination of twists and kinks means longer wire rope life.
8. Safer load placements due to non-spinning loads.

21 standard types available from
½ ton to 250 ton working load

DISTRIBUTORS

John Batchelor, Los Angeles, Calif.; Weeks-Howe-Emerson, San Francisco, Calif.; Mallory Logging Equipment, Portland, Ore.; B & J Equipment, Seattle, Wash.; Power Rental Equipment, Denver, Colo.; Atlas Equipment Co., Salt Lake City, Utah; Fresno Wire Rope & Rigging, Fresno, Calif.; Western Machinery Co., Phoenix, Ariz.; Mine Supply Co., Albuquerque, N.M.; Republic Supply Co., San Leandro, Calif.



MILLER SWIVEL INSULATOR LINK

Electrocutions from accidental crane boom contact with overhead wires CAN be prevented. 50,000 Volt Protection. Seven sizes—½ to 35 ton. For whip line or load blocks.

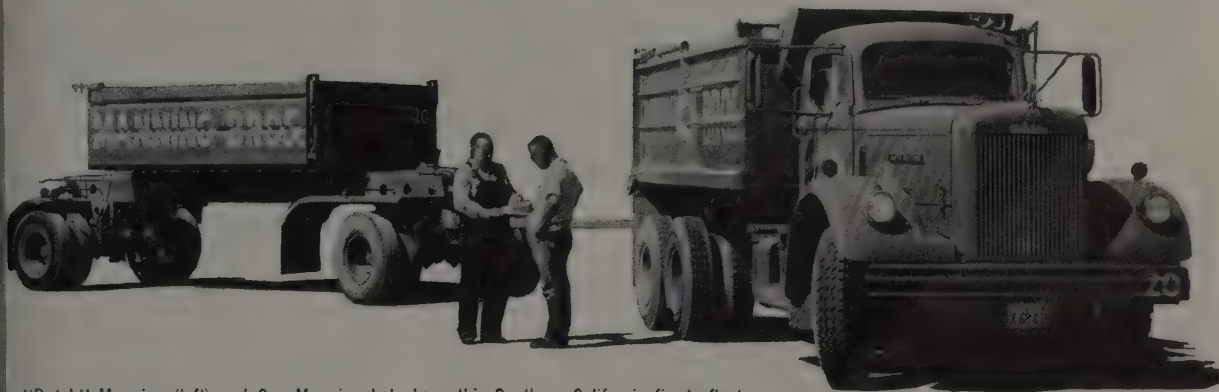
Miller Swivel Products Inc.

P. O. BOX 938 • POMONA, CALIF.

Manning Bros. Rock and Sand Co., keeps ahead of rigid delivery schedules with the new White 4200...

SUPER HAULER

for the West's Billion Dollar Construction Industry



"Dutch" Manning (left) and Guy Manning help keep this Southern California firm's fleet of all White's on the move, serving the area's bustling construction and building program

You, too, will earn more with WHITE!

It takes a strong, efficient fleet of trucks to keep pace with the West's expanding economy.

Manning Brothers have learned this fact in 41 years of hauling rock and sand throughout Southern California. That's why Manning maintains an all-White fleet.

These White Super Haulers are not "standard", assembly-line trucks... indeed not! They're custom-engineered — built to do a specific job best!

Whatever your haul — sand, steel or the 1001 products made in the West's flourishing industrial empire — you'll find a White Super Hauler to help you do your hauling job better. Get the facts from your White representative now!

SUPER HAULERS STAY ON THE JOB

with *White Superservice!*

Ask any White owner! He'll tell you that wherever your White works, there's dependable White service nearby to help you keep your trucks in top earning condition. Parts are readily available from the vast network of White dealers and from conveniently located parts warehouses. White service shops are the finest, most completely equipped anywhere. White keeps your trucks on the go!

Part of Manning's fleet of 25 Whites in service daily throughout Southern California.



WORLD LEADER IN HEAVY DUTY TRUCKS

THE WHITE MOTOR COMPANY

CLEVELAND 1, OHIO

Branches, distributors, dealers in all principal cities.


WHITE

... for more details, circle No. 70 on Reader Service Postcard

three medium breakers. The tractor can travel at speeds of 15 mph. and climb or work on a 2-to-1 slope. Model changes include a longer hood to cover the battery, regrouping of instruments, and use of a single crank case and oil pump for both the engine and compressor cylinders. Both engine and compressor have replaceable wet type cylinder sleeves. Ignition system is increased from 6 to 12 volts. Optional equipment available for the tractor includes power steering and a complete line of attachments.

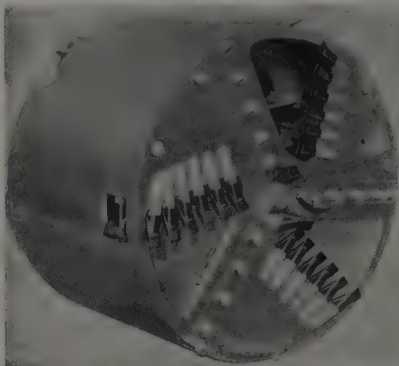
... Circle No. 197

Dredge cutting head

A cutting head powered by hydraulic motor which cuts through clay seams and screens out large rocks and debris has been developed for use on dredge section lines by the **Van Gorp Mfg. Co.** Called an "Aggretator" the unit has double edged cutting teeth mounted on solid plate frames spanning both sides of the intake section. Oscillating frame cuts through cemented deposits while solid plates and division bars push rocks away from the intake. Unit includes a short length of steel suction tube and flanges for quick mounting on dredge section line. ... Circle No. 198

Drilling bucket has carbide teeth

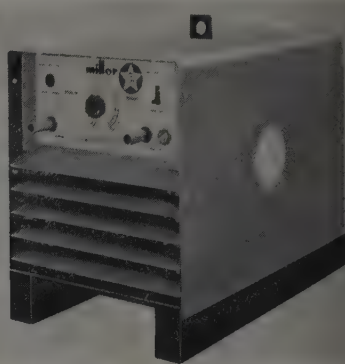
A special drilling bucket with fifteen constant tungsten carbide blocks and 18 chisel points as well as a fish tail and 2 chisel points on



the cutter bar head for drilling large diameter holes in hard shale, sandstone, coral and other hard formations is announced by **Calweld, Inc.** The bucket drill rotates at about 20 rpm. to cut through hard sub-soil formations. Tungsten carbide blocks can be adjusted for wear. Blocks and chisel points are replaceable. Bucket shown is 36 in. in diameter. Other sizes are available. ... Circle No. 199

All-weather welding unit

Special coatings on components of the Model SRH d-c rectifier type welder, manufactured by **Miller Electric Mfg. Co.**, are combined with various construction features of the case to give the unit all-weather performance. Among these weather-proofing features are baked varnish coating of transformer, control cores and coil a



semblies; protective coatings on rectifiers, cooling rings and fan blades; phosphatizing of base and all sheet metal parts. The units have successfully withstood salt spray tests. ... Circle No. 200

THIS JOB 6 MONTHS AHEAD OF SCHEDULE



Stang dewatering cuts time by 50% and reduces costs!

Maximum coordination between wellpoint dewatering, excavation, concrete and rip-rap moved this beach front flood control project ahead by six months. As a result, more than substantial unit cost savings were realized.

Saving time and money by efficient dewatering is a Stang-proved fact. Consult them on your next project for the finest in engineering, equipment and service.

Project: Santa Ana River Improvement;
Orange County, Calif.
Flood Control District
General Contractor:
MacDonald & Kruse
Dewatering Contractor:
Subgrade Engineering

JOHN W. STANG CORPORATION

Engineers and Manufacturers of Dewatering Equipment, Wellpoint and Pumping Systems Dewatering Planning—Equipment—Service

8221 Atlantic Avenue • Bell, California

Tacoma

Minneapolis

Omaha

Tulsa

Mobile

St. Petersburg

Putting water
in its place

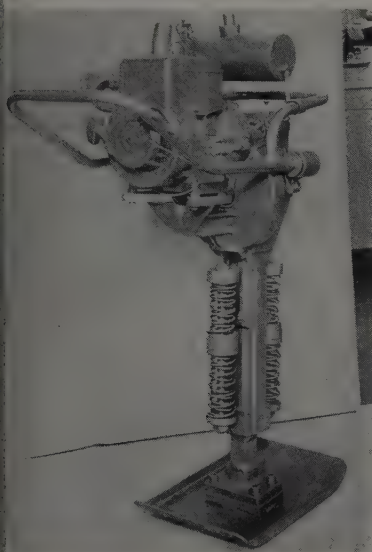


...for more details, circle No. 71 on Reader Service Postcard

WESTERN CONSTRUCTION—September 195

Motor driven tamper

A self-contained compactor operated by one man and powered by a small gasoline engine is being manufactured by **Racine Hydraulics & Machinery, Inc.** The Rapak earth compactor operates without hoses, lines or cords. Interchangeable shoes provide a range of widths



from 6 to 18 in. The machine has an adjustable rate of blows from 100 to 600 per minute. The machine produces compaction greater than 100% Proctor Density in clay through granular soils. It is inexpensive to operate and its simplicity of design allows servicing on the job. Retail price is \$875 f.o.b. factory. . . . Circle No. 201

Versatile 3-wheeled crane

A self-propelled 3-wheeled chassis which mounts any of four optional crane assemblies is announced by **Austin-Western Works of Baldwin-Lima-Hamilton Corp.** Designated Model 110, the crane has capacities of 3 to 5 tons. Simplest of these four optional rigs is the hydraulic cable hoist requiring manual boom topping. This rig will lift just over 5,000 lb. at 7 ft.

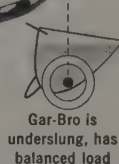
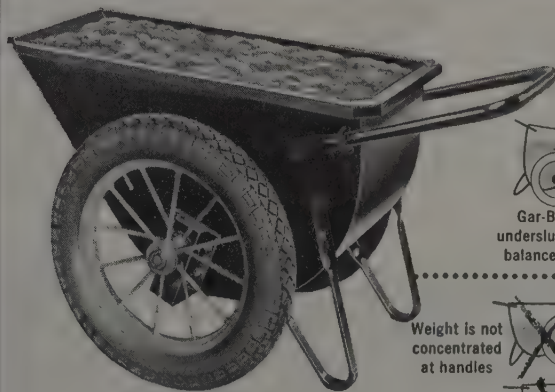


ahead of the bumper, and 10,000 lb. at 2 ft. from the bumper. Longer reach is obtainable with more advanced boom equipped with hydraulic boom topping and a 6-ft. manual or power extension. This version will reach 13 ft. ahead of the front bumper and lift 3,000 lb. Maximum height of the crane hook is 19 ft. 2 in. A third version of the Model 110 has a hydraulic telescoping boom which extends horizontally from 7 to 13 ft. All operations are hydraulically controlled from the operator's seat.

The fourth version has an optional swing mechanism that is completely hydraulic and which rotates the boom through 220 deg. This rig provides maximum maneuverability. Boom telescopes from 7 to 13 ft., rotates through 220 deg. and positions from horizontal to an angle of 50 deg. by hydraulic power. Available manual extensions give the boom a working radius of 18 ft. 7 in. Features of these four versions are available in any combination on the standard chassis. . . . Circle No. 202

designed WITH CONCRETE IN MIND

GAR-BRO CONCRETE CART



Weight is not concentrated at handles

Gar-Bro Cart is not high, unstable

... makes a man want to deliver a full load!

When workmen race to work early just to get a Gar-Bro Cart there must be a difference. And Gar-Bro's balanced design makes that difference.

Gar-Bro Carts are designed specifically for heavy concrete ... are balanced when fully loaded ... are definitely lighter at the handles. They are easier to push, easier to maneuver, easier to control and pour concrete.

Here is a cart that is 25% lighter in weight than other carts; that will handle 30% more load with half the effort and yet it costs no more.

See your Gar-Bro dealer or write for catalog!

GAR-BRO MANUFACTURING CO., Los Angeles, Calif. • Peoria, Ill.
General Offices: 2415 East Washington Blvd., Los Angeles 21, Calif.

GAR-BRO

CONCRETE
HANDLING
EQUIPMENT



THE WORLD'S MOST COMPLETE LINE

... for more details, circle No. 72 on Reader Service Postcard

News of DISTRIBUTORS

Hi-Way distributors named

New distributors appointed by Highway Equipment Co., Cedar Rapids, Ia., are the G. K. Machinery Co., Boise, Idaho, and Normont Equipment Co. of Great Falls, Mont. G. K. will handle the Hi-Way line of ice control spreaders and bituminous paving equipment in the southern half of Idaho, while the Normont company will serve the northeastern section of Montana.

Ernest Esgate joins Sun Equipment Co.

Ernest E. Esgate has joined Sun Equipment Co., Oakland, Calif., as vice president. He will work with Charles and Ed Grant and their associates as representatives of Blaw-

Knox, Diamond, Madsen, Cleaver-Brooks, Etnyre, Miller and other manufacturers of equipment used in rock plants and concrete and asphalt construction. Esgate is known nationally as a consultant on construction equipment. In addition to extensive experience with the U. S. Corps of Engineers, he was previously with Thew Shovel Co. and Continental Copper & Steel Industries.

N C Machinery expands

N C Machinery Co., with headquarters in Seattle, has purchased 8.6 acres in Chehalis, where plans are under way to construct a new plant consisting of a store for parts, service and sales, with a separate building for roller-rebuild,

steam cleaning, and painting. The new branch will be a complete facility to serve the machinery needs of southwestern Washington. Branches are already maintained at Mount Vernon, Port Angeles, and Tacoma.

PM distributor appointments

Electronic Sales & Service Organization, Twenty-Nine Palms, Calif. has been appointed a stocking distributor for Pacific Mercury electric plants and PM communications equipment. A complete parts and service department will be maintained. Likewise, Tucker & Sons, Tacoma, Wash., will distribute PM equipment in that area.

Two new distributorships announced by Trojan

Announcement is made by the Trojan Division of The Yale & Towne Manufacturing Co. of two new outlets. Connell Motor Truck Co., Stockton, Calif. has been assigned five counties in California: Madera, Fresno, Kings, Tulare and Kern. In Wyoming, Century Truck Co., Inc. of Casper will distribute the Trojan line in all of Wyoming with the exception of Teton, Lincoln, Sublette, Sweetwater, and Uinta counties.



PORTLAND MACHINERY DEALERS HOLD ANNUAL OUTING

PART of the big turnout for the Portland Machinery Dealers Assn. is this foursome. From left, Frank Cooper, president, Howard-Cooper Corp.; Jim Wahoske, Columbia Equipment Co., new president of the association; R. D. Reishaus, International Harvester Co.; and Jack Hatton, Hatton Machinery Co., Seattle, regional director of AED.

At the group's brief business meeting, Wahoske was elected president, succeeding Frank Parker, Howard-Cooper Corp. Lloyd Miller, Western Equipment Co., was elected vice-president, replacing Ed Gurney of Wood Tractor Co. Don Wilson of Howard-Cooper Corp. was named secretary-treasurer.

Retiring President Parker carried off the golf honors in the form of the International Harvester trophy with a net 65 and a lucky flip. Parker finished in a 3-way tie with New President Wahoske and George Hudson of Clyde Equipment Co. Wahoske won the toss for second, leaving Hudson in undisputed possession of third place.

Machinery dealers and manufacturers from Portland and the Pacific Northwest attended the tournament and dinner which followed.

New pile-hammer outlet

McKiernan-Terry Corp. announces that its diesel "C" type, double-acting and single-acting pile hammers will now be distributed by George M. Philpott Co., Oregon Ltd., Portland. This distributor will also handle the general McKiernan-Terry line of equipment including pile extractors, leads, sand drain equipment, steam generators and special driving equipment.

Recent appointments at Moore Equipment Co.

Recently promoted to the position of vice president and general manager for sales, advertising and other departments in the H. W. Moore Equipment Co., is Jack Moore. He has been with the Denver distributorship since his student days when he worked part time. His former post as sales manager has been filled by Brad Martin. Martin is well known in the Colorado territory, having served Moore as assistant sales manager.

(Continued on page 134)

YOU'RE AHEAD

because the
specialized experience of
two pioneer companies
in front-end loaders
is now combined...

Now Tractomotive Corporation has become part of Allis-Chalmers... and that means we'll be able to serve you better than ever. One very important reason is that the specialized experience of each organization in its field cannot be surpassed.

Allis-Chalmers pioneered its history-making HD-5G in 1945... has led the field in crawler shovel design and performance ever since... now offers the most complete line of such equipment in the industry, with bucket sizes from 1½ to 7¼ cu yd.

The Tractomotive team has been building heavy-duty wheel loaders since 1948... has consistently pioneered developments of great value to users, including torque converter drive and single-lever shifting control.

Through the combined facilities of these two pioneers,

YOU'RE with a **TRACTOLOADER**
AHEAD ...a complete line now built
and backed by Allis-Chalmers

Seven models—34 to 130 hp—up to 9,000-lb carry capacity. Torque converter drive in every model.



move ahead with **ALLIS-CHALMERS**
...power for a growing world

... for more details, circle No. 73 on Reader Service Postcard



ALLIS-CHALMERS

—pioneer of the world's first successful hydraulically-controlled crawler-mounted tractor shovel.

result of 14 years' leadership



TRACTOMOTIVE

—one of the first to develop heavy-duty rubber-tired loaders.

result of 11 years' leadership

we offer you industry's most complete line of front-end loaders, on rubber or tracks... with these added basic advantages to back it up!

- another modern plant joins Allis-Chalmers' extensive facilities for manufacturing construction machinery
- a company-wide record of engineering leadership in all types of heavy-duty equipment
- widespread research activity that insures continuing progress
- original factory parts and blue-chip parts control
- increased man power in sales and service

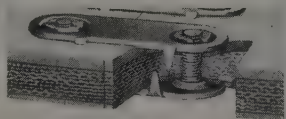
See 'em at work—your Allis-Chalmers dealer will be glad to demonstrate the machine of your choice—wheel or track-mounted, whichever meets your job needs best. Just give him a call. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wis.

Flexible...

HEADQUARTERS FOR

FLEXCO®

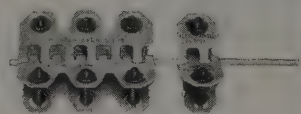
**HD® BELT FASTENERS
FOR SPLICING, REPAIRING
RIPS AND WORN SPOTS**



WRITE FOR BULLETIN F-112

**FLEXCO HINGED
500X & 375 FASTENERS**

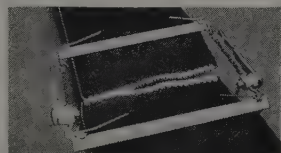
**FOR EXTENSION BELTS IN
MINING AND CONSTRUCTION**



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500X & 375

FAR-PUL® BELT CLAMPS

Install your belts the modern way
(eliminate wood blocks).



WRITE FOR BULLETIN FP-1

**ALLIGATOR®
V-BELT FASTENERS**

... for low cost, custom-made
V-Belts



Sizes for B, C, D, E and BB V-Belts.

WRITE FOR BULLETIN V-227

Flexible

STEEL LACING COMPANY

4704 Lexington Street • Chicago 44, Illinois

... for more details, circle No. 74



Moore



Martin

To cover the northwestern section of the state, R. A. "Dick" Tremaine has joined the sales staff. He has had nine years' experience in construction and earthmoving equipment.

MANUFACTURERS

Appointments by White Motor Co.

Joseph E. Adams, vice president-manufacturing since 1956, and a member of the White organization for fifteen years, has been elected executive vice president for manufacturing and development of The White Motor Co. It is a newly cre-

ated position established as a result of continuing expansion and diversification of White Motor's sales and product lines which now embrace White, Autocar, Reo and Diamond T trucks and transport tractors, and White Superior Diesel stationary engines.

New contractor service manager

American Cyanamid Co., New York City, announces the appointment of Stuart A. Currie as contractor service manager of the explosives and mining chemicals department. With headquarters in Latrobe, Pa., Currie will be responsible for nationwide coordination of marketing to the construction industry.

Lorain features described at Thew schools

The Thew Shovel Co. recently sponsored for the first time a series of two sales training schools. Representatives of Thew-Lorain distributors from all over the country attended the two 5-day courses covering the complete line of the Lorain shovel-cranes, and front-end loaders.

OPPORTUNITY FOR A CAPABLE, ENERGETIC SHOP MANAGER

Wheeler Machinery Co. is the Caterpillar Tractor Co. dealer in Salt Lake City, Utah. We are a well financed, medium-sized dealership with an excellent reputation after being in this type of business for thirty years.

We are determined to be the best heavy construction equipment dealer in our area. We have been expanding rapidly, and to accommodate our increased business, one year ago we moved into a new, modern plant which is fully equipped with the latest and most efficient shop tools and other service facilities—all to better serve our customers and give better representation to our manufacturers.

Our shops will accommodate 20 complete machines at one time, and we are now working about 45 men. This could be built up to a 75-man shop.

We are looking for a man with the ability to manage such a facility and really make it function. Starting salary will depend upon how well his qualifications meet our requirements. We would like a letter fully stating experience, family and all other details that will help us to get a complete understanding of all qualifications. Interviews will then be arranged with selected applicants.

If you are not a top man, please do not write.

WHEELER MACHINERY CO.

330 West 21st South Street Salt Lake City, Utah

... for more details, circle No. 75

IF YOU POUR CONCRETE

these catalogs are
for you...

just check those desired

☐ Catalog featuring EFCO Steel Forms available on a purchase basis.

☐ Catalog featuring Economy Steel Forms available on a rental basis.

☐ Catalog featuring EFCO Steel Forms, Economy Steel Forms and Special Economy Steel Forms.

☐ Folder featuring Economy Steel Forms for precast, prestressed concrete.

Economy Forms Corp.
Box 128-V, H. P. Station
Des Moines, Iowa

Please send literature checked above, and address of nearest sales office (there are 24 coast-to-coast).

Name _____
Firm name _____
Street address _____
City _____ State _____

... for more details, circle No. 76

Allis-Chalmers to acquire Tractomotive construction equipment

Plans to acquire Tractomotive Corporation, Deerfield, Ill., through an exchange of stock is announced by Allis-Chalmers Manufacturing Co., Milwaukee, Wis. One of Tractomotive's principal products is a rubber-tired wheel loader called the Tractoloader which is sold through A-C construction machinery dealers. The Illinois company also manufactures front-end loaders, rippers, side-booms and other equipment for attachment to crawler tractors. Since 1945 they have been a major supplier of this equipment to Allis-Chalmers.

Eden heads sales in K&M division

Kenneth M. Eden has been appointed general sales manager of the Building Products Division of Keasbey & Mattison Co., Ambler, Pa. He has been associated with the company since 1934.

Grant Metzger elected vice president—production

Calaveras Cement Co., San Francisco, elected Grant W. Metzger as vice president in charge of produc-

tion to succeed E. M. Barker, deceased. Metzger had been manager of the company's San Andreas, Calif., plant since 1953. This post is now being filled by Orrin E. Weeks.

Hal Malloy manages Sacramento branch for Union Wire Rope

Following a successful record in wire rope and sling sales and service in the East, Hal Molloy has been transferred by the Union Wire Rope Co. to manage its branch at Sacramento, Calif. In addition to managerial duties, Molloy will contact wire rope users in California and Nevada.

Cook Bros. buys Brogdex division

J. E. Hall, executive vice president, Cook Bros. Equipment Co., Los Angeles, announces that his company has purchased the Trailer Hopper and Truck Body Division of Brogdex Company. Brogdex bottom-dump trailer hoppers are well known throughout the West in hauling dry flowable material in bulk. Bob McClurg, former sales manager of this division with Brogdex, is now associated with Cook Bros. and will specialize in the sale of bottom-dump trailers.

Cox heads Armco's Calco division

Jack H. Cox has been named manager of the Calco Division of Armco Drainage & Metal Products, Inc., one of the nation's largest manufacturers of steel construction products. The Calco Division includes California and most of Nevada and Arizona, and has its headquarters in Berkeley, Calif. Formerly manager of drainage and allied products sales, Cox succeeds L. W. Hanson, who is retiring.

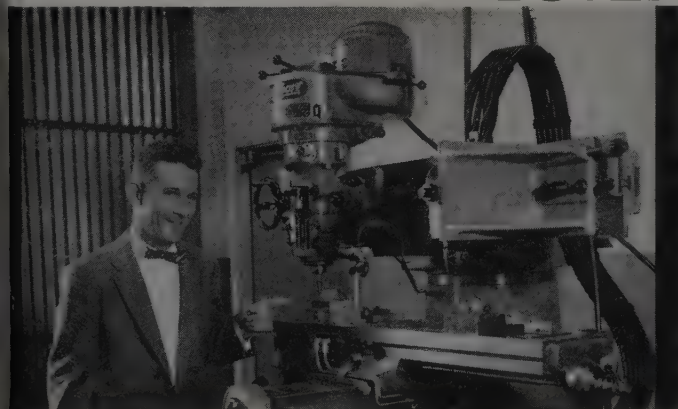
Chicago Pneumatic buys Reich Bros.

Chicago Pneumatic Tool Co. has acquired Reich Bros. Manufacturing Co., Inc. of Terre Haute, Ind., producer of a line of truck and crawler-mounted hydraulic rotary blast hole drills and drilling rigs for down-the-hole blast hole operations.

Edward C. Gledhill dies

Edward C. Gledhill, 80, one of the pioneers of the road machinery business, died recently at Galion, Ohio. He was the founder of Gledhill Road Machinery Co. Gledhill started his 66-year long business ca-

ANOTHER SATISFIED INSURANCE BUYER



GEORGE FRY, JR., President, True Trace Sales Corporation of El Monte, says:

"We believe in safety on the job. So does our insurance agent, Lewis Ross of Columbia Associates, Inc. That's why he recommends Industrial Indemnity as our workmen's compensation carrier. Their safety engineers consistently help us improve our in-plant safety program, and we save on our insurance costs by eliminating work hazards in our shops. And, as a member of the Metal Workers Service Association insured by Industrial, we know we're getting the best insurance at the lowest possible net cost. We're grateful to Industrial and to our agent for the parts they have played in helping True Trace become the nation's leading manufacturer of machine tool tracer controls."

MODERN INSURANCE FOR MODERN BUSINESS



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reer as a part-time road contractor in 1893. Eighteen years of his distinguished career in highway construction equipment were spent as a salesman for the Galion Iron Works & Manufacturing Co. He founded the Gledhill Road Machinery Co. in Marion in 1930.

Pioneer Industries purchases King Trailer

Pioneer Industries, Inc., of Sioux City, Ia., has purchased the Load King Trailer division from Hansen Manufacturing Co. of Elk Point,

S. Dak. Pioneer will operate the production of 20- to 100-ton, low platform Load King trailers as a division of the company. O. D. Hansen, Jr., formerly with the Hansen company, is sales manager of the new division.

Westinghouse names director of works engineering

Burr Tupper has been appointed director of works engineering for the Westinghouse Electric Corp., and will direct construction of all new company plants throughout the country. Tupper was formerly project engineer and construction manager for Kaiser Construction Co., Oakland, Calif., and succeeds Walter W. Wendelken who is retiring from Westinghouse. Tupper's headquarters are in Pittsburgh, Pa.

Sales reorganization

Reorganization of Gar Wood Industries' truck equipment executive sales staff is announced. Harold H. Hippler, formerly general sales manager, truck equipment, becomes assistant director of truck and construction equipment sales.

Kaiser top management

Henry J. Kaiser, Sr., announces important changes in the top management structure of four of the principal companies in the Kaiser group. As chairman of the board of Kaiser Industries Corp., the parent organization, he said that the following executives were advanced to president and chief executive officer of the respective companies: J. L. Ashby, Kaiser Steel Corp.; S. A. Girard, Willys Motors, Inc.; W. A. Marsh, Permanente Cement Co.; and D. A. Rhoades, Kaiser Aluminum & Chemical Corp. Henry Kaiser, Sr., assumes the new position of founder-chairman of each organization; Edgar F. Kaiser becomes chairman of the board of each organization, and E. E. Trefethen, Jr., assumes the new position of vice-chairman of the board of each of the four companies.

Hank Davis joins Mobile Drilling

H. E. Davis has joined Mobile Drilling, Inc., Indianapolis, Ind., as district sales and service representative for nineteen Western



H. E.
Davis

states. Davis, for ten years a materials handling engineer with the California Division of Highways, brings a wealth of practical field experience to assist users of Mobile drilling equipment. Davis is working out of the Denver, Colo. office.

Euclid service training schools in California

A service training school covering Euclid earthmoving equipment was recently held at two points in California. Twenty-six Navy Seabees completed the four-day course at Port Hueneme, and twenty-four completed a similar course at U. S. Borax & Chemical Co.'s operation in Boron. Two Euclid factory instructors covered the theory and methods of preventive maintenance, trouble-shooting and repair using components from Euclid's mobile training unit to show locations of the points discussed.

profit from the
efficiency and
economy of a

LENKER

**DIRECT
READING
LEVEL ROD**



Every
Rod Reading
An Elevation.

No
Computations



Awarded
Medal of Merit
For Utility
— BY —
FRANKLIN
INSTITUTE
OF
PHILADELPHIA

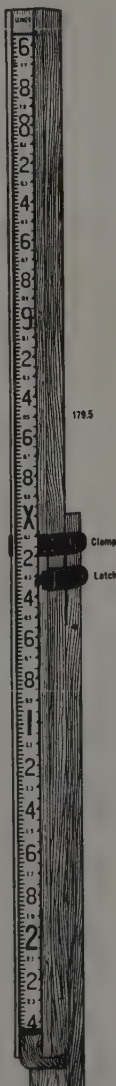


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**All-new 1959
Transistorized
M-SCOPE
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FINDER**

only
\$189.50

- Greatest depth penetration
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- Pinpoint accuracy
- One year between battery changes
- Built-in battery testers
- 90% less maintenance costs

**New, Transistorized
LEAK DETECTOR**

- Finds leaks faster, more accurately
- Weighs 80% LESS than ordinary equipment

only
\$295.00

SEND FOR FREE 1959 CATALOG

FISHER Research Lab., Inc.
Dept. WC-1, Palo Alto, Calif.

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... for more details, circle No. 79

Ramset has new sales manager

R. H. Benedict, Jr., has been named sales manager for Ramset Fastening System, Cleveland, a part of Olin Mathieson Chemical Corp. A member of the firm since 1955, Benedict was most recently assistant field sales manager. Ramset produces powder-actuated fastening tools, the Shure-Set hammer-n tools and assorted fasteners for use in steel and concrete.

Triangle Steel announces new southern California facility

Opening of an important new addition to the warehousing and distribution facilities of Triangle Steel & Supply Co. is announced by James F. McLaughlin, vice president and general manager. This facility located at San Bernardino, Calif., will service the entire industrial area in and around San Bernardino. The new Triangle installation maintains a complete inventory of steel bars, plates, structurals and reinforcing steel, pipe and other contractor supplies. The center is managed by Ernie Lemper who previously managed Triangle's Las Vegas, Nev., outlet.

New assistant district manager

Announcement is made of the appointment of Calvin Friar as assistant district manager in the Northern California-Northern Nevada district for The Union Metal Manufacturing Co. With headquarters at 127 Montgomery St., San Francisco, Friar will work with Charles Strom, district manager, in the sale of Monotube lighting poles, foundation piles, material handling equipment, and other company products.

Hetrick named head of Gar Wood tractor equipment sales

Appointment of Del Hetrick as tractor equipment sales manager is announced by D. J. Davis, Gar Wood Industries' director of sales. Hetrick has been associated with Gar Wood since 1947. He has held sales positions ranging from assistant product sales manager to that of assistant sales manager, tractor equipment, his latest post.

R. B. Parks appointed assistant sales manager

Raybestos-Manhattan, Inc., Passaic, N. J., announces important changes in its sales structure. R. B. Parks, formerly San Francisco district manager, has been appointed assistant sales manager for industrial rubber products and packings, and S. J. Synnott has been appointed general marketing manager of industrial rubber products. Park is being replaced by R. E. Stiles as San Francisco district manager.

Single warranty by Galion

Galion Allsteel Body Co., Galion, Ohio, has adopted a policy which provides for a single warranty to cover body, hoists, and chassis of Galion trailer units. To the ultimate user, this policy offers the advantage of a single source for replacement parts and the added convenience of dealing with only one manufacturer for all trailer components.

New AD&MP headquarters

Construction is progressing on a new office building to house the 130-man headquarters staff of Arm-

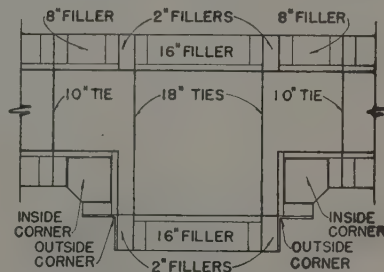
Power Plant Forming



Symons Forms Help Contractor Race Clock

Pour 530 Yards of Concrete in 5½ Hours

Racing a siege of wet, windy weather, workmen on the new \$10 million Blue Valley Station of the Independence, Mo. power plant, teamed up to pour 530 yards of concrete during one 5½ hour period.



Pilasters similar to the ones shown are easy to erect with Symons Fillers and Corners.

Sharp Bros. Contracting Co., Kansas City, the contractor, is using 8,000 square feet of Symons Standard High Strength Forms to pour 40,000 square feet of concrete. Much of the concrete is in thick slabs and pedestal bases with wall thicknesses varying from six to 84 inches. Symons 84-inch washer ties are being used in pouring pedestals for the turbines.

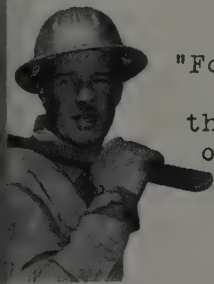
You can rent Symons Forms, Shores and Column Clamps with purchase option. Information on Symons products upon request.

Symons

SYMONS CLAMP & MFG. CO.

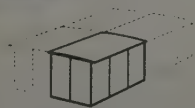
683 Thornton Street, San Leandro, California
Phone: LOckhaven 9-9159

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"For a field office
or a tool shed
that's quick to move
on and off the job,
Porta House is IT.
We have seven, on
different jobs."

And if you would like to get rid of that old shack and standardize — get Porta House. Prefabricated, bolted, waterproof plywood panels. No plans to draw, take only one man off the job about an hour. All you do is telephone. Always immediately available.



SIZES: 6' OR MORE X 9' OR MORE

PORTA HOUSE

Ridgely K. Dodge

6767 Broadway Terrace, Oakland, Calif

Phone collect for immediate delivery: OLYmpic 2-7237

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co Drainage & Metal Products, Inc., Middletown, Ohio. AD&MP is one of the nation's largest manufacturers of steel products for the construction industry. The new building is the first of three to be erected on a site near the general offices of the parent company, Armco Steel Corp.

L-W opens Salt Lake office

LeTourneau-Westinghouse Co. announces opening of an office at Salt Lake City to serve the Western area. According to President Merle R. Yontz, the move is designed to provide closer liaison between the company and its Western distributors. The new office is located at 1935 South Main St. O. A. "Art" Krueger, Western sales manager, and his assistant M. D. Hellman are both being transferred to Salt Lake City from Peoria to direct the Western activities.

San Jose Steel Co. opens So. Cal. division

Recently announced by San Jose Steel Co., Inc., is the opening of a Los Angeles Division at 12118 Bloomfield Ave., Norwalk, Calif. Division manager of the new plant

is F. A. "Avery" Klinger, Jr., who has been prominent in the reinforcing steel business in California for many years. He was formerly manager of Sierra Steel & Fabricating Co.'s reinforcing division, and prior to that was in partnership with his father in F. A. Klinger Co. in Stockton. Chief estimator is Don Weber. Clifford Z. Carlisle is production manager.

The company also announces the acquisition of the Reinforcing Steel Division of Hale Steel Company, which business has been integrated with the new division.

The parent company has been a prominent factor in the construction industry in Northern California for over thirty years. Headquarters are in San Jose, with branch plants in Portland, Seattle, Oakland and Fresno.

C. H. Hallett joins Allison Steel

Charles H. Hallett has been elected a director of Allison Steel Manufacturing Co. of Phoenix, Ariz., and appointed vice president and general manager. In his new capacity he will assume chief administrative responsibilities under William L. Allison, Sr.

Top level appointment by Standard Oil's Western Operation

Appointment of J. T. Higgins as vice president and general manager of manufacturing for Standard Oil Co. of California, Western Operations, Inc., is announced by Howard G. Vesper, Western Operations president. Higgins succeeds Fred Powell who was recently named



J. T. Higgins

president of California Chemical Co. In his new position Higgins will coordinate Standard's manufacturing activities at refineries in Richmond, El Segundo, and Bakersfield, Calif., and at the new refinery under construction in Hawaii. He has been assistant general manager of manufacturing for Western Operations since 1956, and will be succeeded in that position by N. T. Bogart.

(Continued on page 141)

HIGHWAY CONSTRUCTION or CITY MAINTENANCE DOUBLE WORK LOAD of limited-duty equipment at a MINIMUM COST with FROST LOADER SHOVELS



DISTRIBUTORS

No. Calif.
Edw. R. Bacon
So. Calif.
Calavar Corp.
No. Nev.
Truck Parts
& Equip.
So. Nev.
Calavar Corp.
Oregon (Eugene)
Star Equip. Co.
Arizona
WEMCO
Colorado
WEMCO
Utah
WEMCO
Idaho
WEMCO

The FROST LOADER SHOVEL attached to any truck automatically converts it to a double duty vehicle capable of doubling or tripling its work load. Ruggedly built to withstand years of abuse, yet easily operated, the hydraulically operated FROST LOADER can fit all trucks regardless of make, model, or design. FROST LOADERS are available in three models from 3/4 to one yard load capacity, and from 2500 to 4000 lbs. lifting capacity.

Also available is the FROST cut out attachment for use in pipe line installation clean up. Whether the job is to move gravel, sand, earth, snow or rubbish, the FROST LOADER can boost your truck's earning capacity and work load. Send for illustrated brochure.

P B LOADER MFG. CO.

P. O. BOX 341

FRESNO, CALIF.

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fast, dependable snow plow action with **MONARCH POWER** HYDRAULIC CONTROLS

Lift and lower the snow plow right from the cab . . . automatically . . . with Monarch Power Hydraulic Controls. Snow removal is easier, faster, more economical with Monarch. Instant up-and-down action with the flick of a wrist. See your dealer or write for illustrated folder.

DYNA-NIGHT

Battery-Operated



HY-LO-JACK HY-LO-JEEP

Fan-Belt
Driven



MONARCH ROAD MACHINERY COMPANY
1331 Michigan St., N. E. — Grand Rapids 3, Michigan

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WESTERN CONSTRUCTION—September 1956

UNIT PRICES

Selected abstracts for Western projects

HIGHWAY — Grading and surfacing in Tacoma, Wash.

Washington—City of Tacoma—State. Cherf Bros. Inc., and Sandkay Contractors, Inc., low of eight bidders with \$2,155,892 for 1.216 mi. of freeway construction in Tacoma, covering nearly 3,000,000 yd. excavation, and 3 bridges.

(1) Cherf Bros. Inc. & Sandkay Contractors Inc.	\$2,155,892
(2) Fiorito Bros.	2,359,202
Erickson Paving Co.	2,491,593
Woodworth & Co.	2,570,152
Guy F. Atkinson Co.	2,585,386

	(1)	(2)
Lump sum		
2,821,340 cu. yd.		
1,132,560 unit		
897,340 cu. yd.		
63,865 cu. yd.		
1,670 M. gal.		
220 hr.		
215 hr.		
7,565 hr.		
32,135 cu. yd.		
9,410 lin. ft.		
376 sta. yd.		
1,975 cu. yd.		
6,220 ton		
21,390 ton		
4,530 ton		
Clearing and grubbing	\$ 19,935.00	\$ 92,000.00
Common excavation	.23	.30
Overhaul	.30	.30
Embankment compaction	.04	.01
Structure excavation	1.05	1.05
Water	3.00	2.00
Pneumatic tired roller	10.00	8.00
Smooth wheeled power roller	8.00	8.00
Mechanical tamper	5.00	5.00
Topsoil	.30	1.00
Soil treatment class A	.30	.15
Finishing roadway	10.00	15.00
Gravel backfill for drains	3.75	5.50
Special gravel surfacing	1.35	1.35
Selected roadway borrow	1.00	.78
Crushed surfacing top course	2.00	2.00

BITUMINOUS SURFACE TREATMENT CLASS A

13,140 sq. yd.	.05	.05
32 ton	50.00	50.00
245 cu. yd.	4.00	4.00

BITUMINOUS SURFACE TREATMENT CLASS D

90 ton	50.00	50.00
650 cu. yd.	4.00	4.00

CEMENT TREATED BASE

4,970 ton	2.50	2.50
1,210 bbl.	5.40	5.40
15 ton	55.00	55.00
10 cu. yd.	5.00	5.00

ASPHALTIC CONCRETE PAVEMENT

17,440 sq. yd.	.05	.05
29 ton	50.00	50.00
205 cu. yd.	4.00	4.00
3 ton	60.00	60.00
5,270 ton	6.25	6.25
55 ton	20.00	20.00

OTHER ITEMS

18 sq. yd.	Cement concrete pavement		
	14 day 5 sack mix 6" section	7.50	4.00
45 sq. yd.	Cement concrete driveway		
	14 day 5 sack mix	5.50	4.00
46 cu. yd.	Unfinished cement conc. pave.		
	3 day 6 sack mix var. sec.	30.00	22.00
2,726 sq. yd.	Cement concrete sidewalk	3.15	3.15
870 lin. ft.	Mountable cement concrete curb	1.75	1.70
4,448 lin. ft.	Cement concrete curb, gutter	1.75	1.70
625 lin. ft.	Special cem. con. curb, gutter	1.60	1.60
4,414 lin. ft.	Type A precast traffic curb	2.12	2.00
106 lin. ft.	Type C precast traffic curb	2.12	2.00
33 ea.	Precast traffic buttons	2.25	1.00
2,300 sq. yd.	Precast conc. slope protection	5.00	7.50
1 ea.	Illum. term. nosing type No. 1	164.00	60.00
100 lin. ft.	Galv. conduit pipe 3/4" diam.	.55	1.50
22 lin. ft.	Galv. conduit pipe 1 1/2" diam.	1.30	2.50
1 cu. yd.	Hand placed riprap	25.00	25.00
21 ea.	Monument cases and covers	30.00	25.00
72 ea.	Right of way markers	8.00	7.00
56 ea.	Guide posts type A	6.00	6.00
14,266 lin. ft.	Chain link fence type No. 1	2.10	2.12
550 lin. ft.	Chain link fnc. type No. 1 mod.	2.70	2.38
9 ea.	Double 14' chain link gates N.	150.00	112.00
1,917 lin. ft.	Permanent road barricades	3.25	3.25
8 lin. ft.	Plain conc. sew. pipe 4" diam.	1.00	1.00
213 lin. ft.	Plain conc. sew. pipe 8" diam.	1.25	1.25
730 lin. ft.	Rubber jtd. extra strength pl.		
	conc. sewer pipe 6" dia.	1.55	1.55
	Ditto 8" dia.	1.95	1.95
2,967 lin. ft.	Ditto 10" dia.	2.45	2.45
3,174 lin. ft.	Ditto 12" dia.	3.15	3.15
576 lin. ft.	Ditto 15" dia.	3.95	3.95
614 lin. ft.	Rubber jtd. reinforced conc.		
2,997 lin. ft.	sewer pipe 15" diameter	4.85	4.85
	Plain conc. cul. pipe 12" dia.	1.95	1.95
616 lin. ft.	Standard reinf. conc. culv. pipe		
6,155 lin. ft.	12" dia.	2.75	2.75
	Ditto 15" dia.	5.00	5.00
3 lin. ft.	Ditto 18" dia.	3.95	3.95
5,133 lin. ft.	Ditto 24" dia.	5.85	5.85
3,612 lin. ft.	Ditto 30" dia.	7.95	7.95
1,410 lin. ft.	Ditto 36" dia.	11.95	11.95
800 lin. ft.	Ditto 42" dia.	14.10	14.10
1,500 lin. ft.	Extra strength reinf. conc. culv.		
260 lin. ft.	pipe 42" dia.	17.50	17.50

428 lin. ft.	Rub. jtd. ex. strength reinf.		
	conc. culv. pipe 36" dia.	15.75	15.75
704 lin. ft.	Ditto 42" dia.	19.25	19.25
980 lin. ft.	Ditto 48" dia.	22.75	22.75
1,440 lin. ft.	Ditto 54" dia.	27.00	27.00
80 lin. ft.	Black steel sewer pipe 1/2" shell		
	10" dia.	10.00	10.00
10,529 lin. ft.	Type 1 perforated metal drain		
	pipe 6" dia.	1.30	1.35
	Ditto 8" dia.	1.70	1.90
596 lin. ft.	Ditto 10" dia.	2.50	2.65
600 lin. ft.	Type 1 metal drain pipe 8" dia.	2.38	2.35
6,496 lin. ft.	Type 1 metal culvert pipe		
1,138 lin. ft.	14 gage 12" dia.	3.75	3.75
	Manholes	235.00	235.00
85 ea.	Special manholes type B	210.00	210.00
7 ea.	Special manholes type C	380.00	550.00
12 ea.	Special manholes type F	720.00	750.00
9 ea.	Special manholes type F mod.	850.00	1,250.00
1 ea.	Special manhole type J	1,000.00	1,000.00
1 ea.	Special manhole type K	1,200.00	1,200.00
10 ea.	Lamp holes	35.00	35.00
165 ea.	Catch basins type No. 1	100.00	100.00
168 cu. yd.	Concrete class B	50.00	55.00
24 cu. yd.	Concrete class C	24.00	30.00
216 cu. yd.	Concrete class G	40.00	55.00
8,750 lb.	Steel reinforcing bars	.1	.12
5 ea.	Rein. concrete sewer caps	210.00	100.00
Lump sum	Restoring Lincoln bowl flygrd.		
375 lin. ft.	Reloct. temp. beam guard rail.	2.20	1.00
3 ea.	Adj. monument cases to grade.	35.00	35.00
1 ea.	Adj. manhole to grade	75.00	75.00
1 ea.	Adj. manhole invert to grade	125.00	125.00
2,370 lin. ft.	Removing conc. curb and gutter	.25	.25
15,100 sta. yd.	Removing bituminous pavement	10	.35
390 sta. yd.	Removing concrete pavement	5.00	5.00
64 ea.	Removing manholes	15.00	25.00
11 ea.	Removing catch basins	8.00	10.00
est.	Flagging est. \$5,000		

HIGHWAY—Relocation of railroad and highway

Oregon—Lane County—Corps of Engineers. Steelman-Duff, Inc. of Portland was low bidder at \$270,359 for construction of relocated S.P. railroad and State Highway #58 on Middle Fork Willamette River about 3 mi. southeast of Lookout Point Dam.

(1) Steelman-Duff, Inc.	\$270,359
(2) Durbin Bros.	278,884
Gibbons and Reed	303,183
Slate & Hall	318,186
Charles Parker	322,669

	(1)	(2)
2 ac.	Roadway clearing	\$2,000.00 \$1,300.00
1 ac.	Roadway grubbing	500.00 1,100.00
281,000 cu. yd.	Excavation, unclassified	.051 .055
	Rolling, additional roller hours:	
20 hr.	a. First 20 hours	20.00 20.00
70 hr.	b. Over 20 hours	15.00 15.00
	Sprinkling:	
100 M-gal.	a. First 100 M-Gal.	2.00 3.00
200 M-gal.	b. Over 100 M-Gal.	1.00 2.50
	Deleted	
2,350 cu. yd.	Structural excavation, unclassified	2.00 3.00
7,000 cu. yd.	Base course, in place	4.50 4.50
1,000 cu. yd.	Leveling course, in place	4.50 4.50
9 ton	MC 2 Asphaltic cement	75.00 75.00
1,170 ton	Asphaltic concrete, in place	10.60 10.60
110 cu. yd.	1/2 in.-1 1/4 in. material in shoulder	
	mat. in place	6.00 6.00
11 ac.	Grass, slope seeding, in place	500.00 500.00
1,950 lin. ft.	Guard rail, in place	2.80 3.00
	8-in. dia. perforated CMP, 16 gage, in place:	
50 lin. ft.	a. First 50 Lin. Ft.	3.00 10.00
200 lin. ft.	b. Over 50 Lin. Ft.	2.50 6.50
128 lin. ft.	18-in. dia. CMP culv., 14 ga., in place	6.50 7.00
186 lin. ft.	48-in. dia. CMP culv., 8 ga., in place	25.00 25.30
394 lin. ft.	54-in. dia. CMP culv., 8 ga., in place	30.00 32.00
10 cu. yd.	Reinf. concrete headwalls, in place	55.00 60.00
16,000 cu. yd.	Rock fill, in place	2.30 1.85

HIGHWAY—11.759 mi. in New Mexico

New Mexico—Dona Ana County—State. Ten bidders competed for a highway project in New Mexico on I-025 from junction U.S. 70 northerly with J. W. Jones Construction Co. coming in low at \$985,767.

(1) J. W. Jones	\$ 985,767
(2) Brown Const. Co.	1,013,980
Henry Thygesen & Co.	1,032,516
Jack Adams	1,046,420
O. D. Cowart	1,065,768

	(1)	(2)
lump sum	Clearing and grubbing	\$4,000.00 \$1,000.00
876,000 cu. yd.	Excavation unclassified	.17 .17
6,850 cu. yd.	Excavation for structures	1.50 1.50
95,000 cu. yd.	Ordinary borrow	.20 .20
49,120 M-gal.	Watering	.25 .25
2,500 hr.	Rolling tamping roller	4.00 5.00
1,200 hr.	Rolling pneumatic tired	4.00 3.00
2,500 hr.	Fifty-ton roller operation	5.00 5.00
4,340 hr.	Mechanical tamping	4.00 5.00
1,800,000 sta. yd.	Station yard overhaul	.01 .01
774,300	Quarter mile yard haul	.04 .04
	Grading	2,000.00 1,000.00
15,000 lin. ft.	Contour ditches	.15 .10
208 cu. yd.	Wire enclosed riprap	10.00 12.00
2,700 lb.	Wire fabric for riprap	.40 .50
210 cu. yd.	Excavation for riprap	3.00 2.00
260 lin. ft.	Steel stakes	2.00 3.00

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without proofs).

50 lin. ft.	Steel plate guard fence	5.00	4.00
124,200 lin. ft.	Galvanized barbed wire fence	.20	.10
1 each	Gates—standard type	50.00	50.00
200 each	Bracing	10.00	1.00
90 each	Right of way markers	7.80	6.00
1 each	Standard FAP markers type 1	50.00	75.00
230 each	Tr. tmbr. warning post refl. 6 in.	7.00	6.00
89,000 ton	Base course cement treated	.55	.80
14,100 bbl.	Portland cement	4.50	5.00
377,000 sq. yd.	Cement treated base—type B	.10	.12
2,250 bbl.	Bit curing seal material	8.00	7.65
6,348 cu. yd.	Class A concrete	36.00	40.00
270 sq. yd.	Class A conc. for blankets	9.00	7.00
842,876 lb.	Reinf. for concrete structures	.13	.10
1,020 lb.	Wire fabric reinforcement	.35	.30
1,044 lin. ft.	Culvert pipe, 24 in.	6.00	6.50
2,636 lin. ft.	Culvert pipe, 30 in.	7.50	7.60
1,316 lin. ft.	Culvert pipe, 36 in.	11.50	11.70
728 lin. ft.	Culvert pipe, 42 in.	13.00	13.60
2,436 lin. ft.	Culvert pipe, 48 in.	15.00	15.00
1,296 lin. ft.	Culvert pipe, 54 in.	19.00	18.90
146 lin. ft.	Stand. reinf. conc. pipe, 60 in.	21.00	19.80

HIGHWAY—4.814 Bellingham Freeway

Washington—Whatcom County—State. Wilder Construction Co. of Bellingham was lowest of five bidders at \$1,524,335 for road job in Bellingham from Fielding St. to Northwest Ave.

(1) Wilder Const. Co.	\$1,524,335
(2) Fiorito Bros.	1,535,985
Northwest Const. Co.	1,625,005
Erickson Paving Co.	1,695,462
Sather & Sons	1,714,001

	(1)	(2)
lump sum		
19,820 cu. yd.	Clearing and grubbing	\$.75
85 cu. yd.	Common excavation including haul	2.50
61,500 cu. yd.	Com. ditch excav. including haul	.55
20,400 cu. yd.	Stripping quarries and pits incl. haul	1.40
2,685 cu. yd.	Topsoil from stockpile	2.50
7,450 M-gal.	Structure excavation	2.00
7,850 cu. yd.	Water	.25
520 lin. ft.	Embankment compaction	.15
2,695 hr.	Slope treating class A	8.00
364 hr.	Pneumatic tired roller	8.00
624 hr.	Smooth wheeled power roller	6.00
425.5 sta.	Mechanical tamper	10.00
70 cu. yd.	Finishing roadway	6.00
985 cu. yd.	Gravel backfill for foundations	6.00
221,050 ton	Gravel backfill for drains	.50
14,800 ton	Selected roadway borrow	1.40
33,440 ton	Special ballast	2.50
25,300 cu. yd.	Crushed surfacing top course	1.50
	Sand borrow	

BITUMINOUS SURFACE TREATMENT, CLASS A

90,240 sq. yd.	Processing and finishing	.025	.025
220 ton	Asphalt cement MC-3	47.00	47.00
1,930 cu. yd.	Furnishing, placing crushed cover stone	4.75	4.75

ASPHALTIC CONCRETE PAVEMENT

67,160 sq. yd.	Preparation of untreated roadway	.025	.025
53 ton	Asphalt cement MC-3 prime coat	44.00	44.00
750 cu. yd.	Prime coat aggregate	4.50	4.50
14 ton	Asphalt cement for tac coat	65.00	65.00
12,690 ton	Class B	8.15	8.15
130 ton	Mineral filler	25.00	25.00

CEMENT CONCRETE PAVEMENT

133,830 sq. yd.	Cem. conc. pvmt., 14 day, 6 sack mix.	4.21	4.21
7 sq. yd.	Cem. conc. pvmt., 3 day, 6 sack mix.	6.00	6.00
15,320 sq. yd.	Unfin. cem. conc. pvmt., 14 day, 6 s. m.	3.50	3.50
155 sq. yd.	Cem. conc. driveways, 3 day, 6 sack mix	6.00	6.00
768 each	Capped dowel bars	.50	.50
528 each	Uncapped dowel bars	.45	.45
4 each	Temporary pavement spans	250.00	250.00
1,079 cu. yd.	Concrete, class B	21.00	20.00
242,330 lb.	Steel reinforcing bars	12	13
370 sq. yd.	Removing bituminous pavement	.50	.25
7 sq. yd.	Removing concrete pavement	5.00	10.00

OTHER ITEMS

32,717 lin. ft.	Cement concrete gutter	1.85	1.90
9,800 lin. ft.	Asphaltic concrete curb	.60	.60
lump sum	Bridge barrier curb		
23 each	Concrete inlets	100.00	100.00
470 lin. ft.	Cement concrete curb	1.75	1.80
5,695 lin. ft.	Cement concrete curb and gutter	1.75	1.80
4,845 lin. ft.	Mountable cement concrete curb	1.65	1.80
2,015 lin. ft.	Special reinforced concrete gutter	2.00	1.80
6,010 lin. ft.	Asphalt lined median ditch	2.50	2.50
10 each	Precast traffic buttons	3.00	5.00
3,530 lin. ft.	Extruded traffic curb	1.00	1.00
40 cu. yd.	Concrete, class G	60.00	60.00
1,367 lin. ft.	Type 1 metal drain pipe, 8" diameter	3.00	3.00
5,899 lin. ft.	Plain perf. metal drain pipe, 6" diam.	2.00	2.00
2,355 lin. ft.	Stand. reinf. conc. culv. pipe, 12" diam.	3.00	3.00
87 lin. ft.	Stand. reinf. conc. culv. pipe, 18" diam.	5.00	5.00
114 lin. ft.	Type 1 metal culv. pipe, 16 ga., 12" dia.	3.25	3.00
72 lin. ft.	Plain conc. or V. C. sewer pipe, 10" dia.	3.00	3.00
2 each	Manholes	250.00	300.00
26 each	Catch basins, type No. 1	100.00	100.00
96 each	Completing unfinished catch basins	50.00	50.00
13,660 lin. ft.	Beam guard rail	2.35	2.35
4,895 lin. ft.	Double beam guard rail	3.75	3.75
6 each	Monument cases and covers	40.00	50.00
814 sq. yd.	Cement concrete sidewalk	3.50	3.50
11 cu. yd.	Hand placed riprap	30.00	20.00
48,910 lin. ft.	Chain link fence, type No. 1	2.05	2.05
3,880 lin. ft.	Wire fence, type No. 1	.46	.46
1 each	Double 20' metal gate	80.00	80.00
11 each	Illum. terminal nosings, type No. 1	75.00	80.00
316 lin. ft.	Galvanized conduit pipe, 1 1/4" diam.	1.50	1.50
10 each	Adjusting manholes to grade	40.00	50.00
5 each	Adjusting catch basins to grade	40.00	40.00
416 sq. yd.	Removing cement concrete sidewalk	.50	.25



G. HERBST (right) has been appointed general sales manager of "Quick-Way" Truck Shovel Co., Denver, following the resignation of **T. S. Petersen**. Herbst has been with "Quick-Way" 28 years, in manufacturing, engineering, testing, field service and sales. Here he discusses a perplexing question with **Gilbert Rigdon**, executive vice president.

MC promotes John Kelley

John M. Kelley has been appointed sales engineer for the eleven Western states for **FMC Form-Crete** products. His former capacity with the company, **Food Machinery & Chemical Corp.**, was that of design engineer on steel concrete casting forms.

Pioneer appoints Callander

Announcement is made by **Pioneer Engineering**, Division of **Poor Co., Inc.**, of the appointment of **L. L. Callander** as assistant sales manager. Callander is a 15-year service veteran with the **Minneapolis** firm, designer and manufacturer of equipment for highway and heavy construction, mining, and other industries.

Imonetti receives promotion at Symons Clamp

Symons Clamp & Mfg. Co., Chicago, announces the promotion of **John E. Imonetti** to assistant general sales manager, **Eric W. Lane**. Imonetti has been with Symons for the past twelve years, during which time he has had charge of the sales engineering department as well as the product development section.

BE buys rights for wheel excavator

Bucyrus-Erie Co. has acquired the plans and patents for the **Kolbe Wheel Excavator**, the largest earth-moving machine ever built in America. **William L. Little**,

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POSITION WANTED

Construction equipment superintendent and experienced, professional master mechanic desires position. Write to Box 9A, **WESTERN CONSTRUCTION**, 609 Mission Street, San Francisco 5, Calif.

board chairman of **Bucyrus-Erie**, told upwards of two hundred industrialists at a recent demonstration of the equipment that "The machine may be used in large-scale strip mining of uranium and other big earth-moving jobs in addition to its present application in the coal fields.

Personnel promotions at Timken

Six men in **The Timken Roller Bearing Co.** have been named to new positions. **R. K. McConkey** has been promoted to general manager of the Industrial Division, and **Wyn E. McCoy** has been named assistant. **C. L. Simpson** has been promoted to auditor. In the company's engineering division, **A. E. Matejka** has been named chief product engineer; **R. H. Holsing** has been appointed chief engineer of the rock bit division; and **C. L. George** becomes assistant chief product engineer.

Jack Heuser heads Atlas Copco in U. S.

Atlas Copco A. B. of Stockholm announces the appointment of **Jack E. Heuser** as president of its two companies in the United States: **Atlas Copco Pacific, Inc.**, and **At-**



Jack E. Heuser

las Copco Eastern, Inc. Heuser was for nineteen years with the **Le Roi Division** of **Westinghouse Air Brake Co.**, and was its general sales manager since 1946. **Atlas Copco Pacific**, with headquarters in **San Carlos, Calif.**, operates district offices in **Seattle, Spokane, Salt Lake City, Phoenix** and **Denver**. **Atlas Copco Eastern** serves the East from **Paramus, N. J.**

Rates are \$15.50 a column inch. Copy should be sent in by the 15th of month preceding publication date.

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20 Ton, 25 Ton, 45 Ton, 80 Ton GEN. ELEC.

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Standard Steel buys division

Standard Steel Corp., Los Angeles manufacturer of road construction machinery and other machinery, has acquired the assets of **Cambridge Company**, Lowell, Mass., from **Carrier Corporation**. The Cambridge firm is now an operating division of **Standard Steel**, and Standard becomes a leading manufacturer of systems for transportation and storage of missile fuels.

Waukesha West Coast expansion

Waukesha Motor Co. of **Waukesha, Wis.**, a leading manufacturer of heavy-duty internal combustion engines, announces the purchase of the entire inventory of its distributor, **Waukesha Southern California**, which previous to its incorporation in the **Waukesha** distributor system had been the supply division of **Bethlehem Pacific Coast Steel Corp.**, with establishments at **Watts, Bakersfield, and Ventura, Calif.** This now gives **Waukesha** three new branch operations in these same locations.

Highway Trailer up-grades Stricker

Henry C. Stricker, Jr., chief engineer of **Highway Trailer Co.**, has been promoted to director of engineering of the truck-trailer and utility equipment manufacturing company. He has been chief engineer since 1954.

Craig receives promotion

Joseph E. Craig, with twenty-three years of experience in **Warner & Swasey's** advertising and sales promotion activities, has been made manager of **Construction Equipment Marketing Services**. The appointment follows the creation of a new **Marketing Services Department** in charge of **Baxter Fullerton**.

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