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Building Missile Bases **APRIL 1960**

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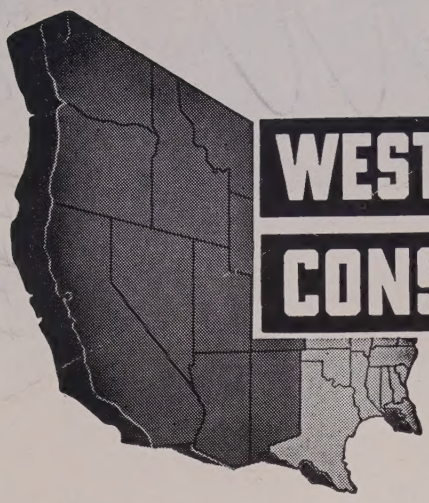

WESTERN CONSTRUCTION

KING PUBLICATIONS

APRIL
1960
Vol. 35 No. 4

CONTENTS

FRONT COVER—Man cage is suspended over yawning underground silo which will house propellants for Titan missile at Vandenberg Air Force Base. In background is the central silo for the missile itself. Note I-beams arranged radially for supporting 1-in. rods which carry slip-form concrete paver. Article on missile base construction in the West starts on page 47.

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For 34 years serving the construction industry of the Western States

CHARLIE OWEN STAKES HIS WHOLE OPERATION ON CHEVY'S STAMINA AND TORSION-SPRING RIDE

C. L. Owen, vice-president of GO Oil Well Service, Fort Worth, puts his faith and $15,000 worth of electronic equipment in his Chevy panel and sends it out on rugged oil field duty every day of the week. They used to have to pad the sensitive electronic recording panel to cushion out road shock and vibration. But not any more. Not with torsion springs soaking up bumps and jolts. Chevy's new ride is "made to order," according to Charlie Owen. "In our oil well locating operation we stay on the go anywhere, any time . . . and count on less breakage along with lower maintenance costs." The GO company goes for Chevy 100%. Driver John MacPherson says, "The '60 Chevy's ride and handling are really slick. You'd think this truck had power steering."

They're speaking right up, these owners of '60 Chevrolets, talking about a new truck build that's the best yet at putting out extra dollars'-worth of profit-producing work every day. And you'll be talking, too, once you turn these Chevy advancements loose on your money runs!

New truck-and-tire-saving ride that leads to shorter trip times, too. The biggest advance in trucking in years: independently suspended front wheels that step right over bumps, virtually eliminate most of the severe impacts that can wear out trucks and tires before their time. You profit by a big savings on maintenance; get a bigger daily work output because these trucks float you over rough roads with fewer slow-downs. And the tough torsion bar springs assist further in soaking up shocks before they can do any damage.

New longer lasting cab construction . . . new comfort that boosts driver efficiency. You'll find that drivers stay fresher, work better in a new Chevy cab. There's more leg room, head room and hip room than ever before, new visibility that's greater by more than 26%, new foam-padded seat, new see-at-a-glance instrument panel. And new cab construction features—double-panel roof, box-section door pillars and many more—will help keep your Chevy on the road years longer.

Tough truck power that knows the most about saving money. Efficient Chevy short-stroke V8's that range from 160 h.p. all the way up to 230 h.p., offer as much as 335 ft.-lbs. of torque for toughest going. Or America's most widely used truck 6's, engines that do more work per dollar with time-proved, truck-built components. Look into it for yourself; Chevy's totally new working ability is available at your Chevrolet dealer's right now. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

1960 CHEVROLET STURDI-BILT TRUCKS CHEVROLET

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

NEW EQUIPMENT

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

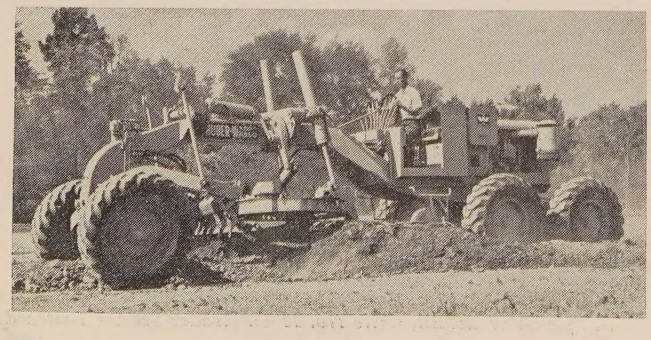
New model of Tellurometer

Based on recommendations from users during the past several years, a new and improved model of electronic Tellurometer has been introduced. Major refinements in the new model: The units are now all interchangeable, and each can be used either as a master unit or a remote. The built-in radio communication system of the Tellurometer has been redesigned and a head set added so that the operator's hands are

entirely free for taking notes. The separate power pack has now been transistorized and built into the instrument itself. Size has been reduced to 14 x 10½ x 10½, with a corresponding weight reduction of 20% (now less than 30 lb.). The instrument panel has been illuminated for easier reading in dusk or dark and the new model will operate under extreme ranges of temperature. The operating system of the new Tellurometer is unchanged from older models. The new model is based on a military version of the instrument tested by the U. S. Army under rugged field conditions. The instrument was developed and is manufactured by **Tellurometer, Inc.** *. . . Write No. 150*

Graders that reflect years of experience

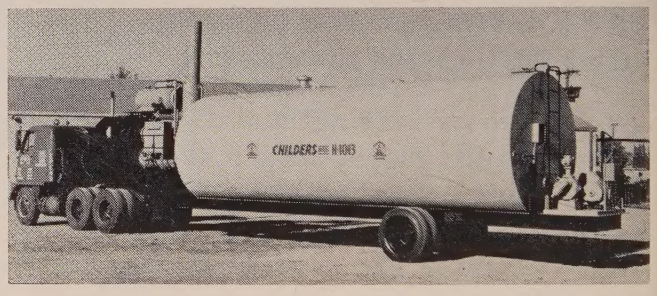
Designated Models 8-D, 9-D, 10-D, and 11-D, **Huber-Warco Co.** has announced a new series of motor graders. These machines reflect years of experience in grader design and construction by a company bringing out new refinements, advance features, and reliability. The models have been under field test since early 1958. Huber-Warco's objective has been the development of the best standard-transmission graders to meet the requirements of the 1960's. Field tests have demonstrated the units are rugged, dependable and economical to operate.



A greater selection of diesel engines is available from an 83-hp. model for the 8-D to a 160-hp. engine for the 11-D, six forward speeds and reverse are standard on all models. Shifting from forward to reverse speeds is carried out by movement of a single lever. Optional creeper gears provide extra slow speed for precision grading or for extra power. A new hydraulic booster makes steering easier. *. . . Write No. 151*

For portable and efficient asphalt storage

A trailer-mounted asphalt storage tank and heater combination announced by **Childers Manufacturing Co.** provides the operator of a portable plant with facilities usually found only in a permanent plant. The unit is completely plumbed and wired ready for



immediate operation when charged with circulating fluid and connected to a power source. An electric generating plant can be installed on the trailer if power is not available at the job site. Storage tanks are mounted on a heavy-duty, goose-neck trailer and are insulated with 2-in. Fiberglas. No direct firing is employed, eliminating the danger of overheating and all parts are accessible for adjustment or repair.

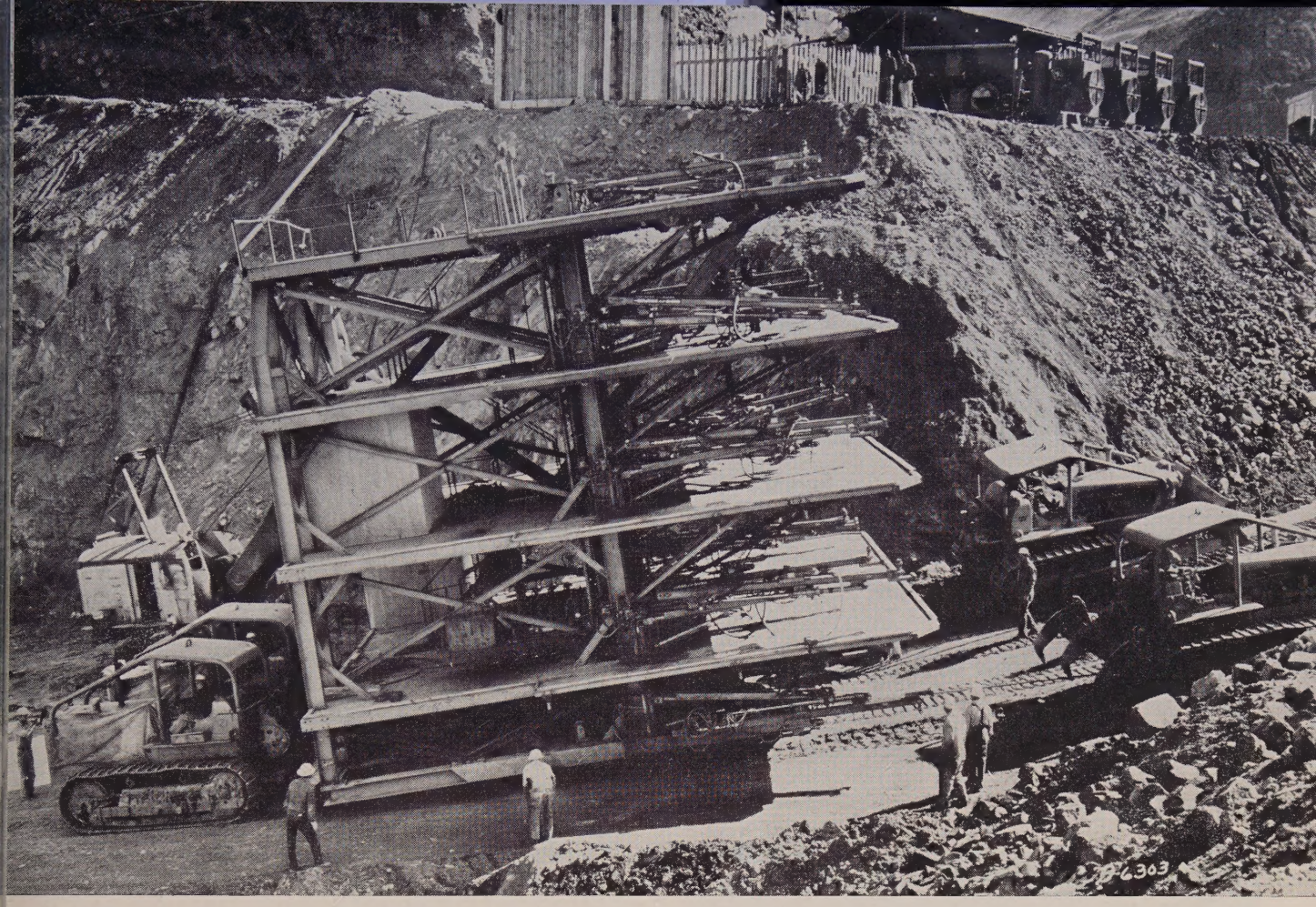
. . . Write No. 152

New hydraulic package for Ford tractors

By developing a new subframe and equipment hydraulic package, **Ford Motor Co.** enables the user of its tractors to mount any combination of Ford "Super-Duty" loader, Ford backhoe, or counterweight boxes on the tractor to fit job needs. The new package is now available for Fordson major diesel and Fordson power major tractors. The new loader has just been announced and is being made available at this time. It has a capacity of more than 1 ton and supplies the need for higher capacity tractor-mounted loading equipment than previously available from Ford for its tractors. It has a lift capacity of 2,500 lb. and a break-away capacity of 3,500 lb.

Power for the loader comes from the independent

. . . for more details, adv. opp. pg., write No. 12 on Reader Service Postcard →



World's biggest Hydra-Boom jumbo drives OXBOW TUNNELS

19 Hydra-Boom mounted I-R drifters on five-level air-driven jumbo, drill twin 42-ft bores for 200,000 kw hydro station

Shown above being moved up to the working area with an assist from four tractors, is the largest tunnel jumbo ever built—taller than a four story building and carrying the concentrated "fire power" of 19 Ingersoll-Rand D-45 drifters on 10-ft chain feeds with I-R Hydra-Boom mountings. Designed and built by Morrison-Knudsen Company, Inc., this huge jumbo was used to drive the twin 42-ft horseshoe power tunnels that will supply Idaho Power Company's 200,000-kw hydro-electric station on the Oxbow bend of the Snake River.

The Hydra-Boom mountings permit rapid hydraulic positioning of all drills from convenient centralized controls at each drilling station. Drilling 2½" holes 10 ft deep with modified Vee pattern in the hard, chunky columnar basalt of the area, the jumbo was moved alternately from one bore to the other—drilling in one while the other was blasted and mucked. The crawler-mounted jumbo is self-propelled in the working area by 25-hp I-R air motors.

Air power for the tunnel jumbo was supplied by a bank of six skid-mounted I-R electric-driven XLE compressors with a total capacity of about 8000 cfm at 100 psig—shown at upper right in the photo above.

Whenever you want fast, effortless drill positioning on any job, be sure to check the advantages of I-R Hydra-Boom mountings. Your Ingersoll-Rand engineer will be glad to give you complete information.

Ingersoll-Rand

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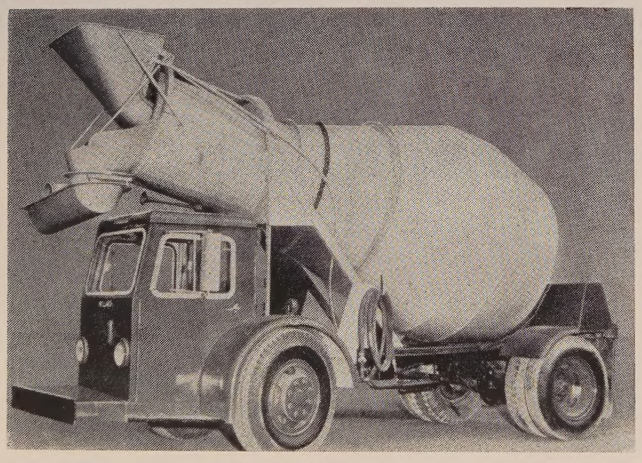
A CONSTANT STANDARD OF QUALITY IN EVERYTHING YOU NEED FOR DRILLING ROCK.

. . . for more details, write No. 37 on Reader Service Postcard

hydraulic package which provides fast bucket operation at rated engine speed. Contractors can obtain buckets with either ⅝ or ¾-yd. capacity. A material fork, crane, dozer blade and bucket and blade scarifiers are also available. *. . . Write No. 153*

Revolutionary design of truck mixer

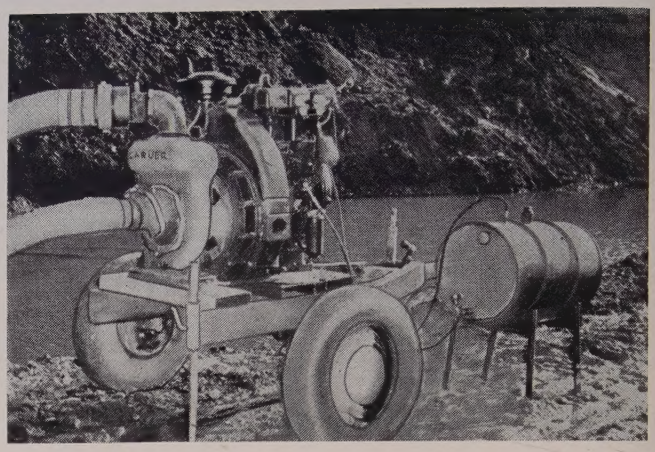
Announced as the first major improvement in concrete mixers since the first unit was truck mounted, a new front-discharge design comes from the **Willard-Concrete Machinery Co.** With the new unit, it is possible to drive the truck cab directly to the place of use,



unload the concrete at the front end of the truck with a clear view by the operator and then back the truck out empty. Additional features resulting from this revolutionary design is a shorter wheel base and greater maneuverability resulting from the elimination of a high water tank and complete control by the driver in the cab. The mixer is operated from the truck engine. The model shown has 5-cu. yd. capacity, and provides a legal load on two axles. The new design will soon be available on three-axle trucks and all-wheel drive. *. . . Write No. 154*

Carver adds a diesel engine to its pumps

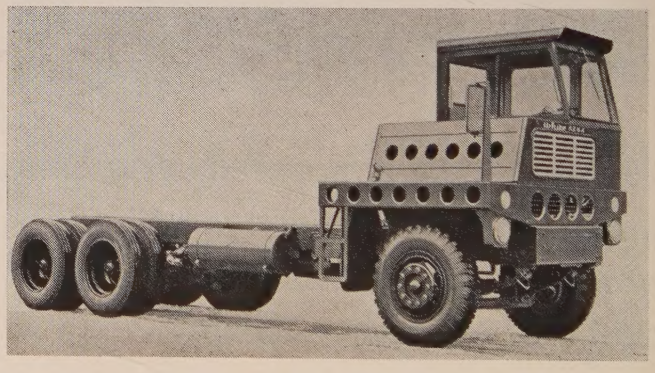
The advantages and economy of diesel power have now been added to the de-watering pumps of the **Carver Pump Co.** The company has introduced a new line of Carver pumps equipped with Lister-Blackstone diesel engines. These diesel units, famous for low-cost maintenance and fuel consumption, result in pumping efficiency where continuous de-watering is a major



consideration. It also eliminates the problem of gasoline storage and possible pilfering at the job site. A complete line of self-priming pumps are available in sizes from 40 to 1,600 gpm. The picture shows a Carver KF-301 pump using the new diesel engine operating against a 10-ft. suction lift and discharging through 500 ft. of 4-in. hose. *. . . Write No. 155*

Power take-off on White truck

A new flywheel driven power take-off is a special feature of the models announced by **White Motor Co.** for both ready-mix and dump applications. The take-off of both belt and gear driven is of simplified design. The belt drive is from a cog pulley on the rear of the crank shaft ahead of the flywheel, and it is of steel cable encased in neoprene with neoprene teeth covered by nylon. This belt drive is 150 lb. lighter than gear driven applications and less expensive, both as to initial cost and upkeep. The gear driven take-off is available for those who prefer it. Another special fea-



ture is the new White half-cab chassis with the along side engine. The design of the trucks emphasizes maneuverability and high payload.

The White Motor Co. has purchased the designs, tooling and inventory for the unique half-cab chassis developed and marketed on the West Coast for the past five years by Cook Bros. of Los Angeles. The trucks will be manufactured in Lansing, Michigan for national distribution and Cook Bros. will continue to merchandise the half-cabs in its present territory. *. . . Write No. 156*

(Turn to page 166 for more New Equipment. New Literature can be found on page 156.)

The WEST from WASHINGTON

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

It was probably unfair for the General Accounting Office to release that report on Interstate Highway operations in Nevada and Arizona which was made available to Washington correspondents.

GAO, in a covering letter addressed to the Speaker of the House of Representatives, made it clear that the investigation on which its report was based was completed nearly a year and a half ago (in September, 1958, to be exact), and that action has been taken since to correct some of the problems it found.

Point is that practically nobody in the press corps noticed—or paid attention to—this fact. Hence the report was hailed as a current criticism of the highway program in the two Western states, and immediately became fodder for the political hopefuls in desperate search for issues on which to lambaste the present administration and all its works.

What GAO investigators found to criticize in Nevada and Arizona, by the way, was confined to right-of-way acquisitions and general accounting practices, which it said were cumbersome. On right-of-way, the investigators criticized the lack of substantiating data on some land price deals, indicated that the Bureau of Public Roads should have withheld claimed payments until the states had made a better accounting.

The only engineering point that was criticized concerned a stretch of Interstate Route 1 (old U.S. 40) near Wadsworth, Nevada, where three interchanges were built within a stretch of three miles, despite traffic checks which showed that about 89 vehicles a day would use the three exits. GAO contended that BPR's (and the state highway department's) argument that local traffic would be inconvenienced by lack of the three interchanges didn't seem reasonable. (Local officials had claimed that the three intersecting roads were "section-line" roads, and detours of up to three and a half miles would be necessitated if only one interchange were built. Total cost involved is $221,000.)

And while Congress again takes up consideration of a group of proposed "wilderness" bills (S 1123 and others), an example of the cost of "preserving" natural wonders is available in Washington that'll be of interest to Westerners.

The example is the plans now being made to preserve Rainbow Bridge, in southern Utah—at the loud insistence of conservation and sporting interests—from encroachment by the waters of Glen Canyon Dam, now building downstream.

It now appears that a barrier dam to prevent a possible three-foot rise of water under the 309-ft. high natural arch will cost in the neighborhood of $25 million. Such a dam would serve no other purpose, would have to be pumped out after heavy rainstorms, and would block what many thought would be an advantage — the natural bridge would have been easily reachable by water, where it can now be reached only over difficult canyon trails, inaccessible to anything but burro or horse transportation.

The wilderness bills, by the way, still aren't given too much chance of passage at this session—opposition from irrigation and commercial interests in the West has been very strong. The bills would prevent any exploitation — including roads or trails, power lines, development of water resources — of the areas declared to be "wilderness."

* * *

Architects have lost out badly in their attempt to get the Bureau of Indian Affairs to drop its present ban against use of outside consultants in favor of using its own technical staff and developing stock plans for Indian schools, dormitories and other structures (see March column.)

The House Appropriations subcommittee not only accepted the Bureau's report that it was saving money by these methods — but it commended the action, and urged further economies (including a cut in the Bureau staff). Architects were particularly concerned with a Bureau report which noted that it has been cutting down on space for children in the schools (by about 20 sq. ft. per child), eliminated multipurpose rooms and other facilities, to the point that "any further reductions would mean sub-standard facilities."

Meanwhile the general battle in Washington over outside consultants — aimed particularly at the highway program—continued unabated. And engineers lost at least a skirmish through lack of information, when local newspapers printed the fact that the District of Columbia had spent something like $8 million over the past two years for consulting engineering on its highway program. Not mentioned was the fact that this had produced plans for something over $180 million worth of work now under way or ready for bids.

* * *

Western areas will be very much concerned if the Corps of Engineers is granted authority it is now seeking to investigate the flood-plains of all U. S. streams, issue warnings to local authorities and property owners.

The implication is that if anyone built on areas that the Corps had warned against—and a flood did develop — the owners (or the communities) would do considerable whistling before Uncle Sam would come to their rescue with flood protection works or disaster relief.

The Corps' concern with unrestricted construction in flood plain areas—and thus a "built in" hazard and expense for the future—came out during hearings on its $936 million (total) Civil Works program, when Lt. Gen. E. C. Itschner told Senators that the Corps would ask for such river flood-plain authority. Specifically mentioned were Western developments in flood plains of normally dry arroyos. Reception was so good that there is little doubt the authority will be granted, if asked.

* * *

On the Corps of Engineers, by the way, don't look for any fast action on another proposal, which would call for "one shot" total appropriations for new projects.

Senators agreed that such appropriations probably would save money in the long run, by permitting better contractor organization and thus lower bids. But they also commented that an appropriation for a single project (like Oregon's John Day, at $400 million) could unbalance the entire national budget. Chances are that Congress would look favorably on such one-shot appropriations for projects that could be completed within, say, two years.

* * *

Chances of any meaningful

(Continued on page 32)

CF&I Steel Products and the Construction

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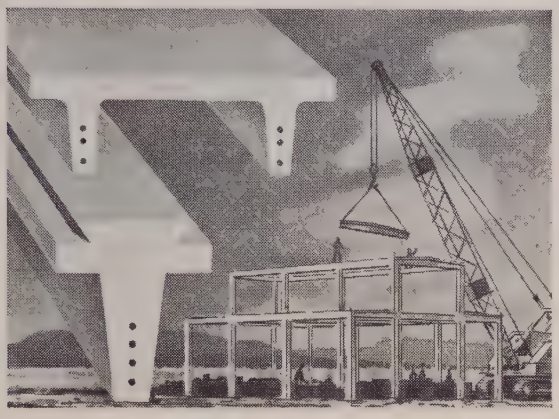
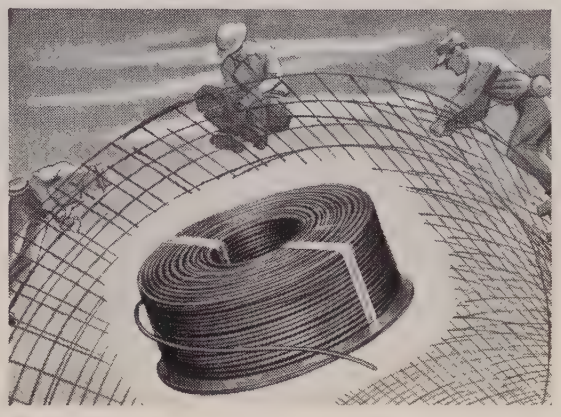
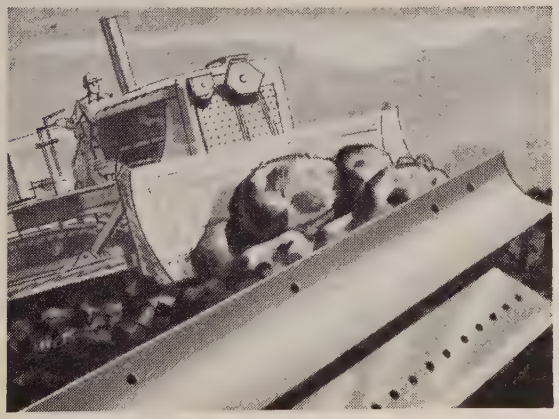


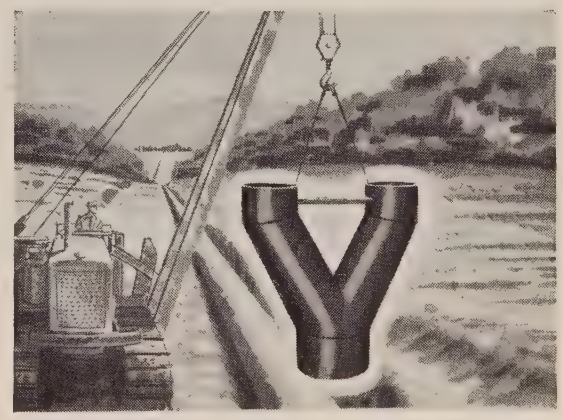
PRESTRESSED CONCRETE STRAND: Stress relieved after stranding, CF&I 7-wire Strand is flexible and easy to use. It is made to ASTM Specification A-416 and is ideal for pretensioning applications. CF&I also offers quick delivery on Prestressed Concrete Wire made to ASTM Specification A-421.



TIE WIRE: CF&I Cal-Tie Wire can't kink, tangle, snag or scratch, assuring maximum safety and economy in tying steel. That's because it is furnished for use in a handy belt dispenser that protects against hazards of loose coil ends. The wire comes in 16 gage. Reinforcing Bars are available in sizes No. 2 to No. 11.



GRADER BLADES: Scientifically designed, CF&I Blades and other Cutting Edges are carefully made of special analysis steel to eliminate hard or soft spots. This assures extra-long service. Wide selection of lengths, widths, thicknesses and hole spacings, flat or curved, beveled or squared edges.



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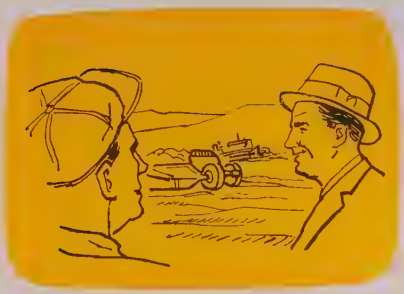
Bill Smith, contractor, speaks on used equipment!



"Take it from me, I've bought some real junk in used machines. Fixing 'em up and keeping them fixed used to be just one long headache.

"But now things are a lot different. When I buy used equipment, I buy from a Caterpillar Dealer.

"I've found Caterpillar used machines similar to new in more ways than one. They stand up better and are easier to keep working. And here's something else that's important . . .

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BEST BUYS IN NEW AND USED EQUIPMENT

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school-aid legislation are still considered slim this session, but there's some evidence that they're improving slightly. As you know, the Senate cracked through a whopping $917 million, two-year program in mid-February.

Under the terms of the Senate bill—which nobody expects to get through the House or conference committee in anything near its present total—Western states would fare very well indeed. They'd get a total of more than $182 million in federal aid in a two-year period, Texas and California getting the lion's share, at $62.9 and $50.2 million, respectively. Smallest allotment would be for Alaska—$623,000.

* * *

What gives some sort of an aid-to-education bill a slim chance is the fact that both political parties have determined that the only national "issue" on which enough voters seemed to be concerned is the subject of education. Thus both parties would like to make some sort of a record that can be pointed to in the coming campaigns.

* * *

Concerned over the fact that their plants are now operating at about half the estimated capacity, construction equipment manufacturers have been showing up in numbers in Washington to oppose an apparently innocuous change in the 1949 Federal Property and Administrative Services Act.

The change, embodied in HR 9996, would soften restrictions on imports of foreign-made machinery (or machinery declared surplus by U. S. forces overseas) by a change of wording: The existing act requires proof that there is a domestic shortage of the machinery to be imported. The change would require only a determination that import would not be injurious to the U. S. economy.

In testimony before the House Committee on Government Operations, manufacturers pointed out that, although their rated capacity is now at $3 billion a year, shipments in 1959 were at the rate of $1.8 billion, and more than $500 worth of new and used equipment is now in the hands of dealers. That's evidence enough, they argued, that there isn't now—and never has been—a shortage of machinery in the U. S. in peacetime.

* * *

The 13 Western states (including

(Continued on page 36)

. . . for more details, adv. opp. pg., write No. 18 on Reader Service Postcard →

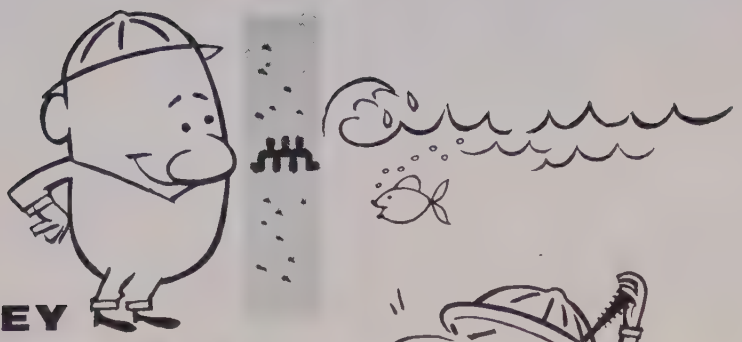
Northwest shovel, equipped with Amsco Dipper and Simplex 2-Part Teeth, at work on Cross Westchester Expressway project.

Shovel operator, Walter Reich, inspecting Amsco Simplex 2-Part Teeth used on Mt. Vernon Contracting Corp. shovel.

Highway Machinery Co. portable crusher, equipped with Amsco rolls, at work in a pit. Machine crushes 175 yds. per hour to ¾" size.

Amsco 25 x 24 manganese steel crusher rolls, of type used in portable crusher at left.

Welder demonstrating how Amsco Manganese rods are used for build-up on rolls.



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Alaska and Hawaii) will get a total of $3.8 million in federal grants for stream pollution control works, under terms of the President's budget, now that Congress has failed to override his veto of a much more generous bill.

You've been reading about the bill (the Blatnik Bill, HR 3610) that Congress passed, to provide a total of $90 million a year in the form of grants-in-aid for pollution cleanup, in open defiance of the President, who asked only $20 million for this purpose for Fiscal Year 1961 (though existing law provides $50 million yearly). Under that measure, Western states would have received a total of $17.6 million. But there'll be no further attempt to pass legislation in this area this session, now that the attempt to override has failed.

Under the $20 million requested by the President, here's how the states will fare: Alaska, $170,650; Arizona, $223,870; California, $819,460; Colorado, $252,000; Hawaii, $213,090; Idaho, $235,570; Montana, $211,440; Nevada, $143,290; New Mexico, $235,520; Texas, $687,170; Utah, $236,910; Washington, $310,130; Wyoming, $181,190.

As you know, the states and local communities have been putting up an average of about $5 to each $1 of federal money for these projects.

* * *

U. S. and Canadian government representatives met in Washington early in March (March 4 and 5) to carry on the second stage of discussions looking toward a two-nation agreement on construction of dams and power generating facilities in border areas, for the benefit of both countries.

The discussions were an outgrowth of recent agreements on principles of development, arrived at by the International Joint Commission, and look toward "full and complete" development of the Columbia River basin. Point of the discussions was the fact that in the agreements setting up the International Joint Commission, no provision was made for cooperative use of waters that cross the boundary, as distinct from waters that actually form the boundary between the nations (as does the St. Lawrence and part of the Columbia). A major obstacle has been the fact that U. S. developments may be undertaken by either federal or non-federal interests, while in Canada, all development will be a federal undertaking. Coordination, to assure Ca-

(Continued on page 38)

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No need to tie up a lot of high-cost equipment—the thrifty John Deere "840" Diesel with 7-1/2-yard elevating scraper takes over by itself—without a pusher. Slat-type elevator builds its own heaped loads—breaks up clay for fast hydraulic ejection, even spreads.

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Size Range	Rated Tons Per Hour		Required Horsepower		Tons Output Per Horsepower		
	Lippmann Grizzly-King	Avg. of Competition*	Lippmann Grizzly-King	Avg. of Competition*	Lippmann Grizzly-King	Avg. of Competition	Lippmann "Bonus"
18 x 36	132	91	62½	67½	2.1	1.4	50%
24 x 36	200	141	87½	94	2.3	1.5	53%
30 x 42	300	212	115	133	2.6	1.6	62%
42 x 48	580	456	200	200	2.9	2.3	26%

*Figures from latest available specifications of Smith, Universal, Lima, Diamond, Iowa, Pioneer, Rogers, and Gruendler, wherever same or comparable sizes exist, and at equivalent discharge settings. To simplify chart, median figures are used where specifications are given in a minimum-to-maximum range.

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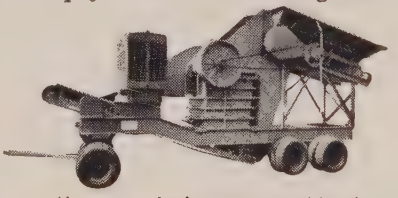
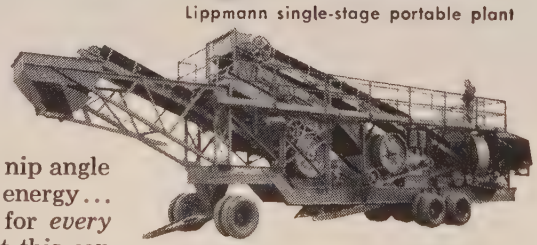


Lippmann single-stage portable plant



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nadians of a fair share of benefits from downstream developments, is a major point at issue.

* * *

So serious has the problem of air pollution become that the Senate received in a very friendly fashion a proposal by California's two Senators (Kuchel and Engle), backed by Pennsylvania Senators Scott and Clark, to extend indefinitely the life of the federal air pollution control law (which was extended for a total of four years last year).

The new bill (S. 3108) would provide for public hearings in all areas where air pollution has become more than a local problem; remove the existing ceiling of $5 million on annual appropriations (to the Public Health Service) for investigations; require that after a "reasonable period" of hearings and investigations, amendments be suggested to make federal air pollution controls more effective.

* * *

On water resources in general, the U. S. Geological Survey reports that most of the United States is in good shape—in fact much of the nation has an excess of water runoff—excepting for most of California, and parts of Oregon and Washington.

And the Bureau of Reclamation, working more than two years ahead of the actual event, has circulated filling criteria for Glen Canyon reservoir (now under construction) to officials of upstream projects in the Colorado River Storage Project, to make sure of proper coordination, once Glen Canyon begins to store water.

* * *

Briefs: There's still some chance that the self-employed will get a tax break, via a bill passed by the House last year (HR 10) that would permit income tax deductions for self-finance retirement programs. . . On taxes, if you are required to make itemized expense-account reports to your employer, the Internal Revenue Service won't ask you to submit itemized statements with your income tax report—but you will be expected to maintain careful records of your own, if questioned.

Efforts to restore secondary-boycott rights to construction trades unions (through Taft-Hartley amendments embodied in HR 9070 and S. 2643) have drawn the fire of almost every employer group, and the hearty support of union groups —and some Congressmen.

. . . for more details, adv. opp. pg., write No. 23 on Reader Service Postcard →

WESTERN CONSTRUCTION

Railroads Leave the Roster of the AGC

RAILROADS gradually leave the construction scene of this Western region. Latest evidence of this disappearing act is the dropping of the designation from the AGC division names. Specifically and officially the "Heavy Construction and Railroad Contractors' Division" has recently been changed to "Heavy Construction, Municipal and Utilities Contractors' Division." This new title is a fearsome handle, but the change is the significant feature.

From the founding of the Associated General Contractors there was a large and prominent group of members who had their roots deep in the building of railroads. This was particularly true here in the West. Hardly a contracting organization in this region that is now in its second generation but looks back to a railroad start. Methods of earthmoving, bridge building and tunneling that developed in this railroad construction were handed over to highway engineers with a valuable background of techniques and equipment use.

Early in the 34-year history of *Western Construction* there was some fairly extensive "new line" railroad work, particularly the 200-mile connection between the Western Pacific and the Great Northern through northern California and southern Oregon. And the articles covering this work in 1931 reveal such familiar names as Utah, Bechtel, M-K, and Fredrickson & Watson. Incidentally, these articles recorded that the work was "well equipped," and only 20 horses were to be found on the entire project.

Today, with the exception of relocation through reservoir sites, strengthening of bridges, and some minor realignments this type of construction is no more. And many of the contractors moved with an easy transition into highway work because of its similiarity. They brought to highway construction the early skills and methods they developed on their railroad activity. For example, the group of contractors headquartered around Springville, Utah, so prominent in railroad building, are now busy building highways for tomorrow.

Years ago the AGC recognized this situation and created a new division for those specializing in highway construction. Sentiment, as much as anything, was the reason for leaving the railroad title as a part of the group doing "heavy construction."

Today, the out-dated part of the label has been dropped and replaced by reference to municipal work and the construction required by utilities. This emphasizes the increasing volume of contracting which is essential for the expansion of our metropolitan areas, and the need for adequate streets, drainage, sewerage, and water supply. It also places emphasis on the work carried out for utilities which represents an equally broad designation. Municipal and utility work supplement each other to meet the needs for the booming Western population that grows constantly more urban.

As construction changes, the heritage from the railroad builders continues to present a solid foundation. From it have come men and methods that have provided the key to Western growth.

Jim Ballard

Get power-shovel-like excavating force from every size of International Drott 4-in-1—*plus* crawler tractor traction and mobility! All five 4-in-1 sizes have the famous pry-over-shoe break-out force. See how this 3 cu. yd. TD-20 Four-In-One lifts out reinforced concrete slab, tons at a time—applying up to 43,150 lbs. of break-out power!

How to make one dollar double for a dozen!

Get big bulldozing capacity— another "built-in" 4-in-1 action that's made instantly available with the hydraulic selector lever. Watch this TD-9 Four-in-One's depth-controlled dozer action roll the earth and double for a specialized bulldozer outfit, on landscaping!

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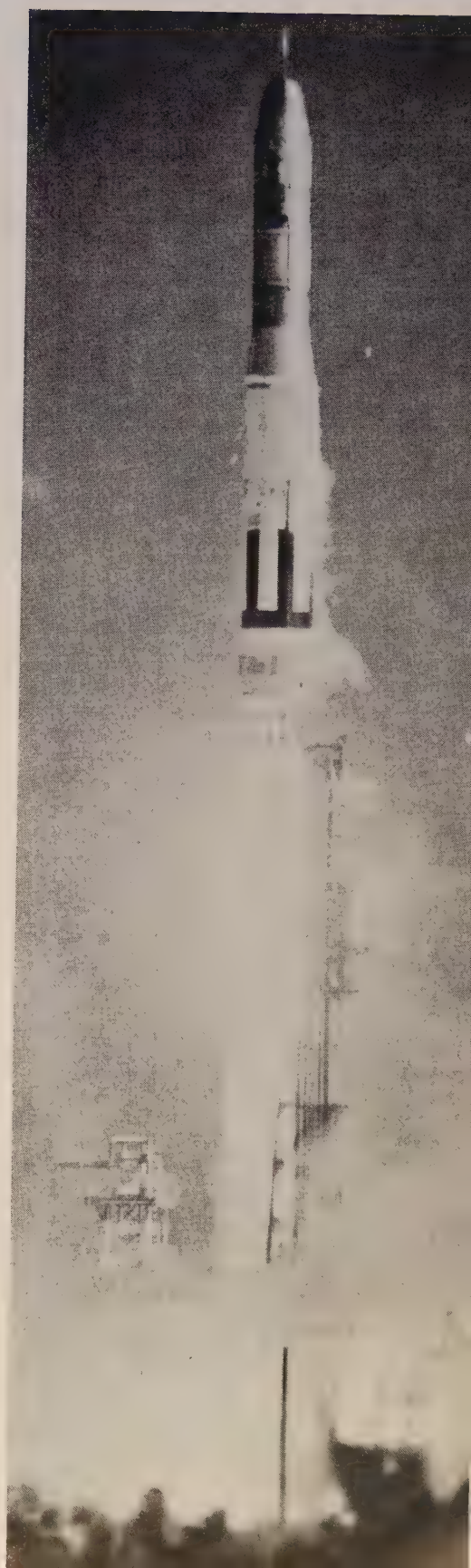
KING PUBLICATION

WESTERN CONSTRUCTION

APRIL, 1960

MISSILE BASE CONSTRUCTION

Building Vandenberg Air Force Base in Southern California provides a full scale dress rehearsal of problems contractors will meet at other huge missile bases in the West.



CONSTRUCTION work is picking up steam at eight air force bases in the West. Total payments to contractors at these eight bases in the next several years can be conservatively estimated to run well over $200,000,000. At the largest base, Vandenberg, near Lompoc in Southern California, which was started first and is now nearing completion, over $100,000,000 has already been spent on heavy construction. As a comparison, this is nearly one-fifth of the value of all contracts now under way on the Interstate Highway System in the 13 Western states. Facilities for launching the Atlas inter-continental ballistics missile, made by Convair Astronautics, are under construction at Fairchild Air Force Base near Spokane, Wash., Francis E. Warren AFB near Cheyenne, Wyo., Vandenberg AFB, Lompoc, Calif., and Walker AFB, Roswell, N. Mex. Launchers for Titan ICBM, made by the Martin Company, are being built at Beale AFB, Marysville, Calif., Larsen AFB, Moses Lake, Wash., Lowry AFB, Denver, Colo., and Mountain Home AFB, Mountain Home, Idaho, as well as at Vandenberg.

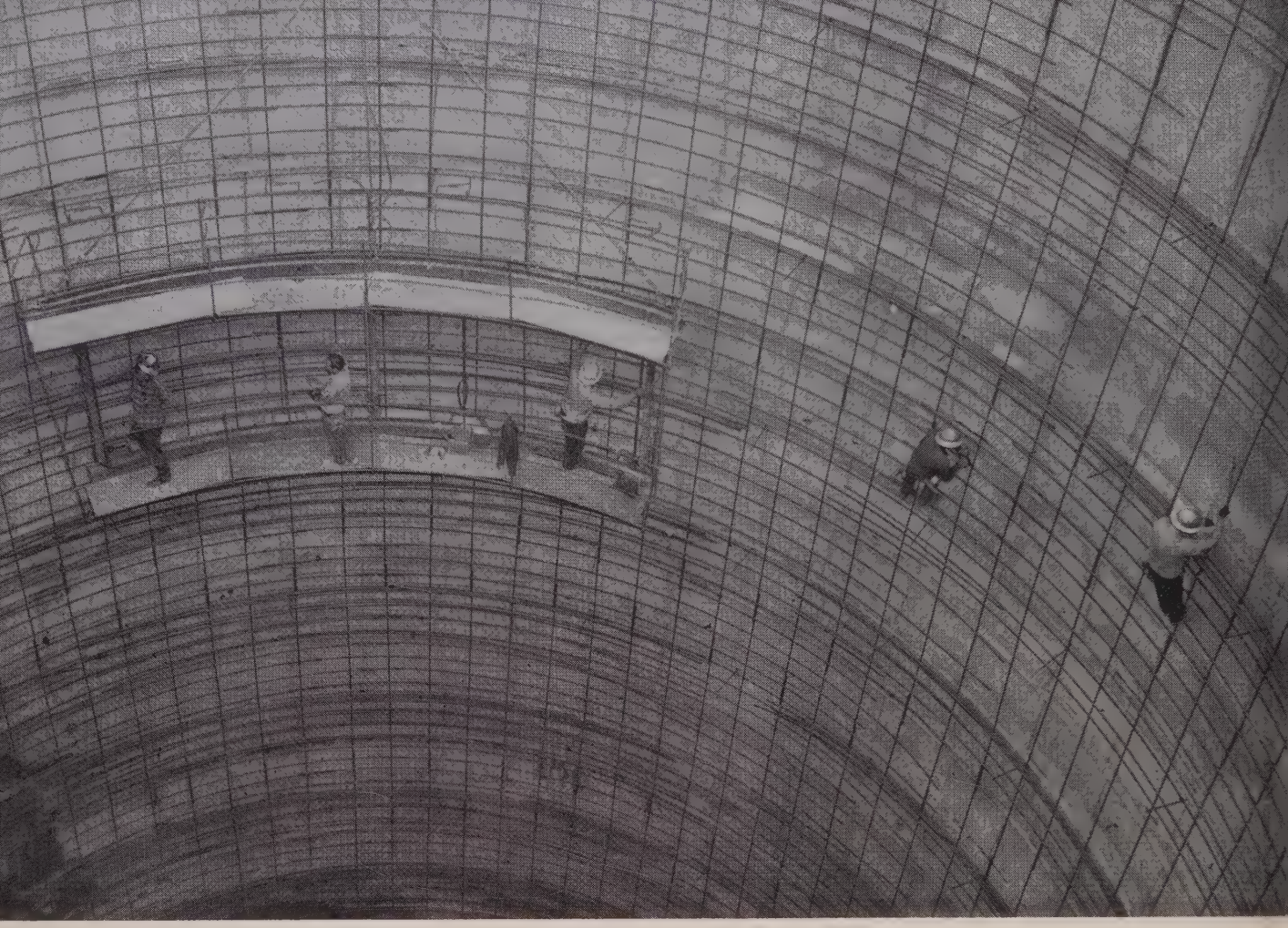
The best way to understand the problems contractors will face in carrying out this vast military construction program is to study construction at Vandenberg, where work started in 1957. First, take a look at the Atlas and Titan, the giants of Uncle Sam's missile arsenal.

Atlas and Titan missiles

The nation's first operational long-range missile is the Atlas. It stands 82.5 ft. high, is 10 ft. in diameter, and weighs 250,000 lb. Its exact capabilities are secret, but it is known to have a range of over 6,000 mi. The power plant consists of two booster rockets, one sustainer, and two small vernier rockets. All five are ignited to start. The boosters are jettisioned first and the verniers are used to trim the velocity to the exact amount required. The nose cone is separated from the rest of the missile when something less than half of the trajectory has been traversed and continues to the target in an unpowered free fall. The maximum thrust developed at take-off is in excess of 350,000 lb.

The second heavyweight ICBM is the Titan. It is still early in the development phase and its future is unclear. It is a liquid-fueled two-stage rocket which stands 90 ft. high, weighs 110 tons, and can carry a nuclear warhead over 6,000 mi. at speeds around 15,000 mi. per hr. Its powerful first stage engine generates a maximum thrust of about 300,000 lb., equal to the power of 15,300 automobiles.

There are three main types of



SIZE OF MISSILE SILO can be appreciated by this view of workmen setting reinforcing steel. Concreting of silo wall was next step. Slip-form method was used by sub-contractor experienced in grain elevator construction. Biggest silo at Vandenberg is 52 ft. diam., 181 ft. deep.

launching facilities for the two missiles. The Atlas missiles which have been fired in tests and in training were launched from reinforced concrete "pads" with the aid of track-mounted service towers, which from a distance look like huge oil well derricks. A second method is to store the missiles in a reinforced concrete "coffin". When the missile is fired, the roof of the "coffin" is rolled back and the missile is elevated by cables to vertical firing position. The steel and concrete roofs weigh up to 200 tons but, nevertheless, can be rolled back in 20 seconds. In the third type of launcher, the missile is stored in an underground silo and is elevated vertically through heavy concrete trap doors to the surface for firing. This type of structure is almost impregnable to attack, except by direct hit, and is the type which will be built at the bases named above. There are variations within the silo design. One idea is to have one central silo for the missile and its elevator and two adjoining silos for fuel and equipment. The most recent design for both Atlas and Titan calls for one large silo which contains everything.

Equipment for tracking and guiding certain of the missiles is also located in underground silos and is elevated to the surface when in use.

The standard size of the silo which contains the missile alone is 160 ft. deep by 40 ft. in diameter, concrete lined. A silo which will contain not only the missile, but its fuel and supporting equipment was recently constructed at Vandenberg by Peter Kiewit' Sons Co. It measures 181 ft. 8 in. deep and 52 ft. in diameter.

A short distance from each missile silo is an underground control center for equipment and personnel who supervise the launching. The control centers and silos are connected by a network of 10-ft. diameter tunnels lined with steel sectional plate. Sectional plate is used rather than concrete so that they can deflect flexibly under a shock of an explosion.

Since Vandenberg is intended to be a training ground for missile men, as well as an operational base, all of the missile launching designs mentioned here are represented.

Development of Vandenberg

It was late in 1956 that the U. S. Air Force announced that Camp Cooke had been selected from 200 possible locations to be the site of the country's first base for missile training and operations. It was selected because of its strategic location and its nearness to many manufacturers of missiles and components. Control of the base is under the First Missile Division of the Strategic Air Command. The base was officially dedicated as Vandenberg Air Force Base in October of 1958.

Construction program, with the exception of two Capehart housing projects, is under management of the Los Angeles District of the U. S. Army Corps of Engineers. Because of the scope of the program, Colonel C. T. Newton, District Engineer, established at the project an area headquarters called the Western Area Office, with Lt. Colonel Allen W. Sanders as Engineer. He is assisted by nearly 100 engineer-

COMMAND CONTROL CENTER is under construction. Floor slab is being finished in foreground while roof concreting is carried out in background. Structure will house personnel and equipment for controlling launchings from silos, and will be covered by a layer of earth.

ing and administrative employees.

Vandenberg AFB is located about 165 mi. north of Los Angeles, near the cities of Lompoc and Santa Maria. The base contains over 64,000 acres, an area large enough to contain the entire island of Manhattan.

Up to the present time, the Los Angeles District has awarded 103 separate construction contracts for Vandenberg work committing more than $100,000,000. There are 26 contracts under way at the present time.

The Corps divides the construction into two broad categories, Support Facilities and Technical Facilities. The latter includes construction related to the missile-launching capability of the base. Project engineers for the Corps who oversee the work on the technical facilities are Carl Yockers, Bill Smiddy, Charles Zleisy, and D. W. MacBeth. All other construction, including the rehabilitation of old Camp Cooke buildings, re-building roads and utilities, etc., comes under the project engineer for Support Facilities, William Starett.

The first contract awarded at Vandenberg was to the P. J. Walker Co. of Los Angeles for $976,300 for construction of a missile guidance building. One month later, on June 4, 1957, came the largest single project in the construction of the base, the first three Atlas launchers. A joint-venture of Frederickson and Kasler and Stolte, Inc. were low at $7,046,000. They received an award the same day. Because of many changes and additions made to the project after work had started, payments of about $15,000,000 were eventually made to the contractor.

The peak of construction activity was reached and maintained in 1958 and 1959. About 2,500 construction workers arrived on the base every morning and left every night. So far, an unofficial estimate indicates that over five million man-hours have been spent on construction. Including Capehart houses, more than 2,000 structures have been built or renovated; more than 20 mi. of new roads have been built and 30 mi. of roads rebuilt; parking spaces have been provided for 2,000 cars; a complete airfield has been constructed including an 8,000-ft. runway; and 13 missile launching stands have been constructed.

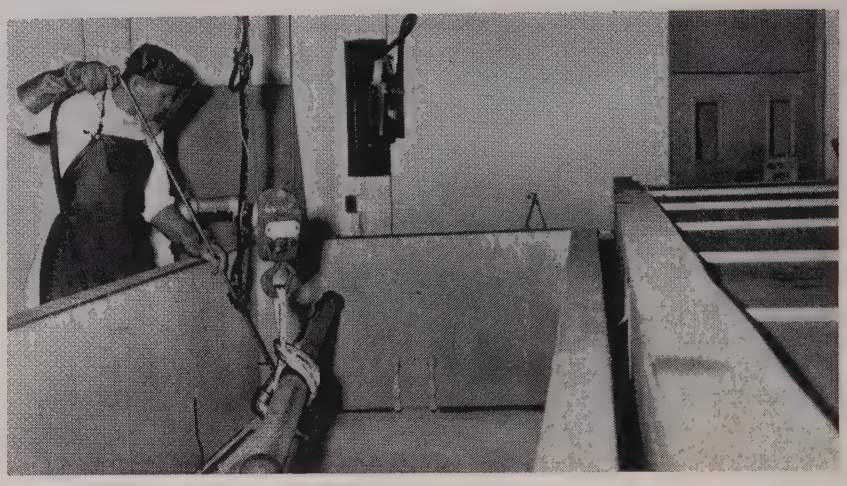
The two biggest contracts now under way are both held by Matich Bros. and M. M. Sundt, a joint-venture. The first one, which is 85% complete, is an $8,123,000 contract for an underground Titan missile test facility, consisting of one missile silo and two supporting silos. The other is fo a Titan training facility which consists of three missile silos, each with two supporting silos. The bid price on this project was $6,282,000 and is 66% complete. Another silo for Titan launching and testing is being constructed in three contracts totalling about $3,000,000. The contractors represented are Ralph M. Parsons Co., Grafe-Callahan, Matich Bros. and M. M.' Sundt, Hansen-Kashner Co., and Vinnell Co. The job is about 22% complete.

Construction methods

Probably the most interesting aspect of the development of Vandenberg AFB from a construction methods point of view is the use

Tips to bidders on missile base work

Construction on missile bases differs from ordinary jobs in many important respects. Contractors who want to stay alive in this new field have to keep these differences clearly in mind both while preparing a bid and executing the work. Here is a chart of the major obstacles, based on experience contractors gained at Vandenberg.



EXAMPLE OF UNUSUAL specifications which are sometimes encountered is illustrated here. Section of pipe which will carry liquid oxygen (LOX) is being cleaned by immersion in chemical solution. Extreme cleanliness is required when dealing with LOX, for it can explode by contacting the grease contained in something as minor as a finger print.

PROCUREMENT. Problems of procurement probably sabotage the good intentions of more contractors on missile work than any other factor. It's not the basic earthwork or concrete forming and placing that gives them the trouble, it's the difficulty, even the near-possibility, of obtaining some of the offbeat pieces of hardware called for in the specifications. A contractor who thinks that the specified bolts, plates, valves, fittings, piping, etc. will be as easy to get as they were on an ordinary job is likely to be in for a ghastly surprise. For much of the hardware called for in missile work is highly specialized and the sources of supply are located in all sorts of unlikely and inaccessible places. The manufacturers who make the items, faced with an unpredictable market in which what is needed is constantly changing, tend to be on the conservative side in their inventories, which makes it hard on the contractor when he has to get his hands on something in a hurry. And if it was hard for contractors at Vandenberg to secure certain items, it will probably be harder for contractors at other bases, for now more contractors are trying to get the same things. So if you need, for example, some special valves made in Mount Pocono, Pa., don't rely on a verbal commitment made over the telephone—get it in writing. If you don't, you may discover when the time comes to get the order, that the manufacturer has sold it to a contractor on another missile base. If any lesson was learned by contractors at Vandenberg, it was that the organization with the best procurement set-up stands the best chance of success.

VISITORS. It is a curious axiom of military construction, that the more secret a project is, the more visitors there will be to plague the contractor. Anything referred to as secret seems to inflame the curiosity of anyone who hears of it. So be prepared for frequent visits to your job from friends, family, and relatives of your workmen, from civilian and military employees of the base, from near-by townspeople, as well as "officials" you can't do much about. One construction man at Vandenberg told *Western Construction* that a mob of "official" visitors numbering 400 once swarmed over his job. "We practically had to shut down," he said. "We couldn't even swing a concrete bucket for fear of knocking down 40 or 50 of them."

To combat this problem, most contractors have hired professional guards to keep visitors to a minimum. Anyone who wants to get on the job must obtain an identifying badge.

SECURITY. The problems of military security probably will not be as troublesome as you expect. When construction at a base is just beginning and the only operations going on are routine ones, site clearing, earthmoving, etc., security restrictions are practically non-existent. It is only as the base nears operational stage that the military authorities will begin to clamp down. And by that time the basic contractors are usually finished anyway.

As parts of the base near completion, some of the contractors may be required to obtain what is called "Facility Clearance". This consists mainly of having arrangements in your home office so that plans and specifications of the project will be handled only by qualified and cleared people. Do not, for example, throw the plans behind the seat of a private airplane and take off for Mexico on a fishing trip, as one contractor at Vandenberg did.

If you have to stay around on the base while highly classified work is under way, the security problem for your employees might become a real nuisance. Each of your employees might have to be checked in each morning and out each night, which can be time consuming. And there are always such slip-ups as a truck-load of material which can't get through the front gate. Labor might suddenly be in short supply, too, because many workmen would prefer to sit idle in the Union Hall rather than he subjected to an intensive security check.

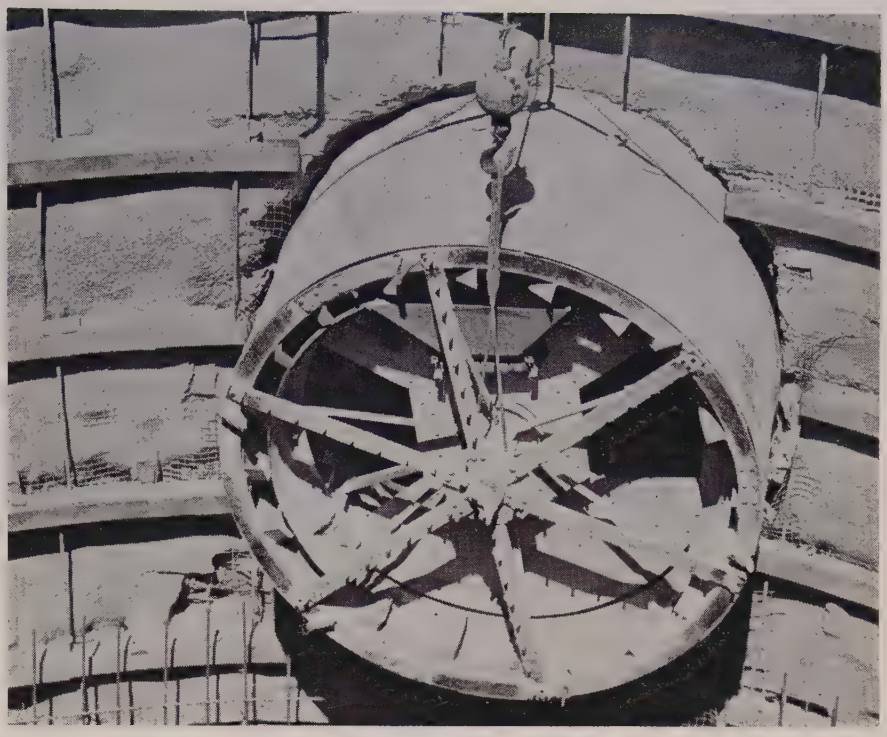
TIME SCHEDULE. Completion dates are utterly inflexible. Falling behind schedule is simply not tolerated—too many subsequent operations depend on the field construction work being completed at the agreed upon date. So no matter what happens, forget about trying to secure an extension of time.

CHANGE ORDERS. A great many changes will be made in the work while it is in progress. Everyone has come to accept this as a necessity. The whole field of missile design is in flux and design changes and improvements are constantly being made. Several times at Vandenberg the final payments made to a contractor were more than double the initial contract because of changes.

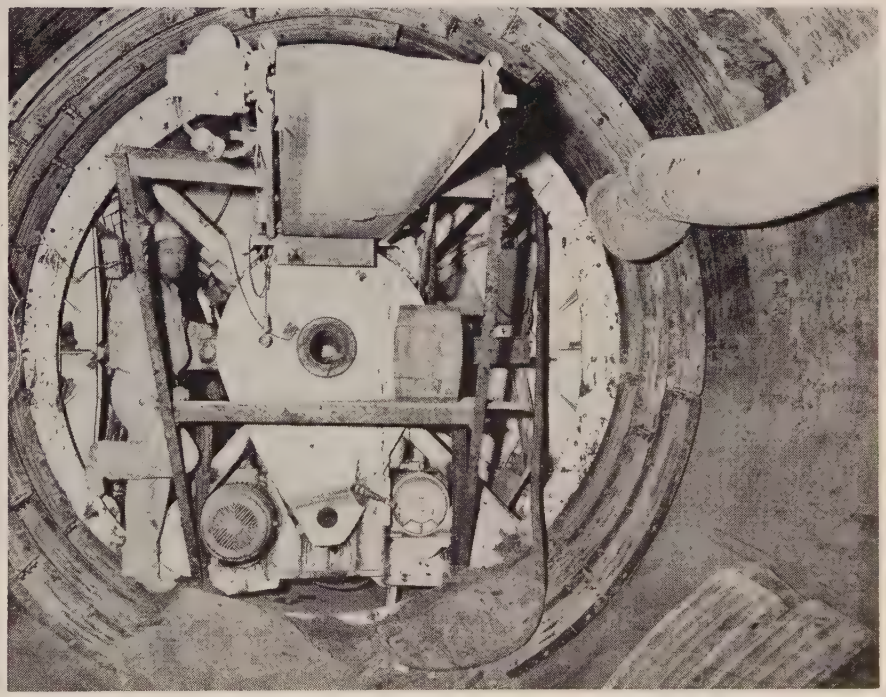
An important thing to remember is that no matter how many change orders are given, the contract completion date will remain the same unless a change order adds a substantial amount of work to the job.

TOLERANCES. If you have gotten out of the habit of reading the specifications, better get back into it. Specs containing tolerances are usually no different than is customary on projects designed and supervised by the Corps of Engineers; for example, 1/8 in. in 10 ft. on the surface of concrete slabs, and 1/32 in. in setting anchor bolts. But although on some projects the Corps might not insist on absolute precision, on missile launching facilities no deviation can be tolerated. The hardware installers who will come along on separate contracts have nothing to go on but the plans, and in industry small tolerances are customary and, it might be added, little knowledge exists concerning the problems of field construction. Extreme accuracy might be required in setting I-beams which will also serve as rails for a roll-back roof, or when setting mountings in concrete from which sightings will be made on Polaris.

So don't be surprised if you are required to follow the specs to the letter.



ROTARY TUNNELING MACHINE called the Badger was used to drive 10-ft. diameter personnel passageways. It is shown emerging into silo where it was lifted to the surface by a crane. Note radial arms carrying cutting chisels and series of scoops around circumference.



INVENTOR and operator of Badger, L. L. Morris of Whittier, Calif., is shown with his machine. Note conveyor belt which brings material from the face. Steel liner plates were installed as soon as possible. Note smooth tunnel wall at right.

of a mechanical tunneler called the Badger. The machine was used to drive the personnel tunnels connecting a group of nine Titan silos, which are under contract to Matich and Sundt.

Driving tunnels by a machine with a revolving cutting head is by no means unprecedented, but it is rare enough to stir up great interest in the construction fraternity whenever it is tried. Without doubt, the best known machine of this type is the so-called "Mittry's Mole" which was used to drive a series of 26-ft. diameter outlet tun-

nels through shale at Oahe Dam on the Missouri River by Mittry Constructors. The rail-mounted machine was designed and built for Mittry by James S. Robbins. The machine was described in detail in the Feb. 1955 and Feb. 1956 issues of *Western Construction.*

The machine used at Vandenberg was built for the 10-ft. diameter personnel tunnels by Lawrence L. Morris of Whittier, Calif., who invented it and operates it on the job.

The photographs show that the cutting head of the Badger consists of six radial steel members spaced 60 deg. apart which carry sharp chisels along their length. Around the circumference of the machine just behind the cutting head is a ring of scoop buckets which carries dislodged material to the top and deposits it into a hopper. From the hopper a conveyor belt carries the material outside the tunnel, or to a muck car, At Vandenberg a muck car was used, which cut down the capacity of the operation slightly. Even with the delays caused by waiting for the muck car to return, the Badger managed to advance 21 ft. in one 7-hr. period.

The Badger holds itself in position with two steel plates at the rear of the machine which are jacked against the tunnel walls. The machine moves forward while the cutting head is revolving by means of two hydraulic cylinders bearing against the wall plates. Uniform pressure is maintained against the cutting head. After about one yard of forward movement, the wall plates are withdrawn, moved forward and reset, and the cycle repeats. The cutting head can be tilted slightly for turning.

Morris and his machine were hired by NorthCal, Inc., sub-contractor to Matich and Sundt. Project manager for the joint-venture is Walter Jarvis. Ted Prescott was foreman for NorthCal.

Matich and Sundt's first contract involved excavation of four silos, the largest of which was 40 ft. in diameter and 160 ft. deep. An overall excavation was made in the area of the silos down to the level of about 25 ft. below existing grade. Within this larger excavation, work commenced on the individual silos.

Because the specifications stated that any over-excavation of the silo walls would have to be replaced with pneumatically placed concrete, the contractors took great care in outlining the silo walls with pneumatic tools. An Eimco overshot loader was used in the excavation, emptying material into a 5-cu. yd. skip which was raised to the surface by a Northwest 80D crane.

Excavation of the silos continued around the clock with miners working in two shifts. Wire mesh was placed against the silo wall along with 6-in. WF steel rings. On the third shift a gunite crew placed gunite against the wall making it flush with the inner surface of the steel liners.

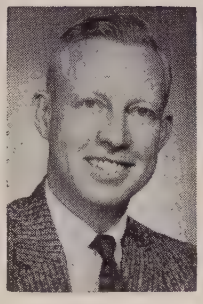
EXCAVATION OF SILOS was done with front-end loader. Crane at surface removed one bucket of material while other was being loaded. Hand tools were used at periphery to minimize over-excavating. Walls are lined with mesh, steel rings, and gunite as excavation is under way.

SLIP FORM advanced about 8 in. per hour. Transit mix trucks brought concrete to site where it was transferred to small diameter buckets for placement in form. Scaffold suspended beneath concrete placement level is used by finishers. Note 1-in. rods, suspended from I-beams, up which the form travels. See also cover photo.

Sub-contractor Hansen-Kashner constructed the concrete silo wall by the slip-form method. Built into the slip-form framework was a series of pneumatic jacks suspended from the top of the silo on 1-in. steel rods. Air to the jacks and air bubbles for levelling were released from a central control. The form was raised a maximum of 8 in. in an hour. The concrete walls were poured into two continuous periods, resulting in one horizontal construction joint.

Thin-shell floor and a flat slab roof feature —

Unique design for Denver reservoir



By

E. VERNON KONKEL

Ketchum, Konkel and Hastings, Consulting Engineers, Denver, Colorado

AFTER excavation for the Hillcrest Reservoir in southeast Denver had been completed and a portion of the box conduit along two sides had been built, it was discovered that a soil condition had developed which completely changed the whole concept of the floor design.

The shale material, exposed by excavation, had become wet to a depth of from 1 to 4 ft. The nature of this material is such that it swells upon wetting. At some locations in the exposed foundation area, measurements indicated a 4-in. upward swelling.

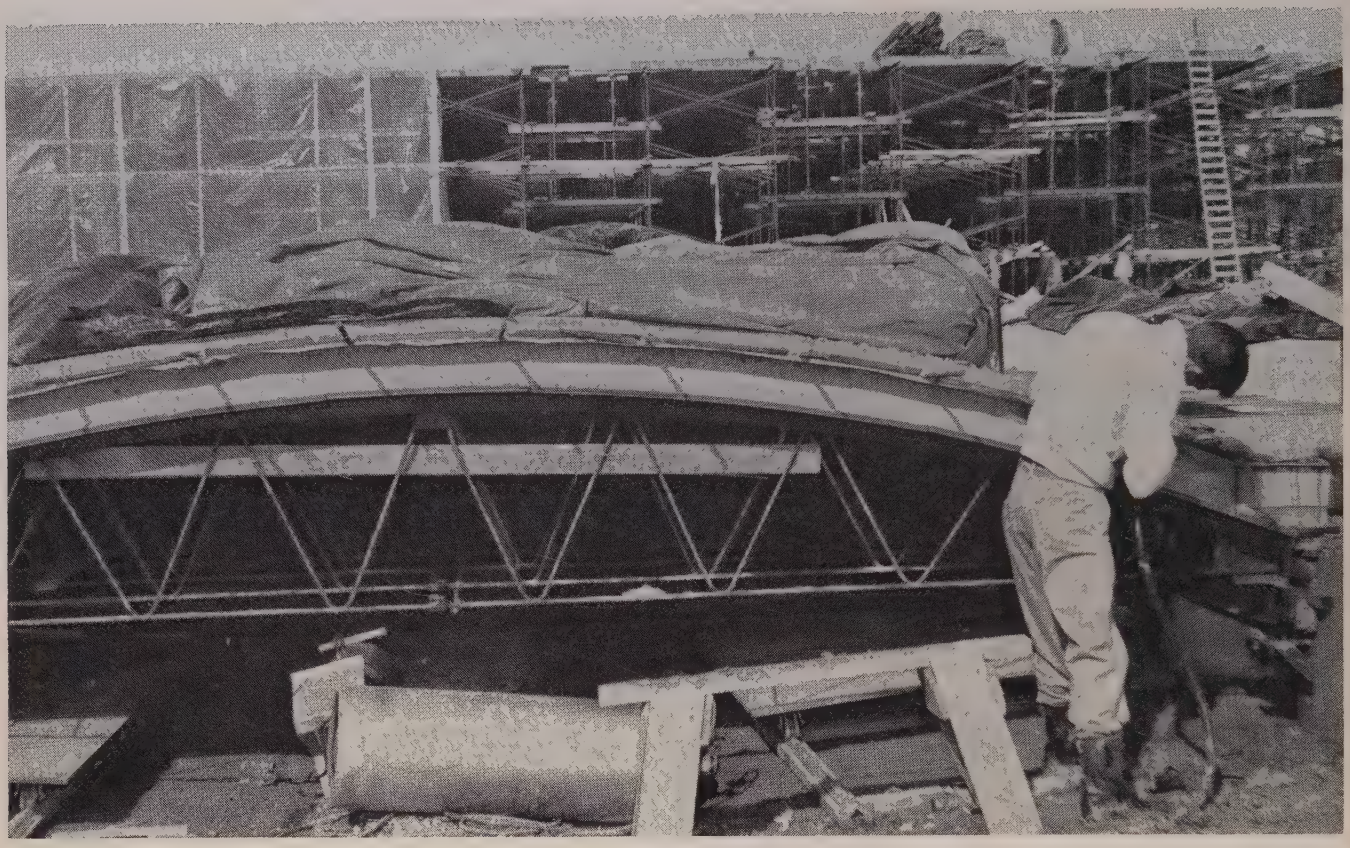
After this problem came to light and several foundation solutions were considered and rejected, the firm of Ketchum, Konkel and Hastings was retained to make a report on the foundation conditions and propose a redesign of the reservoir.

After acceptance of the report, we were engaged by the Denver Board of Water Commissioners to prepare the final design for the floor.

Because of the soil condition, we felt it was necessary to develop a design for a floor system that would be completely independent of the effects of the swelling material. The four systems we considered were:

1—Flat slab on 20-ft. centers supported on drilled caissons.

DRILLED caissons on 5-ft. spacing supported the 20-ft. span of continuous barrel shells. Note the brackets on the sides of the caissons that supported the rails for moving the bowstring trusses which supported the forms.



FABRICATED out of reinforcing steel, these bow-string trusses, spaced at 24 in., supported the plywood forms for the thin-shell concrete. Span was 20 ft. and rise 2 ft. 2 in.

2—Flat slab on 10-ft. centers also supported on drilled caissons.

3—Continuous barrel shells with 20-ft. chords supported on drilled cassions at 20-ft. centers.

4—Continuous barrel shells with 20-ft. chords supported on drilled caissons at 5-ft. centers. Each of these floor systems would be built clear of the soil surface.

Since the depth necessary for the drilled caissons was comparatively shallow, the most economical of the four systems proved to be the last mentioned, and it was adopted. To further contribute to the economy of construction, the new design utilized practically all of the reinforcing steel designed for the original floor. This steel had already been delivered to the job.

It was necessary to provide battered drilled caissons as well as vertical caissons to resist the thrust of the comparatively flat, continuous barrel shells (rise of only 2 ft. 2 in. in 20 ft.)

The shells are 8 in. thick, 18 in. off the ground at the lowest point, and from 3 to 3½ ft. from the ground at the full height of the barrel. The highest stresses on the shell come from reactions of the shores while placing the flat slab roof, rather than the maximum weight of 23 ft. of water that will keep the shells under pure compression.

The flat slab foundations which support the outer and center walls of the basins were also a part of the redesign of the reservoir floor. These were cast on 4 in. of cellular paper material to allow for possible swelling of the underlying soil.

Additional details, such as provision for differential settlement in connections of conduits to the main basins, were another part of our design.

Forming for the shell presented the contractor with the problem of keeping the form supports clear of the swelling soil. This was solved by fabricating bow-string trusses of reinforcing bars supported on rails bracketed out from the drilled caissons. Eight form units, 20x40 ft., consisting of trusses spaced at 24 in. and covered with plywood were erected. Sliding of the forms along the rails, together with one reconstruction of the forms provided for 26 re-uses of each form unit.

The reservoir, consisting of two basins—each 190x550 ft.—will cost well over a million dollars. It is now under construction and is scheduled to be completed this year. Contractor for the project is Thomas Bate and Sons of Denver.

To our knowledge thin shells have not been used for this purpose anywhere in the world. Associate in charge of this project was Ole Melleby.

Las Vegas flood control project

A FLOOD CONTROL project in the vicinity of Las Vegas, Nev. has been approved by the Board of Engineers for Rivers and Harbors. The work would be carried out in Las Vegas Wash and its tributaries in the vicinity of Las Vegas, North Las Vegas, and Henderson. At an estimated cost of $13,410,000 for construction to be paid by the U.S., the project would consist of diversion levees and detention basins. The plans are those recommended by the district engineer and approved by the division office in San Francisco.

In accord with usual procedure, local interests must provide necessary rights-of-way and agree to maintain and operate the works. The project may be carried out in three separate units as funds become available. The report approving the project will now go to state and Federal agencies and ultimately must secure authorization and appropriation from Congress.

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Building that smothers the roar of jet engines

Testing of engines by United Air Lines requires unusual features of insulation. First structure of its kind in the West.

THE POWERFUL JET engine is capable of generating greater sound pressure than any other device known to man. Sound pressure levels around a Pratt and Whitney JT3C-6 jet engine, one of the types used on United Air Lines' DC-8 Jet Mainliners, are 150 to 155 decibels at full power. With afterburners attached, levels of 160 decibels have been recorded.

When United Air Lines planned its new jet engine testing facility at the San Francisco International Airport, first of its kind on the West Coast, noise suppression was one of the prime considerations. Even though the maintenance base is located some distance from both business and residential areas, a great effort was made to insure that sound levels would not exceed acceptable minimums.

The test buildings incorporate the ultimate in modern soundproofing devices and successfully reduce the noise level of a jet engine under test from over 150 to less than 80 decibels immediately outside the building. Naturally, this level drops appreciably a short distance away.

At first glance this may not seem like much of an accomplishment until you carefully consider exactly what these sound levels mean. According to figures of the National Safety Council, "Noise levels above 130 db. may cause permanent damage to normal ears, even after relatively short exposure. This limit represents the pain threshold for many persons." The best designed ear plugs available today could, at best, reduce this level 30 or 35 db., or about to the level of a racing subway train.

However, the soundproofing features incorporated in this test structure go far beyond that. They reduce the overpowering roar of engines under test to approximately the same degree of noise caused by a busy city street—a great help not only to other airport workers, but also to residents of nearby communities.

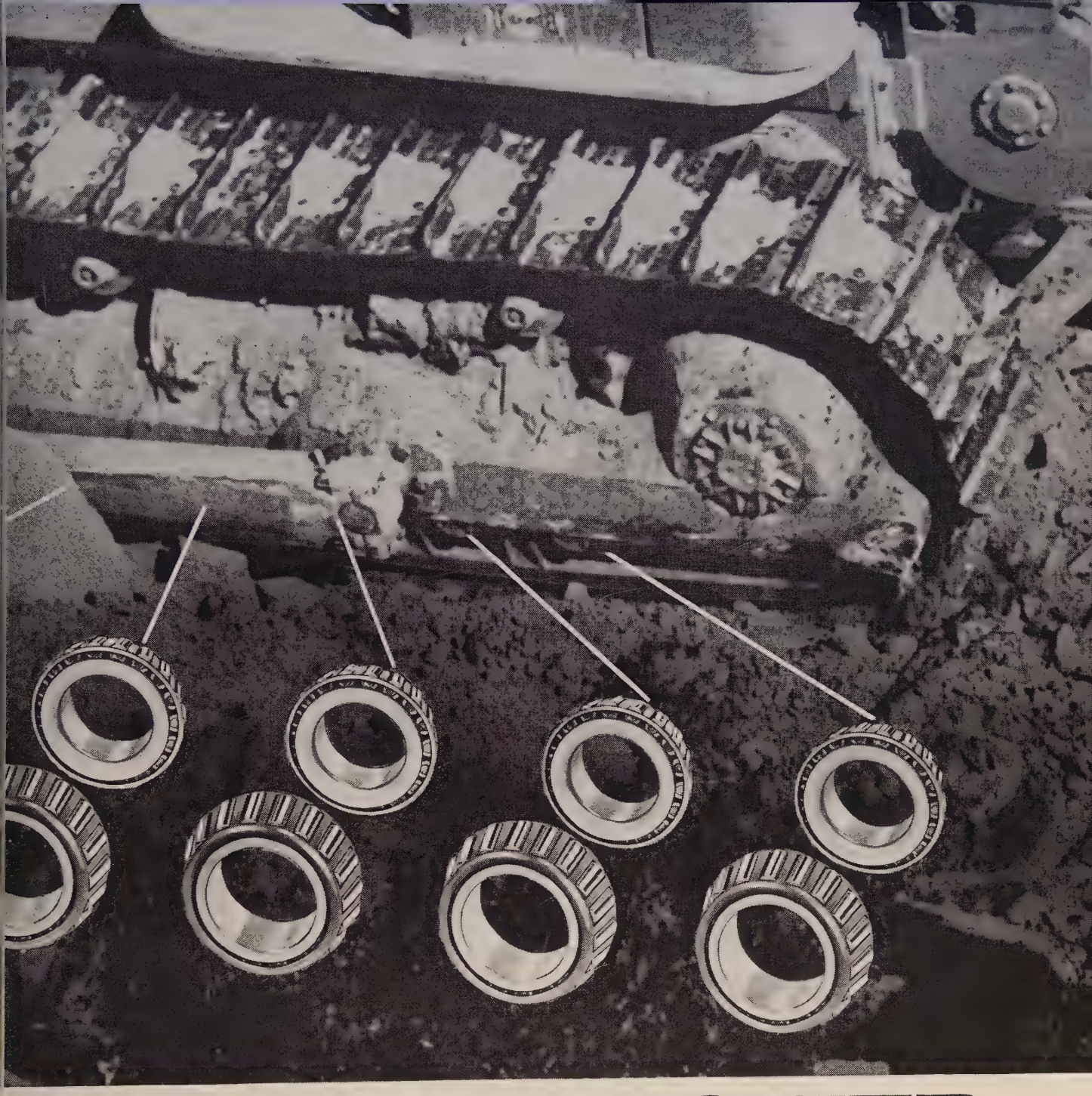
To accomplish this highly efficient soundproofing job many unusual features were involved in the design and construction of the test facility. The Western-Knapp Engineering Co. of San Francisco did the construction work.

Although, to the casual observer, the test facility may appear to be one building, it is actually four separate structures. It consists of two identical jet engine test cells, a control room, and an engine service building. The foundations are separated by 2-in. layers of bituminous expansion joint material, an effective dampener of sounds and vibrations from the test cells.

Test cells themselves are reinforced concrete structures 106 ft. long, 22 ft. wide and 18 ft. high. Two 22-ft. square chimneys rise another 18 ft. above the roofline at both ends of each test cell. One chimney provides air intake and

(Continued on page 60)

WALLS of the two cells, each requiring more than 200 cu. yd. of concrete, were poured in one continuous 10-hr. pour. Cells are 106 ft. long and 22 ft. wide.



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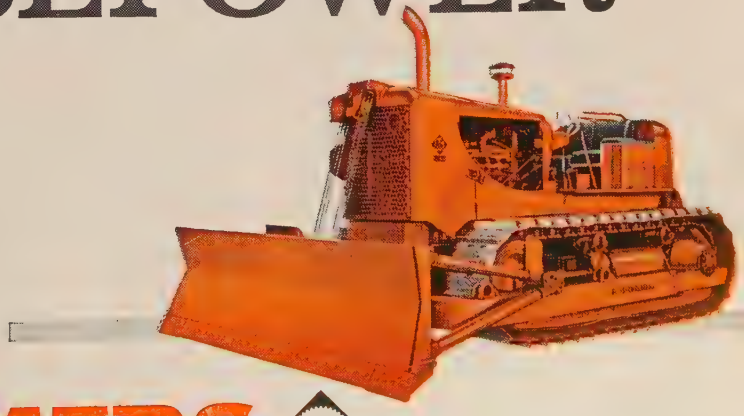

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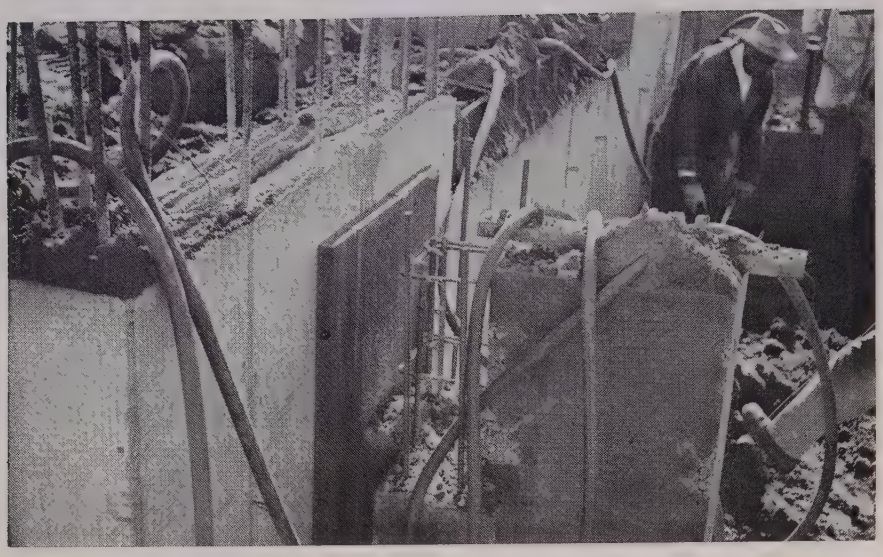


FOUNDATIONS between the four building structures are shown separated by a 2-in. thickness of bituminous insulating material to reduce vibration and sound transmission.

STRUCTURAL STEEL frame of the engine service building is supported on its own foundation and has no common wall with the test cells.

the other exhaust, for engines under test.

Walls of the cells and the chimneys are approximately 12 in. thick. Nearly 200 cu. yd. of concrete was poured for each cell wall —a continuous pour of over 10 hr. About 1,400 cu. yd. of concrete and 150,000 lb. of reinforcing steel were used in the total structure.

A control room is located between the two test cells forming a "U," and an engine service building, of structural steel frame construction and Transite siding, adjoins the other three structures. To aid in the suppression of sound and vibration, the control room and the engine service building, although they adjoin the two test cells, rest on their own foundations and share no common walls. Insulating material separates the foundations, and 1 in. of dead air separates the walls of the buildings.

Although testing operations are done entirely by remote control, the engine under test is visible to the operator through a specially designed window. This window consists of a 3-in. piece of bullet-proof glass mounted in the heavy concrete wall of the test cell, and just opposite it a 1-in. piece of plate glass in the control room wall. The 1-in. air space between the two pieces of glass also helps to absorb sounds from the test cell.

The engine under test is linked by a complex maze of wires and control tubing to the two consoles in the control room, one for each cell. Also linked to the control consoles, are lines from the fuel, compressed air, and water tanks located outside the cells. Approximately 10 mi. of wire and tubing had to be installed to complete the complex control system.

Lighting units within the test cells are resistant to shock and vibration. Especially designed vibration-proof units are built into the concrete wherever possible. Every nut and bolt is vibration-proof, and as much as possible of the equipment is tack-welded so that it will not loosen and be sucked into the engine during test.

Several precautions have been taken in case of fire or explosion during testing operations. Each cell has two independent fire control systems: (1) a fog system and (2) a deluge system. The deluge system, capable of delivering 600 gal. of water per minute, literally drowns each cell in a man-made Niagara. The deluge system is fully automatic and activated from the heat anticipators within the cells. Fog nozzles are aimed at the engines and are controlled from the central control console. A preventive floor-flushing system with sprinkler heads located near floor level is used to wash out spilled fuel and flush the floor before each testing operation.

The door opening into each cell is approximately 8 ft. high by 14 ft. wide to simplify moving the large engines in from the engine service room. Each of the huge concrete-filled steel doors making the double arrangement weighs about 6 tons. Their structural mass and acoustical labyrinth make them almost completely soundproof.

Special acoustical equipment is used throughout the test cells. The intake chimneys have splitter panels, and the exhaust chimneys feature a unique arrangement of curved, sine-wave forms for sound attenuation. Approximately 1,500 sq. ft. of acoustic panels, along with thermo panels and newly developed steel diffuser grids, are used to break up low frequency sounds from the jet blast.

The test facilities, first of their kind on the West Coast, will play a key part in caring for United Air Lines' fleet of Jet Mainliners. The new test cells will also be made available to other carriers on a contract basis.

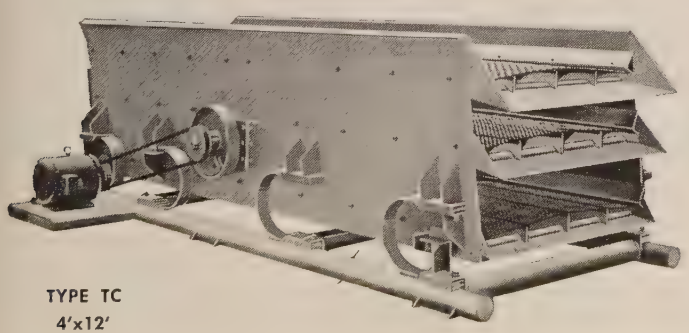
The test cells were designed by Albert Kahn & Associates of Detroit and constructed by the Western-Knapp Engineering Co. of San Francisco.

4'x12' KOLMAN Triple-Deck Screen Handles 120 Tons an Hour

Making specification aggregate in Southern Kansas calls for screening large volumes of fine material. When Mr. George Myers of Myers Materials, Inc. installed his new washing plant at Arkansas City, Kansas to produce concrete sand, engine sand, and mason sand, his operation demanded a vibrating screen capable of handling fines effectively. His choice—a Model TC-120-48 **KOLMAN** Triple Deck Screen 12′ long x 48″ wide.

This high speed, vigorous action screen has proved itself fully capable of the rugged assignment. It receives material from the 8″ pump at an average rate of 120-130 TPH. Everything under 2″ hits the ¾″ square opening screen cloth on the top deck, where less than 5% of the feed is removed. For certain specifications, a No. 4 screen is used on the middle deck.

But frequently the center screen is not used, and the full load of minus ¾″ goes directly to the 6 mesh oblong opening bottom screen. Here 40% to 50% of the 120-130 TPH feed must pass, with a very minimum of carryover. Ralph Bridges, Plant Manager and John Bucher, Plant Superintendent, report that their **KOLMAN** Screen takes care of this separation beautifully. With slots running crosswise, the rapid, sharp stroke of the **KOLMAN** eliminates blinding on the 6 mesh screen in spite of the great amount of oversize on the deck and even in the most difficult areas of the pit.



TYPE TC
4′x12′

This 12′ triple deck model is one of the four **KOLMAN** Screens owned by George Myers. Prior to buying it, he had used a 7′ single deck **KOLMAN** for several years. He has since purchased 2 more **KOLMAN** Double Deck Screens, both 8 footers—the best possible testimony of his satisfaction based on actual results!

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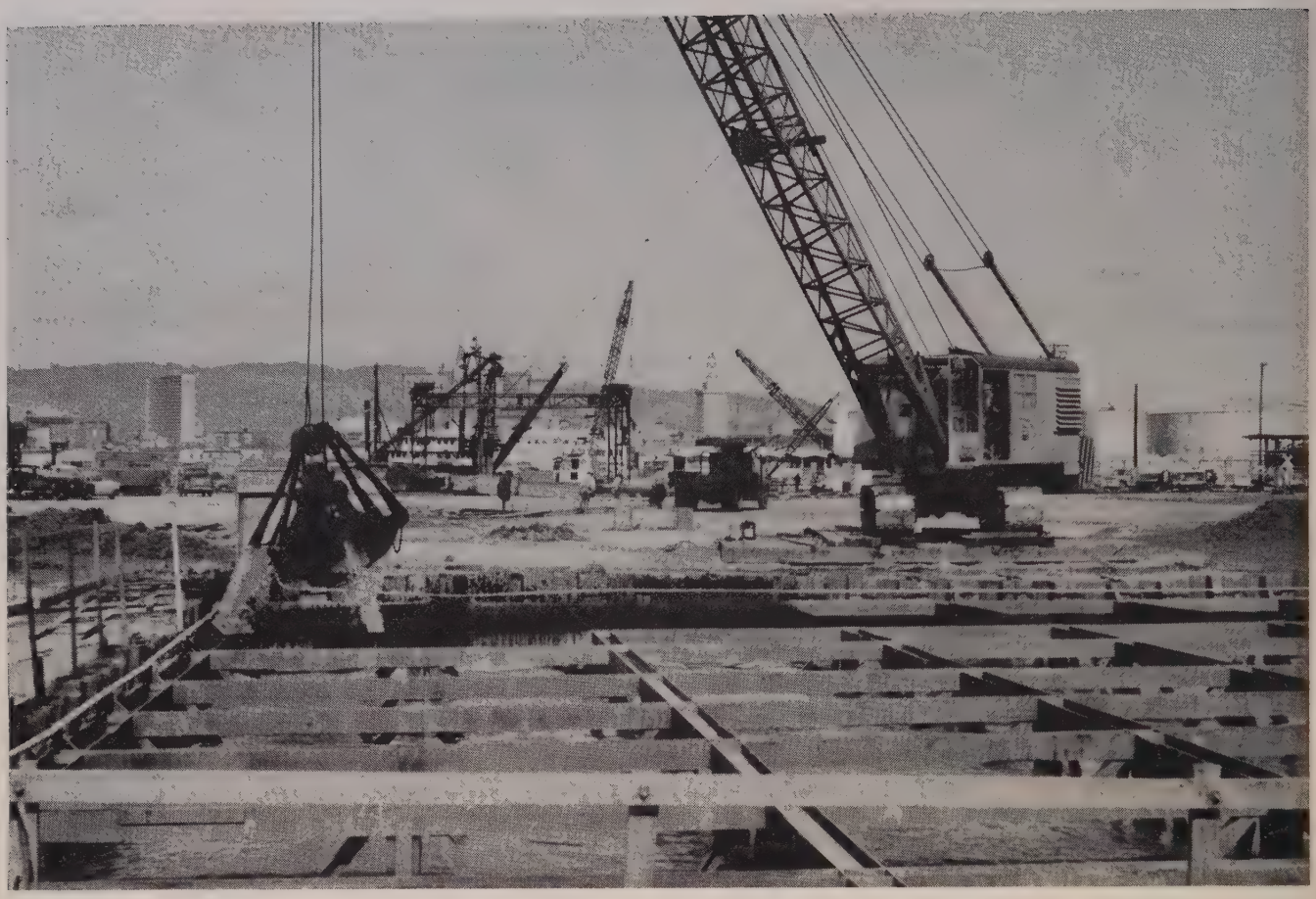

COFFERDAM for Alameda portal building filled with water during final stages of excavation. Five steel grids like the one shown brace the sheet pile sides against the inward pressure of bay mud. Lift bridge in background will span waterway now being dredged.

Unusual construction methods for Alameda tube project

Contractor Pomeroy, Bates & Rogers, and Gerwick built a railroad trestle underground, filled a portal building cofferdam with water, and designed a 60-ton gate with no hinges in preparing the site and building a drydock for the new Alameda tube. Project includes casting of twelve 8,000-ton sections of concrete tube and sinking them in a trench beneath the Oakland Estuary.

CONVENTIONAL construction methods have no place in the building of the second Oakland-Alameda Tube, a 3,350-ft. concrete pipe, 37 ft. in diameter which will carry traffic under the Oakland Estuary. Even the preparatory phases of this mighty project, which will involve sinking twelve 8,000-ton tube sections in a trench at the bottom of the estuary, have their bizarre situations.

For example: On the Alameda side a sheet-pile cofferdam has been constructed in the middle of a paved area a quarter-mile inland, and filled with water while the material within its walls is being excavated.

Nearby, the bents for a railroad trestle 30-ft. high are being constructed completely below ground level. Caps on the wooden piles are slightly below present ground level.

Both the water-filled cofferdam and the underground trestle represent practical solutions to the problems inherent in the location of the tube: restricted site, heavy cross traffic flow, and the oozing, plastic, endless bay mud.

Contractor on the $16,641,000 project is a joint venture made up of J. H. Pomeroy & Co., Inc., Bates & Rogers Construction Co., and Ben C. Gerwick, Inc., with Pomeroy as sponsor. Following award of the contract in September 1959,

(Continued on page 66)

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*Over-all economy test conducted by America's leading independent research organization (name available on request)

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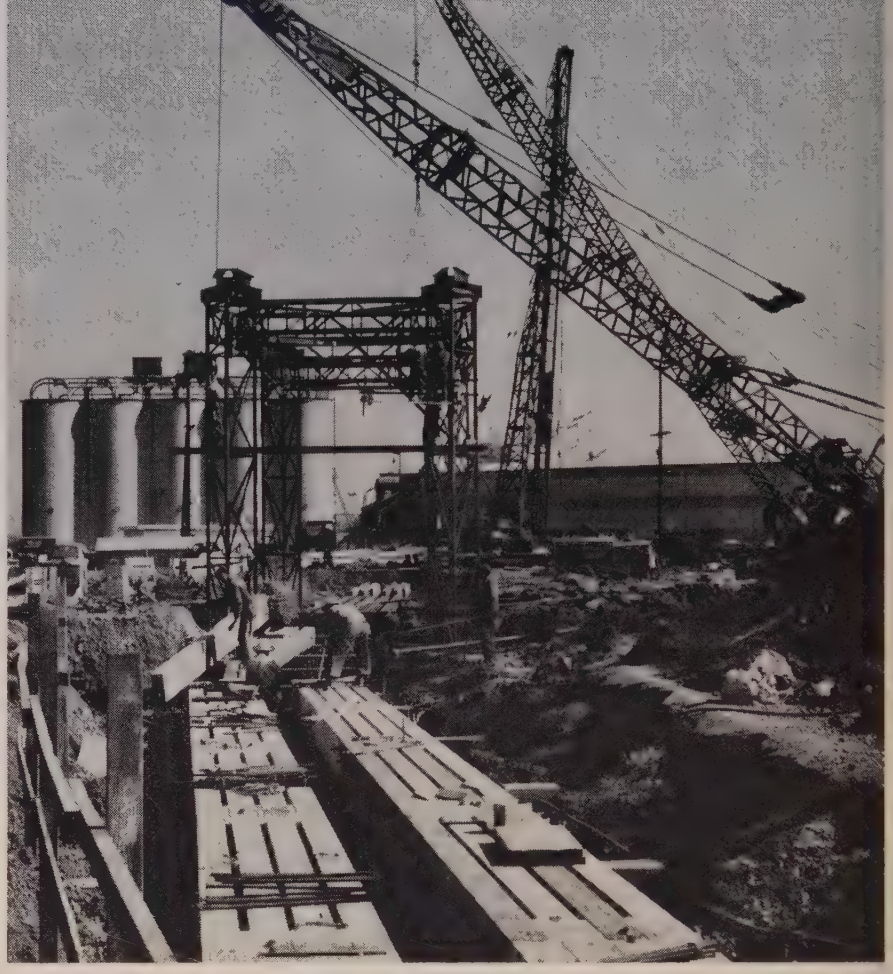
ALAMEDA TUBE

(Continued from page 62)

the contractor leased part of an old Navy installation on the estuary about two miles from the tube site and is building a drydock for casting the tube segments there. The contract covers construction of a portal building at either end of the tube, placing of 12 precast tube sections, and construction of 800 ft. of cast-in-place tube. On the relatively open Alameda side, the contractor will dredge a waterway to the portal. Tube segments will be floated in and placed in sequence. On the Oakland side, the right-of-way is squeezed between warehouses and crossed by two railroad main lines, a 105-in. sewer line, and a major truck route. Here the work will be done in the dry behind cofferdams, with the 800-ft. cast-in-place section linking the Oakland portal and the tube segments emerging from the estuary.

The drydock facilities will be completed in June and construction of the tubes will begin. Meanwhile, intensive work on preparation of the site is under way.



TRESTLE for spur line serving military base is built "underground." Timbers for rails are placed on wood pile bents driven into the mud. Lift bridge across waterway site in background.

Underground trestle

Site of the Alameda portal building as well as the channel which eventually will connect it to the estuary was a rail-yard for the adjoining Army supply depot. In order to get the site cleared, the contractor first had to build a new railroad yard inside the depot.

Then there was the matter of the spur line which must cross the proposed waterway to serve the new yard. It was not possible to excavate the channel and then build a bridge across it, since continuous service had to be maintained. The contractor solved this problem by building the bridge in the dry, or rather in the mud. He set up a big steam pile-driver and sank 70-ft. wooden piles in groups of six to form the bents for a trestle which would cross the channel, leaving a 60-ft. gap in the center of the channel-to-be. This opening is spanned by a lift bridge, with the lift section rising between two pairs of steel towers at the abutments. Towers are triangular in section, fabricated from welded pipe. The lift bridge is the brain child of Don Weaver and Del Pedgrift, assistant general manager in charge of construction and project engineer, respectively. Its function is to permit free movement of barges carrying excavated material out of the waterway. Bridge section will have to be removed for the dredge itself, but this will only happen twice — once in and once out.

LIFT BRIDGE designed by contractor to speed passage of barges through channel which will be dredged from estuary to portal. Tube sections will be floated into channel and sunk.

Cofferdam

At the inland end of the Alameda channel a sheet pile cofferdam, rectangular in shape has been driven, and excavation is under way. The heavy weight and plastic qualities of the bay mud which underlies the entire area add considerably to the difficulties of this operation. Piles are 70 ft. long, extending 20 ft. below the excavation. Piling is braced internally by five horizontal grids of steel I-beams extending from wall to wall in both directions. The grids are spaced vertically about 6 ft. apart, resting on timber uprights. This internal bracing divides the excavation area into a number of rectangular cells, which requires precision work with a clamshell

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just to get down to the dirt (mud).

The design provided that the bracing system would be installed in the dry after which the cofferdam would be flooded, and the balance of the excavation completed. Depth of the excavation in each bay is measured with a sounding line with iron weight at the end, wielded by the superintendent. As each bay is brought down to grade, he paints a yellow "X" on the top beam. A one-yard bucket is used in the center bays, and a 2-yd. bucket in the larger areas around the perimeter.

When excavation is completed, bearing piles will be driven in the bottom, and a concrete slab 4 ft. thick placed. Then the hole will be de-watered and construction of the portal building will start.

Meanwhile, dredging of the waterway from the estuary to the cofferdom is under way. Sheet pile bulkheads will reinforce the sloping sides of the waterway. At a critical point, where the bulkhead runs along the edge of the right-of-way, the piling has been capped with reinforced concrete extending about 10 ft. down from the top. Concrete deadmen have been sunk into an adjoining parking lot and cables connecting the piling strung along the top of the ground. These will be covered with a layer of asphalt paving.

On the Oakland side, work on the portal building excavation is proceeding. In place of sheet piling, steel H-piles are set in 24-in. drilled holes and driven the final 10-ft. through soil previously loosened with a smaller diameter auger. As excavation progresses, timber lagging is set between flanges.

DIVER Dick Clements, right, and John Bugbee, field engineer, check high pressure pump which will power water hose to clean sides of cofferdam before placing 4-ft. concrete slab floor.

SHEET PILE covered with reinforced concrete protects property adjoining right-of-way along channel. Cables inside fence anchor concrete to deadmen. They will be covered with blacktop.

Dry dock construction

Still a third type of piling, prestressed concrete soldier beams, is planned for the drydock, under construction at the contractor's headquarters about two miles up the estuary from the tube site. The dock will be 473 ft. long, 60 ft. wide, and about 40 ft. high. Its floor will be 34½ ft. below sea level. Soldier beams are 20 x 30 in. in section, and 50 ft. long. Each will be anchored with a 2½-in. tie rod to a continuous concrete deadman set about 15 ft. below ground level and 50 ft. back from the dock wall. Walls will be constructed of heavy timber lagging placed behind the soldier beams. Concrete slab floor will have a pipe system to collect water seepage from both above and below the slab. Two 12-in. pumps will be used to dewater the drydock.

Permanent sheet piling wing walls have been constructed at the entrance to the dock, as well as a temporary arc of piling which will act as a cofferdam during excavation. Excavation is done on a subcontract by Piombo Construction Co., and will include about 90,000 cu. yd.

In the upper stages, the material was bulldozed and loaded in tractor-drawn scrapers. As the cut deepened the mud got thicker and the going tougher, and the dozers were replaced by crawler-mounted draglines. One in the bottom of the hole loaded on a string of 10-wheelers operating on a carefully constructed ramp well above the mud line. A second dragline worked from the top of the bank, cutting back the berm on which the deadman will be placed.

The drydock gate will be made of sheet piling welded to three horizontal plate girders each 7 ft. deep. The structure will be 50 ft. wide to fit the slightly narrower dock portal, and will weigh 60 tons. It will have no hinges. On the six occasions when the gate will be opened, a floating crane will lift it out and set it on a barge.

Two gantries composed of Manitowoc 3000 cranes, on 20-ft. rail-mounted towers are being re-pow-

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NEW MODEL 3PN, above, pumps all the water a 3″ suction hose can handle at 5′ lift. Pumps 28,000 gph at 10′ lift when a 4″ suction hose is used. Sure-priming is correspondingly fast, at all practical suction lifts.

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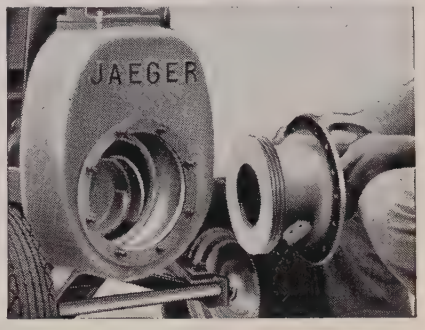

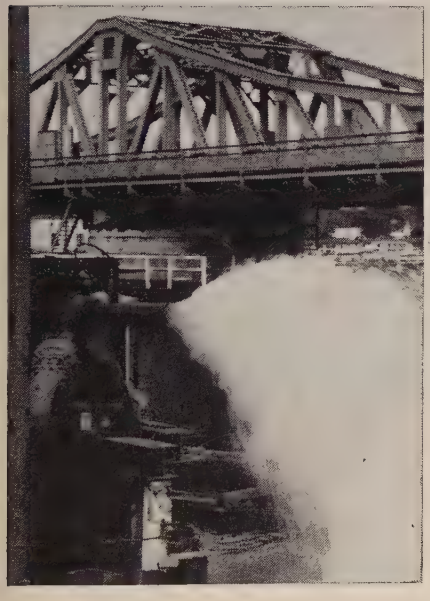

BIG CAPACITY FOR BIG JOBS: This Jaeger 10″ is doing a fast job of dewatering a 43½′ x 129½′ x 26′ deep cofferdam after the pouring of an 8′ thick bridge pier foundation with 1500 cu. yds. of tremie concrete. With a Jaeger 6″ pump also on the job, contractor had well over 300,000 gph of water handling capacity.

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EXCAVATION for drydock where huge tube sections will be cast seen from gate end. Sheet piling being driven for gate portal in foreground. Berm, right, cut for concrete deadman which will anchor prestressed soldier beams and timber lagging forming sides.

ered and will be located along each side of the dock to handle placement of the concrete and other materials.

A Noble batch plant is being set up at the end of the dock area to produce the concrete. Tight specifications require screening of the aggregate immediately over the bins.

Reinforcing steel for the tube segments will be fabricated and placed on a subcontract by San Jose Steel Co. and a dockside area has been set aside for steel operations.

Tube sections

Actual construction of the tube segments will begin in June. The 200-ft. sections will be cast two at a time, in tandem, using Blaw-Knox steel forms. Casting operations will be done in three steps, starting with placement of the invert. Next the flat roadway slab which is an integral part of the tube will be cast. Rails will be placed on the slab to support the travelers for the big inner forms, and the balance of the tube will be cast. Forms break down into sections for removal when the two tube segments are completed.

Ends of the tube sections will be bulkheaded with timbers fastened to heavy steel bracing, the space beneath the roadway slab filled with water for ballast, and the sections will be floated out of the drydock to a holding dock for final trimming before the section is moved to the site and sunk into position.

Trimming includes placement of sand to desired depth on the roadway slab, and finally, adding sufficient water to give the giant concrete cylinder a slight negative buoyancy. (Tubes will weigh about 100 tons in their lowering slings, which is slight compared to their 8,000-ton dead weight, but still a fair heft.)

As the segments are lowered in sequence, projecting steel beams in the upper corners of the square concrete collar of the lowered section will mate with corresponding niches in the collar of the preceding section. Outboard end of the lowered section will rest on temporary positioning piles driven in the bottom of the trench. Forms will be set around opposing collars of two sections, and tremie concrete poured to make the joint. (Later when all sections are in place the joints will be pressure grouted from the inside as an additional safeguard.)

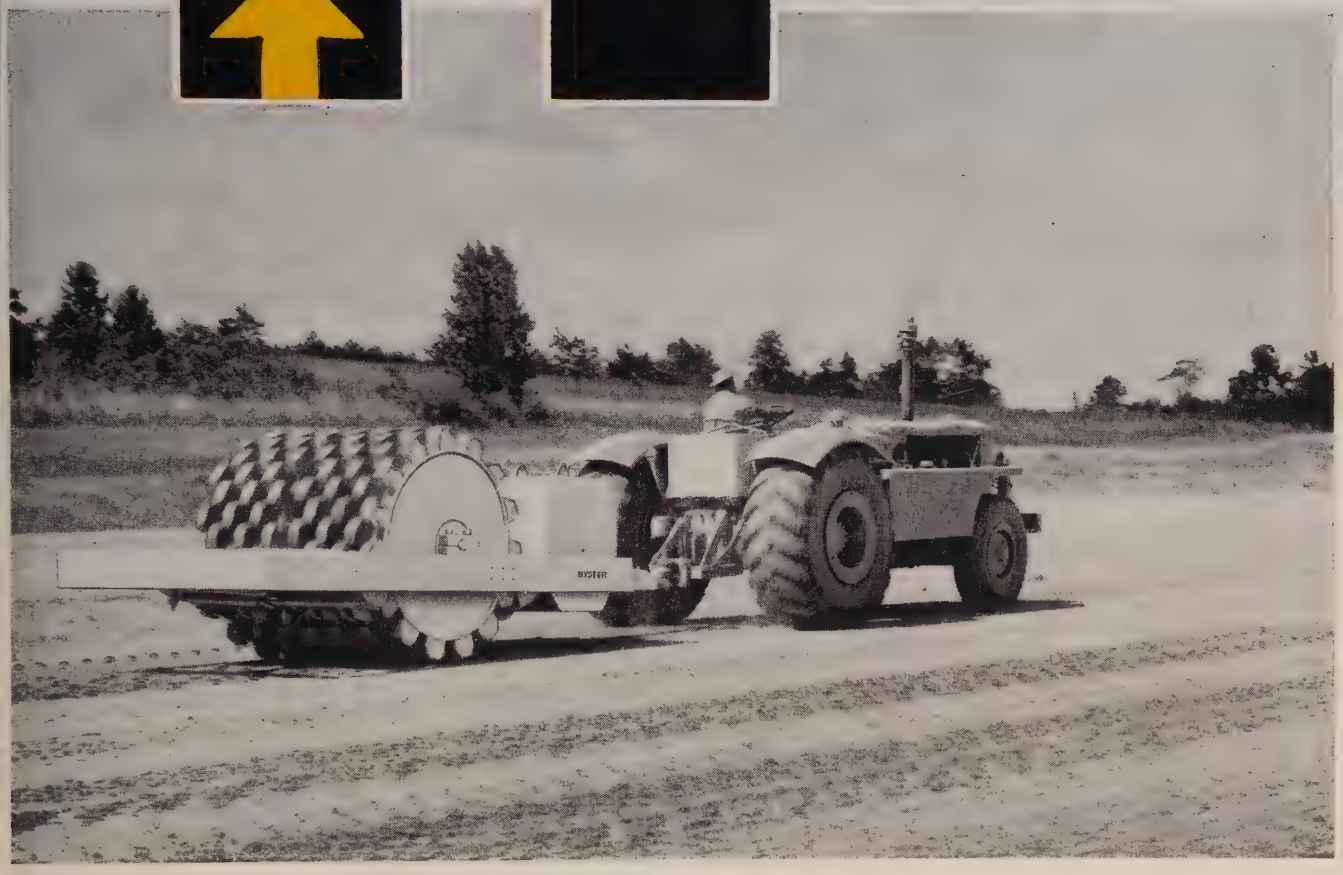
The present project, known officially as the Webster Street Tube, follows closely the methods devised by the late George Posey, then Alameda county engineer, who conceived and built the first sectional underwater tube in 1927. Since then, ten other such structures have been built in various parts of the world. The twelfth, Webster Street Tube, will join the original Posey Tube to form two one-way traffic arteries linking Oakland and Alameda, Calif. The Webster Street Tube is designed by the California Division of Highways bridge department. It was engineered for construction by the Engineering Division of J. H. Pomeroy & Co., Inc.

Personnel

Field staff of the California Division of Highways is headed by George Greene, resident engineer, and includes John Burke and Guy Mancarti, assistants. Burl Housden is district representative.

For Pomeroy, Bates & Rogers, Gerwick, general manager is W. P. O'Farrell. His staff includes Howard Eichstaedt, assistant to the general manager; Don Weaver, assistant general manager; Del Pedgrift, project engineer; Gust Blomseth, master mechanic; S. L. Laughlin, accountant; and Pat Kisich, purchasing agent.

HYSTER



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IMPORTANCE of fast field testing and control is emphasized by this view of fill operations as the area of operations neared the crest elevation. Note the crest length (822 ft.) as compared to the up-and-downstream dimension (1,980 ft.) With standard testing procedure, two or three lifts of core (Zone 7) material could have been placed before results would be available. A testing procedure was developed that permitted results to be transmitted from the laboratory to the field inspector within 15 min.

Completion of 5,250,000-yd. Mammoth Pool aided by—

Fast field testing for earth fill

By **NEVILLE S. LONG**
Resident Engineer,
Southern California Edison Company,
and
LLOYD E. GARST
Senior Engineer, Bechtel Corporation

Capacity of today's earth handling equipment adds lifts at a rate that makes the reporting of test results the key to construction progress. Methods are developed to get answers to the field inspector in 15 min.

SUCCESSFUL completion of the Southern California Edison Company's Mammoth Pool Dam a month ahead of schedule can, in part, be attributed to the time-saving techniques developed and used by the field control laboratory. The dam, completed on Oct. 8, 1959, is a major part of the company's $49,200,000 Mammoth Pool Hydroelectric Project which is scheduled to go on the line early in 1960. The dam, located on the main San Joaquin River, is another feature in the Edison Company's continuing development of this river and its tributaries.

With the exception of the large rock in Zones 1 and 2, used for the upstream and downstream slope protection and the downstream toe of the dam, all material was subject to placement control testing by the laboratory forces.

Zones 3, 3V, 4, 5, 6, and 7 (see cross-section) totalling 4,459,380 cu. yd. were the zones that received the most attention in the matter of control testing to insure their meeting design and specification requirements. Some of the methods used in testing the material of these zones, while not necessarily unique or original, may be of interest in the manner of application to this job and may be useful on similar jobs.

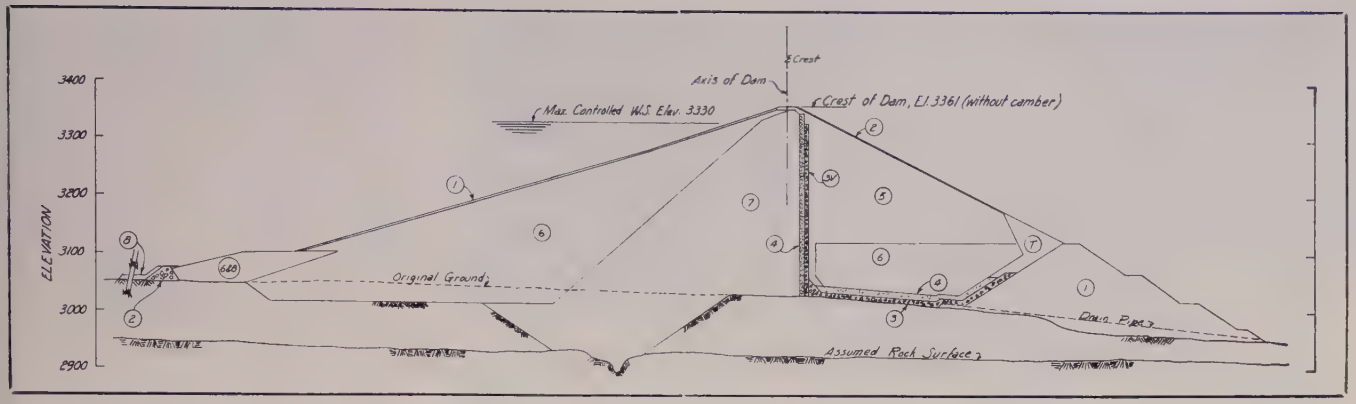
Zones and requirements

The dam is a rolled earthfill structure 451 ft. in height above bedrock and contains a 150-ft. high sluiced-in-place rockfill toe. In addition to the rockfill toe, eight separate zones or classes of earthfill material are included in the structure which has a total volume of about 5,250,000 cu. yd. The dam is unusual for an earthfill structure in that its crest length of 822 ft. is considerably less than its upstream-to-downstairs toe length of 1,980 ft. This, coupled with the specification requirement that placement and compaction had to be parallel to the axis, presented special problems to the contractor, the Bechtel Corporation.

In the construction of the lower half of the dam, the width permitted a reasonable time lapse between placement of successive lifts in the same area. However, as the height increased and the width of the fill decreased, the time between the placement of successive lifts became less and less.

Compaction requirements were quite high, being 98% of a laboratory standard obtained with 20,000 ft. lb. of compactive energy per cu. ft., and re-rolling of the critical zone 7, or core material, was often required. The following of standard testing procedures would have meant that before the results of the density-in-place tests were made available to the construction forces, two and three lifts would have often been placed over the area tested. In this case the unsatisfactory material would have to be left in place or the whole placing operation would have had to be disrupted while material was removed and recompacted.

The short cuts which were de-



MAXIMUM SECTION AND QUANTITIES

TYPE of material in each zone, its source and quantity is shown in the table, with key numbers indicated in the cross-section.

MATERIAL LEGEND

ZONE	TYPE	SOURCE	TOTAL-C.Y.
1	Rockfill	Spillway & Emb. Foundation Excav.	361,260
2	Rockfill	Spillway Excavation	35,310
3	Processed Tunnel Muck	Processing Plant Stockpiles	82,860
4	River Sand	Emb. Foundation Exc. & River Dredging	146,500
5	Coarse Granular	Borrow Areas No. 2 & 4	889,300
6	Random Granular	Borrow Areas No. 2 & 4	2,031,460
7	Fine Granular	Borrow Areas No. 2 & 4	1,355,990
8	Impervious Waste	Borrow & Construction Areas	310,110
7	Spillway Waste	Spillway Excavation	43,250

veloped and which are described in this article, enabled the results of a test to be transmitted to the field inspector within 15 min. from the time the test was taken, thus virtually eliminating this problem.

All of the material placed in zones 5, 6, and 7, was taken from the same borrow areas, and all can be technically described as a very slightly plastic to non-plastic, silty sand. Differentiation of these materials for zones 5 and 7 was by their grading characteristics. The gradation curves for zone 6 (random granular) materials overlapped portions of the gradation bands for both zones 5 and 7. There was an average of 7% rock (No. 4 screen retention) in the material of zone 5, and 5% in both zones 6 and 7. Material finer than the 200-mesh sieve averaged 10%, 14%, and 20%, by weight of total in each of the zones, respectively. Very little, if any, of the zone 7 soil was finer than 9 microns.

Complete mechanical analyses were not made in the selection of material for zones 5, 6, and 7, prior to placement. Allocation was on the basis of the amount of material passing the No. 100 sieve as measured on representative samples taken from the borrow areas in advance of hauling.

The laboratory test consisted of washing a dried specimen of known weight on the No. 100 sieve, and subjecting the screen retention (after drying) to 5 min. of mechanical screen shaking on the No. 100 sieve. The material retained was weighed and the loss calculated. This test of minus No. 100 content was also made in connection with each density test of the material after compaction, thus providing a double check of the grading as well as furnishing information data for the record.

To obtain proper compaction in the embankment fill it was extremely important to have the soil moisture, especially that of zone 7, as close to optimum as possible. The specifications required that the placing moisture range for material of zones 5, 6, and 7 be from laboratory optimum to 3% dry of optimum, except for that placed within 25 ft. of the abutments of zone 7 where increased plasticity was required and a moisture range of from optimum to 3% wet was specified. The moisture-density relationship characteristics of zone 7 (and most of zone 6) material were so critical that in order to meet the specified density requirements under field conditions, it was found desirable to hold well within the allowable limits.

Moisture determinations were made continually during placing operations of the inhaul material both before and after processing on the fill and permission to roll was withheld by the fill inspector until the tests proved that the processed soil was in the desirable state of wetness.

These tests were conducted by a laboratory technician in a skid-mounted shack, 4 by 5 ft. in size,

MAKING a density-in-place test at one of the dam abutments in Zone 7. Soil is being carefully removed from the hole and placed in the 5-gal. paint pail which has a clamp type lid to seal in the moisture during transportation to the laboratory. Volumetric measurement will be made using the small sand cone shown with its previously weighed and calibrated supply of sand.

POURING calibrated sand in a completed density-in-place test hole for volumetric determination with the large sand cone. This test is being made in Zone 7 and the density plate was set 1 ft. below the surface as was done in all tests of this zone which had been compacted by sheepsfoot roller.

which was moved to one location or another on the fill out of the way of the operating equipment. Testing paraphernalia housed in the moisture shack consisted of: one Coleman, two burner, gasoline camp stove; one triple-beam balance with a capacity of 1,600 grams; six aluminum cake pans, 8x8x2 in.; one No. 4 mesh sieve; two pails with lids; one pair of pliers; one Coleman gasoline lantern; and a 2-gal. can of naptha.

Representative samples of the material to be tested were collected in the pails and taken to the shack where they were screened on the No. 4 sieve. The moisture test specimen was then taken from the well-mixed minus No. 4 fraction, weighed on the balance in one of the cake pans and put on the stove to "fry." The specimen was allowed to dry over the flame, with frequent stirrings, until a narrow strip of tissue paper would lie flat and not curl when dropped on the soil. The usual length of time necessary to complete the drying was about 5 min.

After removing the specimen from the stove and allowing a few minutes for it to cool somewhat, it was again weighed and the moisture loss computed. When the original weight of the wet specimen, together with the pan, was made to equal 500 grams, a nomograph, developed in the laboratory, could be used to obtain the percent of moisture directly from the weight of the dry soil and pan, thus obviating any calculations. Ordinarily, 40 of these moisture tests were made during each 8-hr. shift worked by the technicians.

Moisture determinations in the laboratory were made, utilizing an electric hotplate; a three-burner butane gas table stove; and a thermostatically controlled standard laboratory oven. The latter was used principally in testing when speed of results was not especially important, and in checking the results of moisture dry-outs by the quicker methods.

The standard error per test when making the rapid moisture determinations was found to be less than 0.1% as compared to the slower oven. Admittedly, the character of the soil, being practically free of clay-size particles, allowed very accurate testing to be performed by rapid drying with intense heat. However, on another project the writers found that soil having as much as 25% clay-size particles could be dried out using similar rapid methods with a standard error per test of only 0.34%.

Density testing

Several different methods of making the very important density-in-place tests were used on the project. For a while, at the commencement of placing activities, an instrument that measures the volume of the density hole by filling a rubber balloon in the hole with fluid from a cylindrical tank and reading the volume of fluid displaced was used. Use of this instrument was discontinued after it was proved in the laboratory that a number of tests made with it resulted in impossible densities—higher than the theoretical density of the material with no air-voids. There were other disadvantages in its use that need not be described here and it was discarded in favor of the sand cone method of volumetric measurement.

Two sizes of cones were employed on the job. A small cone was used in conjunction with a 1-gal. glass jar as the sand container. The maximum size hole that could be measured with this cone was less than 0.1 cu. ft. Despite the small size hole, consistent results were obtained in material of zones 6 and 7 where very little rock was encountered.

A large sand pouring cone of the Corps of Engineers design was used for the majority of tests in the main fill. This cone could measure holes of comparatively large volume, a desirable feature. However, in the sometimes spongy material of over-optimum moisture, hole shrinkage due in part to the weight of this apparatus was noticeable. Standard procedures, therefore, called for the use of the small sand cone when testing along the abutments and the large cone for main fill tests.

Sand used in the field density testing was a commercially produced, clean, dried sand of size No. 14-16, which was purchased in 100-lb. paper sacks. Cost of the sand (about $1.00 sack) was such that it was considered uneconomical in both time and money to salvage and reprocess it after use. While this sand was very uniform and had little variation in density, it was the practice to calibrate each bucket or jar of sand in a container approximating the size and depth of the density hole to be dug, immediately prior to making the test.

Laboratory testing speeded

The laboratory maximum density was determined from the soil removed from the field density excavation and brought to the laboratory in air-tight containers. Standard procedure for obtaining the maximum density and optimum moisture called for a moisture-density relationship curve to be developed by compacting specimens of the soil at various stages of moisture content in a 1/20-cu. ft. mold in five layers by means of a 5½-lb. hammer dropped 25 times on each layer from a height of 1½ ft., for a total compactive effort of 20,000 ft. lb. per cu. ft. The time required to make a complete moisture-density relationship test by a skilled technician and employing rapid moisture determinations, was still too long to be of much

(Continued on page 81)

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MAMMOTH POOL

(Continued from page 76)

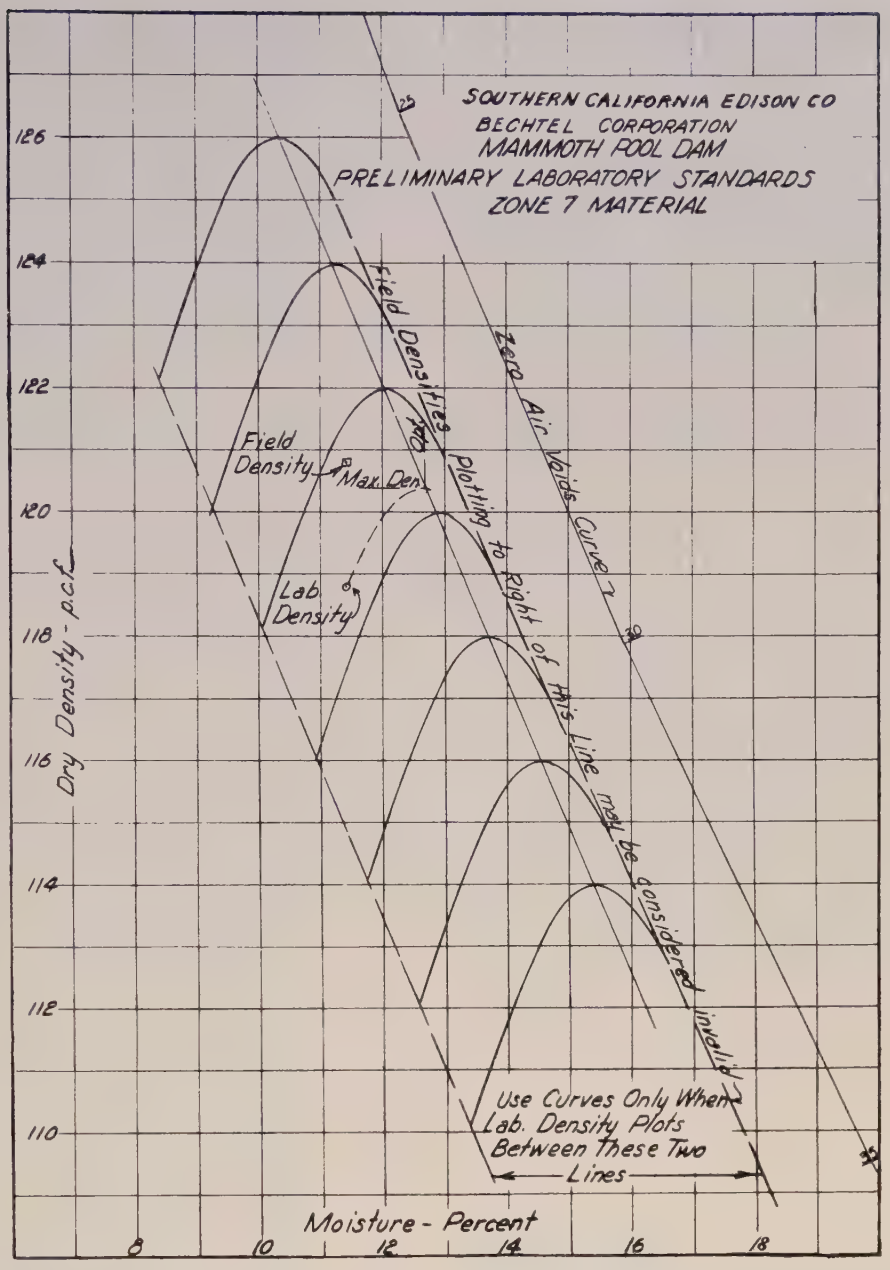
value in control considering the rate of placement in the embankment.

To shorten the length of time necessary to make the relative compaction comparison (field density to laboratory maximum density), and at the same time satisfy the specification requirements, the borrow area was sampled prior to placement activities. Each of the samples representing typical material was subjected to the full moisture-density relationship test as specified. Results of these tests were used in charting the curves shown (see illustration). These curves, from the highest to the lowest, fit over 90% of the curves developed from the tests.

In practice, the field density material upon reaching the laboratory, was screened on the No. 4 screen, the rock weighed, and a specimen of the soil taken for a rapid moisture determination to be used in converting the field wet density to dry density. One compaction test was made of the soil following the specified procedure and another rapid moisture determination made of it after the wet density had been obtained. Plotting the laboratory dry density against the moisture content on the "family of curves" and then paralleling the nearest curve to the line of optimum moisture gave both the laboratory maximum density and the optimum moisture content.

As an example, the curves show the plotting of a field dry density of 120.8 lb. per cu. ft. at the determined field moisture of 11.4%. Compaction in the laboratory resulted in a dry density of 118.8 lb. per cu. ft. also at 11.4% moisture. Paralleling the closest curve to the optimum moisture line results in a maximum density of 120.4 lb. per cu. ft. at 12.7% being read from the chart. The relative compaction is, therefore, 100%.

It should be pointed out that the application of these short cuts can only be made after the technicians had had sufficient experience with the material being placed in the structure to give them confidence in their decisions. Judgment and familiarity with the material being placed are essential to the application of short cuts. Fortunately, the use of short cuts is not as necessary during the early stages of a job as they are later on and by the time their use becomes imperative, the technicians are familiar with materials.



STANDARD curves of the moisture-density relationship for Zone 7 material. These are the preliminary laboratory standards established in advance to speed the testing and control program.

Transmitting results

Using the short-cut methods as outlined permitted test results to

(Continued on page 101)

Zone	DRY DENSITY-PCF. Field	Lab.	RELATIVE COMPACTION % Attained	Specified	MOISTURE—% Field	Opt.	Dif.	Spec.
5	120.6	120.3	100	98	10.0	11.9	−1.9	Opt. −3
6 (Main)	120.0	120.2	100	98	10.9	12.1	−1.2	Opt. −3
6 (Abut)	118.5	119.7	99	95	12.5	12.4	+0.1	Opt. +3
7 (Main)	119.7	120.5	99	98	12.8	12.4	−0.1	Opt. −3
7 (Upper)	117.0	119.5	98	95	14.2	13.0	+1.2	Opt. +3
7 (Abut)	117.6	119.6	98	95	13.6	12.7	+0.9	Opt. +3

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Down in Oklahoma, they've just completed a beauty . . . a new *Deep-Strength* Asphalt pavement that includes many features of The Asphalt Institute's Advanced Design Criteria.

And it won't be the last. That's for sure.

Just take a look at the construction (right) and cross section (below). Notice that precepts of new *Deep-Strength* Asphalt design are incorporated...heavy-duty Asphalt concrete surface course . . . heavy-duty Asphalt base . . . Asphalt primed subbase . . . wide double-sealed Asphalt shoulders (on Asphalt base) . . . heavy compaction . . . good drainage.

When designed like this — for *Deep-Strength* . . . Asphalt pavements will carry the heaviest traffic loads without distress . . . with minimum maintenance cost. Witness the New Jersey Turnpike. Witness also *Deep-Strength* Asphalt city pavements built more than 60 years ago and still in service.

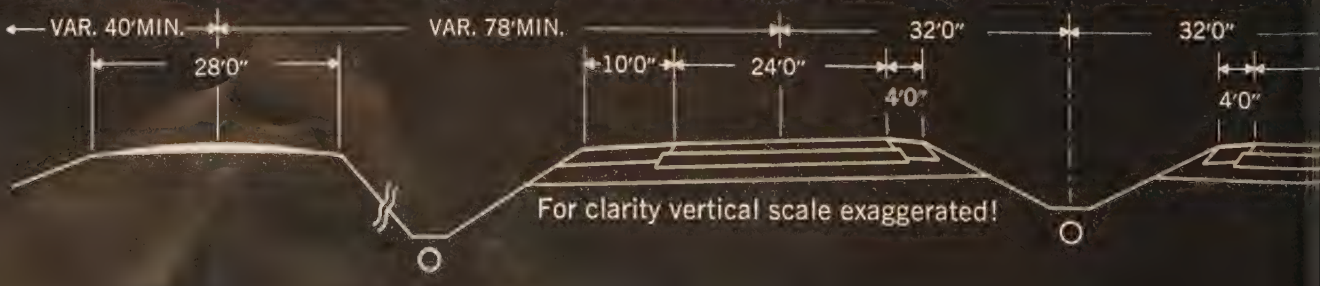
Save money, too

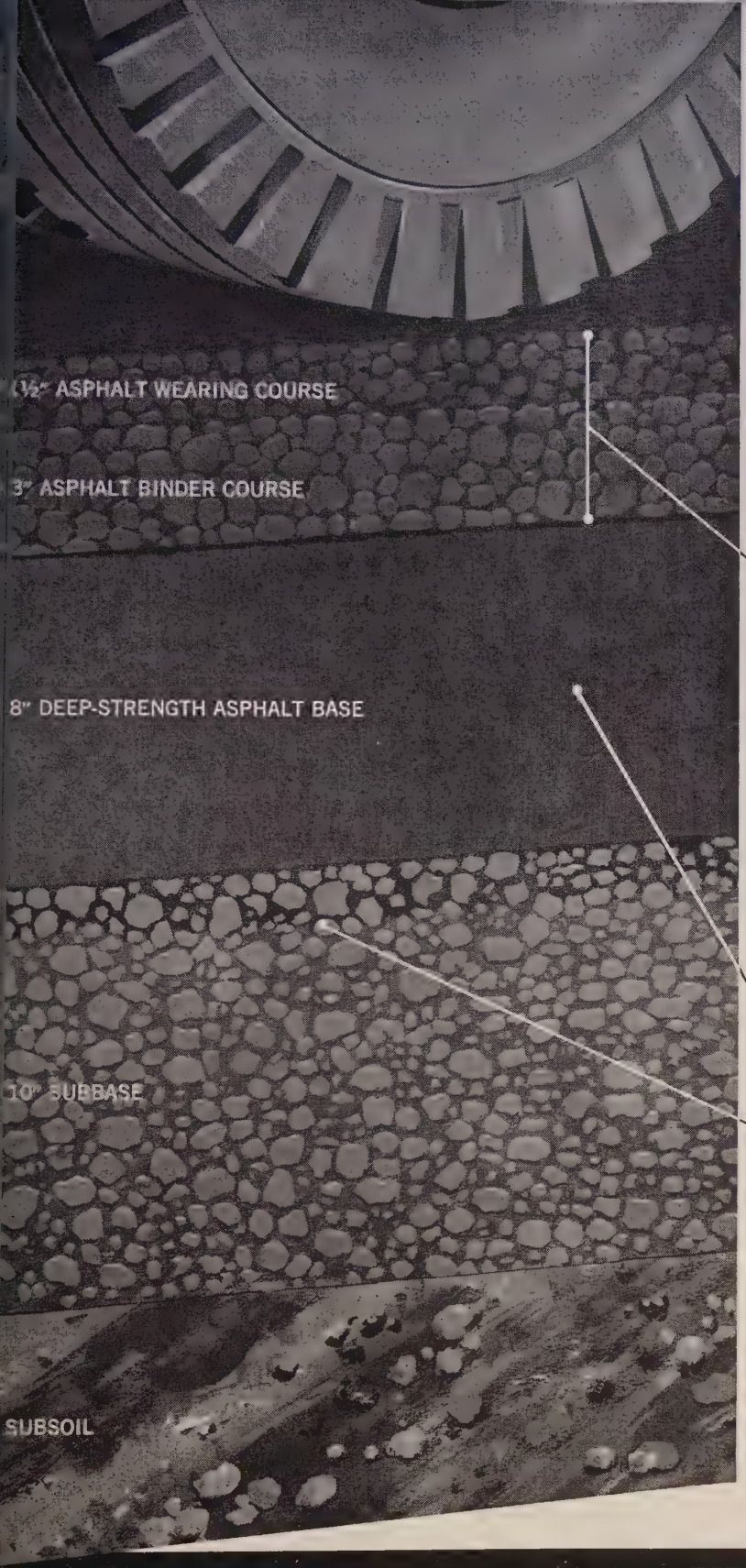
Surprising as it seems at first glance, modern low-maintenance, *Deep-Strength* Asphalt pavements often cost less to build than Asphalt pavements designed to other standards. That's because the Advanced Design Criteria permit inexpensive Asphalt base to be substituted, within limits, for the more expensive Asphalt concrete surfacing. And also because total pavement thickness can often be reduced by several inches.

New Handbook

Now on the presses is a new edition of The Asphalt Handbook. It incorporates all the Advanced Design Criteria for highways implied by the term *Deep-Strength* Asphalt Construction. Copies soon will be available at The Asphalt Institute office serving your area.

DEPRESSED MEDIANS ASSIST FREE DRAINING. Note also the Asphalt shoulder construction. These two measures alone can sub





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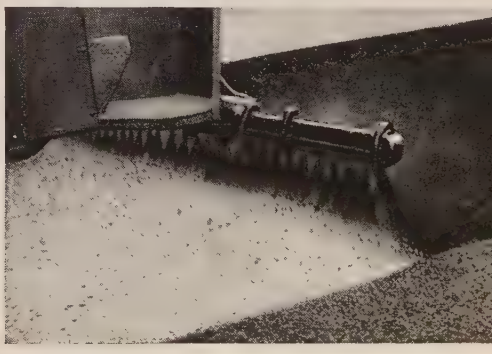
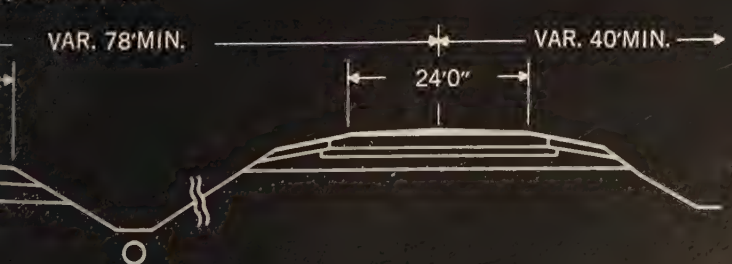
8-INCH SAND-ASPHALT BASE provides Deep-Strength . . . excludes moisture, insures smoother riding surface under heaviest traffic.

ASPHALT PRIME COAT SEALS SUBBASE . . . insures bond with overlying Asphalt base.



pavement life.



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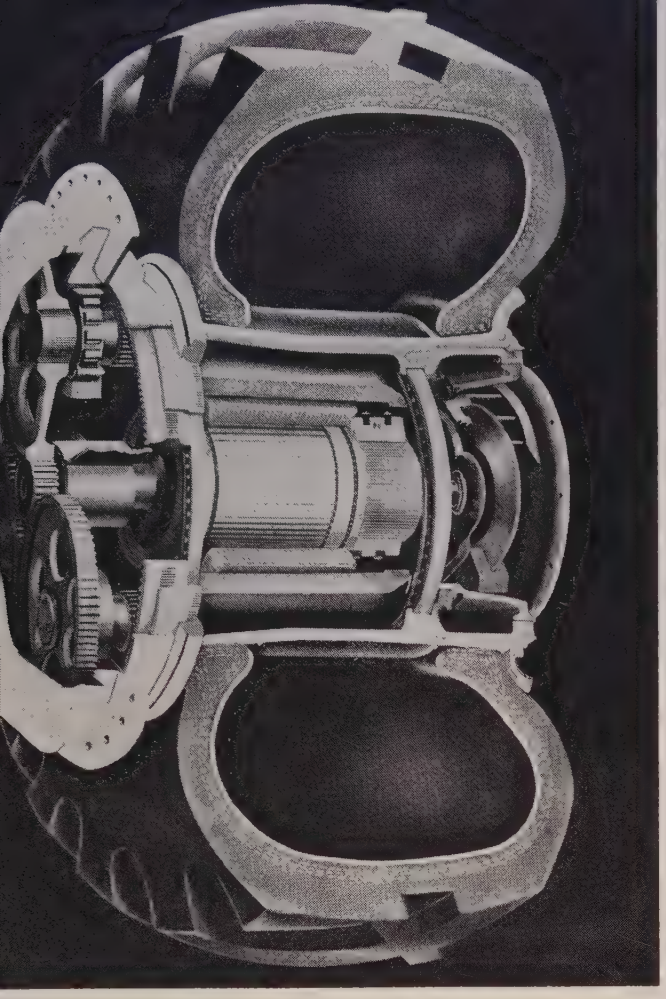


MOTORIZED WHEELS

Method of driving off-the-road construction equipment with all the advantages and flexibility of electric power. A description of the wheel motor, wiring arrangement, use of dynamic braking and operating controls.

By

R. W. VOLPE and H. J. McLEAN

Locomotive and Car Equipment Department
General Electric Company

THE construction industry is faced with the problem of material haulage in heavy volume, as it handles large quantities of earth, rock, ore, etc. The rubber-tired vehicles designed for this work have, for years, utilized various forms of mechanical transmission and torque converters between engine and wheels.

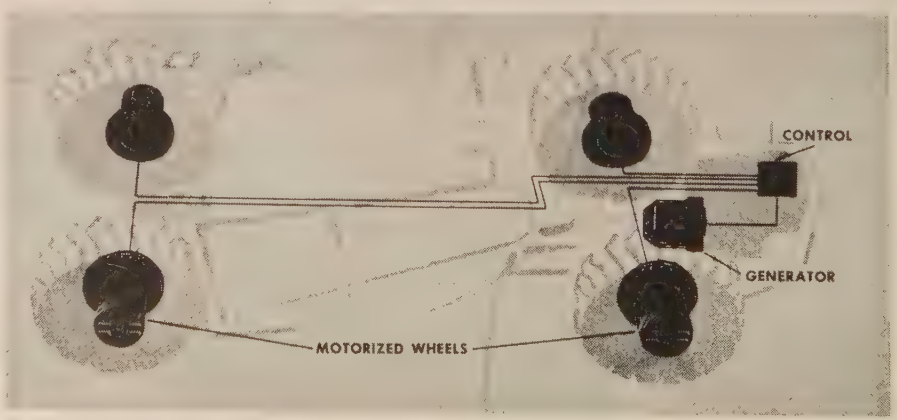
As vehicles have become larger and larger in an effort to reduce operating costs, maneuverability becomes increasingly critical. Finally the point is reached where it becomes imperative that the vehicle be of the tractor-trainer (pivot-steer) type. Getting power to all wheels of such a vehicle presents a difficult mechanical transmission problem. This problem of translating engine horsepower into effective rim pull on all the wheels of this type of vehicle is a natural application for electric drive with its inherent ability to locate the driving motors at the point of use.

A new concept

To meet this need General Electric engineers have designed a heavy-duty traction motor drive that eliminates the need for mechanical drive lines, differentials and hydraulic torque converters. Four of these motors can deliver the full output of engines rating up to 1,600 hp. The system is designed to provide 60% adhesion on all wheels at standstill and practically full horsepower utilization up to 35 mph. on vehicles in the 100-ton gross weight class. In fact, power for traction can now be applied to each and every wheel of any off-highway vehicle anywhere a set of flexible cables can be run.

Cornerstone of this electric drive is the "Motorized Wheel" developed by the General Electric Co. Early attempts to apply electric drive to off-highway vehicles were hampered by the excessive weight of the rotating machines compared with mechanical or hydraulic power transmission systems. The motorized wheel drive concept uses a unique, patented design to solve the weight problem by utilizing the magnet frame of the traction motor as the load-carrying member of the drive.

The Motorized Wheel is basically a heavy steel barrel joined to a large mounting flange (see illustration). A direct-current, series-



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DAYBROOK "long stroke" HOISTS
- are matched to body length
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wound motor of rugged transportation-type design is housed within the hollow axle, and the armature is carried on a concentric shaft which drives the power gear train through a floating pinion. An airplane-type disc brake is mounted on the commutator end of the shaft.

The wheel is carried on large diameter taper roller bearings placed around the axle. They will sustain the heavy loads imposed, and have ample capacity for long life.

A mounting flange attached to the motor barrel also forms part of the gear case structure. The motor armature is splined to a short sun pinion shaft. The pinion teeth engage three large gears placed in planetary fashion 120 deg. apart. Each gear is mounted on a pinion stub shaft whose bearings are in the fixed motor mounting flange. These fixed planet pinions emerge through openings in the flange-gear case wall to drive an internal ring gear. This gear, in turn, drives the wheel rim through a spline connection.

The mounting flange supports the wheel loading through the magnet frame; provides a means of attaching the motorized wheel to the vehicle; and acts as part of the gear case. The tire, rim, axle, motor, gearing and brake form one complete unit. In case of major motor or gear failure, the entire wheel unit can be readily replaced in the field and the vehicle kept in operation.

The motorized wheel drives are designed to work with either a diesel-drive generator or from an overhead electric system for a "straight-electric" vehicle.

In diesel-electric applications, power is supplied from a d.c. generator directly coupled to the engine. High-speed diesel engines rated 600 hp. or more provide vehicle performance superior to that of the small capacity, low horsepower vehicles using other available power transmissions. The advent of reliable higher horsepower lightweight diesel engines will further increase the performance of the large diesel-electric truck by giving it an even more favorable horsepower per ton ratio than it now enjoys.

Diesel-electric drive

When an engine-generator set is used to provide electric power for the wheel motors, the generator is usually designed to mount directly on the engine as shown in the accompanying illustration, so that the two form a power plant unit. An adapter is used to assemble the generator frame to the engine, and the armature is driven by the engine flyweeel through a disc coupling.

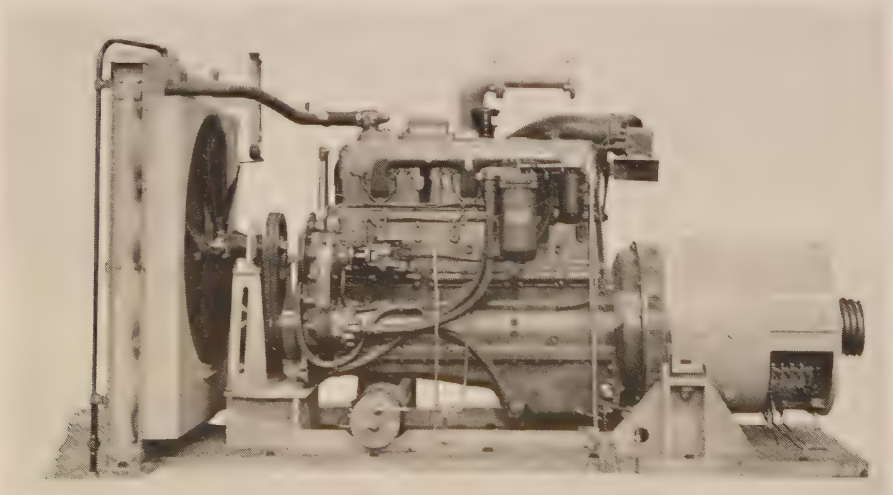
While perfect motors and generators are not economically feasible, practical machines can be built that have very useful output characteristics. For example, a set of four motorized wheels on a vehicle with approximately 40:1 gearing and tires of 103-in. loaded rolling diameter will develop the tractive effort shown in the curve. Tractive effort—the total pull developed at the wheels—is determined by deducting gear losses from motor output and referring the result to the tire diameter. Drawbar pull can be calculated by deducting from tractive effort the power required to overcome rolling resistance and other external losses.

It is desirable to transmit full power over the widest possible range of speed. To do this, the speed range over which a series motor will transmit full power to the wheels can, if necessary, be extended by connecting a resistor around the motor field. This produces an effect similar to that obtained by shifting gears with a mechanical transmission. The resistor weakens the field by diverting some of the armature current around it, causing the motor to run at a higher speed. In practice the resistor connection is made automatically, and the operator can barely notice the transition.

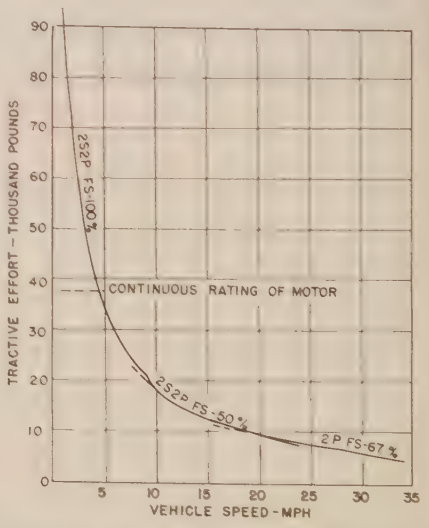
Motor arrangements

With an electric transmission, power can be supplied by means of flexible electric cable to as many wheels as necessary, even though some of them are remote from the power source. This advantage is unique to the electric transmission, since other types of transmissions are limited in their ability to supply power to remotely located wheels.

The desirability of supplying full power to several motors leads to a consideration of the several possible ways of connecting them. On a vehicle with four motors there are three basic ways of connecting motors. One way would be to connect them all in series across the generator. The voltage across any particular motor would then be one-fourth of the generator voltage. Therefore, the generator voltage must be extremely high to drive



GENERATOR is usually designed to mount directly on the engine, so that the two form a power-plant unit. Drive is from the flywheel through a disc coupling.

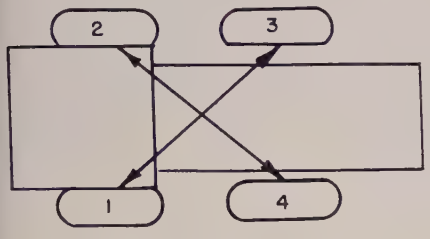


RELATION BETWEEN VEHICLE SPEED AND TRACTIVE EFFORT FOR 4-MOTOR EQUIPMENT WITH 600-HORSEPOWER ENGINE

the motors fast enough to obtain satisfactory vehicle speeds. This introduces a number of difficult problems in the generator design.

Another disadvantage of the series connection stems from the fact that the speed of a series-type motor increases as its load decreases. Therefore, if one wheel should slip, its motor would speed up, and tend to cut off the current to the other motors. As a result, power to all wheels would be reduced and the vehicle might stall. In effect, this is similar to what might happen if all wheels were powered from one 4-wheel differential.

Another way to connect the motors would be to put all four in



CROSS-CONNECTION OF MOTORS

parallel across the generator. Now each motor gets full generator voltage, but the generator must supply four times the motor current. While there is no problem about vehicle speed, the generator must be extremely large to supply the heavy current required to start a loaded vehicle.

An advantage of this connection is that if any motor slips, its share of the generator power is shifted to the other three motors which continue to supply full torque to their wheels. This may often prevent stalling of the vehicle.

The third motor connection is a compromise. Two groups of two motors in series are connected in parallel acrsos the generator. This connection requires only half the generator voltage that would be necessary to drive the motors at the same speed in the series connection. Also, generator current is half that required to get the same tractive effort in the parallel connection. If one wheel slips, it affects only the other motor in series with it. The torque of this motor is reduced, but the two motors in the other group still continue to supply full torque to their wheels. By cross-connecting the motors from front to rear of the vehicle there is little possibility that the vehicle will stall as a result of slipping. Also, motor torques when making a turn with the vehicle are very nearly equal. Experience with this connection in actual service has been most favorable.

Dynamic braking

Although the importance of getting all the available power to the wheels cannot be overemphasized, the job of getting it back out while braking a heavily loaded vehicle is equally important. In handling heavy loads on steep grades, ample braking capacity not only promotes safety, but also reduces cycle time.

The direct-current wheel motor offers a means of obtaining braking effort in quantities large enough to affect operating methods materially. If the correct connections are made, a direct-current machine can be made to operate as either a motor or generator depending upon the direction of power flow. When electrical power is fed into the machine and mechanical power is delivered at the output, it is said to be motoring. When mechanical power is fed into it, and electrical power is delivered at the output, it is said to be generating.

By making two changes from the normal motoring connections, the electric motors at the wheels can be made to operate as generators and act as brakes. First, the motor fields are reconnected so that generator current runs through them only and not through the motor armatures. Second, resistors to absorb electrical power are connected across the motor armatures.

Now power developed by the motor acting as a generator is dissipated as heat in the resistors and the force required to drive the motor retards the wheel. The performance, in braking, of a 4-motor equipment is illustrated; as can be seen, a very substantial amount of braking power can be obtained.

One important limitation is that electrical braking cannot serve as a holding brake since the braking effort vanishes at zero speed. Hence, a mechanical brake is provided to hold the vehicle at standstill.

Operator's controls

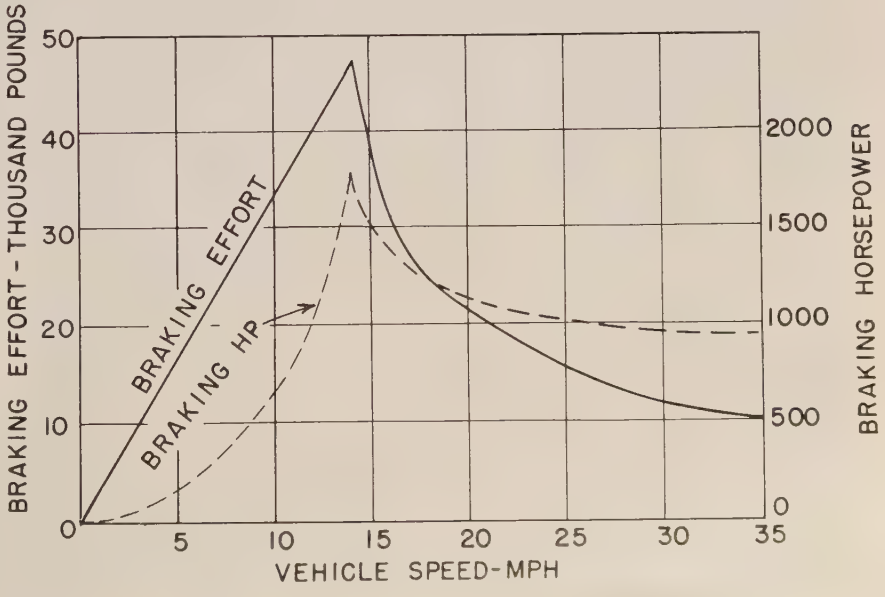
In addition to steering, which is not included in the Motorized Wheel equipment, the three functions an operator must control are:

1. Traction power
2. Braking power
3. Direction (forward, neutral, reverse)

Traction power is controlled in the conventional manner by controlling the fuel supply to the engine. An accelerator pedal sets the position of the engine governor control arm the same as on a mechanical transmission. In addition, a signal is provided to tell the generator that engine fuel is being increased. This is done by actuating a switch from the throttle linkage. Once the switch has been operated, any further increase in power takes place automatically.

Dynamic braking is generally controlled by a separate pedal like the accelerator pedal. It must operate three different devices. First, like the accelerator, it operates a control switch to set up the proper electric circuits. Second, it operates a variable resistor that increases the amount of braking as the pedal

(Continued on page 90)



BRAKING CHARACTERISTICS ON 4-MOTOR EQUIPMENT

OVERLAID PLYWOOD
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FINAL LINK: NIMITZ FREEWAY
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DESIGN & ENGINEERING:
Bridge Department, Division of Highways,
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CONTRACTOR:
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Oakland, California

FORMS GIVE LOWEST
ON ELEVATED HIGHWAY

In carefully planned sequence of operations, prefabricated shoring towers were positioned, screw-jacked to required height. Deck form sections were then crane lifted into position.

High density overlaid plywood concrete form panels give over 50 re-uses, cost less than .007¢ per sq. ft. of form per pour.

"THE EXTRA RE-USES we got from overlaid plywood more than offset its greater initial cost," says George Krenkel, project manager for Johnson, Drake & Piper, Inc., contractors for this 1.55-mile long 8-lane elevated highway.

"Even after giving upwards of 50 re-uses, a large percentage of the panels were salvaged for additional use on other jobs," Mr. Krenkel reports. "Besides being more economical in terms of cost per use, overlaid plywood creates much smoother concrete and is easier to strip and clean."

On the job over 50,000 sq. ft. of 5/8" overlaid plywood was used for deck slabs, columns and guard rails. Prebuilt 8' x 20' and 8' x 22' deck forms were supported by ingenious prefabricated shoring towers which were leap-frogged as pouring progressed. Screw jacks were used to raise towers to required heights. Stripping was accomplished simply by lowering jacks until the forms came free.

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HIGH DENSITY OVERLAID FIR PLYWOOD is a premium concrete form panel intended for jobs that require ultra-smooth concrete surfaces and/or many re-uses (up to 200 re-uses may be obtained with properly designed and constructed forms). Base panel is EXT-DFPA® Exterior plywood.

Standard concrete form grades are: *Interior PlyForm®* with water-resistant glue for multiple (up to 10-12) re-uses; *Exterior PlyForm®* (waterproof glue) for up to 25 or more re-uses.

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MOTORIZED WHEEL

(Continued from page 87)

travel increases. Third, it moves the engine governor throttle arm to increase engine speed as pedal travel increases.

The need for the third function should be explained. The blower for cooling the tractor motors is driven directly from the engine. To obtain maximum braking effort, it is necessary to run the engine at full speed to get maximum cooling air to the motors. The load on the engine during this operation is light and the engine will be running at high, light-load speed "on the governor."

Analysis of vehicle performance

How does a vehicle with G-E Motorized Wheel compare with a similar vehicle equipped with a torque converter and associated transmission? For example, take a diesel-electric truck of 50-ton capacity. It has an estimated selling price of $125,000 compared with the current market price of $105,000 for the same capacity twin-engine rear-dump truck with a torque converter and 3-speed transmission. Almost $12,000 of the difference is accounted for by the larger, more expensive single tires. This difference should decrease as volume production of the large tires is attained. Moreover, tire manufacturers, vehicle builders and users expect to realize longer operating life from the large single tire than is now obtained with smaller dual tires of comparable total capacity.

Conservative performance studies have shown that the diesel-electric vehicle can move over 170 tons per hour on a one-mile, 8% grade haul compared with the 150 tons theoretically possible under ideal conditions with the diesel-torque converter truck. Production, of course, varies with operating conditions, so that production figures are all relative and must be calculated specifically for each operator's particular situation.

The total operating cost on a per-hour basis would be about the same for both vehicles, but the real yardstick of economic comparison is the cost per ton of material moved.

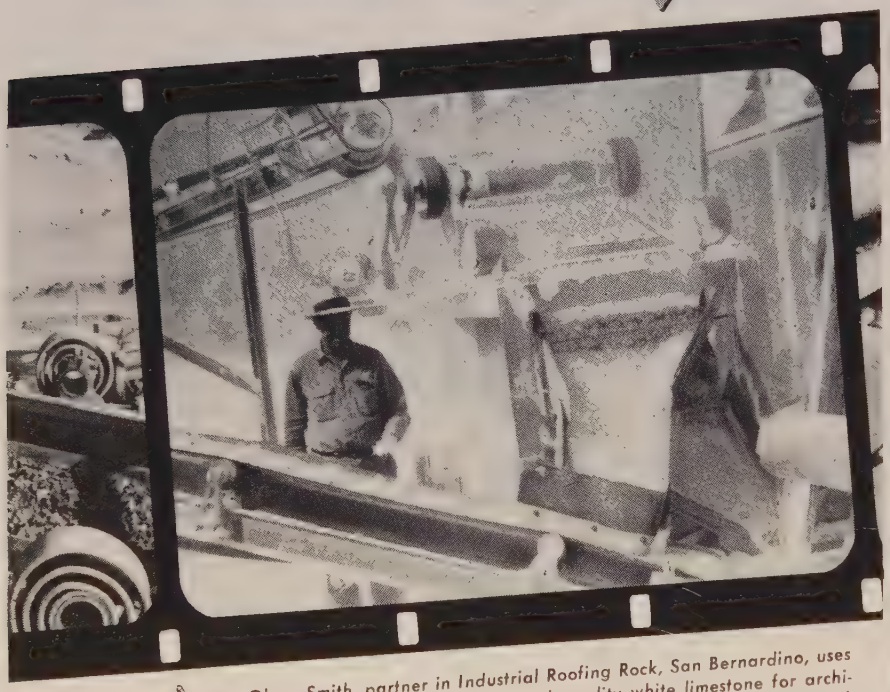
Calculations on the theoretical one-mile haul outlined above indicate a saving on the order of about 1.4 cents per ton for average conditions. With trucks which haul a million tons or more per year each, the total annual dollar savings for an average shovel speed becomes truly impressive.

The concept of the Motorized Wheel provides new standards of flexibility and performance by permitting electric power application to a number of wheels, and by giving increased braking capacity. The weight and cost reductions it offers make it economically feasible for large off-highway vehicles. Moreover, the Motorized Wheel vehicle will easily fit into established operating and maintenance patterns.

Field service tests lasting more than two years indicate that the equipment is sturdy and reliable, and capable of outstanding performance when properly applied.

There are now several units of various manufacture on the horizon which incorporate electric drive of the conventional and of the Motorized Wheel designs. These vehicles will give the construction industries the opportunity to witness the effectiveness of both the straight-electric and diesel-electric drive in solving the problem of security capacity, performance and maneuverability in the same vehicle for minimum haulage cost.

Screen Story...



Mr. Glenn Smith, partner in Industrial Roofing Rock, San Bernardino, uses two Overstrom Screens to produce high-quality white limestone for architectural and fine plaster products. One of the two 3' x 10' double-deck machines is equipped with dust enclosure and ball cleaners to produce 16 x 40m. and minus 50m. products efficiently and without blinding.

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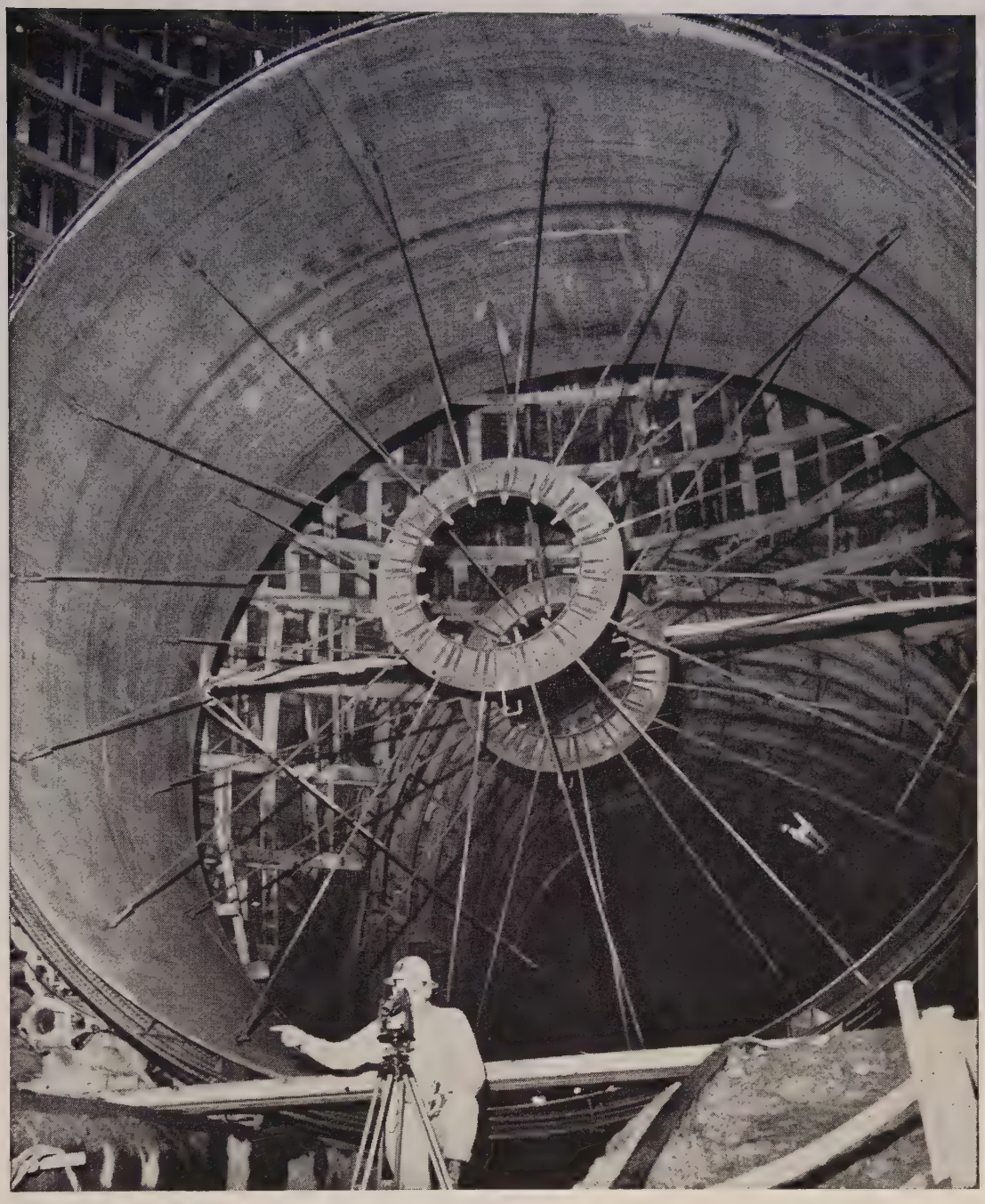

25-foot diameter section of Swift Dam tunnel liner inside 55-foot diameter surge chamber.

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Fifteen and a half million cubic yards of rock and compacted earth, holding back a 740,000 acre foot reservoir, are the biggest ingredients of the Pacific Power & Light Company's recently completed Swift Dam on the Lewis River in Washington. But the "pay load" conveyor of this man-made mountain is the 1,575-foot, steel-lined power tunnel which carries water under high pressure into three 13-foot diameter penstocks for the 68,000 kilowatt generators.

The plate steel lining of the power tunnel, the penstocks, and the 55-foot diameter surge chamber were all fabricated by American Pipe and Construction Co. at an "on the job-site" assembly plant. American's steel plate products, engineering, fabrication and erection abilities were proved once again at Swift Dam.

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ROCK FILL for a frontage road along the side of the new Interstate is spread by a Cat D8. This road will include a tunnel formed by a 16½ X 14-ft. multi-plate arch culvert, the largest ever placed in Montana. Triple-grouser track shoes on the D8 are found to give better wear by the contractor.

Montana highway job opens second year of rock work

Interstate project near Livingston includes heavy rock cut. Albert Lalonde Co. is moving 90% rock on a 1,700,000-cu. yd. job on U. S. 90.

CREWS of the Albert Lalonde Company, Sidney, Mont., resumed work early last month on an important section of the Interstate Highway System in Montana. The Montana winter shut down operations last December 19 on the 4-mi. project which involves 1,700,000 cu. yd. of excavation, with 90% of this in rock. The project will bring a section of U.S. 10 up to Interstate requirements in the vicinity of Livingston, and will carry the new designation of Interstate 90.

Original contract was let on a bid of $1,537,336 in May 1958 followed by an additional work order for $1,032,401 issued early in 1959. When the work shut down in December there remained about 150,000 cu. yd. of excavation. The base course gravel was about 50% completed last fall and the entire project is scheduled for finishing late this summer.

Slopes in the originally planned 800,000-yd. cut through limestone, shale and Virgelle sandstone were specified at ½:1. Due to random faulting found in the formation following excavation into the rock, however, it was found necessary to widen the upper reaches sufficiently to allow a slope of 1½:1. Necessary additional excavation for this purpose added 850,000 yd. increasing the total yardage to the present 1,700,000.

This largest cut on the project is approximately 2,300 ft. in length. Deepest point is 250 ft., with width at the base set at 80 ft. Sideslopes are set at 1½:1 for the first 170 ft., at which point a bench is cut into the hillside, and continuing at ½:1 to 1½:1 for the remaining 80 ft.

Largest fill is 2 mi. long and averages 25 ft. in depth.

Drill crews worked 24 hr. per day,

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LOADING in the rock cut was done by Northwest 80D, using a fleet of DU21-PR21 tractor-rock wagons for hauling. Most of the material was wasted. The D8 is used for cleanup work.

ROADBED material was spread by D8 Tractor-80 Scraper combination. About half of the base course gravel was spread last season.

six days per week. Three-inch holes were drilled to depths of 10 to 30 ft. on 5- to 7-ft. centers by a Crawl-I-R powered by 600-cfm. Ingersoll compressor. Drilling of 6½-in. blast holes to depths of 26 ft. on 12-ft. centers was done with an Ingersoll Drillmaster. Each hole was loaded with 90 to 150 lb. of Spencer ammonium nitrate primed with 15 lb. of Dupont powder.

Due to the random fault pattern in the rock, it is difficult for blasting crews to anticipate their shots as accurately as is desired. As a consequence, there is a constant danger of rock falling on the Northern Pacific Railroad tracks which run parallel to the road at a distance of 50 yd. Careful placement of the charges has prevented interruption of railroad service, and only minor damage to railroad property has resulted.

The shot rock is loaded with two Northwest 80D 2½-yd. shovels into a fleet of eight Cat DW21-Athey PR21 tractor-wagons. Hauling loads varying from 15 to 21 yd., the tractor-wagon combinations average 80 loads per 8-hr. shift, two shifts per day, for a daily production of approximately 5,000 yd. of rock.

In those areas where ripping was possible, a Cat D9 Tractor equipped with No. 9 Ripper shattered the material for pick-up with a D8 Tractor-No. 80 Scraper combination and transportation to fill areas. The company's other D9 and D8 tractors are used both in the cut area for cleanup work and spreading the fill. A D6 performs minor cleanup duties around the Northwest shovels.

Haul road maintenance and final grading of the fills is accomplished with two No. 12 Motor Graders, while a Michigan 175-A front-end loader picks up and spoils oversize rocks hauled to the fill. Compaction is obtained with two Bros sheepsfoot rollers pulled by D8s.

The completed road will be four-lane divided highway from its west end to the eastern edge of the big rock cut. From that point it will be four-lane divided with a 6-ft. median strip. Crown width of the blacktop will be 80 ft.

Asphalt will be 4 in. thick under the riding surface, 2 in. on the shoulders. In all, a total of 138,500 tons of base course, 25,000 tons of top surfacing and 32,500 tons of plant mix will be required.

Drainage will be provided by 1,000 ft. of 24-in. corrugated steel culvert pipe and 114 ft. of 7-ft. 8-in. by 5-ft. 5-in. multi-plate.

Access roads for two farms lying along the road will be provided through tunnels under the roadbed formed by the largest multi-plate arch sections used to date in Montana. These will require 194 ft. of the 16-ft. 6-in. by 14-ft. 3-in. structures.

During last season the crews of the Albert Lalonde Company worked two eight-hour shifts, six days per week. Work was under the supervision of A. M. (Andy) Stolzenburg, job superintendent. General foreman was Earlon Fisher; Julius "Blackie" Blacketer was blasting foreman and Vane Swenson, shop foreman. This season Earlon Fisher will have the responsibility of gravel superintendent and Rich Redding will be general foreman. Gene Lalonde is office manager on the project.

Award of generators to foreign firm

THE two generators which will be installed in the Hills Creek Dam (30,000 kw) have been awarded to a Swiss firm by the Portland District, Corps of Engineers. A lower bid by a Japanese manufacturer was disallowed as not conforming to the specifications and other requirements. The award went to Boveri Corp., a Swiss firm with United States headquarters in New York City, and the contract price was approximately $650,000. Work will include design, manufacture, installation and test of the two generators. There were a total of nine bids received for the generators.

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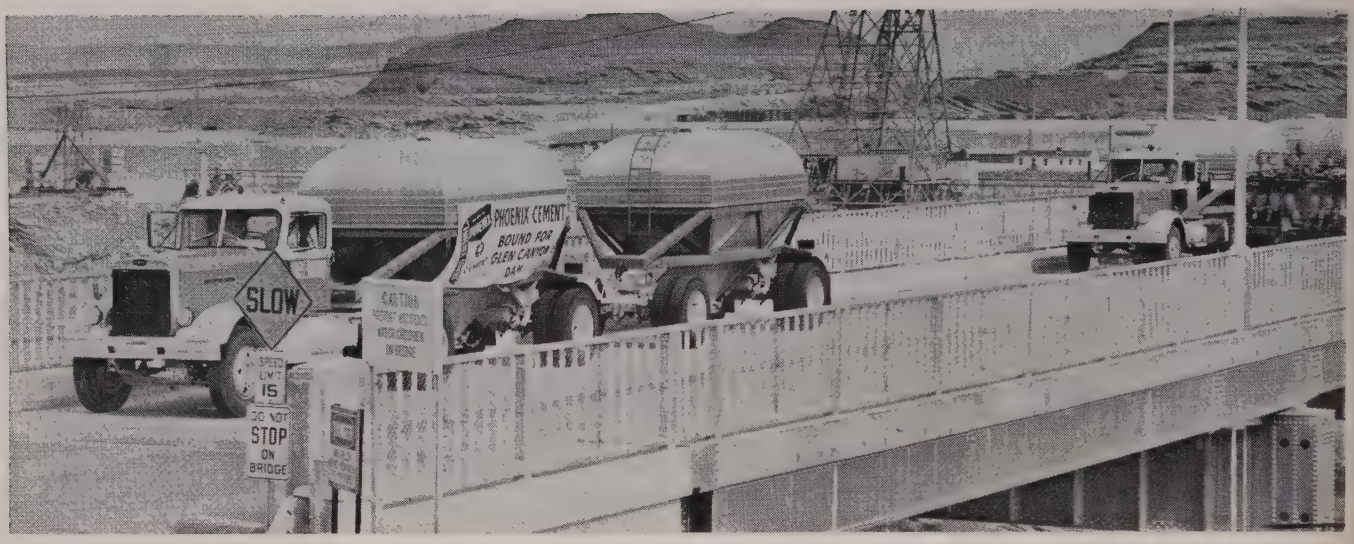


Cement starts arriving for Glen Canyon Dam

THE three-year-long cement haul from Phoenix Cement Company's Clarkdale Plant to Glen Canyon Dam will be the largest truck-ton-mile cement haul in history. The first truckload rolled up to the Dam on Feb. 8, 1960. Over the three-year period 3,100,000 bbl. of bulk cement will be carried in hopper trailers a total of 4,320,000 mi. for a total of 137,052,000 cargo-ton-miles. Counting the trips up and back the trucks will cover a total of 8,640,000 mi.

The company making the haul is Belyea Truck Company, Los Angeles. Belyea bought 4.5 ac. of land in Cottonwood, Ariz., not far from Phoenix Cement Company's plant for its truck terminal. Les King is Belyea terminal manager. The truck fleet consists of 20 rigs — 20 Autocar Model A102T light-weight, single-axle, diesel-powered tractors and 40 Fruehauf hopper-type cement trailers.

The trucks, which have aluminum frames, cabs, hoods and radiator shells and Fiberglas fenders, are powered with 220-hp. Cummins engines. Tires are General Nygen, 1000 x 22, of tube-type specially designed with this particular run in mind, and with rubber which was specially-compounded. They can be recapped 4 or 5 times, and are inflated to 90 lb. at the start of a trip.

A total of 24,000 to 27,000 round trips of 376 mi. each will be made before the job is complete. Approximately 27 tons, or 145 bbl. of cement are carried on each trip.

Total gross revenue to Belyea for the haul will be $3,000,000 to $4,000,000. About $1,250,000 of this will go to meet the payroll, with a force of about 60 people working at or out of the Terminal — drivers, mechanics, supervisors, clerical help. On the run the trucks will burn 1,750,000 gal. of diesel fuel—that's 5 mi. per gallon.

Approximate taxes Belyea will pay:

To Arizona, gross receipts tax	$50,000
Fuel tax, federal	70,000
Fuel tax, state	87,500
Sales tax, equipment purchase, State of Arizona	12,000
Sales tax, tires, state and city	7,700
Federal payroll tax (FICA)	20,000
State	15,000
Licensing	17,000

There are more taxes — minor ones — such as the taxes on oil and grease, which are not listed above.

Belyea's trucks will use Highway 89-Alternate to Flagstaff, at least until July when the new Interstate Highway 79 to Flagstaff, which bypasses the heavily traveled tourist haunts around Oak Creek and Sedona, will be opened. Then it's clear sailing on "89" to Page.

Presently, the trucks are forced to climb a 7% grade in Oak Creek. Maximum rise on the new highway to Flagstaff is 4%, without a cutback.

CORE SAMPLE of first cement load to Glen Canyon Dam is taken with hollow tube pushed down through cement in trailer to get cross-section sample for testing. Truck and trailers then move to weighing station scale. Buildings in background are contractor's headquarters.

. . . for more details, adv. opp. pg., write No. 44 on Reader Service Postcard—→

MAMMOTH POOL

(Continued from page 81)

be radioed to the fill inspector within 15 min. after the material had reached the laboratory. Such speed was absolutely necessary if the control testing was to keep up with placement. All embankment material of zones 5, 6, and 7 was placed in 293 working days. During this time, there were 2,115 density-in-place tests made in these zones, or one test per 2,020 cu. yd. In the most important zone 7 the ratio of tests to cubic yards was one in 1,330 cu. yd., which is considered to be excellent representation.

Personnel required

The results described were obtained with a laboratory force consisting of ten men. These ten men serviced the placing operations which went on for 18 hr. a day with compaction often being carried out for the hour between the two 9-hr. shifts and for an hour after completion of the last shift.

One man was assigned on each shift to the field moisture control shack; two men were assigned on each shift to the taking of density tests and the securing of other samples required; one man on each shift worked in the laboratory, assisted from time to time by the two men assigned to density taking; one man was assigned to permeability testing and other special tests required; one man handled concrete testing. The entire laboratory operations were under the supervision of Lloyd E. Garst, as Chief of Laboratory. In addition, the borrow pit inspector did some sample taking and some moisture testing and from time to time an additional engineer was assigned to the dredge operation where sand for zone 4 was being obtained.

The sand placed in zone 4 and the processed rock placed in zone 3 and 3V were controlled both as to gradation and density with the main emphasis being on gradation as this was harder to obtain than density. The control methods used resulted in a zoned embankment well within the limits contemplated by the design and specifications as shown in the tabulation of average values which follow:

The Mammoth Pool Dam was designed and constructed by the Bechtel Corporation. Construction was under the general supervision of Southern California Edison Company representatives and Bechtel Corporation Engineering personnel. The field laboratory was staffed by Bechtel Corporation personnel with all operations subject to review by the Edison Company.

The field engineering organization included: for Southern California Edison Co., H. A. Barber is project engineer and N. S. Long is resident engineer. Field inspectors are T. P. Sutten and D. A. Barber. For Bechtel Corporation, K. V. Taylor is project engineer, C. W. Lacey is field control engineer and L. E. Garst is senior engineer in charge of laboratory operations.

Tests on plastic canal linings

TESTS in the Bureau of Reclamation's Engineering Laboratories at Denver of a variety of plastic canal lining materials, some of which had been buried in soil as long as 10 years, indicate that the materials are in very good condition and have not undergone any significant chemcial or physical changes, Grant Bloodgood, Assistant Commissioner and Chief Engineer, has announced.

"The tests are a step forward in our engineering program to reduce the costs of canal lining construction on Bureau water resources development projects," Bloodgood stated. "Thousands of miles of irrigation canals in the Western states fail to deliver a large portion of the water diverted into them because of leakage from unlined sections. To reduce these losses of valuable water, the Bureau of Reclamation during the past 13 years has conducted a program of development of lower cost canal linings. Through such research effort as the tests of plastic materials, which indicate that these materials may be installed as buried linings for as low as $1 a square yard in many instances, we foresee significant reductions in our canal lining construction costs," Bloodgood further stated.

"Tests of the plastic materials take on added significance when it is realized that the materials were subjected to bacteriological conditions in a buried soil environment under long-term accelerated tests," explained Walter H. Price, Chief of the Division of Engineering Laboratories, under whose direction the tests were performed. "Because of these rigorous accelerated conditions, it is expected that many of the plastics tested will withstand actual bacterial and chemical exposures up to four times their service life in the laboratory," Price stated.

Some 60 plastic materials obtained from 15 manufacturers were studied in the long-term tests. Materials tested included vinyl-coated canvas, petroleum polymer, vinyl-coated paper, polystyrene, polyethylene, and polyvinyl chloride. Thickness of the materials varied from 1 mil (0.001 in.) to 25 mils (0.025 in.).

Because canal linings are in contact with moist soil, whether applied as surface coverings or as buried membranes, they are subject to attack by bacterial and micro-organism action. Therefore, composted soil used in the tests was prepared according to usual greenhouse practice. Such aged soil is rich in cellulose destroying micro-organisms, high in organic content, and of porous texture to permit air circulation.

The soil was placed in metal containers coated on the inside with asphalt cement. To accommodate the 6-in. long plastic specimens, the soil was placed to approximately 7 in. depth in the containers. Moisture content was kept at the optimum for micro-organism activity, which is between 25 and 30%. Temperature of the room in which the samples were stored was maintained at 100 deg. F.

Rapidity of the deteriorating effects of the micro-biological activities of the soil samples was studied by frequent checks of untreated cotton duck and burlap specimens, which were buried for 1- or 2-week periods. The extent of micro-biological action was indicated by loss of as much as 70% of the tensile strength of the control specimens in 1 week and more than 90% in 2 weeks.

On removal from the soil, most of the specimens which had been buried for 10 years were found to be in excellent condition and were very pliable. Tensile strength was virtually unaffected. These specimens, as well as those which had been buried for shorter periods of time, were found to be highly resistant to bacteriological deterioration. Even the plastics as thin as 1½ mils remained water-tight.

WESTERN CONSTRUCTION NEWS ®

Cooperation on the Colorado River

SENATOR KUCHEL of California has urged talks between California and Arizona interests about a possible new project in the lower basin of the Colorado River to increase hydro-electric power supplies available for these states and Nevada. In a radio program Kuchel indicated he favors efforts to avoid a head-on conflict between the Arizona Power Authority and the City of Los Angeles which have filed competing applications with the Federal Power Commission for permission to build a power dam at Bridge Canyon on the Colorado River.

To meet ever-increasing demands for electricity in the Southwest, he suggested the best solution might be a new project constructed by the Federal Government and underwritten by potential power users. The California senator, who discussed the matter recently with officials of the Los Angeles Department of Water and Power, noted that arrangements might follow the pattern established in bringing about Hoover Dam, by agencies agreeing to purchase certain quantities of energy following completion.

Views of the senator

"The growing demand for electricity requires agencies both public and private to determine how best they can increase their capacity to generate power and to do it as cheaply and as economically as possible," Kuchel said.

"The State of Arizona and the City of Los Angeles have each filed an application before the Federal Power Commission to build a dam on the Colorado River at Bridge Canyon in Arizona. Those are competing applications.

"Representatives of the City of Los Angeles have talked with me about the possibility of a cooperative venture under which the Federal Government would build a power dam to be repaid by the users of the hydro-electric energy, and that the dam receive the backing of the people of Arizona, of California, and also of Nevada.

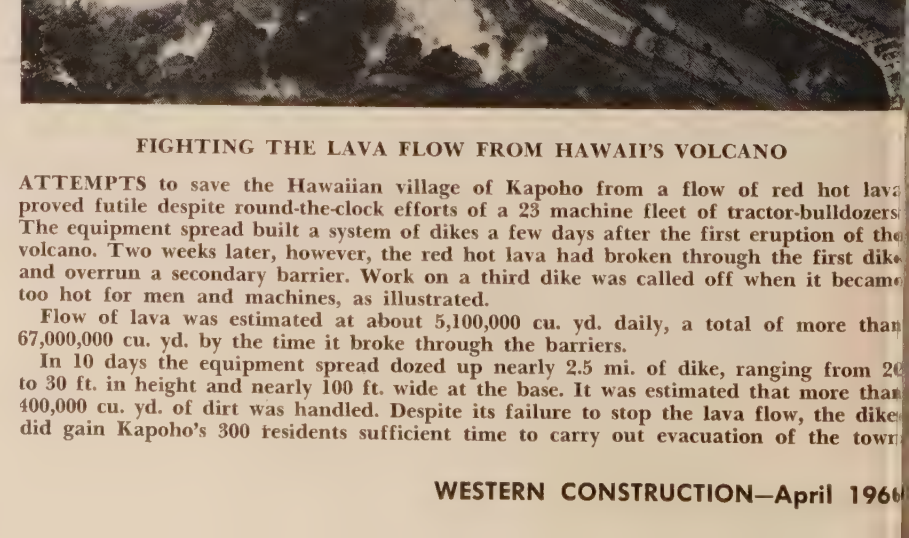
"I counselled with representatives of the City of Los Angeles and said I thought we should begin by sitting down with the senators from the three neighboring states in the Lower Colorado River Basin. Then we should commence contacting as many people in the governments of the three states as would be necessary to bring together representatives of the people, both in those states and Federal Government. The result could be legislation to provide for the construction by the Federal Government of a dam to be repaid by the users. It would be far better and we would be in a far stronger position if the three states and their representatives in the Congress all stood together."

Denver 23-mi. water supply tunnel holed through

THE 23.3-mi. Harold D. Roberts water supply tunnel for the City of Denver was holed through late in February. The tunnel has frequently been referred to as the longest existing bore drilled entirely from the two portals.

Driving procedures and a comprehensive description of the project appeared in *Western Construction* September 1959.

The usual public officials and engineers were on hand for the final shot when the headings met about 10 mi. from the eastern portal of the tunnel near Grant, Colo. At this point the tunnel is about 3,800 ft. below the surface of the mountain. The project which will ultimately cost about $50,000,000 is designed to carry water from the Blue River under the Continental Divide to Denver. Work started in 1956 and scheduled completion date is January 1962.



FIGHTING THE LAVA FLOW FROM HAWAII'S VOLCANO

ATTEMPTS to save the Hawaiian village of Kapoho from a flow of red hot lava proved futile despite round-the-clock efforts of a 23 machine fleet of tractor-bulldozers. The equipment spread built a system of dikes a few days after the first eruption of the volcano. Two weeks later, however, the red hot lava had broken through the first dike and overrun a secondary barrier. Work on a third dike was called off when it became too hot for men and machines, as illustrated.

Flow of lava was estimated at about 5,100,000 cu. yd. daily, a total of more than 67,000,000 cu. yd. by the time it broke through the barriers.

In 10 days the equipment spread dozed up nearly 2.5 mi. of dike, ranging from 20 to 30 ft. in height and nearly 100 ft. wide at the base. It was estimated that more than 400,000 cu. yd. of dirt was handled. Despite its failure to stop the lava flow, the dike did gain Kapoho's 300 residents sufficient time to carry out evacuation of the town.

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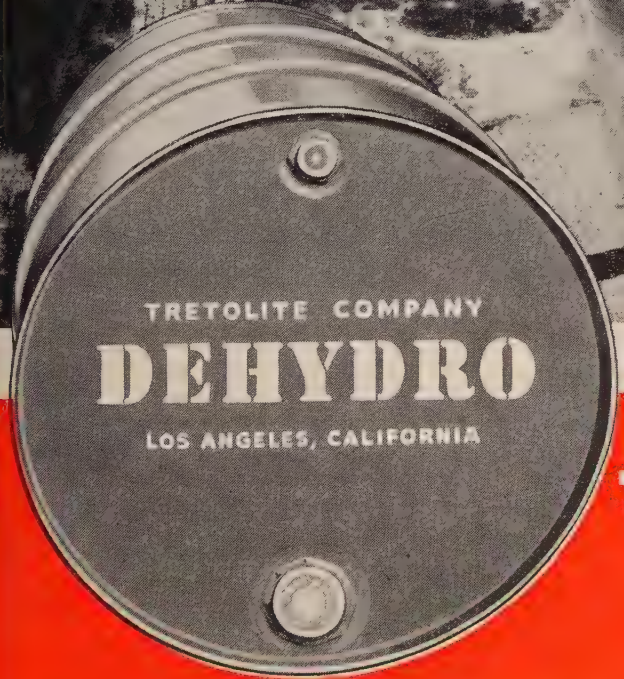

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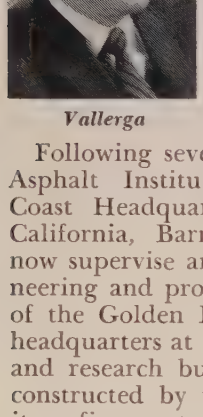
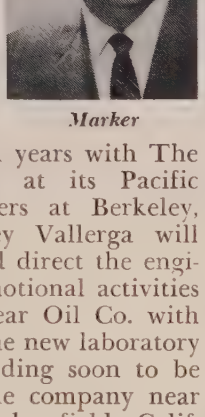
Prominent asphalt engineers move into new positions

TWO engineers well known in the West as authorities in the field of asphalt and bituminous highway work have recently moved into new positions. B. A. Vallerga leaves The Asphalt Institute to become Director of Products Engineering for the Golden Bear Oil Co. and Vaughn Marker, Division Paving Engineer for the Institute, takes over the position as Pacific Coast Division Managing Engineer.



Vallerga



Marker

Following seven years with The Asphalt Institute at its Pacific Coast Headquarters at Berkeley, California, Barney Vallerga will now supervise and direct the engineering and promotional activities of the Golden Bear Oil Co. with headquarters at the new laboratory and research building soon to be constructed by the company near its refinery at Bakersfield, Calif. His work will include particular emphasis on areas of soil conservation and highway construction. The company will be promoting two newly developed products, one a binder for dust and erosion control, and another for use in rejuvenating old and weathered asphalt pavements. Prior to his association with the Institute he served on the civil engineering faculty of the University of California.

Vaughn Marker has been promoted to the position held by Barney Vallerga, and becomes the Managing Engineer of the Pacific Coast Division of The Asphalt Institute. Marker will direct the activities of the Institute in the seven Western states, including Alaska and Hawaii.

He joined the Institute in 1955 as district engineer and two years ago was named Division paving specialist, an assignment which he had held with the California Division of Highways before joining the Institute field forces. Marker is a civil engineer graduate from the University of Nevada, 1947, and had seven years of service with the California Division of Highways.

Highway building costs are reported to Congress

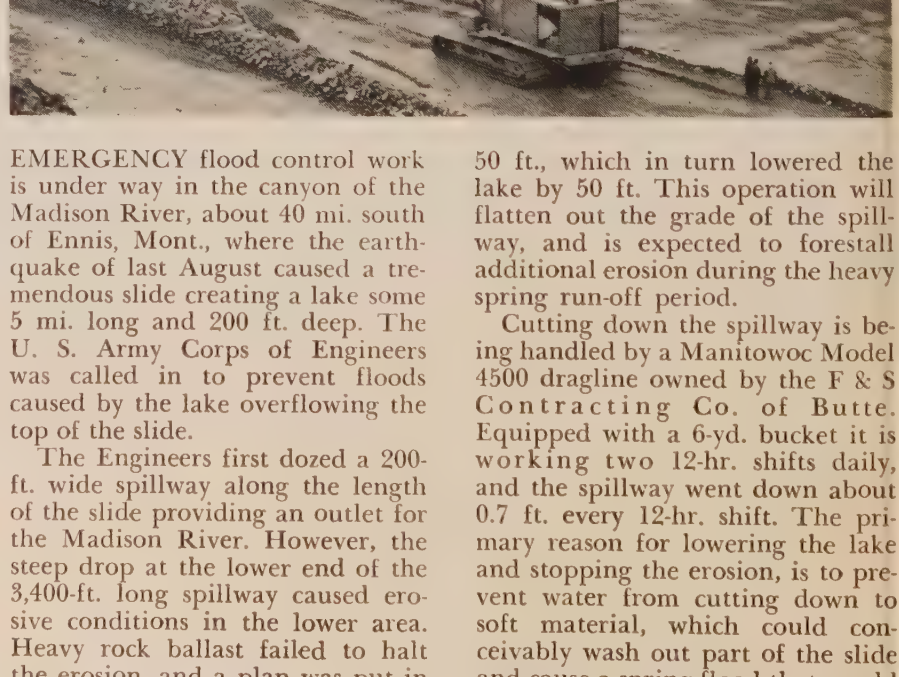
THE cost of highway construction, as reflected in contractors' bid prices, is less than 3% above the level of 1953, and is at the lowest point in the last three years, a spokesman for the Associated General Contractors told the House Committee on Public Works.

Max C. Harrison, former chairman of the Highway Contractors' Division of the AGC, testified on a bill (H.R. 10495) introduced by Rep. George H. Fallon (D-Md.) to authorize $925 million annually for the fiscal years 1962 and 1963 for the Federal-aid primary and secondary systems and their urban extensions. He expressed regret that the bill does not provide for the annual increase of $25 million contemplated in the Highway Act of 1956, and advocated continuation of the program on an orderly basis. A sustained level of contract awards, he said, is "very important to the level of construction costs to be expected."

With 1953 as the base year, he testified, contractors' bid prices have increased only 2.7%, while average earnings of hourly employees in highway construction have advanced 33.4%, material costs have gone up 20.2%, and equipment ownership expense has risen an estimated 24%.

Keen competition among highway contractors is responsible for holding down the cost of highway construction to the public, according to Harrison. He said highway construction today "is probably the best buy the public receives for its tax money."

Lowering spillway through the slide



EMERGENCY flood control work is under way in the canyon of the Madison River, about 40 mi. south of Ennis, Mont., where the earthquake of last August caused a tremendous slide creating a lake some 5 mi. long and 200 ft. deep. The U. S. Army Corps of Engineers was called in to prevent floods caused by the lake overflowing the top of the slide.

The Engineers first dozed a 200-ft. wide spillway along the length of the slide providing an outlet for the Madison River. However, the steep drop at the lower end of the 3,400-ft. long spillway caused erosive conditions in the lower area. Heavy rock ballast failed to halt the erosion, and a plan was put in force to cut the spillway down by 50 ft., which in turn lowered the lake by 50 ft. This operation will flatten out the grade of the spillway, and is expected to forestall additional erosion during the heavy spring run-off period.

Cutting down the spillway is being handled by a Manitowoc Model 4500 dragline owned by the F & S Contracting Co. of Butte. Equipped with a 6-yd. bucket it is working two 12-hr. shifts daily, and the spillway went down about 0.7 ft. every 12-hr. shift. The primary reason for lowering the lake and stopping the erosion, is to prevent water from cutting down to soft material, which could conceivably wash out part of the slide and cause a spring flood that would inundate downstream communities.

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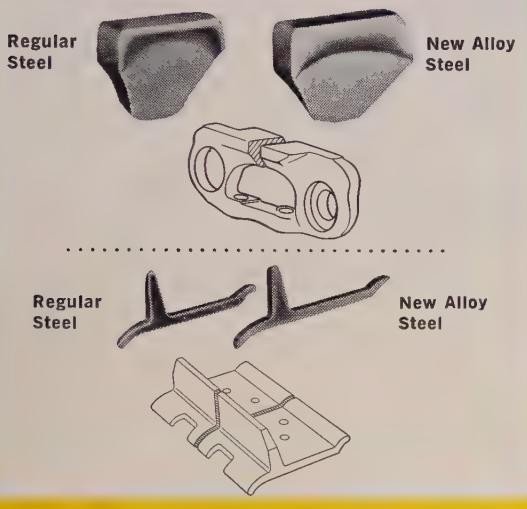
Now, two types of track groups are available for older model D9 and D8 Tractors . . . regular and optional, allowing you to tailor your undercarriage parts to meet job conditions.

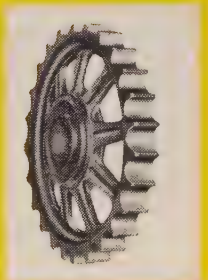
Lighter tones at top of etched cutaways show depth of special hardness in wear zones.



REGULAR track parts are made from durable steel. They're heavy-duty, long-lived, special-hardened to resist wear.

OPTIONAL track parts are equivalent to those used on current production model tractors. The links and shoes are made from Caterpillar's new alloy steel that is hardened much *deeper* than regular steel. Link rails are hardened twice as deep. Shoe grousers are hardened 400% deeper. The new alloy steel also provides greater strength with more impact resistance.

MORE METAL WHERE IT COUNTS. Optional components are king size. Every part is beefed up and made bigger with more *hardened* steel in wear areas.



BORALLOY "HUNTING TOOTH" SPROCKETS are another new feature of the optional groups. Every other tooth is used in one revolution, alternate teeth being picked up the next revolution. This alternation means that teeth contact the bushings only *half as many times* as do regular sprocket teeth. More important are the teeth themselves—they're *machined* for exact fit with the big bushings. This greatly extends bushing life.

COMPARE regular and optional track components:

	Pitch	Pins O.D.	Bushings O.D.	Track shoe bolts and nuts	Sprocket
D8	regular 8 inches	1 3/4 inches	2 3/4 inches	3/4 inch	14 tooth
	optional 9 inches	2 inches	3 inches	7/8 inch	25 tooth
D9	regular 9 inches	2 inches	3 3/16 inches	7/8 inch	28 tooth
	optional 10 1/4 inches	2 1/4 inches	3 3/8 inches	1 inch	25 tooth

HOW MUCH MORE LIFE? Variation in the length of track life occurs because components have different wear rates under various soil and job conditions. In sand, pins and bushings wear faster. In rock, shoes and links wear faster.

ON-THE-JOB TESTS confirm that the new optional track components are giving up to 40% more life than the regular parts. On many applications, you can expect even greater wear life.

CORRECT TRACK GROUP SELECTION IS IMPORTANT. It depends on job types and conditions. Let your Caterpillar Dealer analyze your track needs. He'll recommend the correct components to help you get maximum life at the most reasonable investment. Call him soon.

SERVICE TIP: **FREE!** Handy reference for ordering track options. "New Options for D9 and D8 Tractors" includes part numbers that are used to adapt to your older models. Pick up a copy at your Caterpillar Dealer's.

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ALASKA Newsletter

By CLIFFORD S. CERNICK, Fairbanks

This column contains an on-the-spot report of the construction season around Fairbanks and the Interior, covering all types of work and all agencies. It is the best available information on the coming season of construction work in this area.

Editor

ALASKA NOW CLOSER—I'm writing this during a business trip to Seattle from Fairbanks—a jet plane trip of only three hours from Alaska to Seattle. The trip—one of the first on the new jet service now available—convinced me quite graphically that the distance between Alaska and the so-called "Lower 48" is shrinking dramatically. As a long-time Alaskan, I remember when the only way to get there was by a week-long boat trip. Then, as soon as commercial air service was inaugurated, the trip could be made in from 6 to 8 hours. Faster aircraft further reduced this, in later years, to about 5½ hours. The new jet service now brings Alaska more than 2 hours closer to the state of Washington. To the construction industry, this means faster mail service, quicker transfer of key personnel, quick delivery of spare parts and a general dissipation of the feeling that Alaska is "remote." The arrival of the jet age to Alaska is being applauded not only by the construction industry but by all Alaskans.

THE JET AGE AND CONSTRUCTION—The first Alaska jet service is utilizing Ladd Air Force Base at the Fairbanks end pending completion of the runway extension at Fairbanks International Airport at a cost of more than $4,000,000. A similar extension project is underway at Anchorage. By July of 1961, both fields will be fully usable for jets. Coming of the jet age to Alaska has meant more than $9,000,000 in new construction at Fairbanks and Anchorage.

INTERIOR ROUNDUP—This month, let's take a look at just one section of Alaska and the scope of construction scheduled to get underway there within the next few weeks. I refer to the Fairbanks area and the great Alaskan Interior, an area with which I am most familiar. I spent more than two weeks digging for facts on the 1960 construction season in this region, with a view to obtaining a comprehensive picture for *Western Construction* and my newspaper, the Fairbanks Daily News-Miner. In making this pre-season survey, I talked with contractors, city officials, the district engineer for the Bureau of Public Roads, officials of the U. S. Army Engineer District, school and college officials and businessmen who planned commercial projects.

So far as I could determine, a survey of this scope had never before been attempted in Fairbanks prior to a construction season. I came away from my weeks of work on the subject with a rewarding mass of information and a total figure for Fairbanks and Interior Alaska construction which had not been available before. The total: a whopping $85,000,000 for construction work in Fairbanks and the Interior. Not all of this work, I should point out, will be completed this year nor was all of it to be initiated in the 1960 season. Some of the work was let out on contract last year and some is scheduled to be carried over into 1961. But the bulk of the $85,000,000 will be work carried out this year.

It includes defense and military construction, municipal and utilities construction, work on roads, schools, communication facilities and new commercial structures. Residential construction, including individual housing units and apartment dwellings, also is part of the $85,000,000 picture. The sizeable sum which will be spent on mining activities in the Interior this year was not included since I felt it does not come under the scope of construction.

DEFENSE AND MILITARY—Bob Knox, chief of the technical liaison branch of the U.S. Army Engineer District, Alaska, sets the 1960 construction figure for Fairbanks and the Interior at more than $38,000,000. This figure includes about $25,760,000 in expenditures for work under existing contracts in the Fairbanks-Fort Greely-Clear area. An estimated $12,500,000 will be spent for new work. The majority of this year's defense construction budget will go for installations at the huge new radar station at Clear. The approximate dollar value of work remaining on the first phase of the Clear project amounts to about $16,200,000.

Recently, a $2,859,151 contract was awarded to M-B Contracting Co. of Seattle for work at Clear. Empire Gas Engineering Co. is getting underway on a massive heat and power plant. That firm has a $8,974,930 contract for the job. Another major construction project is the family housing job for the Air Force at Eielson. Alcan Pacific Company of Anchorage has been awarded a $4,628,415 contract for building 138 new family quarters at the base. Another major Eielson project is the non-commissioned officers open mess building which will cost about $700,000. An Army Nike site near Ladd Air Force Base, plus a chapel and a number of other small jobs, will cost approximately $1,000,000 according to Knox.

Work scheduled at Donnely Flats near Big Delta to support the nation's defense and space projects amounts to about $2,000,000. A major housing project, costing about $1,500,000, is scheduled to get underway at Ft. Greely soon. Other projects there include a $550,000 chapel and a $750,000 vehicle maintenance shop. More than $500,000 worth of work remains on the Ft. Greely atomic power plant which will produce 2,000 kw. of electricity and 42 million B.t.u. in steam for space heating. Other major projects include modifications in four Nike sites near Eielson, an explosive assembly building, ammunition storage at Galena and repairs and modifications at several remote radar sites.

ROADS—The Interior's biggest road construction program will be launched this season. The sum scheduled to be spent in the Interior this year—about $15,000,000—is more than twice as much as was spent for the entire territory in previous years. The figure is about one-third of the total amount projected for the entire state this year. A work force of more than 500 men will be required to carry out this year's road-building project in the Fairbanks area and the Interior. H. W. (Woodrow) Johansen, division engineer for the Federal Bureau of Public Roads, said this includes between 300 and 400 men contractors will need to do the job plus about

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250 engineering employes for supervision and planning. A majority of the present 250 employes of the Fairbanks BPR division will switch over to the state operation of the highway system which begins on July 1. (Johansen is undecided about his own plans.)

The big job in the Interior this year will be the Nenana-Clear and Clear-Rex portions of the Nenana-Willow highway which will provide a much-needed direct route between Anchorage and Fairbanks and cut off more than 100 mi. of the present circuitous route. The Nenana-Clear portion will be 20 mi. in length and the Clear-Rex segment will be an additional 9 mi. Road crews will simultaneously be working on the other end in building a 20-mi. road toward McKinley Park from Willow to Talkeetna. A five-year program will be required to link up the roads, Johansen estimated. Road surfacing is planned for a number of roads in the Fairbanks area. Bridge work is planned at Fairbanks, 12 Mile Creek on Steese Highway, Hutlinana Creek, Hot Springs Slough and Baker Creek and at a number of points on the Taylor Highway.

MUNICIPAL – About $6,000,000 in municipal construction, including utility expansion, is scheduled in the Fairbanks area during 1960. This figure includes expenditures in the amount of $2,300,000 by the Golden Valley Electric Assn. The Fairbanks municipal utilities system plans the expenditure of $1,305,530. In addition, the city of Fairbanks will spend more than $2,000,000 on a number of other projects. The big city job for 1960 is the $1,250,000 sewage treatment plant to be built on a 13-acre tract on the city's outskirts. Sewer rehabilitation and a new pumping station will cost about $650,000. The first phase of the new $1,000,000 municipal building is scheduled to start this year at a cost of about $1,000,000.

COMMERCIAL—Completion of stores, office buildings and shopping centers—and a strong possibility that a major hotel project will be put up—will make 1960 one of the busiest years in the area within the Fairbanks city limits. Typical of the projects slated in Fairbanks for 1960 are a new shopping center, extension of a present shopping center and bowling alley and a modern apartment building.

RESIDENTIAL – More than $2,000,000 in new housing projects has been scheduled for the Fairbanks area. A critical housing shortage has developed in the city, particularly insofar as rental units are concerned. Leaders in the community are urging a "crash" program of housing construction to remedy this deficiency. The true scope of the 1960 housing construction effort in the Fairbanks area still is not clear at this writing.

SCHOOLS AND COLLEGES – School and college construction in the Fairbanks area will total more than $5,000,000 during the current construction season. The bulk of this construction will be at College and within the city of Fairbanks; however, a number of schools are planned at outlying military bases. The two major school projects within the city of Fairbanks are the central elementary school, consisting of 16 classrooms, which will cost a total of $1,281,225 and the Lemeta school, which will cost an estimated $1,100,000. A $700,000

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YELLOW PAGES

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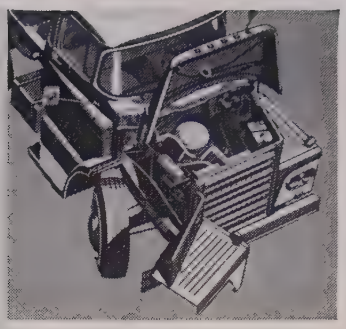

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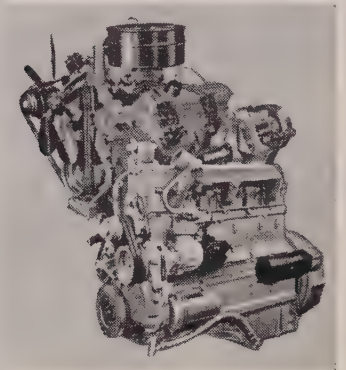

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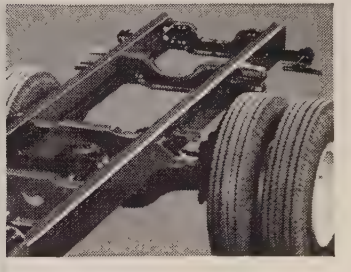

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school project is planned for Ladd Air Force Base and a $200,000 school expansion program is scheduled at Eielson. A new school has also been authorized for the Delta Junction area at a cost of over $200,000.

Present plans at the University of Alaska, contingent on legislative approval, call for construction of a new engineering building, a 150-man dormitory and extensions to the present utilities system. Cost of the first unit of the new engineering building will be $708,000. A second wing on the building, due for completion in 1963, will cost an additional $900,000. The new 150-man dormitory, tentatively scheduled for this year, will, if approved, cost $750,000.

COMMUNICATIONS—More than $5,000,000 will be spent on microwave communications in Alaska. A series of towers are being built across the central part of Alaska connecting with similar facilities in Canada. Each of the towers will cost an average of $250,000 and are scheduled for construction at Murphy Dome, Clear, Gold King Creek, Canyon Creek, Delta Junction, Gerstle River, Knob Ridge, Cathedral Bluff, Tok Junction and Northway. The U. S. Army, Alaska Communication System program calls for spending an additional $1,376,973 for communications. In addition, the ACS will spend $5,000,000 more on operations and maintenance in Alaska this year.

HAWAII Report

By ALAN GOODFADER, Honolulu

DON'T LAY THAT HAMMER DOWN, BOYS—The lull in Hawaii's building boom, if it can be called that, appears to have been merely a brief breathing spell. Early this year, there were reports of a slight lessening of bid openings, but that seems to be over now. The General Contractors' Assn. reports bid openings for January totaled $10,600,000, compared to $9,500,000 in the same month a year ago. New dwelling, military and state construction was less than a year ago, but the slack was more than taken up by contracts for apartment houses and City of Honolulu school and park projects. Construction also contributed heavily to an employment record set in the State that month. Total employment was 217,300, more than ever before and an increase of 11,150 over the January 1959 total. Contractors on Oahu hired 200 new workers that month to boost construction employment to a record 13,450 workers.

BLASTOFF—One new feature in the construction picture here is the start of work on missile bases. Nordic Construction, Ltd., of Honolulu, and Robert E. McKee, General Contractor, Inc., of El Paso, Tex., were the low bidders recently on two Nike Hercules site contracts, the first of six to be built on Oahu at a cost of about $8,000,000. The Nordic-McKee bid was $1,257,520. They are to build two dual launcher sites and two control sites including concrete buildings, roads, electrical facilities and sewer and water systems. Contracts for two more sites were to be advertised by the Army soon after this writing. The low bid on the first two was below the government estimate of $1,556,500.

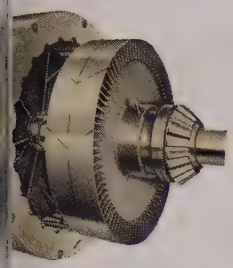
WELCOME, TOURISTS—Hawaii's tourist boom continues to echo through the construction industry. The Bank of Hawaii cites estimates that 2,187 hotel units will be completed during 1960 to ease cramping here of hotel facilities by a record number of tourists. That this figure will be augmented by other building later is foreshadowed by the bank's forecast that an acute shortage of hotel rooms will develop here again during the height of the summer season. The bank lists plans for $18,625,000 worth of hotel and apartment-hotel construction. The list didn't include plans recently announced for a $15,000,000 co-operative apartment hotel to be built fronting Honolulu's Ala Wai Boat Harbor. Two Beverly Hills, Calif., developers, J. W. Driver and Guy K. Harrison, have bought about 287,000 sq. ft. of land from Hawaiian Dredging and Construction Co. for $7,000,000 for their 21-story building. Bids are to be called for soon. The developers plan 1,060 co-operative apartments, plus a private beach on a concrete deck above the ground, offices and other facilities. Meanwhile, Pacific Construction Co. has started work on an eight-story $750,000 Waikiki apartment hotel for a private developer.

NEW FIRM—Hawaiian Construction and Draying Co. has organized a new firm with American Pipe and Construction Co. to manufacture reinforced concrete pipe. The firm, to be called American Concrete Pipe Co. of Hawaii, will use HC&D's present facilities until a $750,000 plant is erected at Barber's Point on Oahu. Construction is scheduled to start July 1. Manager of the company will be John T. Goss, former manager of the Clark-Halawa Rock Co.

HARBOR WORK—Crews are embarking also on a major Honolulu harbor project. Matson Navigation Co. and the State Board of Harbor Commissioners have cleared the red tape so the former can start work on improvement of Honolulu's Pier 2 for containerization handling. Matson was to engage James W. Glover, Ltd., for the job at a figure close to $200,000. Matson is to install a huge crane, build a marshalling yard, and operate a container station. The Harbor Board also has approved plans for a $6,500,000 passenger-cargo terminal to be completed in Honolulu by mid-1962. Engineering plans are to be completed by the end of the year with construction scheduled to start two months after plans are completed.

AIRPORT ZOOMS—Work also is going forward on expansion of the Honolulu International Airport and attendant facilities. The Tani Construction Co. is building a $250,000 office building for Aloha Airlines, an inter-island line. The prestressed concrete building will permit addition of a second story later if needed. K. and M. Sakamoto, contractors, are to build a $750,000 catering plant near the airport for the Spencecliff Corp. The plant will include facilities for the corporation's Honolulu restaurant chain. About $350,000 of the total cost goes for equipment, the rest for land and building. Work is expected to be completed in August.

EDUCATION HELPS—College construction also is in the building



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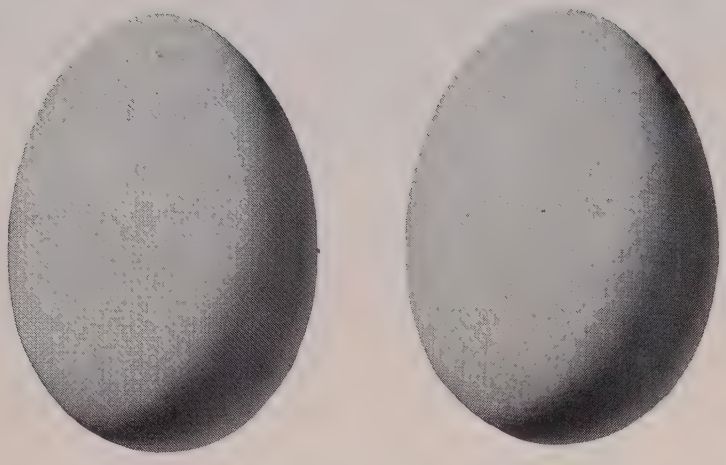

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news. The University of Hawaii has broken ground for a $707,000 classroom building, a dormitory and a music auditorium. Bids were to be opened soon for a second $440,000 classroom building with a third slated soon at a cost of $875,000. The Church College of Hawaii, a Mormon school, is to construct a $2,000,000 dormitory and is spending $250,000 on site preparation and homes for college staffers. Joseph E. Wilson, supervisor of construction for Latter-Day Saints churches, is here to supervise the work.

MEANWHILE, BACK AT THE CITY – Developers Ruddy F. Tongg and David A. Benz have formed a new corporation to build a 43-unit, $375,000 apartment house in downtown Honolulu. The project is expected to be the first of several rushing to cash in on a need for in-town housing facilities.

REMODELING, TOO—Several major remodeling jobs also will keep builders busy. The Ritz Department Store, downtown, has started a $1,000,000 expansion program. An equally expensive one is slated by the International Savings & Loan Assn. at its new downtown home. Von-Hamm Young Co. was apparent low bidder with an offer of $1,322,000 to remake the old Sears, Roebuck & Co. building into a Honolulu Police Department headquarters.

PERSONAL MENTION—Sam O. Hirota, deputy state superintendent of public works to Tim Ho, moves with Ho to the new State Department of Transportation. Hirota becomes deputy to Ho in the new department . . . John P. Errett of Hawaiian Bitumuls was elected second vice president of the General Contractors Assn., making him candidate for the presidency in two years. Frank N. Rothwell is this year's president. First Vice President Marvin G. Elton will succeed him . . . Frank R. Carlson, division engineer for the U. S. Bureau of Public Roads here, has been awarded the Commerce Department's meritorious service silver medal for "outstanding contributions to highway progress in Hawaii" . . . The University of Hawaii's new engineering and mathematics building has been christened Arthur R. Keller Hall in honor of Dean Emeritus Keller.

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Anchorage improvement plans for the 1960 season

THE 1960 improvement program for the City of Anchorage, Alaska, has been outlined recently by Robert B. Smith, city engineer. The work to be put under contract includes water mains, sewers, street construction, water filtration plant and miscellaneous items with a total representing about $4,800,000 of construction.

Street work which was to be bid during April represents about 40,000 lin. ft. of asphaltic concrete paving from 36 to 44 ft. wide. Estimated cost of this street work including sidewalk and some storm drains is $1,250,000. An urban renewal program, which also includes asphaltic pavement, curb and gutter and sidewalks has an estimated cost of $224,000.

A public safety building will be built for the police and fire departments at an estimated cost of almost $1,500,000.

Improvements in the municipal water system with 14 mi. of line from 6 to maximum of 12 in. will represent construction contracts of about $860,000. The filtration plant of 8 mgd. capacity, which will be out for bids in August, has a preliminary estimated cost of $1,600,000.

The sanitary sewer program, with projects having an aggregate length of 15.9 mi. will represent construction work estimated at $834,000 with bid calls extending from early spring to September.

Edward L. Pine has resigned as State Highway Engineer of Nevada to accept an executive position with Isbell Construction Co. of Reno. W. Otis Wright, long-time highway engineer, was named by the State Board to succeed him.

Reservoir named Folsom Lake

THE reservoir created on the American River by Folsom Dam has been officially named Folsom Lake, according to the Department of the Interior. The 12-mi. long reservoir which was constructed by the U. S. Corps of Engineers was subsequently incorporated into the Central Valley Project of the Bureau of Reclamation. It is a multipurpose project involving benefits for flood control, water conservation and hydraulic power.

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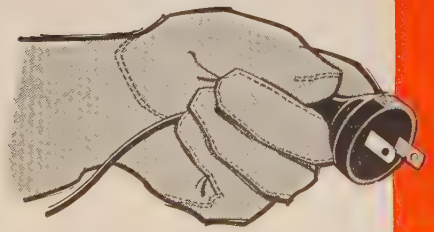

Now you need not carry special generator units for "on the job" electrical power. Your Highway **Generac** unit gives you mobile power—mounted under the truck's hood and taking its power directly from the prime mover. This integral electrical generator gives you 110-120 AC current when and where you need it. Its uses are unlimited—see the picture above for an example. Write for complete information today!

HIGHWAY

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Manufacturers of Public Utility Bodies ● Earth-Boring Machines ● Pole and Cable Reel Trailers ● Winches ● Power Take-Offs ● Service Accessories ● Commercial Trailers ● Dry-Bulk Haulers ● Cargo Containers — Land, Sea and Air
SALES AND SERVICE IN PRINCIPAL CITIES

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Filing for hydro project on Middle Feather River

APPLICATION has been filed with the Federal Power Commission by the Richvale-Irrigation District for license to construct a large water and power development on the Middle Feather River in California. The project which will include extensive storage facilities will involve the construction of 8 dams and a chain of 5 hydroelectric plants having a combined capacity of about 300,000 hp. Estimated cost of the overall project is $120,000,000.

The filing follows six years of detailed engineering investigation and design under the direction of F. E. Bonner, consulting engineer of San Francisco. As soon as necessary authorization can be secured, construction will be expedited.

The project will alleviate present water shortages in irrigation service in the Richvale-Yuba City vicinity. Other public agencies associated with Richvale in this enterprise are the Butte Water District, Biggs-West Gridley District, and the Sutter Extension District. The four districts combine to operate the extensive Sutter-Butte Canal System and embrace more than 100,000 acres of irrigable land.

Pollution control for streams in Oregon

REPRESENTING a ultimate expenditure of more than $55,000,000 the Oregon State Sanitary Authority has released a report listing about 140 projects which will be required to control the pollution of waterways in that state. The cost estimates are divided into sewer projects totalling about $31,000,000 and treatment works that would cost over $24,000,000. The authority points to 30 communities which must replace or improve existing sewage treatment plants and about 50 that will have to have new plants. Some 50 communities will require completely new sewage systems.

Hydro plant will replace old

THE Pacific Gas & Electric Co. has been authoized by the Federal Power Commission to construct a new power plant on the Stanislaus River in Tuolumne and Calaveras counties, Calif. The new plant will replace an existing power station which has been in service about 50 years. The company states that the old plant, with a generat-

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

Modern D Tournapull capacity is 7.3 yards struck . . . 9 yd heaped. Unit has 143 hp diesel with torque converter or straight-shift transmission, weighs about 11 tons empty, 21 tons loaded. Makes 180° turn in 24'3" width.

"How can I cut rising costs to save my profit margin?"

A lot of dirtmoving contractors are asking this question. We believe they . . . and perhaps you . . . can find the answer in the high-speed do-it-all D Tournapull®. This machine can: (a) profitably handle small volume, scattered, cut-and-fill dirtmoving; (b) work efficiently along with larger scrapers on big production jobs, and; (c) handle haul-road construction, maintenance, and drainage problems, and clean-up dirtmoving, at low cost.

Thousands of these versatile 9-yd LeTourneau-Westinghouse D Tournapulls have proved themselves as the contractor's "handyman" around the world. Here are just a few of the "D's" important operating advantages that cut your costs and help increase your profits:

Travels fast around the job, between jobs

With D Tournapull, a mile is only a few minutes away. Meeting 8′ roading clearance and 9-ton axle-road limit, 30-mph D 'Pull* "runs" from job-to-job via highway or city streets without need for special permits. There are no equipment loading or unloading delays.

Handles wide variety of jobs

Versatile D 'Pull does pioneering, ditching, rough-grading, backsloping . . . spreads and backfills gravel and topsoil . . . speeds through dozens of other clean-up or small-yardage production jobs. Its easy mobility and maneuverability (90° turn) make "D" ideal for subdivision grading, landscaping, and for building driveways, streets and alleys. "D's" self-load, haul and spread . . . can also push-load one another in fleet operation . . . or can be pushed by tractor or motor grader for production earthmoving.

D Tournapulls do well in most materials with little loading assistance. However, any available auxiliary piece of equipment — such as a motor grader, or low-horsepower tractor — can be used to top-out loads for maximum production.

Works profitably where others stall

Big, single, *load-rated* tires give dependable traction in soft going. Exclusive power-transfer differential . . . and 90° turn through geared kingpin power-steer . . . allow "D" to "walk" out of trouble. Tournapull works profitably where other rubber-tired earthmovers stall. It's a "handyman" — one that's ready to economically clean-up the tough odds and ends that might otherwise eat into profits, and hold up your big production tools.

Interchangeable work units

Behind basic prime-mover, you can easily interchange other trail units — such as Rear-Dump, side-dump, flat-bed hauler, and 10-ton lift-and-carry crane. Special LW Hitch for operating tandem D 'Pull scrapers also available. It's easy to keep your Tournapull prime-mover busy all year-around . . . saving time, cutting costs, and piling up profits! Why not call or write for an on-your-job demonstration? No obligation.

*Trademark DP-1465-DC-1r

See the LeTOURNEAU-WESTINGHOUSE DISTRIBUTOR in your area:

LW

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ing capacity of 40,000 kw., is expensive to maintain and is obsolete. The building of a new plant will be more economical than a rehabilitation.

The new plant will have an installed capacity of 81,900 kw., and together with a low concrete afterbay dam, conduits, and penstock will represent an estimated cost of about $10,700,000.

Colorado River Project

APPROVAL of contract with the Crawford Water Conservancy District for a share of the construction costs of the Smith Fork Participating Project in Delta County, Colorado, has been announced by the Department of the Interior. Plans for the project — a unit of the five-state Colorado River Storage Project — include construction of 13,650-ac.-ft. Crawford Reservoir on Iron Creek, about one mile south of the community of Crawford. Water will be carried by the 7-mi. Aspen Canal to provide supplemental irrigation to about 6,920 ac., and a full supply to about 1,320 ac. The estimated cost to be allocated of $4,348,000 is tentatively apportioned as follows: irrigation, $4,122,000; fish and wildlife, $197,000; and public recreation, $29,000.

Construction cannot begin until certain contractual terms have been met. Congress has allowed $487,500 during the first session to initiate construction of this project during the present fiscal year.

Two big Federal buildings

SENATOR Kuchel of California, in a move to speed actual construction, has asked the Senate Public Works Committee to reapprove quickly General Service Administration plans for erecting new Federal office buildings in San Francisco and Los Angeles.

Both projects already are on the drawing boards and sites are being acquired by the G.S.A. under authority of the now-expired Lease-Purchase Act of 1954. Kuchel recently was informed the Public Buildings Service expects the design contract on the $31,154,000 Los Angeles customs house and office building will be completed in mid-October and on the $48,000,000 San Francisco courthouse and office building last month.

Kuchel indicated he will attempt to obtain appropriations this year so that construction contracts can be awarded in fiscal 1961.

TRAFFIC PROBLEM

Traffic signal, above, in the Sierra Nevada was installed by general contractor A. Teichert & Son, Inc. to police the intersection where a new highway cut crosses the existing heavily traveled US40. Fortunately, the signals were not in operation when a runaway log truck, below, came down the mountain. Driver swerved his truck into the cut and brought it to a safe stop in a loose earth bank. During the wild ride the truck hit speeds estimated at 100 mph., spilled a loaded log trailer over the embankment, and clipped a pickup truck fender. There were no injuries.

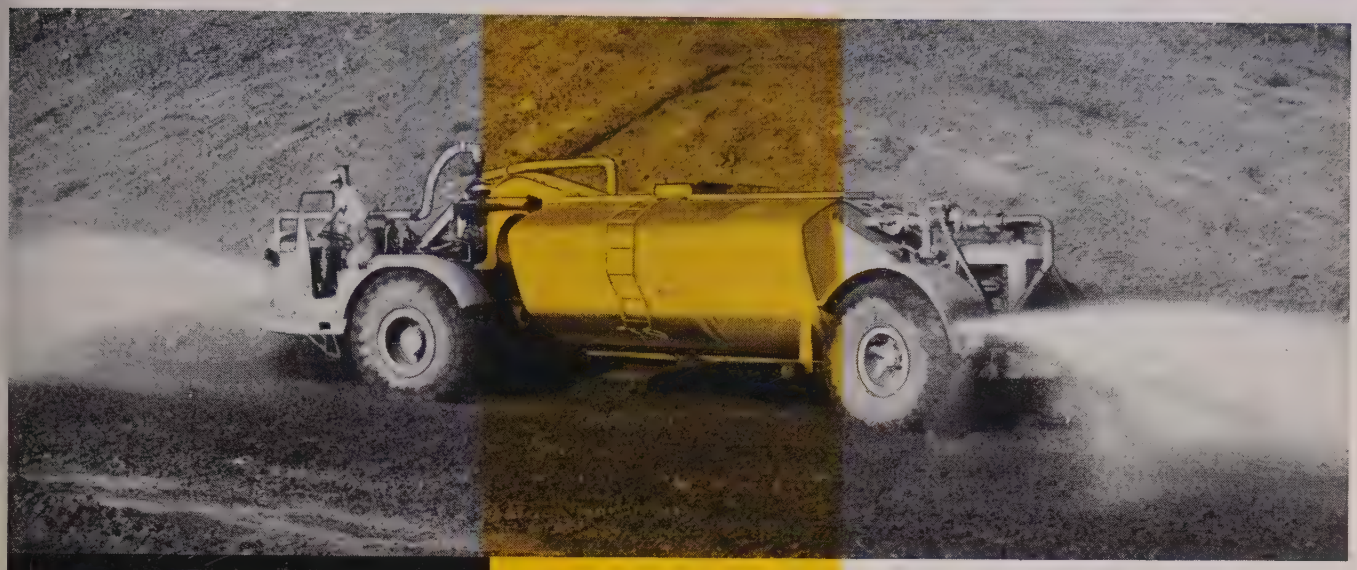
Low bids and contract awards

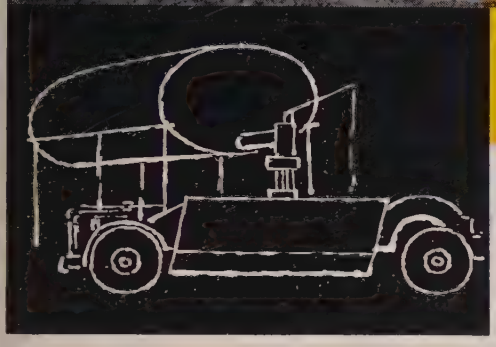
ALASKA

M-B Contracting Co., Inc. of Seattle, Wash. received a $2,859,151 contract from the Corps of Engineers for construction of additional facilities for the Alaskan Air Command at Clear. The work includes construction of rearward communications and other buildings. **Suhr, Peterson, Peterson and Suhr** of Chicago, Ill., received a $434,442 contract to furnish survey services for the Army Engineer District covering survey work in the vicinity of Ladd, Eielson, Elmendorf Air Force bases and other locations. **Nordin Construction Co.** of Fairbanks submitted a low bid of $237,000 for construction of storage and maintenance building for U. S. Army at Fort Greely. For rearward communications facilities in Central Alaska, set up in 6 schedules covering radio relay buildings, tower foundations, utilities and other work, the following were low bidders: **Peter Kiewit Sons' Co.,** Seattle, Wash., $276,000, schedule A, Delta Junction; $194,000, schedule C, Tok Junction. **Industrial & Commercial Construction, Inc.** and **Wrights' Truck & Tractor Service,** Fairbanks, $218,579 for schedule B, Cathedral Air Forse Station; $246,132 for schedule E, Beaver Creek; $248,080 for schedule F, Knob Ridge. **American Service, Inc.** of Anchorage, $219,522 for schedule D, Gerstle River.

ARIZONA

Marshall & Haas of Belmont, Calif. submitted a low bid of $1,422,720 to the Bureau of Reclamatino for earthwork, concrete lining and structures, Wellton-Mohawk main conveyance channel, Gila Project. A low bid of $822,459 was submitted by **Rocky Mountain Construction Co.,** Missoula, Mont. for 1.3 mi. of grading and surfacing on the Globe-Show Low highway, in Gila County. **Gardner Construction Co.,** Littleton, Colo., submitted a low bid of $614,619 for grading and draining 4 mi. on U.S.





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They are built in big-gallonage capacities only, ranging from 5,000 to 10,000 gallons, to reduce by as much as one-half the number of non-productive trips to the water source for tank filling. This minimizes a manpower cost problem ever present when conventional "piggyback" gasoline-type sprinkling tanks of small 2,000 to 3,000 gallon capacity are used.

Equipped with large, high-flotation, low-pressure tires, these big Southwest Sprinkler Tanks can work way out on deep, soft fill without losing traction or bogging down. With pressure spray bars both front and rear, and gravity bar under the tank, they provide faster area coverage with greatest possible water penetration.

Yuba-Southwest Sprinkler Tanks are adaptable for use with Caterpillar DW-21, DW-20 and DW-15 Tractors and other suitable prime movers. Various draft beam or hitch arrangements are available. Get complete information—today.

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3201 W. Mission Road, Alhambra, Calif.

YUBA CONSOLIDATED INDUSTRIES, INC.

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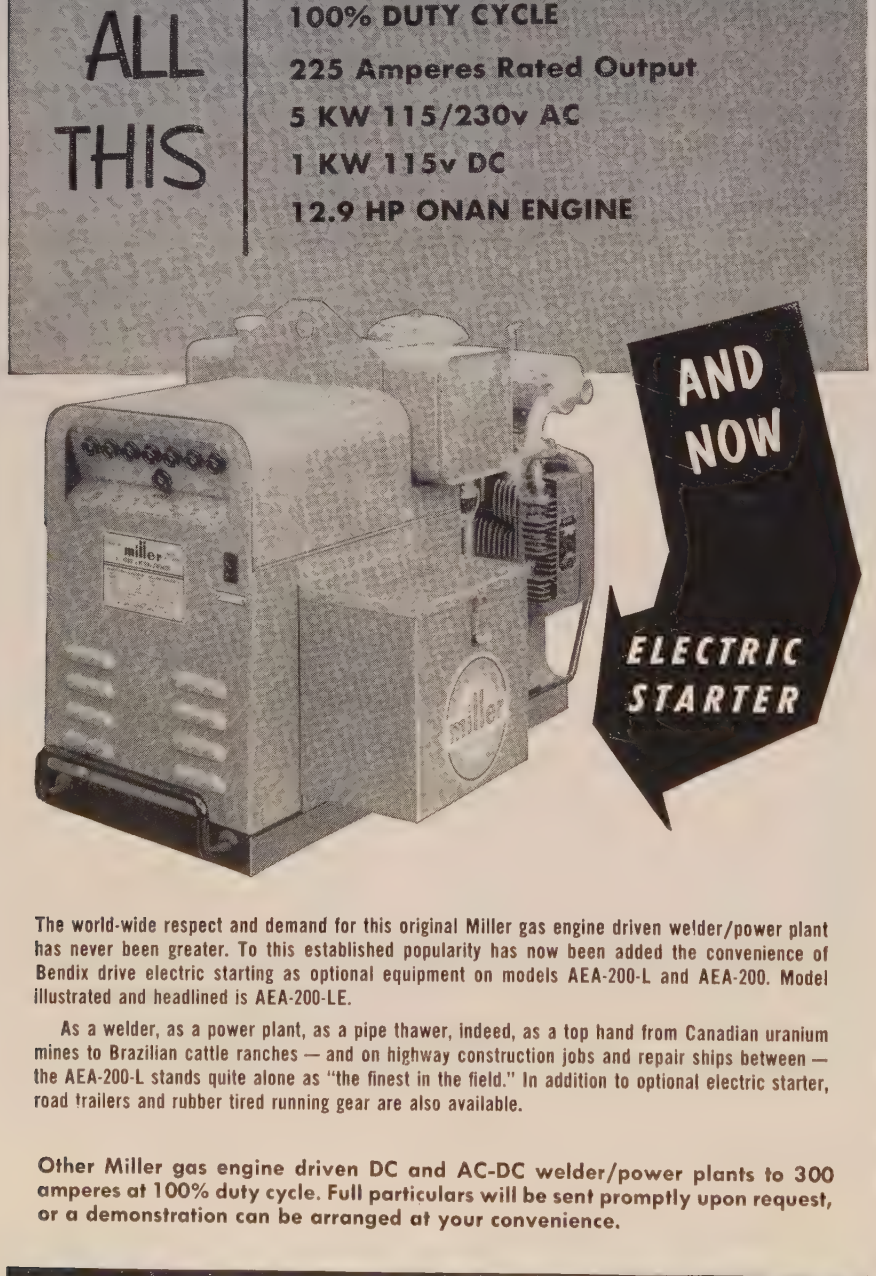
Route 89, Cameron-Navajo Bridge highway in Coconino County. **Givens Construction Co.**, Phoenix, submitted a low bid of $344,478 for grading, draining and seal-coating on 5 mi. of U.S. Route 260 and 666, Holbrook-Springerville highway in Apache County. A low bid of $333,333 was submitted by **Royden Construction Co.**, Phoenix, for grading, surfacing and draining on 4¾ mi. of State Route 85, Gila Bend-Ajo highway in Maricopa County. **General Contracting Corp.**, Salt Lake City, Utah, submitted a low bid of $199,353 for grading, surfacing and structure on the Phoenix Interstate Freeway in and near Phoenix, Maricopa County. **L. M. White Contracting Co.**, Tucson, submitted a low bid of $169,972 for grading and surfacing on two sections of U. S. Route 70, Globe-Lordsburg highway in Graham County. **Phoenix-Tempe Stone Co.**, Phoenix, submitted a low bid of $264,709 for grading and surfacing in and near city of Phoenix, Maricopa County. **Heiskell Construction Co.**, Phoenix, submitted a low bid of $251,177 for 10.7 mi. of grading and surfacing on State Route 64, west of Flagstaff in Coconino County.



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As a welder, as a power plant, as a pipe thawer, indeed, as a top hand from Canadian uranium mines to Brazilian cattle ranches — and on highway construction jobs and repair ships between — the AEA-200-L stands quite alone as "the finest in the field." In addition to optional electric starter, road trailers and rubber tired running gear are also available.

Other Miller gas engine driven DC and AC-DC welder/power plants to 300 amperes at 100% duty cycle. Full particulars will be sent promptly upon request, or a demonstration can be arranged at your convenience.

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CALIFORNIA

Ralph T. Viola Co. and **M & T Concrete, Inc.** of Oxnard received a $4,740,000 contract for construction of project buildings and addition to Instrumentation Center, Naval Missile Center, Point Mugu, for the 11th Naval District, San Diego. **Griffith Co.** of Los Angeles received an $8,209,756 contract for grading and surfacing 4.6 mi. of 6-lane freeway on U.S. 101 in and near city of Ventura, Ventura County. **Matich Constructors,** and **W. F. Maxwell Co.** of Colton received a $5,453,065 contract for grading and surfacing 6.1 mi. of 6-lane freeway on U.S. 70/79 in city of Banning, Riverside County. **George W. Peterson** of North Hollywood submitted a low bid of $265,750 for grading, surfacing, and structures in Englewood, Los Angeles County. **Montgomery Ross Fisher, Inc.** of Los Angeles received a $1,547,000 contract for construction of barracks and related work for 11th Naval District at the Marine Corps Air Base, Santa Ana. **Fredrickson Brothers** of Emeryville submitted a low bid of $447,829 for construction of an interchange on U.S. Highway 50, east of Sacramento. A low bid of $454,808 was submitted by **Osborn Co.**, Pasadena, for relocation and reconstruction of 10 mi. of U.S. Highway 6-395 near Independence in Inyo County. A low bid of $1,188,123 was submitted jointly by **Baldwin Contracting Co., Inc.** of Marysville and **J. W. Briggs** of Redding for grading and surfacing to reconstruct and realign 5.1 mi. of U.S. Highway 299, east of Douglas City in Trinity County. A low bid of $3,768,522 was submitted jointly by **Silva & Hill Construction Co.** of South San Gabriel and **Jack L. Adams Construction Co.** of Banning for grading and paving to construct 8.5 mi. of 4-lane freeway on U.S. Highway 101, west of Santa Barbara in Santa Barbara County. **J. A. Thompson & Son, Inc.,** Inglewood, received a $397,982 contract for construction of a bridge over the future San Diego Freeway in Inglewood and a telephone line structure over the freeway, in Los Angeles County. **O. C. Jones & Sons,** Berkeley, received a $437,591 contract for grading and paving the mole highway, south side, from the east end of the San Francisco-Oakland Bay Bridge to the Toll Plaza. **Foster-Marsch Corp.** of San

Diego received a $3,036,000 contract for the general work for the new Ventura School for girls in Ventura. **Thomas Construction Co.** of Fresno submitted a low bid of $146,526 for constructing a traffic separation bridge near Sacramento.

COLORADO

Colorado Constructors, Inc. of Denver received a $1,744,186 contract to construct twin tunnels, each 695 ft. long, and other improvements on Interstate U.S. 40 and 6, east of Idaho Springs. **Horner Construction Co., Inc.** of Denver and **Smith & Lucas Construction Co.** of Colorado Springs, jointly submitted a low bid of $509,510 to improve U.S. 87 to Interstate Highway standards, between Pikeview and Breed, north of Colorado Springs. **Pioneer Construction Co.** of Pueblo submitted two low bids for highway work in Cheyenne and Washington counties: $371,965 for 4.5 mi. of roadway west of and through Kit Carson and widening 1 bridge over Wild Horse Creek, Cheyenne County; $313,764 for grading, surfacing and related work on 8.3 mi. of U.S. 34 east of Akron in Washington County. **Shore-Bailey Construction Co.** of Littleton submitted a low bid of $298,662 for grading, structures and paving 5 mi. on U.S. 36 east and west of Lindon in Washington County. A low bid of $219,184 was submitted by **Blanchard Construction Co.,** Derby, for grading, surfacing and structure over Mustang Creek, State Highway 71, south of Limon in Lincoln County. **Hubner & Williams Construction Co., Inc.,** Denver, submitted a low bid of $404,587 to build twin overpasses on Interstate Route 80 S (U.S. 6) between Fort Morgan and Brush in Morgan County.

IDAHO

Kaiser Engineer Division, Oakland, **Raymond International,** Oakland, **Macco Corp.,** Paramount, Calif., and **Puget Sound Bridge & Drydock Co.,** Seattle, Wash., received a contract for $28,899,000 to construct 3 Titan missile launching bases in the vicinity of Mountain Home Air Force Base. **Erland & Blickle Co.,** Portland, Ore. received a $480,890 contract for construction of forebay and related work on Michaud Unit, Fort Hall Irrigation Project. **W. R. Cahoon,** Pocatello, received a $569,649 contract for grading, surfacing and structures in

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Gooding and Twin Falls counties. **Raber-Kief, Inc.** of Seattle, Wash., submitted two low bids for defense facilities at Mountain Home Air Force Base: $2,420,129 for air defense facilities; $309,954 for construction of a Nike-Hercules guided missile field maintenance shop. **Hayes Construction Co.,** Idaho Falls, received a $92,000 contract for construction of Idaho National Guard Armory at Rigby. **Babbitt Construction Co.,** Boise, submitted a low bid of $216,666 for enlargement of the city of Boise sewage treatment plant.

MONTANA

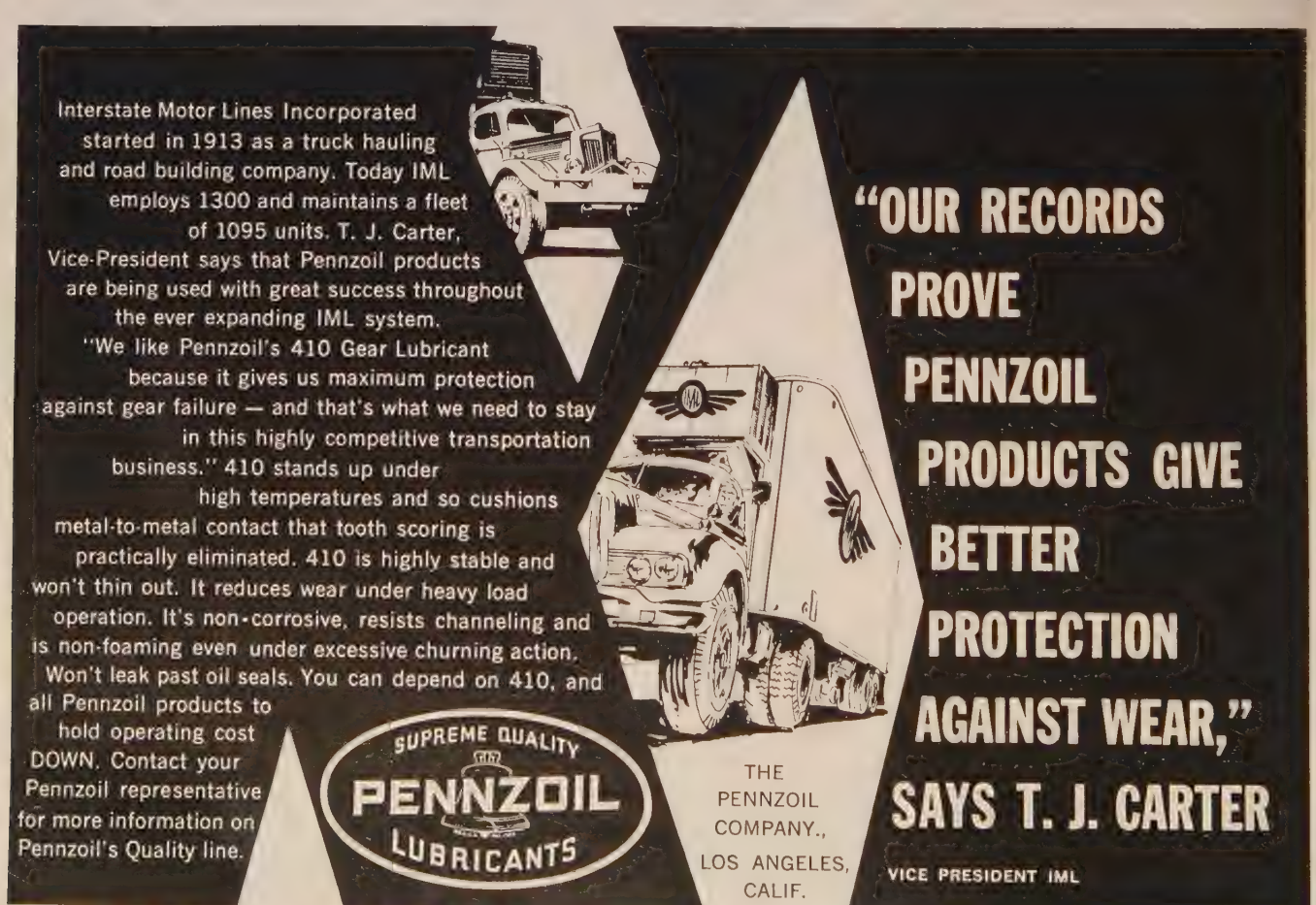
Robertson & Cave and **Sletten Construction Co.,** Great Falls, jointly, received a $1,139,281 contract for construction of a steel and concrete bridge over the Great Northern Railroad tracks in city of Great Falls, Cascade County. **Albert LaLonde Co.,** Sidney, received a $758,200 contract for grading, surfacing and draining west of Wolf Point-North Dakota line road in Roosevelt County. A $484,014 contract was received by **Peter Kiewit Sons' Co.,** Billings, for 17 mi. of bituminous surfacing on the Lima-Monida road in Beaverhead County. A $366,519 contract was received by **Wilbur Christensen Co.,** Rapid City, So. Dak., for 11.8 mi. of grading, surfacing and draining on the Grassrange-Malta road in Silver Bow County. A $334,588 contract was received by **Cahill-Mooney Construction Co.,** Butte, for construction of 3 concrete underpasses and 1 overpass on the Butte urban road in Silver Bow County. **Wickens Brothers** of Suffolk received two contracts for highway work in McCone, Dawson and Garfield counties: $271,618 for grading and surfacing on 9.1 mi. of the Circle-Sidney road in McCone and Dawson counties, and $254,299 for 8.2 mi. of grading, draining and surfacing on the Van Norman-Glasgow road in Garfield and McCone counties. A $261,457 contract was received by **Francis Tindall** of Lewistown for 5.6 mi. of grading, surfacing and draining on the Great Falls-North road in Cascade County. **O'Neil Construction Co.,** Havre, received two contracts for roadwork in Liberty and Toole counties: $214,688 for 5.2 mi. of grading and surfacing on the Chester-South road in Liberty County, and $156,723 for 6.2 mi. of grading and surfacing on the Sunburst-Sweetgrass-Westerly Loop road in Toole County.

NEVADA

V. C. Mendenhall Co., Inc., Las Vegas, received a $320,469 contract for construction of a portion of the State Highway System, U. S. 93, north of Pioche in Lincoln and White Pine counties.

NEW MEXICO

C. R. Davis of Albuquerque submitted two low bids for roadwork in city of Albuquerque, Bernalillo County: $1,722,481 for grading, structures and surfacing Lomas Blvd. to Coal Ave., and $407,221 for grading, surfacing and related work from Lomas Blvd., 4th, to Central. A low bid of $482,214 was submitted by **Brown Construction Co.,** Albuquerque, for 9 mi. of grading and surfacing from Junction U.S. 260 northeast in Grant and Luna counties. **O. D. Cowart,** Albuquerque, submitted a low bid of $337,247 for 17.5 mi. of reconstructing State Highway 262, Milnesand-Bluitt-State Line in Roosevelt County.



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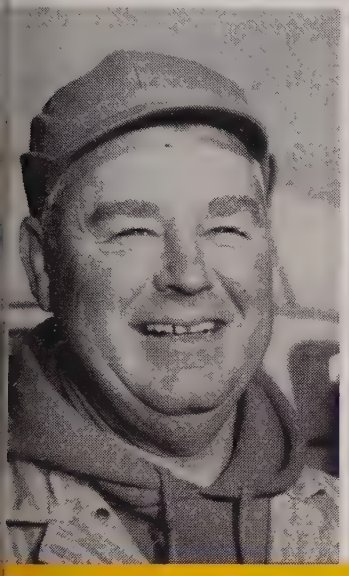

Report on the all-purpose Cat No. 619 with No. 442 Scraper

"This rig has more features than anything we looked at in its class. More power, speed, maneuverability"

George Hudson, Construction Supt., Grant County, Wis.

To keep an 8 to 10 mile per year road building program on schedule, Grant County needed a fast, compact mobile earthmover for use on longer hauls and larger yardages. After testing competitive rigs, a demonstration sold the county on a Cat No. 619 with matching No. 442 Scraper. Reason: it has more "bonus features" than any other machine in its class.

First assignment for the No. 619—relocating a half mile of road to eliminate a bad curve. 14,000 cu. yd. had to be removed to make a 14-ft. cut. The job proved to be a stop-and-go affair—haul distance 375 ft.—with tough material—sand, rock and clay so stubborn that much of it needed ripping. The No. 619's lugging ability and easy handling on sharp turns pay off. And on longer hauls, Superintendent Hudson reports the No. 619 "climbs up a 5% grade in 4th gear with a good load."

Here are some reasons why the No. 619-No. 442 is an "all job" rig loaded with performance. A Turbocharged Cat Engine delivers 225 HP and high torque rise for fast acceleration and lugging power under capacity loads. The LOWBOWL Scraper handles 14 cu. yd. struck . . . 18 cu. yd. heaped. The No. 619-No. 442 team has 30 MPH *usable* operating speed . . . hugs the ground for roadability found in no other 2-wheeled earthmover of its capacity. Newly developed 2-jack hydraulic steering gives effortless maneuverability yet retains "feel of the road" control. This advance steering permits full 90° turns in a diameter of 30 ft.

Get the full story on this hurry-up, all-purpose rig from your Caterpillar Dealer. Ask for a demonstration under the job conditions you face. See how you can make use of its versatility to step up production on your job.

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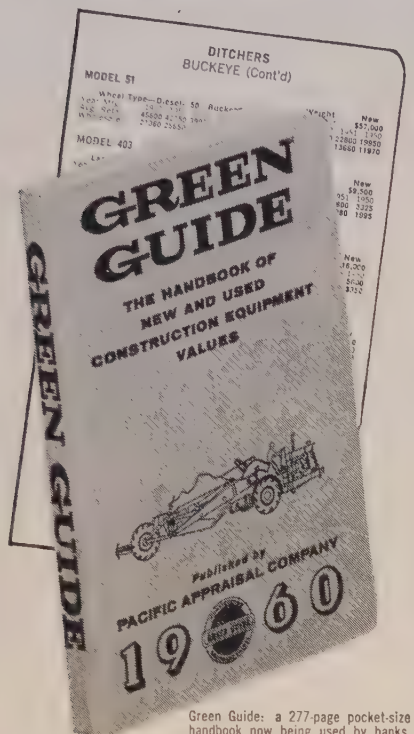
NO. 619-NO. 442
FOR "ALL JOB" VERSATILITY

A COMPLETE GUIDE TO NEW AND USED CONSTRUCTION EQUIPMENT VALUES



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OREGON

Keystone Construction Co., Inc., of Prineville submitted a low bid of $1,560,015 for 9.9 mi. of grading, Baker-Pleasant Valley section of the Old Oregon Trail, southeast from Baker. **Roy L. Houck Sons' Corp.,** Salem, submitted two low bids for roadwork in Jackson County: $794,219 for 2.1 mi. of grading and construction of 3 structures on the Homestead-Rock Point section of the Pacific Highway, east of Grants Pass and $725,392 for 3.3 mi. of grading, construction of three concrete structures east of Grants Pass on the Evans Creek-Homestead section of the Pacific Highway. **Warren Northwest, Inc.,** Portland, submitted a low bid of $786,976 for 9.7 mi. of paving and signing, Lancaster Drive-Sublimity Gun Club section of the North Santiam highway, east from Salem in Marion County. A low bid of $313,815 was submitted by **Gibbons & Reed Co.,** Salt Lake, Utah, for construction of Corbett Interchange, undercrossing structure, grading, paving and signing on Columbia River Highway, east of Troutdale in Multnomah County. **Stanley Wilt,** Corvallis, submitted a low bid of $264,099 for 7.4 mi. of grading and oiling; also construction of concrete bridge, West Unit, Camp Creek-Paulina section of the Paulina Highway in Crook County. **Umpqua River Navigation Co.,** Reedsport, submitted a low bid of $244,538 for 2.6 mi. of grading and paving the Pioneer Mountain section of the Corvallis-Newport highway, east of Toledo in Lincoln County. **Hannan Bros. Co.** of Portland submitted a low bid of $230,-091 for structure, grading, paving, landscaping and lighting on the Ferry St. southbound off-ramp at Eugene, Lane County.

UTAH

Tiago Construction Co., Salt Lake City, received a $939,754 contract for construction of water distribution system for the Bountiful Water Subconservancy District. **L. A. Young Sons Construction Co.,** Richfield, submitted a low bid of $650,547 for bituminous concrete surfacing, from Cudahy Lane northerly to Page's Lane on Interstate 15 in Davis County. A low bid of $365,570 was submitted by **Wheelwright Construction Co.,** of Ogden for construction of water and sewer line in Salt Lake. **Jack B. Parson,** Smithfield, submitted a low bid of $463,337 for construction of graded roadway from Honeyville to Elwood, Box Elder County. **Mountain States Construction Co.** of Bountiful submitted a low bid of $172,754 for roadway drainage structures, surfacing and concrete bridge in Bingham City. **W. P. Johnson** of Grand Junction submitted a low bid of $616,116 for mechanical work on Hillcrest High School in Union.

WASHINGTON

Woodworth & Co. of Tacoma received a $1,252,847 contract for 2.9 mi. of grading and surfacing in city of Tacoma, Pierce County. **Goodfellow Bros., Inc.** of Wenatchee received a $407,240 contract for construction of 6.8 mi. of State Highway 2, from Rocky Reach to Orondo, Unit 3 in Douglas County. **Inland Asphalt Co.** of Spokane received a $192,808 contract for repaving seven blocks of Spokane city streets, Spokane County. A $172,363 contract was received by **Pacific Sand & Gravel Co.,** Centralia, for repaving 2.3 mi. of State Highway 1, U.S. 99, north of Chehalis in Lewis County. **Basin Paving Co.** of Moses Lake received a $111,961 contract to repave 1 mi. of State Highway 3 in city of Pomeroy in Garfield County. **Purvis Construction** of Yardley submitted a low bid of $802,825 for general work for construction of engineering addition to the technology building at W.S.U., Pullman.

WYOMING

Northwestern Engineering Co., Denver, Colo., received a $1,797,328 contract for grading, surfacing and related work on the Rock Springs-Rawlins road in Sweetwater County. **Schmidt Construction Co., Inc.,** of Arvada, Colo., received a $556,-606 contract for 6.4 mi. of grading, surfacing and 1 culvert on the Rock River-Bosler road, in Albany County. A $355,549 contract was received by **Riedesel-Reiman** of Cheyenne for construction of twin 5-continuous spans over Casper Creek and the C.B. & Q. Railroad on the Shoshoni-Casper road east of Mountain View in Natrona County. A $299,-168 contract was received by **Read Construction Co.,** Cheyenne, for 3.2 mi. of grading, surfacing and related work on the Rawlins-Walcott Junction road through Sinclair in Carbon County. **Knisely-Moore Co.** of Douglas received a $212,258 contract for grading, surfacing and miscellaneous work on 9.6 mi. of the Lamont-Muddy Gap road north of Lamont in Carbon County.

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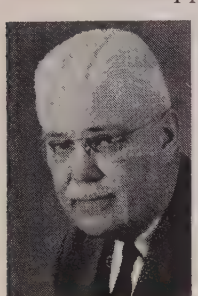
ENGINEERS and CONTRACTORS

Warren Driver

Frederick W. Panhorst, California's chief bridge engineer for the past 29 years, is retiring April 1 after a long career of public service, most of it with the California Division of Highways. Panhorst is assistant state highway engineer — bridges, and heads the division's extensive bridge department at Sacramento. Appointed to succeed



Panhorst

McMahon

him is **James E. McMahon.** McMahon has been in charge of the department's branch office in Los Angeles since 1953 as bridge engineer-southern area. **Dale F. Downing** of Walnut Creek, assistant bridge engineer — state-owned toll bridges, is moving to Los Angeles where he will replace McMahon.

* * *

At the annual reorganization meeting of the Arizona State Highway Commission, **Frank L. Christensen** of Flagstaff was chosen chairman, and **Milton L. Reay** of Safford, vice chairman. **Bryant Whiting** of Springerville was installed as a new member. Other commissioners participating in the meeting were **John Bugg, Wilbur F. Asbury,** and **L. F. Quinn** who retired following a 1-year term as chairman.

* * *

A. B. West, with 25 years Federal service including 19 with the Bureau of Reclamation, has been appointed director of Region 3 with headquarters in Boulder City, Nev. West has been acting regional director at Boulder City since the former director, **W. H. Taylor,** became chief of the division of power operations and general engineering in the Commissioner Dominy's Denver office.

* * *

Francis J. Murphy has been named vice president and general manager of Yuba Erectors, a division of Yuba Consolidated Industries, with headquarters in Emeryville, Calif. As head of Yuba Erectors, Murphy will run an organization formerly operated as two divisions: Yuba Consolidated Erectors, and Judson Pacific-Murphy.

J. Philip Murphy, Yuba vice president, has moved to the firm's corporate staff located in executive offices in San Francisco.

* * *

John H. Harrington joins Jacobs Engineering Co., Pasadena, Calif., as construction manager. Harrington has superintended construction of chemical and petroleum plants throughout the United States, having been associated with The Ralph M. Parsons Co., M. W. Kellogg Co., and Foster-Wheeler Corp. Also joining the Jacobs firm are **James K. Brooks** and **Norman W. Coulson** as senior project engineers.

* * *

Col. Robert R. Robertson, Corps of Engineers, is being assigned to San Francisco as deputy division engineer for the South Pacific Division to succeed **Col. Carleton M. Clifford** who will be retiring from active service the end of July. Colonel Robertson is presently chief of the Technical Liaison Division at Washington, D. C.

Also announced by the South Pacific Division is the retirement of **Martin Holmes** who for the past 10 years has been assistant chief of the Division's technical engineering branch.

* * *

At recent meetings new men were chosen by various chapters of Associated General Contractors to lead the organizations for the ensuing year. **Warren Driver** was elected president of the Southern California Chapter. He is vice president and general manager of C. W. Driver, Inc. **Arthur S. Hainsworth,** president of Hainsworth Construction Co., was installed as president of the Seattle Chapter. The AGC's Montana Contractors' Association, Inc. elected **Jay LaLonde** of Sydney its new head, while the Montana Building Chapter chose **W. R.** Waddell, Helena, president.

* * *

Announcement is made of a change in name by Wilsey and Ham. The firm is now known as Wilsey, Ham and Blair. **Charles T. Blair** is vice president and chief engineer. Simultaneously two of its top engineers, **Gordon Tillson** and **Jack E. Van Zandt,** became vice presidents and partners in the engineering and planning organization with offices in San Francisco and Los Angeles.

* * *

Earl W. Elton, city engineer of Bremerton, Wash., has resigned to become administrative assistant to the city administrator of Covina, Calif.

* * *

Col. John A. Morrison, Corps of Engineers, has received assignment as district engineer at San Francisco, effective in July. **Col. John S. Harnett,** who has held the post since July 1957, will leave in July on a new assignment in Korea. Col. Morrison is at present serving in the Office of the Chief of Engineers, Washington, D. C.

CALENDAR

Apr. 18-23 — American Institute of Architects, annual convention, San Francisco, Calif.

Apr. 25-27—Construction Specifications Institute, annual convention, San Francisco, Calif.

June 8-11 — National Society of Professional Engineers, meeting, Statler Hotel, Boston, Mass.

June 19-24—Western Association of State Highway Officials, annual conference, Multnomah Hotel, Portland, Ore.

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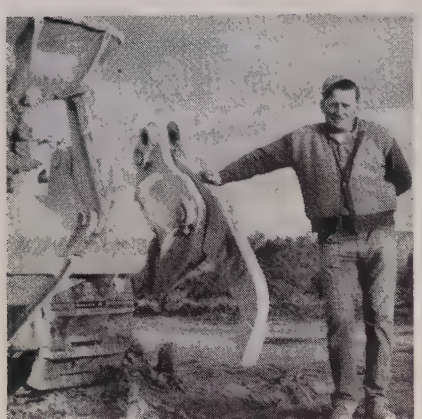

PAT HALE, project superintendent for Copper State Construction Co., stands beside one of the big crawlers on the firm's Interstate Highway job south of Flagstaff. The $1,898,517 contract covers construction of 5.3 mi. of 4-lane divided highway on a new alignment through the Arizona foothills.

R. F. Calou, project manager, is Fredrickson & Watson Construction Co.'s top man on a recent award to grade and surface 2.9 mi. of 4-lane freeway in Solano County, Calif. Other key contractor men on the $1,697,777 job are **W. D. Wilcoxon,** dirt superintendent, **W. H. Thompson,** carpenter superintendent, and in the office, **T. W. Bond,** office manager. Work started in February and will probably end about April next year.

* * *

Ed Kowell is superintending an $89,329 grading, curb and gutter, and paving job in Phoenix, Ariz. for Arizona Sand & Rock Co.

* * *

C. D. Bisordi, project manager, and **George Jones,** superintendent, are key men working for S. S. Mullen, Inc., contractor building facilities consisting of airfield, tower and communications building for the Gold Creek project at Fairbanks, Alaska. Contract amounts to $295,700, with work scheduled for completion in September.

* * *

Ralph Brady, bridge superintendent, **H. Raun,** bridge engineer, **Ed Morris,** highway superintendent, and **R. A. Hays,** highway engineer, comprise the top personnel on a recent $858,887 contract awarded Matich & Maxwell to widen existing 4-lane freeway to 6 lanes in Los Angeles County, Calif. This job of grading, surfacing and structures in Pomona and Claremont has been under way since February, earmarked for October finish.

* * *

Bill Loy is acting as project supreintendent, and **Warren Gaylord,** as project engineer for Fredericksen & Kasler's large highway project in Riverside County, Calif. Situated west of Corona, the $5,577,891 contract is for 7.7 mi. of 4-lane freeway and construction of 12 structures. **Morris Burke** is serving as office manager, and **Leona Tate** is timekeeper. Other important contractor personnel are: **Carl Whetaire** and **"Chuck" Mullens,** structures superintendents; **Bill Jones,** pour foreman; **Jim Farrar** and **Andy Hernandez,** dirt foremen; **George Bell,** crusher foreman; **Jim Hardin,** truck foreman; **Al Hodges** and **Dean Wilburn,** labor foremen. Also **Archie Cambell, John Cambell, Clyde Wilson** and **Al Absner,** all carpenter foremen; **"Slim" Ransdell,** equipment superintendent; **Bob Knott** and **Archie McConnel,** mechanic foremen, and **Furman Howell,** header foreman. Job started in February, and according to **R. E. "Jeff" Kasler** it will probably run till April next year.

* * *

Nick Kohler, superintendent, has charge of Colorado Constructors' recent award in the amount of $446,529 for grading, box culverts and asphalt paving on a 6.3-mi. stretch and a 5.6-mi. stretch of highway in Mesa County, Colo. **Gene Scherrer** is timekeeper. Assisting as foremen are: **Ed Fagin,** grading; **"Slim" Howard,** shovel; **Ed Williams,** structures, and **Sam Samuelson,** labor. Work started in February; June is the target date.

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Bud Holley, superintendent for Colorado Constructors, is supervising another contract recently awarded to this firm. A $266,732 job, the work consists of overpass structures, grading and related items to improve U.S. 87 in Adams County, Colo. Structures foreman here is **James Lawrence,** while **Arnold Gregory** is grading foreman. Under construction since March, the job will be finished in June.

* * *

R. H. Hix has been assigned to Mayfield Dam to serve as Perini Corporation's project manager on a $9,997,140 contract for basic work involving 3 generating units. General superintendent on this dam, which is located near Mayfield, Wash., is **Robert Overman.** Other top personnel for Perini are **Robert M. Snyder,** project engineer, and **Scott Gardner,** office manager. Under way since Feb. 15, work will continue till June 15, 1962.

* * *

John Rumsey, Jr., has been named project manager for a $3,982,242 award to Morrison-Knudsen Co. and Rumsey & Co. covering construction of 3 bridges and related work on State Highway 1 in King County, part of Seattle Freeway, Wash. Work on this overhead viaduct project, located from East Galer St. to Lakeview Blvd., with various turn-outs, got under way in February, scheduled for completion in late 1961. Another key contractor man is **Jesse Coppage,** office manager.

* * *

E. A. Forde, Jr., project manager, **A. Gonzales,** project engineer, with **H. Haghera,** excavation superintendent, **H. Morata,** structure superintendent, and **D. Higa,** excavation foreman, comprise the key personnel on Hawaiian Dredging & Construction Co.'s recent award for work at Honolulu Airport, Hawaii. Costing $543,000, contract for the 2nd increment jet terminal covers excavation and reconstruction of sub-base for new aircraft parking areas, taxiways and holding apron. Job started last January and will be finished in May.

* * *

R. F. Calou, superintendent, assisted by **J. R. Owen,** grade foreman, is in charge of construction of bridge approach embankment with overhead to be constructed in Solano County, Calif. Contract went to Fredrickson & Watson on a low bid of $396,534. Work has been under way since February and will run until April next year.

HERE *Paul Foster,* Copper State's plant superintendent, and *Roy Shupe,* chief project supervisor for the Arizona State Highway Department, look over the Interstate project. Shupe also represents the State on an adjoining job, contract for which was awarded to Vinson Construction Co.

Richard N. Moseman as superintendent is in charge of structures and highway construction of first unit of MacArthur Freeway in Oakland, Calif. This $2,926,802 contract is in the hands of C. K. Moseman & Son who started work in February and expect to finish in February 1962. Other important contractor personnel here are **John A. Carstensen,** engineer; and **Henry De Santos** and **Robert E. Frost,** carpenter foremen. **Harry C. Wunder** is office engineer.

* * *

William A. Huddleston is supervising a recent award to Clifton-Applegate Co. covering construction of crushed rock base, furnishing stockpile and related work in Lewis and Nez Perce counties, Idaho. **Tom Breeding** is acting as timekeeper on this $435,778 contract, work on which started in March and will be finished in October.

* * *

L. A. Welcome and **R. R. Welcome,** partners in the firm of J. J. Welcome Construction Co., are acting as their own superintendents on a recent award in the amount of $621,241 covering 4-lane highway construction. The 4.3-mi. grading, surfacing and related work is situated on State Highway 9 in Grays Harbor and Thurston counties, Wash. Job started in January, earmarked for completion Nov. 1.

* * *

Stanley Benge, general superintendent for Central Paving Co., is supervising a $1,092,300 award to this contractor for a section of the Oregon Coast Highway in Coos County. Work involves paving, slide correction and signing from Davis Slough to Bullards Bridge. Plant superintendent is **Frank Whaley,** assisted by **"Stu" Mullican,** foreman. Street foreman is **Dave Smith.** Grading is sub-contracted to Miller & Hutchins. Vern Hoaglin Construction Co., has the guardrail and signing contract. According to **Emerson B. Page,** project manager for the prime contractor, the job should be completed about October this year.

* * *

W. B. "Red" Rodgers, superintendent, **Don Anderson,** job engineer, and **John Griffin,** foreman, are the principal personnel for a contract of Lewis Hopkins Co., Inc., on the Columbia Basin Project in Washington. A $667,358 contract, it covers earthwork and canal laterals, wasteways and drains for Irrigation Block 88, West Canal Laterals. Expected to be finished in February 1961, work has been going since February.

* * *

Lafey Materne and **R. E. Materne** of the contracting firm of Materne Bros. Co. are directing the work on 3.7 mi. of grading and surfacing on county feeder road in Grant County, Wash., which went to their company on a low bid of $130,369. Subcontractor for the grading is Louis Giersdorf. **James McFarling** is foreman for the job which is expected to be finished by May 1.

* * *

Warren E. Kruse is superintending a $225,389 job contracted to Peter Kiewit Sons' Co. at Hampden, Colo., for bridges and approaches over the Platte River. Described as two 411-ft. precast beam structures, each composed of 6 spans with beams approximately 75 ft. in length, the job, which started in February, has the following foremen: **Harold L. Cherry,** general; **Ovle. E. Rink,** carpenter; **J. L. Douglas** and **William H. Raymor,** ironworker. **John A. Ellis,** job office manager, reports the project is scheduled for completion in July.

* * *

Otto Roeder, dredging superintendent, assisted by **Hal Puddy,** has charge of construction of a cross levee and drainage structure being constructed for the U.S. Army Engineers by General Construction Co. Two other key supervisors for General are **Bill Culver,** shore, and **Rudy Salquist,** excavation. Located in Multnomah County Drainage District 1 in Oregon, work started in February earmarked for September closing. Contract price $364,343.

Mel Beach, engineer, **Ed Bernd** and **Louis Watkins,** grade foremen, and **Ivan Smith,** gravel foreman, are key men on a grading, structures and sub-base contract recently awarded to Herren-Strong on a low bid of $1,164,053. Located between Hudson and Roggen in Weld County, Colo., the 10.2-mi. highway work has been under way since mid-March and will be finished about Oct. 1.

* * *

Clifford G. Christensen, crushing supervisor, has charge of grading, surfacing and miscellaneous work on 6.7 mi. of the Kaycee-Midwest road in Johnson County, Wyo. for Wyoming Paving Co. Contractor received the award on a low bid of $680,320, started work last December, and expects to finish about next October.

* * *

Reid W. Erickson and **Keith J. Erickson,** superintendents for Erickson Paving Co., have charge of 1.2 mi. of construction on Highway 1 in King County, Wash. The $1,401,680 contract covers site clearing, grading, draining, underpass structure, and tunnel access structure. Shop superintendent is **R. G. Schasteen.** With June 1961 the target, work started here in February.

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Harold O. Kester, project manager, and **E. H. Thomas,** project engineer, are the key men for Eagle-Western, joint venture contractors on a $6,500,000 Corps of Engineers project at Fort Peck, Mont.

* * *

M. C. Beach, superintendent, and **Edward Bernd** and **Louis Watkins,** foremen, are top personnel working for Herren-Strong Construction Co., successful bidder for grading, surfacing and structures on 3 mi. of U.S. 6 in Weld County, Colo. Work on the $442,384 project started in December and will be finished probably in May.

* * *

Kent Wheelwright is superintending construction of concrete bridge over the Virgin River together with approaches in Washington County, Utah. The job went to Wheelwright Construction Co. on a low bid of $132,742. Carpenter foreman on this work is **Frank Perla.** Scheduled for completion in April, work has been under way since November.

Proposed hydro project for Alaska to cost $38,048,000

A HYDRO-ELECTRIC power development near Juneau, Alaska, has been found feasible by the Bureau of Reclamation, and will now be studied by state and other Federal agencies. It would then be submitted to Congress.

The project would consist of a 48,000-kw. power plant located near the mouth of Speel River, 28 mi. from Juneau, and would involve two tunnels with an aggregate length of about 14,300 ft. A surge tank and steel penstock would also be required for the project. Generated power would be delivered to Juneau over a 38-mi. transmission line. Of this line, 2.7 mi. would be by submarine cable under Taku Inlet. The entire cost of the project would be allocated to power. This repayment program is based on the expectation that industrial load will build up in the Juneau area if an adequate supply of power is available at the proposed rates. One of these developments would be a mill to produce newsprint planned by the Georgia Pacific Alaska Co.

First generating unit is started at Mammoth Pool

THE first generating unit of Southern California Edison Company's $50,000,000 Mammoth Pool Project went into operation February 18, virtually completing one of the West's great hydroelectric projects. The Mammoth Pool project is the newest addition to Edison's intensive development of its Big Creek-San Joaquin River hydroelectric system in the High Sierra, approximately 60 mi. northeast of Fresno.

This multi-purpose power project, conceived in the 1890s, has been developed during the past 49 years with a total investment of approximately $212,000,000. Fourteen dams, six major lakes and eight powerhouses have been created in this wilderness. They control the waters of the San Joaquin River and its tributaries for use not only in the generation of electricity but also for recreation, flood control and storage of irrigation water.

Mammoth Pool's two units will have a maximum electric generation capacity of 150,000 kw.

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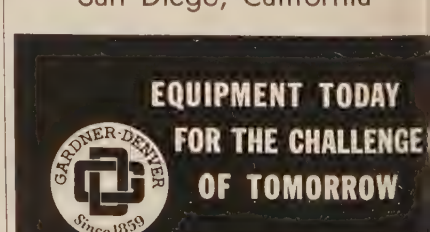

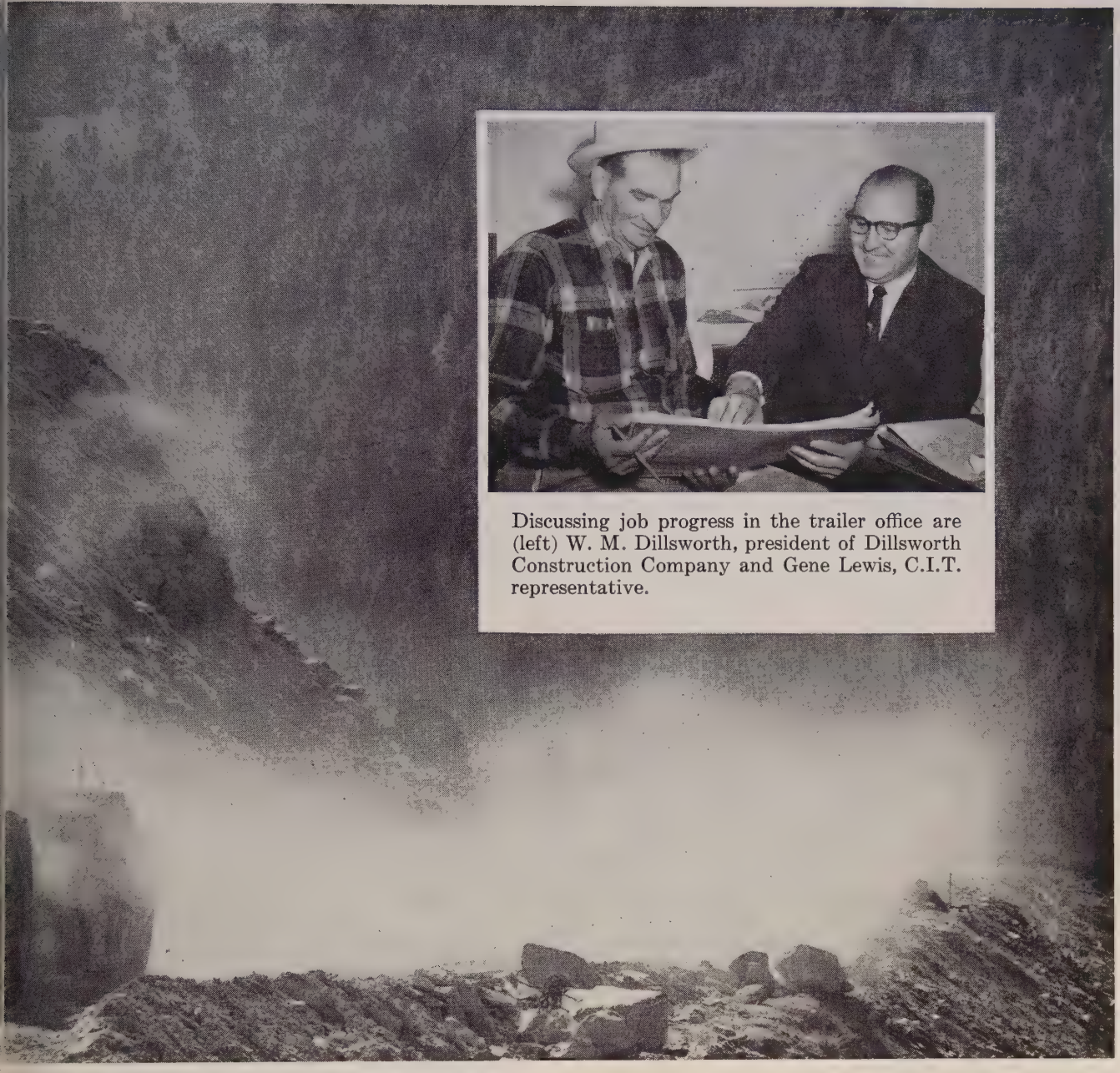

Discussing job progress in the trailer office are (left) W. M. Dillsworth, president of Dillsworth Construction Company and Gene Lewis, C.I.T. representative.

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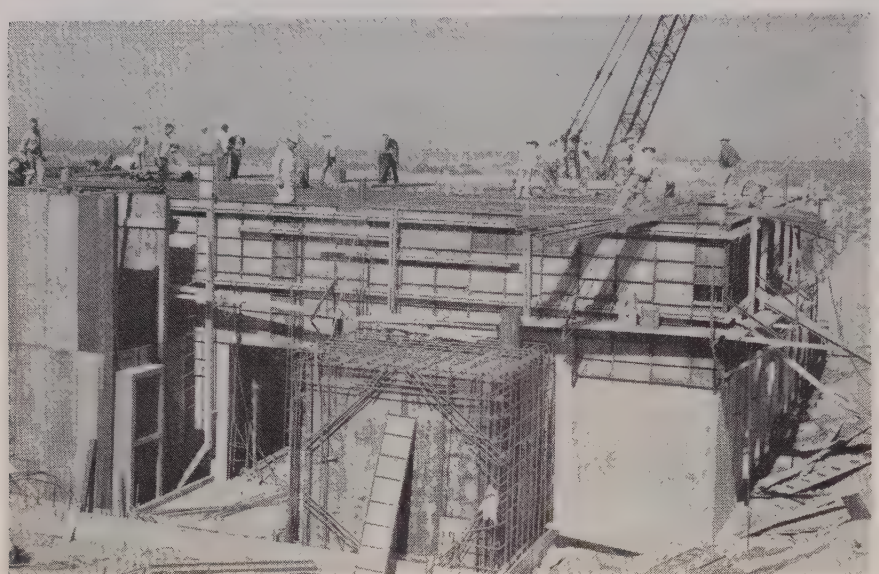
CONSTRUCTION BRIEFS



CONTROL building in Atlas missile system at Vandenberg AFB formed with steel ply panels. Contractor saved a month by using these forms on complex job.

Steel forms save time on critical Vandenberg missile installation

A MONTH'S saving in carpenter-gang time, coupled with significant cost savings, has been racked up under difficult conditions at Vandenberg AFB, Calif. Robinson & Wilson, San Bernardino contractors, used patent steel panel forms on missile installation construction governed by critical tolerances. (The Vandenberg construction project is reviewed in the lead article of this month's issue of *Western Construction.*)

It was an eight-month, hurry-up construction schedule for an Atlas Operation-Testing complex: a no-gantry launcher, a blockhouse partly underground, and a utilities building containing fire-alarm and communications systems, office, conference and ready room. The $1,066,600 contract covered 25,000 cubic yards of reinforced concrete; all of it critically important.

The Vandenberg facility represents an advanced method of launching the Atlas missile, so concrete work is necessarily complex. In fact, every problem in concrete forming which the company had ever faced was all wrapped up in one bundle here. Multi-lift walls, battered walls, warped batters, cantilevered haunches, thin and thick walls, mass-concrete pours in the flame bucket and support beams, curves, corners and circles were required. One small building, containing only 42 cubic yards of concrete, required 600 square feet of forms and 18 angles.

Jesse J. Savell, area general superintendent for Robinson & Wilson, considered setting up a carpenter yard and making the forms. But that takes working room, materials, and supervision. The site is in sand-dune country. Working room, with adequate truck bearing, was nil. It would take time, money and coordination to shop for plywood and other materials.

As an alternative he consulted the Los Angeles office of Symons Clamp & Mfg. Co. Symons' Dick Kozar studied the plans and specifications and reported that Symons Steel Ply panels were eminently suited to the work. They could also be used successfully, and economically, for forming the supported concrete in slabs and beams. Symons hardware could be used on slab work to hold suspended ceilings, and the system could be used in conjunction with job made forms.

The steel ply forms were rented, and Kozar provided layout drawings showing how various pours could be made.

Of 80,000 sq. ft. of forming in the total project, only about 4% was job manufactured. The remainder was supplied by Symons.

One of the most important advancements of the year in concrete contracting is in evidence on this job.

In forming of light and heavy floor slabs with the patent panels on the underside, the unit weight of Steel Ply panels is so light that considerable shoring was eliminated. The slab pours are being supported by using a double cross-joist system of 2x6's, supported on 6-ft. centers by shores.

At one point where 2x2-ft. square haunches had to be built cantilevering out from the main walls, the concrete was successfully placed by using patented haunch forms in the air, minus any shoring from underneath. Another new technique was the use of steel waler ties, embedded in the slabs, for hanging a suspended ceiling later on.

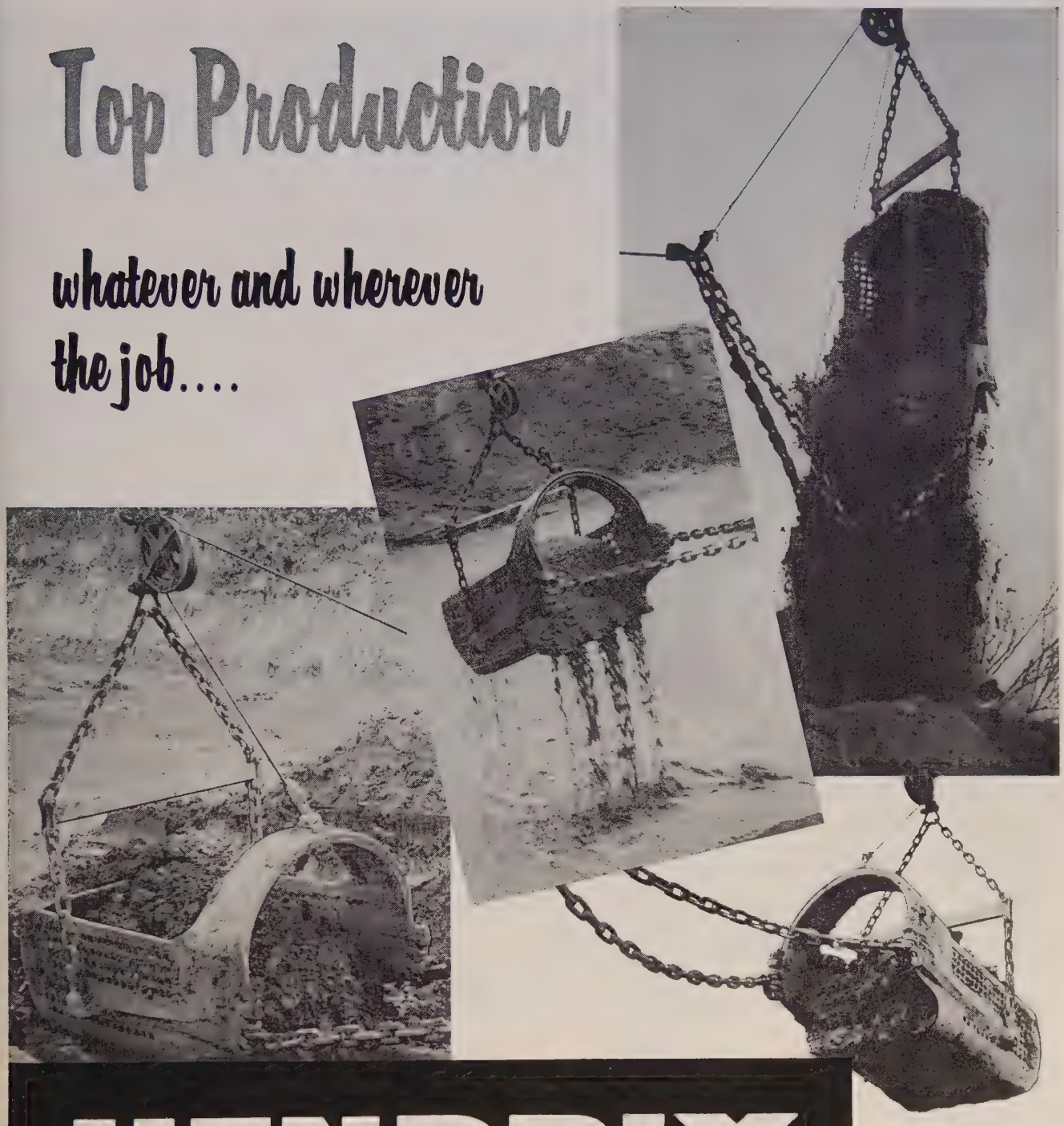
From all standpoints: strength, cost, time and beauty, the forms justified their selection. Strengthwise, a 42-yd. pour 12 ft. high was made in one hour, with a fairly high slump concrete which threw its whole hydraulic load against the forms, exceeding the 5-ft.-per-hour rate recommended. The forms didn't budge. One wall 26 ft. high is straight as a die, with clean lines. Because the forms will be re-used up to ten times or more, their cost will be less than half that of job-made forming. The 20,000 sq. ft. of panels did the 80,000-sq. ft. job.

Concrete placing is on the routine side, with the exception of having to make long reaches to get across some of the buildings. Southern Pacific Milling Co. of Sisquoc, Calif. has a Noble commercial batching setup at Vandenberg, and Robinson & Wilson, like other base contractors, buys the material delivered to the job site by truck mixers.

Robinson & Wilson brings the truck mixers in on a haul road, and transfers the material to the placing points by 1-yd. Gar-Bro buckets, handled by a Lorain Moto Crane.

Top Production

whatever and wherever the job....



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"A Type for Every Digging Purpose"...
¼ to 40 Cubic Yards-Perforated or Solid

Hendrix Lightweight Dragline Buckets

HENDRIX MANUFACTURING COMPANY, Inc.

MANSFIELD, LOUISIANA

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This machine, working usually with outriggers, has a 75-ft. boom with 15-ft. jib.

Whiteman electric vibrators are used as the concrete is placed. On slab work, the surfaces are screed tamped; then finished off by Whiteman 3-blade mechanical finishers. The concrete is being membrane cured with a resin-base product to develop proper strength.

Work is under the general supervision of Col. C. T. Newton, district engineer, U. S. Army Engineering District, Los Angeles. Resident engineering is under Western Area Engineer, Lieut. Col. Allen W. Sanders, CE.

Hydraulic track adjuster for International TD-20

A hydraulic track adjuster, replacing a screw type, has been developed by International Harvester Co. for all future International TD-20 crawler tractors.

Track tension is increased by using a regular hand grease gun to force grease into a lubricating fitting on the track adjuster.

CHOICE OF THE SHOW*

MONARCH DYNA-CHUTE

POWER HYDRAULIC CONTROLS

Raise, lower, hold the discharge chute on Ready-Mix Trucks . . . in seconds, automatically!

*At the National Ready Mixed Concrete convention, in Chicago . . . 70% of truck mixers at the show featured DYNA-CHUTE power hydraulic controls . . . and every truck mixer manufacturer offered DYNA-CHUTE as standard or optional equipment. More and more the swing is to DYNA-CHUTE for faster, more economical deliveries.

Now — PUSH-BUTTON OPERATION, too!

Available as optional equipment. Push the button to raise or lower — holds automatically in any position. Mount power unit in out-of-way place. Permits multiple-station controls.

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Aluminum pipe planted like seed

ALUMINUM pipe is being planted in the ground like seed through use of a backward-curving hollow Ateco ripper blade mounted behind a Euclid TC12 crawler. The new pipe-laying system was developed by Alcoa and a major oil company for laying the type of small diameter pipe used extensively in oil fields.

In a recent Denver test, the automatic pipe-laying equipment dug

a 42-in.-deep trench, unreeled and laid 2-in. pipe and back-filled all in one operation. Rate of installation was about 3 mph., much faster than conventional pipe.

The unique pipeline-laying operation was adapted from a method commonly used to bury communication cables. Thin-walled, 2-in. diameter pipe was extruded and coiled at Alcoa's Lafayette (Ind.) works. At Denver, the pipe was mounted on a specially built trailer coupled to a plow having a hollow, curved blade. Plow and trailer were pulled by a Euclid TC 12 tractor. The trailer was positioned to allow the coiled pipe to unreel and feed down through the hollow plow.

To begin the demonstration, a short length of trench was dug. Pipe, fed into the top of the plow, emerged from the small, backward pointing end on the trench floor. This end of the pipe was anchored securely. As the tractor moved across the field at 3 miles per hour, the blade cut a 42-in. deep slit in the earth. The uncoiling aluminum pipe slipped down through the plow blade and straightened out on the trench bottom. When uncovered and inspected at the end of the test, the pipe proved to be in good condition.

Cooperating with Alcoa in the test were C. V. Miller Construction Co., American Tractor Equipment Co., and Colorado Builders Supply Co.

TIRE STAMINA UP, JOB DELAYS DOWN

with Safety Steel Shield Protection of U. S. Royal Super Fleetmaster!

You know how tire failure can hold up trucks, crews, jobs. Cut down time—get the U. S. Royal Super Fleetmaster. This tire's *Safety Steel Shield* forms a virtually impenetrable barrier against cuts and ruptures. Its *Double-Strength Nylon* is twice as strong as ordinary nylon. This double-armored protection gives you brute strength that defies vicious off-road impacts, yet gives unmatched stamina for long hauls at highway speeds. Call your U. S. Royal Dealer right away!

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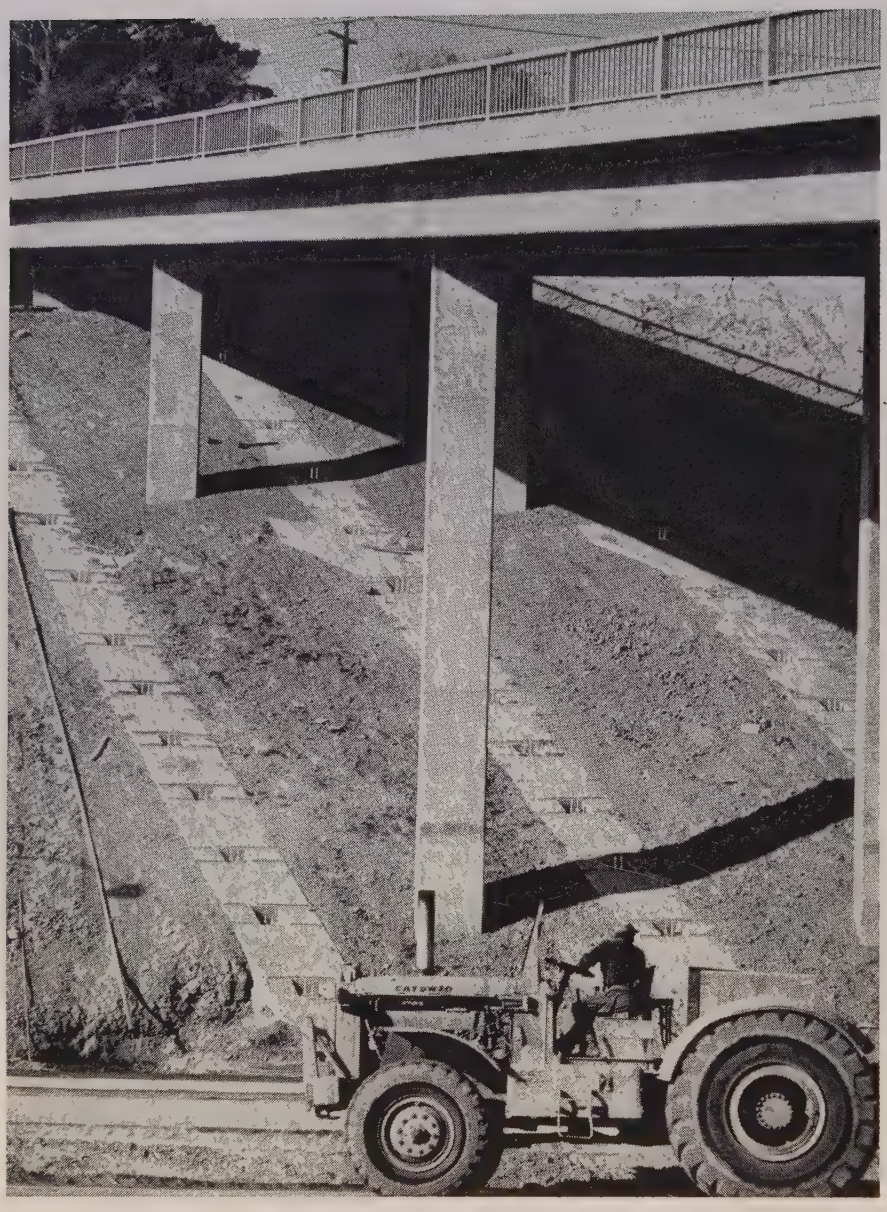


CONCRETE caps provide surface anchorage for post-tensioned steel rods used to stabilize loose bank. Each pair of rods is embedded in 40 ft. of concrete.

"Stressed dirt" provides stable bridge foundation

STRESSED DIRT, yes dirt, provides a solid foundation for the Oakvale Road overcrossing structure in Walnut Creek. Constantly shifting soft earth at the structure location provided no support for the heavy columns, and the bridge could not be re-located in firmer ground, so the soft slope was pinned down by three long concrete beams anchored to deeply imbedded concrete piles at close intervals by post-tensioned steel Stressrods.

The Stressrod anchorage system was manufactured by Rods, Inc., of Berkeley, Calif., and includes a newly-patented grip nut and sleeve, developed by Rods Inc., and manufactured by Howlett Machine Works, Berkeley.

Construction of the "stressed dirt" stabilization job began with drilling of three parallel rows of 14 holes, each 73 ft. deep, in the unstable slope. Stressrods in sheet metal tubes with anchor plates at the bottom were assembled and inserted in pairs in the holes.

The holes were filled with concrete up to the 40-ft. level, and with gravel for the remaining 33 ft. Three concrete caps were then poured at the surface, each connecting a line of rods.

An anchor plate was placed over the protruding ends of the Stressrods and a Howlett Grip Nut attached. A hydraulic jack was secured to the rod and tension applied.

The jacks stretched the steel rods inside the tubing and the nut was tightened. This, in effect, put a stress on the entire slope area, holding the loose dirt under compression and providing a firm foundation for bridge columns.

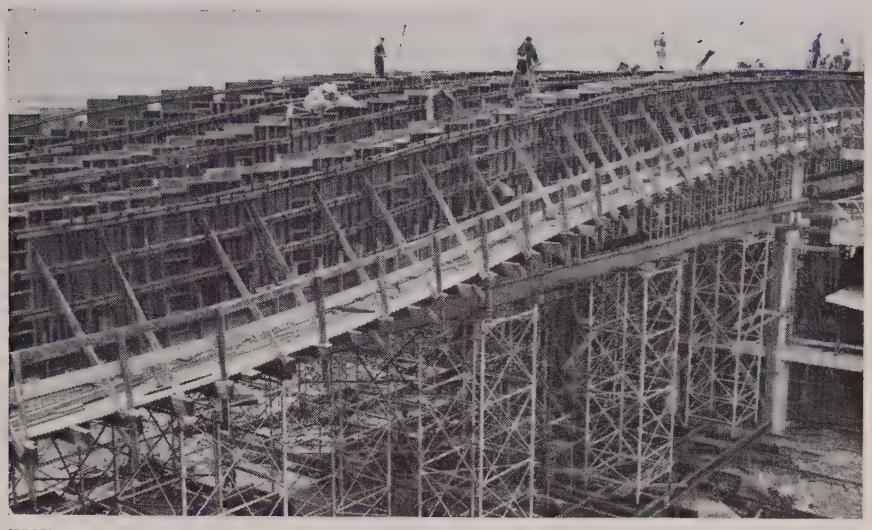
Gripnuts are constructed of an outer casing and inner sleeve, which screw together with large modified buttress threads. The sleeve is slotted to give flexibility and permit its diameter to be reduced. As movement is created when tension is applied to the Stressrod, small teeth on the inside of the sleeve grip the rod and the sleeve is moved forward. As the sleeve moves, its diameter is decreased by the taper of the buttress threads, forcing the small teeth to become firmly imbedded in the surface of the Stressrod. The result is a positive connection between the two units.

Nut and threaded sleeve form coupling which holds steel rod under tension.

Shoring Methods

for concrete construction

. . . by Patent Scaffolding CO.



EXTRA HEAVY DUTY SHORING Rolls to Pours—Mounted on a traveller, each Extra Heavy Duty Shoring set-up supports two of 16 clear-span concrete girders from 7′8″ to 8′8″ deep, 2′ to 2′10″ wide, and 125′ long, at Eastern Airlines Terminal Bldg., Idlewild Airport, N.Y. Gilbane Building Co., gen. contr., pours a pair of girders, lowers shoring and rolls it to new positions.

STANDARD SHORING Meets Most Job Needs—Standard "Trouble Saver" Shoring 5′-wide frames are assembled rapidly to provide safe, ample support for pan construction of the Atomics International Project, Canoga Park, Calif. Shoring supports 30″ x 30″ x 14″ domes with 4½″ slab. C. L. Peck Construction and Realty Co., general contractor.

NEW HEAVY DUTY SHORING Supports Bridge—Safe support for the heavy loads imposed by this concrete overpass in San Jose, Calif., is provided by new PS Co. 4′-wide Heavy Duty Shoring frames, tested under simulated field conditions to safely support loads up to 10,000 lbs. on each leg. General contractor, Oscar C. Holmes.

STANDARD FRAMES SHORE HYPERBOLIC PARABOLOID STRUCTURE—

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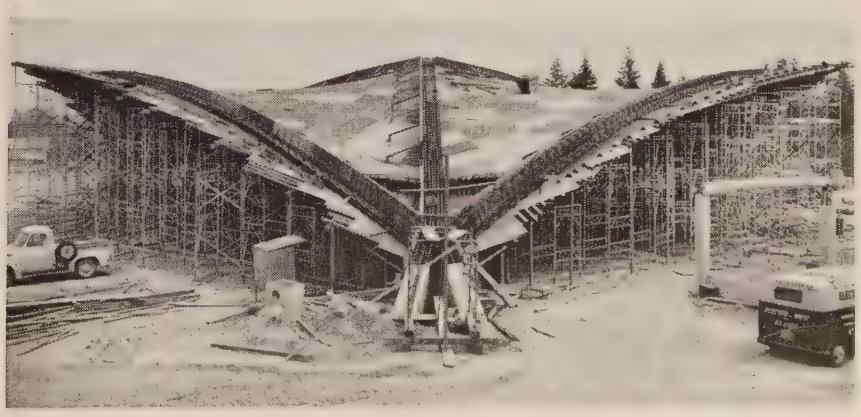

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Inspection program reduces tire cost at Chavez Ravine

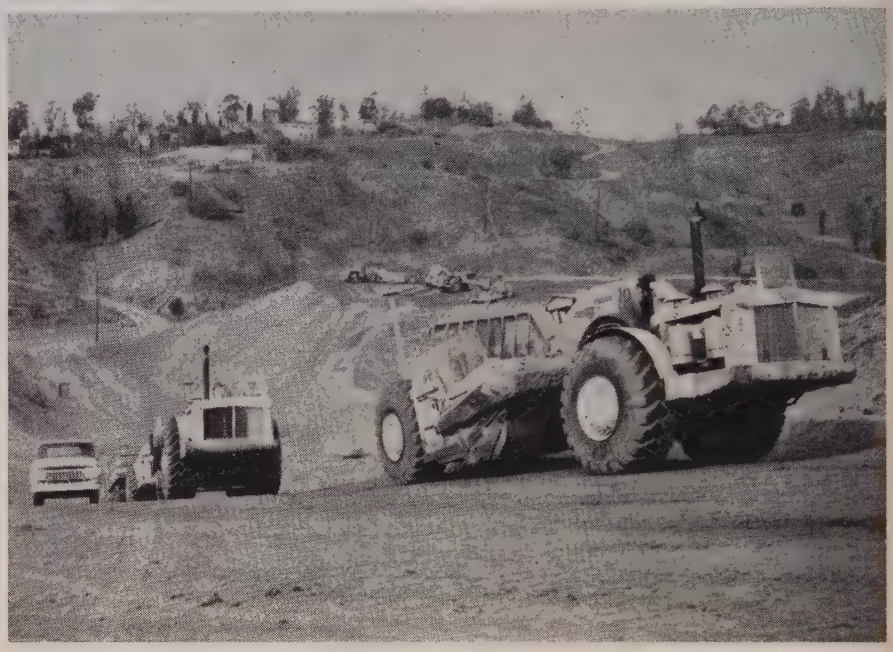
A SIMPLE hand-lettered sign in the field office of Vinnell Construction Co., Alhambra, Calif., contractor, is typical of the precautions taken to prolong tire life at Chavez Ravine, construction site of the multimillion dollar baseball stadium for the Los Angeles Dodgers.

The sign, posted under a six-inch, U-shaped piece of reinforcement rod, reads: "Expensive steel . . . when imbedded in a scraper tire!" It goes on to say the steel was responsible for 3½ hours down-time and a $515 loss.

This sign and the steel it represents have been a cause of concern for both Jack Yount, vice president of Vinnell, and Harvey Ryckman, sales representative for Helmick's Firestone store in Los Angeles. The steel, removed from a 33.5-33 tire, came from an old 5,000,000-cu. yd. fill area that contains debris from dozens of earlier construction jobs.

The fill is located in the heart of a big cut and what eventually is to be the Los Angeles Dodgers' baseball stadium. In the area are huge chunks of concrete with reinforcement rod imbedded, large pieces of iron pipe and a large assortment of other tire damaging objects.

A concentrated maintenance and operator training program was the answer at Chavez Ravine. Operators were alerted and constantly reminded of the dangers of the tire



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V4

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damaging steel. Tire maintenance schedules were altered to increase the frequency of tire inspections.

Vinnell constructors' contract covered moving 2,000,000 cu. yd. of dirt in the Chavez Ravine area. Earth-moving equipment required for the job included thirteen TS-24's, eight D-9's, nineteen D-8's, four TD-14 Euc scrapers, three C-80 Cats, six rollers, one 75-ton pneumatic compactor and one motor patrol.

Art Bartole, master mechanic for Vinnell, and Ryckman and his serviceman, Bill Loveland, devised the tire maintenance program.

Twice a week pressure inspections were made by Ryckman's crew to detect leakers and "rim flats." These checks were made at 3 a.m. to assure "cold" readings. Ryckman was on the job at Chavez two or three times a week to check for cuts and other damages.

"Sometimes a small cut can be stopped from spreading by inserting self-curing rubber," Ryckman said. "By plugging the hole, we prevent dirt, moisture and other debris from accumulating in the cut and causing separation. If the cut is too bad, however, we recommend the tire be pulled and a section repair made."

Ryckman pointed out that complete records were maintained on each tire.

Operator program included checking tire pressure each day before cranking up the equipment, and inspection of tires for uneven wear and damage from rocks.

"All of these checks can be made in a matter of a few minutes," Ryckman said. "A tire that has been run soft or flat often is damaged to the extent that it cannot be retreaded. It's economically sound to enforce tire maintenance practices."

In-operation checks also are recommended. Service records reflect which operators are giving proper attention to their tires.

Operators should be cautioned against spinning or squirming the drive wheels. Haul road obstacles such as sharp rocks should be avoided.

Correct tire selection is essential. To determine this, technicians recommend that rigs be weighed empty and loaded. This is necessary because of the differences in material weights. A cubic yard of magnetite ore, for example, weighs 6,000 lb. compared to 2,700 lb. for dry sand.

Three conclusions can be reached by accurate weighing of equipment.

Re-power your service-worn WISCONSIN ENGINES with

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factory parts

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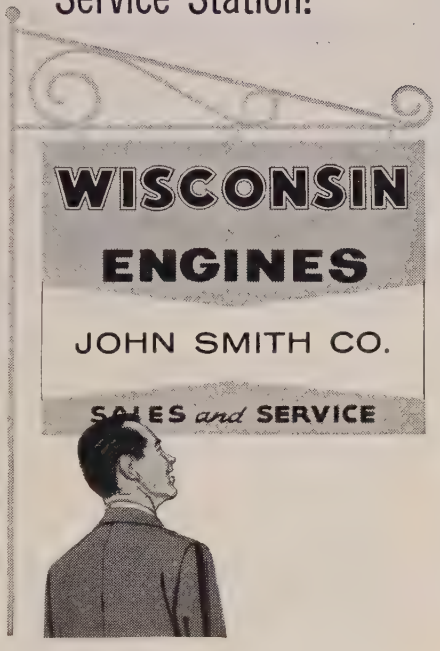

Because all Wisconsin Engines are built to highest quality standards and exacting engineering specifications, it pays to use only factory-approved parts. Wisconsin factory parts now include the new TRI-CROME™ re-ring sets — factory-engineered and built to Wisconsin Engine specifications. Rings are made to exact psi requirements. They are pre-seated to provide light-tight fit for full compression and oil control along the entire piston travel. Full-chrome plating protects rings and cylinder walls by resisting scuffing, abrasion, and scoring — extends ring and engine life. What's more, you get *three* full-chrome rings for the price of competitive sets with only *one* or *two!*

TRICROME re-ring sets are attractively packaged for quick identification on the shelf — and on-the-job servicing.

All Wisconsin factory-engineered parts are built to original Wisconsin Engine specifications and quality. Connecting rods; crankshafts; pistons; valves; governor, fuel-pump, and other parts—even gaskets—are precision-tailored for specific engines. The result: *like-new* power that keeps your Wisconsin-powered equipment at peak efficiency.

You save time and cost because Wisconsin parts for all models are quickly and conveniently available from Authorized Wisconsin Service Stations *directly* — or supplied by these Service Stations to independent repair shops and original equipment dealers everywhere.

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MILWAUKEE 46, WISCONSIN
World's Largest Builders of Heavy-Duty Air-Cooled Engines

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Portable Lima Austin-Western 101-SE crushing plant spews pit-run stone and gravel into mobile surge bin.

Lima A-W Portable Crushers deliver

RELIABLE HIGH OUTPUT!

Designed and built for high output under *rugged* operating conditions, this portable Lima Austin-Western crushing plant is *ready* to pick up and go on a moment's notice. It belongs to the Williams Brothers Asphalt Paving Company, Ionia, Mich.

Reduced tonnage costs

They say, "It's a reliable high-output mobile rig that's been doing a very dependable job for us in widely separated locations throughout southern Michigan.

"It's not a complicated piece of equipment. Only minimum maintenance has been required. It's easy to adjust to meet a wide range of rigid specifications in pit or quarry work. We find that the outfit's one man, central control also helps us reduce costs per ton."

The 101-SE is a completely portable, self-contained unit designed and built for rapid transport from job to job. High-speed production of construction materials near the job greatly reduces hauling time and costs.

Maintenance reduced

Diesel power operates crushers and electric generator; all other operations are electric. Simplicity of transmission eliminates troublesome clutches, chains, sprockets and gearboxes . . . reduces maintenance, increases tonnage profits.

There's a portable or stationary Lima Austin-Western crushing and screening plant just right for your needs. Investigate—see your nearby Lima distributor, or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

Stationary installation—Lima A-W line includes jaw and roll crushers, matching screens, elevators, conveyors and bins.

Edward R. Bacon Company, San Francisco, California; **Columbia Equipment Company,** Portland, Oregon, Seattle, Washington, Spokane, Washington; **N. C. Ribble Company,** Albuquerque, New Mexico; **Western Machinery Company,** Salt Lake City, Utah, Idaho Falls, Idaho, San Francisco, California; **Keremi Tractor & Equipment Company,** Cheyenne, Wyoming, Casper, Wyoming; **A. H. Cox & Company,** Seattle 4, Washington; **Inland Diesel & Machinery Co.,** Spokane, Washington; **Engineering Sales Service, Inc.,** Boise, Idaho; **Macdonald Equipment Company,** Denver, Colorado; **Graid Equipment Company,** Reno, Nevada; **Western Machinery Company,** Phoenix, Arizona, Tucson, Arizona; **Seitz Machinery Company, Inc.,** Billings, Montana, Great Falls, Montana; **Smith Booth Usher, Company,** Los Angeles 54, California

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6016

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They are tire size, ply rating, and air pressure.

Pressure is an important factor in tire performance and tire life. Flotation and traction, for example, can be increased significantly by varying—within limits—the air pressure. The speed, length of haul and road conditions also must be considered.

Bleeding (reducing pressure build-up caused by heat) is forbidden. It is pointed out that a 15-lb. increase in pressure is not abnormal. If pressure build-up exceeds 15 lb., it normally is a sign of overload, excessive speed, under-inflation or a lengthy haul.

Firestone recommends that speeds be held to 30 mi. an hour for short hauls up to 1 mi. and proportionately slower speeds for longer hauls.

The percentage of service which a contractor receives from a tire as compared to that which the tire would deliver under optimum conditions varies with the operator.

Both Yount and Ryckman are convinced that a strong maintenance program is responsible for keeping tire costs down at Chavez Ravine. They agree, too, that both the supplier and user must take an active interest in the tire program if it is to be successful.

Concrete trucks cross soft ground on flotation tires

CONCRETE mixer trucks remounted with flotation tires are able to operate without breakdowns or stalling in blow sand areas of New Mexico and Arizona where they formerly had to be winched to the jobsite.

Delivery time on a 5-yd. load has been cut from as much as 3 hours to 30 minutes, after converting to flotation tires made by Harmco Tire & Rubber Corp. The Harmco flotation tire sizes were

18.50x20 rear and 15.40x20 front, replacing 10.00x20 originals. Carrying capacities of the flotation tire replacements were 16,000 lb. rear and 10,000 lb. front, on operating pressures of 40 and 35 lb., respectively.

The flotation tire, tube and rim assemblies were mounted directly on original mixer truck hubs. No other conversion was necessary.

Flotation tires have extra wide tread, flexible side walls and low operating pressures. Tire spreads out under load to literally float heavy equipment over difficult terrains. Flotation treads are smooth contour and do not tear up soft pavements.

Tunnel work to start on B. C. hydro project

WHILE negotiations drag along between the United States and Canada on resolving the problem of further developments on the Columbia River, work is scheduled to start on the Peace River project. Located entirely in Canada, this river development plan does not include complications resulting from failure to resolve the International problems.

Active construction on the Peace River program will be the driving of a pilot tunnel about 3,000 ft. long which will be a preliminary to boring the three diversion tunnels. If present plans continue without interruption, the pilot bore will be completed next spring and the diversion tunnels, estimated to cost $20,000,000, will be finished two years later. This would permit work to start on the dam in 1962.

The project is located at Portage Mountain in the Peace River Canyon. The structure as planned would be a rock and earth fill about 600 ft. high. Initial cost of the overall project is estimated at $350,000,000 and the development will provide about 1,000,000 hp. of hydroelectric energy.

The Columbia River controversy revolves around the credit which would go to Canada for power developed on the lower Columbia River based on water stored in Canadian reservoirs. Basically, Canada is asking a share of the power developed when this stored water goes through plants in the United States, together with an appropriate share of benefits from flood control.

Diesel-powered Lima Type 44 Dragline speeds sand and gravel loading operations at crusher plant site in southern Michigan.

Got more machine for his money...

EXCAVATOR "LOVES" LIMAS!

"That's right, we love 'em," says general excavating contractor, J. V. Burkett of St. Joseph, Michigan.

Mr. Burkett, who owns two Lima Type 44 draglines adds, "Limas are exceptionally good pieces of equipment. They're giving us excellent service. It was obvious to me when I first looked at Limas—they were heavier built than competitive makes. Consequently, Limas turn out more work yet require considerably less maintenance. I'm convinced we got more for our money when we bought Limas!"

The 44 is one of the most popular type Limas made. It features design simplicity, operational economy, and low upkeep. It has 1-yd. shovel and 25-ton crane capacities; front ends are easy to change. Choice of power; crawler, truck or wagon mounted.

See for yourself the ease and speed of Limas at work. Contact your local distributor or write us today — there's a Lima type and size sure to add extra profit to your job because of the many quality features contributing to its high performance and low maintenance requirements. Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

There's a Lima type and size for every job—crawler mounted cranes to 140 tons, 75 tons on rubber; shovels, ½ to 8 yd.; draglines variable.

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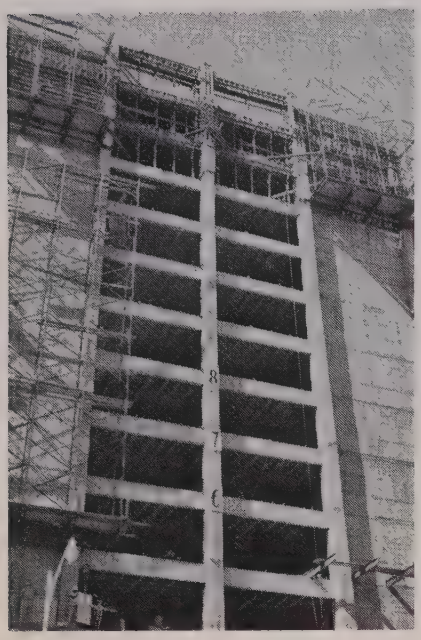


Construction by numbers

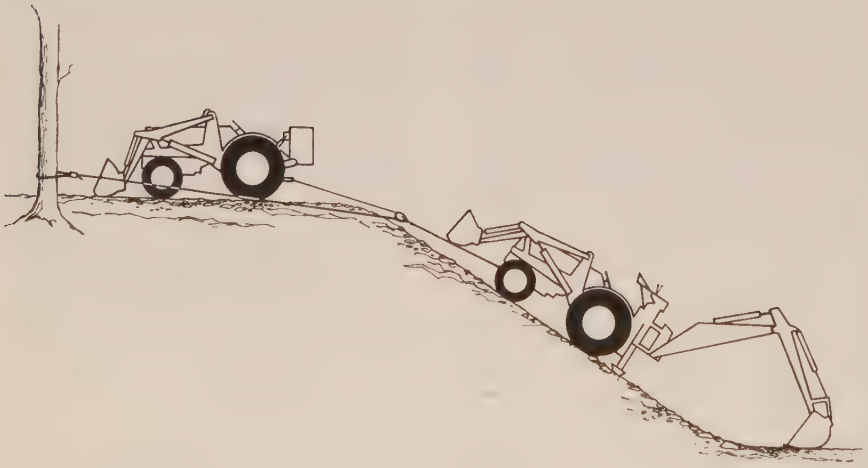
NOT ONE to thwart progress, Donn Smith, vice-president of the Arizona Land Corp., Phoenix, Arizona, must have nevertheless ground his teeth in a little professional jealousy as he looked across busy North Central Avenue in Phoenix, from the construction site of his one-story, 14-ft.-high main home office building, at the new 20-story Guaranty Trust Bank Building, highest building in Arizona, rising into the sky. He noticed the huge signs hung up at the various levels by the workmen (photo at left) which indicate the number of full floors poured and the big strides of progress being made.

A man of good humor, Mr. Smith determined to match the Davey Murdock's skyscraper with his own markings. Instead of the huge signs indicating the number of levels, Smith's sign showed progress on his one-story building in feet and caused a lot of laughs.

The Guaranty Trust Bank Building will cost $3½ million and the Arizona Land Corporation's new home office cost $35,000.

"They may outstrip us with the 20-story building across the street," Donn Smith says, "But that shadow they will throw over us during hot Arizona summer months, will compensate for it and be perfect."

Backhoe doubles as yo-yo



SUSPENDING his backhoe from a second that was anchored to a tree, a Dallas contractor, I. C. Little, executed an unusual trenching maneuver. Little was laying 20-in. sewer main in suburban Dallas. Plans called for him to excavate 30 ft. down the side slopes of a steep ravine and under the bed of a running creek. He solved the tricky crossing by lowering his Case 310B Backhoe-Loader on a cable. Another Case 310B with end-loader served as the anchoring and controlling tractor.

The shallower side-hill trench was cut from positions on the slope, with spoil cast into the creek to dam it. Then with this rig lowered to the water-line, the operator dug the required 12-ft. deep trench across the creek.

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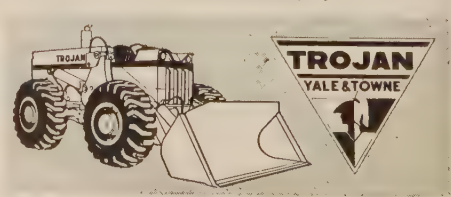

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MASTER MECHANIC®

Flammable liquid handling studied by L. A. EMSA

EMSA'S LOS ANGELES chapter, following reports of a crackdown on heavy construction and equipment firms by Los Angeles City and County Fire Departments, turned the January meeting over to County fire officials for explanation of codes pertaining to handling and transportation of flammable liquids.

Los Angeles

"There is no crackdown," explained Capt. R. R. Balantine of the L. A. County Fire Department. "We have issued warnings to some firms, but no citations. There have been no code changes since the present code became effective in 1958."

Capt. Balantine, assisted by Fire Department Inspector Don Johnson, presented a short film entitled "Flammable Liquid Fire Safety," then turned the meeting over to questions of the nearly 70 members present.

Balantine prefaced the question and answer session with the observation that with minor exceptions the L. A. County code is the same as those found through 90% of the Western states and that in all instances "flammable" liquids refer to liquids with a flash point of 200° or less.

Some of the questions and answers:

Q. Can gasoline be carried in drums in the back of a pickup truck?

A. Yes, but drums must be tightly sealed and secured so they cannot move around under normal travel conditions. If you're carrying more than 100 gallons of flammable liquids in addition to the vehicle's operating fuel, you must obtain a permit from the Fire Department.

Q. Are jeep cans and G.I. cans all right for storage in carrying gasoline?

A. No, not unless they have the self-sealing spring-type lid.

Q. Do small containers and drums of flammable liquids have to be specially marked?

A. No.

Q. Are the large surplus government fuel carriers suitable for use as-is?

A. Only for water. Extensive modifications, particularly in vending, must be made before they meet federal, state and local codes.

Q. How should we transfer flammable fuel from drums to equipment?

A. Pump it or pour it from the spout, but do not force it out with air pressure under any circumstances. This is both dangerous and against the code. Do not transfer flammables within ten feet of any building opening.

Q. Are automatic nozzles on pumps okay?

A. Those that have been approved by the Fire Department are all right. At present, there are four automatic nozzles on our approved list.

Q. Should our trucks carry fire extinguishers when we're using them to transport fuel?

A. If it is a flammable fuel, you must carry a fire extinguisher comparable to a 5-lb. dry chemical unit if the fuel does not exceed 2,500 gallons and is in a single compartmented tank. If it is over 2,500 gallons and/or in a compartmented tank, you must carry an extinguisher comparable to a 10-lb. dry chemical unit.

Q. What about use of elevated gasoline storage tanks on a construction job?

A. We usually permit this, but we must be fully informed about your planned arrangement. We want to see such above-the-ground tanks equipped with properly functioning spouts, like to see the tank over loose dirt and soil that will quickly absorb spilled liquid, want to see it protected from meddlers and ask that guards be erected around it to protect the installation from damage by truck and equipment drivers.

FIRE CODE is discussed by Ralph Currier, second vice-president of Los Angeles EMSA, left, and Capt. R. R. Balantine and Inspector Don Johnson, Los Angeles County Fire Dept.

Mechanic School tour announced

A TENTATIVE schedule for mechanic training courses on diesel engine maintenance to be held throughout the Western region has been released by Detroit Diesel Engine Division of General Motors.

These classes are staged by a mobile training group which provides instructors, teaching aids and test equipment for courses sponsored through local distributors. The traveling school offers several different one- and two-day courses for users and dealer service men during each stop.

Among the courses listed are 71, V-71, and 110 series engines; 53 series converters and governors, industrial accessories and engine tuneup. The courses are free, but advance registration is required due to limited space and facilities. Anyone interested in attending any of these schools is urged to contact the local sponsoring distributor for school reservations and information on the exact date each course is scheduled.

April 4-28, Denver, sponsored by Dobbs GM Diesel, Inc., 5840 Colorado Blvd., Denver 16. Classes will be held at GM Training Center, 2170 S. Dahlia, Denver.

May 3-27, Albuquerque, N. M., sponsored by Southwest Engine Co., Inc., 1716 Second St., N. W. (P. O. Box 1569), Albuquerque.

June 1-16, Salt Lake City, sponsored by Abbott GM Diesel, Inc., 54 W. Seventh South St., Salt Lake City.

June 20-30, Reno, Nev., sponsored by Sierra GM Diesel, Inc., 307 Morrill Ave., Reno.

School will be closed during July and August.

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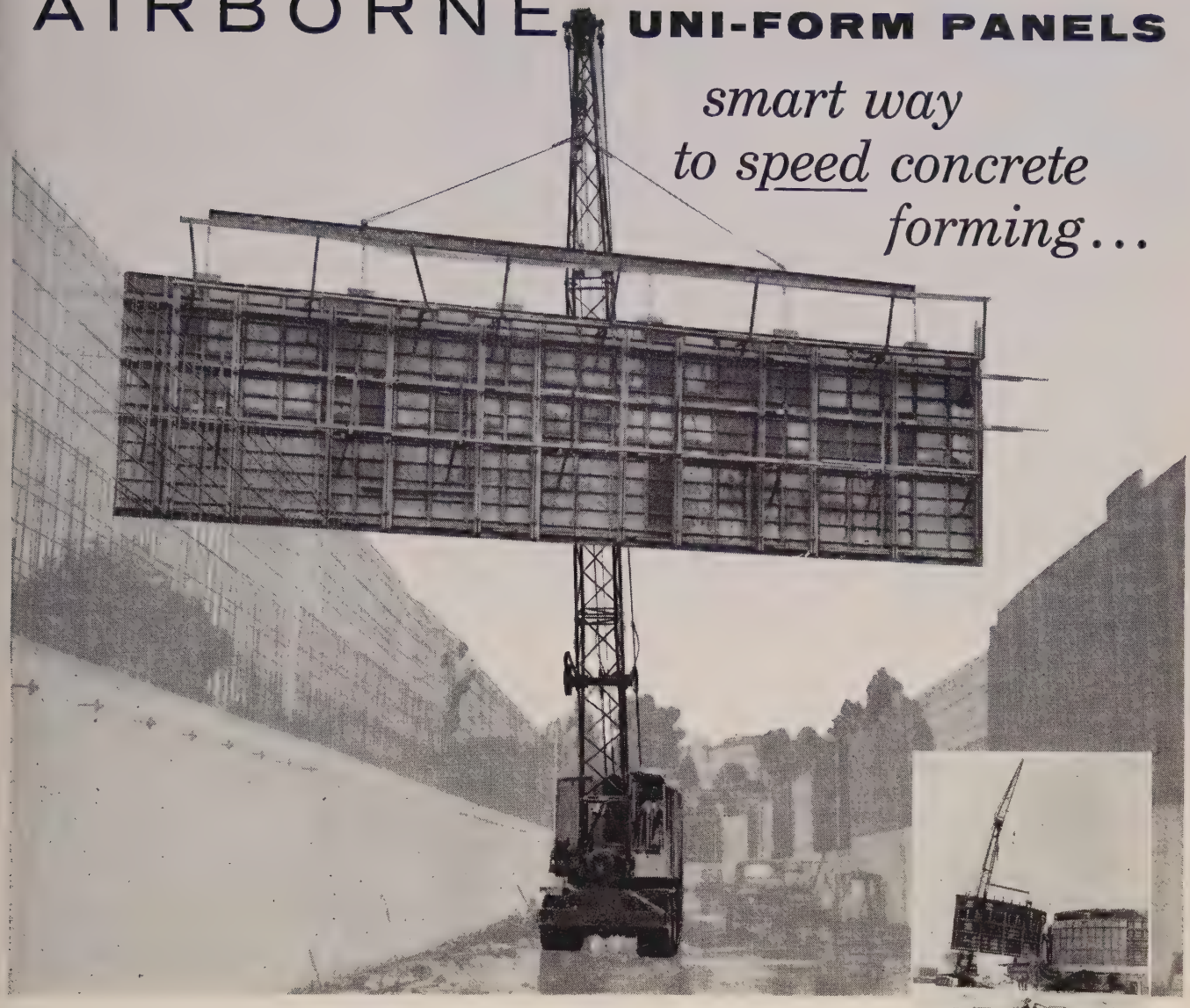
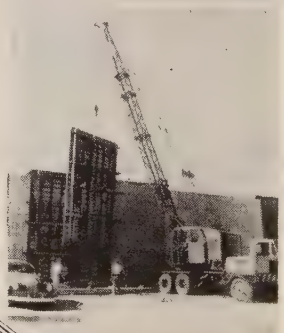
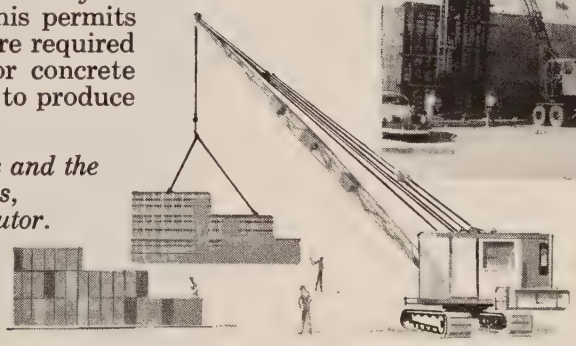


Forming speed and economy can be greatly increased by crane handling big monoliths of UNI-FORM Panels. Contractors with repetitive section forming requirements are finding that the design of UNI-FORM Panel monoliths—in which metal filler angles are used between each panel—give them greater versatility and wider application. For example . . . tie rods of any size from ½" to 1" may be used to tie two monoliths into a wall form. This permits using the right tie size for the job. Fewer ties are required and sections can be placed, tied and ready for concrete faster. Panels may be added or removed at will to produce any monolith required.

For complete information on UNI-FORM Panels and the UNI-FORM System in crane handling operations, write today, or ask your nearby Universal Distributor.





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Best manuals on crushers & screens

A quick run-down of literature available free from the manufacturers of crushing and screening equipment. For your copies, simply write in the appropriate numbers on the Readers' Service Card.

Iowa

A handy storehouse of useful information is the "Cedarapids Reference Book" published by the **Iowa Manufacturing Co.** The manual has 42 pages of charts, graphs, and tables of valuable information which simplify calculations which must be made in the crushing and screening field. For example, there are tables showing the percentage of each size in the product of each crusher, the capacities of crushers and the horsepower required with various sizes of openings, the physical properties of American rocks, conversion factors. There are 30 tables showing how the capacities of standard conveyors vary with such factors as horsepower, belt speed, belt widths, and sizes of head shaft, head pulley, tail shaft, tail pulley, etc. One valuable table gives the size and weight restrictions for every state in the Union. The last six pages carry an explanation of aggregate and bitumens terms. This is a manual you will consult often. . . . ***Write No. 157***

Another interesting piece of literature published by this company is a 20-page magazine called "In the Aggregate," which contains short articles and news items of interest to users of crushing and screening equipment. Each issue contains a list of the dozens of brochures the company publishes covering its large line of construction equipment. To be placed on the mailing list, . . . ***Write No. 158***

Universal

In addition to a large number of folders and brochures on each piece of equipment it manufactures, the **Universal Engineering Corp.**, a subsidiary of Pettibone-Mulliken Corp., publishes a brochure which describes the major machines in its line of crushing, screening, washing, loading, and conveying equipment. The 20-page two-color handbook gives a photograph and specifications for each piece of equipment. Accompanying text points out the main features. Included in the handbook are descriptions of a rig which combines in a single machine the functions of feeding and scalping and which can handle sticky material without blanking. Also described is the Twindual which in a single unit uses two roll crushers in combination with a jaw crusher to give three stages of reduction in a compact, high capacity, portable gravel plant. . . . ***Write No. 159***

Pioneer

An 8-page brochure is now available from **Pioneer Engineering,** Division of Poor & Co., which describes its large line of crushing and screening equipment. Covered in the brochure are bottom deck feed plants, in-line gravel plants, portable combination quarry plants, stationary quarry plants, washing plants, feeders, jaw crushers, twin and triple roller crushers, impact breakers, stacking conveyors, and vibrating screens. The purpose and chief features of each piece of equipment are given as well as a condensed table of specifications. Free literature and information is available on each machine discussed. . . . ***Write No. 160***

Telsmith

The full line of Telsmith equipment is described in a 30-page bulletin published by **Smith Engineering Works.** Described are crushers (including jaw, gyratory, gyrosphere, intercone, and roll types), heavy duty scalpers, pulsators, vibrating screens, scrubbers, fans, classifiers, feeders, conveyors, and portable gravel plants. A full page is devoted to each type of equipment with descriptive text, photographs, and a table of thorough specifications. A feature of the manual is a rip-out questionnaire for contractors who wish advice on their particular gravel pit problem. . . . ***Write No. 160A***

For a copy of a 128-page reference book entitled "Aggregate Producers Handbook,". . . ***Write No. 161***

For a slide rule which gives answers to problems concerning capacity and screen analysis of products from crushers,. . . ***Write No. 162***

Symons

Symons cone crushers are described in a 24-page, 3-color brochure published by **Nordberg Manufacturing Co.** The handbook is well illustrated with job photographs, line drawings, and labeled cutaway drawings which thoroughly explain the operating features of the equipment. The advantages and characteristics of Symons cone crushers are described in detail. Tables of specifications give dimensions, horsepower requirements, operating speeds, and weights. The last page of the brochure contains brief descriptions of grizzlies and screens made by Symons. Included is a tear-out inquiry sheet which will enable the company to assist the user in the selection of the proper screen or crusher. . . . ***Write No. 163***

El-Jay

"Screening at its Best" is the title of a 20-page booklet published by the **El-Jay Manufacturing Co.** Photographs and large labeled drawings along with descriptive text thoroughly describe the features of the company's line of aggregate screening equipment. One section explains how a circular curve vibrating motion is maintained uniformly over the entire screening area, which tends to eliminate blinding. . . . ***Write No. 164***

Allis-Chalmers

A group of manuals covering a line of vibrating screens is available from **Allis-Chalmers.** They are colorful manuals making extensive use of drawings, photographs, and labeled cutaways to completely describe the operating features of the equipment. Technical data is contained in tables of condensed specifications. The problem of how to select a proper vibrating screen is discussed step by step with the use of an illus-

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Victor Ni-Manganese for Build-up is 4½% nickel, 13% manganese alloy, specifically developed for rebuilding manganese steel parts such as bucket teeth and lips; rail frogs and switches; crusher, dredge, pulverizer components. May be used as finish build-up or underbase; forms sound, slag-free welds; high deposition rate and good weldability. Deposits are austenitic with full Hadfield steel properties; non-magnetic, tough and ductile; stands roughest abuse. Made in 5/32″, 3/16″ and 1/4″ diameters; bare, for manual application by DC, reverse polarity.

Victor Ni-Manganese for Attachment welds crack-free, is specially recommended for difficult joining applications on manganese or carbon steel castings, such as: Dipper teeth and lips; track and drive sprockets; dragline pins and links; rail crossovers, switches and frogs; rolling mill parts; crusher screens, hammers, rolls and mantles; dredge parts. Deposited metal is extremely tough, wears well, has high impact strength. It's a wonderful, low-cost substitute for "stainless" where joining rather than corrosion resistance is chief factor. Made in 1/8″, 5/32″, 3/16″ and 1/4″ diameters for manual application by AC or DC, reverse polarity.

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New Jay Tampers cut compaction costs

Now you can tamp harder, faster, better on all soils and blacktop. Also handle, maintain and transport easier. All 3 Jay models have stepped-up power, new plate contours, new handle, improved air cleaner and mounting, and transportation unit *(right)*. Years ahead of other tamping machines or methods, reduce compaction costs as much as 95%. See your Jay dealer for free demonstration or send for new Catalog J-O. Jay Division, J. Leukart Machine Co., Inc., 2222 S. 3rd St., Columbus 7, O.

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California—Rix Company, San Francisco; Construction Machinery Co., San Diego; Orange County Equipment, Santa Ana; Waco Scaffolding Co., Stockton; W & K Equipment Co., San Bernardino; Rix Central Equipment Co., Berkeley and Sacramento

Nevada—Sierra Industrial Co., Reno

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young IRON WORKS

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trative example. Also described is the Sta-Kleen system to eliminate blinding which involves the action of bouncing balls to clear the screen cloth. . . . ***Write No. 165***

Diamond

The aggregate crushing and handling equipment manufactured by **Diamond Iron Works,** Division of Goodman Manufacturing Co., is described in the company's 6-page handbook. It features photographs and descriptions of crushing plants (single path, quarry, and rotor lift) crushing units (jaw, roll or hammermills), and the material handling unit (conveyors, screens and washers, feeders, bins, and hoppers). The handbook covers only the main features of each piece of equipment and refers the reader to other catalogs available from the company which go into all the details. . . . ***Write No. 166***

Barber-Greene

A portable conveyor with a screen at the discharge end is described in a manual published by **Barber-Greene.** The rig requires no disassembly whatever for towing from job to job. The entire set-up including vibrating screen, portable belt conveyor, reciprocating feeder and hopper is towed as a single unit. The screen is merely folded under the conveyor for traveling. Large photographs and labeled drawings fully describe the unit. A detailed operation and service manual is also available on this equipment. . . . ***Write No. 167***

Kolman

A group of folders is now available describing the screening equipment made by **Kolman Manufacturing Co.** Fully described are the company's plate feeders, loading traps, feeder trap combination, trap wing walls, conveyors, and single and multiple deck vibrating screens. . . . ***Write No. 168***

Joy

The Joy-Hazemag impact crushers are described in 4-page folder published by **Joy Manufacturing Co.** In this machine feed is caught by blow bars mounted on a rotor and thrown with great force against impact plates. The folder fully describes the advantages and features with photographs, line drawings, and a table of specifications and dimensions. . . . ***Write No. 169***

Eagle

A complete line of crushing equipment is described in a brochure published by the **Eagle Crusher Co., Inc.** The equipment is described with line drawings, cutaway drawings, and job photographs, along with tables of specifications. Described are jaw crushers, hammermills, impact breakers, pulverizers, four-cage disintegrating mills, single cage disintegrating mills, roll crushers, complete crushing plants, portable crushing plants, apron feeders, vibrating screens, and truck-mounted motors.

. . . Write No. 170

Overstrom

"How To Select the Right Vibrating Screen" is the title of an 8-page brochure published by **Overstrom & Sons, Inc.** Four charts, covering basic capacity, half size, over-size, and bed depth correction factor are used in conjunction with a formula. Solution of the formula is illustrated with a sample calculation. The brochure also includes photographs, engineering drawings, and tables of specifications describing Overstrom screens. Also described are such optional features as ball decks to prevent blinding, grizzly bars, electric heat for damp material, step decks, water sprays and dust enclosures.

. . . Write No. 171

Wescon

Literature is available from **Western Conveyor Co.** (Boise, Idaho) describing a screen tower for 5 x 14 ft., two or three decks screens. The Wescon tower is a mobile unit and only minor modifications are needed to adapt it to any make of two or three deck screens. It can be equipped with optional rock box at the feed, side discharging chutes at discharge, and a splitter in the collecting hopper to allow collection of two sizes of material from the bottom deck.

. . . Write No. 172

Stephens-Adamson

Crushers and vibrating screens are described in two brochures published by **Stephens-Adamson Mfg. Co.** Photographs, drawings, and tables specifications expand the operating characteristics of the equipment. A valuable section

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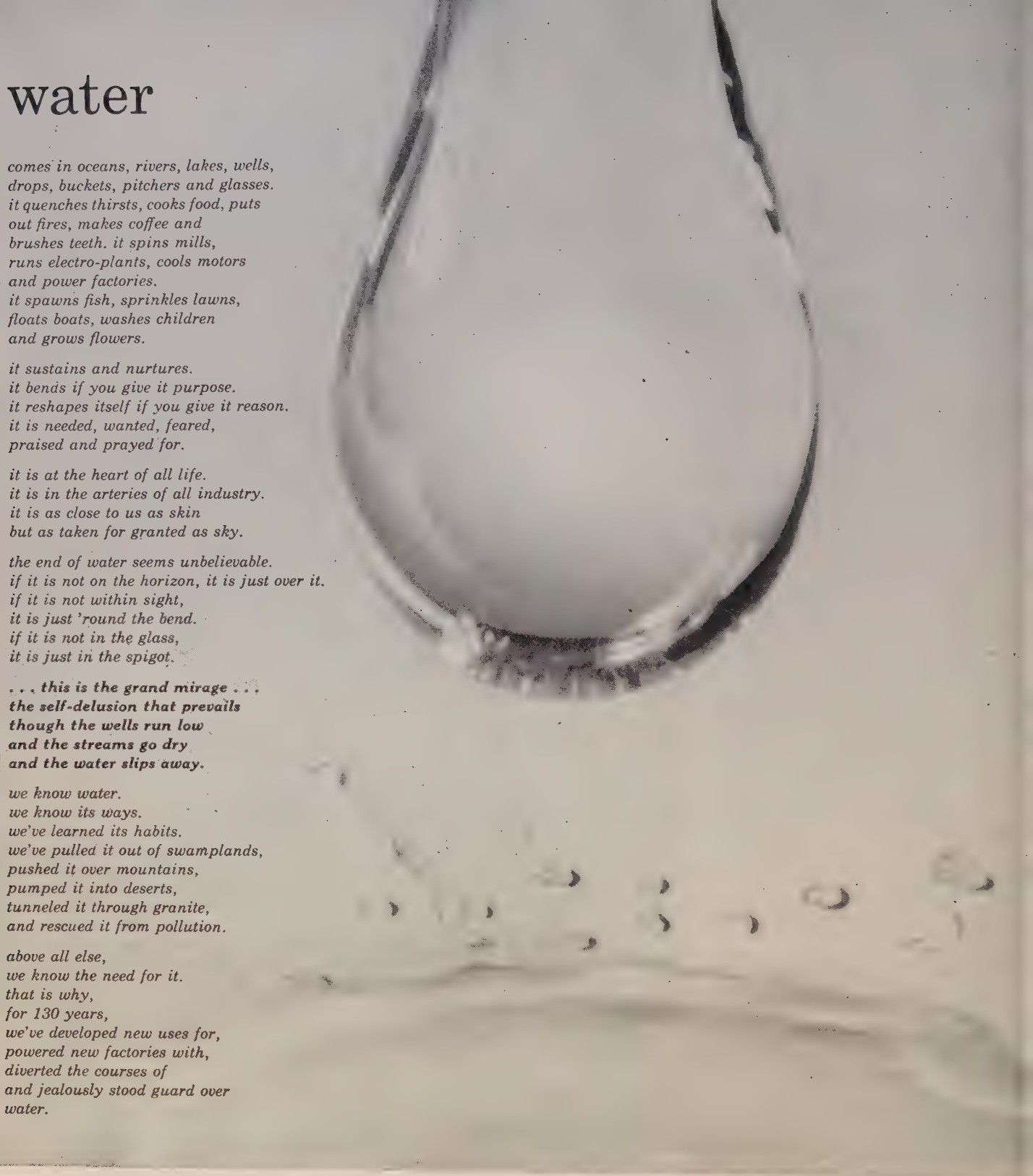
water



comes in oceans, rivers, lakes, wells,
drops, buckets, pitchers and glasses.
it quenches thirsts, cooks food, puts
out fires, makes coffee and
brushes teeth. it spins mills,
runs electro-plants, cools motors
and power factories.
it spawns fish, sprinkles lawns,
floats boats, washes children
and grows flowers.

it sustains and nurtures.
it bends if you give it purpose.
it reshapes itself if you give it reason.
it is needed, wanted, feared,
praised and prayed for.

it is at the heart of all life.
it is in the arteries of all industry.
it is as close to us as skin
but as taken for granted as sky.

the end of water seems unbelievable.
if it is not on the horizon, it is just over it.
if it is not within sight,
it is just 'round the bend.
if it is not in the glass,
it is just in the spigot.

. . . this is the grand mirage . . .
the self-delusion that prevails
though the wells run low
and the streams go dry
and the water slips away.

we know water.
we know its ways.
we've learned its habits.
we've pulled it out of swamplands,
pushed it over mountains,
pumped it into deserts,
tunneled it through granite,
and rescued it from pollution.

above all else,
we know the need for it.
that is why,
for 130 years,
we've developed new uses for,
powered new factories with,
diverted the courses of
and jealously stood guard over
water.

Fairbanks, Morse

A MAJOR INDUSTRIAL COMPONENT OF FAIRBANKS WHITNEY CORPORATION, NEW YORK

No other manufacturer makes pumps for such a variety of hydraulic applications as Fairbanks, Morse. If it's liquid . . . if it flows . . . we make the pumps that move it . . . at low cost per gallon . . . in sizes from 200 gph to 800,000 gpm, and to 3000 psi . . . for every industrial need.

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Send for our brochure—"Hydrodynamics." Please write to Mr. Robert W. Kerr, President, Fairbanks, Morse & Company, 600 South Michigan Ave., Chicago 5, Illinois.

called "Theory of Screening Practice" explains in detail 18 terms and concepts important to the field. Included are tables and formulas giving recommended speeds and travel for various openings and recommended speed rates for different types of screening.

. . . Write No. 173

Simplicity

A complete line of vibrating screens is described in a 32-page catalog published by **Simplicity Engineering Co.** Photographs and tables of specifications and dimensions are given for each of the many models of screens, scalpers, sand and gravel installations, and feeders. A table which gives screen capacities for several common materials with various sizes of screen openings is included.

. . . Write No. 174

Lima Austin-Western

A rock crusher made 75 years ago is contrasted with one of modern design on the cover of a catalog of crushing and screening equipment made by **Baldwin-Lima-Hamilton Corp.** under the trade name Lima Austin-Western. The contrast dramatically points up the progress that has been made in the field of aggregate production. The 32-page catalog is well illustrated and with the aid of photographs and tables of specifications clearly describes the company's line of jaw and roll crushers, apron and plate feeders, primary and secondary units, portable screening and washing plants, revolving and vibrating screens and complete aggregate plants.

. . . Write No. 175

Lippmann

A group of three brochures is available from **Lippman Engineering Works, Inc.,** which describes the company's line of crushers and screens. With large photographs and drawings and clearly written text the brochures take the reader step by step through all of the important features of the equipment. Tables give in great detail the dimensions of the crushers and vibrating screens. An added feature is a rip-out questionnaire which will enable the company to assist the user in designing the best aggregate set-up.

. . . Write No. 176

Screen Equipment

The line of Seco vibrating and twin bearing screens is described in two booklets published by **Screen Equipment Co., Inc.** They are well illustrated publications using photographs and drawings to thoroughly describe the advantages, operating characteristics, specifications and dimensions of the equipment. Each of the many models is illustrated and described. There is a parts list of body assemblies as well as general information to guide in the selection of the correct type of screens. Close-up photographs and drawings describe the various types of wire screen cloths which are available. Suggestions are given to assist in making suspension or rigid mountings.

. . . Write No 177

Bodinson

Bodinson Manufacturing Co., which makes most of its equipment to the customer's order, has available a group of leaflets and fliers which describe some of its screens, feeders, scrubbers, and aggregate plants. Pictured and described is one of the largest sand and gravel plants in Northern California, capable of handling 400 tons per hour which was designed, built, and erected by the company.

. . . Write No. 178

Straub

Featuring its "crushing without rubbing" principle, bulletins are available from **Straub Manufacturing Co.** describing in detail and illustrating both its jaw and gyratory crushers. All features of both types of crushers are described in detail and illustrated by cut-away views, as well as photographs from typical installations. Factual material includes a table presenting figures on capacity, power requirements, weights, size of feed openings, and speeds. Working drawings show dimensions of all sizes of both types of crushers.

Jaw Crushers—Bulletin 608
. . . Write No. 179
Gyratory Crushers—Bulletin 606
. . . Write No. 180

NEW LITERATURE

Dustless cement batcher

Complete details described in a pamphlet on a new dustless cement batcher are available from **Heltzel Steel Form and Iron Co.** Adaptable to any bulk cement plant, it features an accurate, simplified method for batching bulk cement. Completely sealed, operation is dustless and moisture-proof. An 8-page booklet is also available which gives a full description and specifications for full line of bolted type cement batching plants designed to fit virtually every cement batching and unloading application.

. . . Write No. 181

Rebuild wall charts

"How-to" wall chart by **American Manganese Steel Div., American Brake Shoe Co.,** gives step-by-step instructions for replacing tractor grouser bars. It also includes detailed ordering information for manganese or carbon steel bars covering all leading makes of tractors. A similar chart provides instruction and specifications covering two types of dipper tooth repointer and repointer bars. . . *Write No. 182*

Leakproofing nuts for pipe connections

Bulletin 6170 from **The Weatherhead Co., Fort Wayne Div.,** tells how to use Weatherhead Tef-Seal nuts for eliminating leaks on all pipe threads—dry seal or standard—for hydraulic and pneumatic systems. It includes detailed specifications, size range and easy installation instructions.

. . . Write No. 183

Plastics for water intake gates

The use of reinforced structural plastics in the Uniparr Screen Assemblies for water intake gates of steam power plants is illustrated in a 12 page brochure recently issued by **Cincinnati Testing Laboratories, Division of Studebaker-Packard Corp.** The engineering details on the specifications for these massive water gates include the flexural and tensile strengths and the high modulus of elasticity which make possible the wide variety of

← *For more details, adv. preceding pg., write No. 85 on Reader Service Postcard*

structural applications from CTL Uniparr reinforced plastics. While data is particularly related to the steam power industry, it also demonstrates the potential that structural plastics offer all industry for corrosive and abrasive applications.

. . . Write No. 184

Hoists for 60-ton loads

A complete line of hoist products for overhead handling of loads from ¼-ton through 60 tons is described in a new catalog offered by **The Harrington Co.** The 12-page brochure covers more than 20 different kinds of cranes, hoists, and specialty and accessory items in the Peerless line including photographs and line drawings to supplement the text. Products shown include hoists—hand chain, electric, and trolley types—together with lever pullers, I-beam trolleys, packaged cranes, and custom cranes including both traveling and jib varieties.

. . . Write No. 185

Model 24, 11-ton crane

Two-fold, descriptive folders designed to present important and exclusive features of the Model 24, 11-ton machine are now available from **Little Giant Crane & Shovel, Inc.** The direct power train featured in all Little Giant models is illustrated in a schematic line drawing. Action pictures are included showing machines at work on jobs across the country. The Model 24 specifications are presented and detailed engineering data is given including digging capacities, and dimensions.

. . . Write No. 186

Equipment selector

A free equipment selector for wheeling concrete is offered by **The Prime-Mover Co.** The slide rule type calculator shows the cost per yd. to place concrete for varying distances and labor rates using each of three methods: wheelbarrows, hand carts, and Prime-Movers. It also shows how much concrete can be moved by these methods depending on length of haul. Superintendents and estimators will find the selector especially useful as information is based on average job conditions.

. . . Write No 187

No-Joint concrete pipe

Various uses for No-Joint concrete pipe are discussed and illustrated in a brief folder put out by **No-Joint Concrete Pipe Co.** Advantages of the pipe for irrigation, sewers, storm drains and culverts are listed and construction of the pipe itself is described.

. . . Write No. 188

Self-propelled scraper

The subject of a 16-page brochure recently released by **Le-Tourneau-Westinghouse Co.** is the company's 28-yd., 360-hp. model B Tournapull—largest self-propelled scraper in the LW equipment line. The literature details features of the machine and discusses ease of operation, maintenance and other items which provide low-cost upkeep. Also pointed out is the fact that a 35-ton rear-dump or 30-ton crane are readily interchangeable behind the standard model B prime-mover.

. . . Write No. 189

Mountable spreaders

An 8-page catalog which lists features, specifications and user state-

HERE'S SPRAGUE & HENWOOD'S TIME & MONEY SAVER

EXAMPLE:

Have you ever found, after a concrete floor was finished that sleeves had been set in the wrong place, or that they had moved during the pouring? Have you ever found that you needed additional holes for which no sleeves had been set? If you have then you know there should be an easier way to spot and make these holes—**HERE IT IS:** Sleeves could be eliminated, and floors poured solid. Then the required holes can be spotted accurately, and drilled cleanly . . . smoothly . . . quickly and in the required diameter with Sprague & Henwood Masonry diamond bits. Re-inforced concrete presents no problem.

Other ways to save time and money are to use Sprague & Henwood Masonry diamond bits in drilling holes in glass . . . ceramic tile . . . brick . . . stone . . . concrete . . . asphaltic concrete, plus many other hard or brittle materials. Sprague & Henwood manufactures three types of Masonry diamond bits: Resettable—Throw-Away—Impregnated.

Write today for more information on how you can save money . . . save time . . . and in the final result make more money for yourself or your firm.

MASONRY DIAMOND BITS

Look for our emblem . . . It's your Seal of Quality

SPRAGUE & HENWOOD, Inc. S&H

221 WEST OLIVE STREET
SCRANTON, PENNSYLVANIA

ments on the Fox Mountable Materials Spreader is available from the **Fox River Tractor Co.** The booklet shows how the spreader may be mounted or demounted in 15 minutes; it illustrates its dash-mounted electric remote controls designed for one man operation; and describes the adjustable spread of from 8 to 40 ft., at speeds up to 40 mph. *. . . Write No. 190*

Screw conveyor and feeder booklet

A 76-page book, No. 2989, is a comprehensive study devoted to the versatile applications and selection of screw conveyors, screw feeders and components, has been released by **Link-Belt Co.** Twenty different types of screws, 14 types of troughs, 5 types of discharge openings and 2 types of feeders are illustrated. The book shows how screw conveyors are used for conveying and elevating, distributing, reclaiming, collecting, mixing, blending, agitating, aerating, heating and cooling materials. An extensive list of materials for which the conveyors may be used is also included.

. . . Write No. 191

Drilling & boring equipment

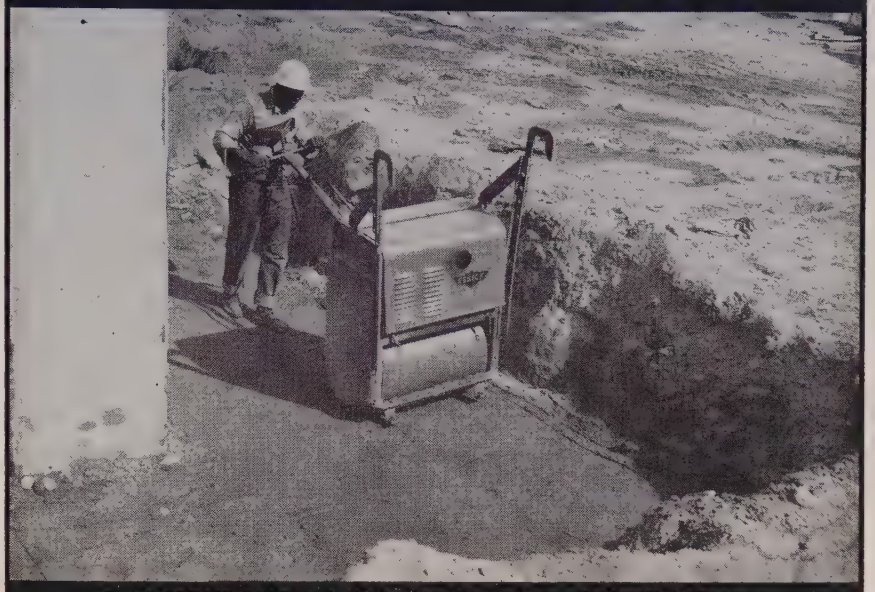
The Ka-Mo line of horizontal, vertical, and angular drilling and boring equipment is fully described in **Kwik-Mix Co.'s** new 12-page bulletin. The brochure discusses the wide variety of air, hydraulic, electric, and gasoline powered drills, and has on-the-job photos of KA-MO equipment working in clay, sand, gumbo, frozen ground, shale, limerock, etc. A reference guide to the KA-MO line showing drill size, type of cutting head, and applications plus a table of specifications for both hand feed track and power feed track units are included.

. . . Write No. 192

Colored coating for asphalt

A new colored coating which protects and improves the appearance of asphalt pavements known as Vynatex 23 is the subject of Bulletin L-1828A from **Maintenance, Inc.** Vynatex is available in a variety of colors; a comprehensive "color reaction" chart shows how different colors create psychologi-

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

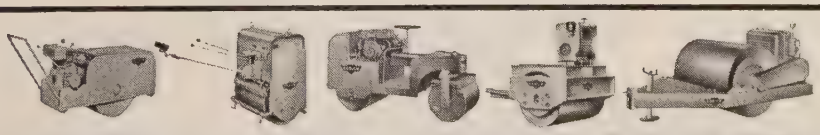
Charlie Brown of the Chas. T. Brown Construction Company states: "We were working on the Golden State Freeway in Los Angeles, compacting backfill around bridge abutments and drainage pipes. At the start of the job, compaction costs were running about $1,300 per month per compaction unit which consisted 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 ½ to 14 Tons

ESSICK MANUFACTURING COMPANY

1950 SANTA FE AVENUE
LOS ANGELES 21, CALIFORNIA

850 WOODRUFF LANE
ELIZABETH, NEW JERSEY

Affiliated with THE T. L. SMITH CO., Milwaukee, Wisconsin

. . . for more details, write No. 87 on Reader Service Postcard

cal responses, and it can be used for indoor and outdoor applications. Recommended are entrances, walks, parking lanes, restricted and safety zones, playgrounds, industrial areas, airport areas and others. Light reflection and absorption charts are included with explanations of how Vynatex 23 reduces illumination problems and lighting costs.

. . . Write No. 193

Motor grader Bulletin

Motor graders 8-D, 9-D, 10-D and 11-D with standard transmission are described in **Huber-Warco Co.'s** two-color, 16-page bulletin. Large photographs, cut-away views and artwork are used to illustrate the construction of the graders and their features including the new constant mesh transmission. A 4-page specification sheet is available on each model and the back page of the spec sheet features the optional equipment that is available on Huber-Warco motor graders.

. . . Write No. 194

Power shovel literature

The Thew Shovel Co. has released a 24-page catalog on their Model L85A, 2½-yd. power shovel. The booklet covers details of the machine's construction and pictures of 85A's at work. The power shovel is available also as a crane, clam, dragline and hoe, and all are pictured and described.

. . . Write No. 195

Electric plant selection

A guide to the selection and installation of standby electric plants and controls is offered by **D. W. Onan & Sons, Inc.** For all who need emergency electric power, this bulletin outlines the steps to be considered in the selection of any emergency electric generating plant. Practical suggestions are offered in the planning and designing of the installation, also common errors to avoid. It also lists items to evaluate to meet particular requirements in specific installations as well as advantages of both gasoline and diesel-powered emergency generator sets. Representative models of each are listed with basic specification data given.

. . . Write No. 196

Metal pipe catalog

A brochure has been published by **Armco Drainage & Metal Products, Inc.** on their corrugated metal pipe and pipe-arch. Advantages are described and tips given on making the correct selection for the application. The booklet contains useful tables, brief data on the various types of structures, and information about joints and fittings and proper installation methods. Typical installations are pictured.

. . . Write No. 197

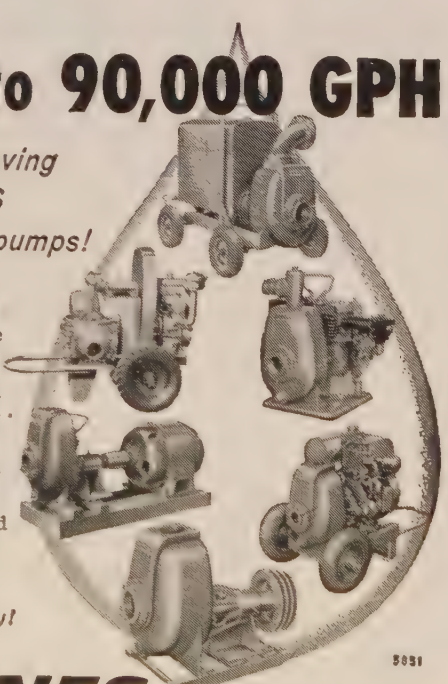
Cam-Lok highway forms

An illustrated brochure is available from **Heltzel Steel Form and Iron Co.** on their new highway forms featuring special "Cam-Lok" locking device. Other Heltzel road form accessories such as keyway plates, steel stakes, and stake pullers are also described in the 6-page piece.

. . . Write No. 198

4000 to 90,000 GPH

Keep jobs moving with BARNES construction pumps!



27 Self-Priming Centrifugal Pumps engineered to move more water faster on excavating, mining and general construction jobs . . . prime and reprime without fail even during intermittent service. Portable Diaphragm models to handle semi-solid seepage faster, too. All constructed and pre-tested to give you Barnes *Blue Ribbon Quality!*

5831

BARNES

Barnes Manufacturing Co.
Mansfield, Ohio

Get a FREE copy of our Construction Pump Selector No. 238 from any Barnes distributor.

. . . for more details, write No. 88 on Reader Service Postcard

Looking for a new employment opportunity, or for a man with specialized experience?

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).

Technical epoxy bulletin

Applications of the Sika epoxy compounds for banding, patching, joint and crack sealants, surface coating for concrete and for resurfacing of pavements, are technically described and illustrated in a bulletin from the **Sika Chemical Corp.** The six new epoxy compounds described make possible many new construction techniques and repairs previously considered impractical, and offer the architect, engineer, and constructor a new tool for building and heavy construction.

. . . Write No. 199

Super Commander plant

Complete information about a portable tandem-crusher aggregate plant, newly designed to include a twin-jaw primary crusher, is contained in an 18-page bulletin issued by **Iowa Mfg. Co.** Bulletin SC-1 fully describes the patented Cedarapids Twin Jaw crusher, while 2-color drawings are used to illustrate its action. Triple deck horizontal vibrating screen is also described illustrating the advantages of horizontal design over inclined screen design. Features such as hydraulic grizzly dump, adjustable sliding door on feeder hopper, remote feeder gate control are detailed.

. . . Write No. 200

Hopper-bucket assembly

Crete-Quip, a concrete hopper and bucket assembly for use with conventional material hoisting towers, is illustrated and described in a 4-page brochure released by **Beaver-Advance Corp.** Literature explains labor-saving features and advantage of internal mounting of equipment in the tower cage. The hopper can be repositioned from one area to another by means of the tower hoisting engine. Diagramatic illustration identifies component parts with photo sequence explaining 2-man assembly operation.

. . . Write No. 201

Hydraulic rams, pumps

A 2-color brochure from **Duff-Norton Co.** provides full specifications for the 12 Ram-Pac rams with capacities from 10 to 100 tons. Two hand and 3 power pumps plus attachments and accessories are also described. A table showing how a series of rams can be actuated by one pump is included in the 8-page catalog.

. . . Write No. 202

ESSICK

VIBRATING COMPACTORS

ESSICK VR-72 ON FREEWAY INTERCHANGE

BACKFILL COMPACTION COSTS CUT IN HALF

"On part of this job involving a tremendous backfilling project of more than a dozen bridges, I would estimate," says Jack Yount, "that by using the VR-72 we doubled our production and cut our compaction costs by at least one-half."

TOUGH FILL EASILY REACHES DENSITY IN 1 TO 3 PASSES

Jack Yount, Vice-president and General Manager of Vinnell Constructors states: "We really had a problem when we started compaction operations on the interchange of the new Golden State and San Bernardino freeways. The fill soil was composed of oil shale, a lightweight, light colored shale and black organic material, and in addition, moisture content was 10-15% over optimum. After many passes and long hours of rework, a Sheepsfoot roller reached density requirements calling for 90% on a modified AASHO test.

"We had successfully used our company-owned Essick VR-54-T compactors in the past, but for this particular fill we chose their larger model VR-72-T. Used in conjunction with the Sheepsfoot Roller (to break up the clods), the Essick 72" vibrator brought the solid density to well above California State Requirements in from 1 to 3 passes.

There is an Essick Vibrating Compactor especially designed to solve your particular compaction problems. The contractor who must achieve higher densities, meet rigid compaction costs and still make every equipment dollar count, relies on ESSICK.

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

for compacting all types of fills, sub base, base materials, asphalt, and trenches

ALSO 14 MODELS OF TANDEM ROLLERS FROM 1/2 TO 14 TONS

ESSICK MANUFACTURING COMPANY

1950 Santa Fe Avenue
Los Angeles 21, California

850 Woodruff Lane
Elizabeth, New Jersey

Affiliated with THE T. L. SMITH CO., Milwaukee, Wisconsin

. . . for more details, write No. 89 on Reader Service Postcard

NEW EQUIPMENT

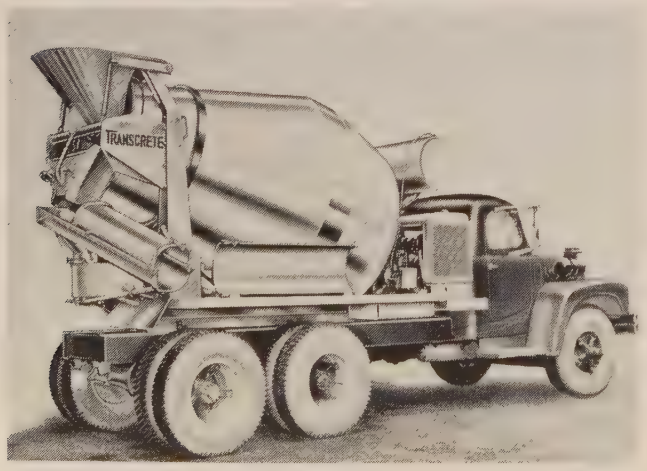
Obtain more information on these new developments in construction equipment by writing the corresponding numbers on reply postcard.

DITCHING in "one-step" is now possible with two new Ulmac attachments designed to go with Caterpillar Motor Graders. The units have been announced by Ulmac Equipment Co.

Ditches are cut in one pass by the U-200 Disc-beam attachment fastened to the motor grader by an all-welded box beam. It is controlled by the regular motor grader scarifier controls. In operation the curved disc cuts the material and directs it in a rolling action to the motor grader blade. This material coming out of the newly-cut ditch is moved to the roadway in a continuous windrow by angled grader blade. Loose material is completely cleaned from the shoulder. An additional attachment on an offset hitch is a loader which centers over the windrow and loads trucks on the roadbed. The two units combined, as illustrated, provide for digging the ditch and loading the material. . . . ***Write No. 203***

Flared drum design for faster discharge

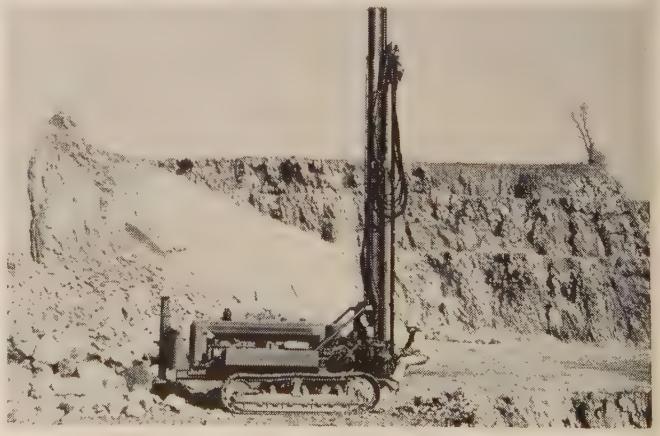
Flaring the drum at the discharge end gives the new Transcrete transit mixer a much larger opening to get the mix out faster with no sacrifice in drum carrying capacity. This is a new design feature of the Transcrete models, available in either steel or aluminum and recently announced by **Construction Machinery Co.** The design makes possible an additional 25% deeper end blades providing an extra push to the mix to add to discharge capacity. Additional features include an automatic wash-down system on which the operator simply turns a valve and 5 spray units automatically wash-down the mixer and accessory unit. There is also a single lever operating control method which permits the operator to start or stop the drum, change direction or modify drum speed from either the front or the rear of the mixer. Design also features an improved center of gravity for carrying bigger payloads with less weight. Models also feature greater use of corrosion and abrasion resistant alloy steels.



. . . ***Write No. 204***

Schramm offers self-propelled drill rig

With the introduction of Model C42 crawler Rotadrill, **Schramm, Inc.** offers contractors a new self-propelled rig for blast hole drilling. The unit is completely self-contained as to drilling equipment, air compressor and has steel capacity for 60-ft. holes. Further, the rig is designed for one-man operation with all controls placed in front of the seat which is mounted on crawler at the drilling station. The operator not only rides the rig when moving from hole to hole, but can also drill to a depth of 20 ft. without leaving his seat. Two additional lengths of drill steel are ready for immediate use on deeper holes. Wide tracks on the crawler provide excellent stability and the unit has hydraulic power throughout. Each crawler tract is in-



Heltzel 150 ton, 3 compartment, unitized type 200 aggregate bin. Three, 50 ton compartments. Twin, 1½ yard automatic batchers.

In South Carolina, too . . .

the move is to Heltzel's unitized, portable batch plants

Heltzel E-3, 357-390 barrel, unitized portable cement batching plant. Automatic twin batchers. 671-742 bbl. single compartment, portable cement tank.

Contractors across the country are taking advantage of Heltzel's easy to set-up and dismantle, fast, accurate batch plants . . . designed to fit each specific requirement.

Simplified design includes easy-to-handle sections that require only a minimum crew and standard crane equipment to set-up in record time. Factory assembled elevators, batcher and bin sections, may be shipped as complete "package" units—easily set in place—accurate—fast-operating and rugged.

It will pay you to investigate Heltzel Batch Plants for maximum versatility and cost-reducing operation. Write for free data containing complete details.

HELTZEL STEEL FORM AND IRON CO.
WARREN, OHIO

EQUIPMENT SALES COMPANY
Phoenix, Arizona

BROWN-BEVIS-INDUSTRIAL EQUIPMENT CO.
Los-Angeles - Bakersfield - San Diego - Ventura - Riverside, California

WEST COAST ENGINE & EQUIPMENT CO.
Berkeley - Ukiah - Oakland - San Jose - Sacramento, California

SCHUMAN CARRIAGE COMPANY
Honolulu, Hawaii

THE HELTZEL STEEL FORM AND IRON CO.
P.O. Box 8345 Crenshaw Sta.
Ken Simpson, Regional Representative
Los Angeles, California

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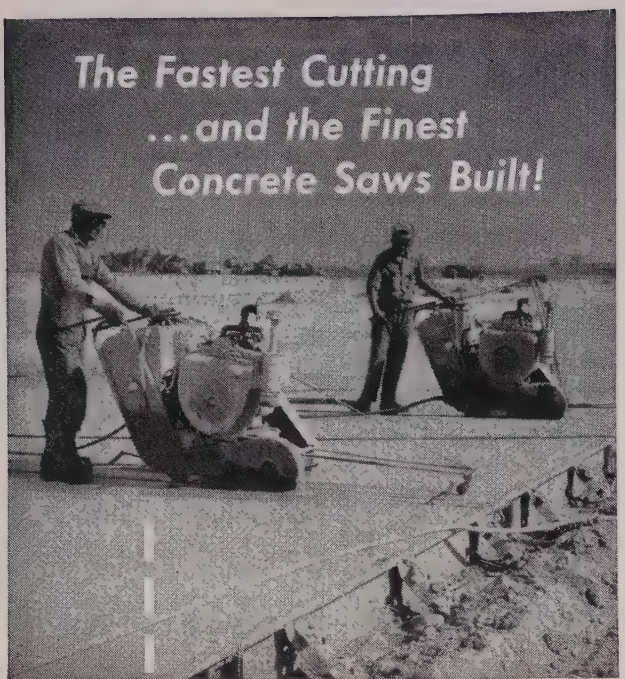


CUT MORE FEET PER DAY AT LESS COST PER FOOT

WITH Clipper "SAILS RIGHT THRU"

36 H. P. CONCRETE SAWS

● The rugged Clipper 36 Horsepower Concrete Saw Model C-363 is the fastest ever built for production performance on highways, airfields and heavy trenching jobs. It's one of several Clipper Concrete Saws for every job — every budget. Call your Clipper Factory Trained Representative for a FREE Demonstration right on your job.

Clipper PREMIUM QUALITY DIAMOND and REINFORCED ABRASIVE BLADES CUT FASTER AND LAST LONGER IN ANY AGGREGATE — best for all Saws ... any Aggregate — Every Job!

Sold Direct from

San Francisco 3
885 Bryant St. UNderhill 3-4324
Los Angeles 13
440 Seaton St. MAdison 8-4589
Denver 16
4303 Brighton Blvd. EAst 2-2881

CLIPPER MANUFACTURING CO.
Kansas City, Mo.

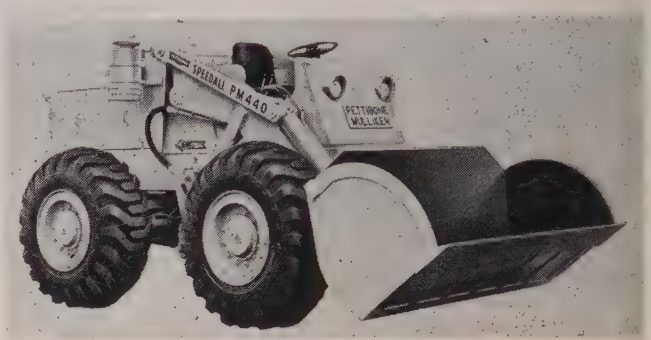
... for more details, write No. 91 on Reader Service Postcard

dependently driven by its own hydraulic motor, and all controls are hydraulically operated.

... *Write No. 205*

Largest in the line of Speedall shovels

Designated Model PM-440, a new 11,000-lb. capacity rubber tired tractor shovel has been introduced by **Pettibone Mulliken Corp.** It is the largest in a completely new line of Speedall tractor shovels and has a lifting capacity of 21,000 lb., and provides a breakout force of 24,800 lb. Bucket sizes range from 3 to 4.25 cu. yd. depending on the weight of the material to be



handled. Clearance under the bucket hinge pin is 11 ft. 10 in., and reach from front tires to the bucket lip is 3 ft. at the maxmium dumping height of 9 ft. At a 7-ft. dumping height, the reach is 4 ft. 5 in. Standard equipment includes an Allison torque converter, 4-wheel power brakes, hydraulic steering, 4-wheel drive. The power plant can be either a 152-hp. GM diesel or a 175-hp. Cummins diesel.

... *Write No. 206*

Larger legal loads with new Diamond T

By handling bigger payloads and with improved economy of operation, trucking costs may be reduced with Diamond T's new V8 truck. The new units of **Diamond T Motor Truck Co.** are of light-weight construction with proper maintenance of necessary strength for severe service. Model 838R-32M (illus-

trated) has a cab which is tight, rattle-free, and weatherproof, with a 3-point suspension. Ten different models are available in this series, ranging in capacity from 34,000 to 50,000 lb. A regular feature of the engine is its wet-sleeve construction which provides for rapid and effective overhaul and restoring of original engine efficiency.

... *Write No. 207*

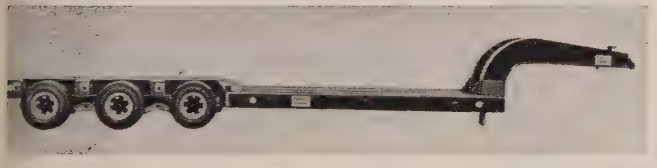
Lull presents loader for high dumping

Featuring a dumping height of 10 ft. 6 in., **Lull Engineering Co.** has announced a 1½-yd. Lull loader. This reach enables the operator to fill any dump body from one side without stopping to push the material to the far side. Its particular design and weight distribution enables it to operate without any ballast, whether digging or carrying a full bucket. The design also provides for maximum traction during digging or

transporting, as a result of the better weight distribution. For maximum safety and visibility, the operator is located high and toward the rear of the machine, completely out from underneath the bucket. The operator is not surrounded by any of the moving parts of the machine. *. . . Write No. 208*

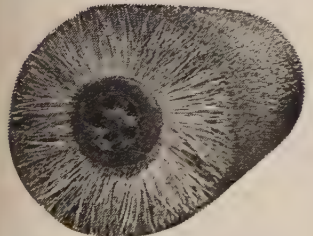
Trailer for those heavy loads

A trailer designed for long-high-heavy load hauling by **Talbert Trailers, Inc.** is a new three-axle model. The unit features 15-in. tires for lower rear bridge



height. These three-axle trailers are available in either drop or level deck models, and both models offer spring suspension, cast spoke wheels, air vacuum brakes, lights, reflectors, and directional signals. The patented removable gooseneck is offered on drop deck models only. Payload capacities are rated from 70,000 to 100,000 lb. *. . . Write No. 209*

Fast, expert service on **SWEEPER REFILLING!**



NEW CORES available for most popular machines.
FIBRES & WIRE. All sizes and lengths available from stock.

Ship us your worn street sweeper brooms. We refill cores up to 9′ long with any of the standard sizes of Flat Steel Wire, Palmyra Stalks, Split Hickory or African Bass. Gutter brooms refilled. Service is very prompt, even during rush season. Contact your regular equipment dealer or send us his name.

FLO-PAC BRUSHES

PACIFIC COAST BRUSH CO.
2030 E. 7th Street, Los Angeles 21, Calif.

. . . for more details, write No. 92 on Reader Service Postcard

TECHKOTE

. . . products for Concrete

CONCRETE CURING COMPOUNDS
Clear — Pigmented — Black

•

TILT-UP COMPOUNDS
Wax Base — Non-Wax Base

•

LIFT SLAB COMPOUNDS
(YOUTZ-SLICK METHOD)
Wax Base — Non-Wax Base

•

SPRAY EQUIPMENT
Hand and Power Operated

JOINT SEALING COMPOUNDS
(COLD APPLIED IN 3 TYPES)
Ready Mixed Rubber Base Mastic,
Rubber Base Emulsion and 2 Component Mastic

•

SEALING COMPOUND APPLICATORS

AIR ENTRAINING AGENT

•

AIR ENTRAINING AGENT DISPENSERS

•

AIR METERS FOR CONCRETE ENGINEERING

- *Comply with all leading specifications*
- *Distributed and stocked in principal cities*

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Seattle, Washington, W. J. Burke & Co.
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Albuquerque, New Mexico, W. J. Burke & Co.
Salt Lake City, Utah, Intermountain Concrete Specialties
Phoenix, Arizona, Superior Building Materials
San Antonio, Texas, Rufus A. Walker & Co.
Honolulu, T. H., R. L. Castendyk Company
Vancouver, B. C., Canada, Burrard Construction Supplies, Ltd.

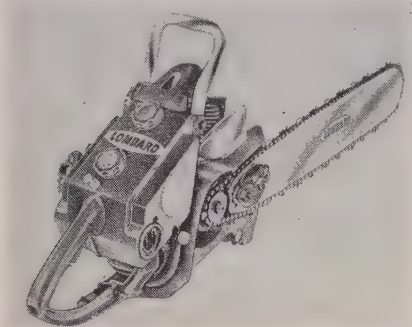
TO BE SURE . . . A-M *USE THE FINEST!*

PRESSTITE DIVISION
AMERICAN-MARIETTA COMPANY
Western District
600 LAIRPORT ST. • EL SEGUNDO • CALIFORNIA

. . . for more details, write No. 93 on Reader Service Postcard

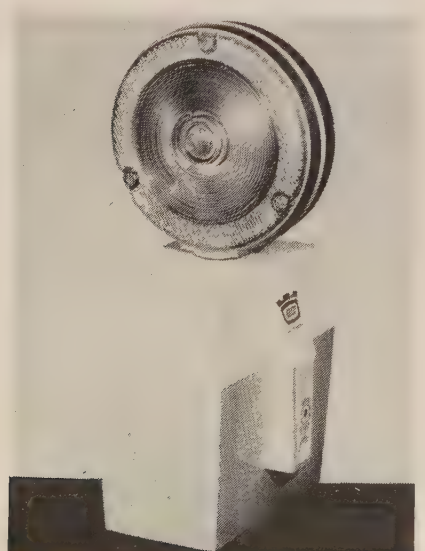
Chain saw power increased

New features of the "Tornado" 52 announced by **Lombard Governor Corp.** include a "slim" engine that is 15% smaller, 15% lighter, but gives 15% more power than the previous model. The Tornado 52 is a 5-hp. direct drive saw weighing only 17¾ lb. less bar and chain. Features of the unit include a chain oil system which can be cleaned from one exposed position without dismantling the saw. The protected carburetor also has a special design feature permitting on-the-spot removal for cleaning. Catalog available. *. . . Write No. 210*



Bright flasher lights

Flasher lights with a brilliant circle of light around the rim are introduced in two sizes by **Pacific Mercury.** Made in 5 and 7-in. diameters each has a 1-in. circle of bright light around the edge. They are available in amber and red. Flash rate of the lights is adjustable to meet specific state highway requirements and maximum "on" time is adjustable to meet specific state highway requirements. PM's patented plug in circuit is used on both the models. Lights are vapor proof, completely safe for use in the presence of gasoline or explosive vapors. *. . . Write No. 211*



Lifetime lubricated track roller

Lifetime lubricated track and carrier rollers recently announced by **Caterpillar Tractor Co.** are now available as standard equipment on six additional machines. These are Traxcavators No. 977 series D, No. 955 series C and E, No. 933 series F; and tractors D6 and D4. The new rollers need lubrication only when rebuilt. Oil lubricant is sealed inside the rollers during factory assembly and they require no servicing during normal life. The completely redesigned and strengthened rollers have been widely tested in the field. Here it was found that the units were more effectively lubricated and cooled with SAE 30 weight oil sealed inside than similar rollers filled with grease. *. . . Write No. 212*

Dual purpose pipe finder

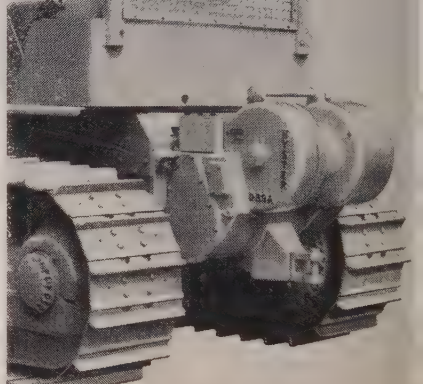
The "Master" dual-purpose pipe finder and leak detector featuring completely transistorized circuits has been developed by the **Fisher Research Laboratory, Inc.** The dual-purpose instrument has independent circuits for each operation. New construction features include printed circuits, indestructible fiberglass cases, single turn solid aluminum detecting loops and built in four-transistor amplifier circuit for the leak detector. The 12-lb. unit has a battery life of some 1,500 hr. which is equivalent to more than a year of normal field use. *. . . Write No. 213*

Side opening auger bucket

A side opening, drilling bucket for boring in gummy, sticky clay is announced by **Calweld, Inc.** The bucket has a 180-deg. side opening door instead of the standard bottom opening action to provide complete clean dumping in sticky material. Since the door comprises half the circumference of the bucket, usually no difficulty is encountered in dumping sticky clay. Literature available. *. . . Write No. 214*

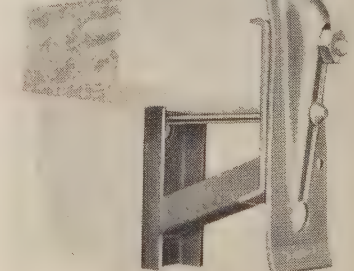
Redesigned towing winch

A new model hydraulically controlled towing winch for installation on Caterpillar D8 and D9 tractors has been announced by **Hyster Co.** The new models feature redesigned controls which require only 8 lb. of effort. A single lever provides automatic brake release while engaging clutches. An inching brake lever gives precise control when lowering the load. Powered by gear type hydraulic pump, the winch can be operated independent of tractor clutch. It is available in regular and low speed models. *. . . Write No. 215*



Snap tie holder

The snap tie holder used with ¾-in. plywood sheating where single liners only are applied is announced by **Superior Concrete Accessories, Inc.** In application, the

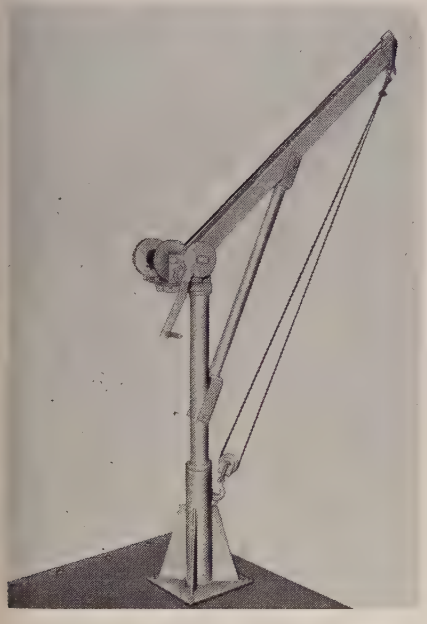


opposing holes are drilled in the plywood and the snap ties inserted. When the liner is brought into place, this tie holder secures the ties and supports the liner. No nailing is necessary. Although it is designed for single liners on forms without studs, the rugged holder may also be applied to vertical studs on forms where walers are not used.

. . . Write No. 216

Low clearance truck crane

A hand-operated crane with pivoted boom which can be folded down against the mast for minimum clearance is announced by **Thern Machine Co.** Boom on the Thern model H-550B truck and davit crane can be folded down by removing a single pin in the boom support. Maximum lifting capacity of the unit is 1,500 lb. with the



boom retracted to minimum reach of 39 in. With boom extended to maximum 54 in. reach, lifting capacity is 1,000 lb. Crane is operated with a heavy-duty double gear hand winch rated at 2,500 lb. capacity. Total height is 8 ft. and lifting height from floor 7 ft. 6 in. Minimum height with boom folded is 51 in.

. . . Write No. 217

Radio signal will honk horn

A transistorized "Quik Call" selective signaling decoder which enables a radio dispatcher to talk to individual mobile units and which can even be hooked up to blow a horn has been introduced by **Motorola, Inc.** for use with its mobile

All-Purpose MAGINNISS CONCRETE VIBRATORS

Cut costs on every job!

Whether you're using plastic or stiff mixes, Maginniss Hi-lectric Vibrators will place concrete faster and produce blemish-free finished surfaces.

Powered by a constant-speed 180 cycle 120 volt induction type motor located in the vibrator head for maximum efficiency, Hi-lectrics produce variable frequencies up to 10,500 V P M and maintain constant speed at all times—they do not slow down and lose vibrating effectiveness even under full load in stiffest low-slump concrete! This means you can use all purpose Hi-lectric Vibrators on any job, no matter what the concrete specifications may be.

Because pours are completed faster, labor expense for the entire crew is reduced. One-man operation cuts vibrating costs, too. The Hi-lectric power unit can be located as much as 200 ft. away from the work site—the vibrator operator is free to move about on the forms unhampered by cumbersome, unwieldy flexible shafts. What's more, with blemish-free surfaces, costly hand finishing is eliminated.

Ask your Maginniss distributor to demonstrate on your present job—he'll show you how Hi-lectric equipment can cut your concrete placing costs. You'll find him listed in the Classified Section of your telephone directory. AA-1826

Simple, rugged construction of Hi-lectric motor-in-head vibrators keeps maintenance costs at a minimum. There are no brushes, commutators or armature windings to burn out.

Maginniss HI-LECTRIC POWER TOOLS

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☐ STRUCTURAL VIBRATORS (180 Cycle Heavy Duty)
☐ STRUCTURAL VIBRATORS (AC-DC Light Duty)
☐ PENCIL VIBRATORS
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MAGINNISS POWER TOOL CO.
Dept. W-40, Mansfield, Ohio Date_____
Please send me literature on items checked at left.
Individual_____ Title_____
Firm or Dept._____
Street _____
City_____ State_____

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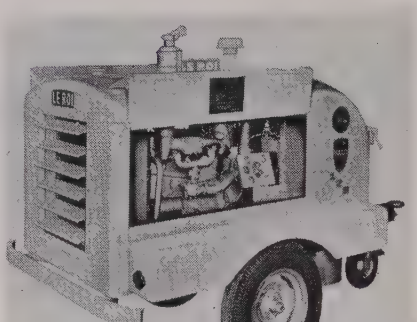
2-way radio. When transmitting to a single mobile the dispatcher presses a button on his Quik Call control console to activate and transmit a pre-set series of tone signals. The signals are received by all mobile units and fed to the Quik Call decoders. The decoder in the desired mobile activates its receivers audio circuitry upon receipt of the tone code. All others remain inactive. If the operator is working away from his vehicle the Quik Call decoder can be connected to the truck horn or a light to signal the driver that he is wanted on the radio. The system has 4,300 possible code combinations. In addition to its decoding device the company announced that it is expanding its line of transistorized radios. The new line will consist of 25 and 50-watt models for the low band frequencies and 30, 60 and 80-watt models for high band frequencies. *. . . Write No. 218*

New compressor model

Three safety features have been added to the new Model 125RG2 portable rotary compressor announced by **Le Roi Division of Westinghouse Air Brake Co.** New features inclued an automatic cut-off switch that stops compressor when oil pressure drops, an automatic dump valve that releases air pressure in receiver when compressor is shut down, and a non-wearing orifice in the receiver outlet which assures proper air-end oil cooling by holding 40 lb. pressure in the receiver. The 125-cfm. compressor weighs 2,280 lb. and operates at 1,600 rpm. *. . . Write No. 219*



Two transmissions are now available for L-W units

Now there are two transmissions available for the Model D Tournapull as announced by **LeTourneau-Westinghouse Co.** Equipment users have their choice of: a torque converter or conventional manual shift type transmission. Both are equally available on current production model Tournapulls. The new torque converter version of the prime mover can be had with any of the standard "D" size interchangeable trailing tools, including the 9-yd. scraper, 11-ton rear dump or 10-ton mobile crane.

Some re-arrangement of components is involved although most critical dimensions remain unchanged. The unit maintains its 143-hp. GM Diesel engine.

The new transmission is being built for L-W by the Allison Division of General Motors and was tailored to the "D" by a team of L-W and Allison engineers. It consists of a single stage, multiple phase, four element torque converter combined with a heavy-duty, power shift gear box. Four forward and two reverse ranges provide the equivalent of an infinite number of gear ratios with speeds up to 30 mph. A feature which is standard equipment on the D Tournapull with Allison transmission is an automatic lock-up clutch. This has been added to provide maximum operating efficiency and economy. This clutch eliminates power consuming slippage in the converter at haul speeds.

. . . Write No. 220

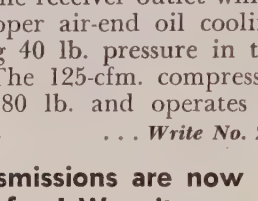
Thermal insulation cement

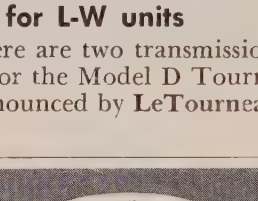
A quick-set, one-coat insulation cement has been marketed by **Thermal Products Co.** The new

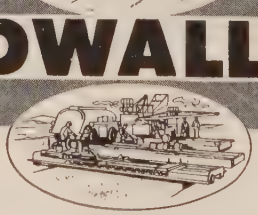
Machinery Supply, Inc.

exclusive distributors in CALIFORNIA for

SEAMAN-ANDWALL







Now . . . internationally famous Seaman-Andwall Sta-Bilt equipment is available in California through MACHINERY SUPPLY, INC. . . . . completely modern equipment for roads of every type at lower cost . . . an excellent stock of repair parts. Add to this, Machinery Supply's policy to do more than you'll expect in serving users of this leading line of soil stabilizing machinery . . . a service that's as near as your phone.

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Look for

WILLIAMS FORM ENGINEERING "BIG THREE" AD

in Next Month's Issue!

. . . for more details, write No. 9

material can be packed by hand, troweled, injected, palmed, sprayed, or poured to any thickness, and the set or dried material can be re-used. It can withstand freezing with no deteriorating effects, and it is non-rusting and non-corrosive to metal and materials. It will not shrink, blister or drip, and will give a smooth hard finish even when applied to such difficult materials as fiberglass board and blanket, rock cork board, foam glass block, and rock wool blanket. The material can also be used to make pre-molded jackets for pipe fittings. K factor is considered low enough for any temperature range. Literature available.

. . . Write No. 221

Transistor pipe detector

The Detectron Model 808 transistor pipe detector which can operate in hot southern climates and which has a maximum depth range of 20 to 25 ft. has been announced by the **Computer-Measurements Co.** Unit has special compensating circuitry to eliminate heat instability of transistors. It can trace pipes and cables by the conductive method through highly mineralized soils and can locate a pipe line so precisely that it can be marked on the pavement above within an area narrower than the width of the pipe itself. Depth range on 1 in. water pipes is approximately 10 ft. and maximum range on large lines is 20 to 25 ft. depending upon soil conditions. The instrument uses standard batteries which require replacement on the average about once a year. *. . . Write No. 222*

Diesel pile hammer

The DE-40 diesel pile hammer delivering a mean energy of 24,000 ft. lb. per blow has been announced by **McKiernan-Terry Corp.** The unit includes a 4,000-lb. ram, operates at 48 to 52 blows per min. and weighs 11,350 lb. fully equipped for operation. It is completely self-contained, requiring neither boiler nor air compressor. A built-in fuel-oil tank holds 19 gallons of diesel fuel. Carrying its own lubricating system powered by a simple, efficient integral pump to lubricate all critical points, the hammer requires no manual lubrication. The DE-40 features automatically timed firing, requiring no pressure injection and eliminating timing mechanisms and electric circuits. It is especially suited for driving large concrete pipe and "H" beam pile.

. . . Write No. 223

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DIFFERENT USES
in the
CONSTRUCTION FIELD

THERE'S A PACIFIC WIRE ROPE BUILT FOR YOUR INDIVIDUAL APPLICATION

"Designed Engineered Construction" is the reason why PACIFIC Wire Rope can do a better job for you. Only PACIFIC Wire Rope is "EQUALIZED," which means the rope is "broken in" — can be used right from the start — does not have to be babied as all other ropes do . . . gives you better performance, longer life, dollar savings.

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News of DISTRIBUTORS

Appointments at Peterson Tractor

In line with the growth and expansion of the firm, Peterson Tractor Co., San Francisco Bay Area dealer for Caterpillar Tractor Co., announces additional appointments. Frank Castellucci has been named director of sales, moving up from general sales manager of the San Leandro distributorship. Other personnel changes include the appointment of John S. Cole as assistant used-equipment manager, Otto Smith as used-equipment sales representative, and LeRoy Story as interplant coordinator for used equipment.

New Hi-Way distributor in No. Calif.

Contractors Machinery Co., San Francisco, is a new distributor for Highway Equipment Co., Cedar Rapids, Ia., manufacturer of Hi-Way ice control spreaders and bituminous paving equipment. Contractors Machinery's territory embraces 16 Northern California counties.

Colorado company expands

Appointment of H. W. Moore Equipment Co., Denver, as a distributor for Marion Power Shovel Co. is announced by the Ohio firm. Moore will represent the manufacturer in the state of Colorado, handling sales, parts and service for the Marion line of excavating machinery up to 4 cu. yd.

Ralph J. Bickers was recently named sales manager for the Moore

Ralph J. Bickers

company. He is well known in the area as a machinery man. Prior to assuming his new position he handled the Colorado Springs territory for the company. Other new additions to the sales force include Mark E. Murray, east-central Colorado; Bruce Bynum, northern Colorado, and Dallas Adkins, southeastern Colorado.

New B-L-H distributor

Baldwin-Lima-Hamilton Corp., Construction Equipment Division, Lima, Ohio, announces the appointment of Redwood Equipment Co., Inc., Crescent City, Calif, as distributor of Lima shovels, cranes, draglines and pull-shovels, from ½- to 8-cu. yd. capacity, and the Roadpacker, a self-propelled vibratory compactor. The new distributor will cover four counties in Northern California.

Complete L-W line goes to new distributor

The new firm of Buckhorn Equipment Co., Cheyenne, has been appointed distributor for the complete line of LeTourneau-Westinghouse earthmoving equipment in the eastern and southern half of Wyoming. The Buckhorn firm is located at 521 E. First St., and is headed by Rudy A. Zibert, who has been a district representative for L-W during the past 11 years, has had more than 17 years with the company serving on all phases of the earthmoving business. His business partner is Albert Nielson, vice president and sales manager. Prior to the formation of the distributorship, Nielson was with Rocky Mountain Machinery Co., L-W distributor at Salt Lake City, as a sales engineer.

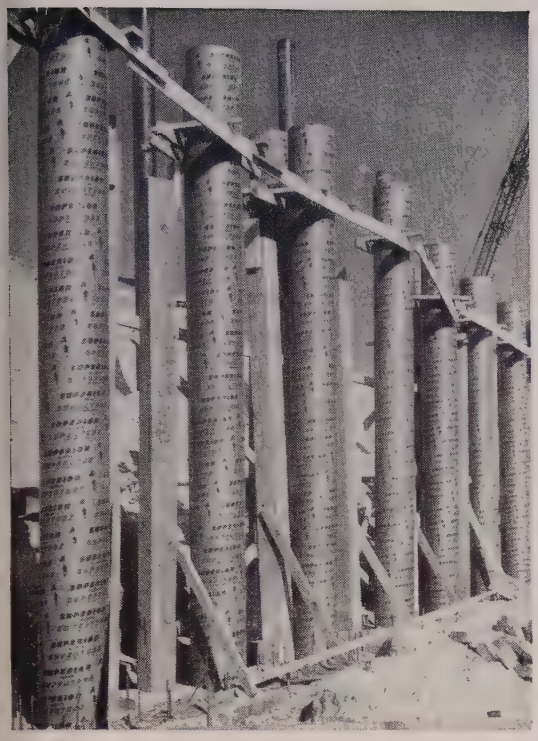
H. J. Mayer assumes AED presidency

Following the death of J. A. Benson, national president of the Associated Equipment Distributors, H. J. Mayer was installed as AED's 42nd president on February 22. The new president is executive vice president of Western Machinery Co., San Francisco, and general manager of Edward R. Bacon Co., also of San Francisco.

Koury moves up to manager of sales

A. R. "Alex" Koury has been appointed sales manager of R. L. Harrison Co., replacing J. F. Harrison who has for some time handled both the sales manager and general manager posts in this dealership. Koury has been with the Harrison organization for 12 years; originally employed in the general office, later in the sales department, and for the past three years as territory salesman handling contractor accounts.

IN attendance at Barber-Greene Co.'s 1960 Management Conference held at the Aurora, Ill., headquarters were management representatives from several of its Western distributors. Pictured here are (l. to r.): *"Jack" Jackson* of Clyde Equipment Co., Portland; *Stan Drew* of B-G; *Bill Euster*, also of Clyde; and *G. R. Lundberg*, Barber-Greene's newly appointed West Coast district sales manager. Also *Frank Lloyd* and *Max O. Eggerts* of Santa Fe Equipment Co., Los Angeles. And *Bill Martin* of A. H. Cox & Co., Seattle; B-G's *W. C. Gifford*, and *Emil Dionne*, president of Cox.



There is literally no limit to the variety of structures in which round concrete columns can be formed with SUPER-TUBES.

- **ECONOMICAL**—Low first cost; self curing; pour all columns on job without resetting forms; protects column while job is being completed.
- **VERSATILE**—Saw to length on the job or order in specified lengths. Variety of sizes and types. Simplified beam and wall tie-in possible; utility outlets easily formed.
- **EASY TO USE**—Lightweight, easily handled; quick to erect; minimum bracing required, simple to strip; set retardant easily applied.
- **READY TO USE** — No form inventory, no form cleaning.

Introducing SUPERIOR SUPER-TUBES

For Fast Forming of Round Columns of Concrete

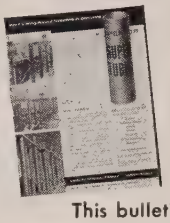
✓ Easily stripped and finished - uniform surface

✓ Can be placed by semi-skilled labor

The SUPERIOR SUPER-TUBES are tubular fibre forms developed to provide a fast, economical method of forming round columns of concrete. Easily placed by semi-skilled labor, SUPER-TUBES, are used for forming concrete piers, supporting columns, underpinning, stub columns, quarter, half, and obround columns. May also be used as a form for encasing existing columns, piers, and piles with concrete.

SUPERIOR SUPER-TUBES can be sawed, tied in with walls or beams, and punched for reinforcing rods, electrical outlets, or anchor bolts. They are light weight, easy to handle, place and strip easier and require only minimum bracing.

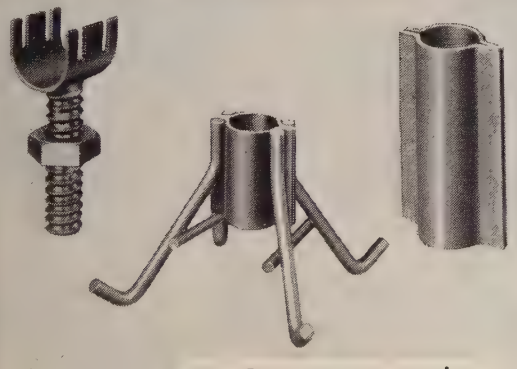
Choose the type of SUPER-TUBE to meet your job requirements. (1) *Seamless*—premium form for finished columns. (2) *Regular "A" Coated* for standard exposed columns. (3) *Light wall "A" coated*—similar to Regular "A" but has thinner wall. (4) *Regular "W" Coated* — has wax coating where stripping not required. (5) *Light Wall "W" Coated*—Thinner wall than regular "W" coated. (6) *Dry Ply*—For encasing existing pillars, posts, etc., with concrete.



For details, request new 4 page Bulletin

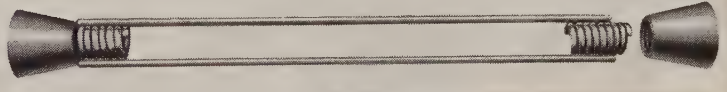
This bulletin also describes SUPERIOR SUPERVOIDS — to form voids in concrete construction.

OTHER TYPES OF SUPERIOR FORMING ACCESSORIES

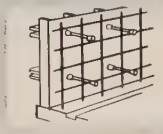


HEAVY-DUTY SCREED SUPPORTS

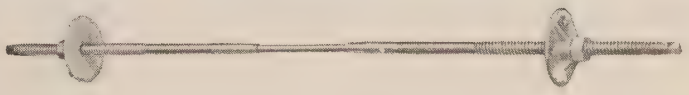
Overpasses and Underpasses



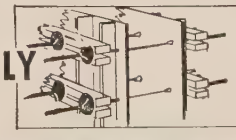
THREADED COIL TIES



Engineering Structures



SHE BOLT ASSEMBLY



Heavy-Duty Forming

SUPERIOR Concrete Accessories, Inc.

2100 Williams St., San Leandro, Calif.

. . . for more details, write No. 98 on Reader Service Postcard

U.S. Rubber names Portland outlet

Breezee Supply Co., Portland, has been appointed a general distributor for industrial rubber products manufactured by United States Rubber Co. The firm will offer complete lines of hose, conveyor belting, power transmission products, and other items manufactured by the mechanical goods division

Sales personnel addition

John H. Leuthold, Jr., has joined the sales department of Nash-Davis Machinery Co., at Billings, Mont.

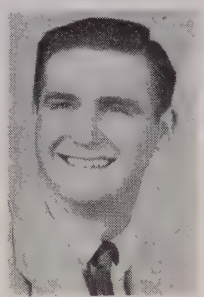
Foulger expansion

Three new lines have been added by Foulger Equipment Co., Salt Lake City, Utah: Browning Manufacturing Co.'s complete line of rollers, pneumatic, steel wheel, vibrating; as well as the accounts of American Saw & Manufacturing Co., and Threadwell Tap & Die Co.

Kieth "Milt" Fisher recently joined the sales staff. He has been with Foulger six years as manager of the rent department.

McCoy Company promotes Ken Wilhelm

Announcement is made by the McCoy Company of the appointment of Ken Wilhelm as sales representative for northern Colorado.



Ken Wilhelm

Wilhelm has been with McCoy three years and served as branch manager of the Durango store.

Cummins Service & Sales announces anniversary

Cummins Service & Sales, Los Angeles, is celebrating its 15th anniversary year. In making the announcement, President J. H. Flanagan pointed with pride to a record of 15 successful years of service to the local trucking industry, and added that "Our celebration of this special anniversary will take the form of accelerating our organization to give even better service in the years to come." Headed by Flanagan and S. B. Cook, vice president, the company maintains branches at Bakersfield and Montebello, Calif., all a part of a network of Cummins service and parts centers strategically located throughout the United States.

Shepherd forms new division

Shepherd Machinery Co., Los Angeles, announces the establishment of a new Materials Handling Division to be managed by T. R. "Mike" Michael, whose experience and many qualifications enable him to provide able direction for the activities of salesmen J. T. "Jim" Foley, W. G. "Bill" Garns, and J. N. "Jim" Clark.

Napco names Western outlets

Napco Industries, Inc. announces the appointment of two new distributors for its Powr-Pak in the West: Mailman Truck Equipment, Las Veges, Nev., and Graver Tank & Manufacturing Co., Salt Lake City, Utah.

Nevada dealer appointment

Appointment of Wines Bros. Equipment Co., Inc., Yerington, Nev., as an area dealer for Massey-Ferguson Industrial Division is announced by Charles F. Hill, division general manager.

Expanded sales and service activity

J. D. "Jim" Davis, with more than 20 years' experience in heavy construction equipment merchandising, has been appointed industrial manager of Wallace Machinery Co., Oxnard, Calif. Wallace is Caterpillar and John Deere dealer for Ventura, Santa Barbara, and San Luis Obispo counties. Davis has been industrial equipment sales representative with the firm since 1958. Bruce Fleming, with nine years in handling heavy machinery needs in the tri-county area, has been appointed industrial and used-equipment sales representative. Adding depth to the accelerated sales activity, Wallace has appointed W. D. "Jim" Forister promotion manager, making his headquarters at the Santa Maria store.

Jaeger distributor in southern Idaho

Jaeger Machine Co., Columbus, Ohio, announces the appointment

All the load goes through the hubs!

Free-wheeling 2-wheel drive with Warn Hubs stops front end drag, saves gas, gears, tires; improves steering, highway performance. There is no strain on hubs or the front drive. But in 4-wheel drive, the hubs must withstand the entire front drive load *first!* Warn Hubs can, and do — usually for the life of the vehicle or longer. Install Warn Hubs on your 4-wheel drive for top performance. Get Lock-O-Matics* for automatic conversion, or manual Locking Hubs.

*Willys only

DESIGNED to stop front end drag in 2-wheel drive

BUILT to "take it" in 4 w.d.

WARN® HUBS

The Name that Means Selective Drive

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Seattle 88, Washington

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of Contractors Equipment Supply Co., Boise, Idaho, as distributor in the southern Idaho area, handling Jaeger air compressors, pumps, concrete mixers and truck mixers.

MANUFACTURERS

Sales representative appointment in Arizona

Announcement is made of the appointment of Palmer B. Ford as sales representative for Phoenix Cement Co. He will cover the Phoenix area. Ford was formerly general sales manager of the Western Rolling Mills Division of Yuba Consolidated Industries, Inc., Phoenix.

Bucyrus-Erie executive retires

Peter H. Birckhead, a vice president and director of Bucyrus-Erie Co., retired last December, closing out an illustrious 43-year career with this heavy equipment manufacturer. Known and respected throughout the construction and other industries served by B-E, Birckhead first joined B-E at South Milwaukee shortly after graduating from Cornell University. Service in World War I interrupted his apprenticeship, but he rejoined the company in 1919 and began his long and successful career in the sales end of the business. For several years he was in the Chicago and San Francisco offices before returning to the headquarters office. He became general sales manager in 1934, was elected a vice president in charge of sales in 1943, and has been a director since 1952. Birckhead and his wife plan to move to St. Croix in the Virgin Islands.

Southwest sales appointment

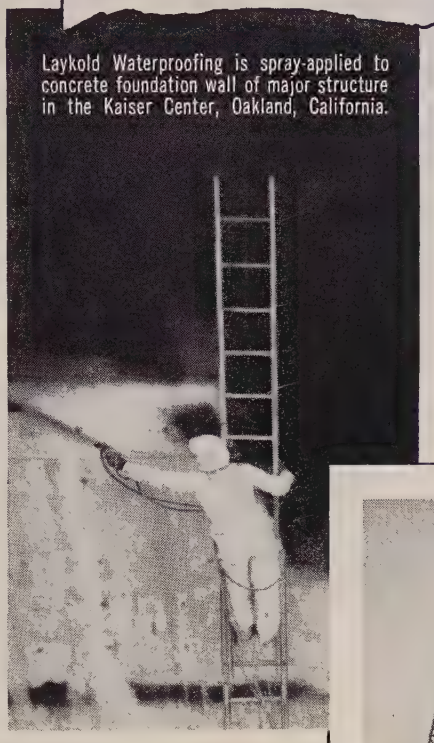
Henry Swigert is the new district sales representative in Arizona and New Mexico for Electric Steel Foundry Co. From his headquarters at 916 West Adams St., Phoenix, Swigert will handle ESCO products for construction and other industries.

George Bowden joins Symons Clamp

Announcement is made by Symons Clamp & Mfg. Co., Chicago, of the appointment of George F.

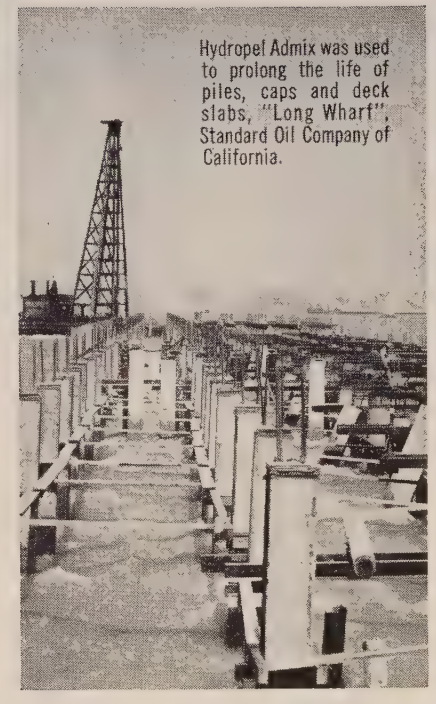
These Laykold® Products
ASPHALT SPECIALTIES

Keep Walls and Slabs DRY!


Laykold Waterproofing is spray-applied to concrete foundation wall of major structure in the Kaiser Center, Oakland, California.

LAYKOLD WATERPROOFING...

for fast, economical "first-line" protection. Laykold® Waterproofing* is a specially-compounded asphalt emulsion for cold, external application on concrete or masonry walls. Put on by brush or spray ahead of backfills, it provides resistance to moisture and dampness.


Hydropel Admix was used to prolong the life of piles, caps and deck slabs, "Long Wharf", Standard Oil Company of California.

HYDROPEL INTEGRAL ADMIX...

a unique type of asphalt emulsion for waterproofing* concrete used in walls, slabs, footings, etc. for industrial, marine or other construction.

Whenever moist conditions, freeze-thaw cycles, the presence of alkaline or neutral salts require the absolute minimum of moisture absorption, always specify Hydropel®. It cuts capillary water absorption by 80 per cent.

Waterproofing and Hydropel are only two of the famous Laykold line of asphaltic products available to the construction industry. Call or write our nearest office today for full information.

*The limitations of any product to "waterproof" any type of surface for an indefinite length of time are clearly recognized, as covered by the "Trade Practice Rules for the Masonry Industry," outlined 8/31/46 by the Federal Trade Commission.

American Bitumuls & Asphalt Company

320 MARKET, SAN FRANCISCO 20, CALIF.
Perth Amboy, N. J.
Baltimore 3, Md.
Cincinnati 38, Ohio
Atlanta 8, Ga.
Mobile, Ala.
St. Louis 17, Mo.
Tucson, Ariz.
Portland 8, Ore.
Oakland 1, Calif.
Inglewood, Calif.
San Juan 23, P. R.

BITUMULS Emulsified Asphalts • CHEVRON Paving Asphalts • LAYKOLD Asphalt Specialties

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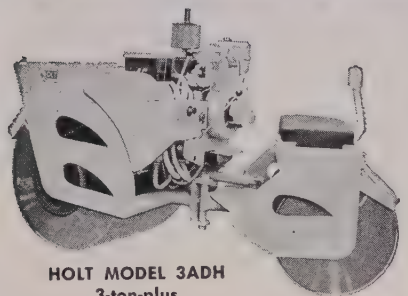
HOLT ROLLERS



HOLT MODEL 3ADH
3-ton-plus
Comp. PSI 260 lbs. at 1¼"

FAST, ECONOMICAL, EFFICIENT COMPACTION

- Portable
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- 12½ h.p. converted by HOLT HYDRO DRIVE to 2-speed transmission
- Meets State specs. for highway patching
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- Ideal for parking areas
- 5 sizes from ¾ ton to 3 ton

Write for literature and nearest dealer

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WATER WORRIES?

Let water specialists bring you back to dry land. Specify

John W. **STANG**

*Corporation * Los Angeles * Omaha * Tacoma * St. Petersburg*

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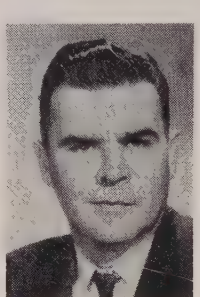
Bowden as director of the research and development department. Bowden, a registered civil engineer, joins Symons after eleven years in the construction department of Commonwealth Edison Co., where he served as a field engineer. Bowden replaces John E. Imonetti who has been promoted to assistant to the general sales manager.

R. M. Prescott named Western manager

Appointment of Robert M. Prescott as Western regional manager, Massey-Ferguson Industrial Division, is announced by John J. Vilven, general sales manager. After engaging for a time as product education supervisor and then as service manager for Tractor Sales Corp., in Los Angeles, Prescott joined the M-F Industrial Division, recently serving as sales specialist for the Western region. His headquarters are in Los Angeles.



Robert M. Prescott

Bros appoints equipment specialist

Bros Incorporated has appointed Tom Kelly as specialist in charge of the road machinery heating division, according to announcement from R. L. Wicker, general sales manager. This new position was created to provide specialized sales assistance in marketing the company's line of bituminous heating and handling equipment. Kelly was previously employed by a Wisconsin construction equipment firm.

Massey-Ferguson promotes Vilven

John Vilven, well known industrial sales executive, has been appointed general sales manager for Massey-Ferguson Industrial Division, Wichita, Kans. Previously, Vilven had been serving the division as Western regional industrial sales manager.

Key appointments by Euclid

Several appointments that are a part of an expanded sales and service organization of Euclid Division, General Motors Corp., in Cleveland and in its Western offices are announced. Gerry E. Danby, formerly a sales representative in the Western district and recently in charge of sales training, has been named manager of the sales development department, succeeding Alan S. McClimon who takes over the post of manager of national accounts. Louis A. Campbell has been appointed district sales representative in Montana. Before joining Euclid he was sales manager for a large construction machinery distributor. Charles T. Gallaher and Howard W. Middleton, from the sales development department at Cleveland, are now sales representatives at the Los Angeles, Calif., branch.

Western regional manager appointed by Utility

Baxter L. Schroeder has been appointed Western regional sales manager of the Utility Division of Highway Trailer Co., Edgerton, Wis. With more than fifteen years' experience in the sales and administrative fields, Schroeder will be in charge of sales programming for the Utility Division in all states west of the Mississippi.

Bill Talmadge joins Earth Equipment Corp.

Appointment of William Talmadge as general sales manager of the Everett Trencher Division is announced by Fritz von Schlegell, Jr., president of Earth Equipment Corp., Los Angeles. Talmadge, with 25 years in the sales field, comes to Earth Equipment from Massey-Ferguson where he was general sales manager of the Industrial Division, U. S.

Personnel changes at Thor

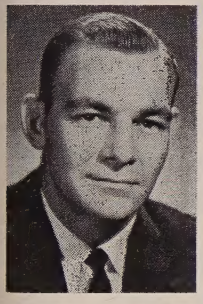
George A. Gambee has been promoted to district sales manager of the Denver branch of Thor Power Tool Co., portable air and electric tool manufacturer. Gambee has an 8-year Thor sales background in the San Francisco branch. Announced also are the transfer of M. A. Sorenson from Denver to the Chicago branch, and R. J. Horrocks from Denver to the Salt Lake City branch as service engineer.

Wallace Supplies Western dealers

Wallace Supplies Manufacturing Co., Chicago, announces the following Western dealers to handle its line of bending machines and abrasive cutting units on an exclusive territory basis: Seattle area—Perine Machinery & Supply Co., Seattle (bending machines and abrasive cutting units); Portland area—Allied North West Machine Tool Corp., Portland (bending machines and abrasive cutting units); West Coast—Harley-Pence Machinery Co., Los Angeles (abrasive cutting units); Machinery Sales Co., Los Angeles (bending machines); M. M. Thackaberry, Inc., Los Angeles (abrasive cutting units).

Maurice Hellman new L-W district rep

LeTourneau-Westinghouse Co. announces the appointment of Maurice Hellman as district representative for the states of Utah, Colorado and parts of Wyoming. Hellman replaces Rudy Zibert who left



Maurice Hellman

to open his own L-W distributorship in Cheyenne, Wyo. Hellman has been assistant to the manager of the L-W Western office at Salt Lake City, which post will be filled by Robert Paustian, a L-W wire rope sales representative.

Wm. Grede elected J. I. Case prexy

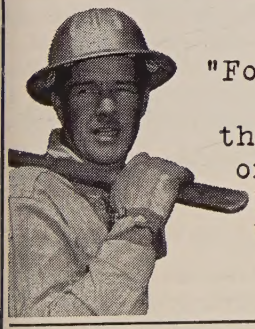
Wm. J. Grede was recently elected president of the J. I. Case Co., succeeding Marc B. Rojtman, who assumed the important new position of special advisor to the president and the Case executive committee. Case's new president is a well known industrialist and former president of Grede Foundries, Inc. He has been head of the Case executive committee since 1956, and was instrumental in the merger of Case with American Tractor Corp. whose construction, roadbuilding and materials handling line has been spearheading Case growth during the past three years.

Seaman-Andwall becomes A-M division

American-Marietta Co., Chicago, announces that its Milwaukee operations, formerly a part of Seaman-Andwall Corp., subsidiary of American-Marietta, will become the Construction Equipment Division of A-M. The division manufactures compaction and soil stabilization equipment for the road-building industry. John W. Spoor will continue as president of Seaman-Andwall Corp., and will assume the new role of general manager of the Construction Equipment Division.

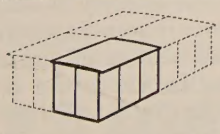
Construction starts on Allis-Chalmers plant

Construction is to begin immediately on a multi-million dollar engine manufacturing plant for the Harvey Works of Allis-Chalmers Manufacturing Co. The new facility will add 515,000 sq. ft. to the 654,000-sq. ft. area of the two plants which comprise the Harvey Works at present



"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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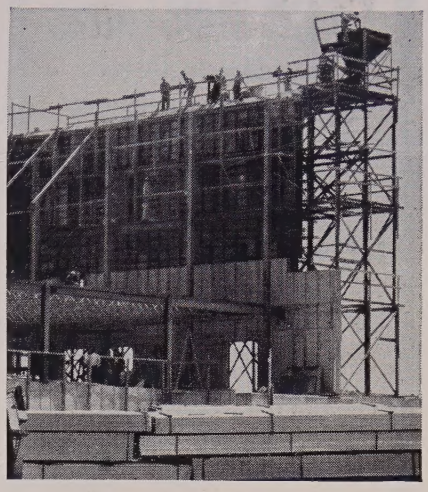
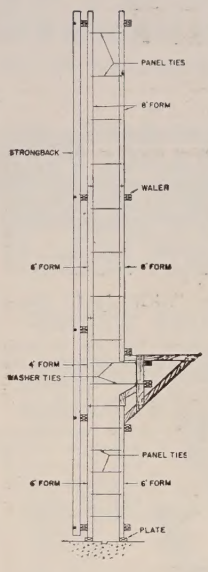
Saved! One Month



Extensive Use of Symons Steel-Ply

. . . Speeds Work on "Rush" Job

New, non-military, air route traffic control center building near Fremont, California will help control and direct aircraft, prevent collisions, and guide "lost" planes over a wide western area. J. H. Pomeroy & Co., Inc. San Francisco was the contractor.



The project was unusual because of the speed with which it had to be erected. The building is perhaps the first non-military structure in the west that has been designed to withstand atomic "fallout." The contractor gave careful study to the most time-saving methods. Symons Steel-Plys proved to be one of the principal time-savers. They were used on all major construction and were also adapted for pouring of large, reinforced concrete beams that were set between steel columns for blast protection.

Complete "Air Route Traffic Control Center" story sent *free* upon request. Symons Steel-Plys can be rented with purchase option.

Symons

SYMONS CLAMP & MFG. CO.

683 Thornton Street, San Leandro, California

Phone LOckhaven 9-9159

Warehouses Thruout the U.S.A.

MORE **SAVINGS** FROM **SYMONS**

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EFCO Steel Forms
available with RETURN OPTION

Satisfaction is guaranteed when you purchase EFCO Lifetime Steel Forms for your concrete forming needs.

NEW CATALOG

Describes and illustrates EFCO Steel Forms and accessories with examples of many uses. Send coupon for your copy.

ECONOMY FORMS CORP. EFCO ECONOMY FORMS

MAIL TODAY

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Box 128-V, H. P. Station
Des Moines, Iowa

Please send new catalog on EFCO Steel Forms, and address of nearest sales office (there are 29 coast to coast).

Name_____

Firm name_____

Address_____

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BUY BIG ORANGE AND YOU BUY THE BEST

SHACKLE CHAIN HOOKS

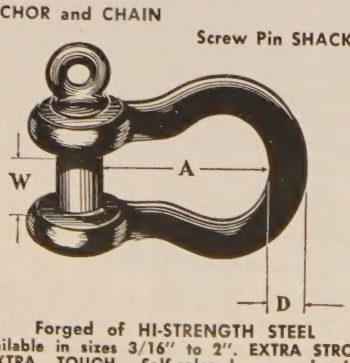
Use on "HIGH TEST" Chain
EXTRA STRONG
Even the pin is made of high-strength steel and heat-treated.

SAVES TIME
Can be attached anywhere on the job. Only a pair of pliers needed.

GRAB HOOKS
Available for Chain Sizes ¼", 5/16", ⅜", 7/16", ½", ⅝"

SLIP HOOKS
Available for Chain Sizes ¼", 5/16", ⅜", 7/16" and ½"

ANCHOR and CHAIN
Screw Pin SHACKLES



Forged of HI-STRENGTH STEEL
Available in sizes 3/16" to 2". EXTRA STRONG —EXTRA TOUGH. Self-colored or galvanized.
Order from your Distributor or Write
MIDLAND INDUSTRIES, INC.
Cedar Rapids, Iowa

. . . for more details, write No. 106

B-G sales assignments

As a further step in its recently announced field sales management expansion, Barber-Greene has appointed two new district sales managers to the Western area. G. Richard Lundberg has been assigned as district sales manager in an area covering the West Coast states, plus Arizona and Alaska. A member of the Barber-Greene organization

Lundberg

Gilbert

since 1957, he is moving his headquarters to the Seattle area. Herb Gilbert operates from Denver, Colo. He came to B-G initially in 1951. In 1955 he was named a district manager, eventually wending his way West and into the Rockies. Each district sales manager is responsible for the sale of all B-G products through the distributors and dealers in his territory.

Napco appoints regional managers

Napco Industries, Inc., Minneapolis, reports the appointment of two regional managers. J. E. Stilwill was named manager for Region 6 covering California, Nevada, Utah, Arizona, New Mexico, Colorado and Wyoming. M. L. Garrettson was appointed manager of Region 7 which includes Washington, Montana, Idaho, Oregon and western Canada.

ROTARY SWEEPER BROOMS

WE MANUFACTURE

- Austin-Western
- Cub Low Boy
- Det-Harvester
- Fordson
- Ferguson
- Grace
- Guttersnipe
- Hough
- Huber
- Jeep-Willy's

$69.50 Up

- Littlefords
- Little Giants
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- Ram
- Rosco
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Special Cores made to order

COCOA ROLLER MATS •
Drag Broom Levelers
Street Push-Concrete Brooms

RE FILLING BUILDING PAIRS

KENNEDY'S
VAN BRUSH MFG. CO. INC.
2728 McGee Trfwy. Kansas City, Mo.

. . . for more details, write No. 107

Chain Belt to market carrier and mixer package

Signing of an agreement with Crane Carrier Corp. of Tulsa, Okla., manufacturer of customized construction vehicles, granting rights to market carriers for the concrete industry, is announced by Chain Belt Co. The carriers will be marketed as a Rex Mixer-Master line through Chain Belt's distributor organization.

New sales representative

A new Western sales representative has been appointed by L. B. Foster Co., national supplier of steel sheet piling, pipe, rail and track accessories. He is William J. Bedford who will operate from the Los Angeles office.

Major appointments by Marion

Two major executive appointments for the Marion Power Shovel Co. division of Universal Marion Corp. are announced by James Mullaney, president of Universal Marion. Adrien F. Busick, Jr., formerly executive vice president and general manager, is now president and general manager of the division. David Reich was appointed assistant to the president of Universal Marion Corp., at the same time retaining his position of vice president-administration of the division.

W. D. Lease appointed CIMA director

W. D. Lease, executive vice president and director of Athey Products Corp., Chicago, has been appointed a director of the Construction Industry Manufacturers' Association.

H. W. King appointed Worthington vice president

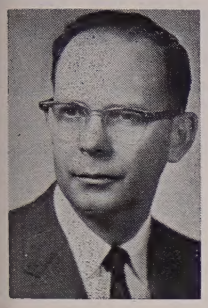
Recently announced is the appointment of H. W. King as a commercial vice president of the Worthington Corporation. King is Western regional sales manager of the firm with offices in San Francisco.

Landers heads marketing dept.

G. J. Landers has been named manager—marketing department, a new position formed in Blaw-Knox Co.'s Construction Equipment Division. Landers' headquarters is at Mattoon, Ill., where the B-K Construction Equipment Division offices and production facilities are located.

R. L. McKillip moves West for U. S. Steel

Appointment of Richard L. McKillip as construction materials engineer for Columbia-Geneva Division of U. S. Steel is announced. He has been sales engineer for the Chicago district sales office since 1954, and is now changing his headquarters to San Francisco.



Richard L. McKillip

Moline purchases Lamson Mobilift

Minneapolis-Moline Co. has added a $3,000,000 annual volume to its expanding manufacture of materials handling equipment through the purchase of the fork lift truck business of Lamson Mobilift Corp. of Portland, Ore. A Materials Handling Equipment Division was established by Moline in 1959. In January this year the company acquired the John Morrell Manufacturing Co., and now offers fork lifts powered by diesel fuel, LP gas, gasoline and electricity.

Waukesha moves Los Angeles branch

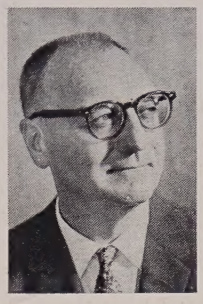
Announcement is made that Waukesha Motor Co.'s Los Angeles branch headquarters has been moved into its new building in Huntington Park, Calif., located at 5608 Soto Street.

Bill Nelson joins Columbia Steel

Appointment of William G. Nelson as Southwestern sales representative of Columbia Steel Casting Co., Inc. of Portland, Ore. is announced. For the past 14 years Nelson has been servicing the trade in Southern California, Arizona, New Mexico, Nevada and west Texas, specializing in replacement of parts for crushers, tractors, shovels, etc. His long experience will be of particular value to Columbia customers.

Pacific Coast staff changes by White Motor Co.

Several personnel changes in its West Coast staff are announced by The White Motor Co. Rejoining the company is William C. "Bill" Hagens who has been appointed manager of the San Francisco branch wholesale territory. He replaces Ken Strother who recently was promoted to head White's Portland, Ore., branch. Raymond D. Schmitt, service manager of the San Francisco branch, will fill the newly formed post of regional technical service engineer. William Hubka of the Los Angeles branch steps up into the post vacated by Schmitt.

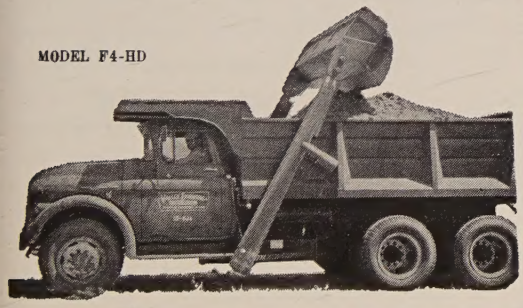


William C. Hagens

HIGHWAY CONSTRUCTION or CITY MAINTENANCE

CONVERT YOUR TRUCKS TO SELF LOADERS and DOUBLE WORK LOAD with FROST LOADER SHOVELS

MODEL F4-HD



MODELS
F4-HD
4000 lb. lift
1 yd. capacity
FC-4
Clam Attachment
2500 lb. lift
1 yd. capacity
F4
2500 lb. lift
¾ yd. capacity

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.

DISTRIBUTORSHIPS NOW AVAILABLE

P B LOADER MFG. CO.

P.O. BOX 341 FRESNO. CALIF.

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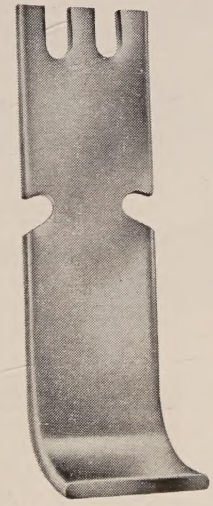
SEAMAN-ANDWALL

PULVI-MIXER OWNERS

SAVE MONEY

WITH



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STERLING STANDARD OF QUALITY

REVERSIBLE TINES

ORMCO QUALITY is "built-in" these replaceable, reversible tines for the Seaman-Andwall PULVI-MIXER. ORMCO, Heat-Treated, 3/8 x 3-in. forged spring steel tines are combination right or left in both 3 and 4-inch types. The extra-long wearing life and reversible features of the ORMCO Tine provide greater production at lower cost by reducing replacement "down time." ORMCO TINES are unconditionally guaranteed to give you this service.

CONTACT YOUR DISTRIBUTOR OR WRITE TO:

ORENDORFF MANUFACTURING CO.

P. O. Box 58186
Los Angeles 58, Calif.

P. O. Box 187
Amarillo, Texas

. . . for more details, write No. 109 on Reader Service Postcard

Transfer brings new appointments

A series of appointments beginning with transfer of Pete Conner from Hyster Company operations in Danville, Ill., to San Francisco, are announced. Conner's new post is

Pete Conner

that of office manager of the firm's retail Industrial Truck Division dealership. Filling his former place in the Danville sales department office is Ted Burmeister, who was advanced from the position of factory parts manager. This latter position is being filled by Robert Strawser who joins Hyster following 14 years as president and general manager of Fountain Foundry Corp.

ESCO promotes Grubb

Norval T. Grubb has been appointed to the position of manager of the Construction Equipment Di-

Norval T. Grubb

vision of Electric Steel Foundry Co., Portland, Ore. He has been assistant manager of the division since 1956.

American Cement acquires two ready-mix firms

American Cement Corp, announces the acquisition of M. F. Hickey Co., Inc., New York City, and Graham Brothers, Inc. of Los Angeles. Both companies have been active in the ready-mix concrete business for more than 40 years. Graham Brothers is also a large producer of sand and gravel. The companies will operate as subsidiaries of the parent company.

CLASSIFIED

Space is sold as advertisers inches. All advertisements in this section are 1/8 in. short of contracted space to allow for borders and composition.

Rates are $15.50 a column inch. Copy should be sent in by the 15th of month preceding publication date.

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GENERAL MGR.—CIVIL ENGINEER

IMMEDIATE opening for qualified take-charge applicant in leading commercial and industrial general contractor's organization, located in Arizona. Will be responsible over estimating, bidding, purchasing, sub-contracting and organizing projects.

State experience, resume, references and expected salary. Write Box 4A, WESTERN CONSTRUCTION, 609 Mission Street, San Francisco 5, Calif.

OFFICE-MANAGER and CONTROLLER

Leading southwestern U. S. Building Construction Firm has IMMEDIATE opening for qualified applicant experienced in controllership functions, CPA desirable. Background of General Contracting Accounting Methods very essential. Submit resume, detailing education, experience, references and expected salary. Write Box 4B, WESTERN CONSTRUCTION, 609 Mission Street, San Francisco 5, Calif.

POSITION WANTED

EQUIPMENT MANAGER

General equipment superintendent for heavy construction fleet. Set up and control equipment costs. Purchase new and used equipment. Supervise complete maintenance operation. Modify and design special equipment. Write to Box 4C, WESTERN CONSTRUCTION, 609 Mission Street, San Francisco 5, Calif.

FOR SALE

4000 POUND B.G. BATCH-O-MATI PLANT

Including:

(1) Barber-Greene Model 894 mixing tower unit with hot elevator, mineral filler attachment.

(1) Barber-Greene Model 837 portable drier less wheels and tires with 78' feed conveyor high pressure atomized oil burner. (We have prices for conversion to natural gas or low pressure air.)

(1) Barber-Greene Model 857 dust collector, high pressure cyclone type. Plant is completely automatic, completely electrified with all motors, controls and wiring. This unit was traded on larger plant because of increased production needs. It has been excellently maintained, and is in splendid condition. A number of spare parts, such as complete set of pugmill paddles and tips, are included in the price of $82,500 loaded on truck at plant site.

A 6 conveyor, 4 product blending system is also available for this plant with all electric motors, controls, interlocks, etc. $4,450.

For more information write, wire or phone collect

GERRY MOORE

H. W. Moore Equipment Company

5990 Colorado Blvd. Denver, Colorado ATlas 8-0771

WRECKING 7 TD EUCLID

CONTACT LABRUCHERIE TRUCK SERVICE, 2463 MARIPOSA ROAD, STOCKTON, CALIF. TELEPHONE HOward 6-3521.

FOR SALE

Used Douglas fir timbers in excellent condition. Approximately 1,500,000 board feet in 10" by 10"—10" by 12"—12" by 12" and 12" by 16" —up to 40 ft. long.

C. S. HEINZ, JR. CONSTRUCTION CO. INC.

P. O. Box 277, Vernonia, Oregon
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New structural component available

Plywood Fabricators Service, Inc., Chicago, has acquired the manufacturing rights for Trofdek, a new structural building component capable of 50-ft. clear spans. The product is available on an exclusive basis from subscribers of PFS, an affiliate of Douglas Fir Plywood Association, Tacoma, Wash.

WESTERN CONSTRUCTION'S CLASSIFIED SECTION BRINGS FAST RESULTS!