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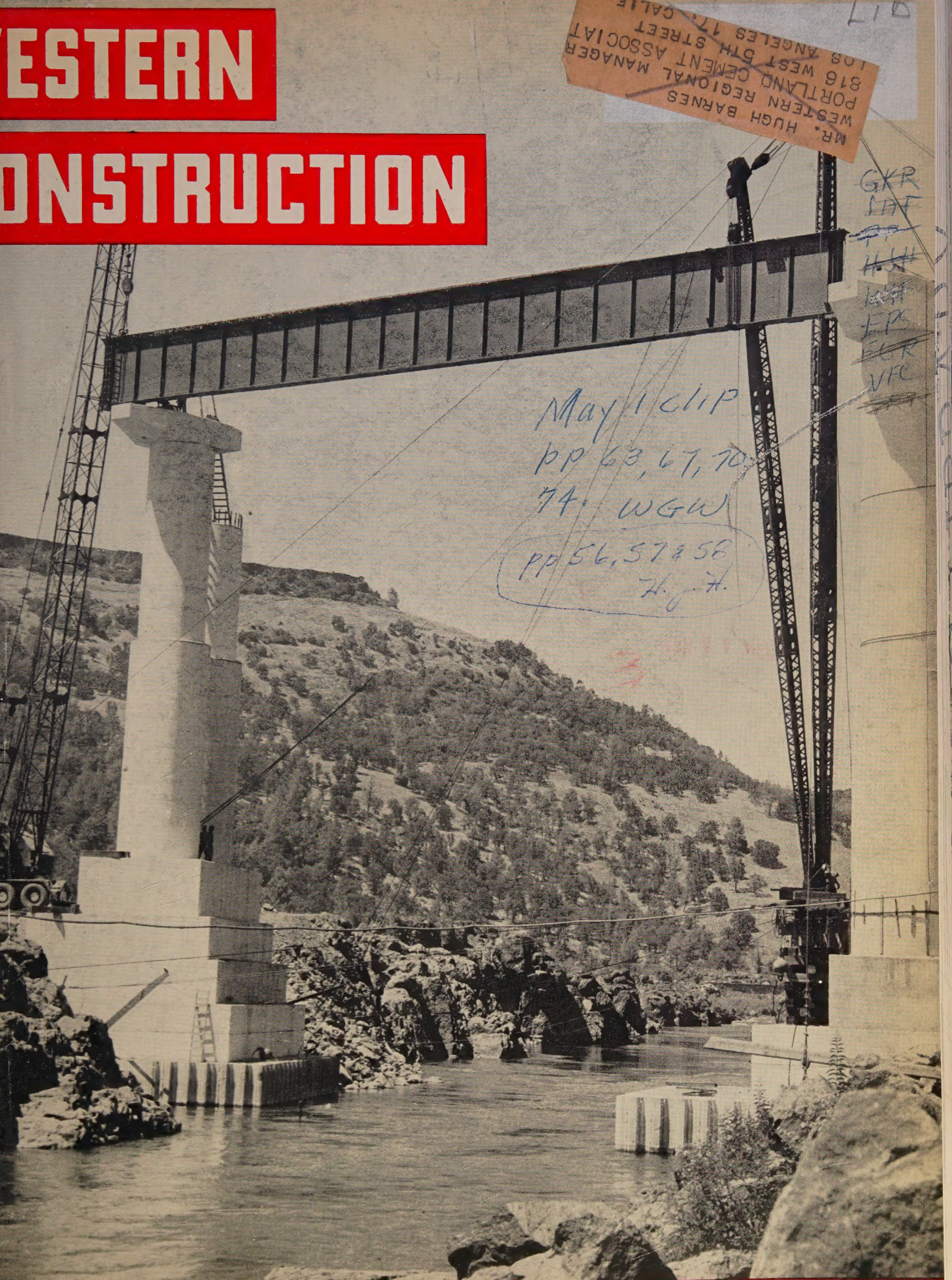

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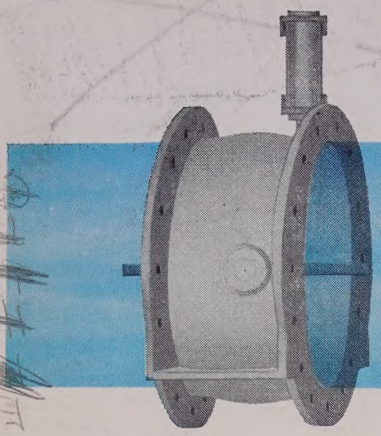

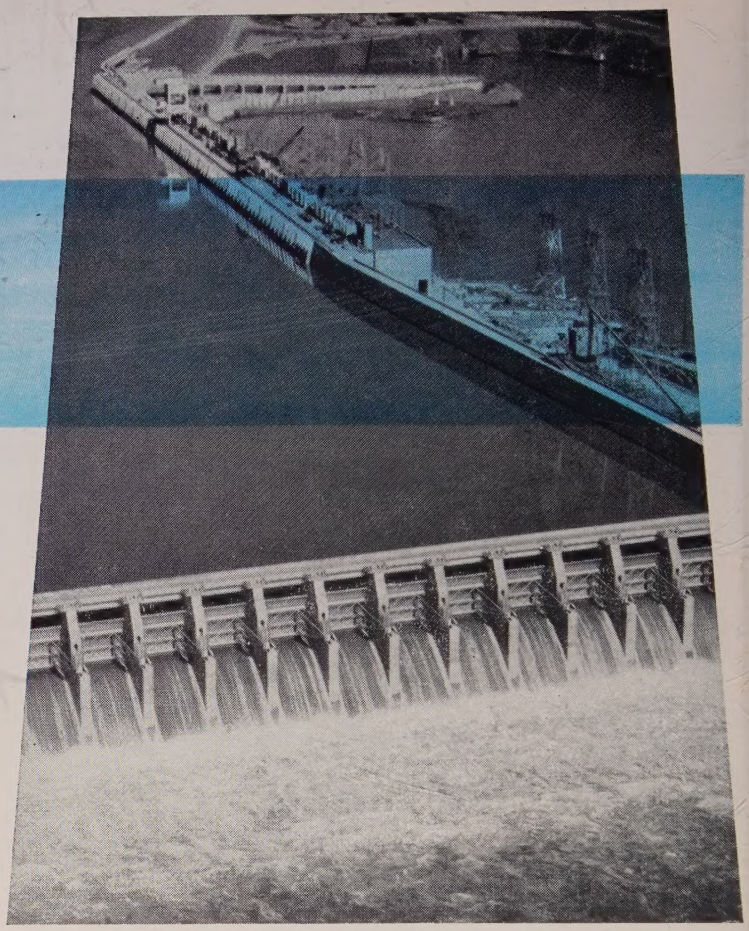

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The inside-mounted "64" Dozer is under full hydraulic control—tilt, angle, and lift. Tilt or angle can be changed on the go with a touch of a lever.

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WESTERN CONSTRUCTION

MARCH
1960
Vol. 35 No. 3

CONTENTS

COVER—With a guyed derrick at one end and a P&H crane at the other, this 125-ft. girder is being lifted 70 ft. into place. The bridge will carry the relocation of the Western Pacific Railroad over the Feather River as a preliminary of the Oroville Dam project. See page 96 for article.

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

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★

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

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

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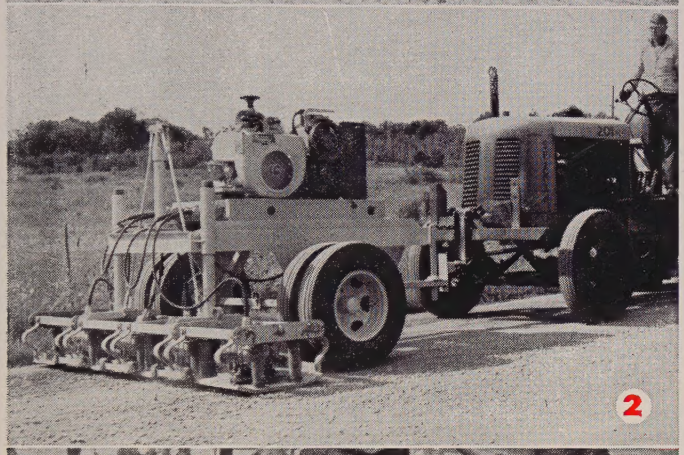

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On any major paving project involving the compaction of granular soils, from sand to large rock, or soil-cement mixes the JACKSON MULTIPLE VIBRATORY COMPACTOR will save its cost in jig time. It's faster in attaining 100% specified density, more economical to operate and maintain, and has far greater job adaptability than any other machine. Vibratory units can be arranged to exactly fit the job — individual units manually operated to reach the otherwise inaccessible spots. The machine operates in either direction — no turning required; and each vibratory unit supplies 4200 3-TON BLOWS per minute.

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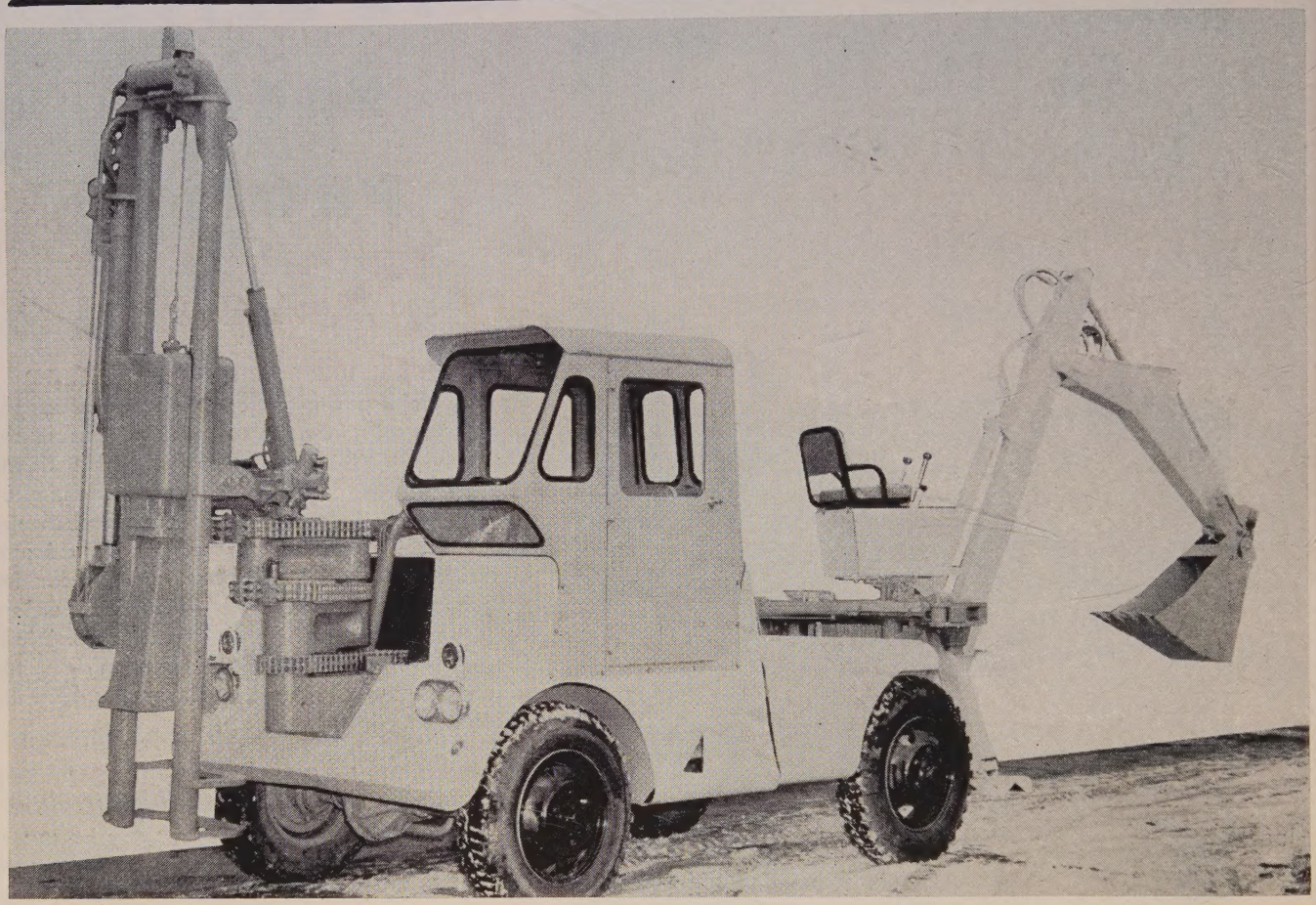
NEW EQUIPMENT

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



Ottawa announces Commando prime mover

A new prime mover unit with a complete line of contracting accessories has been announced by the **Ottawa Steel Division** of **Young Spring & Wire Corp.** With the name "Commando", the unit is completely new with rugged and functional design. It has a husky power plant, massive power train, a heavy-duty set of axles and weighs 9,200 lb. One of its most important features is the power train that combines the advantages of high speed truck operation and the high torque, low speed of a tractor. This is secured by a shuttle transmission which permits full power hydraulic creep and solid direct drive or torque converter drive.

The unit turns in a 24-ft. circle and is available in two- or four-wheel drive. Speeds range from a controlled creep at full throttle up to 35 mph. Steering and shifting is handled by hydraulic power.

Many accessories—Uni-Tools—are available for the Commando and others are planned. These can be used either single or in combination to make the unit available for a wide variety of construction jobs. For example, the Hydra-Hammer is a powerful unit for breaking, tamping, or pile driving. It works the full width of the machine without tilting the tower.

The Commando is also a propelled backhoe digging 12½ ft. deep with a 190-deg. swing. It can also be used as a truck and a crane, for self-loading and unloading of pipe, steel, or forms. Other units that can be used with the Commando include a tower for serving utility companies and other overhead work, a sweeper, snow plow or dozer.

Selected dealers in key cities are to provide modern service and parts facilities, with factory trained servicemen available by "airlift" to supplement the dealer service where necessary.

. . . Write No. 150

Steel shoring at double strength

Double the load-bearing capacity of standard frame scaffolding is available in the new heavy-duty, tubular steel frame shoring line introduced by **Safway Steel Products, Inc.**

In addition to handling bigger jobs, any given load can be supported on half as many frames because of the 100% greater capacity. This reduces the capital investment required, and permits corresponding sav-

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OHIO—Roll-O-Matic Tandem and 3-Wheel Rollers working on Routes #3 and #62 access roads near Columbus.

FLORIDA—Galion T-500 Grader working on construction of Route #1.

MICHIGAN — T-600 Grade-O-Matic Grader with sand tires on Route #12 near Battle Creek.

..with GALION Graders and Rollers

There's a mighty good reason why the name GALION is a familiar one on graders and rollers working on major construction projects across the country. That reason is their ability to help pull contractors out of tough situations caused by unexpected delays and rigid completion schedules.

GALION Graders and Rollers have the built-in stamina and reserve power to make up lost time by working at full capacity without let-up all day long. Their ease of handling and precision control enable operators to set performance records, get their job done on time and profitably.

See your Galion Distributor for complete information on the Galion ROLLER RENTAL Plan.

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CALIFORNIA—Galion Tandem Roller working on Dunsmuir project, Route #99.

WYOMING—Galion Roll-O-Matic Tandem Roller working on Highway #87 near Cheyenne.

TEXAS—T-700 Grade-O-Matic Grader working on Highway #75 near Huntsville.

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The WEST from WASHINGTON

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

The American Institute of Architects has jumped in—a little obliquely—to the growing battle in Washington over the use of consultants and other professionals in the construction industry.

AIA moved into the fight over a matter of particular interest to the West: The employment of outside architects by the Bureau of Indian Affairs for the design of schools and other facilities. Under a year-old policy, all contracts for the services of private architects have been cancelled, on grounds that it is cheaper to use government-paid people and "stock" plans.

Said George Wright (of Stanley and Wright, Albuquerque, N. M.): "The claim is that it is cheaper to use government architects than private . . . ones. Government architects can prepare standardized plans for each type of building needed. The claim is false, and the reasoning erroneous. . . ."

Policies of the Bureau of Indian Affairs, as you know, are at the moment a side-issue of the main battle, which has centered around the Bureau of Public Roads. But they are indicators of the quick spread of a general attack on consultants which began last fall, with a report by the General Accounting Office which criticized fees to consultants as "open invitations to overdesign" in efforts to increase the amount of fee.

The criticism was echoed by Virginia's Harry F. Byrd—the acknowledged Senate financial expert; and was bolstered further by another GAO blast, aimed at Pennsylvania, Maryland and other Eastern states for excessive use of consulting engineers.

The American Society of Civil Engineers, the American Institute of Consulting Engineers, American Road Builders, and now AIA have leaped to the defense of the consultant.

But, to many a politician looking for election-year issues, the consultants continued to appear as a tempting target: The general public does not understand the consultants' refusal to bid or attempts to equate themselves with the practices of other learned professions.

* * *

And if you're dealing with the military, it'll pay you to watch the progress of Rep. F. Edward Hebert's (D. La.) HR 9682, which would curb "selling" by retired military personnel.

Reflecting Hebert's own—and that of many other Congressmen—long irritation with ex-military men getting lucrative jobs in private industry on the strength of their knowledge of government procedures and people, the bill will undoubtedly affect any firm dealing with any government agency, if it gets through.

Key is a definition of "selling": "All activities which bring a contractor and his representatives into contact with the Department of Defense for the purpose of obtaining contracts . . . for procurement of tangibles or intangibles. . . ." Presumably the "intangibles" would include engineering services.

Hebert's own Armed Services Committee, to which the bill was referred, is aiming especially at aircraft and missile manufacturers. But the construction industry—so heavily involved in missiles, for instance, can't escape tarring with the same brush.

* * *

As expected (see February column) the President's budget message showed a very slight loosening in the Administration's normal ban on "new starts"—but the loosening was comparatively very slight. Six new Bureau of Reclamation projects were programmed, to cost $4.5 million in their first year; there was some loosening of Army Engineer investigations. But out of a total of nearly $7 billion earmarked for federal construction (including highways and military), that was a pretty small proportion.

Overall, Western states will get most of the $226 million set up for BuRec; about $8.4 million of Army navigation spending (including a $1 million project at Kahului Harbor, Hawaii); and these other statewide totals out of the $742 million Army civil works programs: Alaska, $1.1 million; Arizona, $265,000; California, $57.7 million; Colorado, $185,000; Hawaii, $1.7 million; Nevada, $154,000; New Mexico, $6.1 million; Oregon, $30.1 million; Texas, $42.1 million; Utah, $35,000; Washington, $77.5 million.

Of course, that's not all of the federal construction money that'll be flowing west, even discounting the highway program. The Fish and Wildlife Service, for instance, will spend $1.4 million on Lower Columbia fish sanctuary programs; a good share of the $89 million set up for the National Aeronautics and Space Agency will be spent in the West; and there will be money for ending stream pollution, hospital construction, and much straight military construction.

But in all of this, keep in mind that the President's budget is only a guideline, and very often bears no relation to the actual appropriations that Congress makes. Chances are that this year Congress will consider Mr. Eisenhower's budget as an absolute minimum—and will work upward from there.

* * *

Although the Senate Select Committee on National Water Resources (January column) hasn't yet turned out a report of its own (and won't until near the end of the current session, by all appearances) it has generated some very valuable reports from other government branches.

One of these, just released, was prepared by the U.S. Geological Survey, and gives water data for every state in the union, including maps, flow of streams at selected stations, and maximum and minimum discharges. It would be a valuable addition to the files of any engineer concerned with the problem. Official title is "Committee Print No. 4, Surface Water Resources of the U. S.," printed for use of the select committee.

* * *

Because of the facts of life in the political year of 1960, you can expect a greater impact from the sixth annual National Legislative Conference of the AFL-CIO's Building and Construction Trades Council, early this month (March 14-17).

The union men are taking particular aim at the famous Denver Building Trades Rule of 1951 (concerning employment of union and non-union men on the same job). But they also will push hard for other basic labor law changes, a housing and an aid-to-education bill, and a bill to aid depressed areas by construction loans from the federal government.

As you may know, the "conference" usually consists of bringing

Scrapers make mountain hauls

A canal across a mountain! That's the job this contractor's doing in Colorado. Brannon Construction Co. is building an irrigation canal from Vega Dam near Collbran to agricultural areas 18 miles away. To make the mountain job even tougher the canal path is mostly rock. Hauls are short—1000 feet maximum. There's little room for turning.

Brannon Construction got set for the job with a spread of three Caterpillar D8 Tractors, two No. 90 Scrapers, a D9 and a D7. A Cat No. 12 Motor Grader—used for sloping the canal sides—completes the spread.

Each D8 pulls a No. 90 Scraper, while the D9 backs them up with its mighty pushloading force. The D7 dozes and pulls a sheeps-foot roller. This efficient spread moves about 4500 yards a day. Even with tricky mountain maneuvering, scrapers make 5 to 6 minute cycles.

This application is another demonstration of the efficiency of crawler-drawn scrapers—on the short hauls, for the rough ground and underfoot conditions that are mean and tricky.

This is exactly the kind of going that Cat crawler-scraper combinations can convert to high production. They're self-loading or, for even higher production, they can be pushloaded. And with the added brawn of recent improvements, Cat crawler-drawn Scrapers haul bigger loads, last longer. Your Caterpillar Dealer has four-wheel Scrapers to match the D9, D8, D7 and D6 Tractors and to fit different hauling needs. And he has the tractors to match any job that comes your way! New 335 HP D9 Series E . . . the new D8 Series H—up 44 HP to 235 . . . the 140 HP D7 Series D. See your Cat Dealer for the quality equipment . . . before you bid on your next tough job.

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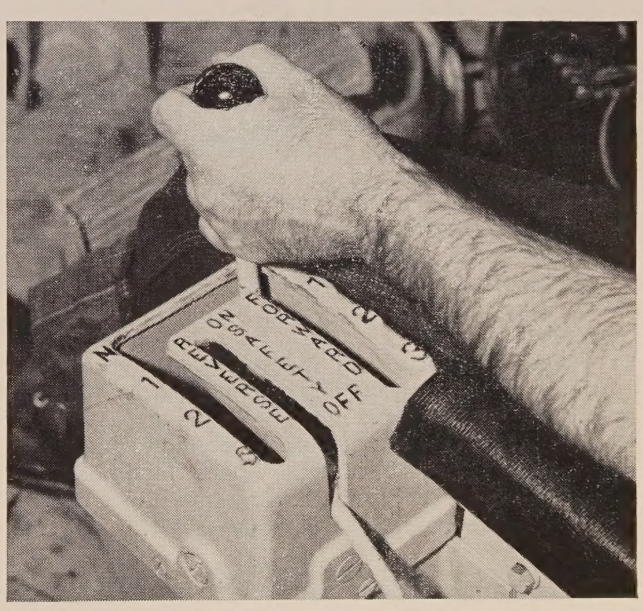

POWER SHIFT TRANSMISSION MAKES THE D8 AND D9 EVEN MORE NIMBLE

Shift on-the-go under full load in a split second. No more clutching. Shift in a single motion with a flick of the selector lever. Even when conditions are as tough as those above, operators will move more dirt with the new Cat power shift transmission.

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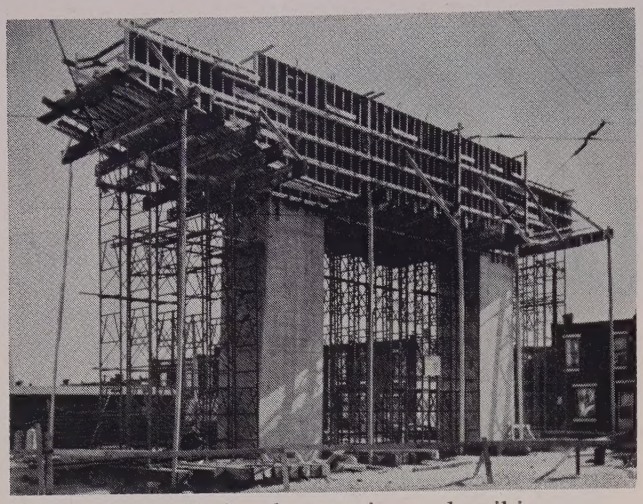


ings in time and labor for erection and striking.

The versatile Safway shoring method also offers a series of practical new assembly features that save time and cut costs in shoring beams for bridges and overpasses, floor slabs for industrial buildings, and other heavy concrete structures.

Despite the increased capacity, all component parts are made in sizes and weights that are easy to handle, assemble, dismantle, transport and store. The largest frame weighs only 69 lb.

New Safway heavy-duty shoring combines the load capacity of post-type shores with the stability and erection efficiency of frame-type scaffolding. Although scaffolding, the new heavy-duty equipment is made scaffolding, the new heavy duty equipment is made from tubing of larger diameter and having thicker walls. Also, end-frame legs are spaced closer together.

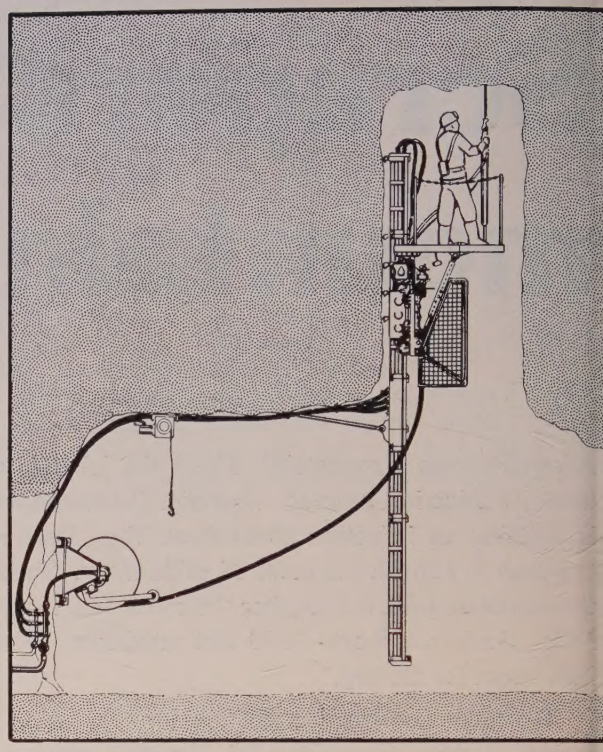
Each frame safely carries up to 20,000 lb., as compared with the 10,000-lb. capacity of standard Safway scaffold frames. Load capacity is figured with a safety factor of 3:1. The load may be distributed with 10,000 lb. on each leg, or with 5,000 lb. on each leg plus another 10,000 lb. on the top chord or horizontal member of the frame.

Fine adjustment of the shoring height may be obtained with heavy-duty screw jacks at the top, bottom or both, adjustable through a range of 24 in. Jacks are available with fixed or swiveling heads for every job requirement. The bottom frame can also be mounted on a new heavy-duty base plate when no jack is needed.

New U-shaped steel saddles are also available for time-saving convenience in mounting ledgers and joists. Ledger saddles mount with wing nuts to the flat heads of screw jacks at the top of the shoring assembly. They provide a 4¼-in. wide stocket for holding standard 4-in. wide ledgers or 4-in. rough lumber. Nail holes are provided. *. . . Write No. 151*

Unique platform for driving vertical shaft

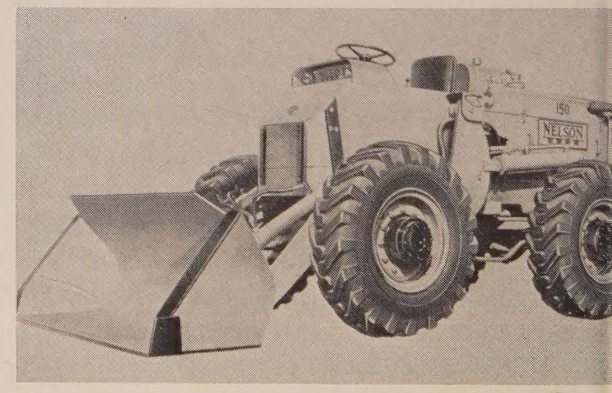
A portable steel elevator which climbs its own set of rails to hoist a drill operator into position to drill blast holes in the top of a rise and then swings back out of the way before blasting is introduced by a Swedish firm, **Alimak Corp.** The unit, known as the Alimak Raise-Climber, consists of a motor-driven steel platform which rides on rails rock-bolted to the side of the shaft. Bottom section of these rails is hinged to permit the platform to be folded back against the tunnel roof out of the way of the blast. Platform is equipped with air, water, electricity and telephone. High pressure water and air system incorporated in



the rails sprays the blast area after a shot to give qu cleanout before the platform is again raised into d ing position. Air and water hoses are brought up the intake part of the guide rail from a remote-c trolled valve station. Hose supplying the air moto fed from a motor driven reel which also has an a matic takeup when the climber is descending. U can be used for driving raises up to 1,200 ft. l Literature available. *. . . Write No*

Tractor shovel has four-wheel drive

A 1⅝-cu. yd. capacity tractor loader has been ad to the **N. P. Nelson Iron Works** tractor shovel l



The new Model 150 is equipped with Nelson un slung arms to give the operator full visibility. It 40 deg. tip-back at ground level and a maximum dumping capacity. Maximum reach at 7 ft. heigh 5 ft. 2 in. The unit is equipped with Allison T matic full reversing transmission providing t speeds forward and reverse and a top speed of 27 per hour. Timken-Detroit planetary axles provid wheel drive. It is powered by a Hercules 107-hp. or diesel engine. Weight of the gas model is 15 lb., diesel 15,900 lb. Literature available.

. . . Write No

(Turn to page 158 for more New Equipment. New Literature can be found on page 150.)

come rock, sand, mud or stumps...

NYGEN-BUILT

GENERAL TIRES

will outlast . . . outdrive any other truck tire ever built!

For top performance at the lowest cost-per-mile, roll your units on General Tires. Built with exclusive Nygen Cord and tread-designed for sure-footed power and traction, General Tires will keep your projects on schedule . . . help insure deserved profits. In construction, logging, quarrying or mining there's no tire to equal General.

THE GENERAL TIRE & RUBBER CO. Akron, O.

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several thousand building tradesmen to the capital, breaking them up into state and election district teams, and sending them swarming over Capitol Hill, for face-to-face discussions with politicians over union legislative demands.

* * *

A widely-hailed device for reducing the amount of air pollution created by automobiles works well — but not well enough to promise relief from automobile-caused air pollution in major cities like Los Angeles, the U.S. Public Health Service has said, in a cautiously-worded report.

Such devices have been promised by the auto industry on 1961 model cars for sale in California.

PHS doesn't disagree with estimates that the device removes 33 to 40% of hydrocarbons emitted by an engine. But it feels that the effect on hydrocarbons created in the cylinders will be small; that it has no effect on olefins—one of the two ingredients of sunlight-triggered smog, comprising about 45% of the hydrocarbons in the exhaust stream; doesn't destroy carbon monoxide.

However, PHS scientists said that the significance of such devices shouldn't be minimized: They emphasize the great extent of the air pollution problem.

* * *

Western congressional delegations didn't even wait for the reception of the budget message, before urging added public works projects for their areas.

Examples: California's Kuchel (who is minority whip in the Senate) immediately urged the Senate Public Works committee to include new authorizations for Army Engineer bank protection work on the Sacramento River; Washington's Representative Don Magnuson pushed for authorization for the Corps of Engineers to review the flood control studies that have been made on a number of western Washington rivers.

And another Washington Magnuson — Senator Warren G. — proposed that Western states take the lead in a national interstate highway compact that would have as its objective the rapid interchange of vehicle and operator licensing information.

Aim is a reduction in the staggering national highway death toll —a toll which Magnuson said can't be controlled by engineering alone.

WESTERN CONSTRUCTION

A Fork in the Highway System Road

TO SAY that the highway program is at the crossroads would be an exaggeration. But it is being subjected to critical re-appraisal. It can move forward at the programmed pace, or it could suffer a detour that would be a serious stretch-out. Final decision rests with people who are unaware of this situation—the general public. Congress holds the power to make the decision, but the pressure needed to maintain the program, or the failure to supply support will come from the people back home.

The dramatic concept of the Interstate System was sufficient to win strong public backing several years ago. Intervening years have seen the pressure leaking out of this support. Today, it will not be enough to give the average car owner a repainted picture of a network of super highways stretching across the country. That concept has lost its punch in building back public demand. It will be necessary to present factual evidence of tangible advantages—cold figures of monetary gain—to impress the public.

For example, just to state an isolated fact: How many citizens of Utah know that traffic accidents in 1959 cost $32.60 for every man, woman, and child in the state, according to figures of the Utah State Road Commission? Do they know that such a staggering cost figure can be cut in half on modern freeways of the Interstate type? That kind of information must be driven home forcibly at the grass-roots level. It represents the kind of education which will rebuild public pressure behind the Federal Highway program. All states and all highway agencies have adequate factual information of this type, but the problem remains to get it properly distributed and forcibly presented.

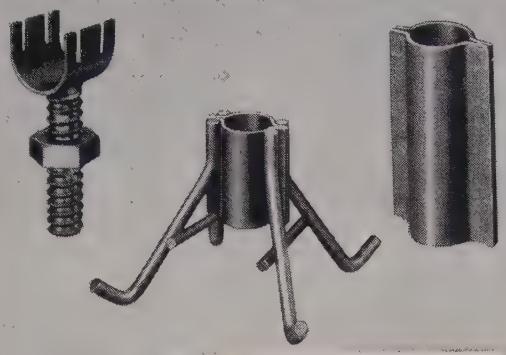
Opponents of the highway program are taking advantage of the present cooling of public interest. This year of politics is no help in the situation. Congressional inquiry and investigations are just beginning and will uncover isolated situations which can be exaggerated and built into real stumbling blocks. Expressions of disappointment and a pessimistic attitude on the part of the public could turn the program down the wrong fork of the road to a serious stretch-out.

On the other hand, a strong local voice coming from all highway users could move Congress into positive steps to keep the program rolling. Such a voice must make itself heard promptly. The average car owner must come to understand and appreciate the real benefits of safety, convenience, reduction in accidents, reduced cost of driving, and such tangible factors if he is to become vocal in his demands.

At this point lies a prime difficulty since organizations most familiar with such information stand to gain most from the highway program and, therefore, tend to be suspected in various degrees. They are not in a position to set up an educational drive on their own. Understanding this difficulty, the American Road Builders' Association has initiated a plan which could become the united effort of all elements interested in highways. It instituted an Advisory Committee some months ago, which is being modified to function as a Foundation to inaugurate the needed educational program.

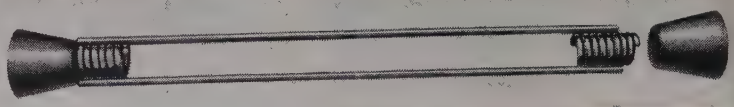
The first step will be to sell the tangible benefits to civic leaders, clubs, fraternal, service and safety groups. They, in turn, are in the proper position to secure the attention of the public as they pass the word along. This plan may represent the pivotal point in the highway program and must be implemented promptly. It deserves the support of all elements in the highway building field.

Jim Ballard

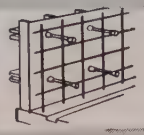


HEAVY-DUTY SCREED SUPPORTS

Overpasses and Underpasses

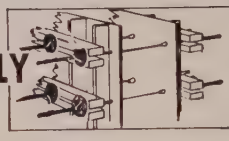


THREADED COIL TIES



Engineering Structures

SHE BOLT ASSEMBLY



Heavy-Duty Forming

4-STRUT COIL ROD ANCHORS

Temporary or Permanent Anchorage

PLATE HANGER FRAMES

Bridge Superstructures

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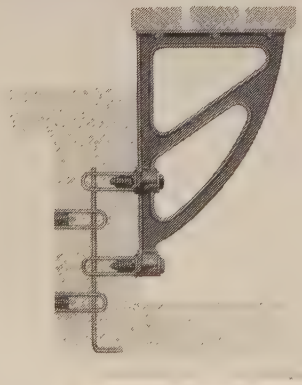
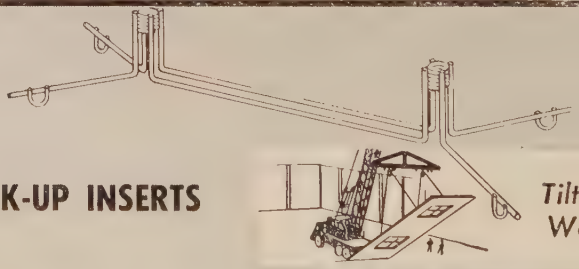


RISER-FRAMES

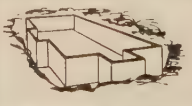
Stadiums and Grandstands



PICK-UP INSERTS

Tilt-Up Work

SNAP TIES

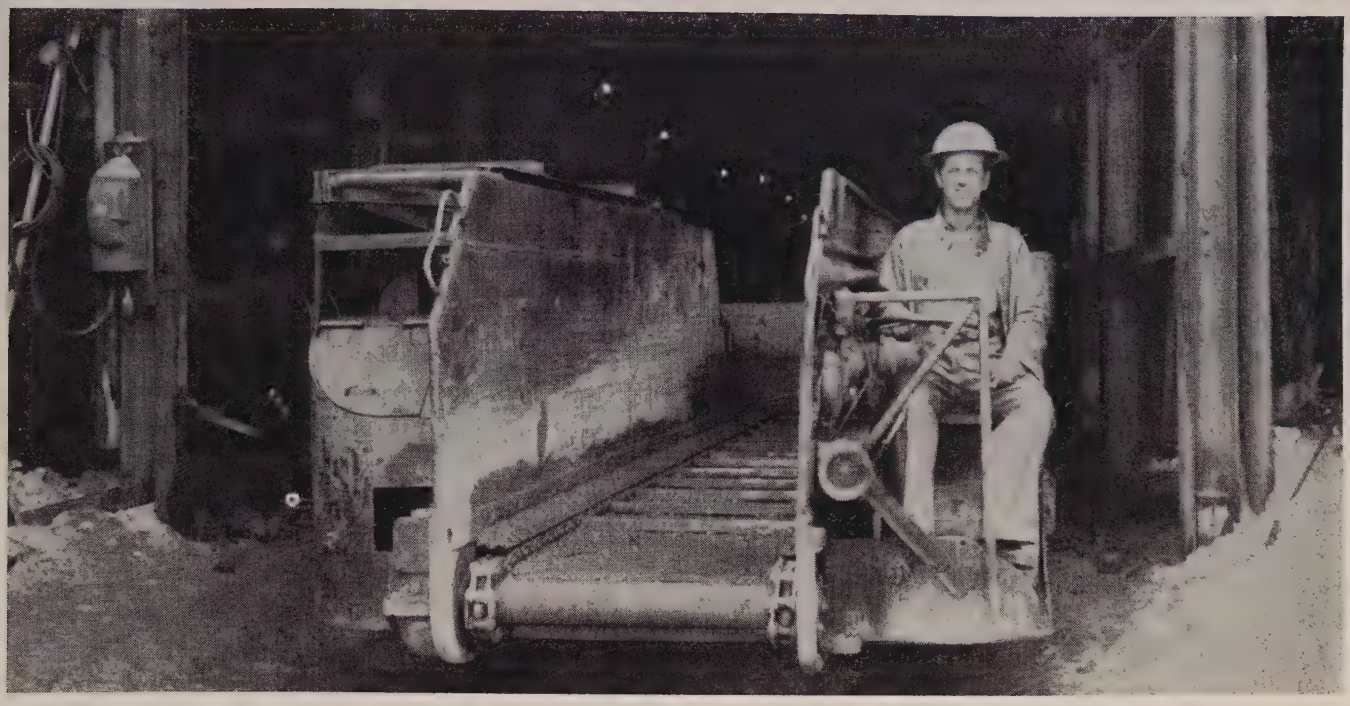


Ordinary Foundations

KING PUBLICATION

WESTERN CONSTRUCTION

MARCH, 1960



VIEW OF EMPTY shuttle car shows operator's position, and the sliding-bar type conveyor which runs the length of the car. Common in mining, car is being used for first time in long construction tunnel. In lining operation cars carry concrete by use of bulkhead at open end.

Jaybird Tunnel rigs run on rubber

Contractor Frazier-Davis borrows an idea from the mining industry and is hauling muck with diesel-powered, rubber-tired shuttle cars. After 16,000 feet of tunnel driving, it looks as if advantages outweigh disadvantages. Project is part of Sacramento Municipal Utility District's $85,000,000 construction program, with design and construction by Bechtel Corporation.

IN THE MOUNTAINS east of Placerville, Calif., a tunnel project is under way which represents a major departure from established tunnel practice. Frazier-Davis Construction Co., driving the 21,100-ft. long Jaybird Tunnel for the Sacramento Municipal Utility District, is using a fleet of 8 diesel-powered, rubber-tired shuttle cars for hauling muck. There is nothing unusual about the machines themselves — they are commonplace on mining projects — but their use on a tunnel of this type (14-ft. diameter horseshoe) is unprecedented. Use of the shuttle cars solves some old problems and creates some new ones, but after more than a year's work the contractor seems convinced that the advantages are paying off. This is indicated by the fact that the contractor recently submitted a bid on another tunnel project using the same method.

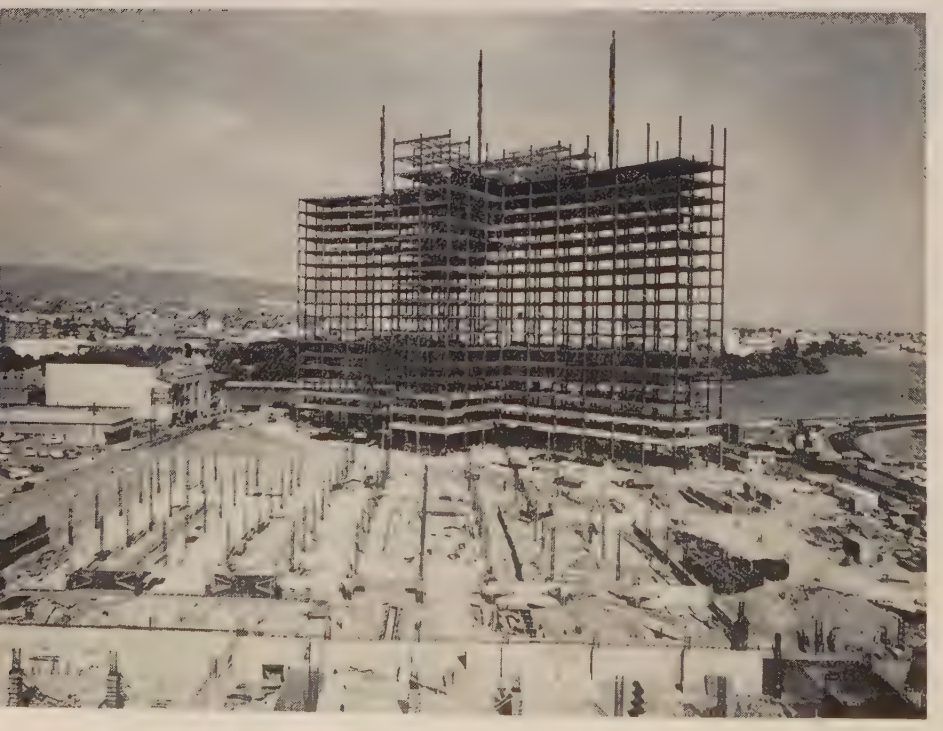
Power system

Jaybird Tunnel when finished will carry water from the reservoir behind Junction Dam to Jaybird powerhouse penstock. The dam, powerhouse and penstock are under construction under separate contracts. (See following article on overall project). The tunnel will be unlined for most of its length but will have a concrete lining in those sections which require steel supports during the driving. With about 80% of the excavation complete, it is estimated that about 6,000 ft. of the tunnel will be lined with concrete. The tunnel is at a constant 0.25% grade, except for the upstream 4,500 ft. which are at 1½%.

Only one adit was used in the entire 21,100 ft. of the tunnel. Excavation has been completed between the adit and the downstream

GRACEFUL curving front of Kaiser Center on the shore of Oakland's Lake Merritt. The 28-story, 390-ft. office structure has gross area of 976,000 sq. ft., making it the largest building west of Chicago. Curtain walls use 1,230,000 lb. of aluminum. Extension in front houses cafeteria and auditorium.

BOLTED steel framework was erected at a rate more than a floor a week. Building was topped 10 months after foundation was placed, using record 13,400 tons of structural steel. Horizon members were carefully cut to fit prism-shaped b of curved structure.



STEEL skeleton rises 18 floors beyond garage and shopping area. Shop and parking structure will include 704,000 sq. ft. with 5-level garage for 1,200 cars. Wide-flange steel in office building was fabricated and erected by Bethlehem Pacific Coast Steel Corp.

The West's
larges
office
building

FLOATING foundation of the office structure is a steel-reinforced slab 5 ft. thick, 62 ft. wide, and 420 ft. long. More than 130,000 cu. yd. of material was excavated for foundation which was placed 40 ft. below surface. Here transit trucks discharge through chutes into mobile surge hoppers which are used to feed concrete buggies 4 at a time. Subsurface work was done by MacDonald, Young & Nelson, Inc. General contractor was Robert E. McKee, Inc.

AST concrete-dolomite panel weighing 1 ton
oisted into position on building end-wall.
s are mounted singly to permit individual
ment. Window walls use gold-anodized
num and glass tinted gray to cut down glare.

ROOF of garage and shopping center will be landscaped around 10,000 sq. ft. reflecting pool, center. Office building, which has its own telephone exchange and push-button mail system, is equipped for year-around temperature control. It will house Kaiser Industries Corp. and more than 50 affiliated companies. Designer was Welton Becket and Associates.

Upper American River Project

Review of progress on $85,000,000 construction program shows 12 major contracts under way with more to be awarded in 1960 and 1961.

WHEN *Western Construction* last reviewed the Upper American River Project (August 1958) work on the first two contracts was just getting started. Now there are a dozen contracts under way totaling $39,000,000. Bid calls are scheduled on three more contracts in 1960, three more in '61, and four in '62. This article will be a quick job-by-job look at what's going on and what's coming up.

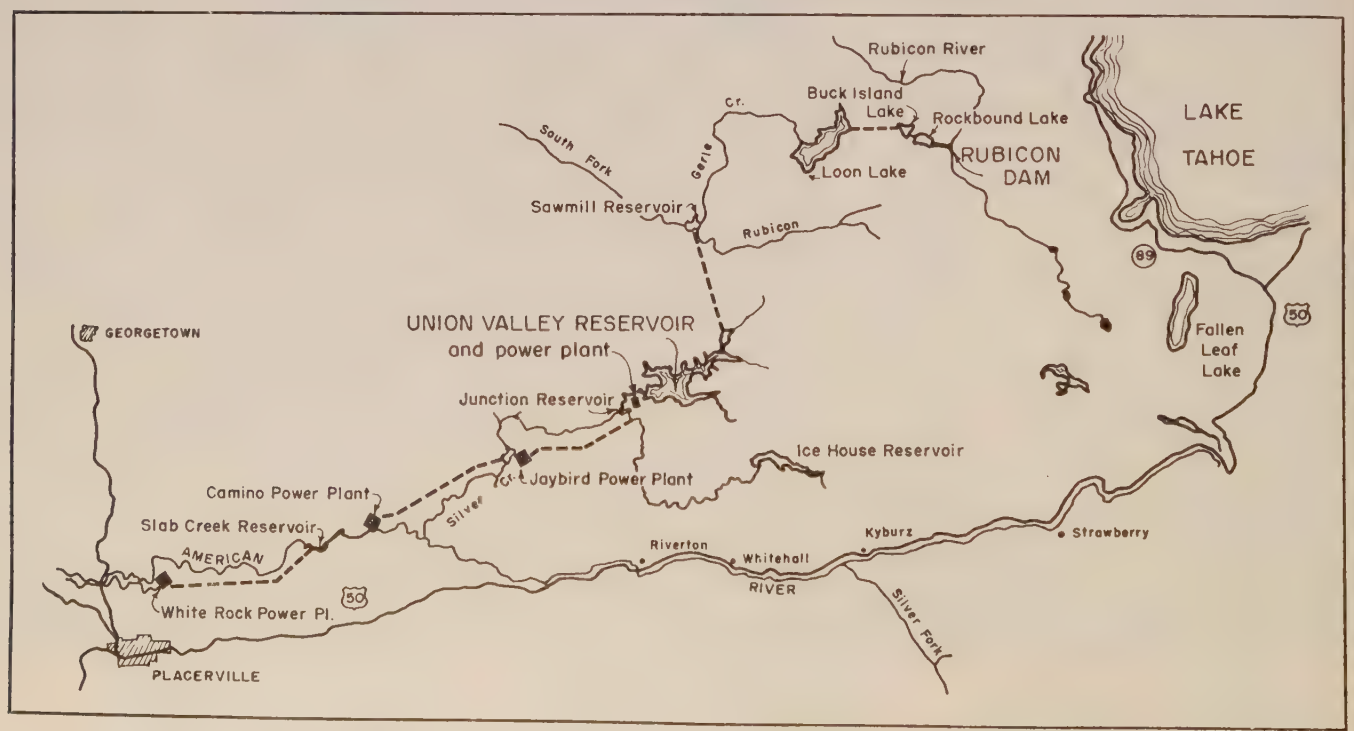
The Upper American River Project is being carried out by the Sacramento Municipal Utility District with the Bechtel Corporation handling the engineering design and construction supervision. The project is located in the mountains between Placerville, Calif., and Lake Tahoe just north of Highway 50. Financing is by an $85,000,000 revenue bond issue approved by voters in 1955. The project consists of nine reservoirs and dams, five water conduits or tunnels and three powerhouses. The project will assure the Sacramento area of a continued supply of low-cost power for many years. Flood water stored in the project dams will be available for consumptive use in the valley below the power plants.

Flood water storage

The project when complete will collect now wasted flood run-off water in what is called the Upper Rubicon Basin. Water will be routed by way of Rubicon Diversion Dam, Rockbound Lake, Buck Island Lake, Loon Lake, Gerle Creek Diversion and Ditch, and connecting tunnels to the main storage unit—Union Valley Reservoir. This reservoir will also collect flood water from the Silver Creek Basin now going to waste. Ice House Reservoir will collect flood water from the basin of the South Fork of Silver Creek. The initial operation of Ice House Reservoir calls for release into the South Fork of Silver Creek and into Junction Reservoir. Under ultimate operation, Ice House Reservoir water can be channeled into Union Valley Reservoir through Ice House-Union Valley Tunnel. Water will be passed through three powerhouses: Union Valley Powerhouse and into Junction Reservoir, by tunnel to Jaybird Powerhouse and into Camino Diversion Reservoir, from there by tunnel to Camino Powerhouse and into Slab Creek Reservoir, on the South Fork of the American River north of Placerville.

Ultimately, under future potential expansion, the water will be diverted again from Slab Creek Reservoir into a 21-ft. diam. 24,000-ft. long White Rock Tunnel. Preliminary designs indicate that White Rock Powerhouse should

FEATURES OF THE SMUD HYDRO DEVELOPMENT PROJECT



SIMPLIFIED MAP shows relationship of major features of the Sacramento Municipal Utility District's Upper American River Project. Dotted lines are (l. to r.) White Rock Tunnel, Camino Tunnel, Jaybird Tunnel, and Robbs Peak Tunnel.

have two 75,000-kw. units operating at 860 ft. of static head.

Project features

RUBICON DIVERSION DAM is a 50,000-cu. yd. rock-filled structure slated for award in 1962. Located at 6,555-ft. elevation, it will be 28 ft. high and 2,900 ft. long at its crest. The dam will have a reinforced concrete apron on its upstream surface. The reservoir will create a lake of 146 ac.

ROCKBOUND TUNNEL is also slated for award in 1962. It will be an unlined 12-ft. diameter bore 1,040 ft. long.

BUCK ISLAND LAKE DAM will be advertised in 1962. It will be a rockfill dam at elev. 6,456, 42 ft. high and 710 ft. long. Preliminary design shows about 15,000 cu. yd. of rock fill which will create a lake with an area of 87 ac.

BUCK-LOON TUNNEL is scheduled for award in 1962. It will be unlined, 12 ft. in diameter, 8,450 ft. long.

LOON LAKE DAM, a rockfill dam 90 ft. high and 2,030 ft. long, will be advertised in 1961. Preliminary design shows about 600,000 cu. yd. of rock in the main dam and 350,000 cu. yd. in an adjoining dike.

GERLE CREEK RESERVOIR DAM is coming up for bid in 1961. The dam will be about 75 ft. high and will have a crest length of 450 ft.

ROBBS PEAK TUNNEL, to be awarded in 1960, will be an unlined 13-ft. diam. tunnel, 17,000 ft. long, connecting the Rubicon River drainage area with Tells Creek arm of Union Valley Reservoir in the Silver Creek drainage area.

UNION VALLEY DAM was awarded to Peter Kiewit Sons' Co. in June of 1959. It is an earthfilled dam, 428 ft. high, with a crest length of 1,860 ft. There is about 10,000,000 cu. yd. of fill in the dam. The contractor is about 75% finished with the diversions tunnel and about 5% complete on the entire project. Low bid was $13,500,000. George Morton is project manager for Kiewit and George Carlson is office manager. Rick Seemel is Bechtel's resident engineer.

ICE HOUSE RESERVOIR DAM was awarded to Gibbons & Reed in July of 1958 for $2,200,000 and is now practically complete. It is a rockfill earth-core dam, 148 ft. high, 1,600 ft. in length. Division manager for the contractor is J. R. Bremner. S. J. Koche is job superintendent, R. J. DeVault is office engineer, and Fred Lasiter is office manager. Bechtel's resident engineer is Fred Gentry.

FIRST BLOCKS of Junction Dam are under construction in a cold-weather concreting program by contractor Fruin-Colnon. The dam will be a concrete arch 170 ft. high, 520 ft. long at crest.

UNION VALLEY POWERHOUSE is coming up for bid in 1960. It will be located at the downstream toe of Union Valley Reservoir Dam and will be connected with the reservoir by 540-ft. tunnel and steel pipe 1,805 ft. long. Peak static head will be 416 ft.

JUNCTION DAM is under construction by Fruin-Colnon under a $1,600,000 contract which is about 15% complete. It is a concrete arch structure on Silver Creek downstream from the confluence of Silver Creek and the South Fork of Silver Creek. It will be 170 ft. high and 520 ft. long at its crest. Project manager for Fruin-Colnon is Robert Brenner, with Lowell Emmert as superintendent. Bechtel's resident engineer is Paul Terrell.

JAYBIRD TUNNEL is a 14-ft. diam. tunnel, 21,100 ft. long, which is under construction by Frazier-Davis Construction Co. under a $5,200,000 contract. The job is about 75% complete and is described in detail in the preceding article.

JAYBIRD POWERHOUSE is under construction by Pacific Bridge on a $2,500,000 contract they received in June 1959. Excavation is 90% complete and the total contract is about 20% complete. Jaybird Powerhouse will have two 88,000-hp. turbines working under a static head of 1,527 ft. For Pacific Bridge, John Dean is project manager, Jess Hoopes is superintendent, and John Hull is engineer. Jack Eakin is resident engineer for Bechtel.

CAMINO DIVERSION DAM, a concrete gravity structure on Silver Creek ½ mi. below Jaybird Powerhouse, will be 110 ft. high and 440 ft. long, creating a reservoir of 17 ac. Contractor is Gibbons & Reed and J. A. Jones.

CAMINO TUNNEL, an unlined 15-ft. diam. bore, 26,600 ft. long, is under construction by Walsh Construction Co. on their bid of $6,400,000 submitted in September of 1959. Access roads for the job are nearly finished and the contractor is just getting under way on his underground work using rail-mounted equipment. Wayne Wilmoth is general superintendent, H. P. Porter is outside superintendent and F. E. Hiesel is project engineer.

CAMINO POWERHOUSE will be advertised for bids in 1961. It will operate under a static head of 1,054 ft.

SLAB CREEK DAM, a concrete arch-type 206 ft. high and 1,200 ft. long at the crest, will be up for bid in 1961. It will be located on the South Fork of the American River and will create a reservoir with an area of 291 ac.

●

Bur. of Recl. completes arrangements to finance dam

TO FINANCE construction of Stumpy Meadows Dam and extension of an existing distribution system, the U. S. Bureau of Reclamation has completed a repayment contract with a small public district in Eldorado County, Calif. The contract provides for a loan of $3,878,000. The work will finance a more dependable water supply for 1,700 ac. now irrigated and bring water to an additional 2,300 ac. within the district. Total estimated cost of the project is $4,695,000.

RUBBER-TIRED shuttle cars show up in this view of mucking operation during portalling-in. Fast-acting Joy JSL7 mucking machine is throwing load into hopper at end of car. Conveyor at bottom of car carries load forward to distribute it evenly. Four cars are used at each heading.

portal and is now being carried forward on two headings from the adit and the upstream intake.

Advantages

The big advantage in using rubbered-tired equipment is, of course, the elimination of rails, along with the expense of materials and labor that they involve. In addition, considerable flexibility is gained in the muck disposal area. However, part of this savings must be invested in keeping the invert of the tunnel smooth so as to avoid excessive maintenance costs on the shuttle cars. A 2- or 3-in. layer of crushed material had been laid down over much of the invert to provide a smooth roadway for the rigs. This crushed material, which was produced by a small portable plant, must be removed before the contract is completed. The contractor estimates that it would actually be economical to deliberately over-excavate the invert a few inches to make room for the crushed material if it were permissible to leave it in place. But, in a tunnel of this type, which will carry water to a powerhouse, all loose material must be removed.

The shuttle cars being used are Joy diesel-electric, Model 60E-12. Each has two 15-hp. traction motors connected to the drive wheels by chain from a sprocket. The engines are equipped with conventional exhaust gas conditioners. The manufacturer states that the cars can carry 14 tons up a 25% grade. The cars have four wheels with two 12 x 20 Firestone tires on the front, and two 14 x 24 Firestone tires on the rear. The front tires are 16-ply and the rear (drive) tires are 20-ply.

This particular model is 8 ft. wide, 25 ft. long, and 60 in. high.

Shuttle operations

In operation, a Joy JSL-7 overshot mucking machine deposits material in a hopper at one end of the car. A bar conveyor along the length of the car bottom pulls the material along the full length at the direction of the operator. The rear of the car is open and dumping is carried out simply by operating the conveyor. Use of a loading conveyor between the mucking machine and the car was found to increase the capacity of the car from 8 cu. yd. to 12 cu. yd. The cars are equipped with job-installed 6-in. high sideboards. The use of sideboards and the loading conveyor do not put an excessive load on the machines because the metamorphic material being carried weighs less than some of the ores for which the cars were designed.

One car at each heading is equipped with a steel channel framework on top which is used to install the 36-in. diameter ventilating pipe. The framework is simply a pin-connected parallelogram which is raised by means of a hydraulic ram operated off the car system.

At the lower end of the tunnel, where concreting of the invert is now under way, concrete is carried in the shuttle cars with the help of a steel bulkhead at the open end. The bulkhead is pivoted at the top and swings open when the conveyor forces concrete against it. When concreting the arch, the shuttle cars will be used to carry 6 cu. yd. agitator buckets.

To permit car passing, the contractor has excavated the tunnel 20

MAJOR EQUIPMENT

Frazier-Davis Construction Co.
Jaybird Tunnel

- 3 Ingersoll-Rand 900-cfm. compressors
- 1 Gardner-Denver 900-cfm. compressor
- 2 Gardner-Denver 600-cfm. compressors
- 1 Ingersoll-Rand 600-cfm. compressor
- 2 Euclid-mounted drilling jumbos
- 10 Gardner-Denver 93 drills
- 2 Gardner-Denver 43 drills
- 1 Caterpillar No. 12 grader
- 4 Joy JSL7 mucking machines
- 8 Joy 60E12 shuttle cars
- 2 Joy PL11-27RE muck conveyors
- 1 Pressweld machine
- 1 Cedarapids portable rock crusher
- 1 Allis-Chalmers HD6 tractor-loader
- 1 Allis-Chalmers TD9 tractor-loader
- 1 Ford 1½-ton flatbed truck
- 1 White water truck
- 1 Northwest 25-ton crane
- 1 C. S. Johnson batch plant
- 4 Joy 75-hp. Axivane fans
- 1 Oshkosh dump-truck

ft. wide and 70 ft. long every 1,000 ft.

The two jumbos are mounted on Euclid trucks and carry 5 Gardner-Denver 93 drills, and 1 Gardner-Denver 143 burn drill. The blast holes are 1¾ in. in diameter and the two burn holes are 5 in. in diameter, located in the center of the pattern.

Shooting pattern

The pattern contains 48 holes spaced about 2½ ft. apart, but more holes are added when the going gets tough. Miners are drilling a 10½-ft. round and breaking about 10.

Ingersoll-Rand and Brunner & Lay carbide insert bits are used and they last anywhere from 20 to 50 ft. before re-sharpening is needed. This means that steel is changed two or three times a round.

Each round takes about 300 pounds of Hercules 40% gelamite 2X. About five pounds of powder are required for every yard broken. Ten tunnel delays are used when shooting. This blasting pattern has very little throw and has sufficient breakage for the ½ cu. yd. mucking machine.

A normal week's progress for the contractor is about 200 ft. per heading. Four shuttle cars work each heading which is adequate for hauls up to one mile. Beyond one mile, there is a lag at the mucking machine between the time it loads the fourth car and the time the first one returns.

For lining the tunnel a 160-ft. form made by Century Steel will be used. The form collapses in 20-ft. sections to a size small enough to be telescoped through the forms still standing. Concrete will be supplied from a C. S. Johnson batch plant equipped with a 1½-yd. Smith turbine mixer. Cement is supplied from Ideal Cement Co.

Winter tunneling trick

One of the tunnel walkers with Frazier-Davis, Al Lamb, has worked out an idea which saves a lot of time in the Monday morning start-up period. The problem is that during the winter months the water lines outside the tunnel freeze up over the week-end. If drilling is the first order of business on Monday morning, there is a wait of several hours while the pipes are thawed. Lamb's idea was to place a water tank inside the tunnel where temperatures stay above freezing, which could be used in case the outside lines are frozen. Finding space for a tank big enough was a problem that was solved by using a 40-ft. section of 3-ft. diameter steel pipe with the ends capped, a shape which permits it to be neatly tucked out of the way along one wall of the tunnel. It contains just enough water to run the jumbo for three hours—the time it takes to get things rolling normally on a frosty Monday morning.

Work proceeds around the clock five days a week with a total crew of about 130 men.

Personnel

Sacramento Municipal Utility District's project organization is set up under the direction of Paul E. Shaad, general manager and chief engineer, with Clyde H. Spencer as project engineer and J. J. Mattimoe, engineer.

Bechtel Corporation has D. S. Culver as project manager over the entire Upper American River Project, with Bill Stinchfield, resident engineer, Dick Deming, assistant resident engineer, and C. L. Jeffs, office manager. Dick Perly is engineer in charge of Jaybird and Camino tunnels.

For Frazier-Davis, contractor on Jaybird Tunnel, Howard Odell is project manager, Ted McCoy is superintendent, Bob McCoy is engineer, and Lew Lentz is office manager. Safety engineer is Tom Warfield. Walkers are Whitey Martin. Ralph Christian, Heiney Fossum. Al Lamb and Guy Hamilton.

(Review of SMUD project follows on next page)

TWO-LEVEL JUMBO, shown at portal, was built from Euclid truck. Each of two jumbos mounts five Gardner-Denver 93 drills and a G-D 43 burn drill for 5-in. burn hole in center of pattern.

MINERS standing on top deck of jumbo set steel arch. About one-third of the tunnel had to be supported. Supported sections will be lined with concrete. Holing through is expected in April.

Re-bars take a new step forward

REINFORCED CONCRETE construction moves forward when significant advances are made in any segment of this broad field. These segments, or the governing influences, extend from the concepts of the architect, through the work of the structural designer to the re-bar fabricator, the general contractor, and particularly the suppliers of steel, cement and concrete.

Any improvement in design technique, field procedure, or an advance in the strength and quality of component materials represents a potential improvement in this type of construction. However, the advance must be recognized, accepted and put into effective use by the other elements. Even a significant advance by any one part of this combined team will not fulfill the potential advantage, unless and until the other members of the team take corresponding advance steps.

It is hardly necessary to review the significant developments in the industry during the past decade, for they have been many, ranging all the way from improvements in cement, to prefabricated forms, shop fabricating of re-bar units and advances in structural design. It is too much to expect that all of these factors will improve at the same rate or in proper sequence. But, true progress is made when all branches move forward as a result of a significant improvement in any one branch.

Reinforced concrete construction can now take advantage of a higher strength re-bar with corresponding advantages of smaller cross section.

Today, a higher strength of reinforcing steel is available on the market which provides significant advantages that will be recognized by other segments of the industry. This relatively new product has already been recognized by the American Society for Testing Materials, and two new ASTM Specifications have been created to govern its properties and use. The new bar is available from several producers throughout the West, including Columbia-Geneva Steel Division of United States Steel Corporation, whose product is marketed under the designation "USS Di-Lok High Strength Reinforcing Bar."

Expressed in the simplest terms this is a high carbon steel reinforcing bar with a 60,000-psi. yield point. This adds 20% to the recognized strength of the top grade of reinforcing steel previously available. The three classes of steel normally available for reinforcing bars have been Structural Grade with a 30,000-psi. yield point. Intermediate Grade with a 40,000 yield point and Hard Steel with the 50,000 psi.

This newest advance fills in the missing step below the alloy steels with minimum yield points estab-

APPLICABLE ASTM SPECIFICATIONS FOR NEW-BILLET STEEL

PROPERTY	STRUCTURAL GRADE	INTERMEDIATE GRADE	HARD GRADE	HIGH STRENGTH GRADES A-432	A-431
Tensile Strength	55,000/75,000	70,000/90,000	80,000 min.	90,000 min.	100,000 min.
Yield Point, min.	33,000	40,000	50,000	60,000	75,000
Elongation in 8" min. per cent by Bar Number 3	1,200,000 Tensile Strength—1% (but not less than 16%)	1,100,000 Tensile Strength—1% (but not less than 12%)	1,000,000 Tensile Strength—1%	1,000,000 Tensile Strength—1% (but not less than 7%)	7½%
4, 5, 6	1,200,000 Tensile Strength (but not less than 16%)	1,100,000 Tensile Strength (but not less than 12%)	1,000,000 Tensile Strength	1,000,000 Tensile Strength—1% (but not less than 7%)	7½%
7	1,200,000 Tensile Strength minus 1% (but not less than 16%)	1,100,000 Tensile Strength minus 1% (but not less than 12%)	1,000,000 Tensile Strength minus 1%	1,000,000 Tensile Strength—1% (but not less than 7%)	7%
8	1,200,000 Tensile Strength minus 2% (but not less than 16%)	1,100,000 Tensile Strength minus 2% (but not less than 12%)	1,000,000 Tensile Strength minus 2%	1,000,000 Tensile Strength minus 1% (but not less than 7%)	6½%
9	1,200,000 Tensile Strength minus 3% (but not less than 16%)	1,100,000 Tensile Strength minus 3% (but not less than 12%)	1,000,000 Tensile Strength minus 3%	1,000,000 Tensile Strength—1% (but not less than 7%)	6%
10	1,200,000 Tensile Strength minus 4% (but not less than 16%)	1,100,000 Tensile Strength minus 4% (but not less than 12%)	1,000,000 Tensile Strength minus 4%	1,000,000 Tensile Strength—1% (but not less than 7%)	5½%
11	1,200,000 Tensile Strength minus 5% (but not less than 16%)	1,100,000 Tensile Strength minus 5% (but not less than 12%)	1,000,000 Tensile Strength minus 5%	1,000,000 Tensile Strength minus 1% (but not less than 7%)	5%
14S and 18S	13	10	7	7	5

lished at about 75,000 psi. Thus, the new grade of reinforcing bar provides a steel with not only greater available strength per square inch of area, but one which provides the designer with a steel of relatively normal characteristics, as compared to those encountered in the alloy class.

Working stresses used by designers represent considerable variation as compared to the technically stable figure of yield-point strength. However, the improvements in available steel for reinforcing bar have advanced concrete design many steps from the 16,000 psi. of working stress which was the standard for so many years and in so many regulations.

Working stresses are frequently established by building code, or other governmental regulation. In such cases the designer has minimum latitude in his design for any steel, but can select a stronger steel for securing a reduction in area. One of the common code provisions is to allow a working stress of "50% of the yield point but not more than 30,000 psi." The new steel used at the 50% designation, will provide working stresses which can get up to the 30,000 psi.

The introduction of the new bar moves this element of reinforced concrete construction a big step forward and represents an opportunity for extending this type of design if and when the other elements move forward to an equal degree. Some of these related considerations can be pointed out briefly and without attempt to go into their inter-relationship.

Designer

Key to the potential advance in reinforced concrete construction is the structural engineer and his control over building, bridge and miscellaneous design. There is a universal tendency to lean toward conservative design, maintaining the use of materials which are acceptable and proven by long service. Also, engineering organizations have to modify their standard procedures, the accepted calculations of their designers and to explore all possible problems before they are anxious to adopt its advantages and economies of new or improved materials.

This may represent the key to advancing concrete design, and a regrettable delay in the acceptance of the new reinforcing steel.

Obviously, the advantages of any stronger material are multiplied in using larger quantities. In this case the advantages lie in the use of the larger sizes of bars, where the greater cross section has more advantage in reducing the final dimensions of the concrete member.

The designer must determine the availability of concrete with a corresponding strength to balance his design, not to mention the matter of fabrication, particularly the question of butt welds. Also there is the factor of bond in a steel which sustains high stresses, and the matter of elongation and the use of hooked bars. All of these factors combined with the structural engineer's contention that he never has adequate control over field operations tend rather strongly to emphasize the "conservative approach."

Concrete

Reinforced concrete design necessitates an economic balance between the strength of the two materials. Any increase in steel strength and allowable stress must necessarily require a corresponding increase in allowable concrete stress for the designer.

Quality of concrete has improved adequately and regularly during past years with strength rising to averages which can accompany use of stronger reinforcing bars. In modern ready-mix plants, and with materials now available the producer can provide almost any concrete the designer specifies.

The problem is one of consistency and workability from the point of view of the contractor. Ultimate strength and adequacy of the concrete which encases the bars he places in concrete members is the concern of the designer.

Only when field control is adequate to insure a consistent quality of concrete that tests up to the strength specified by the designer will there be a willingness to get the proper advantage out of higher strength steel. This is not a new problem with the introduction of new steel, but has been a problem of reinforced concrete construction over the years.

Fabricator

With the development of the reinforced concrete steel fabricator as an accepted specialist, this segment of the industry represents an important position in any overall advance.

Usually working with and for the general contractor, the operations of the fabricator are equally important to the designer since the size, characteristics and spacing of the bars in any preassembled unit must follow the working drawings of the structural engineer.

Any modification in use of a new type of steel bar, or any combination of different types of grades of steel bar in a design becomes an important part of bar fabrication.

There is no change in procedure, of course, or operations in using the new strength steel. There are, however, two elements to be considered.

First, if the designer elects to get the maximum advantage out of the greater strength by using larger bars, the fabricator has the possible problem of the capacity of his equipment in handling large bars requiring more bending effort.

Second, the matter of welding, particularly for the large bar sizes might involve some revision in welding materials and shop practice.

General contractor

Operations and field procedures of the general contractor would not be materially affected in carrying out any building or bridge project in which the designer had used the newer and stronger bars.

The fabricator would install the same type of units and preassembled cages, and the concrete would be delivered and handled in the same way.

One difference which might be anticipated by the general contractor would be a little tighter inspection since architect and engineer would feel greater responsibility in having the designs, plans and specifications adhered to with minimum exception. The contractor would also have the responsibility of using quality fabricators and quality concrete producers to be sure there would be no variations and inconsistencies that would be caught by the inspector with subsequent delay of the work.

Conclusion

The field of reinforced concrete construction has advanced in one of its step-by-step movements, with an improved material now available. Use of this material represents a distinct advantage in concrete design when it is accepted and used by the designer, with corresponding additional responsibilities on the part of the fabricator and the supplier of concrete.

MIGHTY ripping team is composed of Euclid TC12, in front, mounting two ATECO rippers, pushed by Caterpillar D9, working in limestone.

Massed Power on Arizona Highway

MASSED HORSEPOWER embodied in some of the construction industry's biggest machines is providing the solution to problems encountered by two Arizona contractors building adjoining sections of the Interstate highway in central Arizona about 50 mi. south of Flagstaff.

Operations are centered around the hamlet of McGuierville where the highway leaves State Route 79 to cut across sagebrush and cedar-studded hills along a new alignment. Both contracts cover construction of 4-lane divided highway meeting Interstate standards, and include everything from grading through placing of asphaltic pavement, as well as construction of bridges, interchanges and access structures.

Problems involved arise from sources common to most Western construction: hard rock, dry country, and low bids.

The southermost job covers construction of 2.7 mi. of roadway (part of which is remodeling of existing highway 79), two 3-span bridges, and an interchange structure. Specifications call for 834,100 cu. yd. of roadway excavation; 185,000 tons of subgrade and select material, placement of 26,000 tons of asphaltic pavement, and application of more than 46,000,000 gal. of water.

Vinson Construction Co.

The contracts went to Vinson Construction Co., Phoenix, on a bid of $1,254,845. This was a thumping $227,020 below the second low bid of $1,472,866, entered by Southern Industries, Inc. Ten additional bidders entered figures ranging upward to $1,821,019. (Ironically, the contractor, who had expected to work both jobs as a single unit, lost the adjoining contract by $13,000.)

Vinson's low bid was based on the company's judgment that the hillsides, composed of layers of hard limestone and clay, could be ripped. Having "laid $227,000 on the table," it was then up to Project Superintendent George Bell and his grade superintendent, Harry Varner, to prove the hypothesis.

This they proceeded to do with a ripping team made up of two company-owned Caterpillar D9's and a rented Euclid TC 12 mounting to Ateco ripper shanks.

On relatively light material the three units ripped independently. In tougher going, a D9 was used to push the twin-engine TC 12, and in the hardest material, the D9 and TC 12 teamed up to drive a single ripper tooth through the rock. The low-set, hydraulically operated ripper bar on the TC 12, plus its high horsepower, give it excellent ripping properties, Bell noted.

In four months, from September through December, the ripping spread carved out a new 2-lane roadway for the southbound lanes in the hills above the existing state route. These cuts totaled 500,000 yd. and covered the most difficult ripping material. During the period, rental of the Euclid was $17,-

000. It operated about 720 hours at an hourly cost of $36. Operating costs of the company-owned D9's was computed at $28 per hour. Ripping costs were figured at about 13¢ per yd., and this comfortably fit into the 46¢ per yard bid for excavation.

Balance of the earthmoving spread included 1 Caterpillar D9 and 3 D8 crawlers, 3 Allis-Chalmers HD 21 crawlers; 4 Caterpillar DW 21 two-axle scrapers; 1 motor grader to keep haul roads in shape; 4 sheepsfoot rollers; and 1 White water truck.

Remainder of the ripping (and push loading) is being done with company-owned machines. These tractors work in pairs, one mounting a single shank, the other a double which provides two double ripping combinations as well as independent operations.

Part of the material from the southbound lane cuts must be wasted, and this material is deposited in a long dike across the hillside above the steeper cuts to provide runoff protection from the cloudbursts which hit the area. Location on the haul road for this dike requires that the DW 21 scrapers be loaded up hill. This is done with two push tractors. Units have a comparatively short, tough up-hill haul to the dike area, and a long down-hill return cycle along a one-way haul road.

Not all the rock was ripped. Those strats that held out against massive doses of horsepower were reduced with injections of explosives. However, Bell estimates that his powder bill will be less than $25,000 for the entire job. Part of this powder was used to blast in caves and fissures which occur frequently in the limestone formation and which must be collapsed and compacted to provide a solid roadbed.

Water application

Customarily, water is applied to excavation areas as well as fills to compensate for the nearly bone dry condition of the soil. Unless it is wet down, the material breaks into loose powder under rippers and dozers. It becomes next to impossible to load, and creates a monumental dust problem. To water his cuts before excavation, Bell hired a water specialty company, Water

SELECTED UNIT BIDS FOR BOTH CONTRACTS

SOUTH SECTION, Cordes Junction—Flagstaff highway (Vinson), 2.7 mi. grading, draining, subgrade seal, select material, aggregate base, asphaltic concrete, emulsified seal coat, and an interchange structure and two 3-span steel girder bridges.

(1) Vinson Construction Co., Phoenix $1,245,845
(2) Southern Industries, Inc., Phoenix $1,472,866
Ten additional bids.

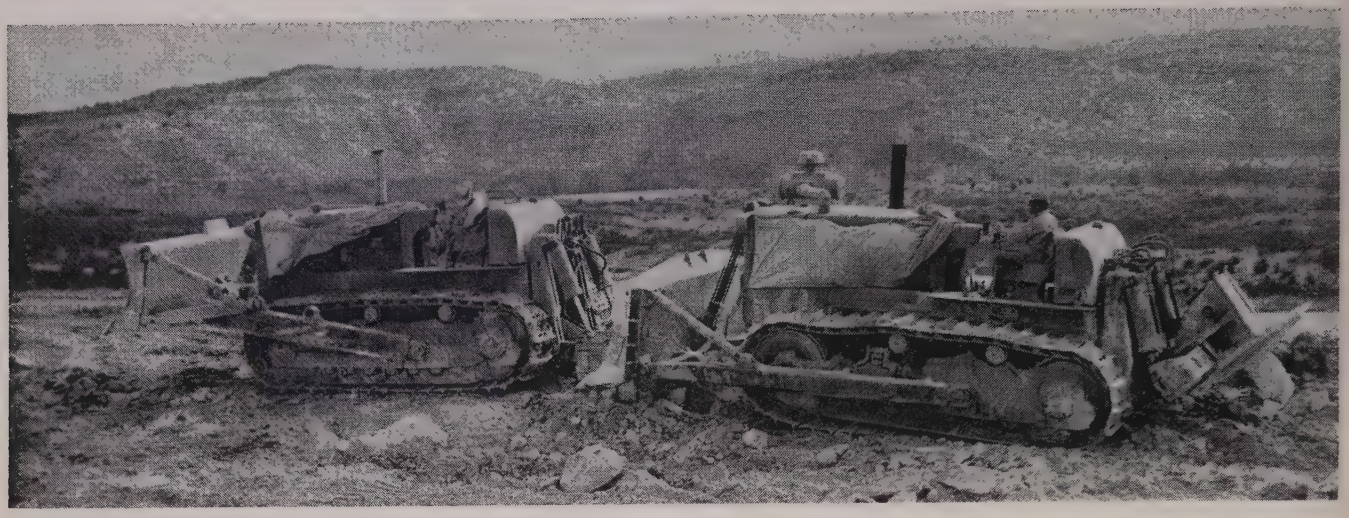
		(1)	(2)
834,100 cu. yd.	Roadway excavation	$ .46	$ .63
10,100 cu. yd.	Special compaction	1.35	1.50
82,820 cu. yd. mi.	Overhaul	.14	.16
Lump sum	Provide water supply	4,400.00	4,400.00
46,400 M gal.	Apply water	1.10	1.75
900 hr.	Rolling (Class I)	7.50	8.00
4,550 hr.	Rolling (Class II)	12.75	14.00
42,650 ton	Subgrade seal	.37	.38
102,600 ton	Select material	.60	.55
41,500 ton	Aggregate base	.85	1.00
1,320 ton	Paving asphalt	36.00	37.00
26,225 ton	Asphaltic concrete	2.40	2.50
672,990 lb.	Structural steel	.14	.18
2,729 cu. yd.	Class A concrete	40.00	41.20
556 cu. yd.	Class D concrete	46.00	45.35
492,100 lb.	Reinforcing steel	.12	.13
450 lin. ft.	Bank protection (std)	17.80	17.50
610 lin. ft.	Rail bank protection for bridges	25.00	20.60

NORTH SECTION, Cordes Junction—Flagstaff highway (Copper State), 5.3 mi. grading, draining, subgrade seal, select material, aggregate base, asphaltic concrete, emulsified seal coat, and two interchange structures.

(1) Copper State Construction Co., Mesa $1,898,517
(2) Vinson Construction Co. $1,911,235
Eight additional bids.

		(1)	(2)
1,008,850 cu. yd.	Road excavation	$ .52	$ .445
43,550 cu. yd. mi.	Overhaul	.23	.25
268,300 cu. yd.	Borrow	.32	.35
Lump sum	Provide water supply	5,000.00	5,000.00
74,600 M gal.	Apply water	1.50	1.15
2,500 hr.	Rolling (Class I)	8.00	7.50
6,700 hr.	Rolling (Class II)	11.00	12.00
95,000 tons	Subgrade seal	.45	.53
256,700 tons	Select material	.62	.80
90,300 tons	Aggregate base	1.10	1.05
3,010 tons	Paving asphalt	37.50	38.00
59,800 tons	Asphaltic concrete	2.40	2.65
2,183 cu. yd.	Class A concrete	45.00	47.00
560 cu. yd.	Class D concrete	46.00	54.00
404,900 lb.	Reinforcing steel	.135	.13

SHOVEL SPREAD develops cuts for new alignment. Earth and boulders are sandwiched in between strata of limestone.



DOUBLE RIPPING team bites into Arizona limestone formation on Interstate route south of Flagstaff. Tractor in front mounts two shanks, while tractor at rear has single shank protruding from chair-like push block. In hard going, tractors swap places.

Engineering Co. Inc. of Phoenix, which moved in with quick-coupling aluminum pipe. Water is pumped from an existing ranch well beside nearby Wet Beaver Creek (as distinguished from Dry Beaver Creek which does not flow year around). Excavation areas are irrigated with Rain Bird sprinklers for periods up to 48 hours, with the water penetrating as much as 25 ft. into the dry material.

Sprinklers were used instead of water trucks primarily to control dust. In some areas, however, this method has an economic advantage.

As the cuts are developed, additional water may be applied by spray trucks. Trucks use three special nozzles mounted one above the other on a vertical pipe at the back of the tank which can spray a swath 50 ft. wide.

Roy Shupe, chief project supervisor for the Arizona Highway Department, explained that about 50% of the optimum moisture is applied to the cuts and the other 50% to the fill as the material is being laid down and compacted. Governing factor on water application is compaction density, 95% required by State specs.

Shupe and his inspectors use a quick compaction test which involves a balloon-like measuring device. Material from a test hole is carefully excavated and weighed, and a plastic balloon is inserted in the hole and inflated to measure the volume.

Base material

When excavation is completed, the contractor will bring in some 185,000 tons of select and base material from State-designated pits along the right-of-way, using 5 Mack 6-yd. dump-trucks and a Michigan 175 loader for this purpose, along with dozers and compactors from the earthmoving spread as required.

Base material is placed on the compacted fill in four layers, starting with a 6-in. lift of subgrade seal. On top of this goes 15 in. of 3-in. select material. Subgrade seal and select are essentially the same materials except that the seal must have a plasticity index of 12, compared to 5 for select. Over the select layer is a 6-in. lift of ¾-in. ABC (aggregate base course). Wearing course, next, is a 4-in. layer of asphalt plant-mix topped by a seal coat of emulsified asphalt and covered with ⅜-in. chips.

Bridges and interchanges

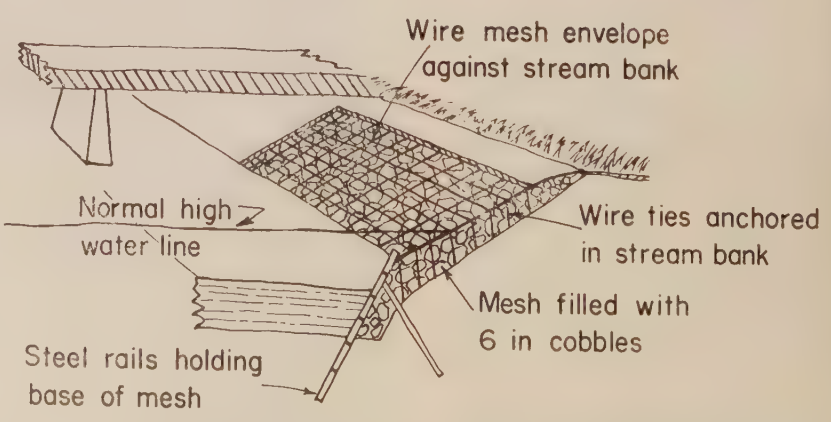
The two parallel bridges carrying the divided highway lanes over Wet Beaver Creek, and the interchange overpass structure at McGuierville, close by, are being constructed on a sub-contract by Palmer Construction Co. The three structures employ steel girders on concrete piers and abutments topped by continuous concrete slab decks. Girders are supplied by Allison Steel of Phoenix.

Elaborate bank protection is installed for about 100 ft. up and down stream on either side of the bridges. This item is handled by the prime contractor Vinson, on a unit bid of $25 a lineal foot.

Described as "rail bank protection," the job starts with steel rails sunk in the stream-bed. These are used to anchor a long wire mesh envelope laid along the bank. This envelope is filled with 6-in. cobbles, and tied into the bank at intervals with wire ties fixed to steel anchors imbedded in the banks.

Mesh-enclosed rock extends about 15 ft. above high water line as protection against the occasional

(Continued on page 50)



RAIL-MESH protection placed on stream banks around bridges to guard against flash floods. Mesh is anchored to rails and filled with rocks.

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WATER truck sprays cut as tractors double-push scraper. Material is so dry in Arizona that cuts are customarily watered before and during excavation so that powdery material can be loaded, and to reduce dust problem. Half the total required water is applied to the cut.

ARIZONA

(Continued from page 46)

flash floods which can fill normally dry canyons with water in a matter of minutes.

Paving has been subcontracted to Copper State Construction Co., which holds the adjoining contract.

Personnel

Key men for Vinson Construction Co. are George Bell, project superintendent; Harry Varner, grade superintendent; Herman Mills, grade foreman; Virgil Prater, master mechanic; and Guy Johnson, office manager.

Copper State Construction Co.

The adjoining contract to the north, covering 5.3 mi. of roadway construction and two interchange structures, was awarded to Copper State Construction Co. of Mesa. Estimated quantities include 1,000,850 cu. yd. roadway excavation; 350,000 tons of base material, 60,000 tons of asphaltic concrete, 268,000 tons of borrow (to complete an access road at the northern end of the project), and application of 74,000,000 gal. of water.

Copper State's low bid of $1,898,517 was just under Vinson's $1,911,235. There were eight other bids ranging up to $2,409,212.

Copper State, too, faced a number of problems. A labor dispute delayed start of the project, making time a critical factor. The entire contract was located on new alignment running across dry foothills where it would be necessary to drill a well for water. And, the limestone layer-cake rock formations were no softer, nor less evident.

To fight hard rock and a tight schedule, the company moved in a big equipment fleet, supplementing it as equipment became available from other jobs. Ultimately more than $1,000,000 worth of machinery was brought in to the job.

A well drilled near the project mid-point provided an adequate water supply at depth of about 75 ft., and this supply can be supplemented from a small stream a mile off the right-of-way to the northern end of the project.

Superintendent Pat Hale is operating two scraper spreads and a shovel spread with a drilling and blasting team working independently wherever they are needed.

Ripping is done with a Caterpillar D9 and several D8 crawlers as well as a recently introduced International TD 25 crawler. Additional D8 crawlers are used to push-load the scraper fleet, usually double-pushing to get a load in about 30 seconds. Earthmovers fleet is made of 1 Caterpillar DW20 three-axle, and 5 DW21 two-axle scrapers; 2 LeTourneau-Westinghouse Model B two-axle Tournapulls; 2 L-W and one Cat pull-type scrapers.

In addition Hale is renting the same Euclid TC12 used on the Vinson job to help rip the hard-cap rock which covers much of the excavation area to a depth of 2 to 5 ft. Again the Euclid twin is teamed with a Cat D9.

The two B 'Pull scrapers are used interchangeably in ripping and shovel spreads, and for this latter purpose sheet metal guards have been placed over the push-block assembly to protect the ejector motor from falling dirt. Ejector and back of the bowl have additional sheet metal strips fastened along their top edges.

Shovel spread consists of two Northwest 80D 2½-yd. shovels and 3 LeTourneau-Westinghouse end-dump rock trucks, assisted by the L-W scrapers and tractor-drawn units as needed. Shovels handle both shot rock and straight excavation, frequently working through

Major Equipment

Vinson Construction Co.

- 1 Euclid TC12 crawler
- 3 Caterpillar D9 crawlers
- 3 Cat D8 crawlers
- 3 Allis-Chalmers HD21 crawlers
- 4 Cat DW21 two-axle scrapers
- 2 Cat 463 pull-type scrapers
- 1 motor grader
- 4 sheepsfoot roller pairs
- 1 White water truck
- 5 Mack 6-yd end-dump trucks
- 1 Michigan 175 loader
- 1 Allis-Chalmers HD6 loader
- 1 Dodge boom and welding truck
- 1 Ford service truck
- 1 Chevrolet flat rack truck

Copper State Construction Co.

- 2 Northwest 80D 2½-yd. shovels
- 3 LeTourneau-Westinghouse B scrapers
- 1 Caterpillar DW20 scraper
- 5 Caterpillar DW21 scrapers
- 2 LeTourneau-Westinghouse pull-type scrapers
- 1 Cat 80 pull-type scraper
- 1 Euclid TC12 crawler
- 1 Cat D9 crawler
- 1 International Harvester TD25 crawler
- 14 Cat D8 crawlers
- 3 track drills
- 3 Chicago Pneumatic 600 cfm. compressors
- 3 5x5 sheepsfoot roller pairs
- 1 6x5 sheepsfoot roller pair
- 4 pull type pneumatic rollers
- 1 Case industrial wheel tractor
- 1 International industrial wheel tractor
- 1 Allis-Chalmers HD5 tractor
- 1 Hough Payloader
- 2 transit-mix trucks
- 5 Water trucks (4500-6000 gal.)
- 3 Welder trucks, Lincoln 300 welders
- 15 Mack end-dump semi-trailers
- 1 Cedarapids primary crushing plant
- 1 Cedarapids secondary crushing plant
- 1 Barber-Greene 8T asphalt plant

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SMALL BATCH plant furnishes concrete for crossing structure at remote location. Hopper, center, is charged with dry materials by loader and belt loads transit truck.

the soft strata composed of fine clay and loose boulders.

Although the contractor tries as far as possible to match the equipment to the material, this must be done on an area basis, to keep the various spreads from getting in each other's way. Spreads are spotted on successive cuts as the contractor works down from north to south.

Northern section was worked first in order to clear that area for placing borrow material to form an access road. Borrow must be moved from the pit which is on one side of the project to the access road on the other. Borrow material is paid for on an actual tonnage basis. The contractor has set up a mobile Murphy platform scale at the upper end of the pit. The 120,000 lb. capacity scale has a 40-ft. deck. Transport wheels on two tandem axles are mounted beneath the scale frame. A small pit is dug at the scale site to accommodate the wheels permitting scale frame to be set flush with ground. Borrow will be moved with a spread of 15 Mack trucks of 30-ton capacity.

Structures

Two parallel overcrossing structures of reinforced concrete also are being constructed at the north end of the project. The job calls for less than 3,000 cu. yd. of concrete, and to handle this small quantity (nearest transit plant is 70 mi. away), the contractor has set up a small batch plant. It consists of a Detecto open hopper scale with a belt loader. A Hough Payloader is used to charge the hopper with aggregate from nearby stockpiles, and cement is drawn from a storage shed beside the hopper. Batched material is loaded into two transit trucks which then mix and deliver the concrete. A storage tank furnishes water for the trucks.

Compaction

The fill is compacted with crawler-drawn sheepsfoot rollers, either in single pairs, or two pairs in tandem. Rolling is paid for on an hourly basis, with the bid price set at $8.00 per hr. for Class I, and $11.00 per hr. for class II. Hourly rates apply to a single pair of rollers, and time and a half is paid for two-pair rigs (since the state loses the compactive benefit of the second crawler). Rubber tired compactors pulled by International and J. I. Case wheel tractors are used for compacting shallow lifts of base material where a sheepsfoot would punch through the layer, and on the sides of the drainage ditch that forms the median over part of the job. Two rubber tired units are pulled in tandem on the roadbed, while a single unit is used on the sloping ditch sides.

Water application on the Copper State project has been reduced considerably by heavy winter rains which soaked the excavation areas, rendering them workable without much additional moisture.

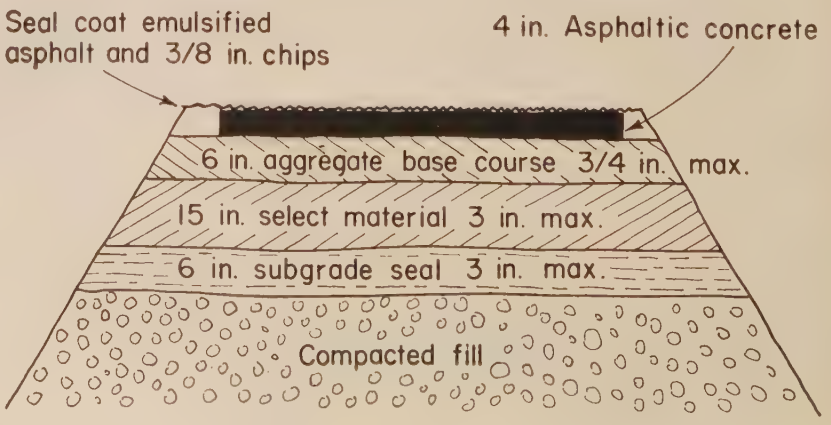
Paving

The contractor is setting up an aggregate plant and an asphalt batch plant at McGuireville, close to gravel deposits on Wet Beaver Creek. Aggregate plant is made up of Cedarapids Commander primary and secondary crushers. A Barber-Greene 8T 250-ton capacity batch plant will produce the asphalt mix. These units will supply paving for the entire 8 mi. of roadway covering both jobs.

Personnel

Copper State Construction Co. project superintendent is Pat Hale; excavation superintendent is Hub Renick; plant superintendent is Paul Foster; grade superintendent, H. B. Snowden; concrete superintendent, H. L. Davis; master mechanic, Don White, and office manager, Homer Brown.

Highway Department resident staff is headed by Roy Shupe, chief project supervisor, and includes Larry Byrd and Gus Michels, project supervisors; Bob Howard, laboratory technician; Paul Frye and Mat Christy, chief of party; Dick Collins, chief inspector. Work is under direction of Patton Syler, District 5 engineer. William E. Willey is state highway engineer.



SKETCH of highway cross-section shows the various courses that make up the roadbed. Subgrade seal and select material are identical except for difference in plasticity index.

T-40 Batch Type Asphalt Plant

T-50 A Batch Type Asphalt Plant

T-25 Batch Type Asphalt Plant

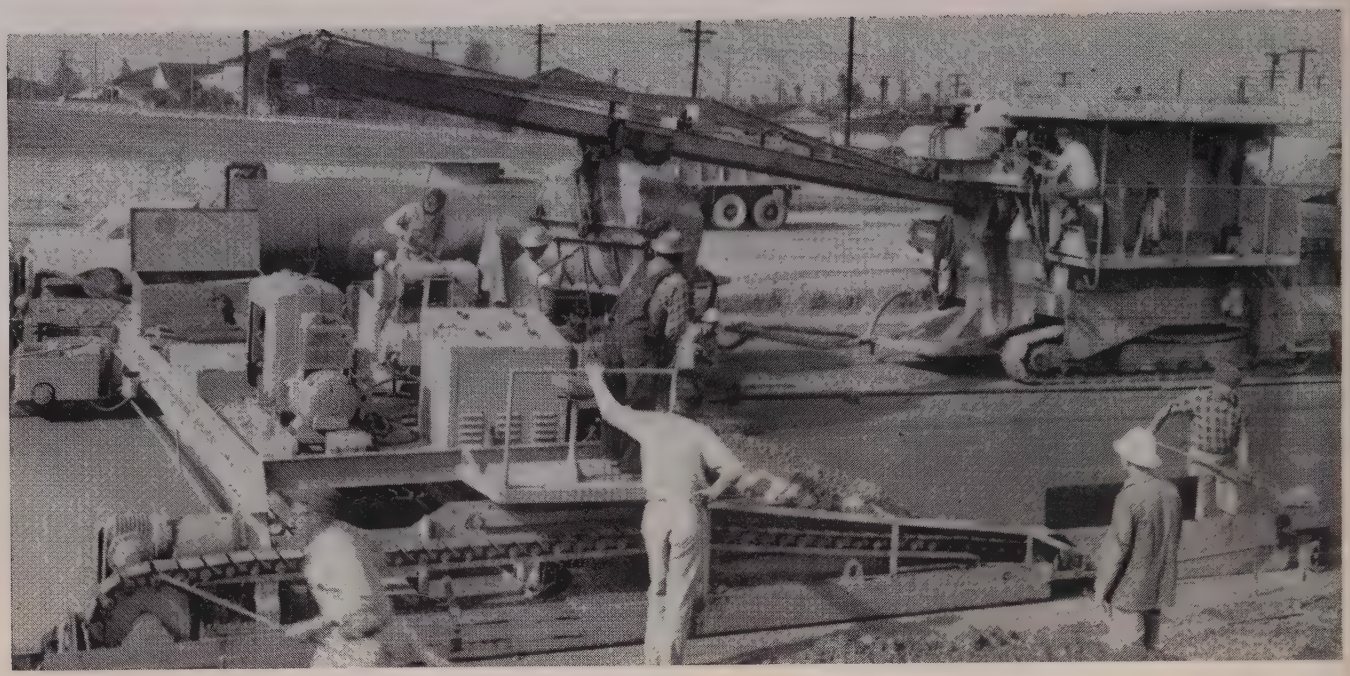
T-50 A Batch Type Asphalt Plant

S-250 Base Stabilization Plant

S-250 Base Stabilization Plant

S-250 Base Stabilization Plant

T-40 A Batch Type Asphalt Plant



REX SLIP-FORM PAVER mounted on crawlers and working without headers, lays down a 12-ft. wide, 9-in. thick concrete slab. Picture was taken during first week of job when only one mixer was used. Another was added following week when crew was trained.

Slip-form paving on L. A. Freeway

Rex slip-form paver tackles 61,000-cu. yd. concrete placing job on Harbor Freeway in Los Angeles, the world's busiest traffic artery. Early results are highly promising.

DESPITE several years of successful application in Colorado, slip-form paving in the West is still almost entirely confined to that state. "It might be faster, but it could never meet our smoothness specs," is the reason most often heard to explain why this new paving technique is not more widespread. This excuse has been demolished by current experience in California, where smoothness requirements are as uncompromising as any.

(It is not possible to compare exactly the smoothness specifications in various states because most use different methods of measuring this illusive quality. California employs an instrument called the Profilograph which measures in inches the accumulated deviation from the design surface of the highway. Maximum allowable is 7 in. per mi.)

Not counting a small experimental job several years ago south of Stockton, California's first slip-form highway job was recently completed near Winters in Northern California with Gordon H. Ball as contractor, using a machine made by Guntert & Zimmerman, Inc., of Stockton. This project was described in detail in an article in the January 1960 *Western Construction*. The paving operation described in the present article started in late January on the Harbor Freeway in Los Angeles using a Rex slip-form paver made by Chain Belt Co. The project provides some interesting contrasts to the one described in these pages two months ago.

The Harbor Freeway in Los Angeles begins in the central business district and proceeds southerly toward the harbor area near Long Beach. It is the world's busiest highway, carrying about 194,000 vehicles daily. The project under way now will extend it from 0.2 mi. north of 124th Street to 0.5 mi. south of 190th Street, a distance of 25,020 ft. Contractor is J. E. Haddock, Ltd. and Ukropina, Polich & Kral, a joint venture, who submitted the low bid of $7,576,081 in November of '58. The contract included 1,600,000 cu. yd. of dirt (300,000 yd. of which was excess and was hauled off the job to future embankment sites on the San Diego Freeway), 28,000 cu. yd. of concrete for bridges (lump sum bid), 8,581 cu. yd. of concrete for curbs and gutters, and 61,000 cu. yd. of paving concrete. The freeway for most of its length has 10-ft. shoulders surfaced with plant mix, two 48-ft. wide lanes of portland cement concrete, and a 22-ft. median strip. Cross-section of the fast lanes shows 0.75 ft. of portland cement concrete pavement underlain by 0.67 ft. of untreated base, of which the top 0.33 ft. is cement-treated, and 0.67 ft. of selected sub-base material. In cut sections, half of the selected sub-base material there is defined as pervious. The cement-treated subgrade has a 3% cement content.

U-P-K handled the bridge items, and Haddock is doing the earthwork and paving.

The paving operation

The Rex slip-form paver is a rigid framework which is set to deliver a fixed width and thickness of concrete slab. Changing the thickness of the slab can be accomplished easily in the field by turning four large threaded vertical rods with a wrench. Since the thickness of the slab cannot be changed while the machine is moving, considerable

care is put into the preparation of the subgrade, although not as much as one might expect. On this project, hubs were placed at every 25 ft. instead of the customary 50 ft. Final trimming was done by a Caterpillar motor grader equipped with a Preco automatic blade control. The Preco attachment enables the operator to raise and lower the blade without altering the cross-fall. The operator must only watch one end of the blade—the rest is automatic. All that was necessary to provide the correct surface on the subgrade was for the grader operator to just brush the top of the hubs as he passed. On curves where superelevation is involved, the grader operator merely changes the setting on his automatic blade control to the amount calculated for each 25-ft. mark. The paver's long crawler tracks tend to eliminate any minor irregularities between the hubs.

PLUMB BOB suspended over string line enables paver operator to keep machine on course. Gear motors on each track are controlled separately for steering. Adjustments affecting thickness of slab are not made while machine is in motion. Note job-mounted sideboard.

Advance strike-off

Spanning the full width of the machine at the front is a strike-off beam which resembles a grader blade. Operated by hydraulic rams and running on rails, this beam can be advanced or retracted 5½ ft. by the operator of the paver. The beam acts as a spreader for fresh concrete placed in advance of the paver. Immediately behind this strike-off beam is a Maginniss internal vibrator attachment. The spacing, angle and depth of the immersion of the vibrators is adjustable by the operator to meet job conditions. Frequency is variable from 5,000 to 10,500 vibrations per minute. Vibrators are powered by their own generating set mounted on the rear of the paver. The Maginniss generator furnishes 180-cycle, 120-volt, 3-phase current and is powered by a 2-cylinder gasoline engine.

The actual shaping of the concrete is done by a 42-in. wide steel plate called the extrusion meter. Adjustment of the extrusion meter up or down by means of four large screws determines the thickness of the slab. Concrete is tucked uniformly under the extrusion meter by a tamping bar which runs the full width of the machine and has a variable tamping frequency.

The surface of the concrete as it emerges from the extrusion meter is dressed by a 24-in. wide rubber belt which oscillates transversely in strokes variable from 3 to 8 in.

The paver at present is pulling behind it 32 ft. of forms which are held at the proper width by two tubular steel trusses. The trailing forms are adjusted so that they tilt inwards just enough so that the slump of the concrete causes the edge of the slab to be vertical as it emerges from the rear of the trailing forms. The only additional finishing required is applied by a workman with a long-handled float. Proper texture is provided by a burlap drag.

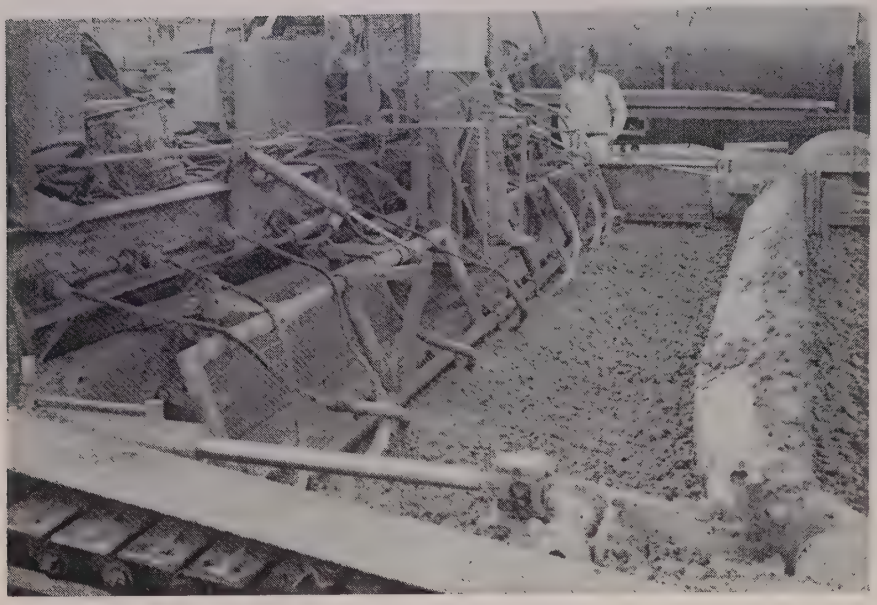
PLACING CONCRETE uniformly in front of paver is essential for smoothness of finished slab. Keyway blockouts for edge of slab are being inserted in slip-form by kneeling man.

Tracks driven separately

Each track of the paver is driven by a 2-hp. Master DC gear motor independently controllable by the operator. Master gear motors also drive the dressing belt and the tamping bar. Primary power is supplied from a Wisconsin engine driving a Master DC 10-kw. generator.

To maintain proper line, operator of the paver watches a plumb bob suspended from the right side of the machine and sees that it stays directly over a previously set string line.

Western Construction visited the project on the sixth day of the concrete placement operation. Only one mixer, a Rex double-drum Model 34E, was supplying concrete while the crew familiarized themselves with the equipment and the proper procedure to suit local conditions. By the time this article is in print, a second mixer will have



FIRST CONTACT with concrete is made by strike-off beam which operator of paver can extend 5½ ft. forward by means of rams. Next is a row of Maginniss internal vibrators which are variable in number as well as depth of immersion and frequency. Man standing on paver imbeds steel bar in center of slab where longitudinal saw cut will be made.

DOWEL BARS are inserted in slot near end of trailing forms by workman with hollow tube of proper length. Bars pass through holes in keyway blockouts which will be removed later. Tubular steel framework keeps trailing forms at proper width and carries burlap drag.

been added. With both mixers working, production rate may go as high as 7½ ft. per min.

Achieving specified smoothness

Engineers of the California Division of Highways are watching this project very closely to make sure the pavement meets the required smoothness standards. The Profilograph is run on both the subgrade and the finished pavement to determine the correlation between the two. An inspector makes a log of the time and place every significant change occurs in the operation, such as a change in the speed of the paver, quality of the mix, overloading the machine, etc., and this data is studied later along with the Profilograph readings to find the factors which influence smoothness. Consistency is definitely the key to the operation. The best results are obtained when the machine moves at a constant speed with no changes or stops, when the mix is uniform, and when the concrete is deposited uniformly in front of the paver. Even a change in the humidity of the air can be reflected in the finished product if it is not compensated for.

After only a week of operation, while experimentation with the mix and details of the procedure was still going on, smoothness of the pavement was close to the specified 7 in. per mi. with some sections as smooth as 2 in. per mi.

Placing dowell bars

In order that the slab being placed may be tied into the slab which will be placed adjacent to and abutting it, a horizontal keyway and short dowel rods are being placed on the inner edge of the slab. The keyway blockouts are fed into the front of the paver and the dowel rods are inserted at the rear of the machine about 2 ft. from the end of the trailing forms. However, the contractor plans to try another method of placing the dowel rods to find out if it might be more economical. The alternate method involves bending the dowel rods at right angles and inserting them along with keyway blockouts at the front of the machine. The bars would be straightened several days later when the blockouts are removed from the edge of the slab.

Aggregate for the project is provided by Consolidated Rock to the contractor's batch plant, a C. S. Johnson with a 240-barrel cement capacity. The contractors' equipment fleet includes 2 Wood Mixers, 2 Caterpillar motor graders (one No. 12 and one new No. 14), 1 Bros pneumatic roller, 2 Buffalo-Springfield tandem rollers, 2 Peterbilt water trucks, 1 Sterling water truck, 1 General Motors bottom-dump truck, and 1 International Harvester bottom-dump truck for soil cement. Batch trucks shuttling between the batch plant and the double-drum mixer are 4 Cook Brothers, 4 International Harvester and 4 General Motors.

Personnel

Resident engineer for the California Division of Highways is Bob Innis. Principal assistant resident engineer is G. L. Lundstrom. Grade inspector is Robert Clark and concrete inspectors are Richard Gerald and Dan Peterson.

F. D. Cressy is construction engineer of District 7. A. L. Himmelhoch is district engineer.

For J. E. Haddock, Ltd., Henry Rollston is superintendent. Jerry Hennessy is project office manager. Foremen are Roy Bennett, Carroll Gresham, and Olen Obar.

EPOXY ADHESIVES—
Uses of a material new to construction

By R. W. GAUL
Manager-Technical Sales
Adhesive Engineering Division
Hiller Aircraft Corp.
San Carlos, California

EPOXY ADHESIVES are not new. Their chemical history goes back many decades, but only in recent years have they been improved to a point of much interest and importance to the construction industry. In this field, where ruggedness, strength and permanence are standards, the epoxies have found a place for themselves, primarily because present-day formulations are exceptionally tough, long-lasting and versatile.

Properties of base epoxy resins are merely starting points. These resins must be modified carefully with selected compounds and various fillers to produce epoxy adhesives meeting the stringent construction requirements. Such adhesives have been used successfully as bonding agents in dams, highways, bridges, aircraft runways, buildings, streets, sidewalks and floors. New uses crop up daily, for there seems to be no limit to the scope or range of applications.

Presently there are several different types of epoxy adhesives available:

a) *Liquid* for bonding fresh cement concrete to old concrete in such cases as concrete toppings to bridge decks, dam surfaces and floor slabs; to build up gutter grades in proper levels, to eliminate depressions, and also to repair spalled concrete on vertical surfaces. Epoxy mortar and concrete (liquid adhesive mixed with fine sand and/or aggregate) can be prepared to fill cracks and deep or shallow spalls—epoxy concrete and mortars set up faster than portland cement concrete and will take greater loads over longer periods of time.

b) *Paste* is used to fill cracks and holes on vertical and overhead concrete, to bond stone, masonry, slate, marble, and other materials to concrete and asphalt pavements.

c) *Grout* to meet Air Force and Corps of Engineers specifications covering anchoring of steel dowels in runway slabs and to repair cracks and spalls in concrete surfaces and joints.

Adhesive properties

Regardless of where or how they are used, specialized epoxy adhesives for concrete demonstrate unusually high flexural, tensile and shear strengths, excellent impact and environmental resistance, plus an important degree of flexibility. Since the strength of the adhesive itself and its bond to concrete are substantially higher than the cohesive strength of the concrete mass, effective strength of the adhesive is the actual strength of the concrete adjacent to the bond.

Depending upon the concrete mix, effective shear strength of an epoxy adhesive bonded concrete joint is between 4,000 and 5,000 psi., and fully-set tensile strength varies from 200 to 700 psi. Effective impact strength of an epoxy bond is such that the entire concrete mass acts as though it were monolithic, even when the bonded layer is thin or feather-edged.

In addition to their high strengths, cured epoxy adhesives also are fully resistant to water, gasoline, fuels, lubricating oils, most hydrocarbons, solvents and de-icing salts. They can withstand freeze-thaw cycles and temperatures from minus 70 F. to over plus 350 F.

Another important consideration is that epoxy adhesives for concrete are designed with a certain degree of essential flexibility. This quality enables them to withstand shrinkage strains resulting from concrete curing and also to tolerate thermal expansion and contraction regardless of the ambient temperature.

Labor and material costs

Compared with conventional concrete repair methods, epoxy adhesive repairs frequently cost less than half for combined labor and materials. For example, to repair a structurally sound concrete sidewalk by overlaying with new concrete, the cost is 50% less than it would be to rip out the entire slab and replace completely with a fresh pour. Generally, repairing by bonding an overlay of fresh concrete to a sidewalk depression ranges from 30 to 50¢ per sq. ft. for areas under 100 sq. ft. To tear out a section of equal size and depth and replace it would cost from 80¢ to $1.00 per sq. ft. However, as the areas to be resurfaced become more extensive, the costs of labor and materials for both methods draw closer together, but overlaying with epoxies can be done in half the time.

Or consider the rather new technique of bonding continuously extruded concrete curbing to existing roadways. This method costs less than half that of conventional curbs cast in forms. Since concrete is needed only above the roadway,

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SKAGIT RIVER BRIDGE. Brushing liquid epoxy adhesive over sound concrete just prior to application of fresh concrete overlay. New concrete is bonded permanently to old concrete. Application of adhesive and concrete topping was made in 3 hr.

Caledonia Sand & Gravel...

Building for the Future

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

The future looks brighter, and brighter. In just ten years' time, gross business up from $50,000 to $1,500,000 . . . equipment inventory up from $20,000 to $750,000. This is the growth record of Caledonia Sand & Gravel.

Right now they are involved in their biggest construction project. Hacking through the mountains in Vermont to build a portion of the four-lane highway linking Montpelier with Burlington. It's part of the 321-mile Interstate Highway System that's changing the face of the Green Mountain State.

To do the job, Caledonia has 100 road-building specialists on the payroll. On the equipment side, there are five scrapers, eight tractors, a 1½-yard shovel, two cranes, a Gradall, and a bituminous concrete paver. In addition, there is a new hot mix plant, and a new rock crushing plant to give Caledonia new dimensions in profits. All this equipment is new—60% of it financed by C.I.T.

Douglas Wood, treasurer of Caledonia Sand & Gravel said, "Our local financial institutions are generally unable to handle the financing on big jobs like this. C.I.T. provided us with the cash to do this job. This Interstate program has given Vermont contractors a chance to get into and above the million-dollar class."

How Job-Engineered Finance Plans Help Contractors

Payd Plan equipment financing terms to 6 years with payment schedules related to depreciation, or equal monthly payments over 36 months, or skip-payment plans a

EPOXIES

(Continued from page 63)

the total amount is substantially reduced. Less labor is required for there is no need for excavations or forms. Curbing extruded in a continuous line and bonded permanently to the roadway with a liquid epoxy adhesive costs less than $1.00 per lin. ft. for labor and materials. The average national cost of installing standard poured curbing is about $2.50 per lin. ft., which may drop to $2.00 on long-run applications.

JUST BEFORE concrete curbing is extruded by machine, liquid adhesive is brushed onto existing pavement. Concrete and adhesive cure together, anchoring the curb securely.

How to use epoxy adhesives

A common opinion about epoxies today is that they are all alike. Nothing could be further from the truth. No single epoxy resin can possibly satisfy all construction demands, and such claims should be regarded with suspicion. Each epoxy adhesive must be formulated to meet specific requirements. For instance, Adhesive Engineering has developed three basic adhesives for concrete:

A low-viscosity epoxy liquid which can be applied readily by brush or can be sprayed with special equipment; an epoxy paste designed to bond rigid materials together and to fill voids between the surfaces if they do not meet properly; and an epoxy grouting compound which actually exceeds the military specifications for which it was designed.

Epoxy adhesives are two-component systems, consisting of the modified resin and hardener, which must be mixed together just before use. Once mixed, the adhesive begins to cure through chemical reaction. No heat or pressure is required. These adhesives contain no weakening solvents which must evaporate out before they cure. The use of solvent systems in other adhesives induces a shrinkage away from the bond surfaces during cure that weakens the bond.

Usually, the epoxy adhesive will begin to set up within 30 to 60 min., depending upon the air and surface temperatures. Since there is no practical way to stop the chemical reaction once the resin and hardener have been mixed, only enough of the material should be prepared that can be applied before the adhesive sets.

When applied in a thin layer over old concrete, in an air temperature around 80 F., the liquid adhesive will remain tacky long enough to permit bonding the new concrete mix within 45 min. At higher temperatures the setting time is reduced. Generally, the use of epoxy adhesives at 40 F. or lower is not recommended. Curing time can be hastened by means of sufficient heat. This is particularly applicable when epoxy mortar and paste are used in those areas where traffic must move over repaired sections in a few hours.

For the ultimate bond strengtth of epoxy adhesives, surfaces to be bonded must be absolutely clean, dry and free of dirt, dust, paint, oil and grease. Concrete contaminated by oil or grease should be sandblasted or be etched with a diluted acid solution. After acid etching, surfaces should be flushed with clean water and dried completely before adhesive is applied. Wirebrushing followed by a blast of compressed air to blow away dirt is usually enough for most ordinary concrete repairs.

New concrete applied over the epoxy adhesive should always be a relatively dry mix, with a standard slump of zero to 2½ in. Coarse aggregate can be used except on feather-edges. When concrete is feathered, a curing compound, wet burlap or polyethylene sheeting should be employed to eliminate rapid drying. For a smooth outer surface, dry-mix concrete can be covered with a wetter surfacing mix.

TYPICAL APPLICATIONS

In addition to the applications mentioned earlier, epoxy adhesives are recommended for repairing spalled areas due to faulted joints, frozen expansion joint systems and poor joint sealing. The mortar can be employed for the recasting of pavement edges whether at the joints or extremities of interior or exterior concrete.

Slippery cement concrete pavements in such areas as toll-booth approaches, bridges and intersections can be made skid resistant by broadcasting grit over a thin layer of the epoxy liquid. An adhesive-aggregate layer just 15 mils thick may cost on the average of $2.00 per eq. yd. applied and will skid-proof the area for several years.

Epoxy sand mortars have proved ideal for patching concrete floors; for complete overlaying of floors to provide greater wear and abrasion resistance; as toppings for superior chemical resistance in food and chemical processing plants; and for exterior building repairs.

The following case histories illustrate the broad versatility of the liquid, paste and grout adhesives.

Skagit River bridge

Of box girder-type construction, this heavy-duty concrete logging bridge on the Skagit River at Nehalem, Wash., is 300 ft. long by 14 ft. wide and was built for the U.S. Forest Service.

The concrete deck was poured around the box girder construction in two sections, each 150 ft. long, but the second section was poured one morning with the temperature hovering near freezing. When the expected temperature rise failed to materialize, the concrete surface spalled severely.

The Forest Service considered the bridge as unacceptable and could have forced the contractor to rip out that half of the deck structure. However, they would accept a proved method of repairing such spalled condition. The method selected consisted of removing the unsound concrete and using a high strength liquid epoxy adhesive to bond down a new concrete topping.

(Continued on page 70)

OKLAHOMA PROJECT I-205 (5) Interstate Route 40

Oklahoma builds to last...with "DEEP-STRENGTH" Asphalt pavement

• Hot-mixed—hot-laid Asphalt base promises outstanding service life.
• Design overcomes problems of plastic subsoil and short aggregate supply.

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.

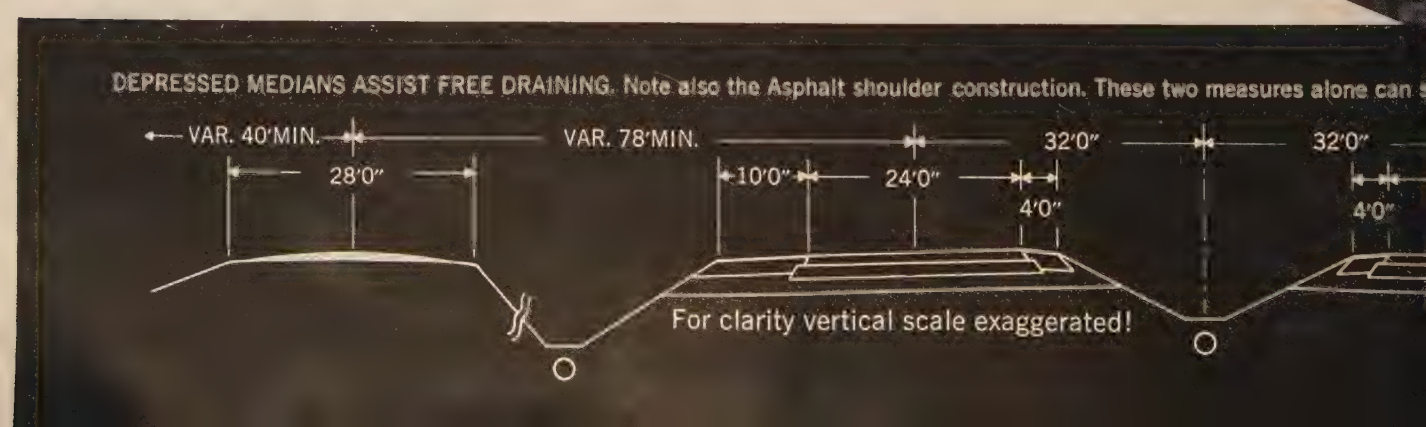
When designed like this — for *Deep-Strength* . . . Asphalt pavements will carry the heaviest traffic loads without distress . . . with minimum maintenance cost. Witness the New Jersey Turnpike. Witness also *Deep-Strength* Asphalt city pavements built more than 60 years ago and still in service.

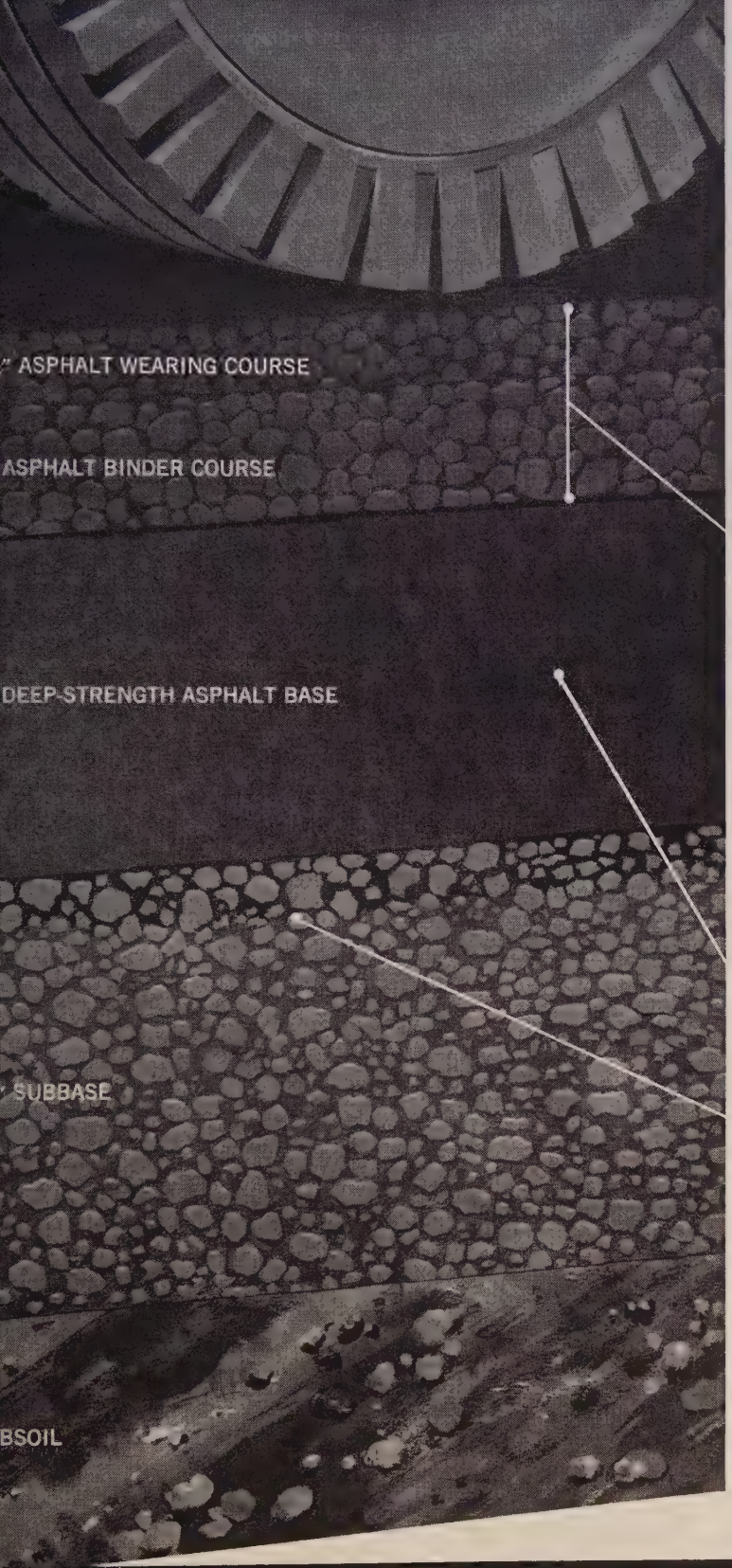
Save money, too

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.



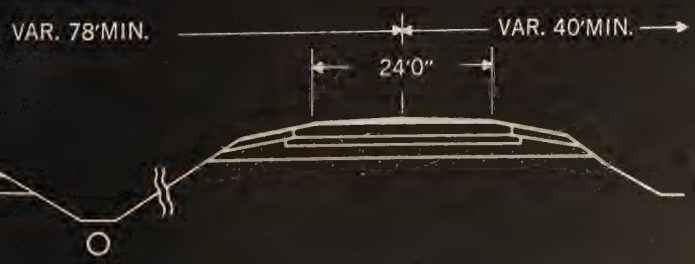


4½-INCH ASPHALT CONCRETE SURFACE takes heaviest traffic, deicing salts without distress. Lane markings show up better day or night, wet or dry.

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.

vement life.



Ribbons of velvet smoothness . . .
ASPHALT-paved Interstate Highways.

DEEP-STRENGTH

THE ASPHALT INSTITUTE
Asphalt Institute Building, College Park, Maryland

LIQUID adhesive is being used to bond fresh concrete to old concrete in a sidewalk trench, eliminating both conventional saw-cutting of slab and separation bond-line normally caused by shrinkage of new concrete.

UNDER TEST is a new method utilizing epoxy grout to bond sections of prestressed concrete piles. Grout was coated over the lower section and poured into anchoring holes before upper section was lowered in place. It has been proven that within several hours joints so constructed have sufficient strength to permit pile to be driven. Arrow indicates bonded section.

EPOXIES

(Continued from page 67)

Ordinarily, chipping out the unsound concrete with air hammers would have been sufficient to provide a good bonding surface. But a heavy rain storm soaked the loose concrete following chipping, causing the latent concrete and concrete dust to set up again on the surface. Sandblasting therefore was necessary.

At 9 a.m. on May 22, 1959, the epoxy was mixed in 1-gal. amounts and brushed with brooms onto the rough deck surface. Fresh concrete was poured immediately over the thin layer of adhesive for the full length of the area to be repaired. About 21 gal. of the adhesive were required to cover the 150 x 14-ft. surface. By 12:30 p.m. the entire deck had been topped with concrete varying in thickness from ⅜ to 2 in.

To date, most of these curbs have been laid in the West, mainly for dividing strips on both concrete and asphalt pavements. Curbing consists of no-slump concrete extruded by special machines. Just before the concrete is extruded onto the pavement, the liquid epoxy adhesive is brushed onto the roadway surface in two strips 1½ in. wide or in a single 4-in. wide ribbon. Adhesive is positioned along the edges of the strip onto which the 8 to 10-in.-wide curb will be extruded. Although the adhesive's setting time allows more than enough time for the curb to be laid, the time is not regarded as critical in this application. The resin cures more rapidly and develops strength faster than the concrete.

With miles of this type of curbing already in service for years, it has been proven that bonding the still-wet concrete to the roadway with the adhesive ensures permanent anchoring of the curb despite repeated impact by car and truck wheels. Extruded curbing was used to construct a traffic island 4 mi. long on El Camino Real between Sunnyvale and Santa Clara, Calif. J. S. Mattos Concrete Co., Hayward, installed the 8 mi. of extruded concrete.

One of the more troublesome problems facing both contractors and engineers is the spalling of concrete at expansion and contraction joints. One case involved more than 1,300 ft. in the concrete floor of a new electronics manufacturing building. Five-inch strips of asphalt had been attached to the cured concrete before the adjoining slabs were poured. The slabs shrank about ⅛ in. during curing. Finishing operations did not follow straight lines and after the slabs were screeded, grout filled up behind the paper and shifted it. The resulting joint irregularities and spalls were quite extensive. The manufacturing requirements in this building were such that even the slightest variations in the floor surface could not be tolerated.

Ordinarily, repairing the joints would have required cutting back the concrete 1 ft. on both sides and recasting with fresh concrete. Instead the architect and engineer approved repair of the joints with epoxy mortar. This recently-introduced repair method permits the entire job to be finished in a few days.

Two diamond concrete saws, spaced ⅞ in. apart, sliced through the cold joints to a depth of 2 in. Spalled concrete and paper were ripped out and the joints were thoroughly cleaned to remove all dirt and dust. Oakum was packed down into the bottom of the open

(Continued on page 74)

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

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

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

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

EPOXIES

(Continued from page 70)

joint below the saw cut depth before the epoxy mortar was troweled in. Mortar was produced by using a powered stirrer to mix 1 gal. of resin and hardener with 2½ parts by volume of fine sand. Portland cement was brushed onto the wet adhesive to color-match the repaired sections with adjoining concrete. The mortar cured in a matter of hours. Later that same day, a single saw cut was made in the center of the repaired joints. A flexible sealant was then poured into the saw cut, providing a sealed working joint.

Street repairs

Chuck holes, potholes and deep cracks in both concrete and asphalt pavements have been repaired successfully with an epoxy resin adhesive possessing high strength and a certain degree of flexibility so that the repair material gives with the pavement. Clean, dry aggregate and sand are added to the liquid resin to produce a thick-consistency mortar which, nevertheless, can be troweled easily to desired levels. Heat applied to the mortar will cure it in less than 30 min.

This type of heavy-duty mortar was used to repair chuck holes in several streets in Los Altos, Calif., in July 1958. Examination of the repaired areas in 1960 revealed that the mortar was still intact, without any signs of cracking or breaking.

Bonding runway dowels

Certain runway areas are exposed to extreme stress by the latest Air Force bombers and their heavy equipment loads. To meet this serious problem, the Corps of Engineers in 1957 specified thicker pavements and the use of steel dowels to connect adjacent pavement strips for load transfer in stress areas. The steel dowels (20- and 24-in. long by 2.375 in. o.d.) are anchored into one concrete slab, while the other half is greased to permit freedom of movement in the adjoining slab.

A portland cement grout was tried first to bond the dowels into holes precast in the slabs. However, this grout proved inadequate because it did not fill the space between dowels and holes.

Engineers then selected an epoxy grout whose high adhesive strength had proved suitable for bonding steel to concrete. The grout meets the specifications of the Air Force (AFP 88-116-1) and the Corps of Engineers (Technical Memorandum #2-11). After the holes and half the length of the dowels are coated with the grout, the dowels are inserted. This grout sets moderately hard in 24 to 48 hr. at 75 F. and develops full strength in 6 to 8 days at the same temperature.

Tests performed by the Corps of Engineers for bond strength in shear between concrete and dowels resulted in the shattering of the concrete without any delamination of the dowel bond to the concrete. As a result of these and other studies, this method of installing dowels has been approved for use in the Corps of Engineers Contract Specification for Rigid Pavement as an alternate method of construction.

This test work was accomplished by the Sacramento District, U. S. Army Corps of Engineers, with technical assistance provided by the Materials and Research Laboratory of the California Division of Highways.

Camp buildings designed for easy erection and reuse

Fifteen structures for a new prison camp of Los Angeles County Road Department feature interlocking panel construction that is weathertight and readily portable.

FOR CONSTRUCTION of mountain roads, the Los Angeles County Road Department utilizes minimum security prisoners from the county jail. The roads are in mountain areas, and camps are set up in a given area of operation for construction of several miles of roads or series of roads. The primary objective of these camps is to provide useful work for the rehabilitation of county prisoners.

Each camp is designed to be self-sufficient. A camp superintendent is in charge and is assigned: (1) equipment operators, truck drivers and other paid men (they work with the prisoners as lead men), and (2) 60 prisoners under the supervision of the sheriff's office. Each camp is complete with its own complement of motorized equipment, graders, dozers, shovels, and other tools; also, all necessary construction materials, culverts, timber, and cement.

All phases of road construction are handled by camp personnel, including grubbing, grading, blasting, and culvert installation.

Recently a new camp was required for road construction in

DISMANTLING of this typical building for a move will include removal of roof panels individually, removing of rib bolts at top and bottom, and tipping the wall panels outward

Brinson-Allen's No. 14 is equipped with Preco Automatic Blade Control. This exclusive factory-installed attachment for all Caterpillar Motor Graders saves money on a wide range of applications. With the desired slope set on the dial, the operator only has to control depth of cut. The transistorized unit automatically maintains blade slope within 1/8 inch in ten feet.

CAT NO. 14 MOTOR GRADER INCREASES PRODUCTION 20 PER CENT

This Cat No. 14 Motor Grader handles subgrade and base on the western approach of the Interstate System highway bridge between Tampa and St. Petersburg, Fla. Charlie Clyatt, superintendent on the job for owner Brinson-Allen of Tampa, reports, "We have increased production about 20 per cent. The No. 14 has more weight, traction and power, gets the job done quicker. It has never failed to stay well ahead of the base crew."

Here's why the big No. 14 excels in weight, power and traction: It weighs a hefty 29,280 lb. . . . the 150 HP turbocharged engine delivers power to spare . . . 14:00-24 tubeless tires all around provide excellent stability. The 12 ft. (standard) or 14 ft. (optional) moldboards with ample throat clearance between moldboard and circle assure you of greater loads than ever before.

But this versatile motor grader has more than sheer power and weight. Features like the dry-type air cleaner which removes 99.8 per cent of the dirt from intake air means longer service life. The exclusive Caterpillar oil clutch, which operates up to 2000 hours without adjustment, practically eliminates down time for clutch repair. Operator has excellent visibility to front wheels, toe of blade and circle. The power steering and power brakes are designed for operator efficiency and high productivity. These are just a few of the reasons why the No. 14 is the most profitable and productive motor grader in its class.

Heavy-duty circle and moldboard on the No. 14 provide big load carrying capacity. Circle and moldboard are strong to match engine power and can absorb the punishment of rough work. Mechanical blade controls provide precise, fast blade adjustment and positive hold.

See your Caterpillar Dealer and ask him to demonstrate the No. 14 on the toughest application *you* can find. See for yourself how the rugged No. 14 can handle the hard work.

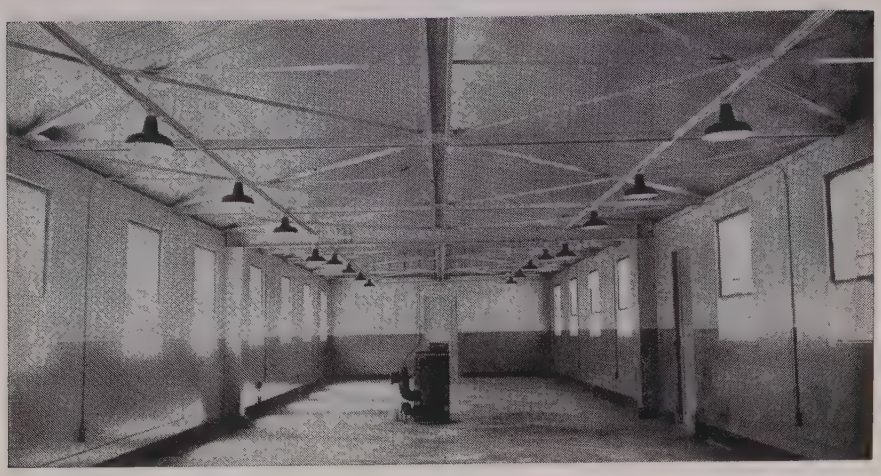
Caterpillar Tractor Co., General Offices, Peoria, Illinois, U. S. A.

CATERPILLAR

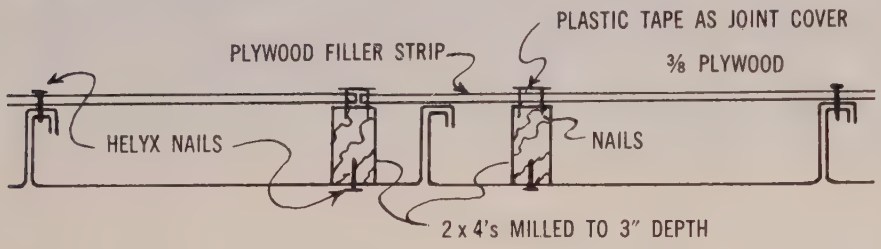
Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

STEP UP PRODUCTION WITH THE NEW NO. 14

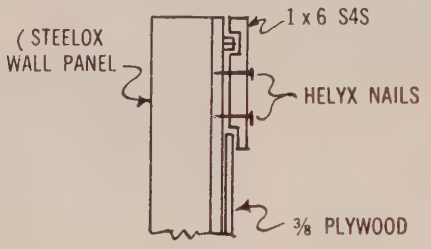
. . . for more details, write No. 31 on Reader Service Postcard



INTERIORS are completely finished in plywood nailed directly to the panel ribs (see drawing). This enables the panel walls to be dismantled in sections. Mild climate does not require insulation.



STEELOX wall panels have interlocking ribs and are 16 in. wide. Helyx nails are driven through the steel without drilling. Detail of moulding is shown at right.



San Francisquito Canyon, in the mountains northwest of Los Angeles. In designing the camp, the engineers wanted buildings that were portable. After considerable investigation Armco steel buildings, Types S-1 and S-2, were selected. The all-bolted construction of these buildings assured portability and easy re-erection. Also, the interlocking panel-type construction provides a weathertight building even after several moves.

In the design stage it was decided that the building interiors would be completely finished with ⅜-in. plywood nailed directly to the panel ribs. This enabled the building walls to be dismantled in sections of various widths; not less than 4 ft. or more than 10 ft. Each section is complete with interiors finished and with doors, windows, and electrical wiring included in a particular wall section. Because of the relatively mild climate, no insulation is required. Specifications were written around a panel-type construction for the basic building.

The call for bids included construction of an access road, grading, water and sewage systems, and building construction. The buildings required were:

2—20x84-ft.—Prisoner's dormitory
1—20x24-ft.—Prisoner's bath
1—20x80-ft.—Mess hall
1—16x20-ft.—Root house
1—20x40-ft.—Sheriff's office
1—24x48-ft.—Paid mens' dormitory
1—20x24-ft.—Cement house
1—20x28-ft.—Engineer's office
1—20x48-ft.—Service building
1—12x20-ft.—Oil tool house
1— 8x32-ft.—Visitor's toilet
1—20x32-ft.—Commissary
1— 8x 8-ft.—Boiler room
1— 8x12-ft.—Boiler & refrig. room

The successful bidder was the James Mazza Co. of North Hollywood, Calif. After award of contract, the contractor placed an order with Armco Drainage & Metal Products, Inc., for the fifteen buildings on a furnish-and-erect basis. The prime contractor poured the slabs and set the anchor bolts. Armco Construction Department then erected the buildings.

The buildings are constructed of Steelox panels, which have an interlocking rib. Panels are 16 in. wide. Since specifications required the walls to be capable of being dismantled in panels 4 to 10 ft. wide, a joint between wall sections was designed. The wall sections were laid out so there was a full length panel on either side of each door and window opening. This permits the buildings to be dismantled with the doors and windows intact since the door and window jambs are bolted to the adjoining panel.

At the joint between each adjacent wall section, 2x4's milled to 3 in. in depth to match the depth of the Steelox panel rib, were nailed to the panel 2 in. away from each side of the rib. The interior plywood was nailed to the 2x3's and at each panel rib with hardened steel Helyx nails that drive through the steel with no drilling. A 4-in. wide plywood filler strip was then nailed to the 2x3's spanning the panel rib at the joint. A detail of this is shown.

Dismantling of the buildings requires removing the roof panels individually, removing the rib bolts, which are in the top and bottom of each 16-in. wide panel, and tipping the wall section outward. To provide working room to remove these rib bolts, the top and bottom finish moulding was of special design, as shown. The moulding was nailed to the panel ribs at top and bottom of the wall. Plastic tape was applied to the vertical joints on the plywood and the building interiors were spray painted.

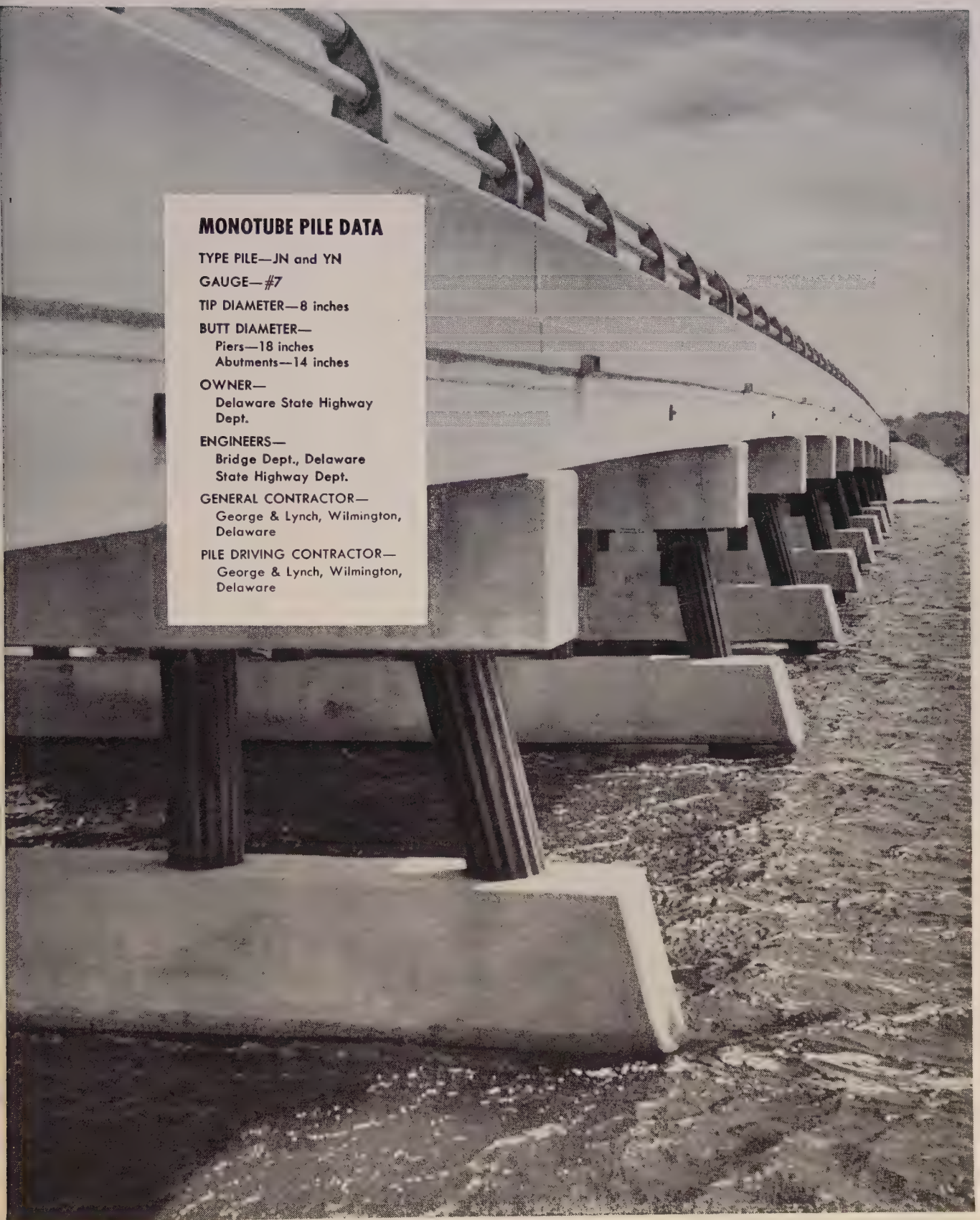
Supervisor Burton W. Chace, chairman of the board of supervisors, Los Angeles County, is also chairman of the Road Department Committee.

UCLA has largest educational building program

LARGEST building program ever undertaken by an educational institution is going forward at the University of California at Los Angeles. The plan is being carried forward to meet an expected enrollment of 27,500 students by 1967.

The program which began in 1949 will represent a cost outlay of more than $370,000,000 by 1967. The work will represent about 150 separate projects, including both individual structures and major additions to existing buildings.

At the present time, sixteen buildings are under construction and four more are scheduled to start before the end of the semester. These structures alone represent a cost of more than $51,000,000. This compares with the four buildings which were standing on the site when the campus was first opened to students in 1929.



MONOTUBE PILE DATA

TYPE PILE—JN and YN

GAUGE—#7

TIP DIAMETER—8 inches

BUTT DIAMETER—
Piers—18 inches
Abutments—14 inches

OWNER—
Delaware State Highway Dept.

ENGINEERS—
Bridge Dept., Delaware State Highway Dept.

GENERAL CONTRACTOR—
George & Lynch, Wilmington, Delaware

PILE DRIVING CONTRACTOR—
George & Lynch, Wilmington, Delaware

DESIGN ECONOMY AND CONFIDENCE with Monotube Piles . . . acting both as piers and foundations for this prestressed concrete beam bridge at Fenwick Island, Delaware. The high columnar strength of Monotubes makes their application ideal for this type of project.

Tapered, fluted Monotube steel piles are available in lengths, diameters and gauges to meet your requirements. The Union Metal Manufacturing Co., Canton 5, Ohio—Brampton, Ontario, Canada.

UNION METAL
Monotube Foundation Piles

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Present and future highway picture

A report from the ARBA Convention

CONGRESSIONAL attitude toward many of the pressing problems that confront current and future work on the Interstate Highway System was presented at an important session of the American Road Builders' Association Convention held in Cincinnati, Ohio. In a panel session designated "Congress Talks to the Press" representatives from leading construction publications questioned Congressional leaders. Members of the panel, as originally scheduled, are indicated in the accompanying box.

Because it is difficult to use direct quotes from several responses that resulted from many questions, and to present rather the general attitude of the representatives from both branches of Congress, the following review of some important questions is presented in the form of specific questions and the consensus provided by the answer.

QUESTION — *What are your views on "Contract control"; does it violate the intent of Congress and should Congress spell out its intent more precisely?*

ANSWERING DISCUSSION — Excerpts from the original law show that Congressional intent was to make the full amount of money apportioned to the states available from the date of such proportion, thus, the law would appear to be in conflict with the present system of control exercised on the individual states in relation to their committing funds to contract.

Consensus seemed to be in sympathy with the states and their highway administrations, realizing the problems resulting from present controls which set up different procedures from long established practice. On the other hand, it was pointed out Congress had the obligation to make enough money available to eliminate the present control system which has been forced upon the U. S. Bureau of Public Roads by the depletion of the Trust Fund. It would appear to be the lesser of two evils since the imposing of controls was required by the financial situation of the Trust Fund, or it would have been necessary to reduce the apportionments drastically.

QUESTION—*If the urban portion of the Interstate Program is curtailed, will the cities be required or be able to build these highways with their own financial resources?*

ANSWERING OPINIONS— Considerable background information was presented reviewing the importance and seriousness of urban traffic problems and their relation to the Interstate System. The proportion of urban to rural population now and in the future was mentioned, as well as the origin and destination of most traffic emphasizes the importance of cities in the entire highway program. It was mentioned that this program is ultimately being paid for by the users of the highways and these are principally people living in metropolitan areas. Any plan to reduce the highway funds to be spent within cities would not find favorable Congressional reaction. A system of highways which brings traffic on modern routes up to the edges of metropolitan areas and then dumps it into an antiquated arterial system would be contrary to the original intent of Congress. Congress is aware of the financial plight of most cities and the fact that they would be completely unable to provide adequate facilities with the municipal or metropolitan funds. Even representatives from rural states in Congress take the national approach to the problem and realize the intent of the Interstate System is to reach to and within the centers of population with the necessary facilities. It can be assumed that there will be no material change in this part of the program.

QUESTION — *If the overpasses on the Interstate System have to be raised to meet military requirements, should the estimated additional $1 billion come from the Trust Fund or the Defense Department?*

ANSWERING COMMENT — Emphasis was placed on the fact that the system originally carried the additional designation of "Defense," which was certainly an important consideration in the original plan. Although this factor has been somewhat pushed into the background with the common designation of "Interstate System" it must be considered. Further, the Defense Department agrees that the dispersal of modern weapons must be prompt and needs adequate highway facilities. Any part of the program which requires changes in highway design for the exclusive requirements of national defense should be paid for by the proper department and would not logically come from the direct contributions paid by highway users to the Trust Fund.

(Continued on page 83)

Panel Members

Moderator—*Harold L. Plummer,* vice president, Central District, ARBA

Representing Congress:

Dennis Chavez, chairman, Senate Committee on Public Works

Francis Case, ranking minority member, Senate Committee on Public Works

Jennings Randolph, member, Subcommittee on Roads, Senate Committee on Public Works

George H. Fallon, ranking majority member, House Public Works Committee; and chairman, Subcommittee on Roads

Gordon Scherer, ranking minority member, Subcommittee on Roads, House Public Works Committee

John Blatnik, member, Subcommittee on Roads, House Public Works Committee

Representing the press:

James I. Ballard, editorial director, Western Construction

Robert Boger, publisher, Engineering-News Record

Donald V. Buttenheim, president of Buttenheim Publishing Corp., Contractors and Engineers.

Harold J. McKeever, editor-in-chief, Roads and Streets

George Stewart, publisher, Constructioneer

ARBA

(Continued from page 78)

QUESTION — *Would Congress tend to look favorably on the use of Federal Aid Highway Funds for the improvement of inter-urban rail transit facilities?*

ANSWERING OPINION—The answer appears to be simple. Since inter-urban transportation problems are exclusively a local matter and not related to Federal Highway needs there is no reason for Federal Funds to be used or allocated for such type of local improvements.

QUESTION — *Should some thought be given to cutting back the design standards on the Interstate System in areas where the cost may appear excessive in relation to expected traffic?*

ANSWERING OPINION — Standardization on the Interstate System represents important advantages in elements of safety and driver convenience. Modifications in accepted standards in any particular state or region of the country would tend to introduce hazards which the system is trying to eliminate. Further, the growth of traffic has been so rapid during past years and is so difficult to predict in the future that who can be in a position to advocate a reduction in these standards as being adequate for any particular area. The accepted standards should be maintained uniformally throughout the system.

QUESTION—*Can you give any information on plans and status of the investigations to be conducted by Congress into the highway program, with reference to financing, frills, extravagances, and trends?*

ANSWERING COMMENT—It is much too early to indicate the extent or direction of these investigations, although they must be complete and adequate. The volume of public funds involved in the program warrants a searching review of the methods and results in spending this money. The public deserves such a thorough review. On the other hand, the committees should be extremely careful in generalizing on specific cases where unfavorable facts are uncovered. Any situations which indicate deviations from the plan and intent of Congress should be treated as isolated cases and kept in proportion to the size of the overall program. This will maintain a correct perspective.

QUESTION — *Is there any chance that Congress will alter its traditional thinking and consider a Federal Aid program to encompass some of the burden of maintenance of the Interstate System particularly in the thinly populated states?*

ANSWERING COMMENT — Over the years it has been readily accepted that states would maintain all highways built with contributed funds from the Federal Government. This would appear to be a logical responsibility, in consideration of the aid received in constructing these highways. With Federal participation at the 90-10 level on the Interstate System, this responsibility on the part of the state becomes even more obvious and there is no reason why Congress should change the program to provide financial assistance in any maintenance operations.

Resolutions passed

Among the resolutions adopted at the convention were the following:

A resolution calling for the establishment of uniform cost accounting procedures and procedures for pre-qualification to stabilize conditions in the consulting engineering profession and to encourage the use of consultants to the extent proper and feasible in the highway program.

A resolution urged that legislation be passed to assure that Federal Highway Aid Funds be made available in the full amounts authorized.

One urged the extension of the Federal Aid Airport Program for at least five years at the annual rate of $100,000,000.

A resolution expressed opposition to the extension of the Bacon-Davis labor provisions in highway construction. Another urged continuation of the 90-10 financing of the Interstate System and continuation of progress on the urban sections.

A final resolution called for the prompt organization of the Better Highway Information Committee which has been initiated by ARBA as an agency to establish and improve the communication lines between the highway industry and the general public.

Present highway situation

A precise and extremely clear review of the Federal highway program, and its financial and legislative future was presented by Gen. Louis W. Prentiss, executive vice president of ARBA. A condensed version of his talk follows:

We who are interested in the national highway program are going to be hearing quite a bit of the familiar cry, "Wait until next year," in the months ahead. The year 1961 is supposed to be the year when Congress will put highway financing on a sound footing so that the program launched by the 1956 Highway Act can finally become fully effective.

There are good and sufficient reasons why a long-range solution to the financing dilemma cannot be reached earlier than 1961. In 1961, the Bureau of Public Roads will bring in its comprehensive report on the highway costs attributable to the various classes of highway users and the highway benefits which accrue to the various classes of users and non-users. This, together with the third in the series of periodic estimates of the cost of the Interstate System, will give Congress the best information possible on which to base a revision of the revenue laws supporting the Highway Trust Fund.

Unless we are ready in 1961, the opposition is likely to knock our ears off.

Recently the Secretary of Commerce referred to the revenue provisions of the 1956 Highway Act as having been "thrown together," and while I would take issue with the inference that these provisions were drafted carelessly and with undue haste, it is clear that Congress was aware, in 1956, that the financing provided for the Highway Trust Fund was not the final answer to the highway revenue problem.

With the advantage of hind sight, we can now look back and see some shortcomings in the highway financing plan that was established in 1956.

For one thing, the estimate of the cost of the Interstate System used in framing the 1956 Act was

(Continued on page 86)

If you use rear-dump haulers

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Have the Euclid dealer in your area give you facts and figures to compare with your own hauling costs... you'll find Euclid's greater dimension pays off in a better return on your investment. EUCLID Division of General Motors • Cleveland 17, Ohio

Payload capacities of 10, 15, 18, 22, 27, 40 and 55 tons... also semi-trailer models of 12, 22, 35 and 50 ton capacity.

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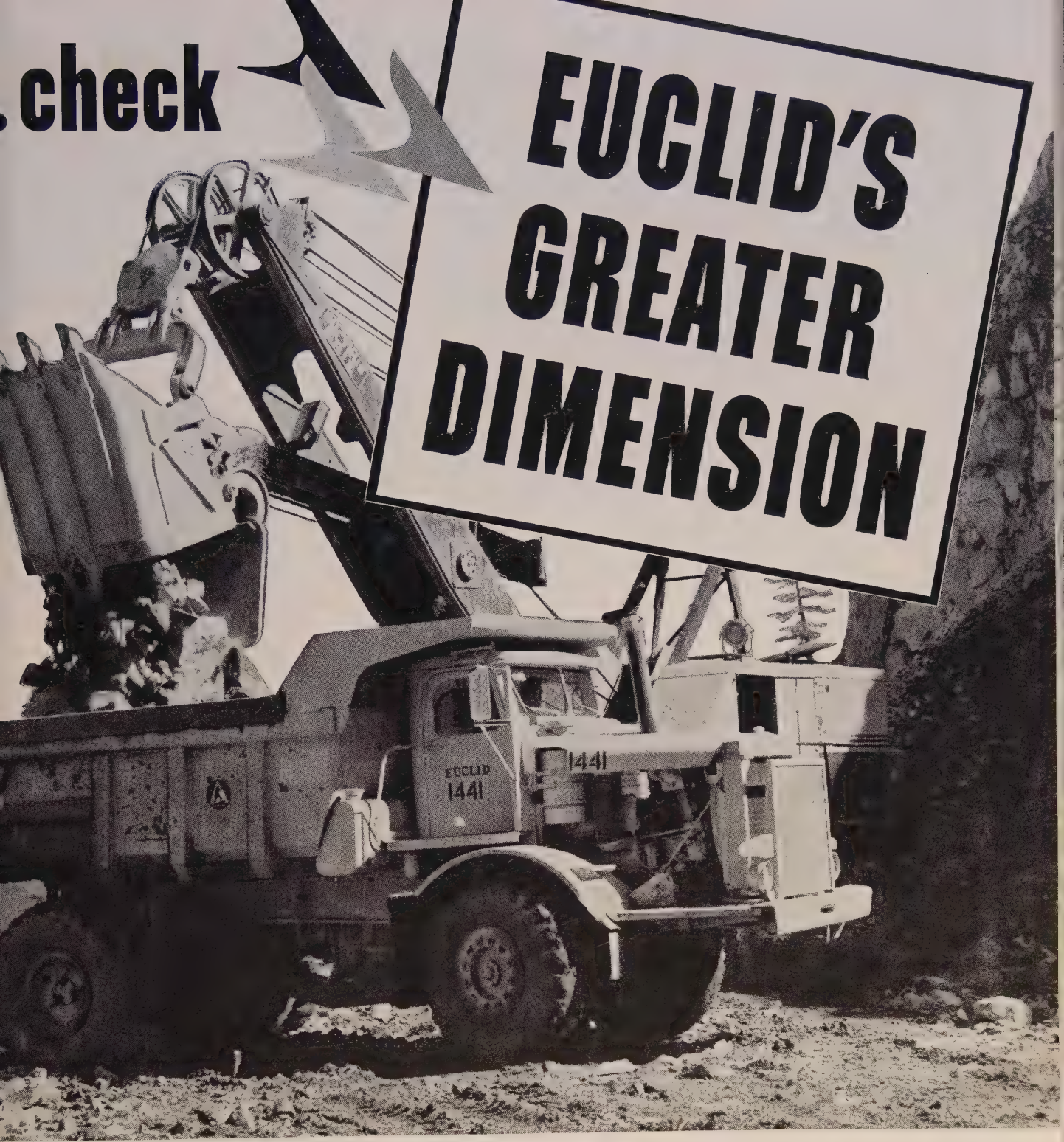
- does machine have required performance ability needed... capacity and speed for high production work, power and traction for rough going and steep grades?
- well-balanced for size of loading equipment... hoppers and controlled dumping needs?
- is there good parts and service availability... at both manufacturer and dealer level?
- are maintenance manuals, parts books and service literature complete... is machine designed for easy servicing?
- is machine easy to operate... convenient controls... good visibility... operator comfortable so that efficiency is maintained for entire shift?
- can required production be maintained at low cost... construction rugged enough to withstand heavy service with minimum maintenance?

Euclid Rear-Dumps meet every one of these important requirements... and more!



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Model R-27 has heaped capacity of 26½ yds. . . . rated payload is 54,000 lbs. . . . available with Cummins 335 h.p. or GM 336 h.p. engine . . . 4-speed Torqmatic Drive with converter lock-up and Torqmatic Brake . . . dual hydraulic booster steering . . . 18.00 x 25 tires on all wheels . . . rugged body with twin hoists . . . top speed with full payload, 34 mph. . . . available in two body types, standard for all-around use and quarry for hauling big rock.

ENGINEERED FOR EASY SERVICING

Like other Euclids, the R-27 is of simple, rugged design for years of dependable performance at minimum maintenance cost. When repair or replacement of major components is necessary, service-minded engineering saves time and money, too. For example, a transmission can be removed and replaced in just one-eighth the time required for the same work on a competitive hauler of the same capacity . . . engine replacement takes only one-half as many man-hours.

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ARBA

(Continued from page 83)

obsolete in terms of the Act itself. The Act contemplated the construction of a 41,000-mi. network of Interstate highways in which the needs of local traffic would be given equal consideration with the needs of interstate commerce. The cost estimate was for a somewhat shorter system—40,000 mi.—which would not accommodate itself so extensively to local traffic needs.

This cost estimate had been prepared in 1954 as a part of an inventory of our overall highway needs, and, because route locations had not been pinpointed, it had to be a rough estimate.

Looking back, we can see that the Trust Fund's estimated total receipts and total expenditures were thrown out of balance at once, because the Trust Fund was obligated immediately to the tune of $1.98 billion carried over from prior apportionments.

Pay-as-you-go problem

Then too, as has been so often noted, the Byrd pay-as-you-go amendment was inconsistent with the rest of the Act because it required that the Trust Fund be kept in balance annually, while the original financing plan contemplated deficits during the peak construction years which would be made up at the end of the program.

The equity of the highway taxes levied on the various classes of users will always be debated, I suppose.

We will know more about what is equitable next year, when the AASHO Road Test will have given us its information on incremental costs, and the Bureau of Public Roads will have completed its cost allocation study.

The imperfect highway financing structure was subjected to further strain in 1958. Now that the 1958 recession is over, there is a tendency to discount the danger to the national economy that loomed in the winter and spring of 1958, and to say that no real emergency existed. It looked real enough at the time, however, and the situation might have become much worse if the government had not taken quick action to combat the recession. One such action was the 1958 emergency highway program, authorizing the apportionment of $400 million for work of the ABC highways on a two-to-one matching basis, with a $115 million loan fund to aid the states in securing matching funds quickly, and a provision that all work undertaken be put under contract not later than December 1, 1958.

I am not among those who are critical of the 1958 emergency highway program. At the same time, the emergency program put an added strain on a Trust Fund that was already strained past its limit. The absence of special financing for this special program hastened the inevitable time when the Trust Fund would run out of money.

Federal tax raised

Early in 1959, the President, in his budget message, called attention to the critical highway financing problem and asked Congress to increase the Federal gasoline tax from 3¢ to 4½¢.

In spite of the fact that future financial troubles were a built-in feature of the 1956 Highway Act, many seemed shocked to learn that the program had run into money trouble so soon.

There was no enthusiasm at all for the President's recommendation that the money be found by increasing taxes on highway users.

In facing the unpleasant choice of deciding whether to raise taxes or upset the budget, many Congressmen began taking a long, hard look at the highway program itself. They found that enough obligations to drain the Trust Fund completely dry, and then some, had already been incurred. Even if you started with the premise that it would be a good idea to cut the Interstate program back to half its size, you still came up with the news that more revenue was necessary. As far as the immediate future was concerned, no tapering off of the Interstate program was feasible, because even tapering off called for more money.

An abrupt halt in the Interstate program would have had great disadvantages. It would have meant the abandonment of many half-finished highways, chaotic conditions and high unemployment in highway and highway-related industries, and it would have been difficult and costly to restart the program after it had once been stopped.

The Highway Act of 1959, as it finally emerged, was a compromise measure which reflected the many divergent points of view. Many Congressmen voted for the bill to prevent chaos, not to push the highway program forward. Many are seriously considering ways of reducing the scope of the highway program. They did not want to push the program off the edge of the cliff, but they will not mind if it rolls down hill to a certain extent.

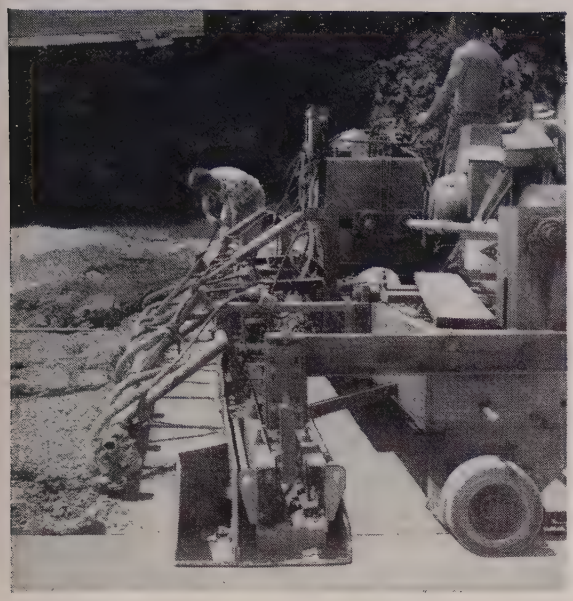
Two very important studies of the highway program are going forward at the present time. A White House study group is looking at the whole concept of the Interstate program, with particular emphasis on the urban aspects, to determine whether any change in scope or emphasis of the program is needed. A special subcommittee of the House Committee on Public Works is also studying the highway program, to determine whether money is being wasted through extravagance or poor administration. A subcommittee of the House Ways and Means Committee is waiting for the Public Works group to come up with some findings before it begins an investigation of its own.

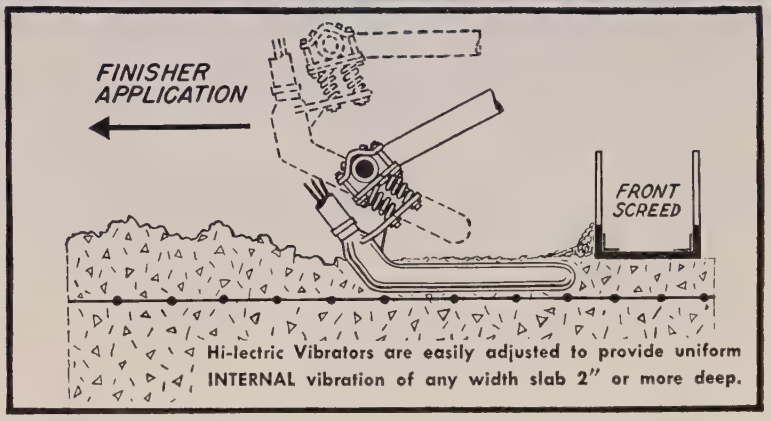
Whether the results of these studies will affect legislation at this session of Congress depends to a large extent on timing and on the nature of the findings. However, we can look forward with assurance that 1961 will be an active and important highway legislative year. As one member of Congress has aptly put it, the legislative hassle of 1959 will look like a pink tea party when compared with the battle royal that is shaping up for 1961.

Idaho highway cost index figures at end of 1959

THE Idaho highway construction index issued by the Department of Highways for the last quarter of 1959 showed a composite figure standing at 99.6 which is 22.1 points or 28.5% above the previous quarter. The index is based upon 1950 as representing 100. Increase in the fourth quarter index figure was due primarily to a 77.7 increase in the price for unclassified excavation and a 49.5 increase in the price of crushed surfacing and a 28.4% increase in the price of plant-mix. These increases, from the preceding quarter, according to the highway department, were due primarily to the type of project let in the current period as compared to the work placed under contract in the third quarter. During the third quarter much of the work was in the vicinity of Boise and the Snake River Valley where bid prices went for 19¢ or 22¢ on large excavation jobs. In the fourth quarter there were no major projects.

To Cut Job Costs - Put MAGINNISS FULL SLAB VIBRATORS - ON YOUR FINISHING MACHINE





Hi-lectric Vibrators are easily adjusted to provide uniform INTERNAL vibration of any width slab 2" or more deep.

Increase production 20%

Hundreds of paving contractors are eliminating the second pass of the finisher—and often the need of a spreader—by using MAGINNISS Hi-lectric Vibrators on their finishing machines. Operating completely immersed in the concrete, Hi-lectric vibrators speed distribution, leave surface semi-finished, increase production up to 20%. You can bid lower—and IMPROVE quality of concrete—by using MAGINNISS Hi-lectric internal vibration.

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Quickly mounted on any finisher or spreader. No auxiliary carriage required. All attachment parts are furnished complete.

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The finishing machine operator controls all positioning of vibrator, on and off, and the vibration speed to suit consistency of concrete and other job conditions. Vibrators are raised and lowered by double-acting hydraulic cylinders powered by the hydraulic system of the finishing machine.

Eliminate honeycomb throughout slab

Angle positioning of vibrators below surface of slab obtains most efficient results possible—assures a UNIFORM homogeneous mixture of aggregate and mortar from base to surface. MAGINNISS Hi-lectrics easily handle the stiffest concrete mixes.

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Hi-lectric Vibrators have only TWO moving parts. No brushes, commutators, gears, flexible shafts, nor complicated air or fluid drive mechanisms to require costly repair or replacement. Because the induction motor is located in the vibrator head, it is cooled by the surrounding concrete.

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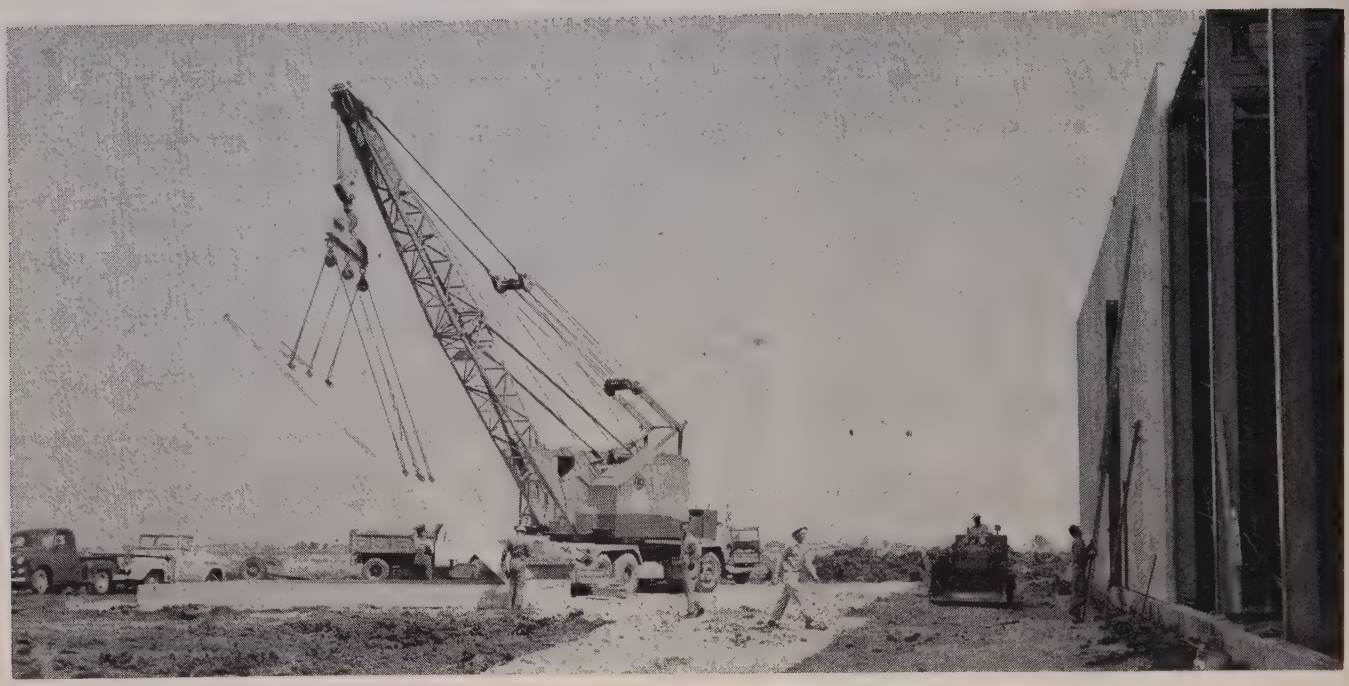

TILT-UP WALLS go into position around an area that totals 16 ac. For economy and architectural effect all slabs were uniform in height, with added wall height in the mezzanine area formed by job-assembled, insulated aluminum wall panels.

Building for missiles is erected in record time

Navy, Lockheed and Pomeroy work as a team to plan and build research building in 270 days. Foundation problems are severe.

By J. P. HAWKE
Formerly, Chief Engineer
J. H. Pomeroy & Co., Inc.
Engineering Division
and
A. A. ANASTASIA
Assistant Manager
Plant Engineering
Lockheed Missile System Divn.

TO expedite the design, development, and fabrication of the Navy's Polaris solid-fueled Fleet Ballistic Missile, a plant was designed and constructed in record time. This $13,000,000 Naval Industrial Reserve Ordnance Plant at Sunnyvale, Calif., houses design, development, checkout and manufacture of the Polaris, on which Lockheed Missiles and Space Division is system manager and price contractor.

The plant comprises 673,000 sq. ft. of air conditioned office, laboratory, test and production area. Design features complete flexibility of mechanical, electrical, and structural systems for convertibility as the Polaris Missile passes through development into the production phase.

Design and construction was accomplished in two stages. Phase I comprising 153,000 sq. ft. was designed in 90 days and constructed in 180 days. Phase II was designed in 120 days and constructed in 240 days (partial occupancy in 150 days). Complete contract drawings and specifications were prepared and all work was awarded by competitive bidding.

Difficult foundation problem

Of particular interest to civil engineers and general contractors is the foundation condition at the site and the method used in solving a difficult problem. This foundation condition also had a direct bearing on the structural design. Each problem was magnified by the urgent need for the earliest possible completion of the building.

The site at Sunnyvale is located adjacent to Moffet Field and along the shore of San Francisco Bay. Black organic adobe covers the site and extends to a depth of from 4 to 5 ft. This most unsatisfactory material is underlaid by San Francisco Bay sands and silts.

Foundation explorations and tests by soil laboratories were made under the supervision of the general contractor and his engineering staff. A typical soil profile indicated the following:

0 to 2 ft. black organic silty clay (adobe)
2 to 14 ft. grey to brown silty clay (C-1000 psf.)
14 to 20 ft. layers of clayey sand and water bearing gravel
20 to 31 ft. stiff light brown silty clay (C-1700 psf.)
31 to 38 ft. compact sand and gravel
38 to 80 ft. very firm to hard, blue-grey silty clay (C-2500 psf.)

Because the building includes large areas devoted to scientific work, combined with the fact that the structural steel was designed as a rigid frame, it was important to provide a foundation that would have minimum settlement. Careful study indicated that the support should be either by piles or caissons that would extend to the compact layer of sand and gravel (depths ranging from 31 to 38 ft.). These supports, in turn, would distribute the load to the underlying "very firm to hard, blue-grey silty clay." Drag-down loads to be caused by the consolidation of the upper

(Continued on page 92)

FAR AHEAD OF ANY MACHINE IN THIS CLASS

Full of exclusive features for better performance

More Power: 77½ hp heavy duty engine provides more power than any comparable machine.

More Dumping Clearance: 8'-½" clearance under bucket edge, dumped — even more than some larger machines.

More Reach: 32" dumping reach ahead of front tires — twice the reach of any comparable machine.

More Reliable Brakes: 4-wheel hydraulic brakes instead of 2-wheel for equal braking forward or reverse. Sealed to keep out dust and dirt. Separate parking brake on drive shaft.

Full Power-shift Transmission plus torque-converter: Provides three speed ranges in each direction. All shifts in either direction can be made "on-the-go" with a flick of the fingers. No need to stop for any "range" shifts.

More Operator Visibility: New slope-down front end styling gives the operator full vision of the bucket digging action without leaning over the side.

More Safety: All boom structures are positioned ahead of and away from the operator. Standard ladder with hand rails makes it easy and safe for the operator to get on and off.

Closed, Pressure-controlled Hydraulic System: Oil reservoir is closed and pressurized to exclude dirt and dust — includes built-in cartridge type oil filter and a fine mesh strainer.

Positive Oil Cooling: Separate fan-cooled oil-to-air radiator assures positive cooling of the transmission and torque-converter oil.

More Accessibility: Compartment on left side with quick-opening cover provides easy access to the battery and all instrument connections. Fuel tank and transmission can be checked and filled from ground level.

Steering-axle Drive Disconnect: A lever in the cab enables the driver to disconnect the rear (steering) axle-drive for over-the-road travel or whenever 4-wheel drive is not needed.

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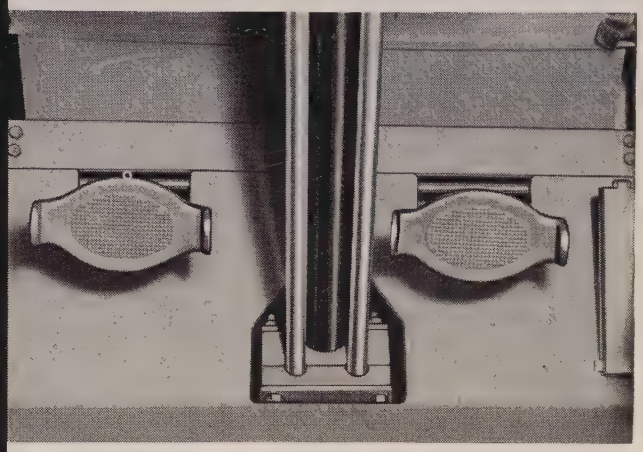
Boom arms of Man-Ten steel combine exceptional strength with light weight. A single long-stroke hydraulic ram with a high-leverage linkage to the bucket develops powerful bucket break-out action for tough digging assignments.



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Lockheed building

(Continued from page 88)

strata were provided for in the design.

Foundation analysis went further to include investigations covering the stresses in the compact sand and gravel layers as well as the underlying hard, silty clay and were found to be satisfactory. Estimates of settlement during construction, the total settlement and differential settlement showed acceptable values. Settlement was reduced as a result of the high preconsolidation pressures revealed by the rebound curves that were developed from consolidation tests.

The contract documents were prepared to permit either drilled caissons or driven cast-in-place piles. This less expensive alternate was selected and used.

Caissons were drilled with rotary rigs (see illustration). As the ground water level was near the surface it was necessary to case and pump the holes, and to use great care in placing concrete. Concrete was placed in the holes by tremie and the casing was withdrawn as concreting advanced.

The structural steel space frame consisted of welded trusses and carrying trusses supported by H columns. Due to the urgency of the job, materials were selected with regard for availability. This resulted in the use of double-angle truss members with gusset plate connections. All shop connections were made up by welding and all field connections were bolted.

In addition to the rigid structural steel frame, the building has tilt-up concrete exterior wall panels, a roof system comprising fiberglass form boards, poured gypsum deck, and a built-up asphalt and gravel roof. Design was based on standard 40-ft. bays and 60-ft. aisles throughout. To maintain this clear working area in the shops and laboratories under the office mezzanine, the mezzanine floor of light weight concrete on steel decking was supported by hangers from the roof trusses.

Clearance under the bottom chord of the roof trusses in the high temperature structural test area is 65 ft., in the mezzanine area 28 ft., and elsewhere in the plant a uniform clearance of 20 ft. is maintained. For economy and architectural effect the exterior tilt-up concrete walls were of uniform height; the additional wall height in the mezzanine area being provided by offset walls of job assembled insulated aluminum wall panels. Similar wall panels were used to enclose the structural test area and the penthouses. The steel frame for the entire manufacturing area is designed to support underhung bridge cranes operating either longitudinally or transversely in the building.

Facilities in the building serve every phase of missile design, development, and manufacture, from exotic metal fabrication and printed circuitry to cafeterias, snack bars and first aid facilities. The large areas devoted to engineering and administrative functions resulted in the use of large quantities of architectural finishes not usually found in industrial buildings.

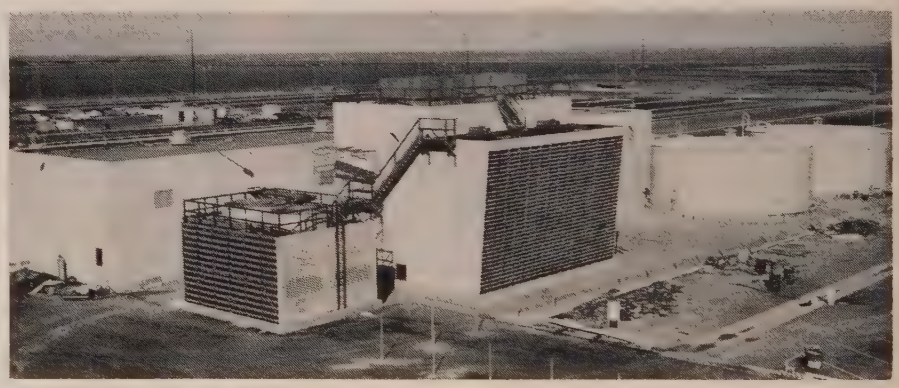
A representative material takeoff gives a good impression of the size of the project:

Concrete piles	1,050
Reinforced concrete..	14,000 cu. yd.
Gypsum roof deck....	516,000 sq. ft.
Resilient flooring	300,000 sq. ft.
Hung ceilings	273,000 sq. ft.
Interior partitions	20,000 lin. ft.

A 7,200-sq. ft. service building (see picture) centrally located to serve the designed and future construction, houses the central chiller compresser units and their transformer power center which serve the entire air conditioning system. Cooling towers are located nearby.

A remote air conditioning control and data recording board is also housed here from which each air conditioning zone in the main buildings and the entire refrigeration system is controlled. The service building also contains the standby pumps which are connected to adjacent water storage tanks. The high temperature structural test area provides facilities for applying programed structural loadings combined with elevated temperatures to simulate missile reentry problems. The test floor has a heavy anchorage grid. Application of electrical heating is con-

(Continued on page 108)



SERVICE building houses the air conditioning equipment for the present enclosed area and future extensions. Cooling tower is three stories high. Refrigeration capacity is 2,650 tons, and some areas are controlled to ½ deg. of temperature and 5% variation in humidity

DRILLED caissons went down 31-38 ft. and had to be cased because of high ground-water.

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Construction Products

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Placing 125-ft. girders in a railroad relocation bridge

By HAROLD E. RUSSELL
Estimates Unit
Division of Design & Construction
Department of Water Resources
State of California

Railroad relocation is feature of preliminary work for the Oroville Dam project, being carried forward by the California Department of Water Resources. Truck transportation most serious problem.

COVER PICTURE

The cover of this issue is a dramatic view of one of these girders being raised into position 70 ft. above the Feather River.

AN American Bridge crew has placed a pair of 125-ft., 74-ton plate-girders to complete the river span of the Feather River Crossing, a single-track, deck, plate-girder bridge located near Oroville, being constructed by the California Department of Water Resources.

The bridge is one unit of a 24-mi. relocation of Western Pacific Railroad facilities from part of the Feather River Canyon necessitated by the prospective construction of Oroville Dam. The relocation also includes five single-track tunnels totaling 21,470 ft., and a double-decked highway and railroad bridge 2,731 ft. long across the West Branch of Feather River. The most northerly structure, a concrete bridge, arches across the North Fork of Feather River with a central span and rise of 308 and 119 ft. respectively (*Western Construction,* April 1959, and January 1960) near the point where the relocated railroad line curves to meet existing track.

Feather River Crossing, the most southerly structure of the relocation, is 1,127 ft. long. It consists of ten plate-girder spans and a temporary wood trestle supporting steel girders. Nine concrete shafts 10 and 12 ft. in diameter, spaced longitudinally 90 to 128 ft. on centers, rise 54 to 78 ft. above footings to support concrete hammerheads and the girders.

John C. Gist of Sacramento, who bid $1,169,000 for the work, was awarded the construction contract in April 1958. This was the lowest of twelve proposals which ranged to a high bid of $1,423,000. The American Bridge Division of U. S. Steel Corp. fabricated and erected the structural steel.

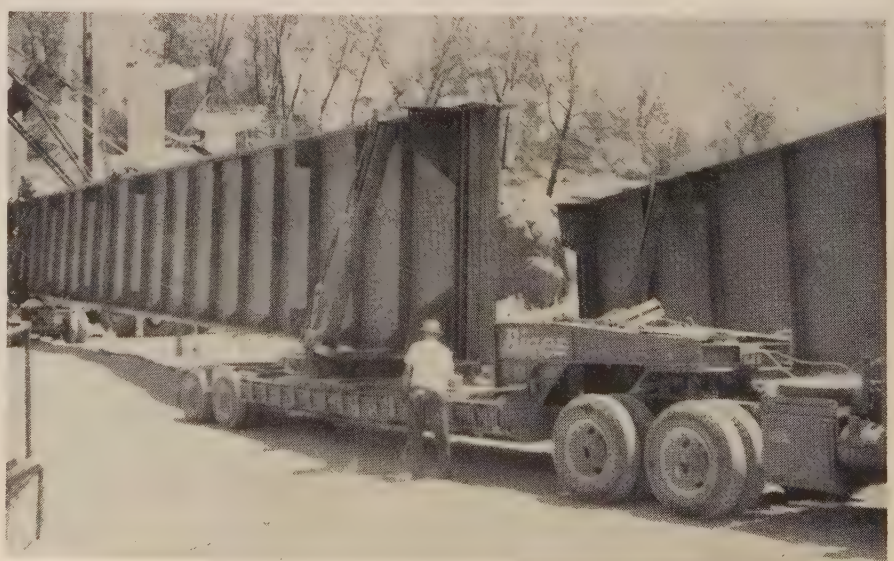
The 125-ft. span river girders are designed for an E-72 live load, and dead, wind, and earthquake loads resulting in maximum design moments of 20,847 kip-in., 767 kip shears, and 792 kip reactions. Web plates are 120 x 5/8 in.; chord angles, 8 x 8 x 3/4 in., set 10 ft. back-to-back. Four 24-ft. by 3/4-in. top cover plates, and six 24-ft. by 11/16-in. bottom plates complete the chords. Bearing stiffeners of 6 x 4 x 5/8-in. angles and intermediate stiffeners of 6 x 3 1/2 x 3/8-in. angles form twenty-one panels. All rivets were 7/8-in. diameter. ASTM A7-56T steel was specified for plates and angles. Workmanship standards conformed to AREA-1956 specifications. In the completed span, six cross-frames, end-frames, and diagonals form a lateral bracing system.

The girders were fabricated at Gary, Indiana, and delivered to Oroville Junction located about 5 mi. west of Oroville. Three standard railroad flat cars were required to transport one girder.

Special truck trailer

Bigge Crane and Rigging Co. hauled the girders to the bridge site on a low-bed semi and a trailer. The equipment, designed by the Bigge organization, included several efficient features. The 3-axle, 50-ton capacity trailer was designed to oscillate fully to bear evenly on 20 tires, and was equipped with a 15-cfm. compressor mounted on the frame to power air-brakes and to permit independent steering. The 2-axle, 50-ton capacity low-bed was similarly designed to bear evenly on 8 tires. Ring mounts permitted the rig components to be maneuvered freely. A 3-axle, 10-tired, 225-hp. Ken-

HAULING equipment to move the girder the 5 mi. from railhead to the site included a 20-tire trailer with its own compressor for brakes and steering. Blocking, timber struts and slings tensioned by turnbuckles held the girder in position during the move.



worth tractor, with heavy-duty, double-reduction rear ends, powered the hauling unit.

Blocking, heavy timber struts, and slings held taut by turnbuckles fastened to shackles secured the girders.

Delivery of the girders was complicated by the transportation route which included the heavily-traveled Chico-Oroville highway, a construction road with 15 and 18% grades, and a crowded bridge site. A 70-ton P & H truck-mounted crane was used to unload the hauling equipment.

A 45-ton derrick with a 100-ft. mast and a 90-ft. boom was erected on the base-blocks of a pier on the east side of the river. Nine tiers of 12x12-in. blocking, two pairs of 36 CB 280 I-beams, and four 12 CB 106 I-beams supported the derrick. Eight radial 1¼-in. dia. ropes guyed the derrick mast. Two 1-in. dia. wire rope kickers, softened with blocking, were lashed to an adjacent pier shaft, and two were anchored to rock across the river. A two-drum Superior-Ligerwood-Munday diesel engine equipped with a torque converter powered boom and load lines.

The girders were walked and skidded towards the lowered derrick boom by the P & H crane, then drifted into hoisting position. The crane and derrick raised the girders 70 ft. into place, a carefully coordinated operation.

Unloading, transporting, and raising the girders were completed without incident. The work reflected thorough planning by the organizations involved and effective field direction.

V. E. Rickey, terminal superintendent, directed operations for Bigge at Oroville, and William Weeks was rigger foreman.

Lou Hack supervised the American Bridge work at the site. D. E. Nyberg, senior field engineer, directed the office planning. G. W. Faulkner, district construction manager, is in charge of the field department of American Bridge in San Francisco.

Woodruff & Sampson, consulting engineers of San Francisco, designed the bridge.

Harvey Banks is Director, Department of Water Resources, and Walter Schulz is Chief Engineer of the Division of Design and Construction. Charles Heikka is project engineer for the Department at Oroville, Sam Dalberg is senior bridge engineer, and Jack Garber was resident engineer.

50 mi. of Interstate highway recommended for Hawaii

A REPORT recommending the allocation of 50 mi. of the National System of Interstate and Defense Highways to the State of Hawaii, has been submitted to Congress. The report was prepared by Federal Highway Administrator Bertram D. Tallamy pursuant to Section 105 of the Federal-Aid Highway Act of 1959 which provided:

"The Secretary of Commerce is authorized and directed to make a study of the need for the extension of the National System of Interstate and Defense Highways within the states of Alaska and Hawaii, and report the results of such study to the Congress within ten days subsequent to January 4, 1960. The report shall include recommendations as to the approximate routes and mileages thereof which should be included in such system within those States."

Based on this study, which included potential routes as identified by the highway departments of Alaska and Hawaii, in a manner similar to that in which the present Interstate System was designated, the report recommended that:

1. Routes in Hawaii meeting the same criteria as those in the presently designated Interstate System in the other states, and approximately 50 mi. in length, should be added to the Interstate System.
2. The inclusion of this mileage in Hawaii be accommodated within the present Interstate System mileage limitation (41,000 mi. total).
3. The two states be encouraged to protect transportation development with legislation necessary to acquire adequate rights-of-way to meet the requirements of future traffic over long-term programs.

In order for recommendations 1 and 2 to be accomplished, several changes in existing Federal law would be required. Alaska and Hawaii have Federal-aid primary and Federal-aid secondary systems in both rural and urban areas but have no authorization for Interstate routes.

As to Alaska, the report said: "Neither the present conditions nor anticipated further developments for the next 15-20 years warrant the designation of any Interstate mileage in Alaska. The generally low volumes of traffic usage, and the long routes through sparsely settled areas with relatively small centers of population to be connected, indicate that the standards for low-volume primary and secondary systems will be adequate. It is also pertinent that Alaska is in a more favored position than most of the other states, with respect to fund matching requirements, since it is in a position of matching 86¢ of Federal-aid funds with 14¢ of state funds on the ABC program (as compared with the 90-10 matching ratio for the Interstate program in nonpublic lands states) because of the large area of unappropriated and unreserved public lands and nontaxable Indian lands within Alaska."

The 50 mi. recommended for Hawaii could be designated from mileage resulting from adoption of more direct locations of routes of the previously designated system.

L. A. building to have exterior service core

PLANS for the construction of a nine-story home office headquarters building in Los Angeles for the Pacific Employers Group of insurance companies have been announced. The building and land will represent an investment in excess of $3,000,000.

An outside mechanical core, used for the first time in a building of this size in the Los Angeles area, will be a design feature. The core will contain all elevators, utilities, stairs and lounges to permit complete flexibility and unobstructed areas within the office portion.

COMPUTER FOR BUREAU OF RECLAMATION

Bureau of Reclamation engineer *T. M. Austin* (left) explains the operation of the IBM 650 electronic data processing machine to *Olin Gray*, construction engineer, Bostwick Division, Missouri River Basin Project, *W. H. Hedges*, of the Bureau's Region 7 Office, and *C. A. Rader*, construction engineer, North Platte Project. The demonstration of the machine was a part of the Sixth Construction Engineers' Conference, held at the Reclamation Engineering Center in Denver, January 25-29. The machine operator is *Darrell Webber*, of the Center's Automatic Data Processing Branch.

The high-speed data processing machine was recently installed in the Engineering Center to solve a variety of complex problems in water resource engineering.

$347,300,000 project planned

THE Arizona Power Authority of Phoenix, Ariz., has filed a revised proposal with the Federal Power Commission for a $347,300,000 hydroelectric project on the Colorado River in Mohave and Coconino counties, Ariz. As now proposed, the Colorado River project would have a total initial capacity of 820,000 kw. with a possible future installation of an additional 650,000 kw. The project would consist of three developments — Bridge Canyon, Marble Canyon, and Little Colorado River.

Bridge Canyon development would be comprised of a double-curvature arch dam, 1,520 ft. long and 480 ft. high, a reservoir having a storage capacity of 820,000 ac.-ft., penstocks and a powerhouse containing four 120,000-kw. generators initially.

Marble Canyon development would have a concrete arch dam, 700 ft. long and 400 ft. high, a reservoir with a storage capacity of 480,000 ac.-ft., penstocks, and a powerhouse with an initial installation of four 85,000-kw. generators.

Little Colorado River development would consist of the Tolchico and Moenkopi reservoirs to be constructed for silt detention. Tolchico Development, to be located on Little Colorado River, would have a rolled-filled dam, 490 ft. long and 80 ft. high, and a storage capacity of 600,000 ac. ft. Moenkopi Development, to be located on Moenkopi Wash, a tributary of Little Colorado River, would have a 1,300-ft. long dam 130 ft. high and a reservoir with a capacity of 50,000 ac.-ft.

The energy generated at the project would be distributed throughout Arizona or sold or exchanged with other power distributors in adjacent states over an interconnected transmission system.

Nevada approves 1960 highway budget

A $34,000,000 highway budget for 1960 has been approved by members of the Nevada Highway Board, and released by the highway department.

A breakdown of items in the new budget shows that $29,500,000 is tentatively slated for construction this year, while $500,000 is planned for capital improvements and $4,000,000 for highway maintenance.

DIVERSION DAM AT FLAMING GORGE PROJECT IN NEW MEXICO
Upper cofferdam, at Flaming George Dam project, looking downstream. It is approximately 85 ft. in height above river level, 500 ft. in length and 350 ft. thick through base. Note intake structure of diversion tunnel in lower right. Right keyway (being excavated) for Flaming George Dam is in upper center. An extended review of construction operations appeared in WESTERN CONSTRUCTION, Dec. 1959.

Commenting on the maintenance figure, State Highway Engineer Edward L. Pine said that it is the largest amount ever budgeted for highway upkeep. The increasing cost of maintenance is one of the toughest problems facing the state's highway planners.

Under the heading of capital improvements, the new budget calls for nearly $20,000 for construction or enlargement of roadside rests throughout the state. This is the largest sum budgeted for roadside rests in some years and is designed to cut down accidents through better rest facilities.

Of the $29,500,000 earmarked for construction, $18,000,000 will go for 71 mi. of new Interstate highways, $9,000,000 for 95 mi. of primary roads, and $2,500,000 for 45 mi. of secondary roads.

Oregon slates $4,705,256 forest highway program

THE OREGON state highway commission approved a $4,705,256 forest highway program for 1960-61 involving 12 projects in U.S. Forest Service preserves. Funds for the program will be provided by the Federal government with the projects under the direction of the U. S. Bureau of Public Roads.

Two projects totalling $1,100,000 will continue work on the realignment of U.S. 101 between Neskowin and Otis junction. This project, begun in the fall of 1956, will shorten the distance between the two points by 6 mi. and eliminate many tortuous turns when ultimately completed. The project is in Lincoln and Tillamook counties.

Largest single project is for 10 mi. on the Lake of the Woods highway in southern Oregon. The program calls for purchase of right-of-way and grading at a cost of $910,000.

Four dams planned for Feather River area

THE Richvale Irrigation District, of Richvale, Calif., has filed an application with the Federal Power Commission seeking a license for a proposed hydroelectric project on the Middle Fork of Feather River. The project would include four storage reservoirs—Clio, Gold Lake, Grizzly and Nelson Point. Clio would have an earthfill dam 155 ft. high and a storage capacity of 156,400 ac. ft. Gold Lake would have an earthfill dam 30 ft. high and a storage capacity of 15,910 ac. ft. Grizzly would have a concrete arch dam 85 ft. high and a storage capacity of 40,500 ac. ft. Nelson Point would have a concrete arch dam 348 ft. high and a storage capacity of 116,000 ac. ft.

A power plant with an installed capacity of 20,000 kw. would be directly served from Nelson Point Reservoir. To use the 2,800 ft. of drop in the 37-mi. section of the Middle Fork Canyon between Nelson Point dam and the mouth of Fall River, the applicant proposes to build a chain of four power plants having a combined installation of 200,000 kw. The estimated cost of the proposed project is about $120,000,000.

Deep well pumping causes land subsidence of up to 20 ft.

A PHENOMENON of sinking land that was recognized in California to some extent as early as 1898 and which has been under intensive study by a multi-agency committee for three years has had new light shed on it by that committee's most recent progress report, the Department of the Interior has announced.

The land subsidence has affected some 2,000 sq. mi. in the San Joaquin Valley, where the land has sunk, in some places, as much as 20 ft. during the last 30 years.

In its report, the committee listed and analyzed two chief types of subsidence — shallow subsidence of light, fluffy soil above the water table that occurs after initial application of irrigation water, and deep subsidence that results from compaction of deposits below the water table, due chiefly to withdrawal of ground water from confined deposits and the resulting lowering in artesian head.

Principal tools in studying the subsidence problem have been detailed topographic mapping, precise leveling, deep core holes and laboratory tests of cores, wetted test plots, water-level measurements, geological studies.

The Inter-Agency Committee's progress report stated that lowering of artesian head because of pumping for irrigation has caused deep subsidence as great as 20 ft.; elsewhere there has been local surface sinking of as much as 15 ft. due to initial water application.

The deep subsidence results in broad downwarps of the land surface of many miles extent that are not readily recognized. The near-surface subsidence produces sunken irrigation ditches, tilted buildings and power lines, and undulating fields that are easily apparent even to a casual observer. Because of surface subsidence, damage has already occurred to farms, buildings, pipelines, and power lines on the west side of the San Joaquin Valley.

Both types of subsidence create serious problems in the construction and maintenance of large canals, drainage systems, and levees. In view of future developments planned in the area, the gathering of basic scientific information on this problem assumes real urgency.

While land subsidence in itself is not unique to the San Joaquin Valley, it does create a unique situation there because of the necessity of constructing and maintaining great trunkline canals through subsiding areas as much as 80 mi. long.

Intensive pumping of ground water for irrigation in the San Joaquin Valley, which has drawn ground-water levels down extensively, is now nearly 10,000,000 ac.-ft. a year, or more than twice the capacity of Shasta Lake in California or almost 1/3 the capacity of Lake Mead behind Hoover Dam.

The drawdown of the water level ranges from 10 ft. near Merced to as much as 400 ft. near Huron, and the result has been land subsidence which by 1957 had reached 20 ft. west of Mendota and 13 ft. a few miles north of Delano.

KAISER MAKING 34-IN. PIPE

Production is under way at Kaiser Steel's Napa pipe mill on the first of over 1,000 carloads of 34-in. large diameter steel line pipe for a new natural gas pipeline to serve the Southern California area. The pipe is being produced for the Pacific Lighting Gas Supply Co., Los Angeles, for the installation of a new line to bring additional natural gas to the Los Angeles area. The line will tie in at the California border to an 1,800-mi. line being laid by Transwestern Pipeline Co. across New Mexico and Arizona from Texas gas fields. Kaiser Steel also supplied a substantial amount of the pipe required for that project.

Large diameter electric weld pipe is produced by a series of press forming operations using 40-ft. lengths of steel from Kaiser Steel's Fontana mill. The final step in the press forming of large diameter steel pipe is the 6,000-ton "O-ing" press, shown.

Four new industries planned for locations in Montana

RECENT announcements indicate that four major new industries have selected Montana locations.

Vancouver Plywood Co., Vancouver, Washington plans a $2,500,000 plywood mill in Missoula which is scheduled to be completed in May of this year. The plant will process lumber from lands of the Northern Pacific Railroad, and the site was selected because Missoula is adjacent to timber and railroad connections.

Cascades Plywood Corp., of Portland, having announced the purchase of the Polson Plywood Co., at Polson, plans to spend $1,500,000 to modernize the plant and increase its capacity.

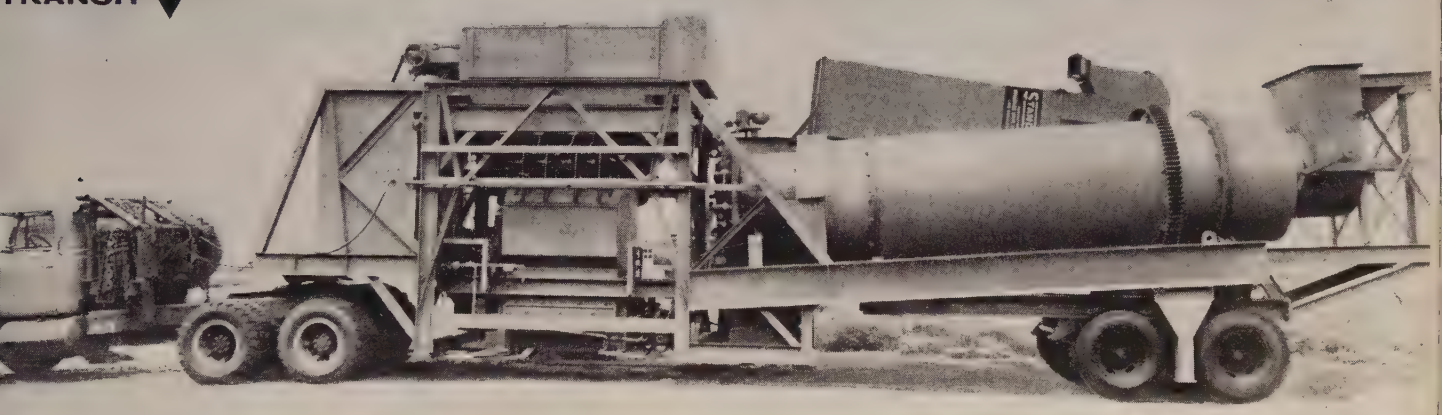
A possible $20,000,000 steel plant to be located in Anaconda has been announced by Webb & Knapp, Inc., New York real estate firm. By means of a new process the plans call for recovery of iron from the huge slag pile adjacent to the Anaconda Company smelter. Webb & Knapp contracted to purchase 40,000,000 tons of available slag and 300,000 tons annually in future years.

Plans have been announced for a $1,000,000 brass plant to be located in Butte. Having produced raw materials such as copper and zinc for many years in Butte, the idea would be to establish a manufacturing facility which would produce finished products, such as plumbing supplies, that could be sold through the Pacific Northwest.

Missile launching program for base in Idaho

A construction program that will exceed $40,000,000 has been started to develop a Titan inter-continental ballistic missile installation at the Mountain Home Air Force Base. The program, which will occupy about two years, will add the missile facilities to the bomber base established at the location in 1953. Three sites for the big missiles will be included, with each requiring a "silo" 200 ft. deep. In addition to these concrete lined pits, the work will include construction of fuel plants and other facilities.

TRANSIT ▼



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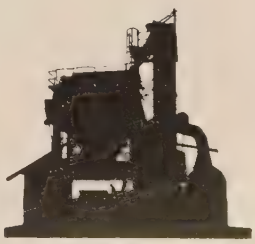

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Permit issued by the FPC for Washington dam

THE Federal Power Commission has issued a 24-month preliminary permit to Washington Public Power Supply System, of Kennewick, Wash., for a proposed hydroelectric project on the Hoh River.

The proposed Hoh Bow project would consist of a rock and earth-filled dam about 210 ft. high with a concrete overflow spillway section; a reservoir with about 465,500 ac. ft. of gross storage; and a powerhouse with an installed capacity of 53,600 kw.

Washington Public Power Supply System is a municipal corporation composed of 13 member Washington public utility districts. Power generated at the proposed project would be used to supply the growing requirements of the member public utility districts, with any surpluses being delivered into the Northwest Power Pool.

Bay Area building permits top $34,000,000

INDUSTRIAL building permits issued in the nine San Francisco Bay Area counties in 1959 totaled $32,395,153, some $6,000,000 less than the amount recorded the year before, according to a report issued by the San Francisco Bay Area Council. Statistics show store building permits in 1959 reached $30,844,662, over $10,000,000 more than the year before while office permits totaled $34,596,182, a figure 59% below 1958.

Santa Clara and Alameda counties were first and second in the amount of industrial building as they were last year. Contra Costa was third. Industrial investments reached $12,757,389 in Santa Clara, $7,289,571 in Alameda and $5,280,608 in Contra Costa. The largest proportion of industrial investments in 1959 went into the electronics and food processing and packaging fields.

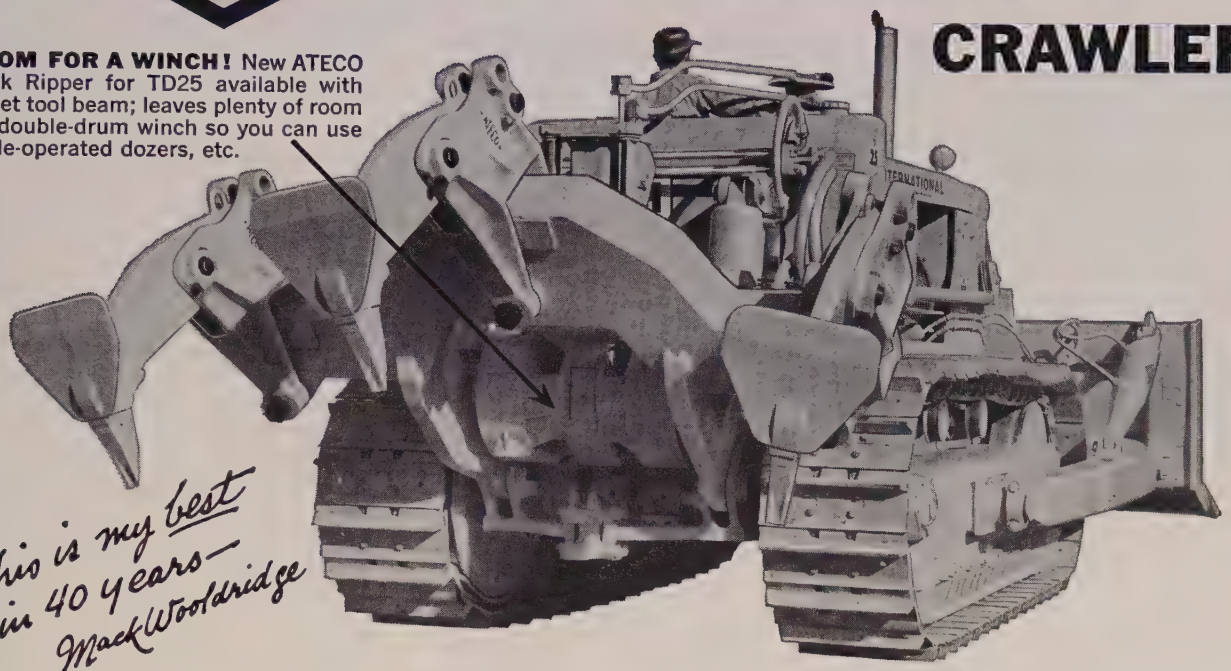
Waste treatment plant to relieve harbor pollution

A $15,000,000 waste treatment and recovery program has been announced by Rayonier, Inc. at its facilities in the Grays Harbor area of Washington. About half of this investment will be designed to reduce water pollution from industrial wastes and the other half will be used to develop useful products from this waste. The program will control about 85% of the waste.

All new for '60—

ATECO RIPPERS for INTERNATIONAL CRAWLERS

ROOM FOR A WINCH! New ATECO Rock Ripper for TD25 available with offset tool beam; leaves plenty of room for double-drum winch so you can use cable-operated dozers, etc.



This is my best in 40 years— Mack Woodridge

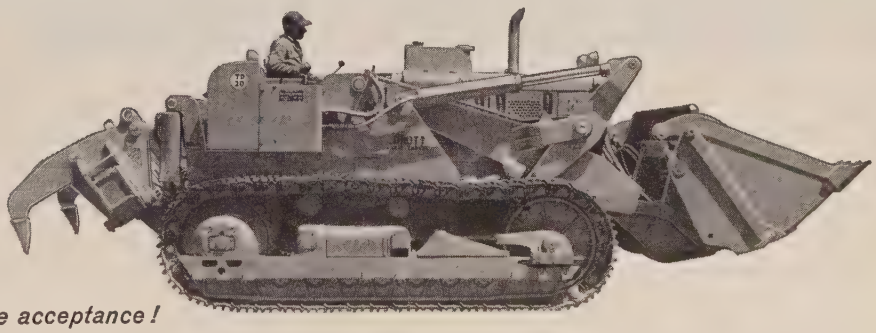
ALL NEW ATECO's line of performance-proved heavy duty rock rippers for International tractors offer profit-making advantages on any earth or rock moving job.

Teamed up with a dozer or skid shovel, they provide perfect balance for increased traction and higher performance, ripping **or** earth-moving.

Their rugged, extra-heavy design has licked the tough jobs the world over. Compare ATECO in every detail . . . the pioneer in tractor-mounted rippers. You'll find they're huskier, built to last longer, deliver more work with less downtime.

They're extra versatile, too. Complete range of models (to 72" ripping depth), shanks, wingfoot boots, cable-laying attachments, etc. available.

PERFECTLY-BALANCED TEAM! ATECO Ripper and DROTT Skid-Shovel on this TD20 make a high-production combination you can't beat for moving rock, shale, other hard-to-load materials. Perfect weight distribution improves traction and performance.



Only ATECO Rippers have world-wide acceptance!

Make **your** International an all-around profit-maker with ATECO's new ripper. Available for TD14, TD15, TD18, TD20, TD24 and TD25. Prompt delivery. Write or wire for literature, prices. East and West deliveries.

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American ATECO TRACTOR EQUIPMENT Corporation

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Lockheed building

(Continued from page 92)

trolled by ignitrons and programming equipment.

The entire 16 ac. are air conditioned for an inside atmosphere of 72 deg. and 50% relative humidity year around. The conditioned air is supplied through 25 fan houses, each handling approximately 50,000 cfm. Three of these fan houses are equipped with electronic filters and designed to supply air to maintain an atmosphere of 68 deg. (within ½ deg.), 35% relative humidity (within 5%), and ½ micron maximum dust particle size, in critical instrument calibration areas. The building is divided into about 100 zones and a system of pneumatic-electronic control is provided to maintain the proper atmosphere in each of the zones.

The supply duct system is designed as a low pressure, low velocity system to keep the noise level extremely low. Total refrigeration tonnage is about 2,650 tons which is supplied by two liquid chillers located in the service building. The refrigeration condenser is cooled by water being circulated through two cooling towers about three stories high.

Electrical service to the facility is through three 12,000-v. feeders in a primary selective distribution system to ten transformer power centers ranging in size from 1,000 kva. to 3,750 kva. Total installed transformer capacity is 14,250 kva.

Personnel

Administration of this project was the responsibility of the 12th Naval District, Capt. J. A. McHenry, Public Works Officer, with Ted Bowman, project manager, assigned to the project. Facilities requirements were formulated and expressed by the Lockheed Plant Engineering Department; Dean Cowley, manager, with A. A. Anastasia, assistant manager in direct charge of this project.

Engineering and architectural design was assigned to J. H. Pomeroy & Co., Inc., Engineering Division, with J. P. Hawke, chief engineer, responsible for engineering and design. Close cooperation between Navy, Lockheed, and Pomeroy personnel was responsible for the early and successful completion of this project and resulted in the issuance of a Letter of Commendation by the Chief of the Bureau of Yards and Docks, U. S. Navy, which is to the credit of all concerned.

There's a reason WHY in MacWHYte Wire Rope*

It brings out the best in your equipment!

Just as you use specialized equipment for a particular job, it pays to use the right kind of wire rope designed for that equipment.

All wire rope isn't the same. There are changes in the construction of wire rope . . . which aren't obvious to the eye . . . but can seriously affect the way it will work on your equipment. Because all equipment isn't the same, different types of rope are required because of basic design variations.

With this in mind, you can see the reason "why" Macwhyte offers such a wide variety of wire rope:

* Every foot of wire in Whyte Strand is specially drawn, cold-worked by Macwhyte in their own wire mill. Complete processes — from raw material to finished wire for rope — are under the watchful eyes of Macwhyte metallurgists.

* Product engineers determine the exact number, size, and relationship of the wires needed to meet the requirements of your equipment. You're sure of the correct size, strength, and flexibility.

* Special lubrication is available in accordance with the needs of the equipment or the type of service in which the rope will be used. The tenacious lubricants provide just the necessary protection — are unaffected by heat or cold, dry or wet conditions.

* Entire wire and rope mill operations are concentrated on the making of wire rope in a thousand and one sizes, grades, and types . . . to give you the rope you need.

Result: Whyte Strand wire rope is literally "custom made" for shovel hoist rope, dragline, clamshell crane rope, boom hoist line, dozer rope, scraper rope, contractors' hoist and derrick rope, overhead cranes, cableway excavators, and winch lines. If you'd like to check the type of rope recommended for your equipment, send for bulletin 5702 — free for the asking.

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MACWHYTE Wire Rope COMPANY

2900 Fourteenth Avenue, Kenosha, Wisconsin, U. S. A.

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ALASKA Newsletter

By CLIFFORD S. CERNICK, Fairbanks

ALL SET FOR THE RUSH—The sun is back in Alaska after a long, dark winter. The difference a little sunlight makes in mental attitude is amazing. With the sun rising shortly after 8 a.m. and setting around 4—the outlook is immeasurably brighter than when our first glimpse of the sun came around 10:30 — our last, each day, around 1 p.m. There's an air of suppressed excitement and a feeling of awakening these bright, clear, sub-zero February days.

In only a few weeks now, the great annual construction cycle will restore itself again. The heavily-loaded-down cars carrying the iron workers, the carpenters, laborers and plumbers will come streaming through the city's south gateway. Their destination: the union hall, the employment agency, the contractor's office. And even now — with winter's icy grip still clutched on Alaska—the scope of the 1960 construction season is advertising itself in the yellow oblongs of light streaming from the windows of architects' offices long after midnight.

The same geometric patterns break up the Arctic darkness surrounding contractors' offices. Only the union halls are vacant, the benches forlorn, with only now and then a sign of activity—such as a typewriter clicking away and echoing through the building. Such small signs are the muted prelude to a vast symphony of construction activity.

CARRY-OVER OUTLOOK—One of the most promising aspects of the 1960 construction season is the large number of carry-over contracts which will be all set to go when the season gets under way. In the latter portion of 1959, bids were called for more than $23,000,000 in Alaska construction projects. Most of these projects were let out for bids too late for work to begin in 1959. This means that the bulk of these jobs will start in the early spring of 1960—adding substantially to the tempo of construction activity this year.

When you consider that President Eisenhower's 1961 fiscal year budget allocated $164,657,172 to Alaska—and that one of the biggest chunks of this budget will go for defense and other construction — you begin to realize the real shape of things to come. Barring a labor dispute or unusual weather during the construction season, 1960 jobs should shatter all previous records by a wide margin.

THE ROAD AHEAD — Some of the best construction news in years has recently been coming out of Alaska's capital at Juneau. An example of this is the billion-dollar, five-year highway program mapped out by the Alaska Department of Public Works and presented to the state legislature. The Department's report outlined plans for $1,119,048,000 in federal aid primary road construction over the 1960-65 fiscal periods. Maintenance costs alone for the five-year period would run to about $35,000,000 it was estimated.

THE TREND OF COSTS — Costs of labor, equipment and materials and other items required by the contractor in carrying out a construction job continue their year-by-year march upward. Here's a typical instance: It has been estimated by the Alaska Department of Health and Welfare that the first phase of construction on the department's new mental hospital (calling for 135,967 sq. ft.) will require an estimated cost of $42 per sq. ft. While both the carpenters' and steel strike have affected Alaska construction costs, the reasons are much more basic.

The Department estimated that the average annual rise in structural costs during the past few years has been 6%. It takes a wise contractor using careful estimates to keep abreast of Alaska's ever-advancing costs. While volume of military and other government construction is not likely to suffer as a result of high costs—these projects would probably go ahead regardless of the price tag — commercial and residential projects may be hard hit.

MUNICIPAL SCENE—Typical of the new projects emerging on the municipal scene is the $1,700,000 city water filtration plant planned by Anchorage. The city has given a firm of consulting engineers the job of preparing plans and specifications for the plant. The new plant would be financed by sale of $1,800,000 in bonds. Anticipated completion date of the plant, which will deliver 8,000,000 gal. daily, is the fall of 1961.

DISSIDENT UNION—A newly-organized Alaska union—the United Construction and Industrial Workers of Alaska—is attempting to recruit members in Fairbanks and Anchorage. Formed by two dissident members of the Laborers Union, the new organization is set up to "represent all crafts in the construction and industrial field." Casimir Sanuita, one of the organizers of the union, has been telling Alaskans about his objectives in large newspaper ads published in Anchorage. Among the objectives he outlined were: selection of union stewards on the job by union members themselves, a plug board system of dispatching to eliminate irregularities in union dispatch and the necessity for "job purchase" by construction men and the avoidance of jurisdictional disputes or strikes.

Other objectives listed include: strict "neutrality" with regard to politics, free and open discussion at union meetings and full freedom on the part of contractors to select men of their choice as stipulated by the Taft-Hartley Act. Sanuita said his organization now has about 30 Alaska contractors set to sign up with his union for job dispatching. "We're trying to wipe out a number of serious abuses on the part of present unions in Alaska," Sanuita told a Fairbanks reporter. "Our new charter, setting up an Alaskan union under principles of honesty and fair dealing is the answer to the present intolerable situation and the corruption which we all deplore."

While not many persons in the construction industry in Alaska are taking Sanuita seriously as yet, he has proved to be a real thorn in the side of established unions in Alaska and has gone to court in Anchorage to restrain unions there from investing their funds in a certain manner. The widely-read newspaper ads, charging union officials with double dealing and a long list of misdeeds, likewise are having an impact not to the taste of the unions.

THE GOVERNOR SPEAKS — Alaska's governor, William A. Egan, devoted a portion of his message on the State of Alaska —

Loading big yardages of wet clay and gravel, J. N. Conley's B Tournapulls pitched in to grade a 5.1-mi section of the U.S. 99 Freeway, near Portland, Ore. "It's a well-made machine," says Superintendent Bill Clark, "with the capacity and speed we need on these long 3-mile hauls. I'd recommend it for use any place — especially on jobs that other rigs can't work."

Loads more pay-yards . . . faster

. . . makes better use of its "horses"

Most of today's big scrapers are equipped with ngines rated in the 300 hp and up range, but engine orsepower ratings alone are not the answer. *It's the mount of power doing useful work that counts!* For xample, the 360-hp LeTourneau-Westinghouse B 'ournapull® gives you greater value because of the ay its power is applied to the problems of off-road oading and hauling. Here's how the B 'Pull* makes ure every one of its "horses" does its share:

Near-horizontal load and push

irst, the "B's" 28-yd Fullpak® scraper *itself* saves ower. Its low and wide bowl lets dirt flow back *almost a horizontal plane.* The scraper floor has a rise of nly 1°, front to back. This means that more power is vailable to *pull* and *cut,* with very little power wasted n *"lifting"* material into the bowl.

Improved anti-friction . . . less dead weight

'our B 'Pull power is also conserved through exten-ve use of heavy-duty roller bearings. Its drive-train is short-coupled for efficiency. And the clean, streamlined body design of the Fullpak scraper gives strength without "frills", eliminating unnecessary dead weight.

Electrics don't "drag" on engine

Electric controls save engine power. Electrics do not impose a constant "drag" on the engine. Current for steering and bowl operations is generated by engine power *only when needed.*

Horsepower must also be judged in relation to overall machine load, or weight. On the turbo-charged B 'Pull, each of its 360 "horses" has to power only 372 pounds of loaded weight, for an *exceptionally* good power-to-weight ratio.

Distributor has all details

When you buy 'Pull power, you get efficient anti-friction operation, with more work done by the available "horses" listed in 'Pull specifications. Your LW Distributor can give you full details, and arrange to let you see the B 'Pull in action so you can judge for yourself.

*Trademark BP-2089-DCJ-1

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delivered at the opening of the second session of the 49th state's legislature — to the subject of construction. He pointed out that the Bureau of Public Roads and the State Department of Public Works through its various branches, had completed 128 projects throughout the state during 1959. He added that, by interesting coincidence, the proposed program for 1960 also includes 128 projects at a total state and federal dollar level approximately three times greater than in 1959. Governor Egan told the joint session of the house and senate that as of July 1, 1960, the newly-organized Highway Division will take over active management of some 5,000 mi. of Alaskan highways, hundreds of buildings, 40 mobile radio units, and 1,800 pieces of mechanical equipment previously operated by the Bureau of Public Roads.

HIRING AT CLEAR—By the time this appears in print, hiring at the big missile detection base at Clear should be in full swing again. In terms of number of men employed on a single project, the Clear construction job will probably be Alaska's biggest single undertaking this year. Estimates as to total employment at the peak of this year's construction season range beyond the 1,000 mark. Total employment there this year may run close to 2,000. The bulk of the hiring at Clear is being done out of Fairbanks.

CONSTRUCTION NEWS NUGGETS — Unemployment in Alaska took a sharp drop last year over the previous year, a report by the U. S. Department of Labor shows. Claims filed for unemployment insurance benefits showed a 12% drop in 1959, the report states... The Bureau of the Budget has approved expenditure of $1,690,000 for planning and purchasing a site for the proposed new Juneau federal building. The building, to contain about 304,000 sq. ft. of gross floor area will cost more than $15,000,000. . . . Need for new school construction is reflected in figures just released by the National Education Association showing that Alaska leads the entire nation in a projection of population increase of the 5 to 17 years age bracket for the period 1957 to 1963. The Alaska increase was 81%; the national average for the same age bracket in that period was 21%.

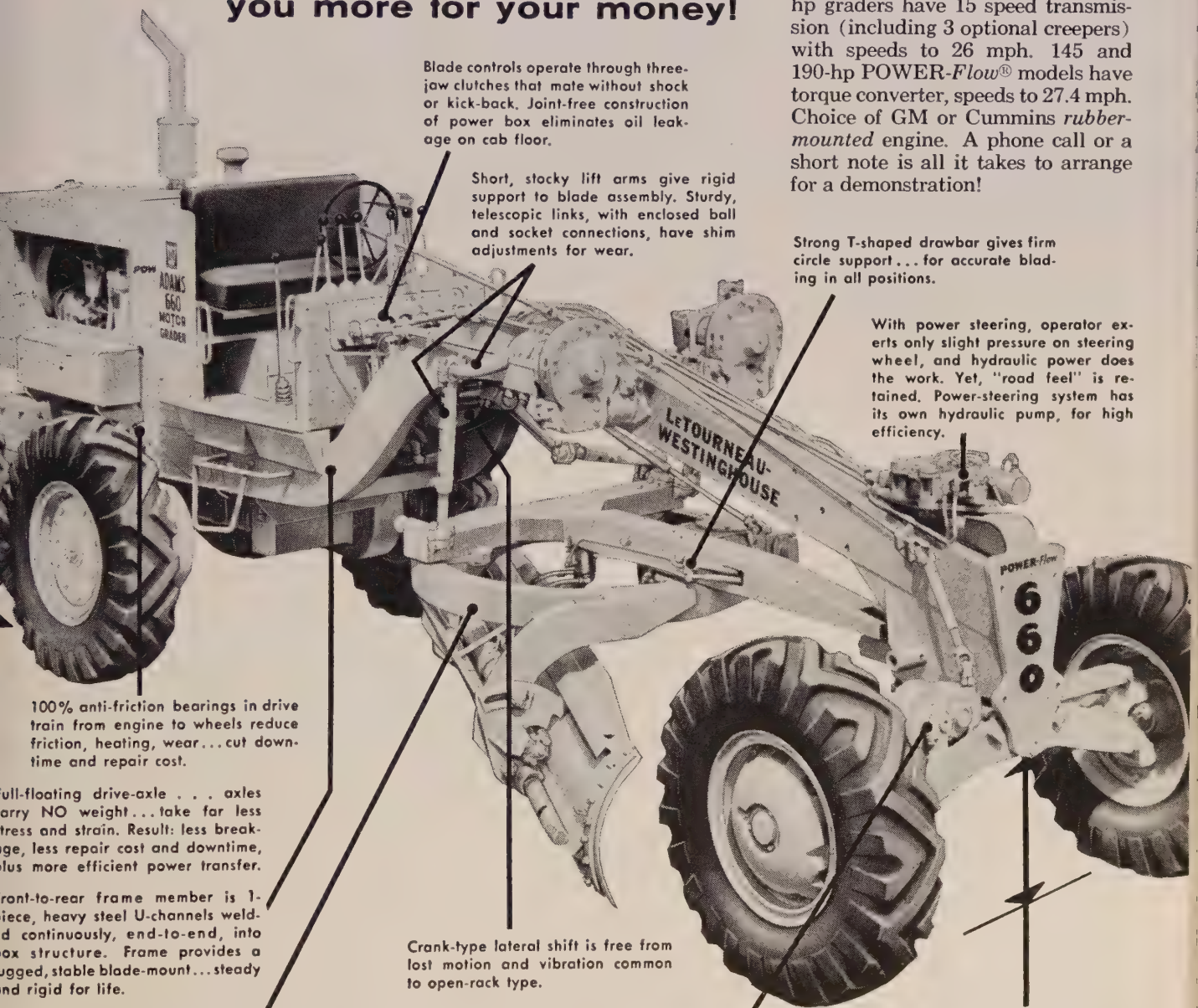
COMPARE

LW Adams* advantages with any other grader

...you'll be convinced they give you more for your money!

Best way to judge a grader is to compare it... against any machine in its class. Do this with LeTourneau-Westinghouse graders; you'll find they give you *more money-saving, more work-boosting features than any other grader on the market.* Others may offer *some* of these advantages, but you get *all* of them in high-speed L W graders.

Check the features illustrated here, then take the next step... ask us to show you an L W grader in the size you need. The 80, 115, 123, and 160 hp graders have 15 speed transmission (including 3 optional creepers) with speeds to 26 mph. 145 and 190-hp POWER-*Flow*® models have torque converter, speeds to 27.4 mph. Choice of GM or Cummins *rubber-mounted* engine. A phone call or a short note is all it takes to arrange for a demonstration!



Blade controls operate through three-jaw clutches that mate without shock or kick-back. Joint-free construction of power box eliminates oil leakage on cab floor.

Short, stocky lift arms give rigid support to blade assembly. Sturdy, telescopic links, with enclosed ball and socket connections, have shim adjustments for wear.

Strong T-shaped drawbar gives firm circle support... for accurate blading in all positions.

With power steering, operator exerts only slight pressure on steering wheel, and hydraulic power does the work. Yet, "road feel" is retained. Power-steering system has its own hydraulic pump, for high efficiency.

100% anti-friction bearings in drive train from engine to wheels reduce friction, heating, wear... cut down-time and repair cost.

ull-floating drive-axle . . . axles arry NO weight... take far less tress and strain. Result: less break-ge, less repair cost and downtime, lus more efficient power transfer.

ront-to-rear frame member is 1-iece, heavy steel U-channels weld-d continuously, end-to-end, into ox structure. Frame provides a ugged, stable blade-mount... steady nd rigid for life.

leavy-duty circle is precision ma-hined for smooth "chatter-free" peration. The *big* 63"-diameter cir-le assures accurate control of cut. eplaceable circle teeth are pro-ected from abrasive materials.

Crank-type lateral shift is free from lost motion and vibration common to open-rack type.

Gear-driven leaning-wheel mechanism is enclosed to give protection against dirt. Wheels hold set position... require no safety lock-pin for high-travel-speeds, or when using front-end attachments.

You have up to 28" front-axle clearance, depending on tire size. This prevents axle from bulldozing high windrows, lets grader come up out of deep ditch-cuts without front-axle dragging the shoulders.

*Trademark G-2106-G-1

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WESTERN CONSTRUCTION EQUIPMENT CO., Billings and Great Falls, Montana.

HAWAII Report

By ALAN GOODFADER, Honolulu

NEW RECORD—Building permits in Honolulu—the indicator of civilian construction for the Island of Oahu—zoomed to a record $129,000,000 in value in 1959 to beat the 1958 record total by more than $30,000,000. Of the total, $38,400,000 went for new dwellings; $42,100,000 went for 5,027 new apartment units, $14,600,000 was paid for 258 new hotel rooms and the rest was for commercial, industrial, public and institutional construction. There were 11,385 permits issued last year, compared to 9,971 the year before. The 1959 total was nearly triple the $46,700,000 in permits issued 10 years before.

PLATEAU REACHED?—Experts who watch the construction industry's figure here indicate it may be ready to hold steady after years of ballooning growth. Nobody sees anything but hustle and bustle for the industry but the following straws in the wind seem to point to a slackening of expansion: The Bank of Hawaii notes that shopping center and retail outlet construction as well as Capehart construction is tapering off, although housing, apartments, commercial buildings, hotels and public works are springing up like mushrooms; contracts let in 1959 totaled $188,600,000 compared with $189,600,000 in 1958, with a $40,000,000 drop in Navy public works contracts a major reason, according to the General Contractors' Association of Hawaii, and the City of Honolulu's building department expects a slackening of Waikiki apartment construction as available land is taken.

STILL PLENTY AVAILABLE—Any slackening here will be hard to note, however, if plans announced by governmental and private constructors is any indication. A survey of the year's plans here includes, among other things, about $3,000,000 worth of work scheduled on Honlulu's park system; $170,000 worth of State library construction scheduled for completion this year and another $798,000 worth scheduled for finishing next year; $240,000 worth of construction by the privately financed Bishop Museum in Honolulu this year; more than $6,000,000 worth of construction this year by the Honolulu Board of Water Supply—its biggest program ever; three multi-story downtown parking garages planned by the City of Honolulu and a multitude of private projects.

FEDERAL SPENDING—Federal construction, as always, will bulk large among the sources of employment for Hawaii's 12,000 construction workers. The U.S. Commerce Department has said it will recommend to Congress the construction of 50 miles of super-highway on Oahu at an estimated cost of $100,000,000 as part of the Defense Highway System. Hawaii was not included in the system when it was a territory. President Eisenhower's budget recommends the spending of $1,216,000 on the Honolulu harbor improvement project in the year starting July 1, about $500,000 for a new Kawainui Swamp flood control project on Windward Oahu, and about $957,000 to complete a memorial in the National Memorial Cemetery of the Pacific in Honolulu's Punchbowl Crater.

UTILITIES SPEND—Hawaii's burgeoning has brought new construction plans from two major utilities here. The Hawaiian Electric Co. has announced it will spend $14,000,000 on plant expansion this year instead of the previously announced $10,000,000. Use of electricity was about twice expectations last year. The Hawaiian Telephone Co. expects to spend nearly $3,000,000 to expand its Hawaii-Mainland facilities. The expansion will include new electronics work and construction of new facilities here and at Point Arena, Calif.

CAPEHART CONTRACT—The Army was to readvertise Jan. 26 for bids on construction of 864 Capehart housing units at Oahu's Ft. Shafter and Schofield Barracks. The contract was originally advertised last year, but no contract was let.

PRIMING THE PUMP—State Planning Director Frank Lombardi wants the State Legislature, which begins a budget session in February, to appropriate $3,000,000 for public works that would make State and private land attractive for resort developers. He wants the work to start as soon after July 1 as possible. His works list includes golf courses, marinas, water sports areas and beach improvement, as well as the conventional roads and water lines. His idea is that the improvements would entice developers to build 700 1,000-room hotels at selected sites on the Neighbor Islands.

AIRPORT WORK MOVES ALONG—Hawaiian Dredging was to start work under an $891,000 contract on an unusual bit of engineering. The firm will build foundations for a holding apron and taxiway at Honolulu International Airport. The problem is working with a deep bed of muck on the site of the apron. Hawaiian Dredging must drive 26-ft. sheet pilings at the edge of the existing paving and remove the muck. This will be replaced with rock and coral so the area will hold the weight of jetliners.

PAY RAISES—Non-union employes of the members of the General Contractors' Association have received increases of 5¢ an hour for unskilled and semi-skilled workers and 15¢ for skilled workers, based on local union rates and averages in other cities. The boosts send laborers' pay up to $2.10 an hr.; construction laborers, $2.30; heavy-truck drivers, $2.75; carpenters, $3.10, and cement finishers, $3.10.

PERSONAL MENTION—Madam Pele, the volcano goddess, is keeping Erwin F. Morrison, State Engineer on the Island of Hawaii, on the hop and in the news. Morrison is in charge of dike-building in attempts to block off inhabited areas of the island from flowing lava. His usual work is supervising road and tunnel construction. . . . Bill Neunzig, a veteran building materials executive here, has organized his own firm, Colortone Pacific, Inc. . . . William Blackfield, developer of large residential tracts, has been elected secretary of the National Association of Home Builders. . . . K. T. (Charlie) Mau has been named general superintendent of the new Hawaiian Cement Corp. plant at Barber's Point. He leaves Gaspro, Ltd., whose wartime cement plant he managed.

The faster you get to a job... the quicker you complete it... the more return you get on your tractor investment

In less than 4 minutes, a fast LeTourneau-Westinghouse Tournatractor® drives a mile to your next job. This mobile 17-mph LW tractor travels anywhere under its own power — via highway, or cross-country.

When moving to a new project, Tournatractor saves you time and expense of moving in extra men, extra transport equipment... loading, blocking, and unloading.

This 218-hp rubber-tired tractor not only saves time traveling job-to-job ... it saves time *on the job*. With its higher *working* speeds, both forward and reverse, torque-converter equipped Tournatractor completes most assignments *faster* than "track" units of comparable power. And the *range* of work Tournatractor will handle is wide. It will do ALL your normal dozing and "push-pull" jobs, with all the "muscle" you need.

Figure for yourself what these advantages mean to you:

1. Greater speed on the job: completes assignments faster.

2. Roadability: cuts moving costs, and non-pay hours of moving time.

3. Fast one-man moves: lets Tournatractor work more productive-hours per shift... lets you handle more work at lower cost.

LW Tournatractor has proved itself in every climate and in all kinds of working conditions. It can save YOU time and money. Get full details on this versatile, high-speed tractor-on-rubber.

CT-2140-G-1

W Tournatractor has anti-friction bearings roughout... with sealed-in lubrication to otect against weather, dust, and wear. What's ore, this rubber-tired tractor has far fewer oving parts and far fewer exposed parts than awlers, so all phases of maintenance — from spection to lubrication — are greatly simpli-ed, to save you money.

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

Low bids and contract awards

ALASKA

Peter Kiewit Sons' Co., Seattle, Wash., submitted a low bid of $1,425,288 for construction of Schedule A, additional housing units for the U.S. Army at Fort Greely. **Chris Berg, Inc.** of Seattle, Wash., submitted a low bid of $264,480 for Schedules A and B, Schedule A for facilities at Murphy Dome Air Force Station, and Schedule B, Pedro Dome. **S. S. Mullen, Inc.** of Seattle is low bidder for the Gold Creek project, $295,700. **Reed & Martin, Inc.** and **Burgess Construction Co.,** Fairbanks, was low bidder for the work at Canyon Creek, $211,360. **Inlet Co., Inc.,** Anchorage, received a $169,700 contract for construction of range and training facilities at Fort Richardson. The project includes road building and grading, construction of control tower, target house and auxiliary facilities. **Ghemm Co., Inc.** of Fairbanks received a $178,781 contract for construction of a radar tower for the U.S. Air Force at Campion Air Force Base.

ARIZONA

Tanner Bros. Contracting Co., Inc. of Phoenix submitted a low bid of $469,088 for 2.8 mi. of grading, surfacing and draining on the Superior-Winkelman highway southeast of Ray, Route 177, in Pinal County. **Palmer Contracting Co.,** Phoenix, submitted two low bids for roadwork in Pinal and Maricopa counties: a low bid of $348,535 for 7.7 mi. of grading and surfacing on the Florence-Florence Junction highway in Pinal County, and $139,346 for 6.2 mi. of grading and draining on the Hassayampa-Salome highway in Maricopa County. A low bid of $299,395 was submitted by **Phoenix Construction Co.,** Phoenix, for grading and surfacing, pipe lines, curb and gutter in the city of Phoenix, Maricopa County. **Bentson Contracting Co.,** Phoenix, submitted a low bid of $208,778 for grading and surfacing and related work in and near city of Phoenix, Maricopa County. **W. R. Skousen** of Mesa submitted a low bid of $132,947 for grading and surfacing on 8 mi. of the Toltec highway on Route 84 in Pinal County. A low bid of $111,535 was submitted by **A. J. Kelton, Contractor** of Phoenix for construction of parking area and utilities for Block 17, Glen Canyon Unit, Arizona-Utah Middle River Division, Colorado River Storage Project. **Arizona Sand & Rock Co.,** Phoenix, submitted a low bid of $89,329 for grading and surfacing in city of Phoenix, Maricopa County.

CALIFORNIA

Gibbons & Reed Co. of Salt Lake City, Utah, submitted a low bid of $4,065,797 for grading and surfacing to relocate 5.1 mi. of U.S. Highway 299 east of Tower House, west of Redding. Included in the project is an 874-ft. bridge over arm of future reservoir at Whiskey Creek in Shasta County. A $865,523 contract was received by **Griffith Co.** of Los Angeles for construction of an interchange at Pond Road, grading and surfacing 4.1 mi. on U.S. Highway 99, near Airport Road in Kern County. The interchange will include 2 bridges, 1 over the Southern Pacific railroad and the other over U. S. Highway 99. **C. K. Moseman & Son,** Redwood City, received a $2,926,802 contract for construction of the first unit of the MacArthur Freeway in Oakland. A low bid of $396,534 was submitted by **Fredrickson & Watson** of Oakland for construction of bridge approach embankment with overhead to be constructed, Solano County. **Berger Coastwide Construction Co.** of San Carlos received a $388,674 contract for reconstruction, widening and realignment on 2.1 mi. near the Santa Cruz County line in San Mateo County. **M. J. Ruddy & Son,** Modesto, submitted a low bid of $272,959 for 4.9 mi. of grading and surfacing near Kings County line in Kern County. **Franks Dredging Co.** of Long Beach received a $618,300 contract for dredging of Mugu Lagoon, Naval Missile Center, Point Mugu. **N. P. Van Valkenburg Co.** and **Gunther & Shirley Co., Inc.,** joint venture, submitted a low bid of $1,743,360 for construction of an 18-mi. long pipeline from Whale Rock Dam to the city of San Luis Obispo, a joint project of the California Department of Water Resources and the City of San Luis Obispo. An $858,887 contract was awarded to **Matich Constructors** and **W. F. Maxwell Co.,** for grading and paving to widen the San Bernardino Freeway from 4 to 6 lanes between 1 mi. east of San Dimas Ave. in Pomona and the San Bernardino County line in Claremont, Los Angeles County. **Allison Honer Co.** received a $491,214 contract for construction of temporary facilities at Orange County State College, Fullerton.

Correction—

Last month Morrison-Knudsen was mentioned as low bidder for construction of a library building addition at San Jose State College, Santa Clara County, Calif. This was an error. **M & K Corporation,** San Francisco, was the low bidder at $1,148,000 and was awarded the contract.

COLORADO

Hopkins Construction Co., Denver, received a $714,000 contract for 4.1 mi. of grading and surfacing the South Street Drain in Roosevelt National Forest, Boulder County. A contract for $428,000 was received by **Eagle Construction Corp.,** Loveland, for 1.4 mi. of grading and surfacing Trail Ridge and Bear Lake roads in the Rocky Mountain National Park, Larimer and Grand counties. **Leone Construction Co., Inc.** of Trinidad submitted a low bid of $250,940 on two combined highway projects in Crowley County. The work will provide structures, grading and surfacing on 5.4 mi. of State Highway 71, north of Ordway extending to Crowley-Lincoln County line, and the other project is for similar improvement of 4.8 mi. of State Highway 96 from Ordway east to Sugar City. **Blanchard Construction Co.** of Derby received a $378,804 contract for grading, surfacing and structures on 5 mi. on U.S. 285 south of Alamosa. **Harrison Construction Co.** of Denver received a $453,283 contract to improve 4.6 mi. on U.S. 160 east of Bayfield in La Plata County. The work includes grading, surfacing and structures. **Colorado Constructors, Inc.** of Denver received two contracts for roadwork, surfacing and structures on 6.3 mi. south of Gateway and 5.6 mi. of paving from the Montrose County line north, and a $266,732 contract to improve U.S. 87 in Adams County, including an overpass and related work. **Herren-Strong** of Platteville submitted a

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low bid of $1,164,053 for 10.2 mi. of grading, structures and surfacing between Hudson and Roggen in Weld County. **Peter Kiewit Sons' Co.,** Denver, submitted a low bid of $225,389 for construction of Platte River bridges and approaches at Hampden, Arapahoe County.

IDAHO

Hummel, Hummel & Jones of Boise received a $300,000 contract to design a MTR-ETR storage and receiving building to serve the two large testing reactors at the National Reactor Testing Station. A $211,000 contract was received by **Oliver General Contractor** of Superior, Mont., for 2.2 mi. of grading and surfacing in Clearwater National Forest. **Clifton-Applegate** of Yardley, Wash., submitted a low bid of $435,778 for construction of a crushed rock base and plant-mix surface and furnishing stockpile in Lewis and Nez Perce counties.

MONTANA

Raber-Kief, Inc. of Seattle, Wash., received a $1,485,218 contract for rehabilitation of Wherry housing at Malmstrom Air Force Base. **Peter Kiewit Sons' Co.,** Billings, received a $2,657,498 contract for 9.1 mi. of grading, surfacing and cement paving and construction of 1 bridge on the Miles City-West section of the Rosebud County line road in Custer County. A $1,096,572 contract was received by **Zook Brothers Construction Co.,** Bigfork, for 6.6 mi. of grading, surfacing and 1 bridge on the Superior East and West road in Mineral County. **G. E. Marshall** of Roundup received a $319,270 contract for 3.7 mi. of grading, surfacing and draining on the Tampico-Glasgow road in Valley County. **Sornsin Construction** and **Tri-State Excavating Co.** of Fargo, N. Dak., received a $324,466 contract for construction of steel and concrete highway overpass on the Miles City-East and West road in Custer County. **Union Construction Co.** of Butte received two contracts for roadwork in Beaverhead and Ravalli counties: $295,563 for 5 mi. of grading and surfacing on the Jackson-Dillon road in Beaverhead County, and $192,850 for 3.7 mi. of grading and surfacing on the Hamilton-Southeast road in Ravalli County. A $199,662 contract was received by **Hilde Construction Co.,** Great Falls, for 4.2 mi. of grading, surfacing and widening on the Stanford-Geraldine road in Fergus and Chouteau counties. **Schye & Sullivan** of White Sulphur Springs received a $139,271 contract for grading, surfacing and 1 structure on 2.4 mi. of Froid-West road in Roosevelt County.

NEW MEXICO

Allison & Haney, Inc. of Albuquerque, received a $558,552 contract for additional channelization and levee construction in the Belen area of the Middle Rio Grande River south of Albuquerque.

OREGON

Roy L. Houck Sons' Co., Salem, submitted a low bid of $1,392,693 for paving Pacific Highway from McKenzie River to Willamette River in Lane County. **Central Paving Co.,** Independence, submitted a low bid of $1,092,300 for Alternate "A" covering paving, slide correction and signing on the Oregon Coast Highway from Davis Slough to Bullards Bridge; and **The Umpqua River Navigation Co.,** Reedsport, submitted a low bid of $1,212,559 for Alternate "B." **Rogers Construction Co.,** Portland, submitted a low bid of $896,757 for paving, structures and signing on the Hood River-Shogren section of the Columbia River Highway in Hood River and Wasco counties. A low bid of $496,402 was submitted by **S & D Construction Co.,** Portland, for construction of Evans Creek railroad overcrossing structure on Pacific Highway in Jackson County. **Warren Northwest, Inc.,** Portland, submitted a low bid of $463,629 for grading and paving the Namorf-Harper Junction section of the Central Oregon Highway in Malheur County. **Rogers Construction Co.,** Portland, submitted a low bid of $265,064 for grading, oiling and structure on the Oregon/Washington highway —Old Oregon Trail highway section in Umatilla County. A low bid of $217,376 was submitted by **Birkemeier Construction Co.,** Milwaukie, for construction of 4 bridges on the North Santiam highway, Lancaster Dr.—Sublimity Gun Club, in Marion County. **Sig Andersson,** Coos Bay, submitted two low bids: $389,769 for 6 bridges on Pacific Highway, McKenzie River to Willamette River between Eugene and Springfield in Lane County; and $357,780 for 5 bridges on same section of the relocated Pacific Highway, northeasterly of Eugene. **General Construction Co.,** Portland, received a $364,343 contract from the Army Engineers for construction of a cross levee and drainage structure in Multnomah County Drainage District No. 1.

UTAH

Floyd B. Whiting, Murray, received a $1,024,755 contract for construction of a 4-in. plant-mix bituminous surface on a 6.53-mi. stretch of road between Thistle and Red Narrows in Utah County. A $571,900 contract was received by **Larsen Construction & Engineering Co.,** Ogden, for additions and alterations to high school in Ogden.

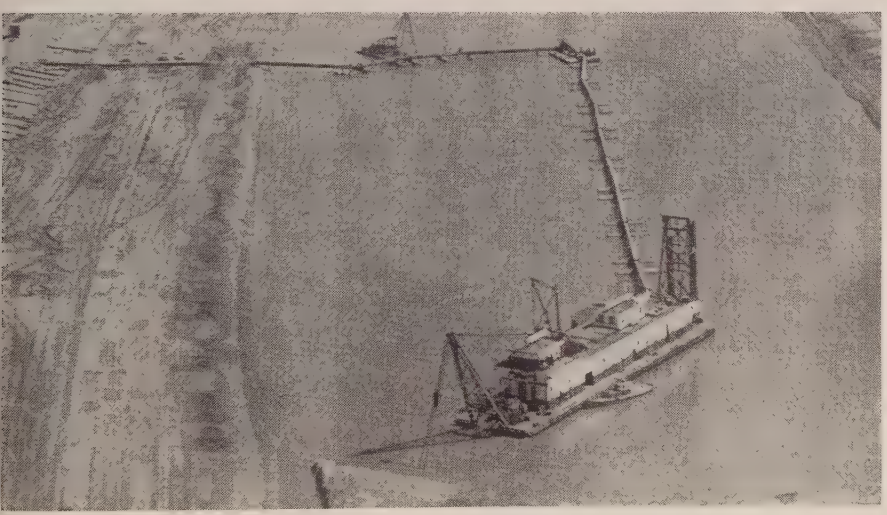
WASHINGTON

Morrison-Knudsen Co., Inc. and **Rumsey & Co.,** Seattle, received a $3,982,242 contract to construct 3 precast, prestressed concrete girder bridges on 0.5 mi. of State Highway 1 in King County, part of Seattle Freeway, from East Galer St. to Lakeview Blvd. **Northwest Construction, Inc.,** Seattle, received a $1,410,641 contract for clearing, draining, grading, surfacing and paving 5.2 mi. of State Highway 1, including 4 prestressed concrete girder bridges in King County, part of projected Tacoma-Seattle-Everett freeway; also a $507,631 contract for repairing and refilling a washout area and rebuilding State Highway 2 at middle crossing of the Snoqualmie River in King County. A low bid of $1,330,000 was submitted by **Strom Construction Co.,** Tacoma, for school project at Tacoma. **Perini Corporation,** Seattle, was low bidder at $9,997,140 for Mayfield Dam basic work involving 3 generating units. **Beuter & O'Neil** and **C. W. Thomas & Son,** Chehalis, received a $172,562 contract for Chehalis River bridge approaches on 0.5 mi. on State Highway 9 at Montesano, Grays Harbor County. A $1,401,680 contract was received by **Erickson Paving Co.,** Bellevue, for 1.2 mi. of construction on State Highway 1, Seattle Freeway, E. 40th St. to Ravenna Blvd., King County. **J. J. Welcome Construction Co.,** Redmond, received a $621,241 contract for grading and surfacing on 4.3 mi. of State Highway 9, McCleary

to Pioneer Rock, in Grays Harbor and Thurston counties. A $130,369 contract was awarded by the State Highway Commission to **Materne Bros. Co.**, Spokane, for 37.2 mi. of county feeder road work in Grant County. **C. E. Oneal, Inc.**, Ellensburg, received a $275,757 contract for 6.3 mi. of state highway including clearing, excavation, surfacing and related work, from Olson Creek to Middleport in Stevens County. A $756,238 contract was awarded to **Anderson Bridge Construction Co.**, Tacoma, for construction of a steel truss bridge and reinforced concrete box girder approach spans on 0.18 mi. of State Highway 12 in Cowlitz County. **Lewis Hopkins Co.**, Pasco, received a $667,358 contract from the Bureau of Reclamation for earthwork and construction of canal laterals, wasteways and drains for Irrigation Block 88 of West Canal Laterals, Columbia Basin Project, in Grant and Adams counties.

WYOMING

A low bid of $22,143,981 was submitted by **Martin K. Eby Construction Co., Inc.**, Wichita, Kans., for WS-107 A-1 operational bases, complexes 549-1 through 549-9, F. E. Warren Air Force Base, Cheyenne, an Army Engineers project. **Wyoming Paving**, Casper, submitted a low bid of $680,320 for sub-base, cement-treated base, plant-mixed surface, seal, and miscellaneous work on 6.7 mi. of 4-lane divided Interstate highway on the Kaycee-Midwest road in Johnson County. A low bid of $629,526 was submitted by **Knisely-Moore Co.**, Douglas, for grade, drain, base, surface and allied work on 7.4 mi. of Lander-Diversion Dam road in Fremont County. **Gilpatrick Construction Co., Inc.**, Riverton, submitted two low bids: $378,469 for grading, draining, excavation, base, surface and other work on 1.74 mi. of 4-lane divided primary highway on the Lovell-Denver road in Big Horn County; and $240,981 for grading, draining, base, plant-mixed surface, seal coat and miscellaneous work on 4.76 mi. of the Mountainview-Lone Tree road in Uinta County. **Brasel & Sims Construction**, Riverton, submitted a low bid of $223,899 for 4.13 mi. of grade, drain, surface and other work on the Robertson-West road in Uinta County. A low bid of $166,742 was submitted by **Summit Construction Co.**, Rapid City, S. Dak., for plant-mixed surface, seal coat, cover aggregate and other work on 7.0 mi. of Ne castle-South Dakota State line road in Weston County. **Leon K. Suhm, Inc.**, Denver, submitted a $155,772 contract for grading, draining, 1 interchange structure on 1.0 mi. of 4-lane divided interstate highway on the Midwest-Casper road in Natrona County. **Carlson Lien Co.**, Rapid City, S. Dak., submitted low bid of $1,108,009 for sub-base, cement-treated base, plant-mixed surface, seal coat, etc. on 7.17 mi. of 4-lane Interstate highway and 5.4 mi. of 2-lane Interstate on the Sheridan-Ranchester road north, and grading, draining, surface seal coat, etc. on 0.49 mi. of 4-lane divided Primary highway on the Sheridan-Ranchester road. **Big Horn Construction Co.** of Sheridan, submitted a low bid of $433,038 for grading, draining, subbase, crushed base, surfacing, seal coat, and allied work on 4.8 mi. of the Daniel-Kemmerer road in Sublette County. **Morrison-Knudsen Co., Inc.**, Boise, Idaho, received a $170,102 award for construction of 3 continuous welded plate girder spans over the U.P. railroad, approaches, and miscellaneous work on .5 mi. of the Sinclair-Walcott road east of Sinclair in Carbon County. A $474,436 contract was received by **Roth Construction Co.**, Rapid City, S. Dak., for grading, draining, and other work on 3.60 mi. of 4-lane divided Interstate highway on the Sheridan-Marginal road in Sheridan County. **Ellingford Bros., Inc.**, Evanston, received a $107,388 contract for construction of 3 continuous reinforced concrete slab span bridges over Smiths Fork, Blacks Fork and Blacks Fork overflow, culverts and miscellaneous work on 4.13 mi. of the Robertson-West road in Uinta County.



HYDRAULIC DREDGE CUTS INLAND SHIP CHANNEL

A 30-in. hydraulic dredge is cutting a 30-ft. depth of channel through California's rich Central Valley at the rate of 160 ft. a day. Excavating a channel 200 ft. wide at the bottom, the "San Diego" is completing a vital link in the $41,000,000 Sacramento-Yolo Deep Water Channel and Port, 90 mi. from the sea.

The work is being carried out by Pacific Dredging Co. for McCammon-Wunderlich Co., which holds a $7,000,000 contract with the Corps of Engineers for excavation of 23,400,000 cu. yd.

With the cutterhead powered by a 1,000-hp. motor and the main pump powered by a 4,000-hp. motor, the dredge is moving 1,000,000 cu. yd. per month. The discharge line consists of 30-in. pipe, a total of 15,000 ft., furnished by the Los Angeles district office of L. B. Foster Company. Pipe sections averaging 39 ft. long are specially constructed with tapered ends to engage couplings.

Los Angeles Custom House design approved by GSA

THE GSA has announced approval of the design for a new $31,154,000 U. S. Custom House and Federal Office Building at Los Angeles. General Services Administration instructed Welton Becket and Associates to proceed with preparation of final plans to be ready by Sept., 1960.

The eight-story building will contain about 1,200,000 sq. ft. of office space capable of housing about 4,800 employees. It will provide space for 23 U. S. agencies now scattered around the city, and will be located on the east side of Los Angeles St. between Temple and Aliso St.

It will have a steel frame faced with metal and glass and marble. It will be air-conditioned, and have 16 elevators, as well as escalators which will serve the first two floors of the building.

ENGINEERS and CONTRACTORS

Leslie W. Graham, member of the firm of Graham & Hayes, Structural Engineers, San Francisco, is the newly elected president of the Structural Engineers Association of Northern California. A registered civil engineer in California since 1944, Graham has served as a director of SEANC and the Structural Engineers Association of California. He is a member of the American Society of Civil Engineers, Consulting Engineers Association of California, and the American Military Engineers.

* * *

Richard E. Reiss and **Richard L. Brown** have entered into a partnership for the practice of civil and structural engineering, under the name of Reiss and Brown, 1150 South Beverly Dr., Los Angeles. Both men are members of the American Society of Civil Engineers. They were formerly project engineers with Albert C. Martin & Associates of Los Angeles.

Eugene W. "Gene" Robbins of Houston, Tex., joined the Washington, D. C., staff of the American Road Builders' Association Jan. 1 as managing director of the Contractors Division. He succeeds **W. Guy Gunn,** who resigned to accept another position.

* * *

William R. Kimball, Jr., president of Kimball Manufacturing Co. of San Rafael, Calif., has been elected a director of Utah Construction & Mining Co.

* * *

Joseph R. Roundtree, an employee of the Montana state highway department since 1934, succeeds **Frank A. Small** as state highway division engineer at Glendive. Small retired following 37 years with the department.

* * *

Named assistant area engineer for the Titan missile ICBM project near Mountain Home AFB, Idaho, is **Ben Molle.** Other assignments by the Walla Walla District of the Corps of Engineers to Mountain Home include **Tom Mendiola,** chief, construction branch; and **Alan Brandes,** chief, contract administration branch. The three engineers are from Walla Walla, Wash.

* * *

New city engineer of Aberdeen, Wash., is **Glenn M. Egger** of Bellevue. He succeeds **Charles Kirkwood** who resigned some time ago to serve as county engineer of Grays Harbor County.

* * *

Charles Neville who served for eighteen years as county engineer of Lewis County, Wash., retired Jan. 1. **Ernest Geissler** of Montclair, N. J. will assume the post on Mar. 1.

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Donald R. Anderson with the Washington Department of Highways in Olympia, has transferred to Aberdeen where he will be resident engineer. He follows **Jack E. Jasper** who was transferred to Seattle. Anderson has been a resident engineer in Olympia since 1957.

* * *

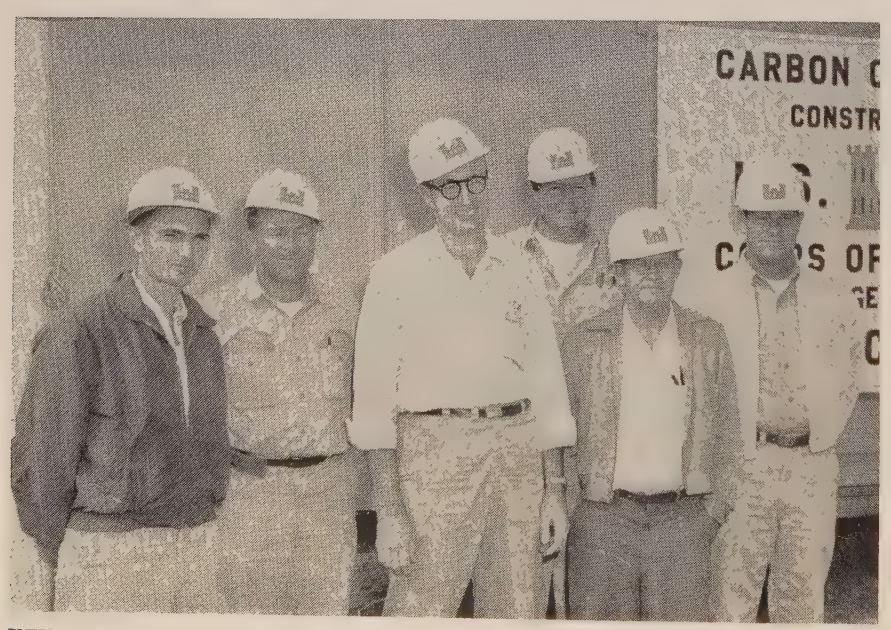
Elected to serve as officers of Intermountain Branch of Associated General Contractors, Salt Lake City, Utah, for the ensuing year are: **Kenneth S. Witt,** president; **Paul Thorn,** vice president, and **Jack Cannon,** secretary-treasurer.

* * *

Glenn H. Von Gunten, assistant to the chief of the Walla Walla District engineering division of the Corps of Engineers, has been appointed chief of planning and reports branch at the Walla Walla, Wash., office. He replaces **Louis E. Rydell** who resigned some time ago to accept a position in Pakistan.

* * *

Joseph P. Frein, chief engineer of Morrison-Knudsen Co., Inc., Boise, Idaho, **A. O. Strandberg,** manager of the Seattle district office of M-K, and **John L. Armitage,** in charge of the company's tunnel work in the Oahe Dam Project at Pierre, S. D., have all been elected directors of this prominent contracting organization. Strandberg and Armitage were also elected vice presidents.



KEY personnel of the project staff supervising construction of Carbon Canyon Dam near Yorba Linda, Calif., for the U. S. Army, Corps of Engineers, are (l. to r.): *J. J. Kuzmich,* assistant project engineer—field; *P. M. McFee,* supervisory inspector—earthwork; *W. J. Robinson,* project engineer; *J. E. Clark,* supervisory inspector—concrete; *J. F. Fallon,* assistant project engineer—office; and *S. E. Barker,* chief, project laboratory. The $6,000,000 earth dam is being constructed by Oberg Construction Co. under supervision of the Los Angeles District, C. of E. Scheduled for completion in 1961, this Orange County flood control structure is 100 ft. high, and 2,600 ft. long.

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High production *when you want it . . . where you want it.* That's the big feature of the *new* Diamond 1536 single-pass portable crushing plant. It can be readied in minutes for moving down the road or across the county and quickly set-up for more economical production. It's designed for counties, townships and contractors where tons produced must be high and mobility is a must.

You get dependable performance, and low operating cost from this rugged, compact plant equipped with a two-cubic-yard capacity loading hopper. The 24′ x 3′ 1½″ plate feeder, 15″ x 36″ jaw crusher, 3′ x 5′ 1½ deck vibrating screen and 30′ x 19′6″ delivery conveyor are mounted on a steel channel, gooseneck truck frame. It also carries the necessary drives, walkways, and ladders as well as optional equipment, including power unit, fuel tank, batteries, battery box and cables.

Delivery conveyor is hinged thus eliminating any dismantling for towing. The short wheel base and towing bar provide excellent maneuverability on road or in pit.

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Announcement is made of the promotion of **Charles O. Fredrickson** to the position of supervising design engineer with the Oregon State Highway Commission's bridge division. He joined the commission in 1951 and until this new assignment was senior structural designer with the bridge division.

* * *

Sparks-Mundo, paving contractor in the Los Angeles area for many years, has been sold to Industrial Asphalt of California, Inc., and **C. O. Sparks** and **W. T. Ellington,** co-owners, are retiring.

* * *

Sam Osofsky died recently following a brief illness. He was a highway economist with the California Division of Highways and played a major role in developing procedures for handling engineering computations for the division. As a member of a team engaged in developing new techniques in this field he received honorable mention in 1956 and again in 1957 in competition for the Dr. L. I. Hewes Award sponsored by *Western Construction.*

* * *

Looking toward the target date of July 1 when all functions of the Bureau of Public Roads are scheduled to pass into the hands of the newly established State Division of Highways, several top level engineering appointments have been made. Heading the department is **T. D. Sherard,** director and chief engineer. Sherard comes from Wyoming where he was deputy state highway engineer. Others are **Donald R. Roser,** assistant state highway engineer – administration; **A. G. Gardner,** assistant state highway engineer—operations; **L. D. Wilson,** highway consultant; **Lee D. Hubbard,** district engineer at Anchorage; **John E. Snell,** chief right-of-way agent, and **H. M. Pentecost,** state planning director.

* * *

William J. Jurkovich, Douglas M. Fraleigh and **Marvin A. Shulman,** bridge engineers with the California Division of Highways, received second honorable mention award in the professional category of the Steel Highway Bridge Design Competition sponsored by the American Bridge Division.

* * *

Col. Eric Dougan, U.S. Air Force regional civil engineer, North Pacific, has been elected and installed as president of the Portland Post, Society of American Military Engineers, for the coming year. He succeeds **Col. Walter L. Winegar,** Portland District Engineer.

* * *

Promotion of **William J. Chase** to junior partnership in the consulting engineering firm of Hill and Ingman, Seattle, is announced. He has been chief design engineer of the firm since 1957.

* * *

Walter P. O'Farrell, widely known in Western engineering and construction circles, has been elected a director of J. H. Pomeroy & Co., Inc., international contracting organization headquartered in San Francisco.

* * *

William R. Gianelli, acting district engineer for the Southern California District of the Department of Water Resources, recently resigned to take up partnership in the recently organized Sacramento consulting firm of **Max Bookman** and **R. M. Edmonston.**

* * *

Clair A. Hill, civil engineer of Redding, Calif., has been elected president of the Sacramento Section, American Society of Civil Engineers, for 1960. Chosen to head the Central Valley Branch was **Bruno Dentino** of Stockton, Calif., while **Vernon M. Meiser** of Reno was elected president of the Nevada Branch, and **Alan S. Hart,** president of the Marysville Branch.

* * *

C. Lee Lowry of the San Francisco office of Porter, Urquhart, McCreary, and O'Brien has been assigned as head of the firm's Soil Mechanics and Foundations Engineering Division at Sacramento.

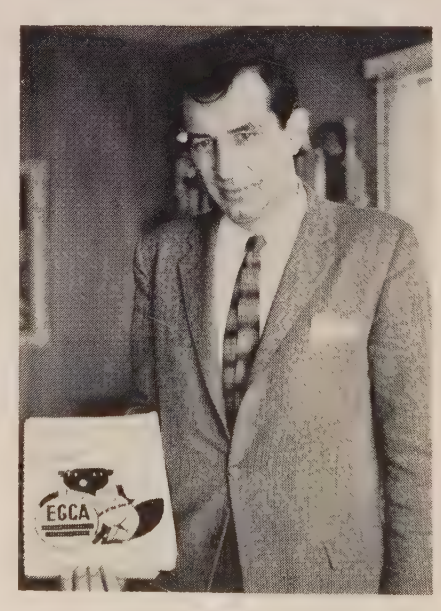
* * *

A. V. Williamson, widely known highway engineer, retires Mar. 1 as staff maintenance engineer for the Colorado Department of Highways. He has been with the Department for the past six years. Before that time he was with the BPR.

* * *

Two changes in regional directors of the Bureau of Reclamation are taking place Mar. 1 when **E. O. Larson,** long time director of Region 4, Salt Lake City, retires. Leaving Billings, Mont., as director of Region 6 is **F. M. Clinton,** who takes over Larson's former post. **Bruce Johnson,** from the Bureau office in Bismarck, N. Dak., has been named in Clinton's place.

Two other major field assignments are also announced. **W. E. Rawlings,** supervisor of irrigation at Billings, is moving to Ephrata, Wash., as manager of the Columbia Basin Reclamation Project, succeeding **P. R. Nalder** who is undertaking a foreign assignment for the USBR. Succeeding Rawlings is **Kermit K. Kober** of the Denver office.



BEAVER IN HARD HAT

The new symbol, a beaver in a hard hat, is displayed by *Warren Mendel,* state manager of Engineering & Grading Contractors Assn. of California. The beaver will be used by member firms on trucks, equipment, and road signs to build a "corporate image" in a program to boost public relations. Members hope the public will associate the beaver with good construction practice.

CALENDAR

Mar. 21-24 – The Associated General Contractors of America, annual convention, San Francisco, Calif.

Mar. 23-25 – Northwest Highway Engineering Conference, (Northwest Conference on Road Building and the Northwest Traffic Engineering Conference) Oregon State College, Corvallis, Ore.

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.

HEAVY DUTY ¾-YARD SHOVEL is fast, rugged, a real profit-maker. Two-lever, "Joy-Stick" controls are available to speed operations. Choice of three crawlers. Boom is all welded with cable crowd, power dipper trip.

VERSATILE 18-TON CRANE with simple, precision controls. Exclusive square-tubular-chord boom boosts payloads. Simultaneous swing, hoist and travel available. Crane converts to dragline, clamshell, shovel or hoe.

LORAIN 26: FAST WAY TO MAKE A FAST BUCK

HARD DIGGING HOE has the weight for forceful "crowding" . . . the stability and power to work toughest materials. Long, gooseneck boom permits maximum digging ranges. All control linkage on anti-friction bearings.

DRAGLINE AND CLAMSHELL have long life, swing clutches for fast action. Hoist drums are mounted on anti-friction bearings. Big crawlers give super-flotation. Lighter, stronger boom increases bucket reaches.

THE THEW SHOVEL COMPANY, LORAIN, OHIO

LORAIN®

ON THE MOVE

ANDREWS EQUIPMENT SERVICE
Spokane, Wash.
ATLAS EQUIPMENT COMPANY
Salt Lake City, Utah
CENTRAL MACHINERY CO.
Great Falls, Havre and Lewistown, Mont.
COAST EQUIPMENT CO.
San Francisco 3, California
GENERAL EQUIPMENT CO.
Reno, Nevada
HATTEN MACHINERY COMPANY
Seattle 4, Washington
INTERSTATE TRACTOR & EQUIPMENT CO.
Portland and Eugene, Ore.
MOUNTAIN TRACTOR CO.
Missoula and Kalispell, Mont.
NASH-DAVIS MACHINERY CO.
Billings and Bozeman, Mont.; Greybull, Wyo.
LEE REDMAN EQUIPMENT CO.
Phoenix, Arizona
SANTA FE EQUIPMENT CO., INC.
Los Angeles and San Bernardino, Calif.
SOUTHERN IDAHO EQUIPMENT CO.
Idaho Falls, Boise and Twin Falls, Idaho
TRACTOR & EQUIPMENT CO.
Sidney, Miles City and Glasgow, Mont.
YUKON EQUIPMENT INCORPORATED
(For Alaska) Seattle, Wash.
Fairbanks, Anchorage and Ketchikan, Alaska

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

SUPERVISING the jobs

Rex T. Mackay is supervising some grading and surfacing work which W. W. & W. B. Gardner are doing in Salt Lake County, Utah. Foreman is **Franklin L. Drake, Jr.** Covered in the $136,769 contract is plant-mix bituminous surfaced road on State Road 152 from 35th South to 45th South streets in Salt Lake City. Earmarked for completion this July, work here got under way in December.

* * *

Daniel L. Handy, superintendent, has charge of a grade-drain, surfacing and structures award to H. E. Lowdermilk Co., costing $859,560. The job is located in Turkey Creek Canyon in Jefferson County, Colo. Structures superintendent is **R. G. McGillivray,** while **B. R. Clark** is grade foreman. Timekeeper is **William E. Kling.** With July the target date, work has been in progress since December.

* * *

Roy E. Ladd as superintendent is Gibbons & Reed Co.'s top man on a recent award to this contractor covering 2.5 mi. of 4-lane freeway, a portion of 2- and 4-lane highway, a 4-lane bridge over Shasta River northwest of Weed in Siskiyou County, Calif. Other key men on the $1,332,900 project are: **John Bowman,** engineer, **L. E. "Mick" Herndon, Dick Stimpell, Jack Griffin, Frank Fisher,** and **Forrest Hunter,** all foremen, and **Adrian Cox,** master mechanic.

* * *

R. E. Dickerson is serving Cahoon Construction Co. as superintendent for its recent $642,857 award covering construction of dual 730-ft. steel and concrete structures over the Yellowstone River on Livingston East and West road in Park County, Mont. December 1959 was the starting date, and according to **W. R. Cahoon,** the job will run probably until September 1961.

Vic McFahlin, is Lee Stephens' superintendent in charge of $490,300 construction contract in Stanislaus County, Calif. Work consists of 2.1 mi. of highway grading, surfacing and construction of bridge over the Tuolumne River and over Modesto Irrigation District lateral in Stanislaus County, Calif. Job engineer is **George Johnson. Pete deFerrari** is master mechanic. Superintending bridge construction for Affiliated Engineers, subcontractor on this phase of the work, is **George Baumgardner.** Representing the California Division of Highways is **Don Hubbard,** resident engineer. Work will be finished this July.

* * *

Frank A. Klingle has been named superintendent of construction by the joint venture of Dillsworth Construction Co. and Maronick Construction Co. which successfully bid a 10.5-mi. job of grading, surfacing and draining on the Wyoming line-Belfry road in Carbon County, Mont. Assisting as foreman on the $413,599 contract, which got under way in mid-December, is **E. Phil Maronick.**

Gene Hill, general superintendent for L. W. Vail Co., Inc., has charge of a $218,990 job of grading, surfacing and related work on 2.3 mi. of highway from Gibbon to Kiona in Washington. The following foremen are assisting: **Clerance Nelson,** grade; **O. C. Haney,** pave; and **H. A. Porter,** pipe. Work started in December and will be finished in June.

* * *

Chris Finnemann is supervising Max J. Kuney Co.'s recent award in the amount of $294,004 for garding, surfacing and other work, Rocky Reach to Orondo in Douglas County, Wash. **Ted Johann** and **A. F. Jackson** are excavation foremen on the job which started in January with May the target date.

* * *

Tony, Mike, and **Jerry Calabrese** of the contracting firm of Calabrese & Sons all have a hand in supervising work on a $107,561 recent award to their company consisting of 1.8 mi. of grading and surfacing in Benton County, Wash. Work will be finished in April.

* * *

Keith L. Stone, project manager, and **L. Denui,** superintendent, are key men on construction of a portion of highway near the Oregon-Nevada state line, a recent award to Wells Cargo, Inc. Grade foreman on the $286,630 project is **Jack Chattele; Dave Spiller,** timekeeper. Consisting of grading, draining and surfacing, the job started in February and is scheduled for July completion.

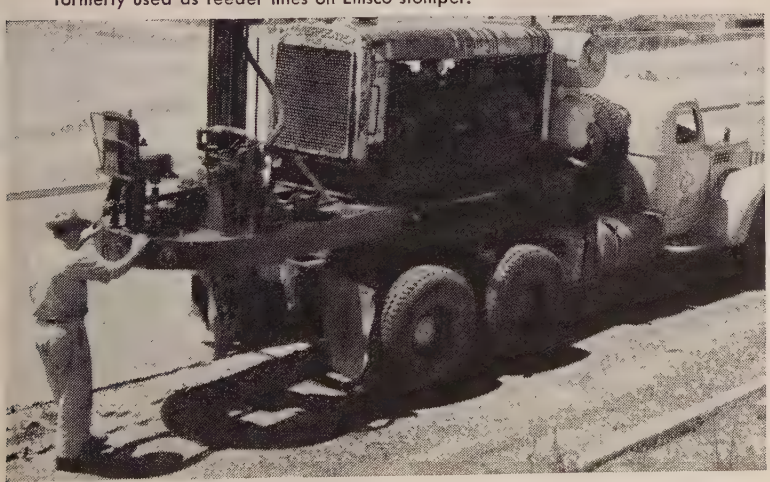
GRADING and surfacing work in the town of Avondale, Ariz., in the amount of $119,528 is being handled by Fisher Contracting Co. Here are some of the key men on the job: (Upper) l. to r., *Dale Sisson,* project manager; *Leo Munoz,* project superintendent, with *Bob Fisher,* son of contractor *D. W. Fisher;* and *Harry Milden,* general foreman. (Lower) l. to r., *Darwin Ritchhart,* grade foreman, talking to *LeRoy Sells,* tractor operator; *Robert Sandvick,* purchasing agent, and *Don Regman,* field office manager. Under way since mid-November, work is now in the finishing stage.

"WE STANDARDIZED ON AEROQUIP HOSE LINES

A Handful of Aeroquip Fittings and Some Hose Handle Our Trouble Calls Easily!"

Says Bill Halloway, Master Mechanic, McGuire & Hester, Oakland, Calif., Paving and Pipe Line Contractors

Aeroquip Hose Lines, with Reusable Fittings, completely replaced copper tubing formerly used as feeder lines on Emsco stomper.



Where copper tubing crystallized in a single day, Aeroquip Flexible Hose Lines have absorbed the stomper's severe shock and vibration for more than a year.

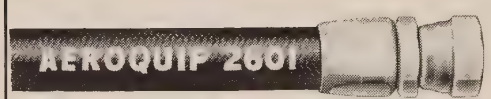
McGuire & Hester's equipment fleet includes two stompers, used in their paving contracts. When breaking out hard concrete, the air hammer control lines, formerly of copper tubing, crystallized in as little as one day.

More than a year ago, Aeroquip Flexible Hose Lines replaced the copper tubing. Under conditions of severe shock and vibration, the Aeroquip lines have proved completely trouble-free. The company has now standardized on Aeroquip.

Using Aeroquip Bulk Hose and Reusable Fittings, new or replacement hose lines are quickly and easily made up in the field, with hand tools. Equipment downtime is reduced. Hose line costs are lower—Aeroquip Fittings are designed to be used over and over again.

Find out how *your* fuel, air, water and hydraulic line problems can be solved, the Aeroquip way. Call your Aeroquip distributor, listed under "Hose" in your Yellow Page phone book.

AEROQUIP FLEXIBLE HOSE LINES KEEP EQUIPMENT ON THE JOB!



Aeroquip 2601 Hose is lightweight, durable. Specific uses: Heavy-duty engine oil and fuel lines. May be used for other approved applications.

Aeroquip 2651 Medium Pressure Hose has single wire braid reinforcement, resists abrasion, oil and mildew in hydraulic, gasoline, crude, fuel and lube oil, air and water lines.

Aeroquip 1509 High Pressure Hose has multiple wire braid reinforcement. Applications: high pressure hydraulic, crude and fuel oil, and air lines.

Aeroquip

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AEROQUIP PRODUCTS ARE FULLY PROTECTED BY PATENTS IN U. S. A. AND ABROAD

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

Don Vizzare is superintending a $248,377 grade and pave job on Highway 1 in King County, Wash., for Northwest Construction, Inc. Assisting as foremen are **Lou Tomaso,** paving, **Mike Cernich,** pipe, and **Mike Fiorito,** grade. Scheduled for May completion, work started in January.

* * *

Lafey Materne and **R. E. Materne** of the construction firm of Materne Bros. Co., are directing operations on their recent award of 13 mi. of grading and surfacing of access roads at Fairchild AFB near Spokane, Wash. **James McFarling** is their foreman. Scheduled for completion this June, work has been under way since February.

* * *

John Mikelson, general superintendent for H. Halvorson, Inc., together with **"Wally" Olson,** superintendent, is in charge of construction of 11 concrete buildings to house microwave equipment at Fairchild AFB, Wash. Foremen on the $837,980 project are **Mertsie Herlin** and **Francis Schuerman.** Construction started in January, earmarked for finish this August.

* * *

Fred A. Talmadge is supervising Swanson & Youngdale Construction Co.'s award to construct a missile-assembly building addition at Fairchild AFB, Wash. Other key men on this $1,148,263 project are **Marvin Jenkins,** engineer-mechanical, and **Bob Gresham,** office manager. Under way since Jan. 11, work is expected to be finished about Aug. 15.

* * *

Ken Long, project manager, **Paul Walters,** superintendent, and **Russ Roberts,** timekeeper, are top men employed by Dinwiddie Construction Co. on a 2-story manufacturing plant being built at Palo Alto, Calif. The $1,258,554 contract got under way last December, earmarked for November close.

* * *

Frank Coluccio and **J. N. Coluccio** are acting as superintendents for the $1,326,680 award to Frank Coluccio Construction Co., Inc. to construct a water supply main to provide water to the city of Kirkland, Wash. **Vincent Coluccio** and **Raymond Patterson** are foremen on the job which has just started and will be finished about June 1.

* * *

C. Vernon Glidden, superintendent, and **Duane C. Stensrud,** resident engineer, are key men on construction of two bridges across the Rogue River on Pacific Highway in Jackson County, Ore. A $623,333 contract being executed by Pacific Concrete Co. and **Otis P. Jordan, Jr.,** the job started the first of January and is expected to be over some time in December this year.

* * *

Henry Carder and **Milton Gracia,** superintendent and project engineer respectively, head the job personnel employed by Madonna Construction Co., successful bidder on 2.3 mi. of 4-lane freeway on U.S. 101 through the town of Pismo Beach, San Luis Obispo County, Calif. Other key men on the $1,481,509 contract are: **Leonard Koll,** concrete superintendent; **Chester V. Bolin,** concrete superintendent-structures; **Don Barrodori,** master mechanic, and **Otis Maxwell,** labor foreman. Earmarked for completion the end of 1960, work here got under way last December.

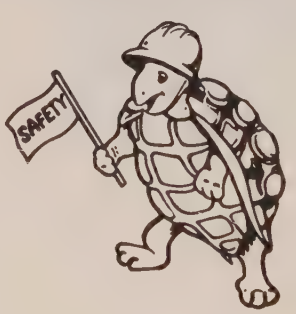
* * *

Mike Herrera, general superintendent for Cen-Vi-Ro Pipe Corp., is in charge of construction of high pressure irrigation water distribution system being built as part of the USBR Central Valley Project in California. Installation sub-contractor is Cala Construction Co., whose chief personnel are **Rowland Drinkgern,** manager; **Fred Davenport,** field superintendent; **Mike Cantrell,** structure foreman, and **"Web" Webster,** pipe foreman. Cen-Vi-Ro won the contract on a low bid of $1,208,662, started work in January, and expects to finish the job this September.

* * *

Delbert Phillips, project manager, **Robert Brewer,** superintendent, **Arne Backman,** carpenter foreman, and **Jack Casto,** steel foreman, head Anderson Construction Co.'s crew working on a Olympia, Wash., school construction job awarded to the contractor on a low bid of $1,472,669. The project will be complete about the end of this year.

Turtle Club



SINCE last August when these pages recorded the names of Western construction men who had recently become members of the Turtle Club, more Westerners have added their names to the roster of this international club in the interest of promoting safety generally, and singing the praises of the hard hat in particular. Here are some of the men who owe their lives to the wearing of their safety hats.

Wayne E. McCool, an employee of Peter Kiewit Sons' Co., was working at the Flaming Gorge dam site, Dutch John, Utah, doing some high scaling when a rock loosened from above and struck him on the head. His hard hat absorbed the force of the blow and he was protected from severe head injury.

Billy G. Cox is employed by Merritt-Chapman & Scott Corp. at Page, Ariz. While working at Glen Canyon Dam, a 75-lb. drill steel fell over and struck him on the head. Cox's helmet cushioned the force and saved him from serious head injury.

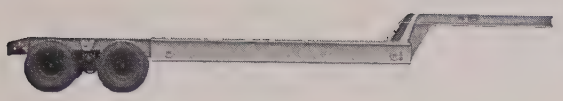
Bernie L. Lawrence is an employee of the Bureau of Reclamation at Page, Ariz. He was working in the power plant excavation area of Glen Canyon dam site when he was struck on the head by falling rock. His safety hat protected him from severe if not fatal injury.

Donald R. McEuen, employed by American Bridge Co., Pittsburg, Calif., was bolting up on the side of a building when a girt vibrated loose 60 ft. above him. It struck him on the head, but his safety hat protected his head from injury.

Joe Welsh is an employee of Western Drilling Co., Tacoma, Wash. While working in Anchorage, Alaska, a vibration caused a nut to loosen on the derrick bracing. The bracing struck Welsh on the head 40 ft. below, but the force was lessened by his safety helmet and he received no serious injury.

Harry F. Fergerstrom is a crane operator for C. K. Buckert, Ltd. of Honolulu. While his equipment was in operation loosening rock for

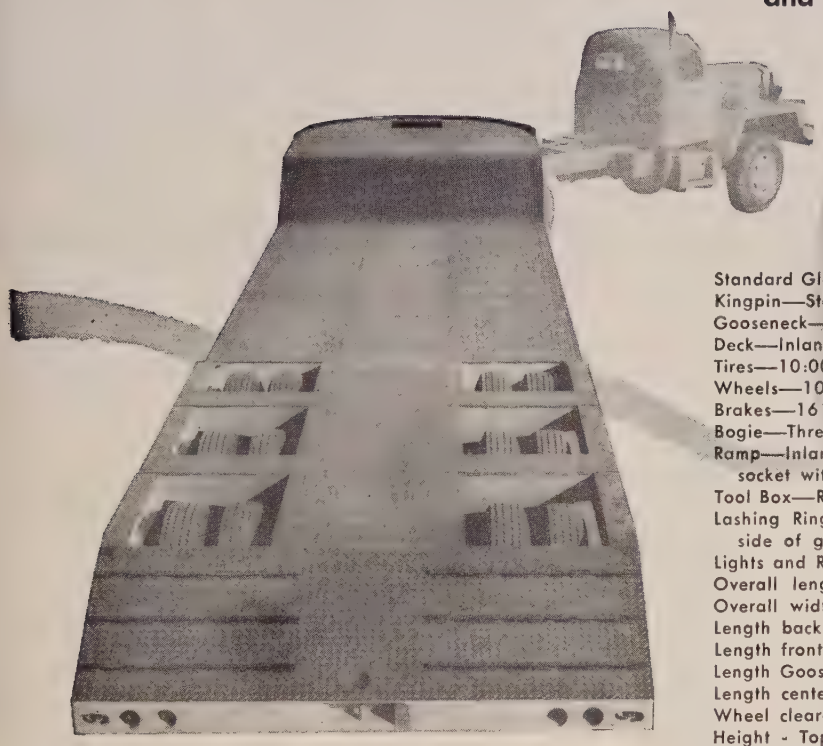
HE-MAN HAULING



25 TON MODEL 8 - LT - 25

35 TON MODEL 35-LT-KRS

The new Miller & Smith 50-ton, 3-axle Lo-Boy Trailer is the answer to the contractor's needs of adequate transport equipment for hauling heavy machinery from job to job, as well as on the job-site. High tensile alloy steel used in the frame members makes it possible to arrive at the high "pay-load to trailer-weight" ratio of 5 to 1. The 3 axle spring-mounted bogie provides ample flotation to meet road and bridge standard loadings. The long, drop-center deck facilitates distribution of load over trailer and tractor axles.



50 TON MODEL 184-TA-50L

SPECIFICATIONS AND DIMENSIONS

Standard Glad Hands and Jumper Cable Socket.
Kingpin—Standard steel heat treated.
Gooseneck—Full width - Decked with Inland 4-way Deck Plate.
Deck—Inland 4-way Deck Plate.
Tires—10:00x20 12-ply Nylon.
Wheels—10 Hole Budd.
Brakes—16½x7 with individual air cylinders.
Bogie—Three Axel Spring Suspension.
Ramp—Inland 4-way deck plate - cleated - recessed tow bar socket with pin in center rear frame member at toe of ramp.
Tool Box—Recessed in top of Gooseneck at front.
Lashing Rings—D-Type-Swinging Type 6 each side - one each side of gooseneck.
Lights and Reflectors—ICC specifications.

Overall length	43',10"
Overall width	9',6"
Length back of gooseneck to front wheel well	16',6"
Length front wheel well to back of trailer	15',1"
Length Gooseneck deck	8',9"
Length center of kingpin to center of Bogie	32',3"
Wheel clearance from center kingpin	76"
Height - Top of loading deck to ground	36½"
Height - Top of gooseneck to ground	59½"
Clearance - Frame Bottom	18½"
Height - 5th Wheel Plate to ground	51"
Height - Gooseneck Above Loading Deck	23"

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loading onto dump-trucks, the boom broke, causing the dipper stick to crash on top of the shovel cab and forcing it down on Fergerstrom. His safety helmet saved this operator's head from being crushed by a crossbeam, and undoubtedly saved him from fatal injury.

Manabu Nambu, an employee of Walker-Moody Construction Co., Ltd., Honolulu, was placing concrete inside a wooden form when the form, hoisted by a crane, swung past the intended position and struck the workman's head against the concrete. The force of the 300-lb. blow was lessened by his safety hat and he was protected from critical head injury.

Charles C. Yano, also employed by Walker-Moody Construction Co., Ltd., Honolulu, was protected from grave head injury by his hard hat. While trying to guide a wooden form into place at a hospital project, the form slid, wedging his head between reinforcing steel and the form, but he suffered no serious injury.

Walter Rosenberg, in the employ of Northern Construction Co. and J. W. Stewart, Ltd., Vancouver, B. C., was operating a power screed vibrator when a concrete buggy fell. Rosenberg was knocked down by part of the buggy, but the 650-lb. blow was cushioned by his hard hat and he was protected from possible fatal head injury.

Peter L. Serool is an employee of Burns & Dutton Co., Ltd., Vancouver, B. C. While putting up scaffolding at a school construction project, a piece of steel bracing slipped from the sling and struck his head, forcing his hat down on his nose. But the safety hat lessened the force and his head was protected from severe injury.

Gaston Jejirsh, who is also employed by Northern Construction Co., and J. W. Stewart, Ltd. in Vancouver, B. C., was working at Mission Dam when he was struck on the head and knocked to the ground by a plywood sheet leafed from the pile by a gust of wind. His safety helmet protected his head from the force of the 70-lb. blow, and he suffered no serious injury.

James Ball, an employee of Dawson, Wade & Co., Ltd., Vancouver, B. C., was working in rock cut scaling when a loose rock was dislodged and struck Ball on the head 20 ft. below. His safety hat absorbed the force of the blow and protected his head from serious injury.

Earl Mykines, in employ of the Lehigh Portland Cement Co. of Metaline Falls, Wash., was with a crew adjusting trunnions on kiln pier, when a wrench broke causing a pipe to fall and strike the worker, but he was saved from serious head injury by his safety helmet.

Bert L. Thyfault is an employee of C. C. Moore & Co., San Francisco. He was working at the Pacific Gas and Electric Co. steam plant addition in Pittsburg, Calif., when a fellow iron-worker accidentally dropped a socket. It struck Thyfault on the head, but he was protected from severe head injury.

If you have had the experience of your life having been saved because you had on your hard hat, you are probably eligible for membership in the Turtle Club. Write for an application form either to *Western Construction,* 609 Mission St., San Francisco, Calif., or to E. W. Bullard, International Sponsor, The Turtle Club, 2680 Bridgeway, Sausalito, Calif.

Construction in the arctic reviewed in Navy book

THE U. S. Navy Bureau of Yards and Docks engineering manual on construction and maintenance of installations in arctic regions has been published for sale to industry by the Office of Technical Services, Business and Defense Services Administration, U.S. Department of Commerce.

As the Navy's technical agency responsible for construction of shore facilities, the Bureau of Yards and Docks has devoted considerable effort to the study of effects of very low temperatures on materials, the theory of heat transfer, techniques of snow compaction and removal, and other developments for speeding construction and reducing the cost of bases in the cold regions.

All phases of construction

The handbook covers characteristics of the arctic regions; site selection and sampling; characteristics of snow, ice, and permafrost; construction of foundations and drainage facilities; design of roads, runways; water supply, sewage and waste disposal; planning for polar construction; transportation of construction materials; excavation and grading; snow compaction for roads and landing fields; concrete practice; ice airfields; construction equipment and maintenance; and site maintenance.

The illustrated manual, PB 151984 *Arctic Engineering*, Bureau of Yards and Docks, U. S. Navy, 473 pages, Mar. 1955, may be ordered from OTS, U.S. Department of Commerce, Washington 25, D.C., price $6.

New field office opened for California aqueduct

THE California Department of Water Resources announced today expansion of its activities in San Luis Obispo County with a new field office. Engineer in charge will be Carl Hagelin, who has been serving as project engineer on the Whale Rock Dam project near Cayucos. He will take charge of construction of the pipeline from Whale Rock Dam to San Luis Obispo and of installation of the two pumping plants which will move the water through the line.

The construction office at Whale

Rock Dam will continue to operate. Assigned as construction manager there is Charles F. Beatie.

The new San Luis Obispo office under Hagelin will gradually shift into high gear on field work for the Coastal Aqueduct of the giant San Joaquin Valley—Southern California Aqueduct System. "My office," explained Hagelin, "will conduct surveys, mapping, right-of-way engineering, exploratory drilling at tunnel sites, and other special investigations along the route of the Coastal Aqueduct."

Pomeroy gets big contract for work in Persian Gulf

THE Pomeroy Construction Corp. has been selected to design and participate in construction of service and access facilities for a vast new multi-million dollar offshore oil development on the oil-rich Persian Gulf.

Announcement of the new assignment, a joint venture with Hawaiian Dredging and Construction Co., Ltd., International, has been made by R. N. Pomeroy, president of J. H. Pomeroy & Co., Inc., international engineering and construction company.

Contract work, already getting under way, is being done for the Arabian Oil Company, Ltd., of Tokio, Japan, by the joint venture. The oil concern is now exploring and developing a large offshore concession in the Middle East.

Site of the new development is at Ras Al Khafji, in the Neutral Zone between Kuwait and Saudi Arabia, on the west shore of the Persian Gulf 75 mi. south of the town of Kuwait. The Japanese company has just announced discovery of oil in commercial quantities there, in a concession area some 30 mi. offshore.

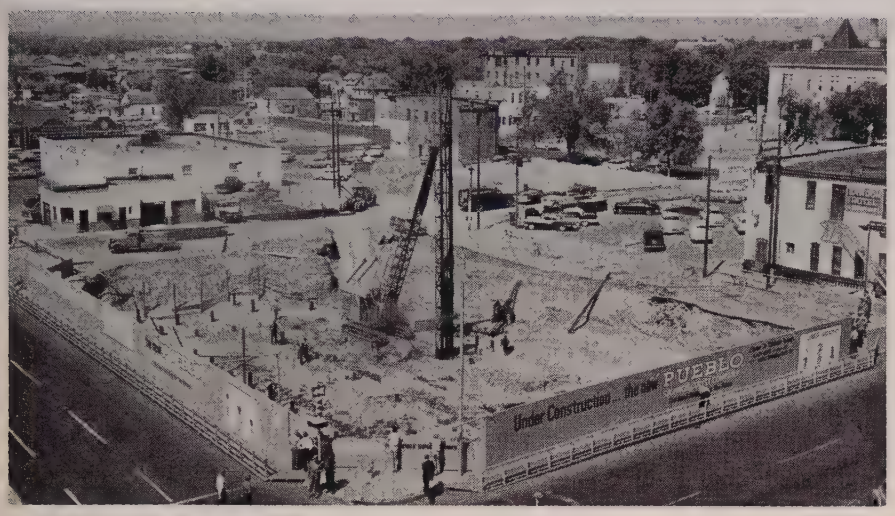
The job will include clearing, preparation and preliminary development of a large modern shoreside service area, with construction of a marginal wharf and dredging for large vessel access. The service area initially will comprise a work camp, residences and offices, 18 mi. of service and access roadways, and a marginal wharf 500 ft. in length. Dredging work will create a mile-long ship channel 18 ft. deep and 250 ft. wide from wharfside to deep water, and a protected inner harbor ship turning basin.

Northwest hydro power to be developed on basin basis

THE Department of the Interior has reported favorably on legislation to establish a basin account to advance water resource development in the Pacific Northwest. Objective of the proposed legislation is to make it possible to utilize uncommitted future power revenues from Federal hydro-power projects on a region-wide basis to assist in returning those reimbursable irrigation costs on reclamation projects in the Pacific Northwest which are beyond the ability of the water users to repay in a 50-year repayment period. Precedent for this approach exists in legislation applying to development of the 9-State Missouri River Basin Project, the 5-State Colorado River Storage Project and California's Central Valley Project.

"In our opinion," wrote Assistant Secretary Aandahl, "the Pacific Northwest is as ideally suited to application of this concept as any other region of the West because of the abundance of water and land suited to irrigation development."

CONSTRUCTION BRIEFS



Welded rail foundation piles used for Pueblo building

A NEW type foundation pile made from three steel rail sections welded along their base edges saved time and money on the construction of the Pueblo Savings & Trust Building in Pueblo, Colo. Fabricated by the Houston Division of L. B. Foster Co., the pile drove easily through tough soil filled with boulders, and permitted the contractor to get in and out in only four days.

Original foundation design called for caissons. But Hutcheson Construction Co. of Englewood, Colo., convinced the owner, architect and general contractor that Foster rail piles would produce a faster, less expensive job. Hutcheson offered the rail pile because: (1) its rigidity would enable it to punch through the tough soil better than conventional piles, (2) it would produce a foundation for at least $10,000 less and about two months earlier than caissons, and (3) it would be available immediately.

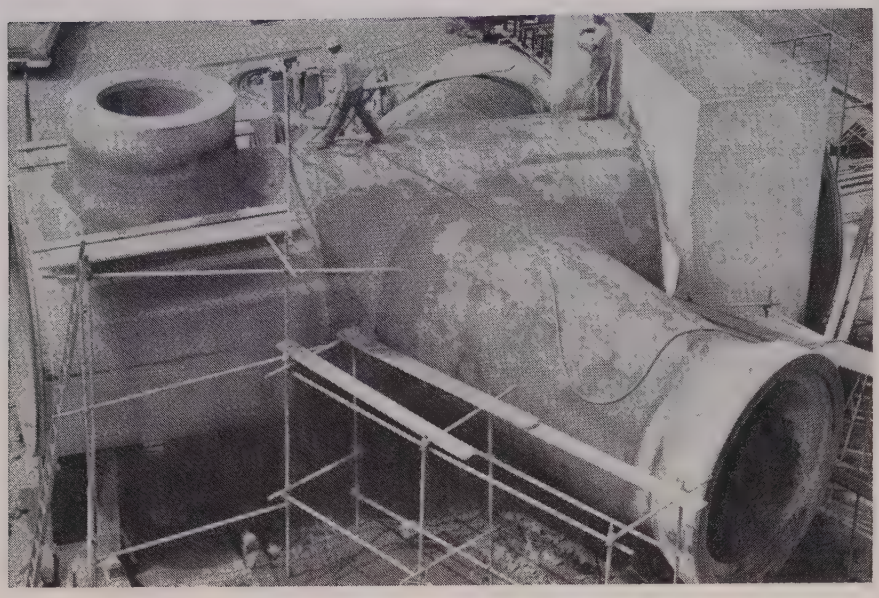
Hutcheson got the job and moved in as soon as the general contractor, Whitlock Construction Co., Pueblo, had excavated the top 14 ft. of the site. The contractor drove the rail piles with a Link-Belt 12K diesel hammer riding in 62-ft. long leads hung from a Manitowoc 2000 crane. A conventional follower block was used between hammer and pile, with the addition of a short shaft welded to the block which projected into the core of the rail pile to keep the block centered.

Driven through boulders

Piles were driven an average of about 22 ft. through the bouldered site to refusal in hard blue shale. Hutcheson recorded 20 to 25 blows per inch at refusal, and there was no damage to the pile. Most of the 83 piles required on the job ranged from 20 to 32 ft. long and weighed 52 lb. per ft. Heavier sections up to 90 lb. foot were driven in areas where the highest pile capacities were required.

Developed by L. B. Foster Co., the rail pile in cross section is a hollow equilateral triangle with rail heads extending outward 120 deg. This design takes advantage of the high tensile, yield and compressive strengths of rail steel. The shape gives the piles a general symmetrical section so that its section modulus is approximately the same around any axis. Heaviest concentration of metal in the pile is at the rail heads, which are the flanges of the section.

THREE RAILS welded together along base flanges form foundation piles for Pueblo building.



300-ton concrete pipe "Y" built for ocean outfall

THE largest concrete pipeline wye structure ever installed in an ocean was recently placed in position 5 mi. at sea, nearly 200 ft. below the surface, at El Segundo, Calif. This wye section is part of the ocean outfall which starts at the Hyperion Treatment Plant (*Western Construction*—May 1959, p. 63-76) and marks the end of the 27,504 ft. of 144-in. reinforced concrete pressure pipe. Each leg of the two 3,936-ft. diffusers starts with 102-in. pipe, reducing to 72-in. pipe farther out, and has ports or openings spaced at 48-ft. intervals.

The wye was manufactured by United Concrete Pipe Corp. at its Long Beach plant where the balance of the concrete pipeline was manufactured. It measures 41 ft. through the 144-in. pipe axis, 45 ft. across the legs and 15 ft. high. It is basically mortar lined and coated steel plate, the coating reinforced with heavy rod cages and the lining with wire mesh. United welded precast concrete bell ends to the legs and spigot ends to the barrel. The balance of the wye was gunited inside and out except for a vertical bulkhead structure which was poured in forms. The continuation of the 144-in. line runs straight through the wye to permit passage of a cleaning device. The terminal opening eventually will be closed with a heavily reinforced concrete bulkhead which will slide in through a slot from above. The bare gunited wye weighed 300 tons.

A 25-ton, box-like, steel caisson with openings for the wye branches was assembled around the wye on the launching platform at United's Long Beach plant. When the assembly was completed, the launching platform was submerged with the wye, and one of the pontoons used to tow the regular pipe was floated into position over the wye. Then pontoon, wye, and platform were raised out of the water. The wye was tied to the pontoon at one end and one 90-ton section of 144-in. pipe was tied to the other end to serve as a balancing block under the pontoon on the platform and as ballast when the tow was made out to the "George F. Ferris," the 4-legged laying barge.

The laying operation was accomplished by lowering the wye by means of winches. The wye assembly was rested on a 4-ft. thick bed of crushed rock and the caisson was filled with rock into which packcrete concrete was pumped from above to tie the assembly together into one massive structure of well over 500 tons.

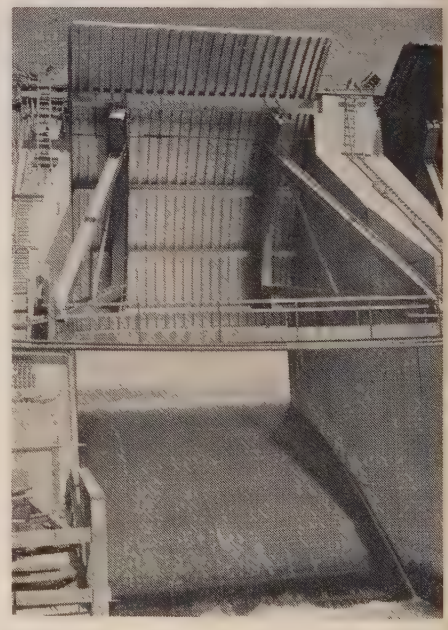
After a cleaning device is run through the 144-in. portion of the outfall, the concrete bulkhead will be inserted to close off the open end beyond the legs of the wye.

The Hyperion outfall was designed for the Los Angeles Board of Public Works by Hyperion Engineers, a joint venture of Daniel, Mann, Johnson & Mendenhall; Holmes & Narver, Inc.; and Koebig & Koebig. United Concrete Pipe Corporation is manufacturing the pipe. Hyperion Constructors, a joint venture of DeLong Corp.; Healy Tibbitts Construction Co.; Macco Corp.; Peter Kiewit Sons' Co.; Raymond International (sponsor); and Tavares Construction Co., is installing the line.

Spillway gates installed in record time

TWENTY-TWO spillway gates at Priest Rapids Dam near Yakima, Wash., incorporating design innovations which made them lighter and simpler than conventional gates, were assembled at the dam site and installed at the record rate of three a week.

Each gate has a skin section 40 ft. wide and 50 ft. high formed to a 50-ft. radius with trunnions anchored to the spillway piers 50 ft. downstream. Each gate can be raised 46 ft. in a circular arc by rotating on its trunnions without its edge deviating more than ¼ in. from the vertical, thus assuring a watertight seal.



Gates were engineered and fabricated by Yuba Manufacturing Division, Benicia, Calif., using fabricated plate girder construction in place of conventional rolled steel beams for the arms and vertical girders. This resulted in a lighter (90 tons) and simpler gate with only two arm struts. Each arm incorporated a curved plate girder to which the gate was fastened.

Erection crews assembled the vertical girder, arm and trunnion on the ground, and installed this assembly in one piece.

INFLATABLE rubber and fabric hose-like form, core of new continuous pipe casting process developed by Phoenix man, used to form irrigation pipe.

PIPE CASTING machine works along trench, placing concrete at 8 to 10 Ft. per min. Machine picks up form to place invert.

Long "balloon" forms core for cast-in-place pipe system

A LONG "BALLOON" made of blimp fabric acts as the inside form of a novel cast-in-place concrete pipe process developed by R. Fuller of Phoenix, Ariz.

The inner form laid in the curved bottom of a pipe trench is fitted with air-tight bulkheads and inflated to 3 psi. It is "surrounded" by a pipe forming machine which moves along the ditch, placing concrete pipe at 8 to 12 ft. per min.

The tube can be collapsed about 2 hours later and snaked out with a nylon rope attached to a motor grader straddling the trench.

Using two 300-ft. inflated forms, Fuller can pour as much as 600 ft. of concrete in one continuous operation. It is possible to line up forms for runs in miles.

Used for irrigation

Currently used to build conduits for irrigation water, the new process is being adapted to build storm sewers and other types of concrete pipe.

In operation, the inner form is picked up by the double-hoppered forming machine so that electrically-driven tampers can place the invert while the other half of the machine is forming the top section of the pipe.

The hose-like inflatable form is constructed of two plies of cotton fabric coated with neoprene rubber. Developed by Goodyear engineers from blimp-type materials, it is manufactured in Goodyear's Phoenix plant. (Goodyear has long made inflatable concrete forms for producing orifices in concrete, for building igloo-like grain storage structures, and even for forming residential structures in some parts of the world.)

Fuller, inventor of the patented process, started working on inflatable form machines about 9 years ago at his ranch near Phoenix. When the present machine was evolved, he formed Fullerton Continuous Pipe Corp. to market continuous pipe machines, Inflataforms and accessory equipment.

COLLAPSED form is pulled out of pipe with nylon rope and motor patrol 2 hr. after placing.

Development of the cast-in-place system progressed through about 20 experimental machines, which were extensively tested at Fuller's ranch. Pipe was laid, then broken out to check the results for uniformity and strength.

Met USBR specs

Finally, Arizona Testing Laboratories found the system and the finished products would meet Bureau of Reclamation standards for Arizona. The concrete conduit exceeded bureau weight-test requirements by 4 tons, and compression strength by 520 psi.

The company has developed forms in lengths of 50 to 300 ft., and has produced pipe diameters of 12 to 48 in. Fuller is now working on a form to produce 60-in. pipe.

Although the first commercial installations have been limited to irrigation pipe, Fuller is convinced the new process is not limited to this field. He currently is working with the City of Phoenix on plans to install storm sewers with the balloon system, and plans to enter the sanitary sewer and other concrete pipe fields.

MASTER MECHANIC

SPEAKERS and officers at the recent Bay Area EMSA meeting. From left, speakers Stan Mostardi, International Harvester, Oakland; L. L. Scott, Bay Cities Equipment Co., Oakland; officers 1st Vice-president Gino Giampaoli, Piombo Construction Co., San Carlos; President Howard Gold, Buran Equipment Co., Santa Clara; 2nd Vice-president O. R. Thomson, Stolte Inc., San Leandro; Secretary Bill Sorensen, Bassco Drayage, Berkeley; and Treasurer Bill Holloway, McGuire & Hester Construction Co., Oakland.

Service manager reviews high cost of negligence

THE HIGH COST of negligence on the part of owners and operators of modern heavy construction equipment was reviewed by L. L. Scott, service manager of Bay Cities Equipment, Inc., Oakland, at the February meeting of the Bay Area Chapter of Equipment Maintenance Supervisors Association.

Scott cited one case where the alignment guide had broken off a tractor and had gone unnoticed until the entire track assembly failed. "The alignment guide is a big part," Scott said. "You can't hold it in one hand. It is mounted in plain view, and you would think some one would have noticed that it was missing."

Today's construction equipment is big, efficient, complicated, and expensive, he noted. It requires regular servicing, precise maintenance, and often minor adjustments. He emphasized that these service functions must be performed correctly and on time.

Among the costly service omissions he listed:

Failure to change oil on time, use of wrong type and size of filter.

Failure to service air cleaner. He observed that the engine on a crusher plant had been fitted with a dry-type cleaner with an indicator to show when the unit was beginning to plug up. "Every time I went out to inspect that engine, the air cleaner flag was sticking up. We put everything on it but a whistle, and it still didn't do any good."

Neglect of turbocharger. Carbon should be removed from turbocharger regularly. It's a simple job, but if it isn't done, the whole unit will fail.

Roller maintenance. Even sealed track rollers can sometimes leak and go out. They should be inspected regularly and leakers replaced.

Cutting edges allowed to wear away. Nearly all cutting edge units are reversible, and should be changed frequently. Scott noted that he had seen scrapers with cutting edges completely worn through, and the leading edge of the apron worn down.

Crawler tracks worn beyond hope of rebuilding. This ultimately costs the contractor $3,000 for a set of new tracks which could have been avoided if he rebuilt the old ones before they passed the point of no return. Scott recommended that tractor fleet owners keep a set of spare tracks so that machines can be kept in service while worn tracks are being rebuilt.

The service manager contended that components of today's machines are too expensive to neglect: torque converters at $5,000; transmissions at $8,000; tires at $5,000 and up. Even bearings, he said, cost up to $150 each.

He emphasized that service must be performed on time. "Push a machine 100 hours beyond its over-

"Our OC-46 turns on a dime... and gives 9¢ change"

Work-test an Oliver OC-46 loader...see how "Spot-Turn" steering eases all your work!

This Oliver OC-46 works and ranges over hundreds of acres—moving, grading, loading thousands of yards. It's one of six Oliver tractors owned by Baldwin Construction Company, Bloomfield, New Jersey.

Operator Nicholas Psiahas reports on its easy handling and maneuverability: "'Spot-Turn' steering is terrific—the OC-46 is so comfortable to operate. Controls are simple. Our OC-46 turns on a dime...and gives 9¢ change."

Simple operation with low-effort steering is just the start of the OC-46's benefits. This compact, easily transported, 5/8-yd. crawler loader is official champion of its class in *pounds-pull*—meaning greater *work power*. It has the shortest turn radius. A factory-built, *integrated* tractor-loader, the OC-46 has low-profile design with shorter pedestals for greater stability and work safety.

Get all the facts on the OC-46 loader. Choice of 30-plus h.p. gasoline or diesel engine.

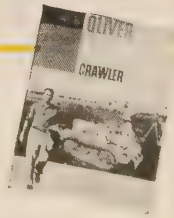
LOOK TO OLIVER FOR YOUR BEST BUY IN WHEEL AND CRAWLER TRACTORS

THE OLIVER CORPORATION

Dept. 2232, 400 W. Madison St., Chicago 6, Illinois

Most versatile, all-job crawler you can own Double the work scope of your OC-46. Add the quick-hitch (only three minutes) Oliver backhoe and handle trenching, excavating and loading jobs of all kinds. Fully hydraulic operation with deep 12'8" digging and high 9'6" loading. Full 180° boom swing. A perfect low-cost digging-loading package for towns, parks, contractors, etc.

Jobs, jobs, jobs—See how valuable the OC-46 can be in your operations. Review its many important features and job advantages in this big, 16-page catalog.



for more details, write No. 65 on Reader Service Postcard

haul date, and minor adjustments become major replacements," he said.

Discussing ways to reduce maintenance costs, he recommended that operators and mechanics cooperate more closely in reporting and repairing minor malfunctions.

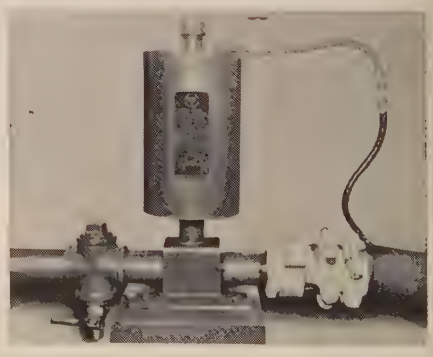
Owners should take advantage of warranty provisions by having maintenance crew instructed in service of new machine; and reporting promptly any difficulties, no matter how small. Scott also noted he asks his customers to notify him before close of warranty period so he can give the machine a final check and field service.

Program of the monthly dinner meeting concluded with a slide talk on operation of the planetary steering system of the International TD-24 and TD-25 tractors presented by Stan Mostardi, International Harvester Co. service representative, of Oakland.

About 30 members attended the meeting. Officers of the Bay Area Chapter are: President, Howard Gold, Buran Equipment Co., Santa Clara; first vice-president, Gino Giampaoli, Piombo Construction Co., San Carlos; second vice-president, O. R. Thomson, Stolte, Inc., San Leandro; secretary, Bill Sorensen, Bassco Drayage, Berkeley; and treasurer, Bill Holloway, McGuire & Hester Construction Co., Oakland.

Tube inside steam hose carries pile-hammer lube

McKiernan-Terry Corp. has developed a pile hammer lubrication method known as the Dualtube System which offers better pile hammer lubrication, plus increased pile

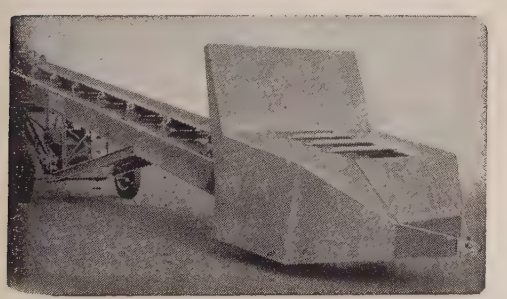


driver hose life. Lubricating oil never contacts the lining of the steam hose but is carried to the hammer through a separate oil tube in the hose and is force-fed by a positive displacement lubricator equipped with a low oil warning whistle. . . . *Write No. 154*

How to Slash Costs of Gravel Loading and Screening

Loading sand and gravel is easy for the City of Yankton, S. D., with their new Model 202 Kolman Junior conveyor-screen plant. 40 feet long and with a 24" belt, equipped with a Kolman SB-60 vibrating screen, 6' x 36".

Complete plant is compact unit for big production, convenience of operation, ease of transportation. Rugged enough to carry a loading trap and large vibrating screen without additional support.



Sturdy design permits installation of loading trap on tail section, portable without disassembly.

Single-deck vibrating screen folds into towing position for transportation without dismounting screen or removing any of the drive assembly.

City Saves with KOLMAN 'Junior' Conveyor

Low cost materials handling was the object when the City of Yankton, South Dakota, set out to locate a loading and screening plant. They discovered, as have many city highway departments, contractors and gravel plant operators, that the KOLMAN 'Junior' portable conveyor-screen plant is the ideal solution.

"Box Type" Construction

The rugged "box-type" construction of the Junior gives you unusual strength and rigidity for an amazing low price. The sides are of fabricated 3/16" steel plates with 2" legs. A steel belt cover completely covers the top, giving additional rigidity and completely encasing the return belt to prevent material from working in to cause belt damage.

The under-slung power unit provides easy access for servicing and operation from the ground. This is an ideal feature for the operator who has to stop and start his plant frequently during the day. The V-belt drive assembly assures positive and efficient transmission of power and the motor mount design provides quick and easy adjustments to maintain proper belt tension through a turnbuckle arrangement.

The Junior is available with the Head Pulley Clutch which stops and starts the belt while the screen remains in operation, thus greatly increasing screening efficiency.

TAKES TOUGH PUNISHMENT

The KOLMAN 'Junior', or Model 202, will take the kind of punishment that is dished out to a portable outfit and will cost you far less money to own and operate. Available in 18" and 24" belt widths, in lengths up to 50".

SEND this coupon for FREE literature

KOLMAN Manufacturing Co.

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

Send literature on following:

- ☐ 101 Heavy Conveyor
- ☐ Vibrating Screens
- ☐ 202 Junior Conveyor
- ☐ Traps ☐ Feeders
- ☐ 303 60" Loader

Please quote.....size or.....capacity

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OAKLAND—Spears-Wells Machinery Co.

COLORADO
DENVER—Faris-Moritz Equipment Co.

IDAHO
BOISE, POCATELLO — Intermountain Equip. Co.

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

NEVADA
LAS VEGAS—Clark County Wholesale Mercantile Co.

OREGON
PORTLAND—Balzer Machinery Co.

UTAH
SALT LAKE—Rasmussen Equipment & Supply Co.

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

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

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

Versatile arc welder for maintenance shops

PLACING the convenience of immediate arc welding repair in every maintenance area is the purpose of the new design 180-amp. welder announced by The Lincoln Electric Company, Cleveland, Ohio. The company states that the cost of the new welder makes it practical to do on-the-spot welding and eliminate the wasted travel and waiting time of outside repair.

Designed with the "occasional" welder in mind, the dial type control of the new Lincoln 180-amp. arc welder provides easy positive setting of the welder output over a wide amperage range. Electrodes from the smallest to 3/16-inch size can be used to weld materials from 20 gauge to ½ inch or thicker plate. The new design has unusually stable arc characteristics and will weld mild steel, low alloy steel, and 18-8 type stainless steel. Operation on 220-volt single phase power supply combined with compact, light-weight construction permits easy movement of the welder to the job when necessary. Price is about $145.

Two EMSA chapters tour Kaiser Fontana steel mill

The January meeting of the founding (Los Angeles) chapter of EMSA was a joint venture with the growing San Diego chapter. One hundred fifteen members and guests of the two chapters gathered at Kaiser Steel's Fontana plant for a tour of the West's largest steel mill.

Officers of the two groups got together during dinner to discuss EMSA activities. In the absence of

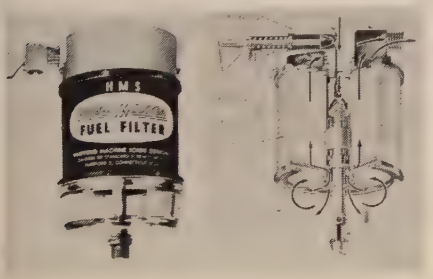
OFFICERS of the Los Angeles and San Diego chapters took advantage of this opportunity to discuss EMSA activities. Shown, from left, are: Los Angeles Secretary, Jim Miller, Shepherd Machinery Co.; Los Angeles Vice-president, Bob Moodie, J. A. Thompson & Son; San Diego Secretary, Kenny Reinert, California Electric Works; San Diego President, Fred Cody, Griffith Co.

L. A. Chapter President Sam Weatherbie, Vice-president Bob Moodie, J. A. Thompson & Son, and Secretary Jim Miller, Shepherd Machinery, presented first production models of the EMSA emblem.

The 4 in. diamond-shaped decal of aluminum foil bears a blue imprint of EMSA in the center and a red border outlining the words Equipment Maintenance Supervisors Association. Available to members for 25¢ each, the decal is designed for use on windshields, door panels and equipment. Los Angeles officers add that cuts suitable for letterhead use will be available in the near future.

New fuel filter includes water trap

A NEW combination diesel fuel filter assembly, announced by Hartford Machine Screw Co., incorporates the features of the standard Roosa paper filter with those of a water trap. Under the filter element there is a glass sediment bowl which enables the operator to see if water is in the fuel. A drain providing for release of accumulated water is located at the bottom of



the sediment bowl and an air bleed is provided at the top of the filter, in the filter body itself.

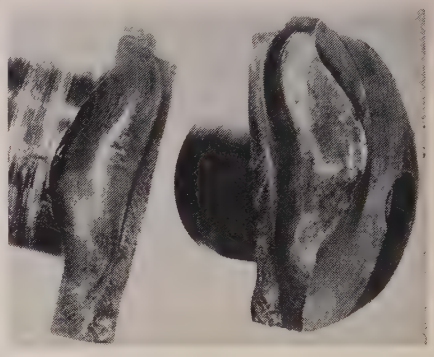
The filter element is the same as used in the standard Roosa Master Fuel Filter. A unique, spiral paper construction of paper strips cemented at top and bottom to form a series of continuous V-shaped coils wound around a cylindrical core is contained in an air-tight metal canister.

. . . Write No. 156

Here's why crankshafts fail

WHEN A MAJOR mechanical failure occurs to an engine, it is a natural reaction for the owner to blame the manufacturer.

Although engine builders often recompense owners for engine damage resulting from crankshafts and other engine components that fail because of "defects in materials or workmanship," facts accumulated over the years prove that the odds are heavily in favor of crankshaft failures being caused by some external force or condition.



IMPROPER shimming of thrust bearing caused crankshaft to break, and cracked cylinder block.

Crankshafts and bearings are not designed to withstand the extreme stresses that can be exerted on them when various type of power take-offs are misaligned, improperly positioned endwise or so designed that they can exert abnormal forces on the crankshaft.

Alignment of air clutches is critical. The higher the air pressure in the boot, the closer the alignment must be to keep the side loads within safe limts. Misaligned air clutches can cause failure to any member to which they are fastened, be it a diesel engine, a torque converter, compound, pump or some other attachment.

Various physical and metallurgical analyses can be employed to determine if a particular crankshaft failure was caused by manufacturing defects. The type of failure also tells a lot about the cause and gives clues helpful to correcting the problem and preventing recurring failures.

Typical failures:

1. Side loads on the crankshaft can break down the oil film in the bearing, causing seizure. High end loads on the crankshaft not only can score the thrust surfaces of the

bearings, but can generate enough heat to reduce the bearing clearance to the point of seizure. Continued running will usually result in a jagged, complete crankshaft fracture near the fillet.

2. High bending type loads, usually from misalignment of

HIGH bending loads result in a break that starts in the fillet and progresses through the web.

driven machinery, can start a crack in the fillet at the main bearing journal which progresses through the web to the adjacent rod bearing journal.

3. Torsional vibration normally fractures a crankshaft at a 45-degree angle. The wide use of tor-

TORSIONAL vibration fracture characterized by a break at a 45-deg. angle, usually toward rear of engine.

sional vibration dampers keeps this type of failure to a minimum. However, the damper can become overloaded because of added driven equipment or the damper can become damaged. Overspeeding may introduce additional torsional vibrations that can be damaging.

Modern, heavy-duty diesel crankshafts and bearings are not usually manufactured with defects. Failures are usually the result of external forces created by conditions beyond the control of the manufacturer. Physical and metallurgical tests can show whether or not the engine builder is at fault.

NEW LITERATURE

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

Pneumatic roller

Information and specifications on the Galion 12-ton, 9-wheel pneumatic tire roller are contained in a new buletin issued by the **Galion Iron Wks. & Mfg. Co.** Featured is the exclusive Equa-Matic articulated front-end construction in which the 5 front-end wheels are mounted on 3 separate struts permitting the wheels to conform to uneven ground while delivering balanced compactive effort. This mounting system also permits a shorter turning radius. Numerous other construction details are provided. *. . . Write No. 157*

Scaffolding setups

A variety of scaffolding setups ranging from simple mobile platforms to multi-story exterior framing are included in an 8-page booklet issued by **Superior Scaffold Co.** The publication includes a catalogue of the various sizes and shapes of tubular steel frame braces and accessories manufactured by the company. *. . . Write No. 158*

Raincoat styles

Latest styles in raincoats and suits, hats and other items of protective clothing are illustrated in a brochure issued by **Mine Safety Appliances Co.** Basic materials offered are heavy weight neoprene latex for rugged use and medium weight neoprene latex where climate and other factors demand lighter clothing. Special features of the apparel include a smooth finish coating, nylon buttons and suspender clasps, and permanent stencilling for identification. Booklet covers acid resistance materials and special protective items.

. . . Write No. 159

Vibrators listed

The complete line of Wyco concrete vibrator grinders and accessories is contained in a 6-page illustrated catalogue issued by **Wyzenbeek & Staff, Inc.** New items are shown for concrete finishing, form cleaning, screeding, core drilling and tuck pointing. . . . *Write No. 160*

Concrete saw brochure

A 4-page folder describing uses for concrete saws has been issued by **Eveready BrikSaw Co.** The colorful circular describes features, specifications, and suggested horsepower models for various construction applications. *. . . Write No. 161*

Crusher bulletin

Smith Engineering Wks. has issued a new booklet describing its Telsmith gyrasphere secondary crushers. These units are designed especially for course and fine crushing and are made in sizes of 24 in., 36 in., and 48 in. as well as a new 66-in. size. *. . . Write No. 162*

Rear-dump trailer

Easton Car & Construction Co. has issued a new bulletin describing its TS-2635 rear-dump trailer built for use in combination with Euclid 30 LOT single axle trailer. The variable wheel base trailer has a capacity of 35 tons and raises to a 58-deg. dumping angle. The wheel base in haul position is 20 ft. which shortens to 13 ft. 6 in. during dumping. Brochure encloses description of trailer components, list of dimensions and performance chart.

. . . Write No. 163

Structural welding

The first half of a 2-part bulletin on data for designing continuous framing using cover plates has been issued by the **Lincoln Electric Co.** The 6-page technical bulletin and its companion piece to be issued later presents a series of 36 charts for determining the stiffness factors, carry-over factors, and moment for beams in which there are abrupt changes in the moment of inertia occurring when cover places are welded to the flanges of an I-beam over part of its length. *. . . Write No. 164*

Winch catalogue

The Thern line of light-duty hand and power winches is described in a 6-page catalogue insert issued by **Thern Machine Co.** Both spur gear and worm gear models are included and capacities range up to 5,000 lb.

. . . Write No. 165

Concrete forming book

"Universal Concrete Forming News," a 16-page booklet released by **Universal Form Clamp Co.,** contains items of interest to contractors and engineers engaged in concrete forming. Booklet is illustrated with numerous on-the-job photos and contains pictures and descriptions of the company's line of prefabricated form components and accessories. *. . . Write No. 166*

Form catalogue

Detailed descriptions of all Symons steel-framed plywood forms are contained in a new 16-page catalogue issued by **Symons Clamp & Mfg. Co.** The panels are available in sizes from 3 to 8 ft. as well as accessories such as fillers, corners, stoop forms, pilasters and ties. The 2-color catalogue shows numerous applications of the forms and describes the basic Symons system for forming. *. . . Write No 167*

Dragscraper and cableway

Dragline handling of ores, sand and gravel, chemicals and other bulk materials is covered in a new 16-page brochure by **Sauerman Bros., Inc.** Four pictorial sections show dragscraper and cableway applications for excavating and hauling; storage and reclamation; engineering and construction; and the marine field. *. . . Write No. 168*

Steel decks in construction

The newest catalog released by the **Building Products Division of The R. C. Mahon Co.** includes details on a 24-in. steel-roof deck section that speeds roof installation work some 50%. The publication, No. D-60, illustrates cross-sections of the firm's complete line of deck plate as well as design features, and provides engineering data useful to architects and building contractors. Its 16 pages contain useful information for users considering steel deck plates for sidewalls, partitions, concrete floor forms and reinforcing. *. . . Write No. 169*

Welding wire guide

A revised edition of the Aircomatic Welding Wire Pocket Guide has been published by **Air Reduction Pacific Co.** The 84-page booklet contains information on Airco's line of gas shielded metal arc welding wires and provides data on

ONE CRAWL-IR replaces two churn drills

The CRAWL-IR shown above, powered by a 600-cfm Gyro-Flo compressor, not only replaced *two* churn-type drills but speeded blast-hole drilling at the same time. This power-packed combination keeps ahead of an aggregate mill that handles 2500 tons per 8-hour shift. Using 3″ Carset bits, holes are drilled about 35 ft. deep on a 10 by 12 ft. pattern. The CRAWL-IR practically eliminates setup time, as all tower positioning is hydraulically controlled.

The Gyro-Flo rotary compressor is the CRAWL-IR's ideal running mate — smaller, lighter, smoother running, with outstanding dependability and freedom from maintenance. Air temperature stays under 200°F, oil consumption is low and pressure is automatically regulated within close limits at all loads from 0 to 100% capacity.

For rock-bottom drilling costs, ask your Ingersoll-Rand distributor or engineer for complete information on CRAWL-IR drills and Gyro-Flo compressors.

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. . . for more details, write No. 72 on Reader Service Postcard

steel, aluminum, copper and copper base, stainless steel, medium and special welding wires used with Air Reduction's Aircomatic welding process. The guide contains technical information on chemical composition, chemical properties and operating procedures as well as wire diameters and packaging data. . . . *Write No. 170*

Earthmover bulletin

Complete description of the new International Model 295 Payscraper is provided in a 24-page bulletin released by **International Harvester Co.** Included are numerous pictures and drawings of the 34-yd. capacity overslung unit and its components. Features include an International DT-817 turbocharged engine, rated at 375 hp, advanced lift frame construction, exclusive tapered bowl design, and 131-in. cutting width.

. . . *Write No. 171*

Welded dragline buckets

A 4-page brochure listing data on its complete line of dragline buckets including the new light weight models has been issued by **M. P. McCaffrey, Inc.** A number of comparative photos show the buckets in field operations. The brochure also provides detailed specification charts. . . . *Write No. 172*

Metal forms

Data on metal panel forms, highway headers, curb and gutter forms and numerous special ring forms are provided in a 20-page, 2-color catalogue issued by **Metal Forms Corp.** The panel forms can be easily assembled to form virtually any type of wall. Standard accessories are available to form offsets, bays, pilasters, and columns.

. . . *Write No. 173*

Framing member manual

Construction details covering the use of open web structural steel framing members are given in a new 28-page manual published by **Macomber, Inc.** The booklet gives design information on new Allspan floor and roof members and gives complete dimensions and properties of the entire line available for spans up to 120 ft. The booklet contains comprehensive tables of dimensions, properties and allowable loads and provides instructions for determining the correct size required for combined uniform and concentrated loads.

. . . *Write No. 174*

Asphalt calculator

An easy to read slide rule device for calculating asphalt quantities on paving and road widening jobs is offered by **Barber-Greene Co.** The calculator permits its user to figure the area or tonnage of asphalt mix needed to pave any road of known length, width, and thickness of mat. Another scale allows immediate computation of the tons of stone, or yards or earth involved in any road widening operation where the necessary dimensions are known.

. . . Write No. 175

Motor grader line

The seven motor grader models ranging from 60 to 190 hp. which make up the **LeTourneau-Westinghouse** motor grader line are described in a new 16-page catalogue. Photographs and diagrams illustrate the operation and design features of the line. Two models offer full torque converter transmissions. The other graders have transmissions with 8 forward speeds, 4 reverse and 3 optional creeper speeds.

. . . Write No. 176

Bituminous mixing plants

Self-erecting features and fully automatic controls of the Cedarrapids line of batch type bituminous mixing plants are described in a 24-page catalogue issued recently by the **Iowa Mfg. Co.** Three plants, the G40A, G50A and G60A with batch capacity up to 7,500 lb. are covered in the publication. Among the G-Series features listed are the inclined hot elevator, horizontal vibrating screen, scientifically sloped bin dividers, and dust scavenger systems.

. . . Write No. 177

Bearing load tables

A 4-page brochure including a chart of load ratings for pillow blocks for various diameters has been issued by **Browning Manufacturing Co.** Chart lists bore size, minimum life expectancy and loads at various rpm. for bearing assemblies ranging from 1 3/16-in. to 4-in. bores. Also included are drawings and specifications for Browning tapered roller bearing pillow blocks. A comparison chart is given. Among the features of the pillow block described are unbreakable malleable housings, Timken roller bearings, eccentric locking collar, labyrinth seals, elongated bolt holes and complete assembly.

. . . Write No. 178

Mixer weight charts

Weight distribution charts have been developed by **Transit Mixer Division, Hercules Galion Products, Inc.,** to help buyers determine the payload capabilities of any given mixer-truck combination. The charts show weight distribution of the 5-, 6- and 7-cu. yd. Hercules Galion Separatengine mixers with right-hand side mounted engine, and of the Mixomatic F.E.P.T.O. mixers in combination with tandem-truck chassis of various types. Hercules Galion 4-cu. yd. mixers in combination with single axle truck chassis are listed. Weight charts for special installations are furnished upon request.

. . . Write No. 179

Idler unit brochure

Several types of troughing and return idlers as well as installation photographs are included in a folder issued by **Barber-Greene.** Pictured are standard troughing idlers, rubber impact idlers, belt training attachments, deep trough assemblies and several types of return idlers. Construction details of normal and heavy-duty idlers also are listed. *. . . Write No. 180*

How to hoist a locomotive

A remarkable photo of two carrier cranes lifting a narrow-gage locomotive off a flat car is included in the new 36-page catalog offered by **Miller Swivel Products, Inc.** Cranes are equipped with Miller high lift blocks, one of the many items listed in the 1960 catalog which covers the entire Miller line. Included are basic swivel barrels of 21 different types with and without hooks, ranging in capacity from ½ to 250 tons. Each unit is accompanied by a table giving complete dimensions, rope sizes, work load and weight. Two new headache ball assemblies are introduced, providing a selection of more than 40 sizes and weights. Other units listed are high lift block and swivel assemblies, insulator hooks, automatic tagline and magnet control reels, sheaves and pulleys. Complete specifications are provided in chart form on each product. The book also lists mobile hydraulic service towers, wire harness and swivels for utility work.

. . . Write No. 181

Case W-10 Terraload'r

Features and performance capabilities of the W-10 Terraload'r are offered in **J. I. Case Co.'s** 16 page catalog. Both operation and construction of the 6,500 lb. capacity rubber-tired tractor shovel are described in this illustrated booklet. The 4-wheel drive, rear-wheel steer unit features full-power shift and torque converter drive. A choice of SAE rated buckets from 1¼ to 2⅞ cu. yd. is offered, plus a number of interchangeable working tools including brush stackers, dozer blade, snow plows and material handling forks. *. . . Write No. 182*

Industrial fasteners

Bethlehem Steel Co. has released a publication titled "Industrial Fasteners" which shows list prices, packing quantities and weights for all Bethlehem standard fasteners, packaged or in bulk. These include

machine bolts, hexagon head cap screws, carriage bolts, lag bolts, plow bolts and nuts, as well as hot-galvanized and zinc-plated bolts and nuts. *. . . Write No. 183*

On-the-job bulletins

A new brochure from **Eimco Corp.** outlines the use of the 105 excavator on three recent major jobs around the United States. Bulletin L-1091 gives facts and figures on the Glen Canyon Dam tunnels, the Fort Pitt tunnels in Pittsburgh, and the Mammoth Pool Diversion Tunnel.

Bulletin L-1092 contains facts and specifications on Eimco's 126 front-end loader. This crawler unit has a 205-hp. diesel engine with "Unidrive" transmission, single stage torque converter, and dual final drives. The brochure illustrates the spin-turn ability of the machine and lists the features, loading cycle speed and full English and Metric specifications of this unit which has a maximum breakout force of 40,000 lb.

. . . Write No. 184

Cat DW20-21 Series G tractors

Two 8-page booklets on the 345-hp. **Caterpillar** DW20 and DW21 Series G tractors give a step by step explanation of how the new SynchroTouch Transmission Control operates. Schematic drawings illustrate the sequence of events involved in shifting by dialing the desired gear. Maximum rimpull of 39,565 lb. for the DW20 and 49,250 lb. for the DW21, are combined with the SynchroTouch Transmission Control to produce increased travel speeds 10 to 20% greater over similar haul road conditions.

The DW20 Series G tractor is mated with either the 456 or 482 Series B scraper; the DW21 is mated with the 470 Series B scraper. Both tractors can also be mated with four models of Athey trailers, giving them increased versatility. *. . . Write No. 185*

Monotube pile catalog

Complete descriptive information is given in **Union Metal's** comprehensive 24-page catalog covering Monotube fluted steel foundation piles. Typical installation photos, test driving data, and other technical information of particular interest to engineers, contractors, and architects are included in the new catalog. Excerpts from recently enacted building codes applicable to Monotube Piles.

. . . Write No. 186

1960 Ephemeris charts stars

Now available to practicing surveyors and engineers is the 1960 Gurley Ephemeris with charts showing Northern, Southern and Equatorial Stars for the first time. These are keyed to tables in the Ephemeris.

Included in the 92-page booklet are bound-in charts for simplifying the computation of Polaris. It gives complete instructions for determining azimuths by methods similar to those used in observations of the sun and Polaris. **W. & L. E. Gurley's** booklet also contains charts for the sun and Polaris, as well as definitions of astronomical terms.

. . . Write No. 187

Allis-Chalmers bulletin

Bulletin 1092 from **Allis-Chalmers Construction Machinery Division** pictorially reviews the 7,000 lb. capacity rubber tired TL-16 Tractoloader. The company's 9,000-lb. Tractoloader is described in Bulletin 1093. Specifications are included in both. Catalog MS-1133 covers the HD-11G tractor shovel. Illustrations are used to graphically illustrate its engineering, design, and construction features, its work potentials and capabilities. Photographs of the Deerfield Works and its line of Tractoloaders plus the attachments produced at the works for the crawler tractor line are shown and detailed specifications given.

. . . Write No. 188

Highway bridge competition

Fifteen winning designs in a recent $44,000 steel highway bridge design competition are covered in **U. S. Steel Corp.'s** 38 page-booklet on new ways to use higher strength-to-weight ratios of modern structural steels in bridge design. The booklet illustrates structural details of the prize-winning entries, discusses their noteworthy features, and gives background information on the designers. *. . . Write No. 189*

Velvetouch Feramic replacement parts

The **S. K. Wellman Co.** presents a complete reference manual of Velvetouch and Velvetouch Feramic replacement clutch plates, clutch facings, brake linings and matched facing sets for tractors, construction and mining equipment, and industrial material handling machinery. Various makes of machinery are listed in alphabetical order. These are classified according to serial number, original clutch make, clutch dimensions, drilling, quantity and type of rivets required. . . . *Write No. 190*

Safety swinging scaffold

An 8-page bulletin from **Patent Scaffolding Co.** tells how "Junior" scaffolds meet many of today's needs in new construction, building maintenance and repair, and industrial operations. Well illustrated material covers such present-day work as waterproofing buildings, bridge stone repair, concrete finishing, stone mason's monorail systems, curtain wall construction, and many other light-duty jobs.

. . . Write No. 191

Rust and corrosion catalog

A comprehensive treatise on rust and corrosion control by protective coatings has just been released by the **Rust-Oleum Corp.** Titled "New Color Horizons," this 38-page manual describes in detail various systems for treating various surfaces to resist heat, chemicals, water, etc. Included are 76 full-color application photos and 110 color chips.

. . . Write No. 192

. . . for more details, write No. 77 on Reader Service Postcard

Kohler electric plants

A 12-page folder illustrating the complete line of Kohler electric plants is available from **Kohler Co.**, manufacturers of electric plants and air-cooled engines. Kohler electric plants, for stand-by or sole supply, are available in sizes ranging from 500 watts to 100,000 watts.

. . . Write No. 193

International engine folder

"International Engines and Power Units" is the title of a revised folder issued by **International Harvester Co.'s Construction Equipment Div.** Included are 24 models, from stripped engines to complete power units. Folder CR-824-I describes ten diesel units with 4 or 6 cylinders, and 14 engines of the 4, 6, and V-8 carbureted variety. *. . . Write No. 194*

Correct wire rope

Bulletin 6025 by **MacWhyte Wire Rope Co.** tells the correct wire rope to use for your equipment. Rope used for haulage, transmission, tramway traction work, for deep oil wells, industrial cranes and derricks, hoists, dredges, winches, etc., is described in detail listing breaking strength in tons and approximate weight in pounds per foot.

. . . Write No. 195

Trojan tractor shovels

Engineering features of models 134 and 164 Trojan tractor shovels are explained in two specification bulletins from **The Yale & Towne Mfg. Co., Trojan Div.** Each of the tractor shovels has three interchangeable buckets. Model 134 has a carrying capacity of from 1 to 1 2/3 yd.; model 164 of from 1 1/3 to 2 yd. Each of the 2-page bulletins lists standard and optional equipment for these newest Trojan tractor shovels. *. . . Write No. 196*

Bay City Series 40

A 20-page catalog from **Bay City Shovels, Inc.,** illustrates and describes the ¾-yd. Bay City crawler, convertible to crane, dragline, clamshell, shovel, and hoe. As an erector's crane, the Bay City Series 40 is available as a 20-ton crawler crane, 25 and 30-ton truck-mounted cranemobile, and 25-ton self-propelled cranewagon. Detailed photos of the major parts and assemblies are shown in 55 pictures with 2-page spread of 23 job photos.

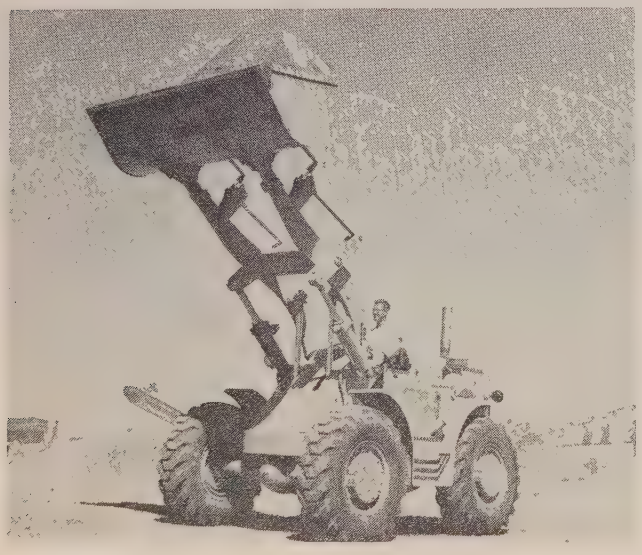
. . . Write No. 197

NEW EQUIPMENT

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

Traxcavator now becomes a wheel loader

The Cat. No. 944 Traxcavator has been announced as the first of an all-new line of wheel loaders produced by **Caterpillar Tractor Co.** The unit features many design innovations, with the most apparent departure from existing machines being the location of all lifting arms and hydraulic cylinders ahead of the operator's compartment. Caterpillar also announces that this is the first rubber tired loader which has been designed definitely to provide an answer for this safety problem. The present No. 944 model is fitted with 2-yd. bucket as standard equipment and is powered either by gasoline or diesel engine. These engines are rated at 105 net hp.



High production capacity results from the combination of power-shift transmission, a new design for the hydraulic system and high degree of stability under all conditions.

The unit results from long research and design studies combined with extensive field testing, both by the company and by contractors. Dumping reach is outstanding, totaling 31.75 in. at maximum height. Dumping height is 9 ft. 2 in. The combination of reach and height permits fast and accurate load-spotting when dumping into trucks and other vehicles. Front tires are in the farthest-position forward and establish the contact with truck bodies. No. 944 has a torque converter and power shift transmission designed to provide quick, positive response necessary for wheel loader operation. Control of the machine direction and speed is afforded by two control levers which are easily accessible. The two air-boosted foot-brake pedals are suspended from the forward wall of the operator's compartment to retain a clean deck area. The steering system is hydraulically boosted. The hydraulic system is patterned after former Caterpillar systems and is entirely closed and the fluid is full-flow filtered. Lift arms are made of solid 2-in. plate joined by a box-type cross member and visibility is provided by tapering the lift arms.

A complete line of Traxcavator attachments is available for No. 944, including a side dump bucket. Caterpillar announces the availability of other models later this spring. Model No. 922 will have a 1.25-cu. yd. standard bucket and Model No. 966 will have a 2.75-cu. yd. standard bucket. . . . ***Write No. 198***

Portable stacker reaches 150 ft.

A line of rubber tired radial stackers has recently been announced by **Kolman Manufacturing Co.**, available in sizes, 90 to 150 ft. Belt widths are from 18 to 36 in. These machines have been field tested for two years and under a wide variety of applications demonstrating satisfactory results from users.

Among the features of the new Kolman stackers are:

a cable suspension design that permits raising or lowering while stock piling is under way. This minimized the height of fall and the resulting segregation of material. Either electric or mechanical power is available providing the operator with easy control of the point of discharge at all times.

A swivel wheel feature permits adjustment so that the stacker may be moved from one location to another at the stock pile without dismantling.

. . . ***Write No. 199***

Dozer and scarifier attachments developed

A hydraulic angling dozer blade for use on Oliver OC-42 and OC-46 crawler tractors and a scarifier for the Hough Model 12 Payloader have been developed by **Hydraulic Tool & Equipment, Inc.**

The dozer blade is exceptionally adaptable for pipeline backfilling. It has a high degree of angle, 36 deg., which causes the earth to flow easily into the trench. The 87-in. blade can be angled hydraulically from the operator seat. It has a high lift of 40 in. for backfilling high spoil banks. It will also operate 24 in. below ground level giving a total blade movement of 64 in. Inside mounting on the frame cuts side draft to a negligible amount even at the extreme angle, and permits operation in confined spaces. The scarifier unit was designed to fit on the Model 12 Payloader without upsetting the machine's balance. This was done by

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ONLY

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1. PATENTED "SNAP-LOCK" eliminates wing-nuts, studs, slides, wedges. No openings to fill with concrete, mortar, etc. and jam spring lock.

2. SERVICE you can depend on. Our own truck fleet assures "on time" delivery and pick-up. From original quote on . . . you can't beat Beatty!

3. MANUFACTURING skill plus the finest raw materials available have made Beatty the name for scaffold in the West for over 20 years. You can't beat Beatty workmanship—all welds are chipped, paint is perfect—in *every* unit.

4. ERECTION AND STRIPPING are *fast* operations, thanks to Beatty's spring-action "Snap Lock". Less planking required, too. You save time, materials, dollars!

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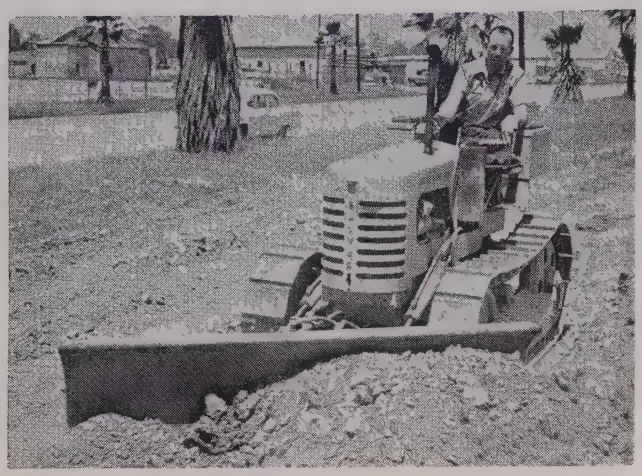
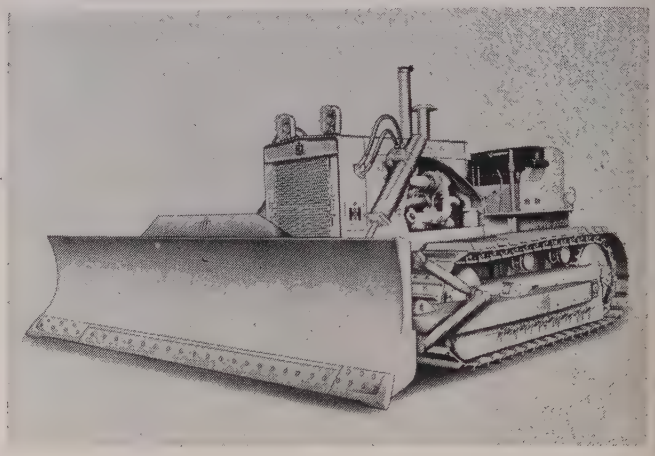


using T-1 steel, by removing the counterweight and fuel tank and by using a parallelogram design that allowed the entire unit to be close coupled thereby avoiding an overhanging weight. A new fuel tank is provided and is located on the right side of the Payloader. When the scarifier is not in use it will not interfere with the normal operation of the unit. No portion of the scarifier protrudes beyond the rearmost part of the loader and the width is the same as the loader tracks. It is equipped with 5 H&L scarifier shanks with replaceable teeth. It has a maximum penetration of 14 in. into the ground and a clearance of 14½ in. above ground in a raised position. Because it is so closely coupled the teeth cannot touch the ground from the raised position no matter at what angle the loader is operating. . . . ***Write No. 200***

Four blades for TD-25

Four specially-designed blades, two for cable control and two for hydraulic operation are announced by **International Harvester Co.** Construction Equipment Division for use on its TD-25 diesel crawler. The bull-



dozer blade with boxed ends is available for direct-lift hydraulic and direct-lift cable operation. It has cutting edges of heat treated, high carbon steel, and heavy-duty arc welded box framed moldboard construction. Tilt is easily adjustable to 18 in. between blade ends and there is a maximum pitch of 10 deg. The hydraulic model weighs 8,720 lb. and cable model 7,950. Blade length is 12 ft. 3¼ in.; height is 49 in. The open-ended Bullgrader blade is also available in cable control and direct hydraulic lift model. These blades are easily angled from straight to 25 deg. right or left, and tilt adjustable to 12 in. between blade ends. Design of the Bullgrader blades virtually eliminates wearing action of the end plates when pioneering, side casting or cutting into a bank. Blades are 14 ft. 4½ in. long and 44 in. high. The hydraulic version weighs 9,500 lb. and the cable blade 9,820. . . . ***Write No. 201***

Backhoe has positive down pressure for tough terrain

A patented hydraulic attachment which applies almost the entire weight of the machine to the backhoe has been announced by **American Hoist & Derrick Co.** The unit consists of a one-way hydraulic cylinder,

fastened to the top of the mast with the cylinder piston secured to the backhoe boom. Its operation is automatic. As soon as the operator starts his in-haul, the hydraulic valve is automatically actuated, locking the oil in the cylinder. This makes the cylinder act as a solid connection between the boom and the mast or backstay. Thus to force the boom upward, almost the entire weight of the machine must be raised off the ground, with the pivot point being just under the rear driving sprocket. This additional weight forces the dipper teeth into the ground or rock. When slack is taken in from the hoist line, the hydraulic valve opens allowing the piston to move with the boom movement giving normal hoe operation. The attachment is available for all sizes of American backhoe and can be field-installed on American backhoes now in use.

. . . Write No. 202

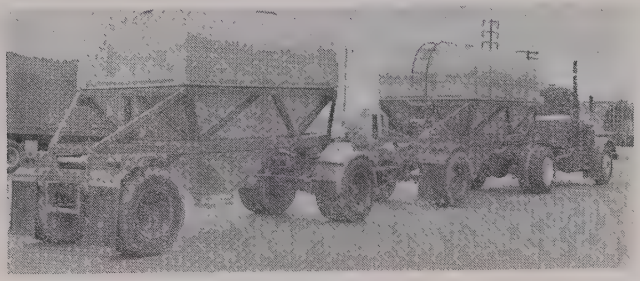
Tractor loader line features instant reverse

Massey-Ferguson, Industrial Division, announces three 1960 Model multi-purpose tractor loaders featuring instant reverse with torque converter. These are Models 1001 and 406 tractor shovels and the Model 204 industrial tractor. They feature full-time power steering and a wide variety of attachments. The instant reverse feature is accomplished through multiple disc hydraulic reversing clutches controlled by foot pedals. The pedal shift arrangement leaves the operator's hands free to steer and to manipulate loader or attachments. These attachments for the 1001 and 406 models include angle dozer, lift fork, swinging cranes, scarifier, backhoe, rotary boom, pickup sweeper, rotary snow blower and leaf loader, as well as a blacktop spreader for the 1001. Both models have 1-cu. yd. capacity buckets as standard equipment. The smallest 204 unit includes a complete assortment of buckets, backhoes, scraper scarifier and others. It will convert into a fork-lift crane, dozer and scarifier.

. . . Write No. 203

Cement trailers feature lighter hopper

After years of job testing **Fruehauf Trailer Co.** has announced a complete new design of cement hopper. The hoppers are lighter than those of previous models

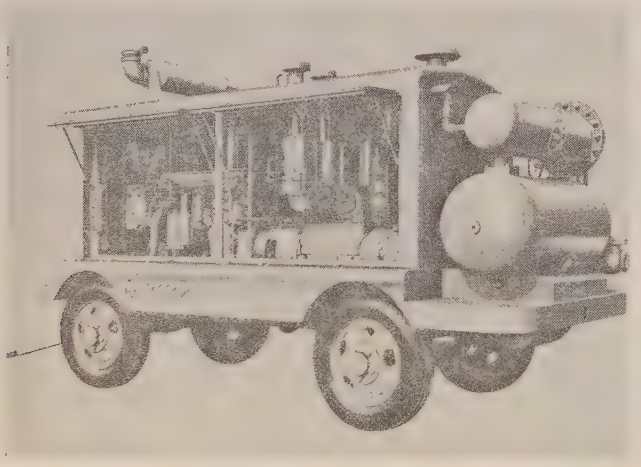


and are designed with full 26-in. butterfly gates at the bottom for quick unloading. Design improvements have emphasized weight reduction combined with larger capacity. The standard unit has a 510-cu. ft. capacity each, but larger units can be obtained if required. Weight reduction is secured by the all-aluminum fill dome and the interliners which are removable for converting the unit to hauling aggregate. This allows flexibility for the customer's fleet and also provided standardization that has reduced Fruehauf's production costs. The fill dome and cover are standard height, corresponding with most unloading chutes.

. . . Write No. 204

900-cfm. compressor introduced

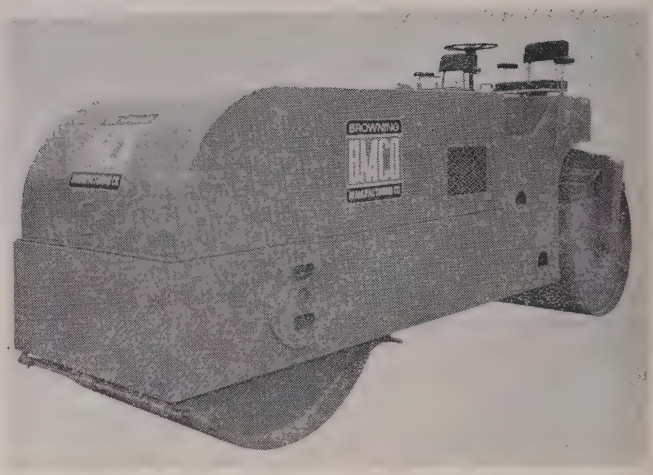
A rotary air compressor delivering 900 cfm. of air at an operating speed of only 1,700 rpm. has been introduced by **Jaeger Machine Co.** It is powered by a Model 6-110 GM diesel which in other compressors



is operated at 1,800 rpm., full load speed. The 100 rpm. reduction in engine speed results in a fuel factor of more than 500 cfm. of delivered air per pound of fuel consumed. Close automatic regulation of engine and compressor maintains 100-psi. minimum air pressure under all normal demand. Stopping and starting require only the half turn of a regulator crank. Standard equipment includes two-pass exhaust muffler, automatic blow-down valve, swing-type check valve, copper tube finned multi-pass oil cooler, hour meter, and radiator shutters. *. . . Write No. 205*

New roller line introduced by Browning

Featuring an 8-12-ton model, a complete new line of tandem rollers has been introduced by **Browning Manufacturing Co.** The line includes an 8-10 and a 5-8 ton model with a 3-5 ton portable roller to be available soon. The 8-12 tandem contains features designed for speed and ease in handling. An auto-



motive type power steering arrangement provides for fast, easy, and accurate driving. The oversize water tank is 240 gal. and choice of gasoline or diesel driving engine is available with torque converter. A single lever controls the four forward and four reverse speeds. Ballast may be loaded easily through the large plates on both sides of the drums. Minimum overhang reduces hand work to areas within 5 in. of walls. For routine servicing, the entire rear cowling is easily removable. *. . . Write No. 206*

A scraper that mounts on a motor grader

Named the "GraderscrapeR," **Martin Co.** has introduced a 3½ yd. (heaped) scraper designed for mounting on Caterpillar motor graders. The scraper is mounted in place of the blade and circle on Caterpillar Nos. 112, 12 and 14 graders. It utilizes grader power and existing connecting points.

Mounted on the circle lift arms, the scraper utilizes the full power of the grader tandem drive. Once loaded, it can be lifted up with the mechanical drive of the grader and carried at full highway speed with a clearance of 11 in. fully loaded. It is said to be the first scraper unit that can be tilted to one side to scrape ditch sides with the grader remaining level.

Attachment time is only a few minutes, and once installed the scraper uses the standard grader control system. With a 6½-ft. cutting width, the scraper is well adapted to light and medium leveling, general maintenance and terracing. It is designed for economical general work on small construction jobs and general maintenance on larger jobs. *. . . Write No. 207*

Worthington restyles truck mixer line

In its new models of well known Fleetmaster and Fleetbuilder truck mixers, **Worthington Corp.** has not only secured a modern design but practical oper-

ating advantages. The center of gravity has been moved about 16 in. forward on all models permitting the operator to haul more concrete within legal-load requirements. It is this forward shifting of the weight that provides the stream-lining effect. The conventional round type of water tank has been replaced with one of triangle design (see picture).

. . . Write No. 208

Caterpillar improves its D6 tractor

With such major improvements as a compact engine with 25% greater lugging ability, two new hydraulic control units, a tilt cylinder for special applications and an all-new operator's compartment for more efficiency and comfort, **Caterpillar Tractor Co.** has announced its new "work-styled" D6 Series B tractor. The new engine delivers 93 flywheel horsepower at 1,600 rpm. and tests indicate this modern power plant has greater economy with easier servicing.

The hydraulic control pump and tank are located at the rear of the engine clearing the radiator which provides for greater cooling ability. The hydraulic control delivers constant hydraulic power because the

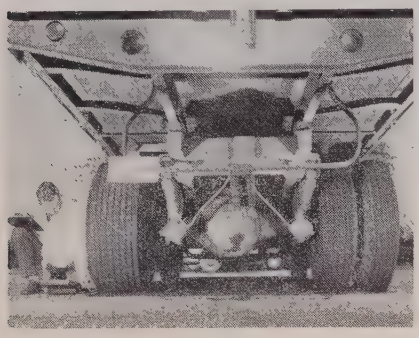
pump is driven off the timing gear train. Also, the hydraulic control cylinders are designed to allow almost twice the bulldozer blade drop.

Operator efficiency is increased by a relocation of the gear shift selector level and the forward-reverse lever. More comfort is provided with better styling of the seat, and footrests have been placed in a more natural working position. A gasoline starting engine is standard on the D6 Series B tractor developing 15 hp. and starting from the operator's feet.

Engines are provided with the new high efficiency dry type air cleaners which have a minimum efficiency of 99.8% under all conditions. *. . . Write No. 209*

Extra-wide truck tire to replace duals

An unusual truck tire nearly twice as wide as conventional tires has been developed by **Firestone Tire & Rubber Co.** Designed to replace standard dual wheels, the new 18-19.5 tire and rim assembly weighs 286 lb. compared to 410 lb. for a comparable dual assembly. On a tandem tractor tandem trailer rig, weight savings would amount to about a 1,000 lb. Other advantages cited for the wide base

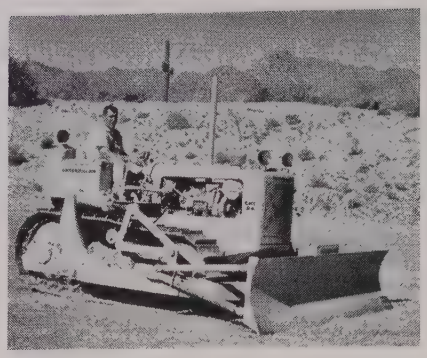


tire, which has not yet been marketed, include lower spring rate, softer ride, less space required, fewer parts, greater safety due to elimination of sidewall damage from rocks wedged between the tires and greater off-the-road mobility. The wide tire is nearly an inch higher than the 11-22.5 dual tire it replaces, but it is only half the width of a set of duals with spacer. It will be made in both tubeless and tubed construction.

. . . Write No. 210

Power increased on D4 tractor

A 25% increase in lugging ability, a new starting system and greater ground clearance are incorporated in the new D4 Series C tractor announced by **Caterpillar Tractor Co.** The unit has a forward-reverse lever and a new spur gear transmission with five speeds forward and four in reverse. An optional lower speed transmission also is available. The 4-cylinder diesel power plant is equipped with a dry type air cleaner. It delivers 65 flywheel hp. at 1,600 rpm. and is rated at 52 drawbar hp. The tractor delivers 13,000 lb. of drawbar pull and with optional transmission this maximum is increased to 14,600 lb. drawbar pull. The D4 is available in 44 in. and 60 in. gage with individual one-piece final drive cases available for each gage. It is equipped with a versatile hydraulic control with one internal valve which can be used to control either a bulldozer



blade, tool bar or rear implement. With an additional internal valve, the control can handle two implements. It is 7 in. longer and weighs 300 lb. more than prior models. A full line of attachments is available.

. . . Write No. 211

Portable batching plant

A new model 6-yard portable batching plant which can be towed behind the average pick-up truck is announced by **Aeroil Products Co.** The unit features a weigh hopper made of Man Ten abrasion resistant steel and an 18-in. belt conveyor 35 ft. long. It is available with beam scales as standard equipment, or optional dial scales. Unit has an overall width of 7 ft., length of 36 ft. 6 in. and height of 11 ft. 6 in. It weighs 6,500 lb. The plant is easily adaptable for use with bulk or bag cement. *. . . Write No. 212*

"Sprawler" crane lifts 30 tons

A 30-ton capacity "Sprawler" crane, Model 330, is announced by **Koehring Division of Koehring Co.** The crawler-mounted crane is equipped with pivoting outriggers

and is able to lift more than its own weight. With outriggers set, the Model 330 can lift 60,000 lb. with a 30-ft. boom at 12-ft. radius. With outriggers folded against the crawler, the crane will lift and carry 47,980 lb. with a 30-ft. boom at a 10-ft. radius. *. . . Write No. 213*

Reversible spreader body

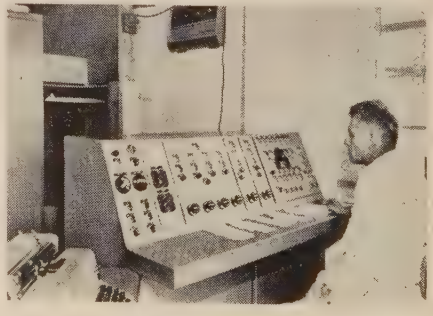
Highway Equipment Co. has introduced a hopper type spreader body with spinner mounted at one corner which can be reversed to position the spinner either at the right rear corner for sealcoating spreading, or the left front corner for ice control and road widening projects. The Model Y-2 reversible spreader can be switched from one position to another in 15 minutes. The 18-in. diameter spinner

spreads evenly in widths of 5 to 40 ft. with complete visual control. The unit is powered by a 12.5-hp. air-cooled engine which drives the conveyor chains, cross auger and spinner assembly. Literature and specifications available.

. . . Write No. 214

Electronic batch controls

Conversion of existing batch plants to automatic operation can be done with electronic batch control systems developed by **C. S. Johnson Co.** Johnson electronic controls, which also can be used as new plant equipment, give accurate remote control of batching operation. Simplified panels permit dial selection of one of a number of pre-set formulas, and selection of



batch quantity. Signal lights keep operator informed at all times of the progress of the batching and interlocks prevent improper batching or discharging. The company custom builds combinations of controls to fit individual plant requirements including, if desired, remote controls for material handling facilities or other plant operations. Equipment can be installed so that discharge of completed batch can be controlled either by the operator at the central control console, or by the truck driver at the batcher discharge gates. *. . . Write No. 215*

Scaling tool for concrete

A scaling tool which chips the surface instead of cutting it has been introduced by **Stow Mfg. Co.** The unusual scaler has three rows of teeth which are rotated in such a way that each individual hardening tooth instead of cutting in, ac-

tually strikes the surface a blow. The tool attaches to a Stow flexible shaft machine and operates at 3,400 rpm. It is used for scaling off loose concrete surfaces or for cutting into concrete surfaces deeper than would be practical with an abrasive cup wheel. It is also used for scaling paint from concrete, brick, or metal surfaces.

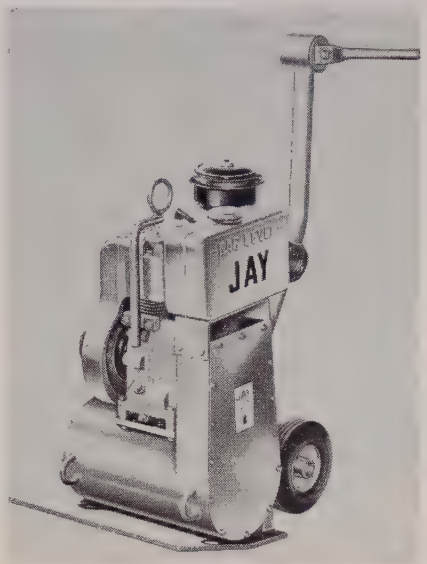
. . . Write No. 216

100-watt transistorized radio units

A 100-watt 2-way radio system designed to operate in the low band frequencies has been announced by **Motorola Co.** as an addition to its extensively transistorized line of Motrac radios. Transistors have replaced the vibrators and dynamotors in the Motrac radio's power supply and all tubes in the receiver to provide reliability, compactness and ruggedness. The 100-watt unit draws no more than .5 amps. plus intermittent crystal heater drain while on standby *. . . Write No. 217*

Power increased in tamper line

Tamping force has been increased as much as 50% and travel speed as much as 100% in the 1960 models of Jay tampers announced by **J. Leukart Machine Co., Inc.** The improved line of self-con-

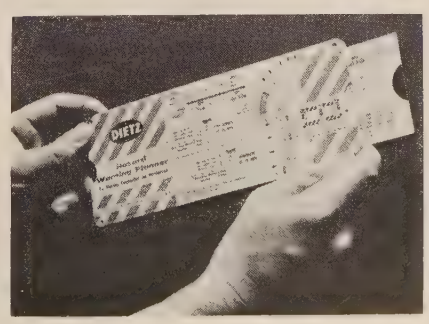


tained motor-driven tampers also features an improved handle, larger oil bath air cleaners, and a new plate contour. Line includes Model J-13 available with interchangeable plates of 13, 18, and 24-in. widths, as well as a special water plate for blacktop tamping; Model J-18 with plate widths of 18, 24, and 30 in.; and Model J-36 with plate sizes of 24, 30, and 36 in. All models are equipped with a 4-cycle Wisconsin 6.8-hp. engine. Tampers are capable of compacting up to 100 cu. yd. per hour in 6-in. lifts.

. . . Write No. 218

How to place warning lights

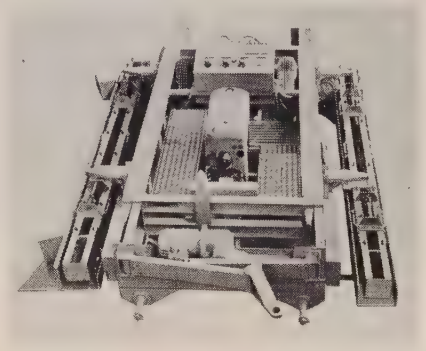
Data on placement of signs, flagmen, traffic cones, barricades, lanterns, torches, and flashers around street and highway work areas is provided by the Hazard Warning Planner offered by **R. E. Dietz Co.** By sliding the inner card through the outer card, data on spacing of signs and lights is presented for varying road and visibility condi-



tions. Information is contained in three boxes in the front of the card; one showing road conditions, a second, spacing in feet of the signs for street sites, and a third, the same information for rural highways. The pocket sized planner is based on latest data sheets, manuals and policies of traffic engineers, insurance companies and government agencies. It is available free from the Dietz Co. which manufactures flashers, torches, and lanterns. *. . . Write No. 219*

Versatile gas-electric pavement finisher combination

A versatile pavement finisher which can handle 12 to 26-ft. widths has been developed by **Hetzel Steel Form Co.** The basic Flex-Plane machine has two independent gas-electric drives, one of which powers the drive wheels and the other the screeds. Both machine and screed speeds can be adjusted independently. The finisher frame extends from 12 ft. to 26 ft. permitting finishing full width slabs as



well as ramps and approaches. Float trailer, supplied as optional equipment, can be attached to produce a combination finisher-float machine. Both screeds and float are equipped with new, quick, crown change mechanisms. The unit is equipped with retractable wheels for highway transport.

. . . Write No. 220

Pre-printed drawing symbols

Pre-printing of standard parts, wiring diagrams, all types of title blocks and other printed matter used repeatedly on drawings is offered by **Keuffel & Esser Co.** The symbols are quantity printed in advance on Dulseal, the company's transparent adhesive film, and applied when needed. Use of these pre-printed titles saves many hours of expensive hand lettering. The Dulseal adhesive material, which can be purchased in blank sheets and rolls as well as pre-printed, has a delayed setting action which al-

lows material to be re-located several hours after original application if necessary and assures accurate positioning. Left untouched for about 24 hours, the film adhesive forms a permanent bond with paper or cloth to which it is applied.
. . . Write No. 221

Three-wheel fork lift handles 17 tons

A tricycle "midget" fork truck with two electrically powered wheels and a third steering wheel was unveiled by **R. G. LeTourneau, Inc.** The FT stacker with a capacity of 17 tons has power to lift and carry nine average American cars. It is called a midget because the company has built other stackers ranging up to four times the size of this one. Forks on the new

machine are 5 ft. long and can hoist loads 16 ft. above the ground. It is available with or without "tusks" to grip the loads. Kicker chains for ejecting loads also are optional. Power is supplied by a 195-hp. diesel engine, driving AC and DC generators. Simple electric switches and potentiometers govern all work functions. *. . Write No. 222*

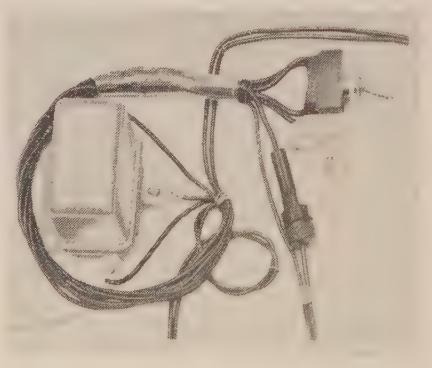
Fireproofing material sprayed on steel

Mono-Kote, a vermiculite based fireproofing compound which can be sprayed directly on structural steel has been introduced by **Zonolite Co.** The uniform coating of this material can be obtained with a single application and lathing between steel decking and fireproofing are eliminated. Advantages cited for the new material include excellent fire protection, efficient insulation, sound absorption and certain rust inhibitive advantages. When sprayed on fluted ceilings a uniform coating over the entire

surface will suffice. It is no longer necessary to fill in the corrugated ridges so that the finished surface is level. Mono-Kote can be used with standard mixers and plastering machines. It sets quickly to become a tough, hard material without cracks or shrinkage. It is nontoxic and can be applied by workmen without gloves or other protective clothing. *. . . Write No. 223*

Warning signal kits

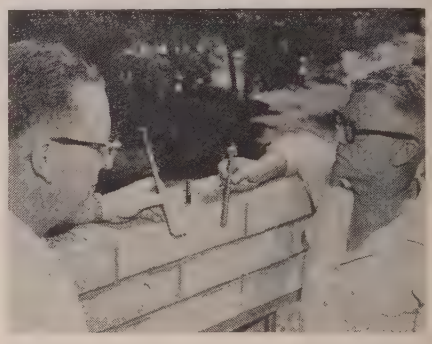
Conventional turn indicator signals on trucks and passenger cars can be converted for double duty as emergency warning signals with two easy-to-install kits announced by **Macchi & Co.** The Heavy-Duty Kay-Lab kit includes a Universal flasher capable of flashing sixteen 32-candlepower bulbs simultaneously 75 times per minute. The



Regular kit for passenger cars flashes six 21-candlepower bulbs 90-100 times per min. Both are made in 6 and 12 volt models as well as a 24-volt model for passenger cars. Both kits come complete with flasher, color-coded wiring harness, control switch, fuse and installation diagram. Neither kit interferes with the normal use of directional signals. Literature available. *. . . Write No. 224*

Headless anchor bolt

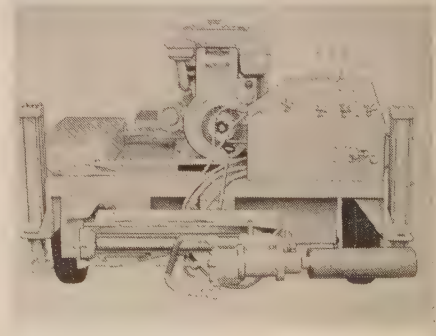
A straight anchor bolt without head or bend, said to be the first design change in 50 years in steel anchor bolts, is announced by **Columbia-Geneva Steel Div. of U. S. Steel.** The new product is called the Di-Lok anchor bolt; has thread-like ridges along its shank in place of the familiar angle bend. The new shape enables contractors to set sills immediately after pouring the foundation by pushing the bolts into the concrete through predrilled holes in the sills. Pre-positioning of the bolts in the foundation prior to pouring is eliminated along with the steps necessary to fix them in place. Straight bolts are cheaper to manufacture and easier



to pack and store. The new bolt is 10 in. long and ½ in. in diameter. Larger sizes are being made experimentally. *. . . Write No. 225*

Pavement coring machine

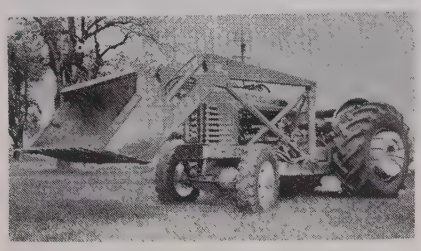
A light-weight pavement coring machine which may be mounted on a quarter-ton truck or trailer is announced by **Mobile Drilling, Inc.** The Mark V unit is designed for production test coring on highways and aircraft runways. The self-



powered drill has three-way hydraulic drive that permits coring through steel reinforcing concrete at the rate of 1 or 2 in. per min. Hydraulic drill motor accommodates diamond bits from 2 to 10 in. in diameter. The Mark V can be set up for drilling in a sew seconds.
. . . Write No. 226

Front drive axles for tractors

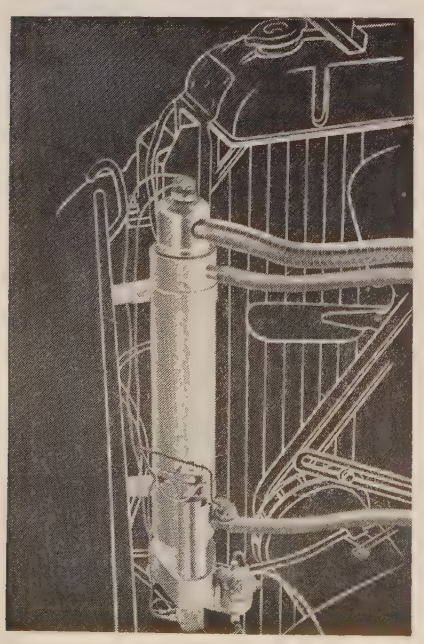
Two new models have been added to the **Elenco Products, Inc.** line of front driving axles for convert-



ing Ford tractors to 4-wheel drive. The new models are a heavy-duty axle for Ford 1800 series, industrial tractor and a high clearance axle for the 600 and 800 series Ford tractor. Conversion to front wheel drive increases load and pulling capacity at less wear and tear on the tractor. Many types of special mounted equipment such as loaders, backhoe, fork lift can be used to greater advantage. *. . . Write No. 227*

Heater uses engine cooling system

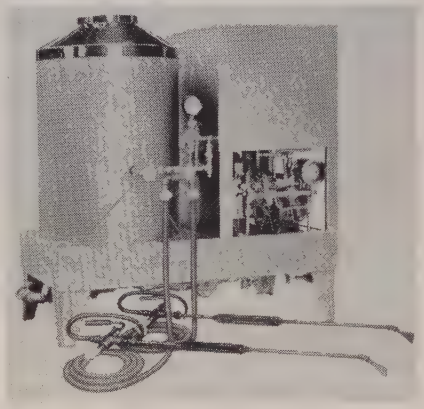
An engine heater which preheats coolant system and maintains temperature when the engine is not running has been introduced by **Thermo-Temp Industries, Inc.** The heater is an automatic, independently operated unit. When installed it becomes an integral part of the cooling system and does not interfere with normal engine function. It operates on the engine's own fuel supply and is thermostatically controlled to maintain temperature at proper operating level. In action, coolant from the engine circulates through the heated water jacket and returns to the block.



When temperature reaches proper level, the unit automatically shuts off. A dashboard control switch can be set on automatic to maintain constant engine temperature control or it can be set for pre-heating 5 min. to 12 hr. before starting. *. . . Write No. 228*

Heavy-duty steam cleaners

An automatic, gas fired cleaner designed for trucks and heavy-duty equipment cleaning is announced by **Malsbary Mfg. Co.** The Model 330 delivers 330 gal. of hot solution hourly at 60-90 psi. It is a station-



ary unit but nozzle controlled guns enable the user to clean effectively up to 200 ft. from the cleaner. The unit can supply two guns at once, each operating independently. Solution tank holds 60 gal., enough for four hours of steady cleaning. Burner is adaptable to natural gas, butane, propane or manufactured gas. The compact unit is 63 in. high and weighs 1,200 lb. Price is $2,350 delivered in the U. S.

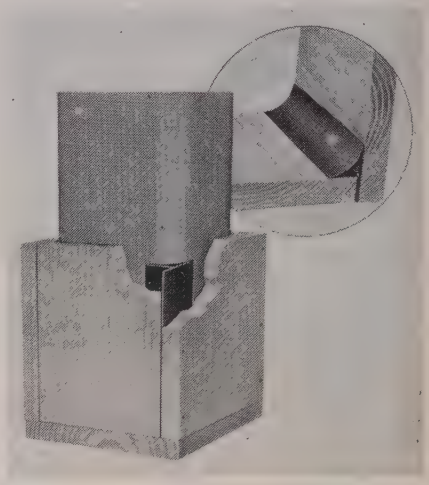
. . . Write No. 229

Tiltable patcher conforms to road crown

A pavement patching unit which mounts on the rear of a truck and can be tilted 13 deg. from a center pivot to match the slope of the road is announced by **Martin Co.** Mounted on a truck with 28 in. clearance, the Martin unit gives up to 8 in. clearance. Roller frame can be lowered 31⅞ in. to roll 3⅞ in. below the pavement level. Frame retracts to a compact 20 in. when not in use. The roller unit weighs only 700 lb. but it can exert over 3½ tons pressure for patching broken pavement. Design features allow the transfer of truck weight to the point of roller contact. Compaction pressure of 250 lb. per sq. in. can be applied. An electrically operated hydraulic pump controls raising or lowering. . . *Write No. 230*

Plastic molding forms round corners

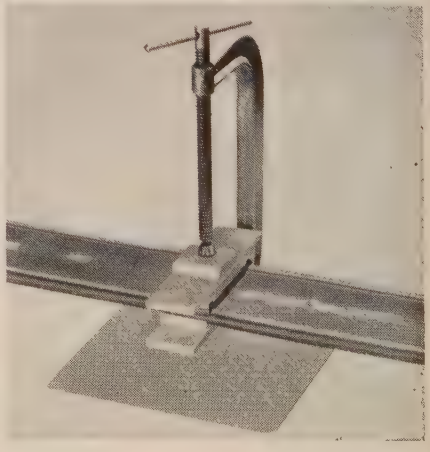
A plastic molding strip which can be built into concrete column forms to produce smooth rounded



corners has been marketed by **Servicised Products Corp.** Called "Green Streak Corner Former", the material produces a rounded 1-in. radius corner. It can be quickly and easily installed on standard forms and is reuseable. The corner form is made with a projecting flange which can be tacked on to the edge grain of a standard wooden form. This flange holds the molding securely in place and when the opposing form is nailed, it automatically locks the feathered edges of the corner molding against the form boards. *. . . Write No. 231*

Waterstop easily spliced

Gates Rubber Co. has introduced a waterstop that can be spliced in just 6 minutes. Called Kwik-Seal rubber waterstop, it is chemically



bonded instead of heat sealed or vulcanized. Only a small splicing kit and a simple clamping device are needed. No heat is required. The new material retains a watertight seal even when movement occurs in a concrete joint.

. . . Write No. 232

Swivel hook for long boom cranes

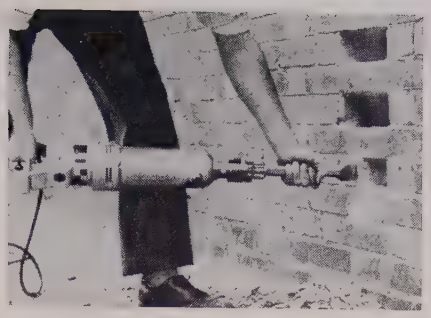
A 600-lb. "Miller Swiveling Headache Ball' for whip lines on crane booms 200 ft. and over, is announced by **Miller Swivel Products, Inc.** The 10-ton capacity model HB16 features the Miller precision ball bearing swivel. It is available in four standard types

including clevis, eye, wedge and thimble. The company also announces that a new line of heavy-duty sheaves of cast iron, and cast iron steel is available as replacement sheaves for Miller blocks.

. . . Write No. 233

Electric hammer line

Three models of electric hammers which run on AC or DC 110-volt current eliminating the need for converters or rectifiers have been introduced by **Porter-Cable Machine Co.** The line will be known as Porter-Cable Kango hammers. They are smaller electric versions of the familiar pneumatic pavement breakers. Type E hammer has a drilling range of 1 in. to 3 in. striking 1,300 blows per minute and weighs 19 lb. Type G. has a range of 3/16 in. to ¾ in., strikes 1,800 blows per minute and weighs 15 lb. All are equipped with Universal 115-volt AC-DC motors.

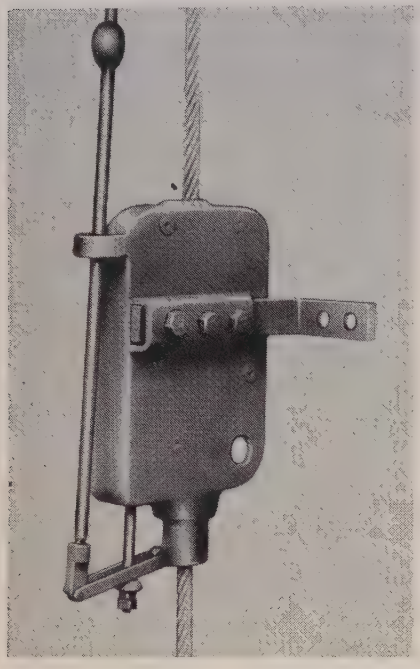


They are equipped with precision ball bearings and three conductor cords. All external working parts are hardened steel and designed to prevent dirt from entering the working mechanisms. Motors are designed with floating armatures that will withstand vibration. The double pole switch is rubber mounted and sealed with neoprene. A total of 195 accessories are available for these hammers including a new exclusive chisel which takes four different disposable double edge blades. Hammer and accessories are packed in metal carrying case with removable tool tray.

. . . Write No. 234

Safety stop holds staging cable

A positive safety device which automatically grips a cable under tension has been introduced by **Griphoist, Inc.** Called Blocstop, the new mechanism employs the same principle as the Griphoist. The unit can be attached to a separate safety cable or mounted on the hoisting cable as an added safety device. Blocstops will permit free movement of the cable when the staging is going up, but immediately grip when the movement stops. Jaws can be released only by taking tension off the cable and must be held open with a hand lever in order to descend. . . . *Write No. 235*



Cable control units for TD-25

Two planetary-drive cable control units are available for the new **International Harvester** TD-25 crawler. Control units include the front-mounted Model 160 and the rear-mounted Model 260. Model 160 is a single drum with brake capacity of 9,000 lb. line pull at bare drum speed. The double-drum Model 260 uses a ring gear and pinion to drive a four-gear planetary system for each cable drum. The drums can handle up to 248 ft. of 5/8-in. cable, attaining a full drum speed up to 650 ft. per minute. Linkage controls require lubrication only at 1,000-hour intervals, and there is only one lubrication point for each drum.

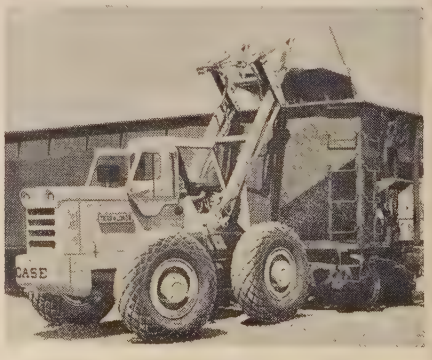
. . . *Write No. 236*

Rubber-tired trencher

Full production of a tandem drive trencher with 30 ft. per min. capacity and road speeds up to 30 mi. an hour is announced by **Speicher Bros.** The Speicher trencher features a point-of-balance shifter which allows a 24-in. shift forward or back. This is comparable to shifting 1,500 lb. in either direction and allows the machine to cross trenches without back-filling. The digging wheel is hydraulically operated and the machine has three conveyor belt speeds and four digging wheel speeds. The trencher uses engines, transmissions and universal joints of standard national makes. Most parts are readily available through nation-wide automotive distributors. Literature available. . . . *Write No. 237*

Loader with long reach

Extra long lift arms which provide clear dump height of 11 ft. 6 in. with bucket retracted and 10 ft. 2 in. with bucket fully dumped are announced by **J. I. Case Co.** for its Case W-9 and W-10 Terraload'rs. With forward reach at 7 ft., lift height of the attachment is 89 in. Bucket sizes for the

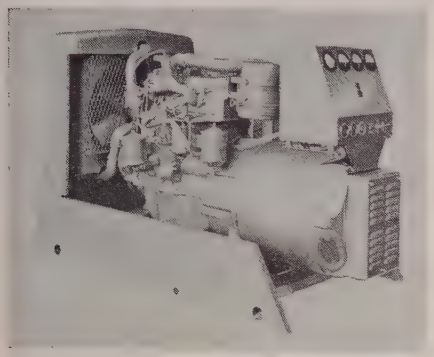


new high-lift models are 1¼ cu. yd. for the W-9 and 1⅝ cu. yd. for the W-10. Slightly larger buckets are available for handling light materials. Both 4-wheel drive unit loaders are powered by Case engines and feature constant mesh hydraulic transmissions.

. . . Write No. 238

25-kw. diesel electric plant

A 25,000-watt diesel electric generating plant is announced by **D. W. Onan & Sons Inc.** Completely



self contained it includes a water cooled Hercules DD226 diesel engine, Onan Magneciter generator, and Onan controls assembled into one compact unit. The DZC Series plants are available in all standard voltages to 460 volts. Optional accessories include weatherproof housing, meter panel, fuel lines with fittings, and underground fuel tank with fittings. *. . . Write No. 239*

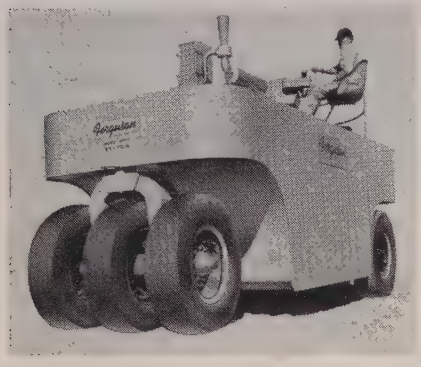
Pump features easy adjustment

Quick removal of the entire suction chamber and liner plate without removing the volute is a new feature of the intermediate and heavy-duty 3-in. contractors' pumps

manufactured by **Jaeger Machine Co.** Adjustments, rotation or replacement of the liner can be completed in a few minutes. Higher performance is also offered. The model 3PN will pump all the water a 3-in. suction hose can handle at 5-ft. lift. With a 4-in. suction hose it delivers 28,000 gph. at 10-ft. lift. Weight has been reduced 30 lb. to 395 lb. complete with pneumatic tired truck. *. . . Write No. 240*

35-ton pneumatic roller

A 35-ton, rubber tired self propelled roller with seven wheels is announced by **Shovel Supply Co.** It is powered with a GM4-71, 125-hp. diesel engine, Allison transmission and torque converter and Clark heavy-duty rear end. Final drive is through heavy roller chains running in oil. Equipped with 13x24 wide-tread tires, it gives full 8 ft. compacting width. 90-lb. pressure tires are standard and 120-lb. pressure tires can be furnished when desired. Machine weighs 21,700 lb. empty, 70,000 lb. when fully ballasted. Wheel loads vary from 3,100



lb. to 10,000 lb. depending on ballast. All wheels oscillate. Instruments, control levers and seat are mounted on an arm revolving a central column, allowing seat and controls to swing from one side of the roller to the other for full vision in either direction. The unit is instantly reversible, has rolling speeds of 2, 4, and 8 mph. It will meet all state highway specifications. . . . *Write No. 241*

Biggest Little Giant crane

A 17½-ton capacity crane, the largest in its line, is announced by **Little Giant Crane & Shovel, Inc.** The new machine, Model 48, features the company's patented ball-bearing turntable with the superstructure mounted on a live ring of hardened steel balls which roll in a hardened race precision machined to the contour of the balls. Free swinging, full revolving turntable eliminates hook rollers and center pin mounting. The new unit has patented mechanical clutches, cut gears of high carbon steel and a direct power train. Model 48 is powered by a Continental M-363 engine, with torque converter and diesel power all available. Collapsible high gantry is used, and counterweight is easily removable. The unit is in production as a crawler or carrier-mounted machine and is

available for barge or pedestal mounting. All front-end attachments are available including clamshell, dragline, crane, shovel, trenchoe magnet, pile drive or skull cracker. Crane attachments are box type lattice boom with single or double sheaves. Maximum boom height is 85 ft. with 15-ft. jib.

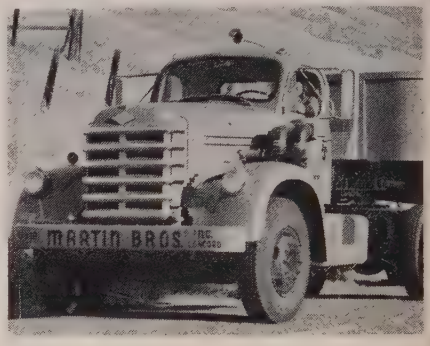
. . . *Write No. 242*

Oil resistant work gloves

Terry cloth work gloves specially treated to resist oil are introduced by **Jomac, Inc.** Called Oilmacs, the gloves repel oil, and can be reconditioned with virtually no loss in oil resistance. The work gloves also are more cut-resistant than leather gloves. . . . *Write No. 243*

Diamond T announces V-8 engines

The first V-8 engines offered by **Diamond T Motor Truck Co.** will be used to power two new conventional truck models announced by the company. The two new DT8 series engines have wet-sleeve construction with replaceable cylinder sleeves. Original factory tolerances can be restored on overhaul by inserting new sleeves in the block. The premium alloy sleeves are machined inside and out to extremely close tolerances. They last longer and have a lower rate of wear than old styled cylinder walls and retain a perfect round indefinitely, great-



ly extending piston and ring life. The two new engines have a horsepower rating of 207 and 235. They will be used to power the model 738R, and 838R trucks respectively. These two new models include the

POWER BUGGY HAS UNITIZED DRIVE

A single assembly incorporating transmission, differential, and drive axle is featured in the Model M-15B power buggy made by the *Prime-Mover Co.* The power transmission unit is completely enclosed in one housing and is lubricated from one oil reservoir. Transmission is full torque shifting, constant mesh, with instant reverse. The ¾-ton unit powered by a 7-hp. air cooled Wisconsin engine will easily climb a 20% incline fully loaded. Only 31½ in. wide, it goes through standard doorways and spots loads quickly in confined areas. The unit's 10-cu. ft. dump bucket latches to the chassis and is quickly interchangeable with a flatbed platform for hauling brick, plaster, mortar and other construction materials. . . . *Write No. 244*

company's new "R" cab designed for comfort and convenience. The cab is all steel welded and has a heavy-duty 3-point suspension. Equipped with single rear axles both models have a gross vehicle weight of 30,000 lb. and a gross combination weight of 78,000 lb.

. . . Write No. 245

Pipe repair clamp

A heavy-duty repair clamp with synthetic rubber lining for repairing leaks—for pipe sizes of ½ through 8 in. is announced by **Marman Division of Aeroquip Corp.** The new Patchmaster is available in widths of 3, 6, 9, and 12 in. Its

new lug design allows the clamp to conform to the contour of the pipe under high torque without biting into the pipe. The Buna N pad will withstand high clamping pressures without extruding, and is adaptable to oil, gas, water and steam.

. . . Write No. 246

Air powered hoist

A versatile drum hoist powered by an air motor is announced by **Joy Mfg. Co.** The hoist has a lifting capacity ranging from 27,000 lb. at 37 fpm. to 3,700 lb. at 220 fpm. It offers a choice of several throttle and brake systems which make it adaptable for many uses. A 5-cylinder, radial air motor (10, 17 or 23 hp.) with integral gear case drives the large rope drum through a multiple roller chain. The drum has a capacity of 2,300 ft. of ¾-in. wire rope. The entire assembly is mounted on a skid base. Controls for the new JCP-120 hoist are mounted on the hoist in the standard model and can be removed and operated from a remote position. Several power options are offered including electric motor drive of 10 to 25 hp. or air-cooled gasoline or diesel engine.

. . . Write No. 247

Indoor-outdoor fork truck introduced

A 6,000-lb. capacity fork truck called the Pacer has been announced by **American Road Equipment Co.** Designed to function outdoors under extreme conditions of rough terrain, mud and snow, as well as to serve as in-plant vehicle,

the Pacer is front-wheel driven and engineered so that the greater the load, the greater the traction under all conditions. It is available with 10-ft. standard lifting mast or optional 7-ft. mast. It uses the largest tires of any fork truck, 14:00 x 24:00. The Pacers have a short wheel base and articulated rear steering axle for high maneuverability. All units have power steering and torque converter. The engine is a Continental F-226 of 73-brake hp. The unit has a top speed of 30 mph. *. . . Write No. 248*

Portable bar cutter

A wheel-mounted, hydraulic bar cutter powered either by electric motor or gasoline engine is marketed by **Motorborr.** The Hallto unit cuts reinforcing rods or bars up to 2 in. in diameter at 22 cuts per minute. It is designed to withstand up to 150 tons and a normal working pressure of 75 to 90 tons. It employs a square prism shaped cutter with 8 cutting edges which can be used in succession as they wear down. Special V-shaped cutting heads are easily interchangeable with regular cutter for cropping angle iron up to 5/16 in. x 2 in. The unit is available in three models, the 32/20 is equipped with a 3-hp. electric motor and handles rods up to 1¼ in. diameter. The 32/20B is equipped with a 5-hp. gasoline engine. The Model 52/15 has a 7-hp. motor and will handle rods up to 2 in. in diameter.

. . . Write No. 249

Two piece tampers for sheepsfoot roll

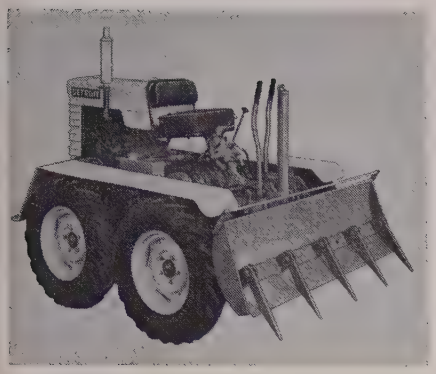
Forged alloy steel feet with removable tips are introduced by **Yuba-Southwest.** The feet are designed to give maximum wear and service in the most severe compaction rolling, particularly in rocky

soil. Pressures up to 1,540 psi. are obtainable when used with Southwest Model 55-RR sheepsfoot tampers. The feet are 9¼ in. long with two sizes of steel tips having contact area of 7 sq. in. or 8 sq. in. Tips can be replaced in the field by driving off the old and driving on the new ones. Tips and shanks have a close taper fit which becomes tighter with work. Load concentrations will not cause bending or distortion of the heavy-bodied shank.

. . . Write No. 250

Small 4-wheel-drive dozer

A small 4-wheel drive rubber tired tractor weighing only 2,000 lb. is announced by **Detroit Tractor, Ltd.** The unit designated W4G062 is designed for light industrial construction work and is available in four different hydraulically operated models, including bulldozer, grader clam, roll bucket and loader. The close coupled machine can turn inside a 6-ft. circle and its 4-wheel-drive system through 7.50x16 tires gives high flotation. Other features include double acting hydraulic cylinder with float position valve in a new fast

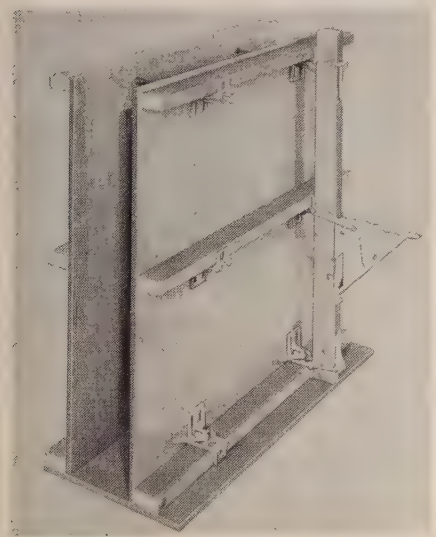


service design that allows easy removal of clutch or transmission. Operator is seated forward for maximum visibility. Bulldozer unit includes scarifier rack and wing plates which can be easily detached. Blade can be removed for replacement with other accessories.

. . . Write No. 251

Forming system uses low cost materials

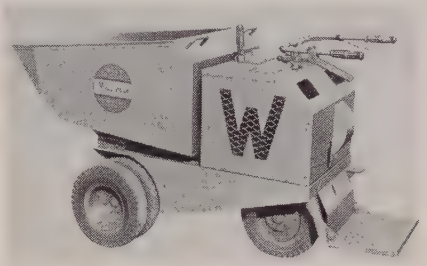
The Gates Cam-Lock system which uses 5 new types of hardware to produce concrete forms with plywood and dimensional lumber is announced by **Gates & Sons, Inc.** The new product includes 2 types of heavy-duty break-back ties, a Cam-Lock tie bracket, a stiff-back Cam, and a scaffold bracket. The new system will integrate easily with present Gates systems. The Cam-Lock system embodies use of 2 x 4s, 2 x 6s and 4 x 8-ft. plywood sheets. No ribbing or special hardware attached to the panels is necessary and the



use of stiff-backs and walers is cut in half. Cam-Lock brackets hold the 2 x 4 waler in place by locking to either a loop-end or button-type tie through camming pressure. Further rigidity of the form may be obtained through use of the new stiff-back cam. *. . . Write No. 252*

Power buggy has automatic transmission

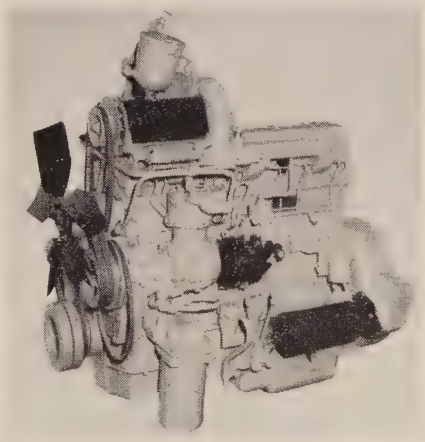
An automatic speed changer which varies the drive ratio to give greater pulling power or greater speed is a feature of the new Whiteman "Walk-or-Ride" power buggy made by **Whitman Mfg. Co.** When the buggy hits an uphill pull, a lower drive ratio (down to 1:2½) automatically takes hold for extra pulling power. When the going is easier it automatically



moves into a higher drive ratio (up to 2:1) for higher speeds. The 11-cu. ft. capacity buggy is powered by a Wisconsin engine; it has front-wheel drive and forward and reverse controls. Model number is WSB-11. It is also available with flat bed body. *. . . Write No. 253*

Lightweight diesel engine

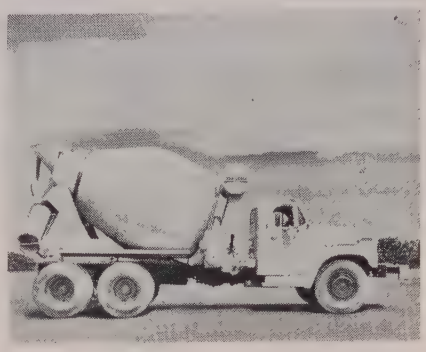
Cummins Engine Co., Inc. has introduced the new C-160 6-cylinder engine which develops 160 hp. and weighs only 1,555 lb. A turbocharged version of this new engine is designated C-175 Turbodiesel engine. It develops 175 hp. with bore, stroke and piston displacement



identical to the C-160. The C-160 is being engineered into smaller and lighter weight chassis than were previously available with diesel power. Among the construction units to which it can be applied are graders, shovels, loaders, rubber tired tractors, scrapers and similar units. Cummins offers 35 diesel engine models in a range of 60 to 600 hp. *. . . Write No. 254*

Truck mixer has four speeds

The "IV Speed Eto" (engine-take-off) truck mixer which offers 4-speed operation for mixing and discharging is announced by **Cook Bros. Equipment Co.** The Challenge mixer features a slow agitating range for pre-mix hauling, a



fast agitating and slow mixing range for long hauls, fast mixing range for high speed job site mixing, and high speed range for faster charging. All four transmission ranges also are available for discharging. The unit is equipped with dual Electro-Aire controls located at the rear of the mixer and inside the cab. All controls are operated by switches. Mixer is made in 5½, 6, 6½, 7, 7½, 8, 8½ cu. yd. sizes.

. . . Write No. 255

Constant speed coupling

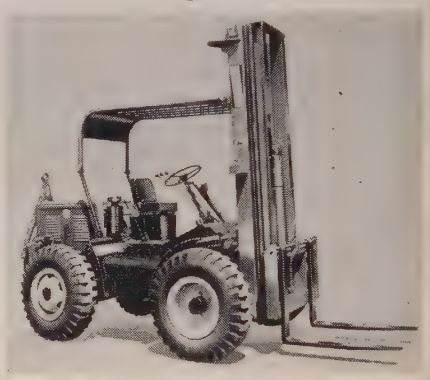
A cast aluminum hydraulic coupling which automatically regulates output speed to a constant rate regardless of input rpm. has been developed by **Knechts, Inc.** Called "Speed Monitor" the unit converts any variable speed rotating energy source to constant speed without loss of power. Among its uses is that of controlling the speed of belt-driven accessories on an automobile engine. A car equipped with Speed Monitor delivers maximum electrical output and cooling at normal idling speed through full throttle, eliminating the necessity for extra output electrical systems.

Each accessory, generator, fan, water pump, etc. operates continuously at maximum efficiency with a minimum of engine horsepower. Under extreme acceleration the constant speed coupling subtracts up to 40 hp. from the fan belt of an automobile. It will also convert any variable speed power source to a constant speed power supply for direct coupling to 60 cycle AC generators or alternators.

. . . Write No. 256

Lift truck has 4-wheel drive

Four-wheel drive lift trucks designed for all-weather operation in rough terrain are announced by **Champ Corp.** Model 44 Hi-Lo has a lifting capacity of 4,000 lb. at 24 in. load center at speeds up to 52 fpm. It is able to serve scaffolding combinations up to 23 ft. The unit



is powered by a 109-hp. Chrysler Industrial 6-cylinder engine. Standard equipment includes 4-wheel power brakes and full time power steering. Extra heavy construction is featured throughout and three tire size options are available.

. . . Write No. 257

Sealing compounds for concrete

Six new epoxy resins for sealing, bonding, and coating concrete are announced by **Sika Chemical Corp.** These materials include Sika epoxy joint sealer for vertical and overhead joints; Sika epoxy crack sealer for small cracks and joints; Sika epoxy bonding compound for bonding fresh to old concrete; Sika epoxy patching compound for patching concrete where rapid curing is important; Sika Guardkote, a skid resistant surfacing for pavements; and Sika Surface-Kote, a chemical resistant floor covering. All Sika resins are packaged in two-component containers and come in ¾-gal. and 24-oz. units. When cured the materials will withstand temperatures up to 2,250 deg. F. and are resistant to gasoline, oil, organic solvents, alkali, and most acids.

. . . Write No. 258

3,000-watt portable power unit

Zeus model GW-300 gasoline generator of 3,000-watt capacity has been added to the line of **Pesco**

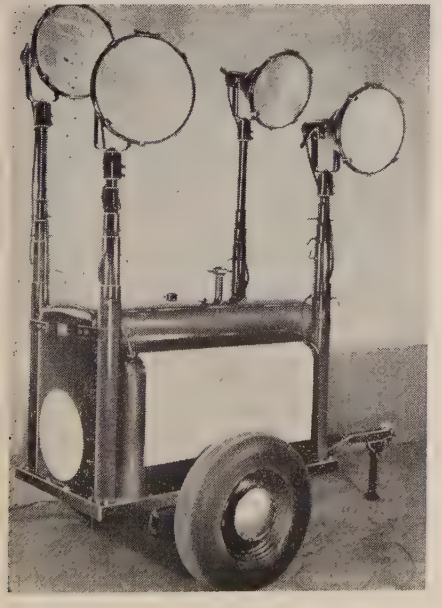
Products Division, Borg-Warner Corp. The new unit features a permanent magnet alternator which has no brushes, slip-rings or commutator to wear out. It is offered with recoil or electric start, non-integral fuel tank and air-cooled operation. Size is only 19 in. high by 16 in. wide by 21 in. long. Optional accessories include conversion units for butane, propane or natural gas. It is light enough to be easily portable.

. . . Write No. 259

Mobile floodlights

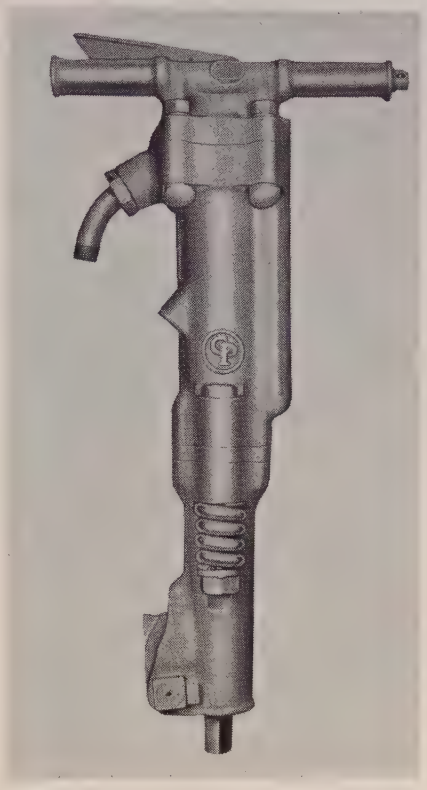
Four huge floodlights, producing 300,000 or 500,000 candle power and powered by a trailer mounted generator, form the new **Pacific Mercury** Mobilite floodlighting unit. Each of the flood lights is individually adjustable to a height of 18 ft. and will pivot in a complete circle. The self-contained units are available with 6,500-watt or 10,000-watt generators. The 10,000-watt model has 12 extra outlets for operation of equipment.

. . . Write No. 260



Compact demolition tool

A compact 80-lb. demolition tool, Model CP-124, has been introduced by **Chicago Pneumatic Tool Co.** Shorter than any tool of comparable capacity, the new unit has a body-contoured backhead which permits the operator to rest the tool against thigh for easy point spotting. Construction features include a new rubber cushioned shock resistant container, reversible pistons and extra large fronthead springs.



. . . Write No. 261

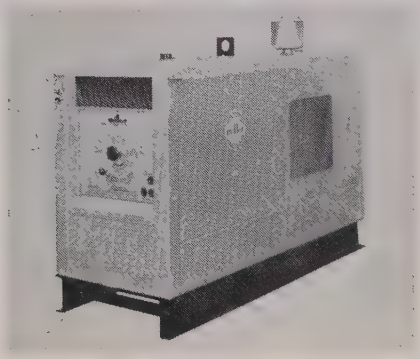
Portable submersible pump

A light submersible pump which weighs 86 lb. and can turn out 265 gpm. against a head of more than 16 ft. is introduced by **Motorborr.** The Weda pump operates on 220 or 440-volt current and uses a 3-in. discharge hose. The ruggedly built unit handles mud and sand up to 3/16-in. particle size, is cold proof, salt water resistant and has a built in temperature switch which prevents burnouts. Casing is cast from a light metal alloy and impeller is made of long wearing stainless steel. Rubber lined impeller casing is highly resistant to abrasives. Rotor is water cooled through a hollow shaft and is completely sealed from stator by stainless steel sleeve.

. . . Write No. 262

Diesel power for welder

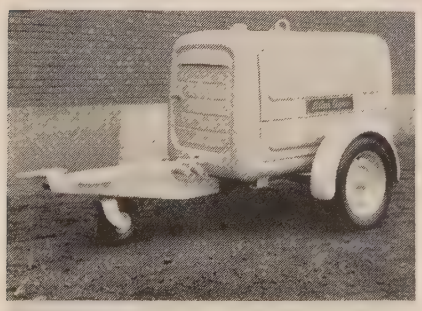
A Hercules 38-hp. 3-cylinder direct injection diesel engine now powers the new DD-250-L welder



and power plant manufactured by **Miller Electric Mfg. Co.** The unit has two DC welding ranges of 50-200 amps., and 150-350 amps., a 100% duty cycle; rated output of 250 amps., DC at 40 v. Maximum open circuit voltage is 65 with infinite current adjustment steps. Power output is 12 kw., 115-230 v. single phase, 60-cycle AC, and up to 6.5 kw. AC while welding. It delivers 1 kw., 115-v. auxiliary DC power while welding. Specifications available. *. . . Write No. 263*

Diesel powered compressors

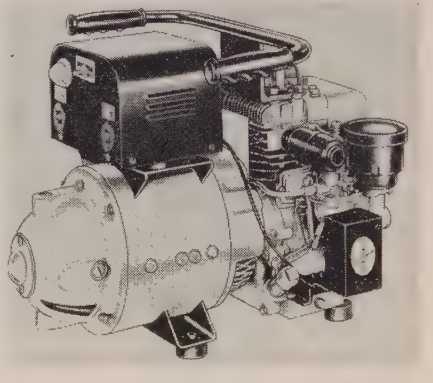
Three compressor models all powered by diesel engines have been introduced by **Atlas Copco Pacific.** The three compressors which make up the VT series offer capacities from 115 to 315 cfm. They feature light weight and compact size. Crankcase, bellhousing, and cylinder ducting are of one-piece welded design. All machines in the series are supplied with air cooled diesel engines. Compressor components are easily accessible for inspection and maintenance. By loosening three bolts, the entire diesel-compressor unit can be lifted out for shop overhaul. Spare parts for compressors and engines are interchangeable throughout the series. Torsion bar suspension for each wheel provides a smooth haul over rough roads. Operating at 100-125 psi., the VT-6 delivers 315 cfm., the VT-4 delivers 160 cfm., and the VT-3, 115 cfm.



. . . Write No. 264

Electric plants have automatic idling control

Three models of portable gasoline electric plants featuring an automatic idle control to reduce noise, save fuel, and increase engine life have been introduced by **Winpower Manufacturing Co.** The units are rated at 1,500, 2,500, and



3,500 watts. The idling control permits the plant to idle until a load of 100 watts or more is applied, at which time it revs up to operating speed and voltage. When the load is removed, it once again drops back to idling speed. All units are powered by 4-cycle air-cooled Briggs & Stratton engine. Units weigh 122, 173, and 221 lb. respectively. Standard equipment includes stop-switch, pilot light, vibration dampers, rope or recoil starter, two 15-amp. and one 30-amp. grounding type receptacles, 3 wire twist lock receptacles on the larger models and convenient carrying handle or dolly.

. . . Write No. 265

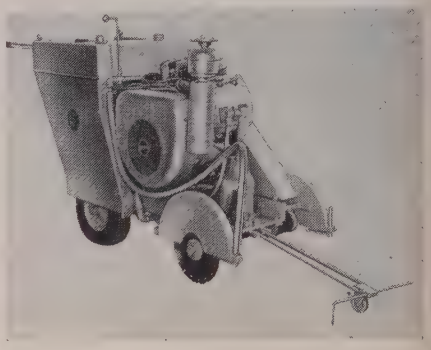
Heavy-duty lift trucks have 4-wheel drive

The new units in the 15,000 to 20,000-lb. capacity range with 4-wheel drive are announced by the **Hyster Co.** The new units are models 150, 180 and 200. The all-wheel drive trucks allow use of a full range of hydraulic attachments, equipment options and accessories. Literature available.

. . . Write No. 266

Pavement saw delivers straight cuts

A lockable third wheel for straight line cuts is featured in the new Tri-Line concrete saw announced by **Engineered Equip-**

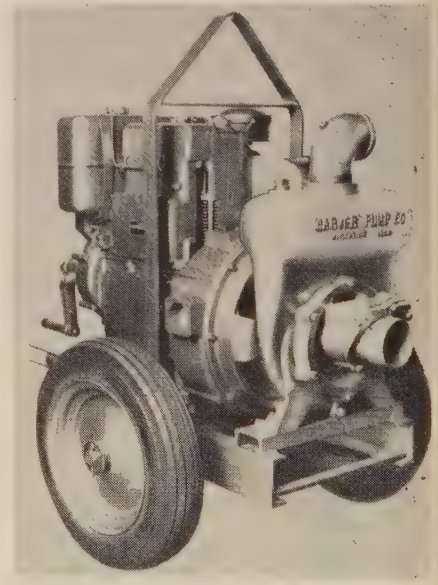


ment, Inc. The unit includes hydraulic blade depth control enabling the operator to start cutting without adjusting blade which returns to pre-set depth automatically. It is mounted on a tricycle under-carriage for moveability and has variable speeds up to 40 fpm. The cutter uses diamond-segmented blades and can operate effectively on concrete or asphalt. Optional equipment includes water tanks and water pumps. A manually propelled model is available.

. . . Write No. 267

Diesel powered pumps

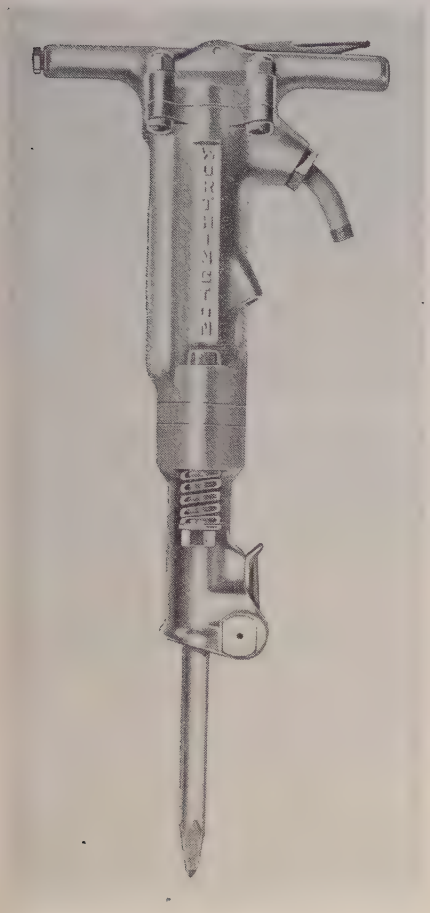
A line of diesel powered pumps has been introduced by **Carver Pump Co.** The line covers both self priming and non-self priming pumps in sizes from 40 to 1,600-



gpm. capacities. Diesel engines are used to take advantage of their low maintenance and fuel economy features. *. . . Write No. 268*

Heavyweight paving breaker

Worthington Corp. announces a new model heavyweight paving breaker, Blue-Brute WB-82, designed for heaviest demolition work. A progressive throttle valve simplifies starting moils under adverse conditions and features like



the bushed front head and throttle valve assure prolonged efficient operation at minimum maintenance costs. Unit is available with spike driver and sheeting driver which are readily interchangeable with the standard paving breaker housing. *. . . Write No. 269*

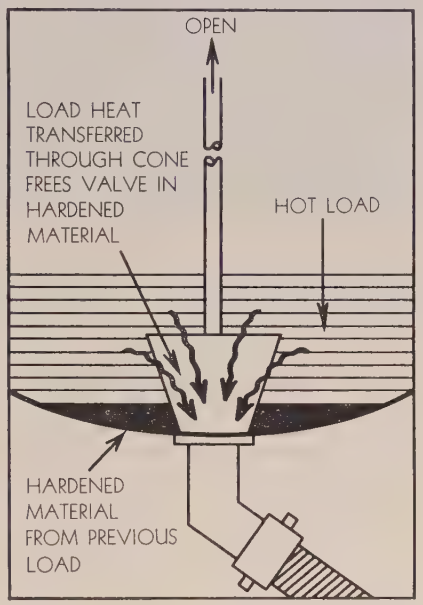
Hardfacing electrode for heavy impact

Nickel Manganese "C", a hardfacing electrode designed especially for components subject to heavy impact, has been developed by **Air Reduction Pacific Co.** The composite 14% manganese electrode is especially suitable for build-up of dipper teeth, bucket lips, crusher jaws, hammers and screens. Hardness as deposited ranges from 170 to 230 Brinell and the material will work-harden to 550 Brinell. The Nickel Manganese "C" electrode meets AWS-ASTM classification EFeMn-A covered and can be used with either AC or DC reverse polarity power source. Effective in all-position work it is available in standard 14-in. lengths in diameters of 1/8, 5/32, 3/16, and 1/4 in. *. . . Write No. 270*

Etnyre designs new valve for asphalt hauling tanks

A completely new design of inside valve for asphalt hauling tanks is announced by **E. D. Etnyre & Co.** It is an external screw type valve with a hand wheel on the top of the tank to operate the valve. This valve is of 4-in. size reduced to 3 in., with a 3-in. unloading line and quick coupler.

Feature of the valve is its design as a cone which utilizes the heat



in the new load to free the valve seat in the hardened material that is present from previous loads. This process is accomplished by conducting the heat from the new hot load which is transferred through the cone and past the hardened material (see drawing). *. . . Write No. 271*

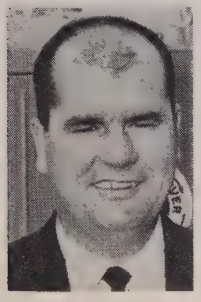
Heavy-duty concrete vibrator

A 40,000 vibration per minute vibrator designed for heavy mass placement of low slump concrete with large aggregate is announced by **Dart Manufacturing Co.** Designated the A-49 "Alaskan", the air vibrator features a three-stage refrigeration system to minimize internal icing of the exhaust and oil strainer which cleans incoming air of foreign particles down to 74 microns. The system has no moving parts, requires no maintenance or service for the life of the vibrator. *. . . Write No. 272*

News of DISTRIBUTORS

New San Diego facility

San Diego Equipment & Supply Co. has completed construction of a new warehouse and sales office at 5901 Mission Gorge Rd. in San Diego, Calif. Specializing in construction, drilling and rock excavation equipment, the newly formed firm represents Gardner-Denver Co., manufacturer of compressors,



J. W. "Bill" Gallagher

pumps and rock drills; Bay City Shovel Co., Rock Bit Division of Timken Roller Bearing Co., and others. Field technical assistance is available as an additional customer service by J. W. "Bill" Gallagher, general manager of the new distributorship.

Additions to personnel

Announcement is made by Andrews Machinery of Washington, Inc., Seattle, of the addition of two new men. Harry J. Rekers has joined the firm as wellpoint engineer. S. L. "Sid" Sanders, who has been associated with the sale of construction equipment since 1949, is the other new man. Formerly he was connected with Bow Lake Equipment Co. and Universal Equipment Co., Seattle.

C. A. Russell succeeds Glen Farrar

Announcement is made by Feenaughty Machinery Co., Seattle, of the appointment of Charles A. Russell as manager, succeeding Glen W. Farrar who has been transferred to the headquarters office in Portland. Widely known in the heavy equipment field for twenty years, Russell formerly operated his own equipment brokerage business.

Cal-Ore expands territory; opens Portland branch

Cal-Ore Machinery Co. has been appointed by Northwest Engineering Co. as direct factory distributor for sales, parts and service of Northwest shovels, cranes and draglines for Oregon and part of southern Washington. Cal-Ore has handled this line for fourteen years in southern Oregon from its southern division in Medford. Now the company has opened a northern division at 5601 N. E. Columbia Blvd. in Portland to better serve the added territory.

N C MACHINERY CO., Caterpillar dealer for western Washington, recently held an open house to mark the official opening of its new branch in Chehalis, Wash. *Frank Johnson*, whose machinery experience dates back to 1934, has been named branch manager, with *Gordon Graham*, parts manager, and *Ray Ginsbach*, service manager. N C Machinery Co., a division of Northern Commercial Co., maintains sales and service headquarters at Seattle, with other branches located in Mt. Vernon and Port Angeles.

Al Burke gets sales award

Al F. Burke (right), heavy-equipment salesman for Howard-Cooper Corp., Portland, Ore., was honored at a distributor sales meeting in Cedar Rapids, Ia., by Link-Belt Speeder Corp., manufacturer of power shovel-cranes and log-loaders. He received a plaque in recog-

nition of his top sales performance among all distributor salesmen during the past ten years. Norb V. Chehak, Link-Belt vice president and sales manager, who was formerly district sales representative in the Northwest, made the presentation, while Rex A. Smith, assistant sales manager, smiled his approval.

Loyd Somers rejoins Shepherd

Loyd A. Somers has returned to Shepherd Machinery Co., Los Angeles, to serve the earthmoving industry as Shepherd's general manager, used machinery department. Before entering on a business venture of his own in 1958, Somers had been with Shepherd for 20 years serving in various capacities.

Promotions at Peterson Tractor Co.

Announcement is made by Howard Peterson, president of Peterson Tractor Co., Northern California Caterpillar dealer, of the promotion of Raymond Gieszl to San Leandro service manager, and the promotion of Charles Welch to parts manager at the same store. New assistant parts manager is William Hamilton.

Big news from Aikens Tractor Co.

George Fretland, formerly branch manager for Aikins Tractor Co. in Ukiah, is again with the firm in Eureka, Calif. Fretland has been engaged in the heavy equipment field for thirteen years. He was eight years with Howard-Cooper Corp., where he won a trip to Hawaii for his outstanding sales

DAYBROOK design increases payload

HERB JACOB, AJAX ASPHALT PAVING, INC., DETROIT, MICHIGAN

Mr. Jacob's Daybrook units have been in constant use on Ajax Paving Company contracts. One of his units is shown above hauling asphalt for a 5000-car parking lot in a Michigan shopping center. Here's what Mr. Jacob says . . .

"The DAYBROOK's are the pride of my fleet of trucks. The trailer unit scales, hauls and feeds 20 tons. Its light weight plus excellent construction make it possible to scale the maximum load. It pays for itself in a season in the volume of asphalt it carries and in the profit it shows in operation. On the tandem unit, a completely new and revolutionary design, I am able to haul a greatly increased payload on the same type of tandem chassis."

Mr. Jacob says also, "Fewer moving parts in the Daybrook telescopic hoists make for less maintenance and strain on the bodies. With Daybrook guaranteeing the service and reliability of their hoists, these two trucks are an unbeatable combination."

DAYBROOK Hoists and Bodies pay for themselves in increased operating profits. See your Daybrook distributor. Let him tell you more about the many design and engineering features that create savings on all hauling operations.

Daybrook—manufacturer of quality hydraulic truck equipment for the construction industry—

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POWER GATE® (hydraulic tail gate) • **POWER LOADER** (truck-mounted crane)

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TRANSPORT TRAILER & EQUIP. CO., INC.
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Seattle 4, Washington

•

UTILITY TRAILER SALES
S. Highway 99 at Orange Ave.
Fresno 66, California

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WESTERN BODY & HOIST
5729 Maywood Avenue
Maywood, California

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WESTERN TRUCK EQUIP CO.
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record. Prior to re-joining Aikins he managed the Ukiah branch of West Coast Tractor & Equipment Co.

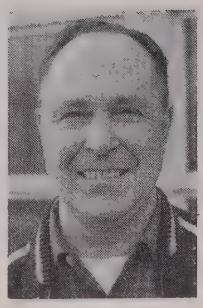
The Aikins company, which recently moved to 959 W. Murray St., three blocks from its former location on Broadway, is distributing the Eimco tractor line in Curry County, Ore., and three adjoining counties in California. The Eimco tractor, built in Salt Lake City, has been well known and used in mining for a long time. In recent years Eimco expanded the line and is now building models for construction and general industrial applications.

Larry Pipkin joins Star

Larry Pipkin has joined Star Machinery Co., Seattle, as a construction equipment salesman. He has had several years of experience in construction and industrial sales. Star Machinery, with branches in Spokane and in Portland, Ore., distributes contractor equipment throughout the Pacific Northwest.

Sales staff expanded

Further expansion of its field sales staff is announced by Interstate Tractor & Equipment Co.'s president, Collis Johnson, from the headquarters office in Portland, Ore. Harold C. "Jeff" Jefferies of Portland and Robert R. Haskin of Forest Grove, Ore., have joined the firm as territory managers and will handle retail sales of Euclid crawler tractors, scrapers and earthmovers, Thew Lorain shovels, cranes and loaders, and Chicago Pneumatic air compressors, drills and tools.



Harold C. "Jeff" Jeffries

Corp Bowen withdraws from active management

Hall-Perry Machinery Co. announces that on advice of his doctor, R. M. "Corp" Bowen has retired from active management of the company, which has headquarters in Butte, Mont., and branches at Billings, Great Falls, and Missoula.

Tire production facilities to be expanded

Plans for a $4,000,000 expansion of earthmover tire production facilities at Goodyear Tire & Rubber Co.'s plant in Topeka, Kans., are announced by Russell DeYoung, president. DeYoung said the most important reason for the move is to increase capacity to manufacture larger tire sizes because "Construction equipment manufacturers are designing bigger machinery for 1961-62 with very high horsepower ratings to speed up construction projects." By 1961 Goodyear plans to have the tire-building equipment installed in a new building, 350 x 100 ft.

District sales appointments

Arnold F. Kohnert, assistant district manager for Ceco Steel Products Corp. in San Francisco, has been promoted to district manager. He has been assistant since 1953. Donald B. Gibbs, a Ceco sales engineer, has been appointed as assistant district manager.

AED convention delegates share optimistic view of sales outlook

A feelig of extreme optimism regarding business conditions for the "Soaring 60's" was generated by the more than 4,000 distributors and manufacturers in attendance at the 41st annual convention of the Associated Equipment Distributors at the Conrad Hilton Hotel in Chicago, Jan. 24-28. The belief was pretty generally expressed that the year ahead could be expected to bring heightened sales in all sections of the country.

These opinions were no more sharply evidenced than in retiring President F. J. Fitzpatrick's keynote address at the opening session. Fitzpatrick said, "The underlying demand for construction machinery will again increase moderately this year." However, he added that the individual dealer's volume and profits are reflected by existing conditions at the local level, and, "as distributors, our business is primarily affected by local conditions."

A subject closely tied to the economic outlook for the years ahead, the Federal Highway Program, provided meat for talks by Gen. L. W. Prentiss, executive vice president of the American Road Builders' Association, and John A. Volpe, president-elect of The Associated General Contractors of America.

Mayer

Skidmore

New president of the association elected at the meeting is Jewel A. Benson of Houston. This is the first time that AED picked a man from Texas as chief officer. Chosen as senior vice president is Herbert J. Mayer, a Westerner, who is executive vice president of Western Machinery Co., San Francisco.

Charles E. Skidmore, who was elected Director of Region 11 in December, was re-elected to a second term as a member of the board of directors and installed during the annual meeting. Skidmore, also from the West, is a partner and general manager of Brown-Bevis Industrial Equipment Co., Los Angeles.

During the four days of business sessions qualified speakers were heard on such subjects as: the importance of explicit communications in management; proper procedures in hiring sales personnel; how to blueprint the market for construction equipment; financing and credit, and other subjects of interest to the members.

As a fitting finale to the sessions, a panel of four leading distributors which included R. L. Arnold of Arnold Machinery Co., Salt Lake City, Utah, and Herbert Mayer, put forth their ideas in the scope of long range management planning, selling, executive management, and ethics and cooperation between competitors, followed by an open forum.

J. A. Benson, who was elected national president of AED at the Chicago convention, Jan. 27, died suddenly on Feb. 19. He was 60 years of age at the time of his death.

MANUFACTURERS

IH sets up Western region office

International Harvester Co. is setting up a Western region sales organization with headquarters at 2858 Cypress St., Oakland, Calif., according to announcement by C. E. "Skip" Jones, engine sales manager of IH's Construction Equipment Division. Sales representatives are J. D. Reishus, Portland, Ore.; F. W. Knox, Oakland, and D. W. Rains, City of Industry, Calif.

Perkins to manage General truck tire sales

Harry V. Perkins has been promoted to manager of truck tire sales for The General Tire & Rubber Co.'s San Francisco division. Perkins has been with General since 1951, his most recent assignment being San Francisco-Oakland territory salesman.

Gardner-Denver opens San Diego office

Announcement of a new Gardner-Denver Co. office in San Diego is made by the company's Western divisional manager, Walt Nilsson, Los Angeles. Heading the new office located at 1629 University Ave., will be Robert Scruggs, formerly a Gardner-Denver field engineer in the Los Angeles and San

Robert Scruggs

Diego area. With general offices located in Quincy, Ill., the manufacturer is represented in San Diego by Bailey Equipment Co., which distributes the G-D industrial line of pneumatic tools and air compressors, and San Diego Equipment & Supply Co., which merchandises the complete contracting equipment line.

ESCO top level appointments

Jefferson J. Davis, vice president in charge of product divisions at Electric Steel Foundry, Portland, Ore., has been appointed executive vice president. He has been a member of the organization since 1936 when he joined ESCO at Seattle. Another recent appointment is that of Ed T. Hewitt to the position of vice president, International Division. He joined ESCO as manager of the San Francisco sales district in 1938.

New division formed

Pacific Wire Rope Co., Los Angeles, announces the formation of a specialty products division to meet the need for material handling equipment by West Coast industry.

W. T. Murphy has new position at IH

William T. Murphy has been named staff assistant to Clarence A. Hubert, general manager of International Harvester Co.'s Construction Equipment Division. Previously Murphy served as staff assistant to Russell F. Denney, the Division's manufacturing manager.

LeRoi names three v.p.'s

Elevation of three to vice president status at the LeRoi Division, Milwaukee, are announced: R. H. Koehler, from general sales manager to vice president—sales; J. R. Gavigan, from manager of administration and accounting to vice president—planning and administration; and L. E. Dondero, from manager of West Allis, Wis., plant to vice president—manufacturing.

Deere offers lease plan

Deere & Company, Moline, Ill. has worked out a nationwide plan with Boothe Leasing Corp. that will permit customers to lease John Deere industrial tractors and equipment. The plan will operate through the John Deere dealer organization.

Raymond Schutz becomes vice president

Raymond J. Schutz has been appointed vice president — research and development for Sika Chemical Corp., Passaic, N. J. For the past fifteen years Schutz has been with Sika, as technical director for the past three years and before that as a chemical engineer.

Ryerson Steel names officers

Appointments of Thomas Z. Hayward as senior vice president, and Weaver E. Falberg as vice president, sales, for Joseph T. Ryerson & Son, Inc., nationally operated steel and aluminum distributor, are announced. Their headquarters are in the general office in Chicago.

Bud Coffey heads Westfall sales

S. J. "Bud" Coffey has been appointed vice president and sales manager of Westfall Equipment Co., Portland, Ore., manufacturer

S. J. "Bud" Coffey

of heavy, pneumatic-tired, off-highway tractors. Coffey was formerly head of the West Coast off-highway equipment program of Mack Truck Co., San Francisco.

Master Builders expands in Northwest

Increased business in its Washington territory has resulted in a major expansion move for The Master Builders Co. which announces the opening of a new branch office in Seattle. Don W. Freeman has been appointed manager. He has been with the firm since 1956. With headquarters in Cleveland, Master Builders, a division of American-Marietta Co., produces admixtures for the improvement of concrete.

Dorr-Oliver moves manufacturing operations

Dorr-Oliver announces the transferal of all manufacturing operations from Oakland, Calif., to the company's Hazleton, Pa., and Englewood, Colo., shops. West Coast customers will continue to be served from offices in Seattle, Wash., and Oakland and Los Angeles, Calif.

West served by new Insley office

Insley Manufacturing Corp., Indianapolis, announces the opening of a Western regional office at 2821 West Mission Rd., Alhambra,

J. Ray Elliott

Calif. J. Ray Elliott, vice president, will assume the office of manager of the new office. District sales representatives include Ed. V. Walsh, Los Angeles, and J. L. Lamley, Olympia, Wash.

Challenge and Cook merge

Challenge Manufacturing Co., manufacturer of the Pacemaker truck mixer, and Cook Bros. Equipment Co., producer of heavy-duty trucks and truck equipment for the construction industry and worldwide distributor of Challenge truck mixers, have merged into one corporate group to be known as Challenge-Cook Bros. J. Ross Castendyck, owner of Challenge, will serve as board chairman of the new corporate group, with Howard F. Cook, associate chairman. Joseph E. Hall, former Cook executive vice president has been named president. General offices will be at the former Cook location, 3334 San Fernando Rd., Los Angeles.

Koehring appoints Western manager

Paul A. McDonald has been appointed district manager for the states of California, Nevada, Utah, and Arizona by the Koehring Division of Koehring Company, Milwaukee, Wis., construction equipment manufacturer. McDonald has

Paul A. McDonald

many years of experience in the engineering, construction, and equipment fields. He is making his headquarters in Danville, Calif.

Kaiser promotes Tom Byrd

Appointed to the post of assistant manager of Kaiser Steel Corp.'s southern district sales office at Los Angeles, is Thomas M. Byrd. He succeeds Fred G. Brear who was recently appointed manager of customer services at Oakland, Calif.

Massey-Ferguson expands facilities

A new building under construction for Massey-Ferguson, Inc., Detroit, will double the company's present engineering and laboratory facilities. The new building will be completed in June.

Olle named by Seaman-Andwall

Joseph L. Olle has been appointed manager of the Seaman-Andwall Corp., International Division, making his headquarters in Milwaukee.

James Talcott forms Western subsidiary

James Talcott, Inc., 106-year old construction equipment and industrial machinery finance firm, announces the formation of a new industrial time sales subsidiary, James Talcott Western, Inc., with headquarters at 510 So. Spring St., Los Angeles. Edward J. Eckert will have charge of credits and operations, and Weldon D. Beezley will head new business activities. Both men are well known among manufacturers and equipment distributors in the West. Each has served for a period of twelve years with C.I.T.

New retread plant at Sacramento

B. F. Goodrich Tire Co. is building a new retread plant at Sacramento, Calif. When it is finished this summer, W. G. Ellis will step in as manager. He is presently employed at the company's Oakland retread facility.

Ritter succeeds Angell at American Bitumuls

Glen L. Ritter has been named vice president, marketing-Western, for American Bitumuls & Asphalt Co., San Francisco, succeeding Norman H. Angell who retired Jan. 1 after 37 years of service with the company. Immediately prior to his present appointment, Ritter was district manager at Portland, Ore.

Glen L. Ritter

Otto Hoefler succeeds Ritter at Portland in that capacity, moving from a similar post at Oakland, Calif. E. L. Morgan was named manager at Oakland. He held the title of assistant district manager before this new assignment. M. A. Ernst was named district manager at Los Angeles, succeeding D. E. Ketcham who retired last year. H. N. Boles, a sales engineer at Los Angeles, was named assistant district manager. R. A. Briggs, sales engineer in the Oakland district, was appointed to the position of assistant district manager here.

Executive appointments at Seattle

Two well-known truck manufacturing executives, Robert D. O'Brien and John G. Holmstrom, have been assigned new responsibilities, according to announcement from Seattle, Wash., by Paul Pigott, president of Pacific Car &

O'Brien

Holmstrom

Foundry Co. O'Brien has been appointed executive vice president, with jurisdiction over all sales and manufacturing of the company, its subsidiaries and divisions. Holstrom is devoting full time to the advanced engineering and designing of on- and off-highway motor trucks for the Kenworth and KW-Dart Truck Co. divisions.

Aeroquip plant expansion

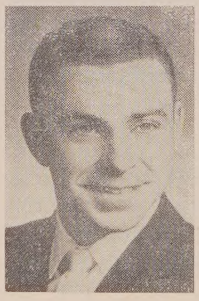
Completion and occupancy of a new development engineering center is announced by Don T. McKone, vice president and general manager of Aeroquip Corporation, Marman Division, Los Angeles. The new addition brings the division's total plant area to 100,000 sq. ft.

Hyster launches plant expansion

Hyster Company, Portland, Ore., plans to enlarge its Danville, Ill. facilities. Scheduled for completion in the fall, the plant will be expanded by 115,000 sq. ft., including a manufacturing addition of 95,000 sq. ft., and a 20,000 sq. ft. office addition.

Leukart names Robert Owen

Edward L. Miller, product sales manager of J. Leukart Machine Co., Inc., Columbus, Ohio, announces the appointment of Robert E. Owen as district representative

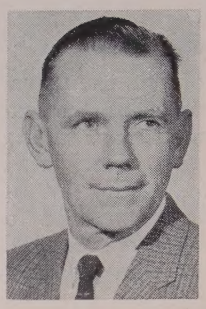


Robert E. Owen

for the company's Jay Division. He will cover eleven Western states. Before joining Leukart, Owen worked for Cal-Western Equipment, Inc. He makes his home in LaVerne, Calif.

Pennell succeeds Lloyd Lundstrom

Announcement is made by Pacific Car & Foundry Co. in Seattle of the appointment of Donald F. Pennell as vice president and general manager of Peterbilt Motors Co., Oakland, Calif., a subsidiary. Pennell takes over the duties of Lloyd A. Lundstrom who has retired after a long career as executive head of the Peterbilt firm. Pennell, who joined Peterbilt a year ago, has held engineering, sales, and executive positions with various truck manufacturing divisions of PC&F for the past twenty-three years.



Donald F. Pennell

Sales veterans fill new B-G posts

Barber-Greene Co., manufacturer of heavy construction equipment, announces a reorganization in its field sales management set-up. This program involves an increase in the number of resident sales managers, with their field sales activities supervised by Western and Eastern regional sales managers. In addition a field sales manager has been appointed, Tom Benbow, who has been with Barber-Greene since 1937 and makes his headquarters in the headquarters offices in Aurora, Ill. The newly appointed Western regional sales manager is Ralph Dano, with 36 years of B-G service. He also will headquarter at Aurora.

PCI moves to Chicago

The Prestressed Concrete Institute has established new headquarters at 205 West Wacker Dr. in Chicago, according to announcement by the newly elected president, Randall M. Dubois. The move from Florida is designed to provide greater centralization of the Institute's activities.

E. M. Smith heads up new O.E.M. Div.

Ellsworth M. Smith, who has long experience and close relationship with the construction industry, has been named director of sales of the newly-formed O.E.M. Construction Division of General Metals Corp. With headquarters in Cleveland, he will devote his time to the new two-piece teeth for shovels, back-hoes, draglines and buckets. Prior to this appointment Smith was sales manager for the Cleveland Division of H. K. Porter Co.

Bucyrus-Erie key appointments

Bucyrus-Erie Co. announces two personnel appointments. John A. Schmitz has been appointed service supervisor for cranes and ex-

cavators, reporting to D. W. Pabst, service manager, while William G. Barnes was named sales manager, blast hole drills. He will report to George D. Grayer, drill division sales manager.

Curtis becomes Rockwin president

George L. Curtis, a vice president of United Concrete Pipe Corp., Baldwin Park, Calif., has been elected president of Rockwin Prestressed Concrete Corp., Santa Fe Springs, Calif. Rockwin is a United subsidiary. Curtis is a member of the American Society of Civil Engineers and a registered civil engineer in California and New York.

Unit acquires Coles crane

Unit Crane & Shovel Corp. of Milwaukee has completed arrangements giving Unit distribution and manufacturing rights under license for the famous line of Coles all-electric, gas or diesel driven mobile cranes in the United States, Canada and Mexico.

FWD names Moellinger to new post

FWD Corporation, Clintonville, Wis., recently consolidated two of its sales departments as a further step in its accelerated marketing program. Heading the newly organized department will be R. W. Moellinger, former Western manager of FWD's defense and special projects section.

Walter Brunn retires

Walter Brunn, a Tidewater Oil Co. marketing executive in the West for many years, recently retired after 37 years of service. He had been special assistant to the general manager of Tidewater's Western division, prior to which he headed the division's marketing operation since 1957.

Apex Machine — Gardner-Denver combine

As of March 1 Apex Machine & Tool Co., Dayton, Ohio, becomes a wholly-owned subsidiary of Gardner-Denver Co. of Quincy, Ill., as announced jointly by G. V. Leece, president of Gardner-Denver, and C. A. Lange, president and general manager of Apex. There will be no change in officers or operation of the Apex organization. In Gardner-Denver's line of construction equipment are power screwdrivers and nutsetters that utilize the bits and sockets manufactured by Apex.

Assumes new sales post at Ryerson

Joseph T. Ryerson & Son, Inc., announces the appointment of H. Dana Huber as manager, national contractor sales. His headquarters are in the company's general office in Chicago. For the past six years, Huber has served as a sales representative of the reinforcing products department.

Carroll Petersen succeeds George Faulkner at San Francisco

Appointment of Carroll C. Petersen as Western district construction manager for American Bridge Division of United States Steel Corp. is announced. He succeeds George W. Faulkner who is being transferred to the New York office.

Paceco names asst. general manager

Walter L. Treadwell has been appointed assistant general manager of the Pacific Coast Engineering Co., according to C. D. Ramsden, president and general manager of the Alameda, Calif., firm. He has been industrial engineering manager for Paceco until this appointment.

41 companies merge

Industrial Asphalt of California, Inc., and forty-one affiliated companies announce approval of agreements by their boards of directors to merge into one organization. After completion of the merger, the company will own and operate thirty-two asphalt mixing plants in Southern California. Home office of the newly-merged corporation will remain at 1100 South Beverly Drive, Los Angeles.

Rucker expands at Portland

As part of an expansion program under way by The Rucker Company, headquartered at Oakland, Calif., the firm's facilities at Portland, Ore., have been moved to new and larger quarters at 1744 S. E. Hawthorne Blvd., Portland. Warehousing facilities at the new address have been doubled, and the service and repair departments have been expanded to provide Rucker customers with even more efficient service.

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