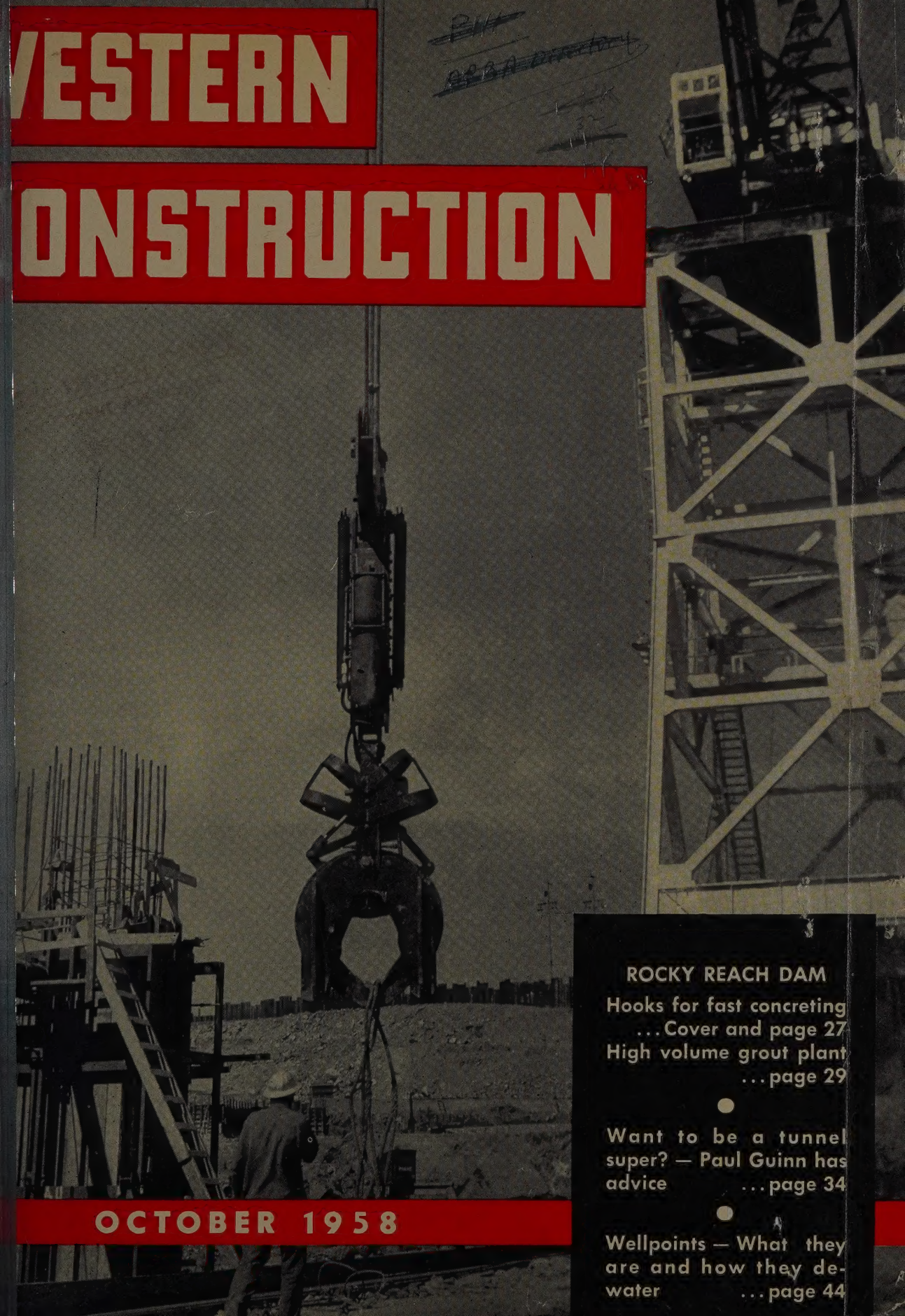
VESTERN
ONSTRUCTION



ROCKY REACH DAM

Hooks for fast concreting
...Cover and page 27

High volume grout plant
...page 29

Want to be a tunnel super? — Paul Guinn has advice
...page 34

Wellpoints — What they are and how they de-water
...page 44

OCTOBER 1958

AN ESTIMATED 73% of the petroleum requirements on major St. Lawrence Seaway projects have been supplied by Texaco. Picture shows Bill Partisch (left), Texaco Lubrication Engineer, and Vic Pandolfi, Equipment Superintendent, discussing the Texaco Lube Plan, represented by the numbered barrels. In background, upstream side of Barnhart Island Power Dam and Robert E. Saunders Generating Station designed to generate 1,880,000 kilowatts. Construction of the 3,230-ft. wide, 167-ft. high concrete gravity dam involved excavation of more than 2,500,000 cu. yds. of earth and placing of approximately 2,000,000 cu. yds. of concrete. Dam is a joint project of the Power Authority of the State of New York and the Hydro-Electric Commission of Ontario.

Contractors for both U. S. and Canadian sides used Texaco lubricants and fuels, the Canadian contractors being supplied through McColl-Frontenac Oil Co., Ltd., Montreal, a Texaco subsidiary.

NO MORE THAN SIX SERVE ON THE ST. LAWRENCE POWER DAM

Texaco Plan reduces needed lubes to no more than six

MASSENA, N. Y.—Barnhart Island Power Dam is the world's second largest hydro electric project (first: Grand Coulee).

A Texaco lubrication plan and the service that makes it work are credited by the contractor's Equipment Superintendent with playing a significant role in keeping the contractors' equipment in an operating condition.

"The Texaco Lube Plan has really helped," says Victor Pandolfi, Equipment Superintendent for Perini, Walsh, Morrison, Kiewit, Utah Companies, General Contractors. "We've used no more than six high quality lubricants *for the entire project* instead of 15 or 20. There's been less inventory. It's been simpler to service and protect the equipment. We've avoided mistakes in lubrication, and saved manhours and money."

Most Contractors Use Plan

The Barnhart Island Power Dam is just one of the St. Lawrence Seaway projects on which the Texaco Simplified Lubrication Plan has been used. It's estimated that 73% of the petroleum requirements for the Seaway have been supplied by Texaco, and that most maintenance programs have included the Lube Plan.

The Plan has been endorsed for the following reasons: proper lubricants are recommended; less storage needed, reduced confusion and misapplication; lower handling and maintenance costs; less time lost by equipment; fewer lubricating errors; time and money saved.

Developed on the Job, For the Job

The Texaco Simplified Lubrication Plan was developed from on-the-job experience in all types of construction work. It's tailor-made for the work to be done. Lubricants may vary from job to job because each Plan is set up to meet the specific needs of a specific project. But regardless of the job, the basic fact remains that—*no more than six lubricants are needed to handle all major lubrication.*

Here are the six lubricants, illustrated above, used on the Barnhart Island project:

(1) For engines: *Texaco Ursa Oil Super Duty Special;* **(2)** for chassis, wheel bearing and general grease lubrication: *Texaco Marfak Multi-Purpose 2;* **(3)** for hydraulic units: *Texaco Regal Oil R & O;* **(4)** for transmissions and differentials: *Texaco Universal Gear Lubricant EP;* **(5)** for wire rope and open gears: *Texaco Crater;* **(6)** for enclosed reduction gears: *Texaco Gear Lube HD.*

Let a Texaco Lubrication Engineer work out a Simplified Lubrication Plan for your project. You'll save time, money and mistakes. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, New York.

LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

. . . for more details, circle No. 1 on Reader Service Postcard

Things that make Northwest users into Northwest Boosters!

Another NORTHWEST 80-D makes 16 Northwests in the growth of Connolly-Pacific Co. Long Beach, Calif.

● Another Northwest 80-D has taken its place in the all Northwest job in the quarries of Connolly-Pacific Co. in the paradise of Catalina Island.

This new Northwest has replaced an old 80-D that began work with the company in 1942. In the past eleven years the old rig had handled over 5,000,000 tons of volcanic rock and Basalt for the breakwaters of southern California.

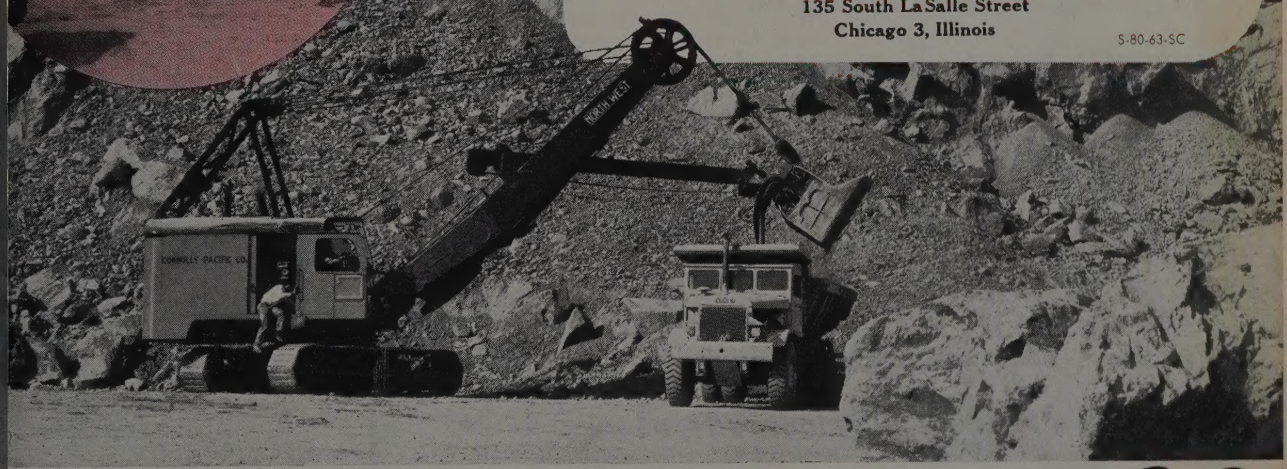
There are three 80-D's in the Santa Catalina Quarries and they have to be nimble rigs. The face is 200 to 250 ft. high and is almost solid rock. Rock is fractured by dynamite and then the shovels by loosening key boulders start landslides and shovel and trucks must move quickly to escape the cascading rock and overburden.

Northwests are built for jobs like this—Northwests load fast and move fast! Plenty of power combines with the Northwest Dual Independent Crowd that utilizes force most independent crowd shovels waste to cut through a bank or handle heavy digging without "stuttering". Uniform Pressure Swing Clutches take the jerks and grabs out of swinging and make spotting accurate without losing time jockeying a load over the truck. The Cushion Clutch eliminates shock overloads before they reach machinery and the "Feather-Touch" Clutch Control gives the feel of the load and makes operation easy without resorting to pumps, compressors, and other delicate mechanism.

This is only part of the story. We would like to have you know the complete details on the size machine you need. Why not ask for a catalog?

NORTHWEST ENGINEERING COMPANY
135 South LaSalle Street
Chicago 3, Illinois

S-80-63-SC



NORTHWEST . . always ready to GO!

CALIFORNIA: Brizard-Matthewes Machy. Co., EUREKA
CALIFORNIA: Gerlinger Steel & Supply Co., REDDING
CALIFORNIA: Southern Equipment & Supply Co., SAN DIEGO
IDAHO: Arnold Machinery Company, Inc., BOISE & IDAHO FALLS
NEVADA: Sierra Machinery Co., Inc., RENO
OREGON: Balzer Machinery Company, PORTLAND
OREGON: Cal-Ore Machinery Co., Inc., MEDFORD
UTAH: Arnold Machinery Co., Inc., SALT LAKE CITY
WASHINGTON: General Machinery Company, SPOKANE
WASHINGTON: Mid-State Truck & Machy Co., WENATCHEE
ALASKA: Bashaw Equipment Company, Anchorage & Fairbanks

NORTHWEST SALES OFFICES

SAN FRANCISCO, CALIF.
255 Tenth Street

VERNON, CALIF.
3707 Santa Fe Ave.

SEATTLE, WASH.
1234 Sixth Ave. South

Call your local Northwest Sales Age

WESTERN CONSTRUCTION

KING PUBLICATION

Ocober
1958
Vol. 33 No. 10

TABLE OF CONTENTS

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

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

★

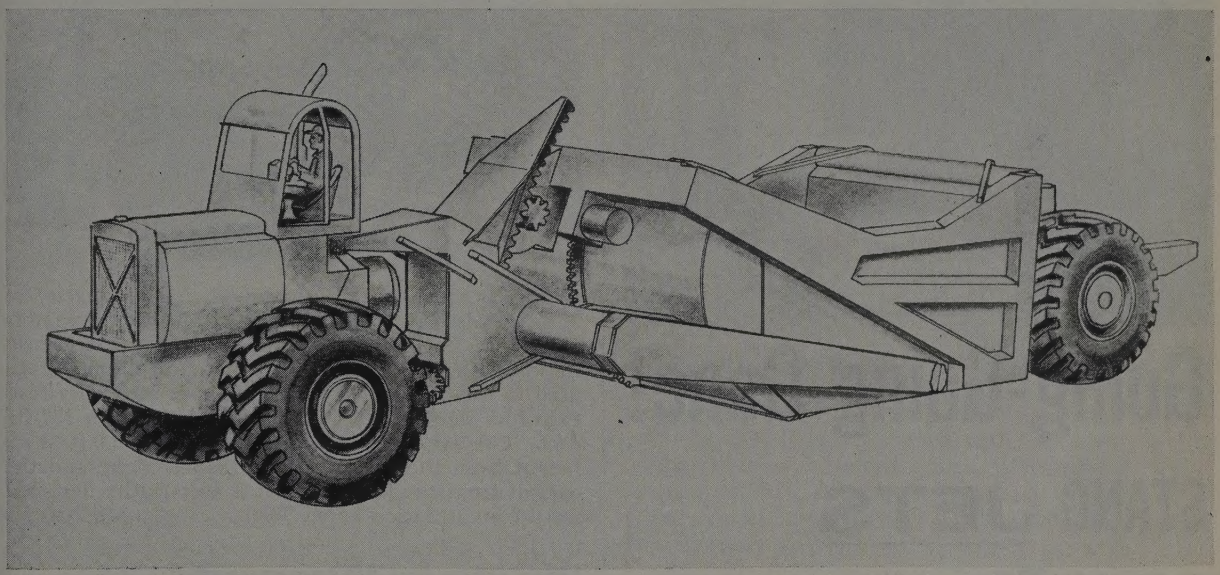
Subscription rate is $10.00 per year; $12.50 in foreign countries. Cost per single copy is $1.00. Cost per single copy of Construction Equipment Directory, published each January, is $5.00. Every regular qualified recipient of Western Construction receives a copy of the Construction Equipment Directory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

For change of address, write Circulation Dept., 609 Mission St., San Francisco 5, Calif.

NEW EQUIPMENT

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



LeTourneau will introduce new line of scrapers with electric wheels

History was made last month when **R. G. LeTourneau, Inc.** introduced the largest self-propelled earthmoving scrapers ever placed on the market.

First public showing of one of the new units took place at the Mining Congress held in San Francisco, Sept. 22-25.

R. L. LeTourneau, vice-president, disclosed that the first units will be in the 70 and 125-ton class —roughly equivalent to 50 and 100-cu. yd. capacity. This is in contrast to conventional scrapers now marketed by other manufacturers, which average 15-cu. yd. capacity, with some few going to 35 yd.

Significantly, it will be the first showing of any earthmoving machinery by LeTourneau since selling out its previous line in April 1953. The company ended a five-year absence from the business in May of this year.

The new self-propelled scrapers are the latest step in the development of this type of machine, originally pioneered by LeTourneau in 1938.

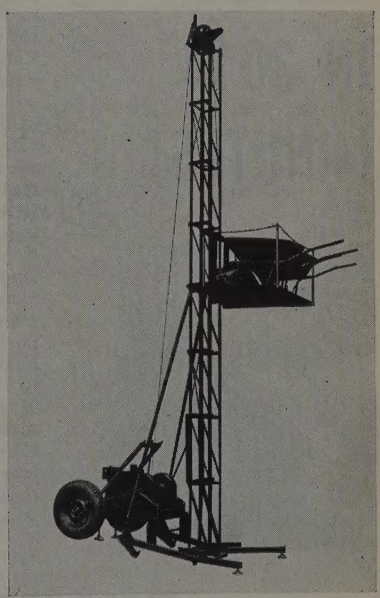
Major difference between the powerful, super-sized scraper and conventional scrapers is that each wheel of the new machine will have an individual electric motor geared directly to its inner rim, thus providing greater traction and working power under the payload than has ever before been attainable. Power is supplied by the machine's 600-hp. diesel-electric dynamo.

. . . Circle No. 151

Non-stop hydraulic truck scale

Truck Scale and Research Corp. has evolved a system for weighing axle-loads of a moving truck. With this method, employing a direct-reading dial, only a driver is necessary and he may remain in the cab. The heart of the new system is the hydraulic Quick-Way scale, which requires no pit to accommodate beams and levers. This allows the entire device to be installed in an 11½-in. deep recess in a concrete driveway to form simple, weighing facilities. A reinforced steel beam tread replaces the conventional platform. An important allied feature of the system is the elimination of the scale house. The 12-in. direct-reading dial is housed in a cast aluminum cabinet which can be located any place within 40 ft. of the scale.

. . . Circle No. 152



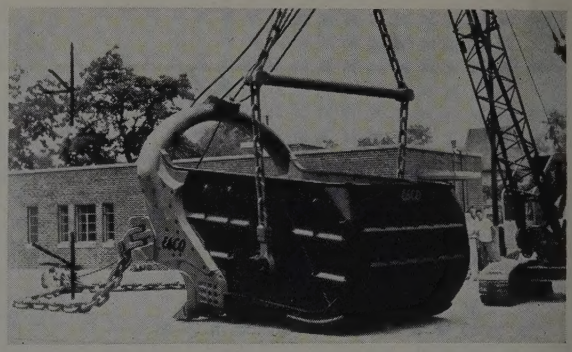
HOISTING AT LOW COST

LOW COST investment is the big feature of this new hoist. Marketed under the trade-name, "Simba," by *Tubular Structures Corp. of America*, this new hoist is a companion to the company's Tusky Hoist. Simba is powered by an 8-hp. air-cooled Briggs and Stratton engine. It provides a capacity of 1,000 lb. with a lifting speed of 125 ft. per min.

. . . Circle No. 153

The largest in the world

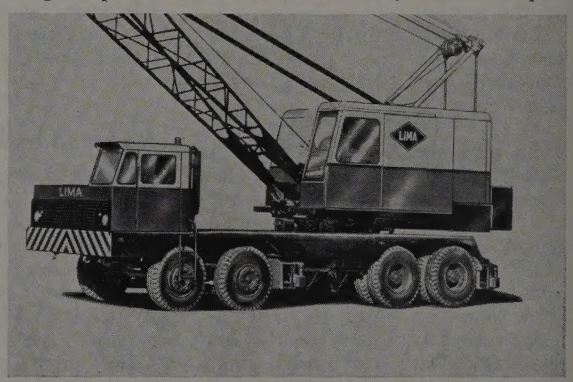
A 69,000-lb. tri-tapered dragline bucket, the largest in the world, has recently been completed by **The Electric Steel Foundry Co.** This gigantic bucket, which



weighs as much as 20 automobiles has a capacity of 35½ cu. yds. The loaded weight will be approximately 175,500 lb. ESCA Alloy 12M and manganese steel castings along with US Steel's T-1 plate are the materials used in the bucket. The drag chain is integrally cast, each link weighing 90 lb., and the teeth weigh 177 lb. each. The average width of the bucket is 11 ft. 2 in. height from the ground to arch, 13 ft. 5 in. and the overall length is 18 ft. 9 in. It is specifically designed for use on a Marion Super 7800. *... Circle No. 154*

Lima crane has 50-ton capacity

The **Construction Equipment Division** of **Baldwin-Lima-Hamilton Corp.**, announces the production of a new four-axle 50-ton capacity truck crane known as the Type 64-T. The carrier is of Lima design and is available in 8 x 4 and 8 x 6 drives. Outstanding in the carrier construction is the use of T1 steel (100,000 psi. yield strength) in the main frame and frame components, resulting in high strength and rigidity at reduced weight. Special features include, easily removable pin-



on type front and rear outrigger boxes, roller mounted outrigger beams, full length combination deck-fender design, large full vision operator's cab and full frame width engine compartment. Ease of steering is accomplished through hydraulic power on all four front wheels. The rotating assembly is of compact heavy-duty design and features air control for all motions, large clutches and brakes, fully enclosed pump lubricated deck gears, power raised and lowered telescoping back hitch gantry. *... Circle No. 155*

(Turn to page 118 for more New Equipment. New Literature can be found on page 110.)

"... as directed by the engineer"

DECISIONS MADE in the field can reduce the cost of construction jobs and speed their completion. It is too bad that more decisions cannot be based on conditions that develop on the job. At least on public construction one word holds the key to this problem—"interpretation."

Specifications provide the rules and regulations by which a construction job is carried forward. When they are tight they spell out in detail every move of the contracting organization, often including methods by which results are to be secured. If specs are loose they present in more general terms the objectives to be attained, leaving at least the smaller decisions to be reached in the field as the job progresses.

Individual specifications prepared from adequate information covering each site could represent directives that would require little interpretation. However, many specifications, particularly those of large government agencies must be general and apply to projects that extend over wide geographical areas. Job conditions over any one of the Western states provide sufficient variation so that no general set of specifications, even with special provisions, can be adequate without some interpretation.

The problem revolves around that key word. Some engineering inspectors would prefer tight specifications for some contractors and agree that loose specifications would be preferable for others. On the other hand, contractors have corresponding opinions about types of specifications depending on the organization and the individuals directing the work.

Another aspect of the complicated problem is the fact that the specifications apply to all bidders, but their interpretation affects only the successful bidder. While every bidder expects to carry out the work as detailed by the specifications, the unsuccessful bidders have a just complaint if they learn that the job shows variations from these requirements. They can properly say, "if we had known that was to be the interpretation, we would have bid the job differently."

The general attitude of engineering organizations is honestly expressed with the desire that contractors should make a reasonable profit on a job. This attitude may appear quite different to the contractor on any particular job. A contractor having a job at a reasonable figure may appear to be the soul of cooperation and on the next job with the margin cut too thin may change his attitude completely. Interpretations accepted from the inspector on the first job might be considered quite reasonable and would be fighting words on the next.

The inspector has no alternative to seeing that operations follow the prescribed rules, while the superintendent has this same understanding tempered by the demands of the profit incentive for his job and his boss' future. Neither side is usually schooled in human relations; youth is often pitted against long, practical experience. Tradition is supposed to show that lack of agreement is the order of the day.

Here in the West, the job conditions are so variable, so involved, and so changeable that specifications should provide the opportunity for certain field decisions. Until the time arrives when adequate bid prices lift the heavy pressure off the superintendent and inspectors are fully qualified for their responsibility, the phrase, "as directed by the engineer" will continue to be a construction hurdle.

Jim Ballard

Powerful 6-wheel Austin-Western tandem grader prepares bedrock surface for construction of a cloverleaf, part of the giant New York thruway project. Rear wheels are offset to compensate for sidethrust of fully loaded blade.

Austin-Western 6-wheel grader gives Buffalo contractor 5 years' rugged service... maintenance cost only $300!

"We rely on Austin-Western for rugged, dependable performance. It's one tandem grader that has the guts and power to handle any tough assignment the construction business can throw at it." That's what George Sheperd, general manager of Bruner Asphalt and Construction, Inc., Buffalo, N.Y., has to say about Austin-Western graders.

No downtime

"We just don't have maintenance problems and expensive downtime with our Austin-Western equipment. Aside from routine service requirements, it is hardly ever in the shop. We receive excellent cooperation from the A-W distributor on the rare occasions when we do require parts or service.

"In construction, perhaps more than any other business, time means money. That's why the A-W's ability to tackle even the heaviest of jobs and do them faster is so important to us. Of course, the fact that we can always depend on the A-W to stay on the job and help maintain project schedules is equally important.

"A man can do a better job when he likes his machine. A satisfied operator and a top-performance grader make an unbeatable combination. Our operator likes the A-W. He says it is comfortable to operate, and so easy to maneuver that even in reverse he can get right in between 12-ft. forms.

Four main reasons

"All-wheel drive . . . all-wheel steering . . . hydraulic controls . . . torque converter—I'd say those are the four main reasons why we're sold on Austin-Western. They combine to deliver power, traction, maneuverability and precision control!"

Investigate. Learn now why contractors the world over are choosing Austin-Western for the really tough construction jobs. The versatile, hard-working A-W is available in 6-wheel and 4-wheel models with a wide choice of power plants. Torque converter optional. Contact your nearby Austin-Western distributor or write us.

Austin-Western

Construction Equipment Division

BALDWIN BLH LIMA-HAMILTON

ARIZONA—
WESTERN MACHINERY COMPANY ..... Phoenix
CALIFORNIA—
EDWARD R. BACON COMPANY ..... San Francisco 10
SMITH BOOTH USHER COMPANY ..... Los Angeles 54
COLORADO—
MACDONALD EQUIPMENT COMPANY ..... Denver 16
IDAHO—
ENGINEERING SALES SERVICE, INC. ..... Boise
MONTANA—
HALL-PERRY MACHINERY COMPANY ..... Butte
HALL-PERRY MACHINERY COMPANY ..... Billings
NEVADA—
GRAID EQUIPMENT COMPANY ..... Reno
NEW MEXICO—
N. C. RIBBLE COMPANY ..... Albuquerque
OREGON—
COLUMBIA EQUIPMENT COMPANY ..... Portland 14
UTAH—
WESTERN MACHINERY COMPANY ... Salt Lake City 15
WASHINGTON—
COLUMBIA EQUIPMENT COMPANY ..... Seattle
COLUMBIA EQUIPMENT COMPANY ..... Spokane

KING PUBLICATION

WESTERN CONSTRUCTION

OCTOBER 1958

COFFERDAM swings out from west side of Columbia River to protect powerhouse work at Rocky Reach Dam. Concrete batch plant is out of view in upper right. Construction bridge can be seen behind completed concrete piers at right. Railroad at left is being relocated.

Rocky Reach Dam in final stage

Final stage construction at Columbia River hydro project is back on schedule after delay caused by loss of construction bridge in flood. Concrete buckets are handled by gantry cranes, 100 ft. high, with ingenious automatic hooks. Completion of $270,000,000 project is scheduled for early 1962.

THE TEMPORARY construction bridge at Rocky Reach Dam went out on June 4. The Columbia River was confined to the east half of its channel and was flowing through the completed piers of the dam at the rate of 391,000 cfs. At 3:00 A. M. the driver of a truck approaching the bridge from the east side saw something he'll never forget: The two spans nearest him heaved up and fell away with a crash that could be heard above the roaring water. He was able to stop in time, as was the driver of another truck approaching the bridge from the other side.

There was no warning. Apparently a heavy mass of drift wood had knocked out one of the bridge supports, causing two spans to collapse.

The Stage II contractor, a joint venture called Rocky Reach Contractors, went to work immediately to repair the bridge, tying it this time to the completed piers of the dam. During the 28 days this emergency work was going on concrete trucks from the batch plant on the east bank had to make a trip of 21 mi. to reach the point of pour at the powerhouse foundations on the west side. Getting permits for the big off-highway rigs to travel on state roads and through the city of Wenatchee was one of the problems that had to be worked out.

The bridge is back in service now and the concrete trucks shuttle back and forth across it, round the clock, carrying up to 2,500 cu. yd. of concrete in 24 hours. The flow of the river dropped to 117,300 cfs. six weeks after the flood flow.

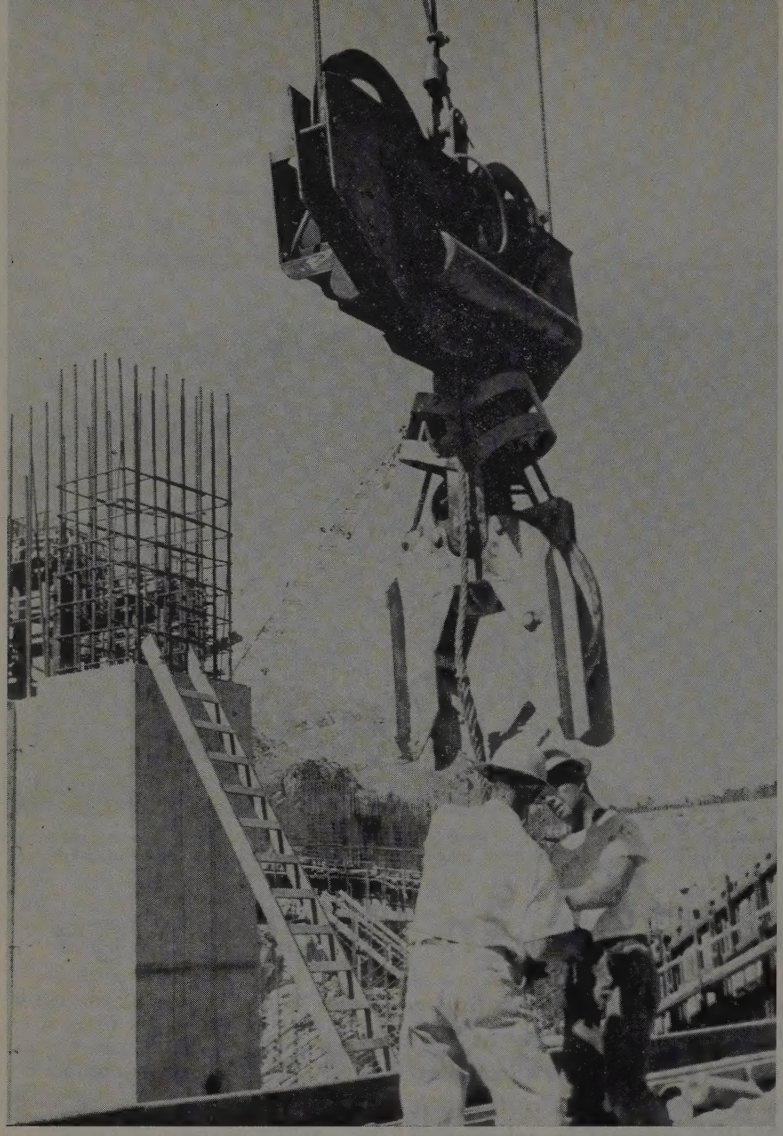
The Johnson batch plant contains four Koehring 2-yd. tilting mixers which give the plant a capacity of about 200 cu. yd. per hour even though the job does not call for a capacity this high. The four mixers are used to handle simultaneously different mixes for various parts of the job.

A fleet of Mack trucks hauls the concrete in two 4-cu. yd. Gar-Bro concrete buckets, with space provided to receive the empty bucket from the crane. The receptacles for the three concrete buckets on the truck beds are U-shaped, which enables the cranes to swing an empty bucket into place on the truck easily from the side.

Spearheading the equipment fleet are four huge Whirley cranes, two Americans, one Clyde, and one Washington Iron Works. The American Whirleys have gantrys 100 ft. high.

Other cranes on the job include four Manitowoc 4500's crawler-mounted, three Lima 1201's, one Bucyrus-Erie 54B, one 3500 Manitowoc, two Northwest 80D's, two P&H truck cranes, and a versatile Gradall for foundation clean-up.

The four Whirleys and three of the big Manitowocs are equipped



AUTOMATIC HOOK operates by means of a small air compressor mounted above hook. Rotation of sheaves during normal operation is passed to compressor by means of a chain drive. Pressure against cam on upper inside of hook opens and closes it. Other automatic hooks on job use the weight of the load being lifted to compress fluid in cylinder. This type is shown on front cover. Contractor devised both types to eliminate hoses leading to operator of crane.

with ingenious automatic hooks created by the contractor's master mechanic, John Gossett. Two types of hooks are being tried, both of which are entirely self contained and have no lines of any sort leading to the operator.

One works on an air principle. A small Curtis air compressor is mounted just above the hook. When the hook is raised and lowered during normal operation, the rotation of the sheaves in the load block operates through a chain drive to charge the cylinder of the air compressor. Opening and closing of the hook is activated by pressure on a lever mounted on the upper inside of the hook. Every other bump opens it, every other bump closes it.

The other type uses the same sort of activating lever or cam but is operated by a hydraulic principle. Merely picking up the load charges a hydraulic cylinder with enough pressure to activate the hook for several cycles.

With only a little practice the crane operators can open and close the hooks without the slightest hesitation or lost motion.

At the present the contractor is about 70% complete on cofferdam work, 75% on excavation, 20% on the east bank grout curtain (described in a separate article) and about 11% complete on concrete for the powerhouse and dam. These figures apply to the Final Stage construction, which is largely contained within the cofferdam in the left half of the aerial photo. First Stage construction was completed earlier this year.

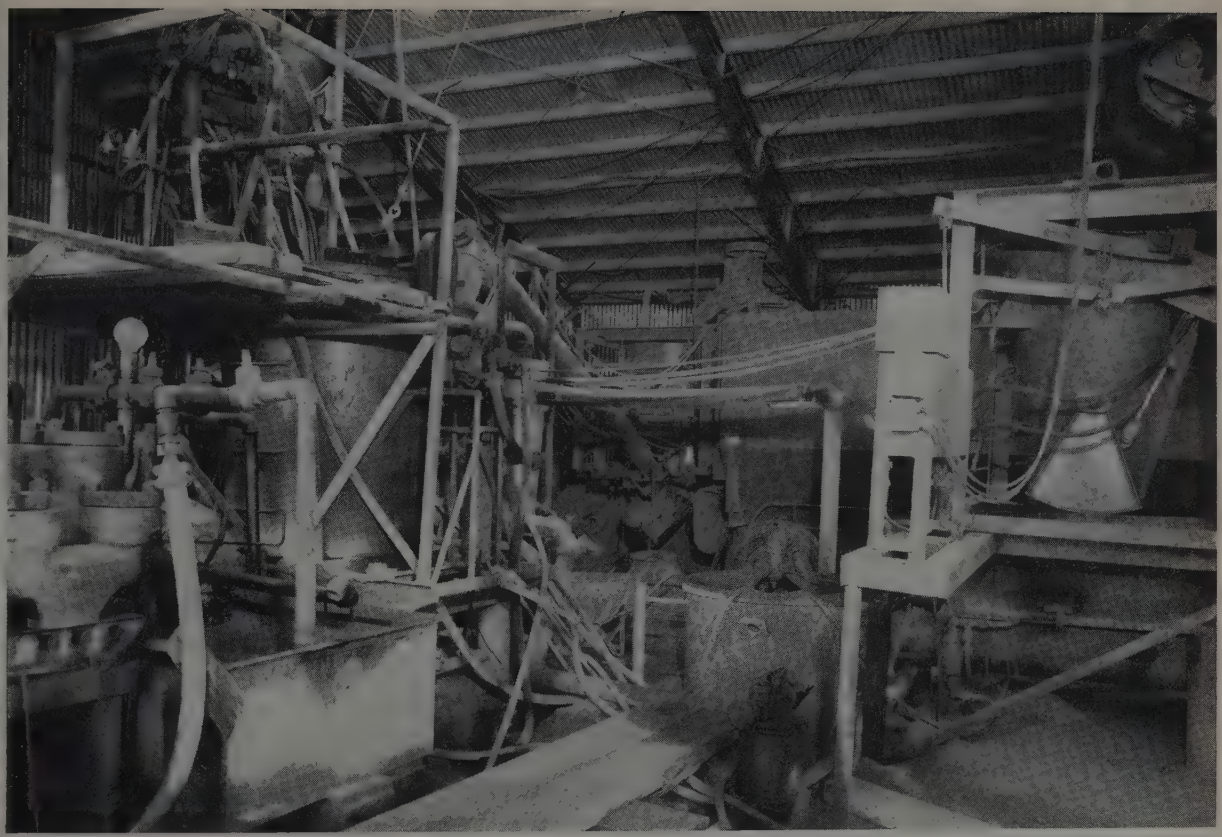
Engineering and construction supervision is being carried out for the Chelan County Public Utility District No. 1 by the Stone & Webster Engineering Corp. Resident engineer is I. R. Kline; construction superintendent is John H. Boyd, with C. L. Mingo, division superintendent, George Torrance, assistant superintendent, W. W. Griffin, chief field engineer, and E. J. Dickhaus, office engineer. Project engineer for Chelan County PUD is E. C. Metcalf. Rocky Reach Contractors is a joint venture consisting of L. E. Dixon Co., Hunkin-Conkey Co., Arundel Corp., American Pipe & Construction Co., and Guy F. Atkinson Co. W. N. Evans, vice president of the L. E. Dixon firm is resident manager. E. W. Elliott is project superintendent, and Tom Curtis is general superintendent. Michael Graves is project engineer, and A. D. Hale is business manager.

Shift superintendents are "Whitey" Hickson, Joe De Molita, and "Rube" Miller. Bill Hughes is electrical superintendent, Stan Frazer is carpenter superintendent, and Bill Jones is rigging and cofferdam superintendent.

Rocky Reach dam will be about 5,000 ft. in length, consisting of an L-shaped gravity concrete structure nearly 3,000 ft. in length and a water-impervious cutoff extending nearly 2,000 ft. into the eastern side of the valley. The principal concrete structures will be a 500-ft. forebay wall extending from the west bank, a powerhouse structure 1,100 ft. long, a center non-overflow section, 430 ft. in length, a spillway section 750 ft. long and a 120-ft. abutment extending into the east bank of the river. The average height of the spillway section from bedrock is 127 ft.

Twelve Tainter-type crest gates about 50 ft. wide by 58 ft. high, furnished by the Todd Shipyards Corp., will regulate the flow of water through the spillway. Steel anchor bolts used for securing the Tainter gates to the spillway concrete are 50 ft. long, 6 in. in diameter, and weigh 4,885 lb. each. These bars are said to be the largest of their type in the world.

Stage I construction was carried out by a combination of firms called Rocky Reach Dam Builders for $13,900,000. Final Stage construction is being done for $54,023,000 by Rocky Reach Contractors, a joint venture consisting of the same firms plus the Guy F. Atkinson Co.



INTERIOR of grout plant assembled by Selby Drilling Co. Clay is weighed in hopper at right and is mixed with water in tank in right center. In center background is end of unusual horizontal cement silo. Pumps are at left. Grout lines returning from field are at upper left.

Unique grout plant at Rocky Reach

For one of the biggest grouting jobs ever tried, the contractor has assembled equipment capable of pumping 600 cu. ft. per hour of a cement-clay-water slurry. Result will be an 1,800-ft. long low-cost cutoff in the gravelly east bank at Rocky Reach Dam in Washington.

AN UNPRECEDENTED and highly significant project is now under way on the Columbia River near Wenatchee, Wash., at the site of Rocky Reach Dam. An 1,800-ft. grout curtain cutoff is being constructed through the gravel which adjoins the east end of the dam. The operation is significant not only because of its size (500,000 cu. ft. of grout may be required) but because of the imaginative approach taken by the contractor, Selby Drilling Co. Selby has the job almost completely mechanized by an unusual central plant which batches, mixes and pumps the grout.

The success of this high production grouting operation might very well make economically feasible a number of dam sites in the West which contain zones of pervious gravel.

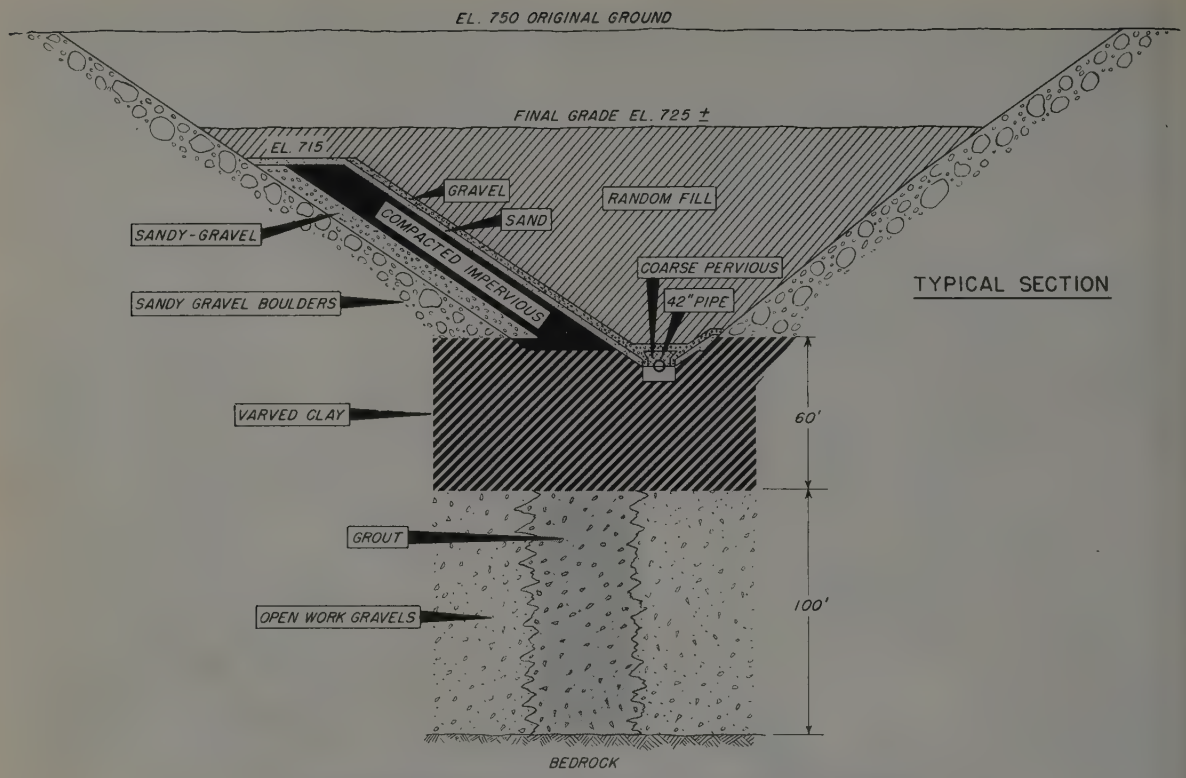
The $273,000,000 Rocky Reach hydroelectric project on the Columbia River was designed and engineered for the Chelan County Public Utility District No. 1, by the Stone & Webster Engineering Corp., the same firm which is supervising construction. First stage construction, now completed, was done by Rocky Reach Dam Builders, a joint venture, consisting of L. E. Dixon Co., Hunkin-Conkey, Arundel Corp., and American Pipe & Construction Co. The final stage general contract is held by Rocky Reach Contractors, the same four companies plus the Guy F. Atkinson Co. First concrete was poured in May 1957, and power is expected to be on the line by 1962.

The dam will be nearly 5,000 ft. long, consisting of an L-shaped gravity concrete structure 3,000 ft. in length and the impervious cutoff extending 1,800 ft. into the eastern side of the valley.

Early investigations by Stone & Webster showed that the east bank consists of an upper formation of sand and gravel 80 ft. thick. Underneath is an impervious clay layer about 60 ft. deep, and underneath that, a coarse, very pervious gravel layer with a maximum thickness of 100 ft. which rests on bedrock. Water seeping through this lower gravel layer instead of passing through the turbines would constitute a continuous loss of revenue for the District, but excavating a trench through all three layers to bedrock represented a tremendous expense.

After considerable study it was decided to excavate only to the top of the clay layer and construct an impervious grout curtain in the lower gravel layer by pumping through holes drilled in the clay.

Seepage through the upper gravel will be controlled by a compacted



Schematic cross-section of cutoff

impervious earth-fill blanket backed by random material (see drawing).

The drilling and grouting operation is perhaps the largest of its kind ever attempted. Best estimates say that about 400 holes and 500,000 cu. ft. of grout will be required. Grout holes will be placed in three lines, 10 ft. apart, with the holes in each line spaced on 12-ft. centers.

Stone & Webster called for bids on the drilling and grouting in March of 1958, with several different schemes available to the bidders. The lowest bid by far was the $740,000 offered by Selby Drilling Co. Selby's bid was based primarily on his idea for an unprecedented centrally-located automatic grout plant. The contract was awarded to Selby in March and the construction firm went to work immediately assembling the plant.

It took a couple of months to put the plant together. Adjustments and modifications were required after start-up but now the main problems have been solved and the plant is capable of turning out grout at a rate of 600 cu. ft. per hour for an extended period of time and twice that rate for a short period of time.

A typical batch consists of about ½ ton of clay, 17 cu. ft. of water, and 5 7/10 sacks of cement. However, it must be stressed that one of the chief features of the plant is that it handles bulk cement, which results in a savings of around 10c per sack. Clay is introduced to the mix because the grout curtain is designed primarily for imperviousness, not structural strength.

The plant is located at the midpoint of the job, about 900 ft. from either end. Including the 100 ft. from the plant down the slope to the bottom of the trench, this means that at the maximum the plant will have to pump grout 1,000 ft.

Grout plant equipment

Bulk cement is held in an unusual horizontal cement silo on wheels manufactured by Spokane Machinery Co. Capacity is 230 barrels.

Specifications require that the water and clay be mixed first before the cement is introduced. The clay, which is obtained from a nearby pit, is bulldozed into a hopper which is covered by a Link-Belt 3 x 8 single deck, shaker screen which takes out the lumps. The hopper holds about 4 tons of material. From the hopper the clay is taken to a scale by means of a drag conveyor. The conveyor is automatically shut off when the scale has reached the proper amount. From the bottom of the weigh scales the clay is brought to mixer No. 1 by a short screw conveyor.

The mixer is simply a 4-ft. diameter steel cylinder with a 6-ft. long tapering cone at the bottom. The clay falls on a screen which helps break it up. The water is introduced to the clay at the screen through three jets. In the beginning, one jet was used with no screen but after some experimentation the present method was found to give the best initial mixing of the clay and water.

The water supply is held in a calibrated tank and delivered to the mixer by activating a quick opening valve. Thorough mixing is accomplished with the use of a recirculating system in which the clay-water slurry is taken from the bottom of the mixer and poured back in at the top by a Krough centrifugal pump.

After several minutes of mixing the clay-water slurry is directed into mixer No. 2 where the cement is added from the top by a screw conveyor. Mixer No. 1 is identical to Mixer No. 2.

The horizontal cement silo has a screw conveyor which runs under-

neath it for its full length. This takes cement from the silo into a vertical screw conveyor at the end. The vertical screw is split at the top, one passage going to a horizontal screw which spreads it back into the horizontal silo, the other going to a weigh hopper mounted on the front of the silo. When no cement is needed in the mixer the cement is constantly being circulated from the bottom of the silo to the top by means of the screw conveyors.

When the scales are full an air ram shunts the cement into a screw conveyor which takes it to the mixer. The screws are also made by Spokane Machinery Co. Final mixing is accomplished in the same way as in Mixer No. 1, that is by a recirculation method which takes the slurry from the bottom of the mixer and pours it back in at the top. Mixer No. 2 empties into two agitator tanks with 60-cu. ft. capacity. Slowly rotating paddles keep the slurry active. At the bottom of each agitator tank is a valve which allows the grout to pass into the tubs from which the pumps draw.

The pumps are two Gardner-Denver 10-in. stroke piston pumps, each with two pistons. Maximum capacity for each pump is 13 cu. ft. per min.

Each pump operates into a separate 2-in. pipe which carries the grout to the headers and back. The grout must be kept moving in the pipes to prevent it from having a chance to set up.

Drilling the holes

For drilling the holes through the clay layer and setting the casings Selby is using a rotary George F. Failing Co. drill mounted on a Ford truck, and a Joy 22 truck-mounted rotary drill. Holes in the gravel layer are handled by two Gardner-Denver 123 truck-mounted percussion drills and a Gardner-Denver 143 truck-mounted drill.

The Gardner-Denver 123s are mounted on flatbed trucks in such a way that the drilling can be quickly converted from percussion to rotary. This convertible arrangement is the contractor's own development and has been used successfully on several other jobs.

The holes are drilled 5 ft. into the gravel layer and then grouted. Next holes are drilled through the grouted layer 5 ft. deeper into fresh gravel and the process is repeated until bedrock is reached.

The average hole so far takes about 26 cu. ft. of grout per foot of hole. A thin mixture is used at first and if it takes easily the workmen at the header telephone to the plant to thicken the mixture. Grout is pumped into the hole at about 60 psi.

The drill rigs operate on a 500-ft. long platform which consists of 3 x 12s set loosely on 12 x 12 stringers. The lumber is leap-frogged ahead as the grouting proceeds.

Air motors are used for the grout pumps, the agitator bin paddles and mixers, the rams in the plant and the hoists on the drill rigs. The air supply is furnished by two Ingersoll-Rand 900-cfm. compressors and one Chicago-Pneumatic 600-cfm. The air is carried from the plant to the headers in a 4-in. steel victaulic coupled steel line. Most of the air motors in the plant are manufactured by Ingersoll-Rand.

CASINGS are placed in the holes drilled through the clay layer. The rig shown can quickly be converted from percussion to rotary drilling, a contractor idea.

KEY MEN on the grouting project are (l. to r.) Jim Whitelaw, job engineer for Selby Drilling Co., and T. A. Henke, inspection supervisor for Stone and Webster Engineering Corp. Whitelaw was previously cost engineer for Morrison-Knudsen on the Donnells Dam project in California.

The job is scheduled for completion in February of 1959. But because of the contractor's mass production methods that target is liable to be beat by several months.

Personnel

R. E. "Bob" Selby, president of the Selby Drilling Co., is in charge of the field work at the present time. Jim Whitelaw is job engineer and shift superintendents are "Red" Gilliland and Reino Kangas.

Engineering and construction supervision for the east bank grout cutoff for Stone & Webster Engineering Corp. is by I. R. Kline, resident engineer; J. H. Boyd, superintendent of construction; G. T. Torrance, assistant superintendent; R. G. Kuntz, field engineer, and T. A. Henke, inspection supervisor.

Smooth paving with veteran rigs

Here's a concrete paving spread that's been around for years and is still turning out some of the smoothest riding surface in the West.

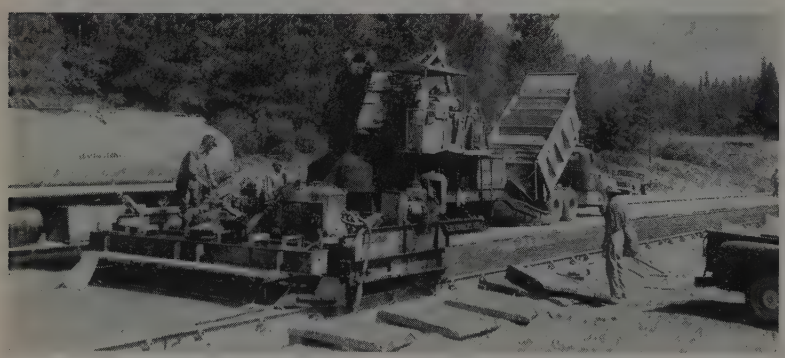
A THOROUGHLY job-tested team of construction equipment is producing 6 mi. of model concrete pavement on an Interstate job near Colfax, Calif. There's hardly a piece of equipment on the job that is younger than 2 years and some of it is as old as ten. But the results the contractor is getting, both in terms of speed and quality, are enough to make any contractor stop and take another look at his old rigs before turning them in on the latest models.

The contract calls for four 12-ft. wide traffic lanes, nearly 6 mi. long laid on 6 in. of imported subbase and 4 in. of cement-treated subgrade. Fredrickson & Watson and Ransome, a joint venture, received the $3,700,000 award in December of '56 and began work in April of 1957. The project is one of many the State of California has under way between Sacramento and the Nevada state line, on Highway 40. This route is expected to carry tremendous traffic during the 1960 Winter Olympics at Squaw Valley.

The paving spread is hitting close to 1,000 cu. yd. in a 9-hr. day. Since each 6-mi. lane requires about 9,000 yd., two 5-day weeks are required for each lane. When finished the freeway will have two 24-ft. wide lanes of traffic separated by a median strip of varying width.

Unofficial tests run on the two 12-ft. wide lanes completed at this writing by the State's smoothness measuring devices, the Roughometer and the new Profilograph, indicate that this section will be among the smoothest in the state.

The project shows how hard it is to beat a fleet of machines that has been thoroughly tested on the job. The operators are familiar with the working characteristics of each machine and the supervisors know exactly what to expect in the way of production. Since there are few unknowns concerning the equipment the spread can be well balanced—no machine working at less than full capacity.



TRIED AND TRUE paving spread features two familiar hard-working veterans, a Blaw-Knox paver and a Blaw-Knox spreader. Despite age of equipment, pavement ranks with best.

HEADING UP job are (l. to r.) H. J. Lopez, resident engineer for California Division of Highways, Grant Brown, contractor's super, and D. McCollum, State District Construction Engineer.

The paving train

The aggregate for the cement-treated subgrade is spread and compacted to a rough grade prior to the setting of the headerboards. After the headers have been set, all low grade is brought up by placing additional aggregate with bottom-dump trucks. Excess is removed by a Standard Steel subgrader. The shoulder also requires cement-treated sub-grade.

A contractor-built windrower which rides the headers on solid rubber wheels pulled by a Caterpillar D8 tractor shapes the material into a sized windrow.

Cement is placed in the windrow by bottom-dump trucks which control the rate of discharge by an arrangement which ties the gate opening to the speed of the wheels. The aggregate and cement are thoroughly mixed by a Wood traveling mixer.

The windrow behind the Wood mixer is knocked down and spread out by another home-made rig which features a long-handled rudder for directing the material to one side of the grade or the other. Steel wheel rollers follow to provide compaction.

Trimming is done with a Blaw-Knox subgrader which pulls itself along on the headers by cables fastened several hundred feet ahead.

Final compaction is done with steel-wheel rollers which drive down small rocks, and rubber-tired rollers which knit together the surface. A scratch template handled by a workman checks the grade. An excess of material is used in the preceding steps so that the subgraders always have material to remove. Depressions would have to be filled with concrete. Final treatment is a spray of MC2 applied at the rate of 0.2 gal. per sq. yd.

The paver is a Blaw-Knox Co., 34E which was purchased by Fredrickson & Watson back in 1949. Thanks to careful maintenance through the years and an extensive overhauling before the present job the machine still turns out a full day's work with a minimum of down-time. The paver is equipped with two long guard pipes at about

waist level which are designed to keep personnel away from the area under the descending skip. The skip itself is equipped with a swinging weight which knocks clinging material free when the skip is raised to an upright position.

Behind the paver comes a Blaw-Knox spreader which, in accordance with specifications, trails two vibrating stingers near each header. Next is a Jaeger-Lakewood traveling screed which carries a transverse strikeoff, a tamper bar, and a transverse screed. Two passes are usually made with the screed to make it easier on the finishing machine, which is a Johnson Float Finisher manufactured by Madsen Iron Works. The finisher normally makes several passes before obtaining the desired finish.

Every 60 ft. a paper expansion joint is inserted into the wet concrete behind the spreader. In the hardened concrete, joints are sawed every 15 ft. In the adjoining slab a paper joint is inserted opposite every point in the previously poured slab where the crack appears to run clear through.

Curing is handled manually by the Techkote Co., Inc.

Most of the aggregate comes from the gravel deposits along the Bear River 3 mi. from the center of the job. The crushing set-up consists mainly of a Symons 4½-ft. cone, Link-Belt conveyors, and Symons vibrating screens. When working on 1½-in. rock the plant will turn out about 350 tph. The material is loaded into bottom-dump trucks with a Michigan rubber-tired loader carrying a 3¼-yd. bucket. The bottom-dump trucks carry between 25 and 30 tons and are weighed before leaving the crushing area on a Howe scale.

PAVING TRAIN includes two pieces of contractor-built equipment. Both are pulled by tractors and run on solid rubber wheels. In top photo is a windrower; in the bottom photo is a spreader for base material. Spreader has long-handled rudder to direct material.

For the imported subbase material, specifications require that 100% must pass a 2-in. screen, 30 to 60% must pass a No. 4, and 0 to 9 must pass a No. 200.

For the cement-treated subgrade material, 100% must pass a 1-in. screen, 90 to 100% must pass a ¾-in., 35 to 55 must pass a No. 4, and 3 to 9 must pass a No. 200.

Although this job is characterized by efficient use of used equipment, it should be pointed out that the contractor, Fredrickson & Watson and Ransome, also knows how to handle a balanced fleet of new equipment (the trouble starts when you try to mix new and old equipment). For the earthmoving phase of the job, which involved over 2,000,000 cu. yd., a fleet of new Caterpillar equipment was used worth in the neighborhood of $3,000,000.

H. J. Lopez is resident engineer for the California Division of Highways.

For the contractor, Grant A. Brown is superintendent, J. Rogers is master mechanic, Joe Mancebo is plant foreman and F. E. Robie is office manager.

Subcontractor for hauling base rock is the Rock Transport Co., of Redding, Calif.

Selected unit prices for the project

The project is located on Highway 40 near Colfax, Calif., and is 5.84 mi. long. The contract called for excavation, grading, and paving with portland cement concrete on a cement treated subgrade. The specifications conform to Interstate standards. The job was awarded in December of 1956 to Fredrickson & Watson and Ransome Co., a joint venture, for their low bid of $3,700,000. Highlights from this low bid are presented here.

$118,000	lump sum	Clearing and grubbing
107,000	lump sum	Developing water supply
0.10	126,000 M gal.	Applying water
0.50	2,310,000 cu. yd.	Roadway excavation
0.004	21,537,000 sta. yd.	Overhaul
2.10	86,500 tons	Imported subbase
2.50	42,500 tons	Untreated base
0.25	159,000 sq. yd.	Mixing, spreading, and compacting cement-treated subgrade
0.44	39,500 sq. yd.	Mixing, spreading, and compacting cement-treated base (median strip)
2.40	48,000 tons	Mineral aggregate (for CTSG and CTB)
69.00	135 tons	Liquid asphalt, MC-2, for curing seal
7.60	16,600 tons	Mineral aggregate (for asphalt surfacing of median strip and frontage roads)
18.80	35,800 cu. yd.	Concrete pavement

Paul Guinn talks about tunnels

What does it take to run a tunnel job? Paul Bunyan Guinn, Utah Construction's renowned tunnel superintendent, gives the answers in an informal interview with veteran construction writer Ray Day.

Paul Guinn

BE FAIR. Be firm. Be tough if you have to. Let your men know you want them to come out of the portal under their own power. Get the confidence of the men who work for you, and the men you work for, and keep it by being competent and being a man. Face the fact that your responsibility works two ways: to your company and to your men. Get used to being the man in the middle; the trouble shooting spot. Spend time in the tunnel instead of the office.

Pull all that off just right, and maybe you'll make a tunnel superintendent.

This is Paul Bunyan Guinn talking. The old Bunyan is Utah Construction Co.'s topnotch tunnel man, and one of the few men still alive who directed the diversion-tunnel driving at Hoover. He's run many others since . . . some bigger and some tougher. The White Eagle portion of the Los Angeles Aqueduct, the Yakima River Siphon tunneling in Washington, the Truckee railroad tunnel, 38,000 ft. at the Bingham Canyon open pit —these are his major monuments. Paul Guinn is, unfortunately for construction, a type whose courage and sense of responsibility are so pronounced that few men can match up to it anymore.

I've heard him cuss out people who were stupid, and seen him choke with emotion when one of his men had undeserved trouble. He's had to fight with his fists, and he still can, if need be, as he turns 70. Few tunnel supers have the real, outwardly - apparent friendship of their men and the backing from their employing company that this man enjoys. He's a tunnel superintendent and a good one.

But these are generalizations. Let's be specific. Consider this: he's driven five major railroad tunnels at Bingham Canyon, the world's largest open-pit copper mine. They total 38,000 ft. He did it without killing a man underground. And, while setting one of the best safety records of all time, he established driving records which still stand. In March 1940, his crews gave the Bunyan a birthday-month present in footage which he broke badly in March of 1958, when 1,363 ft. were excavated in 26 working days. These boys, stretching for distance for the old man again, hit 72 ft. in a day with 15-ft. rounds.

Typically, Guinn said "thank you" to his boys. They had a little party. Food. Whisky. Comradeship. And the next man who thinks he can drive a wedge into this relationship may be badly surprised.

"Face up to responsibility"

"Paul, let's say you're ready to break in a new superintendent," I said. "What's the most important quality you look for?"

Guinn didn't hesitate, except to sneak a pinch of snoose under his lip. "You know what it is? It's finding a man who welcomes responsibility and authority. You can look until you're blind and you can't find men like that anymore."

"After you've managed tunneling for a while, you get so you notice men who might make good superintendents. You get all enthused because you think you've got something—until you butt your head against this damned indifference to responsibility. And you're licked before you start."

Enlarging on his thought, Guinn pointed out that a tunnel superintendent has responsibilities which are peculiarly two sided—possibly more so than in any other type of construction.

As manager of the project, it's his responsibility to push for production, to get the right equipment and use it well, and to develop good crews by constantly weeding out the deadwood. But his job doesn't end there.

In addition, tunneling is a highly dangerous business. So a good superintendent, to a very great extent, is also his brother's keeper. Men's lives depend on the balance of his experience and judgment. There are times when production must be compromised so that men can work safely . . . you have to shorten your round lengths, for example, when the ground gets bad. And footage drops.

When it does, and the front office asks for an explanation, the superintendent absolutely must have that front office's confidence. If he doesn't he'd just as well quit.

Authority a must

The close relationship between responsibility and authority is not as pronounced in any other type of construction as it is in tunneling, says Guinn. The element of danger alone is enough to justify the supremacy of his authority.

"There's other reasons, too, why he's got to run his own show," explained the Bunyan. "Conditions change fast in tunneling, especially here in the West where rock of many kinds is tipped and folded and fractured. Nobody can see what's ahead—all you have to go on are what the borings showed, or what the geologists say is there. Sometimes they don't always know. You never know exactly until you shove a mucking machine up to the face.

"Ground water is hard to predict. Squeezing ground is, too. Right here we've got what appears to be good rock, but there's enough water in it to start it cracking, and the first thing you know if you're not careful it'll choke you to death. We've shortened our steel sets to 2 ft. Had to.

POWER! STRENGTH! PERFORMANCE!

GALION MODEL 160

- 160 HORSEPOWER— Cummins 6-cyl., 4-cycle diesel engine.
- WEIGHS 30,020 lbs. (with scarifier)—Correctly distributed for utmost tractive effort.
- CONSTANT-MESH TRANSMISSION— Six overlapping forward and two reverse speeds.
- HYDRAULIC SHIFTABLE MOLDBOARD— 13' x 29" x ¾" for moving big loads.
- RUGGED BOX-TYPE FRAME— Weighs 134 lbs. per foot.
- FOUR-WHEEL BRAKES.
- 14.00 x 24 TIRES— Front and rear, interchangeable.

Write for Bulletin No. 421.

THE GALION IRON WORKS & MFG. CO.
General and Export Offices—Galion, Ohio, U. S. A.

GALION ESTABLISHED 1907

MOTOR GRADERS & ROLLERS

GALION DISTRIBUTORS IN CALIFORNIA

ALLIED EQUIPMENT COMPANY
Fresno, Five Points, Madera, Reedley, Tranquillity

BAY CITIES EQUIPMENT, INC.
Oakland 7, San Jose

BROWN-BEVIS INDUSTRIAL EQUIP. CO.
Los Angeles 22, Bakersfield, Riverside, San Diego, Ventura

DELTA TRACTOR CO.
Stockton

FARMERS MERCANTILE CO.
Salinas

HOWARD-COOPER CORP. of CALIF.
Eureka, Redding

ORTON'S EQUIPMENT CO., INC.
Stratford

SACRAMENTO VALLEY TRACTOR CO.
Sacramento

STEVENSON EQUIPMENT CO., INC.
Santa Rosa

SANFORD TRACTOR & EQUIP. CO.
Reno, Nev.

... for more details, circle No. 21 on Reader Service Postcard

"The point is that you can't always go to somebody else for decisions. You're better off in tunneling if you make your own. The job will move better and faster, and there's less chance of confusing your men."

Bullheaded as the Bunyan is about his own authority, he's amazingly tolerant of other management aspects. He's almost a philosopher on the subject. According to Guinn, tunneling is such an individualistic business that there are as many refinements as there are superintendents—and they're all good. One man will do things a certain way with certain equipment. Guinn may use competitive equipment and run more holes in his heading. But he'll set his share of records and even a little more, and that, he says, is what counts.

Swivel chair supers—Bah!

Eventually, after working hard for many years, the glorious time comes when a tunnel man is made superintendent. It's the most dangerous point of his career, according to Guinn.

"You know why?" he growled belligerently. "Ninety per cent of the damn fools want to get swell headed and run the show from a swivel chair in the field office. Nuts!"

"When a man is made superintendent, he's needed up at the face more than ever. How in hell are you going to know what's going on if you're not up there to see? You can't do much more than make an educated guess if you spend half your time in the office and the other half having lunch with salesmen."

This is sound advice, of course, but when you watch Guinn operate, you take his words with reservation. He doesn't exactly practice what he preaches. For Guinn is a showman— his sense of drama and timing would do credit to a U. S. Senator. He's the General Douglas MacArthur of tunneling, and when he rides in to the heading, he does it with more than usual impact. It isn't ham, either. It's genuine.

How does he do this? Well, when a heading is going good in safe ground, he delegates authority to his shifters and leaves them pretty much alone. Let the ground change for the worse suddenly, or trouble shows up, and word is flashed out by telephone. It may be quitting time for Guinn, but invariably his reaction is the same.

"I'll be right there," he will say grimly. If he's dressed to go home he'll change swiftly into the tin pants, wool shirt, tunnel coat and rubber boots he likes so well. On his way to the portal in his Oldsmobile he'll change to fresh snoose, storing the used charge of Copenhagen in a coffee can on the seat beside him. His Olds is a story in itself—when Guinn showed up to run the tunnel he's now on, and asked for transportation from the car pool, he was told "Paul, we have only this one Olds, and it's for the big shots when they show up." Guinn grunted. "Okay, I'm a big shot. Gimme the keys."

The Bunyan's appearance at the heading carries a magic, unspoken warning of caution to the crew. When the Old Man shows up at un-routine times, they know something unusual is afoot. And if it's something dangerous, he doesn't keep his men guessing. He'll get them together for an impromptu safety meeting; show them how the rock's going to act and what to watch out for.

"Stand back, boys, this one is dangerous," he'll say, grabbing a pinch bar. "Give that sliver half a shift, and she'll come down and take somebody's brains with it. Always keep the point of your pinch bar out of your guts; hold it to one side and jab like you're a Marine using a bayonet. Then you'll not get hurt."

AT THE FACE, that's where a tunnel superintendent should spend his time, says Paul Guinn. Don't "spend half your time in the office and the other half having lunch with salesmen."

Guinn has the facility of being able to hold impromptu meetings with shifters and men without ever in any way undercutting the authority of his shifters. Occasionally, when he can sense something wrong, Guinn disarms his men completely by asking what it is. His lunchtime bull sessions with crews are enormously valuable; they give him control over—and a close tie with—the human values in tunneling. And sometimes they're as important as the equipment.

Strength comes to a tunnel superintendent when he becomes a real friend to the men he works with, and handles with fairness the men he must invariably discipline. For example, the Bunyan had two particularly tough troublemakers on a recent job. How could he can 'em and still be friends with union officials?

Guinn's method, as usual, was simple and effective. He waited for a few days until his problem children cussed out their union officials—behind their backs, of course. When that happened, Bunyan said, "Okay, you're through. Your officials are fine men, and they're my friends. You can't call them S.O.B.'s in front of me and work on my job. You're not laid off. You're fired."

It stuck, too. And there's been no trouble since.

A new man to watch

Guinn is nearing retirement. In the past ten years he's picked and developed a protege to replace him. Jim Finlay is less flamboyant but equally dedicated; quiet and studious instead of profane and powerful. But he's tended chuck, run a mucking machine, shifted, and done all the things a man must do to become well grounded in experience. He will some day drive more tunnel than the old Bunyan ever dreamed of, without the help of Copenhagen.

Whether he'll be another Bunyan—another Al Coker or Woody Williams or Ben Arp or Whitey Lee, or whether he'd even want to —is problematical. But Guinn trained him well. So well that he just might.

"You know what they're beginning to call him?" The Bunyan grinned wolfishly and lowered his voice to that confidential growl that takes everybody in. "Goddam if they ain't beginning to call him 'Bunyan Junior'!"

And the satisfaction of a lifetime was in his words.

ONSTRUCTION JOB

concrete, dry-mix, and asphalt hauling

ONLY MACK OFFERS ALL THESE PROFIT-POWER FEATURES

A truck or tractor for every construction job. Dumpers, concrete mixers, tractors, flat-bed trucks—there are dependable, economical Macks for every important construction task . . . right up to the biggest. Moreover, when you standardize on Macks, you gain the added savings of a completely integrated parts and upkeep operation.

Widest choice of engines. To meet your needs exactly, Mack offers a choice of proved, dependable engines in every power range: Mack Thermodyne® diesel or Mack gasoline engines at 150 h.p. . . . Mack Thermodyne diesel, Mack gasoline or Cummins diesel units in the 170-232 h.p. range . . . and Cummins diesels from 250 to 450 h.p.

Unequaled performance and economy. Every Mack is fashioned from the finest, most durable materials . . . crafted to the highest standards of strength, stamina and precision in the industry. Mack controls this quality by making more of its own major components—engines, clutches, brakes, transmissions, bogies, cabs, etc.—than any other maker. Every Mack is engineered for fast, simple accessibility. And every Mack is "Built like a Mack"... made to outlast, outwork, and outearn anything else on demanding jobs.

Parts and service wherever you operate. Mack has spared no effort or investment to provide every Mack owner—everywhere—with the fullest parts-and-service coverage. There is a Mack branch or distributor close to your job who carries *nearly* any part you'll need on the job . . . and behind them are Mack parts depots that can ship out *any* replacement part at a moment's notice.

MACK
first name for
TRUCKS

Mack Trucks, Inc., Los Angeles, Denver, San Francisco, Seattle, Portland, Salt Lake City, Albuquerque.

. . . for more details, circle No. 23 on Reader Service Postcard

Dewatering with wellpoints

In wet excavations this method solves many problems in pre-draining the site. The principles of wellpoint use, suitable types of foundation materials, equipment, methods of installation and operation are outlined. Design principles for putting in a system are reviewed.

By R. Y. BUSH
Vice President
John W. Stang Corp.
Bell, Calif.

WELLPOINTS have been used for a number of years for the purpose of dewatering and stabilizing "wet" excavations. The purpose of this article is to describe the method in general and the conditions under which wellpoints should be utilized.

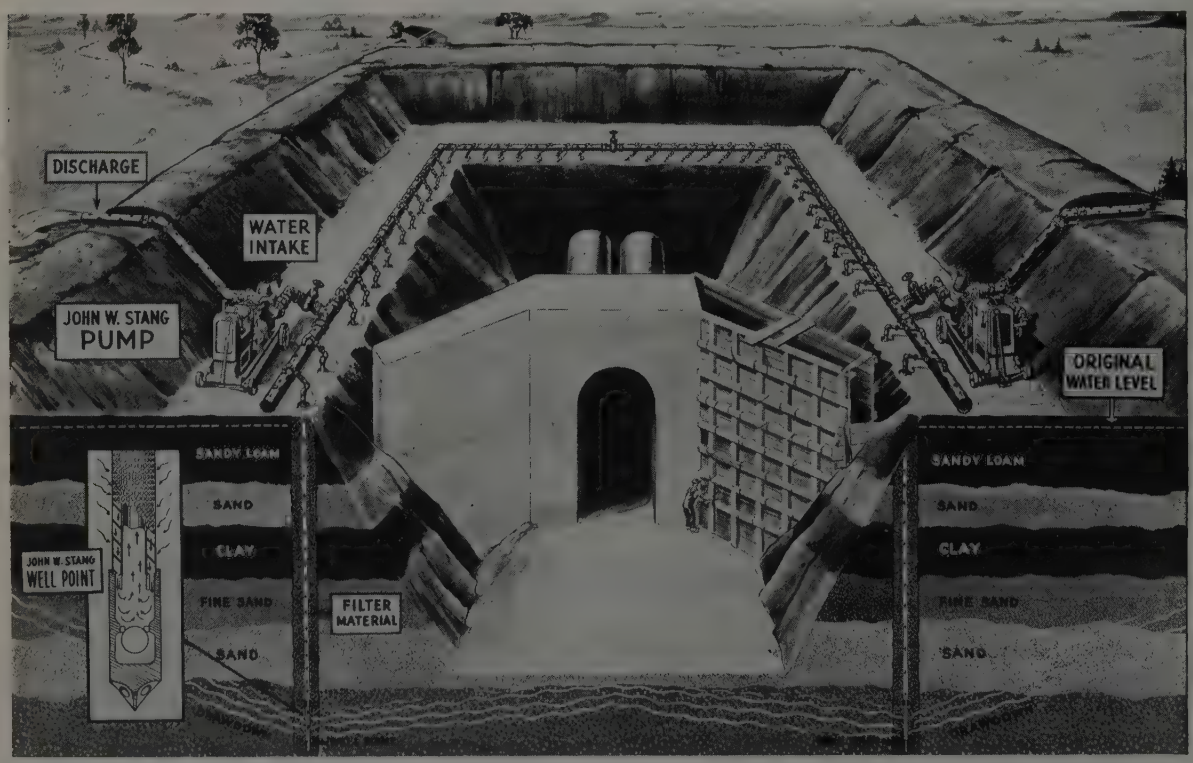
The basic function of a wellpoint system is to pre-drain excavations which extend below the ground water surface, thereby stabilizing the side slopes and bottom. This stabilizing effect results from the elimination of seepage forces which would otherwise be exerted on the sides and bottom as encountered with open pumping methods—dewatering by pumping directly from the excavation. The wellpoint system is installed around or adjacent to the excavation and the water table lowered below the final excavation elevation. (See the schematic illustration on this page.)

The heart of a wellpoint system is the wellpoint itself. Generally speaking, a pipe with screened perforations at the suction end could be considered a wellpoint. However, for maximum economy and simplicity of installation, specially designed self-jetting wellpoints are most frequently utilized in the construction industry. A typical wellpoint of this type is illustrated in the accompanying diagram. Note that the design of the ball valve at the lower end of the wellpoint will permit its installation by jetting.

During pumping, this ball valve seals the jetting orifices preventing the entry of sand into the pumps. The wellpoint is attached to a riser of appropriate length which directs the flow of water from the wellpoint to the header manifold through the connecting swing joint. The header manifold is connected to the wellpoint pump, or pumps, depending upon the anticipated yield of the system. The wellpoint pump is designed to remove air which is constantly entering the wellpoint system along with the water.

Basic features of a properly designed wellpoint pump are:

1. A centrifugal pump capable of operating efficiently at high suction lifts.
2. A vacuum unit of high air handling capacity to insure complete and continuous evacuation of air entering the system.
3. An air separation tank is connected to the vacuum unit.



SCHEMATIC drawing of wellpoint installation showing the general arrangement of the system, and the resulting drawdown of the water level to dry up the excavation.

Water from the wellpoint pump is discharged through pipe to a point sufficiently distant from the excavation to minimize the re-entry of water into the excavation.

Conditions required

The question naturally arises as to whether or not a particular problem requires the use of wellpoints. The main factor to consider in this connection is the nature and gradation of the soil below the water table. The best criterion to use in studying the feasibility of the application of wellpoints is to ask the question: "Is the soil below the water table subject to becoming quick and unstable when conventional pumping methods are used?"

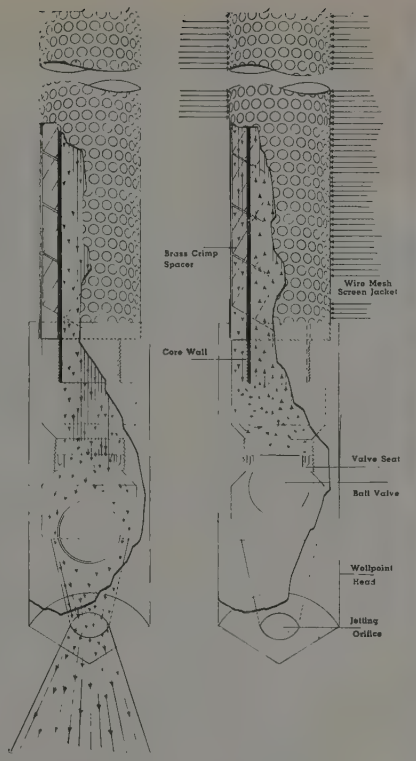
Granular soils ranging from silts to sand and gravel would generally fall in this category. Generally speaking, extremely fine grained cohesive soils—predominantly clayey materials— as well as extremely coarse grained soils, such as predominantly gravely or bouldery materials can be handled by ordinary pumping methods. In connection with the latter, if such soils are relatively homogeneous and extend to an appreciable depth, the application of a system of deep wells may be found to be economically feasible.

At this point, it might be well to discuss briefly the physical cause of a "quick" condition, which the wellpoint system is designed to eliminate. This is illustrated by the diagram showing the two methods of unwatering. Note that pumping directly from the excavation results in an upward flow at the bottom of the excavation. This upward flow exerts a lifting force on each individual soil particle. This upward velocity (as well as the corresponding force exerted) naturally increases as the difference in water level increases.

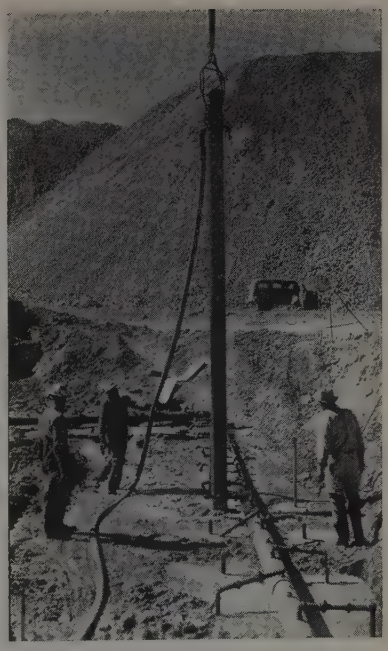
It can readily be seen that fine grained soils possessing little or no cohesion, as in the case of fine sands and silts, would be the most susceptible to becoming quick. Each individual particle, being relatively small and having no "bond" with adjacent particles, would require a relatively small force to cause its upward displacement. In the case of coarser grained granular soil, larger upward velocities would be required to cause a quick condition.

An upward gradient of one, termed the critical gradient, is required in granular soils to cause a quick condition. This gradient can be estimated by dividing the difference in the water level by the shortest percolation distance. In cohesive soils (clays), due to the bonding of one particle with adjacent particles, the upward force of the water would, in this case, result in a "blow"—that is the lifting of a large section of the bottom, in contrast to localized "boils" which occur in a granular material.

By comparison (see same diagram) the effect of the wellpoint system is to lower the water table and, more important, to change the direction of flow, which eliminates the possibility of the development of an unstable condition.



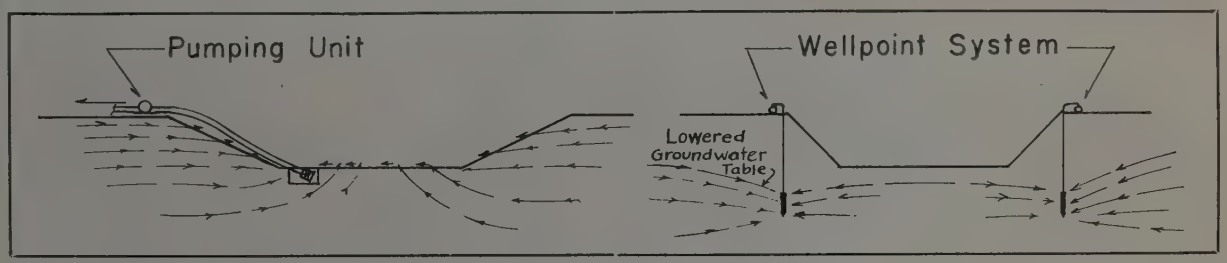
FEATURES of wellpoint design showing the jetting action during installation (left), and the inflow of ground water during pumping (right). Note the positions of the ball valve.



JETTING in an 8-in. casing as a preliminary to setting a wellpoint. In the foreground they are being connected to the 8-in. header. Sand placed in the casing, before its withdrawal, provides a filter around the wellpoint to improve inflow.

Installation of a wellpoint system

In general, the dewatering for a structure involving excavation below the water table requires the surrounding of the excavation area with the wellpoint system. If the excavation is to be unsupported by sheeting, sufficient header must be provided to allow for the sideslopes of the excavation. In this case, it is necessary to estimate the safe cut



COMPARISON of effect of ordinary pumping from an excavation (left) with that obtained by the use of a wellpoint system (right). Note the upward flow when pumping from a sump, which results in a quicksand effect.

YUBA

Movall®

A product of Yuba Manufacturing Division

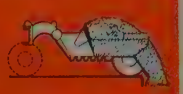
EVERYTHING GOES!

EXCLUSIVE LEVEL ACTION EJECTOR SAVES TIME AND MONEY

LOADED—The big target, big capacity body carries its load low, maintaining high ground clearance since frame and body are integral and compact.

TAIL GATE UP

DUMPING — Level body offers no gravity resistance, with potential 140,000 lb. ejector push assuring complete positive discharge with minimum use of power.



TAIL GATE DOWN

EMPTY — Sides and bottom are scraped clean, eliminating need for "mucking out" or decreasing capacity for next full load. Complete ejection takes only 11 to 14 seconds.

TAIL GATE DOWN

140,000 pound push cleans out desk-size rocks or sticky clay—clean as a whistle in just 14 seconds!

The versatile, high-speed Yuba "Movall" outperforms rear and bottom-dump haulers on most every type of off-highway job! Its powerful, positive ejector makes playthings of giant rock, frozen muck, or any other top loaded material. Bigger year 'round profits are yours with low-maintenance "Movalls" on the job. Check their unbeatable combination of features, such as high clearance, 180° turning radius, full stability in *all* operations, big tire flotation and traction, huge capacity. Get full information from your Allis-Chalmers, Caterpillar, or International Harvester Dealer, or contact *Yuba Manufacturing Division, Benicia, California,* today.

YUBA CONSOLIDATED INDUSTRIES, INC.

Plants and Sales Offices

YUBA

Yuba designs and builds a wide range of equipment for engineered construction:

. . . for more details, circle No. 24 on Reader Service Postcard

DEWATERING OF trench excavations is frequently done with wellpoints, as shown in these two examples. Usually a line on one side of the trench is sufficient. The practical limit of water lowering below the header is 15 to 18 ft., but altitude of the job has to be considered.

slope (sometimes referred to as the angle of repose) for the soil in a stable condition.

The dewatering of trench excavations is frequently performed with wellpoints. In the majority of cases, the wellpoints are installed on one side of the trench which will effect sufficient water lowering to stabilize the trench. It is necessary to install wellpoints on both sides of the trench if: (1) the excavation is quite deep, say, 18 ft. below water table, or (2) the soil is highly stratified. Typical trench excavations are illustrated.

The maximum practical limit of water lowering below the header elevation is generally from 15 to 18 ft. due to the suction lift limitation imposed on the pump by atmospheric pressure. At points of high elevation, this must be reduced approximately 1 ft. per 1,000 ft. of elevation, to allow for the reduction of atmospheric pressure at high altitudes. With this in mind, the header is located at the most appropriate elevation depending upon the depth of the excavation.

In cases where a relatively shallow excavation is required, it is possible to place the header at natural grade. In dewatering deep excavations, however, it is necessary to install the header at or slightly above the water table to keep the suction lift at a minimum. If the excavation extends to a depth greater than 18 ft. it is generally necessary to utilize a multi-stage system of wellpoints. A typical multi-stage wellpoint operation is illustrated. To perform such an excavation job the water level is lowered and maintained for several months at an elevation slightly more than 30 ft. below its original level.

The header pipe is installed along a level grade and the pump or pumps are installed at this same elevation. Since the header manifold will be subjected to a vacuum by the wellpoint pump, it is imperative that all connections on the suction side of the pump be airtight. After the installation of the header, wellpoint pumps and discharge pipe, the installation of the wellpoints is made. If the soil below the water table is relatively homogeneous and pervious, the wellpoints are self-jetted. If, however, the soil profile is stratified and/or consists of relatively fine grained materials, it is advisable to install a sand filter around the wellpoints.

This installation is made with the aid of a sand casing, which is first jetted into the ground. The wellpoint and riser are placed inside the casing and the annular space filled with sand of the proper gradation. Generally speaking, a clean concrete sand can be used for most cases. After the placement of the sand filter, the casing is pulled and re-used for the next wellpoint installation.

After the installation of the wellpoints and their connection to the header manifold, pumping can be started. During pumping, it is necessary to periodically check the system for air leaks. One of the main sources of air entering the system is the wellpoint itself, particularly after maximum draw-down has been obtained.

This effect can be minimized by careful regulation of the cocks of the swing joint connecting the riser to the header. If a wellpoint is sucking air, the condition can be detected by a slightly audible pulsation. The condition can readily be corrected by partially closing the

JETTING ACTION used to sink a wellpoint. In properly graded material, no sand envelope is required. Note the stop-cock on the line that will connect the wellpoint to the header. This cock can be used to control the volume of air coming in through the wellpoint.

cock until a steady flow condition is obtained. An experienced wellpoint field man can make these adjustments by either listening to or feeling the swing joints.

Design of a wellpoint system

A review of the subject of ground water and seepage analysis is beyond the scope of this article. There are a number of soil mechanics testbooks available for those readers wishing to further explore this interesting subject. However, we can, in a general way, review some of the factors to be considered in designing a wellpoint system.

We have already discussed the points to consider in determining whether or not a particular problem will require wellpoint dewatering. These points cannot be overemphasized. Certainly a wellpoint installation in clay, bay mud, or similar materials would be worthless. It may be found that the soil in question contains a high percentage of boulders, cobble stones, etc., which would make it impossible to jet the wellpoints. Having satisfied himself that a particular problem is well suited to wellpoint dewatering, the engineer is ready to make an analysis of the problem in the following manner:

1. It is necessary to estimate the quantity of water that must be pumped to effect the desired water lowering. In many cases, this quantity can be satisfactorily estimated on the basis of previous experience in the area. On larger dewatering operations, it is advisable to conduct pumping tests which provide the engineer with invaluable data as to the relative permeability of the soil. (The term permeability or co-efficient of permeability is numerically equal to the velocity of flow due to a gradient of one.) Permeability is frequently estimated on the basis of a grain size analysis, or a laboratory permeability test. Having the permeability, it is possible to apply the methods of modern soil mechanics to predict, with reasonable accuracy, the water to be pumped.

WITH THE AID of a truck crane workmen at the Mammoth Pool Dam project jet into place wellpoints at 2-ft. spacing for a pit to test foundation materials. Located upstream from the cut-off excavation this system intercepted the majority of the seepage, simplifying excavation.

2. Having determined the approximate rate of flow into the excavation, it is then necessary to design a wellpoint system of sufficient collection capacity to remove this amount of water. It should be quite obvious that the size and number of wellpoint pumps to be used would be directly dependent upon the rate of inflow into the excavation. The design of the number and spacing of the wellpoints is a more difficult problem.

In connection with this, it is necessary to estimate the collection capacity of a single wellpoint installed in the soil to be dewatered. Consider first the contact area of the soil with the wellpoint screen or the sand filter, in the case of a filtered wellpoint. In either case, the area through which the water entering the wellpoint must pass is fixed by the physical dimensions of the wellpoint or the diameter of the sand filter. In addition to the area, the permeability of the soil will also govern the rate of entry into the wellpoint.

As an illustration, a wellpoint of standard size (2½ x 36 in.) would have a capacity of, roughly, 1 gpm. in a fine silty sand. The same wellpoint installed in extremely coarse grained materials, such as sand and gravel, could have a collection capacity of as much as 30 gpm. On the basis of the collection capacity consideration, the number and spacing of wellpoints is determined.

Generally speaking, the spacing usually ranges from 2 ft. to 8 ft., depending upon the permeability of the soil. The design of the header manifold, along with all other piping involved in the system, is based on the principles of hydraulics. Particularly on the suction side of the system, it is imperative that friction loss be kept at a minimum since excessive friction losses cause reduced water lowering.

The reader is urged to consult with a reputable wellpoint dewatering firm for obtaining assistance in connection with any dewatering problems he encounters. The complexities of the subject of ground water and seepage make it imperative that such analysis be made by qualified and experienced engineers. Most wellpoint firms are in a position to provide wellpoint equipment on either a rental or purchase basis.

AT THE SITE of a large steam power station in Southern California, this multi-level installation was used to pull down the water level about 30 ft. and hold it there for several months.

KOLMAN

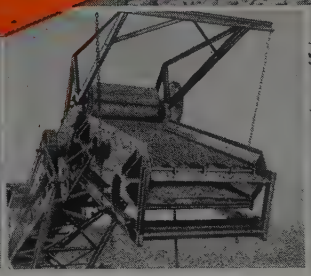
Model 101 is the ONLY Completely Portable Conveyor-Screen Plant

with all these advantages

50' x 36" Kolman 101 Conveyor-Screen Plant

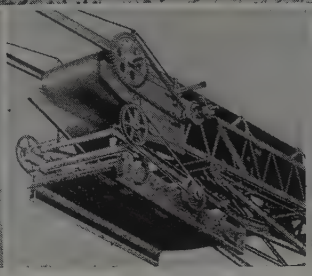
NO DISASSEMBLY FOR TRANSPORTATION

The heavy-duty Kolman conveyor, available in lengths to 70 feet, is capable of supporting the complete unit during travel. You'll save valuable time with its rapid set-up and take-down.



SINGLE, DOUBLE, OR TRIPLE-DECK SCREENS

Rugged construction of Model 101 permits use of one, two, or three-deck Kolman screens without additional supports to make several sizes of material at once! Available in widths from 18" to 42".



SINGLE-DECK SCREENS FOLD UNDER FOR TOWING

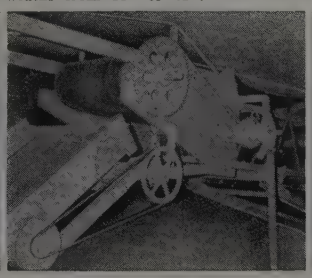
No need to remove screen for towing. Kolman's "Folding Feature" shifts weight of the screen forward, reducing total length and eliminating sway. Faster, safer, easier to move.

PORTABLE FEEDER-TRAP COMBINATION

Reciprocating plate feeder is installed in trap so both are integral part of conveyor. Gives positive constant flow of material. Adaptable to any type of feeding.

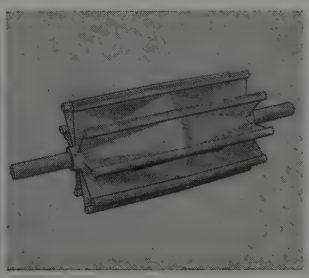
MOTOR-TO-GROUND CONTROLS

Power unit throttle and clutch controls are extended to a point easily accessible to the operator on the ground. Both controls save time and steps.



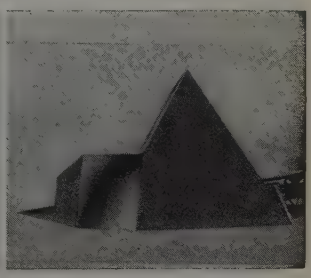
HEAD PULLEY CLUTCH CONTROLS BELT

Conveniently located where operator can observe trucks, clutch increases screening efficiency and permits screen to run empty to clear it of sticky or lodged material.



SELF-CLEANING WING-TYPE TAIL PULLEY

Self-cleaning feature of the wing-type design protects belt against stone cuts and bruises. Welded steel plate construction. Bar type head pulleys eliminate lagging.



WING WALLS PORTABLE WITHOUT REMOVING

Rigidly braced steel plate enclosure prevents gravel from working into tail section. No planking to be picked up and moved from one location to another. Greater convenience.

Costs Less to Buy, Less to Operate. See Your Nearest Dealer.

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

COLORADO
DENVER—Faris-Moritz Equipment Co.

IDAHO
BOISE, POCATELLO—Intermountain Equip. Co.

MONTANA
BUTTE, BILLINGS, GREAT FALLS and MISSOULA—Hall-Perry Machinery Co.

NEW MEXICO
ALBUQUERQUE—Construction Machinery Co.

NEVADA
ELKO—A-D Machinery Co., 251 W. Commercial St.

OREGON
PORTLAND—Blazer Equip. Co.

UTAH
SALT LAKE—Rasmussen Equipment & Supply Co.

WASHINGTON
SEATTLE — Sahlberg Equip., Inc., 5950 4th Ave. So.
SPOKANE—Intermountain Equip. Co.

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

ALASKA
FAIRBANKS, ANCHORAGE—The Carrington Co.

Western Representative
S. A. MADRID
1739 32nd Ave., San Francisco 22

SEND this coupon for FREE literature

KOLMAN Manufacturing Co.
5670 W. 12th St. **Sioux Falls, S. D.**

Send literature on the following:

- ☐ 303 Loader
- ☐ 101 Heavy-Duty Conveyor
- ☐ Vibrating Screens
- ☐ 202 Junior Conveyor
- ☐ Traps ☐ Feeders

Please quote ..... size or ..... capacity

Name .....

Address .....

City .....

... for more details, circle No. 25 on Reader Service Postcard

AERIAL PHOTO shows rugged Cock's Comb area in southern Utah through which access highway to Glen Canyon Dam passes. The long rock formation rises 500-800 ft. from the desert floor. New road required cuts 246 ft. deep through abrasive sandstone.

Tough rock work on Utah road job

Ripping, tandem push-loading, and blasting with nitrate are methods used to complete last link to Glen Canyon Dam highway.

THE BIGGEST BARRIER between Kanab, Utah, and the Glen Canyon Dam site is a long rocky outcropping called Cock's Comb, which rises 600-800 ft. from the desert floor. A 5-mi. section of access road through the region is nearing completion, with rock cuts ranging up to 246 ft. deep. The contract for the highway, being built to primary standards, was awarded to W. W. Clyde Co. of Springville, Utah, for $1,203,416 late in 1957.

Pioneering in country pock-marked by pinnacles, deep canyons and straight up and down ledges was no easy task, but Clyde tackled the job with gusto, knocking off the points ahead of the main grading crew with Gardner-Denver Air Tracs equipped with 4½-in. hammers and D8 and D9 Cats.

In the three weeks required to drill and shoot the points, air was piped up to 500 ft. from the compressors to manifolds through 4-in. metal lines. Three Gardner-Denver compressors including a 500, 600, and one 365 supplied air for the entire job.

Drill, shoot, and scrape, this was Clyde's answer to the abrasive, grinding wheel sandstone of the Southern Utah Desert. Of the 63 mi. of new road completed or now under contract by the Utah State Highway Department to the Glen Canyon Dam site, the 5 mi. through the top of the Cock's Comb was by far the toughest and most costly to construct—built at a cost of $236,438 a mi.

Two cuts through the Cock's Comb, one 246 ft. and the other 80 ft. deep, plus 90 ft. of fill added up to a million yards of excavation and embankment material moved by the contractor. Specifications for the deepest cut called for a ½ to 1 side slopes with 10 ft. benches placed every 60 ft. in elevation to control falling rock. The finished highway will have a 36-ft. width with a 5.98% maximum grade and a 5½ deg. maximum curvature. Where grades exceed 3%, truck lanes will be provided.

Beating excavation costs with fast motorized scrapers was not Clyde's only ace-in-the-hole. Working on the theory that ammonium nitrate is as good an explosive in sandstone as the conventional granular-type powder, he cut his powder costs in half.

The nitrate was trucked by the contractor 300 mi. from U. S. Steel's Columbia-Geneva Division near Provo, Utah, at a cost of less than $100 per ton delivered at the job. Drilling in 20-ft. lifts, 12½ lb. or

15% of Atlas Amodyn blasting powder was tamped in the bottom of the hole over an Atlas electric detonating cap to ignite the charge. About 50 lb. of the Ammonium Nitrate Prills were required to fill the hole to within 3 ft. of the surface—a combination that resulted in about 1 cu. yd. of broken rock for every ½ lb. of powder used. By drilling on 12-ft. centers and shooting heavy, Clyde was able to move in his scrapers and pushers immediately for fast loading in the finely fragmented sandstone.

In addition to two Gardner-Denver Air Tracs, two Worthington hammer drills mounted on D8 Caterpillar tractors were used in the drilling operation. The Timken carbide insert bits used with these rigs gave a good accounting for themselves in the abrasive sandstone averaging 800 ft. of drilling per sharpening.

The real workhorses, however, were the motorized scrapers. The fleet used by Clyde included three Caterpiller DW 21's, two Model B Tournapulls, and a Model C Roadster. Push-loaded by a D9 alone or D8's working in tandem, these fast rubber-tired scrapers moved pulverized sandstone at the rate of 6,000 cu. yd. in an 18-hour day. The single D9 used by Clyde was equipped with Ateco rippers and the D8's with Wardsworth rippers for breaking up the ribs of rock that could not be handled by the scrapers.

By shooting heavy in the abrasive sandstone Clyde was also able to lengthen the life of his rubber. Using 24-ply Firestones, he averaged 2,000 hours of tire wear from his drivers and 5,000 hours on the scrapers. Driver tires were switched to the scrapers to get a maximum amount of wear. About 40-50 lb. of pressure in each tire were used for the relatively slow speed hauls of 15-20 mi. per hour. By contrast the emery wheel sandstone reduced wear on tractor links to about 1,200 hours.

Drainage was a major problem through the Cock's Comb where the highway crossed and recrossed the natural channel several times. Using corrugated culvert pipe to control side drainage, road builders drilled and blasted a channel change through the top of the formation up to 80 ft. in depth and 16 ft. in width.

Drainage through a 30-ft. fill on the Cock's Comb west side was controlled by a 180-in. Armco corrugated culvert pipe. One of the largest multi-plate pipes manufactured, the culvert is built up of three-gage structural steel plates designed for the fast on-the-job assembling.

UNLOADING part of the 1,000,000 cu. yd. of material which was moved is a Cat DW21. In the background, compaction is carried out by sheepsfoot rollers and D8's.

In addition to the 180-in. pipe, a 120- and 72-in. multi-plate and a 14 ft. by 8 ft. 9-in. arch type corrugated culvert pipe were used in controlling drainage through the Cock's Comb. Of the 17.4 mi. of road under construction a total of 9,332 ft. of culvert pipe was used at a cost of $8 to $177 per ft.

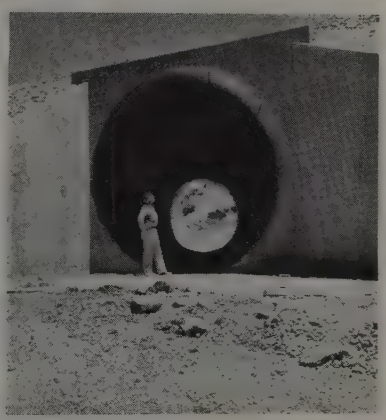
Equipment used by Clyde in addition to the scrapers and drilling rigs included a D9 Caterpiller tractor, eight D8's, four sheepsfoot rollers, a fleet of nine L-190 International trucks with 7-yd. rear dumps, and two Caterpillar graders.

Base coarse and oil gravel was crushed in a Universal crusher with a 350-ton-per-hr. output and hauled 5 mi. to the job. Water was hauled about the same distance from the nearby Paria River in three 3,000-gal. tanks mounted on International trucks.

A total of 40 men working in two nine-hour shifts were employed by Clyde for grading the 5 mi. through the Cock's Comb. Two hundred and thirty working days were allotted to complete the job including grading and oiling.

In addition to Clyde's section 12.01 mi. of road approaching the Cock's Comb was under construction by three Salt Lake City, Utah, firms, R. M. Jensen, P. W. Brimhall, and Nelson Brothers. The contract price for this section was $714,013.

Completion of the 17 mi. of new highway in September welded together Utah's final link to the $421,000,000 Glen Canyon Dam site in northern Arizona. The 63 mi. from U. S. Highway 89 near Kanab, Utah, to the Utah-Arizona line took two years to build and cost $5,000,000. Approximately 100 mi. of new highway in both Utah and Arizona will eventually tie up with the $4,250,000 Colorado River Bridge making the remote Bureau of Reclamation project accessible from both sides of the river. Completion of the bridge—the nation's highest and second longest steel arch span—is expected by the first of the year.



DRAINAGE calls for 9,332 ft. of culvert pipe. The largest (above) is a 180-in. diameter multi-plate manufactured by Armco.

Superintendent for W. W. Clyde Co. is Lars Palfreyman. Engineer for the Utah Highway Department is Robert Wheadon. (Picture on page 92.)

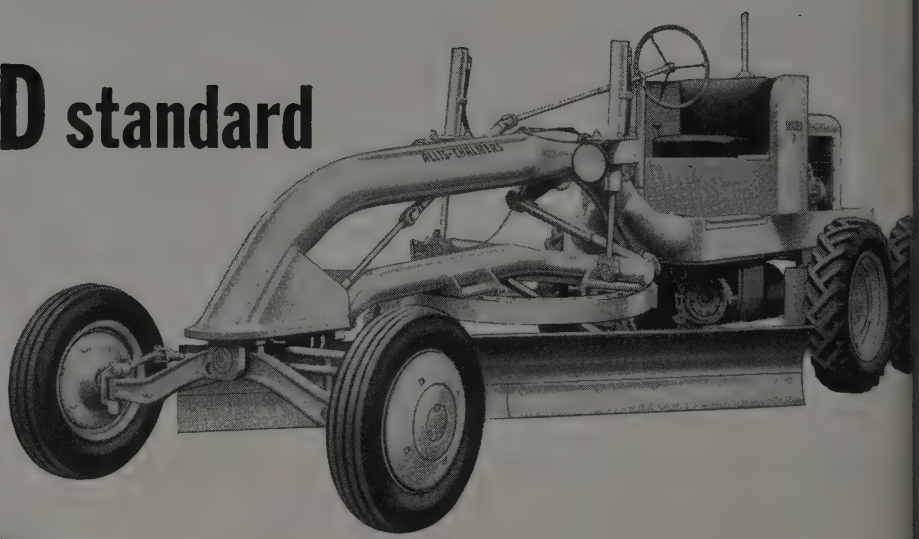
...for big economy on maintenanc

GET THE ALLIS-CHALMER

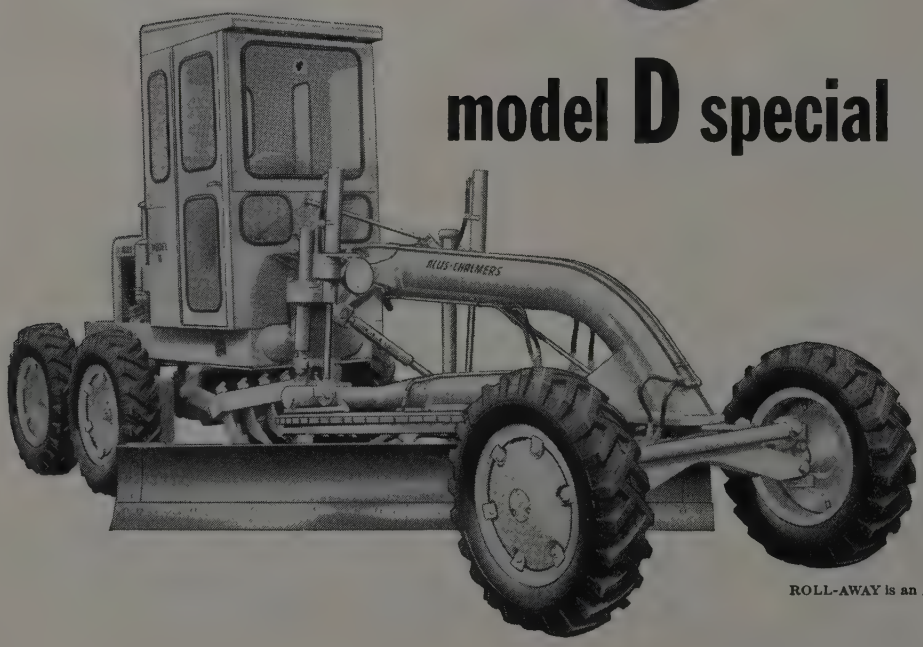
Here's the original low-cost motor grader with big-grader design and performance advantages. The Model D handles so many jobs so well, you have to see it at work to convince yourself. Your Allis-Chalmers dealer can arrange a demonstration.

model D standard

50 hp
Approx. weight
8,800 lb (gasoline)
Approx. weight
9,350 lb (diesel)



model D special



50 hp
Approx. weight
10,900 lb (gasoline)
Approx. weight
11,450 lb (diesel)
4 forward speeds to 25 mph (approx.)
1 reverse speed to 3 mph (approx.)
All-steel cab*
Shiftable moldboard*
Hydraulic scarifier*
Leaning front wheels*
Power circle turn*

*Also available with the model D standard as optional equipment.

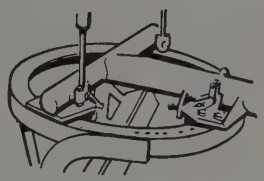
ROLL-AWAY is an Allis-Chalmers trademark.

nd construction work

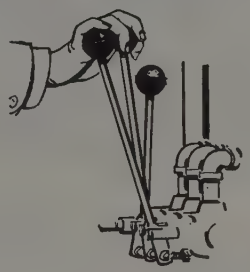
ODEL D MOTOR GRADER

many production-boosting advantages

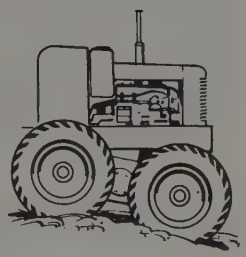
he ROLL-AWAY mold-oard rolls dirt up and ead to eliminate pack-g, reducing friction . . . ves you more perform-nce per horsepower, ore production per gal-n of fuel.



Revolving circle and heavy tubular drawbar provide exceptionally stable moldboard mounting.



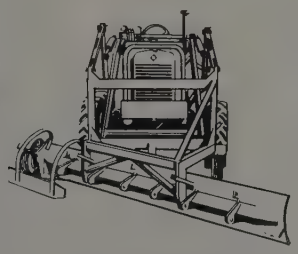
Convenient hydraulic controls, easy to operate. Two levers fit into one hand to control circle lift.



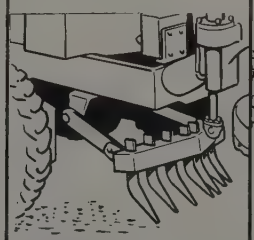
Positive tandem drive gives you four driving wheels under the heavy end of the grader.

many job-multiplying attachments

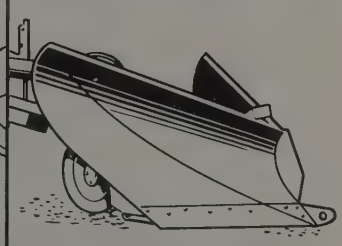
-yd rear-mounted loader



Interchangeable shoulder maintainer



Midship-mounted scarifier



Blade and V-type snowplows

ook ahead... *move ahead*... and stay ahead with

ALLIS-CHALMERS

ARIZONA
Neil B. McGinnis Equipment Company—Phoenix

NORTHERN CALIFORNIA
Industrial Tractor Sales—North Sacramento
Shasta Truck & Equipment Sales—Redding
West Coast Engine & Equipment Company—Berkeley,
Branch: San Jose & Ukiah
Trinity Tractor Company—Eureka

SOUTHERN CALIFORNIA
Construction Machinery Co.—San Diego
San Joaquin Tractor Co.—Bakersfield
Shaw Sales & Service Co.—Los Angeles

IDAHO
Southern Idaho Equipment Co.—Idaho Falls and Twin Falls
Southern Idaho Equipment Co. of Boise, Inc.—Boise

MONTANA
Mountain Tractor Company—Missoula and Kalispell
Seitz Machinery Company, Inc.—Billings

NEVADA
A D Machinery Company, Inc.—Elko and Las Vegas
Reno Equipment Sales Co.—Reno

OREGON
Haupert Tractor Company—Medford
Wood Tractor Company—Portland
Timber Tractor Company—Springfield

UTAH
Cate Equipment Company, Inc.—Salt Lake City

WASHINGTON
Pacific Hoist & Derrick Company—Seattle & Puyallup
American Machine Company—Spokane

WYOMING
Studer Tractor & Equipment Company—Casper

ALASKA
Yukon Equipment, Inc.—Anchorage, Fairbanks & Ketchikan

... for more details, circle No. 27 on Reader Service Postcard

Building a concrete dam on a dam

High in the mountains of Colorado a thin arch increases storage for Denver in Williams Fork. Aluminum pipe used for concrete cooling system.

By **L. K. WALDRON**
Project Engineer
and
ROBERT D. GOULD
Shift Engineer
Mountain States Construction Co.
Golden, Colo.

BUILDING a thin, arch-type concrete dam on an existing gravity arch section at an elevation of 7,500 ft. in a remote mountain location presents unusual construction difficulties. These were some of the problems faced by Mountain States Construction Co., when it received a contract for work totaling about $4,500,000. The project is being carried out for the Denver Water Board and is located on Williams Fork, about 5 mi. by highway from Parshall, Colo. Storage at this location has a long history involving the trans-mountain diversion of an additional supply of water to the city of Denver. However, this review will be confined to the construction problems and work on the concrete arch which is now nearing completion.

Transportation problems were not too serious since an existing road was available to within 2 mi. of the actual dam site. At this point, the river is about at elev. 7,600.

The original plan of the contractor was to set up a construction camp at the site, but further consideration of the problems involved made it seem more desirable to let the men locate their own accommodations in the nearby towns of Kremmling, Parshall, Hot Sulphur Springs, and Granby.

With commercial repair shops of a size able to handle the construction equipment located at a distance of almost 20 mi. from the project, the contractor planned and built adequate shops and servicing facilities at the site.

With a relatively short construction season, which would normally be about six months, the job was planned to occupy two years. This resulted in a shutdown of all concreting operations during one entire winter season.

One of the most unusual features of the project was the fact that the concrete arch for a distance of about 350 ft. across the bottom of the canyon would have as its foundation the existing gravity dam built in 1939. The accompanying cross-section shows the area of the old dam, the amount of concrete required to be removed from its crest and the arch section now nearing completion. Removal of the existing concrete was carried out by drilling and controlled shooting.

Working from the surface of an old dam provided a relatively simple program of stream diversion. One block of the new arch was left low enough to handle the spring runoff without interfering with the placing of concrete in the remainder of the arch. This block was selected to carry the water in a direction that would bypass the excavation work on the powerhouse.

Preparation of aggregate was relatively simple due to the fact that the valley upstream from the dam site contained extensive deposits of well graded river gravel. No crushing was necessary. It was excavated directly from pits and screened into 6-in., 3-in., 1½-in., ¾-in. gravel and sand. The batching plant was located at the aggregate deposit.

From the concrete mixing plant the concrete was trucked about a mile to the dam, with each truck hauling two 2-yd. Blaw-Knox concrete buckets.

The severity of the curve in the dam eliminated the possibility of an overhead cableway for handling concrete. The contractor elected to erect a steel trestle at elev. 7,750 which followed the general curve of the upstream face and could be used for placing all of the concrete. The buckets delivered by truck operating on this trestle were handled by a P&H crane. As dumped into the forms, the concrete had a slump of about 2 in. and was vibrated into position. Lifts were 5 ft. in thickness. Specifications called for a time interval of not less than 72 hr. between lifts. The surface of the lift was required to be sand blasted before the next lift was started.

For cooling the concrete down to about the temperature of the river water, each of the 50-ft. blocks had two coils of 1-in. diameter pipe placed on top of each 5-ft. lift. The

ATTENTION CONTRACTORS!

Looking For . . .

---MORE PAYLOAD CAPACITY?

---FASTER OPERATION?

---AT MINIMUM INVESTMENT?

See COOK BROS.
Bottom Dump Trailers
IN ACTION!

- The **ONLY** complete line on the market
- Load and unload "on the move"
- Bottom Dump Gate options to meet **ANY** job requirement
- **ONE SOURCE RESPONSIBILITY.** Every trailer "ready to work" upon delivery
- Free descriptive literature on request

C-B BOTTOM DUMP SEMI TRAILERS made in sizes from 12 to 35 tons payload capacity

C-B BOTTOM DUMP TRAINS made in sizes from 18 to 35 tons combined total payload capacity

CB COOK BROS.

*Factory Branch

3334 San Fernando Road · Los Angeles 65 · CLinton 6-3151

Manufacturers of: Stabilift End Dump Trailers, Bottom Dump Trailers, Transfer Trailers

Distributed In The West by:

CALIFORNIA — Cook Bros., Los Angeles*, Oakland*
OREGON — Cramer Machinery Co., Portland
WASHINGTON — Reo Washington Sales, Seattle; Andrews Equipment Service, Spokane
ARIZONA — Cook Bros., Phoenix*
MONTANA — Seitz Machinery Co., Billings; Roberts Truck & Parts, Butte
UTAH & IDAHO — Harris Truck & Equip., Tremonton, Utah
COLORADO & WYOMING — Jacobs Kerr & Co., Denver, Colorado

. . . for more details, circle No. 28 on Reader Service Postcard

contractor elected to change from the usual black pipe to a 1-in. diameter aluminum pipe. This was the first time, according to our information, that aluminum pipe has been used for this purpose in dam construction.

The choice of aluminum pipe was based principally on the simplified handling. Wire "hairpins" were embedded in the top of every lift at 3-ft. centers in the desired pattern and spacing. The aluminum pipe could then be rolled out in the block by one or two men as easily as rolling a wheel, and tied down with the hairpins. Coupling of the loops was accomplished by banding a short length of 1-in. rubber hose to the ends of the pipe. The whole operation usually took only about 15 min. and did not require the use of any equipment. Two men were able to carry all of the pipe necessary in one trip. The aluminum pipe for this purpose has proved most satisfactory.

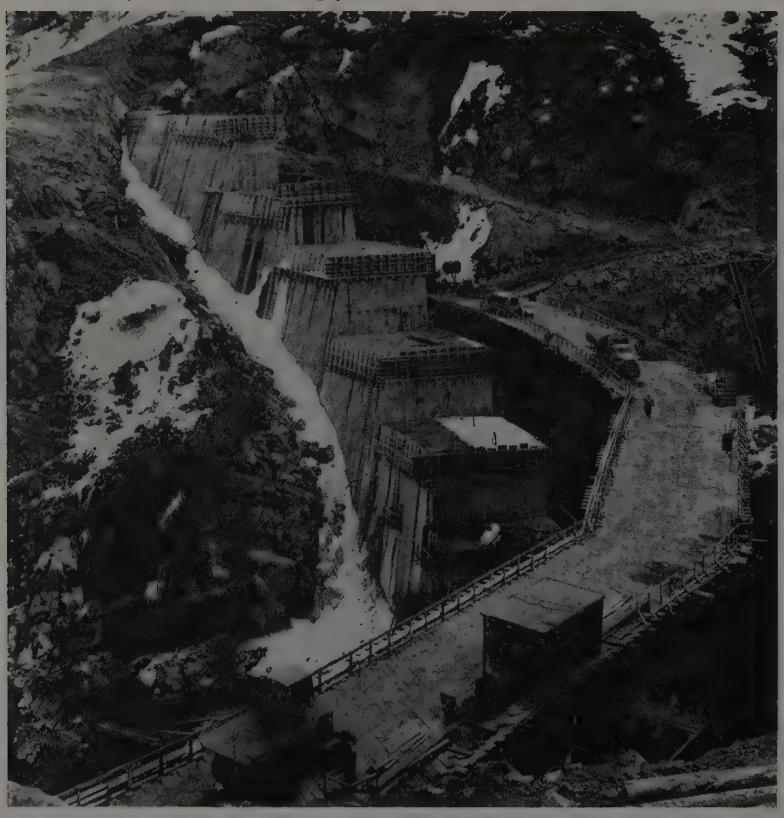
Another, and rather unusual purpose served by this cooling pipe system was for raising the temperature of the existing concrete in the spring prior to the renewal of concreting operations. By the use of three Burkay heaters, normally used for swimming pools, water at 110 deg. was circulated through the cooling system pipes and the temperature of the concrete raised to about 50 deg. before the first lift was placed in the spring.

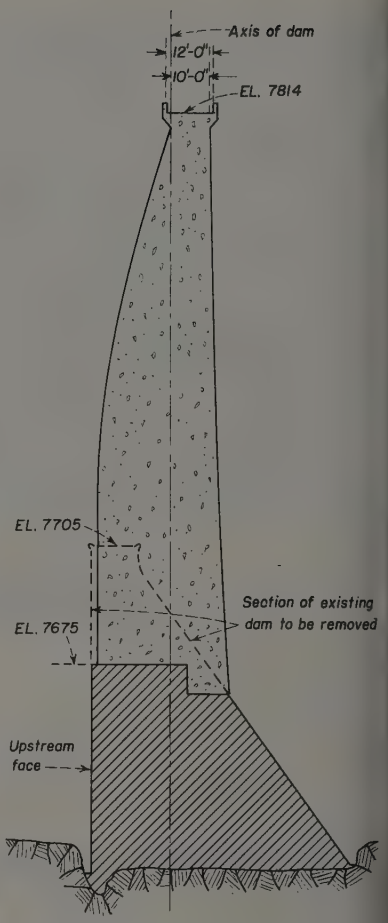
Vertical contraction joints were grouted under pressure through a system of pipes left in each block.

Development of power at the Williams Fork Dam was a very desirable supplementary feature of this storage program. Although firm energy could not be produced under the planned operation of the reservoir for replacement purposes, a substantial part of the energy from the 3,000-kw. power plant will be in precise phase with the energy which the city of Denver will be obligated to transmit to the U. S. Government system. This power will be produced by water which Denver will be diverting from the Blue River during the replacement season.

Another miscellaneous feature of the project is an earth dike containing about 43,000 cu. yd. of material required to fill a low saddle on the west side of the reservoir site. This dike will provide a crest at elev. 7,814.

CURVE OF THE arch presented serious problems in using a cableway and the contractor erected this curving trestle for concrete handling. A P&H crane handled the 2-yd. concrete buckets that were hauled by truck from the mixing plant.





MAXIMUM section showing the new concrete arch built on the old gravity section. Crest of the old dam was removed as indicated.

For Mountain States Construction Co., the supervisory staff consisted of the following:

Earl Cooper, project superintendent; L. Kay Waldron, project engineer; Robert D. Gould, day shift engineer—dam; Warren Hunter, swing shift engineer—dam; Curtis Hunter, power plant engineer; Adolphs Egletis, chief of surveys; Herbert Rice, batch plant superintendent; Larry Woosley, day shift superintendent—dam; Dick Lora, swing shift superintendent—dam; Clayton C. George, power plant superintendent; Anthony Dattilo, excavation superintendent; Sidney D. Gould, personnel manager; Gerban R. Houtman, office manager; James Brock, master mechanic.

For Tipton & Kalmbach, consulting and supervising engineers of Denver, Roy Wright, is resident engineer; Everett Osgood, chief inspector; Marvin E. Langsteiner, office engineer; and Jack Waltman, chief of surveys.

Pictures of supervisory personnel appear on page 94.

FREE—COMPLETE FACTS ON NEW EXTRA HEAVY DUTY TRUCKS
Check Choice of Booklets and Return to:
FORD Division of FORD MOTOR COMPANY
P.O. Box 658, Dearborn, Michigan

☐ **Extra Heavy Duty Conventional and Tilt Cab Trucks**
Up to 36,000-lb. GVW, 65,000-lb. GCW

☐ **Tandem Axle Models**
Up to 51,000-lb. GVW, 75,000-lb. GCW

Name_____

Address_____

City_____ State_____

D-NEW TILT CAB TANDEM FORDS for '59 combine asier, more economical maintenance of tilts with tandem-axle load capacities. Tilt design also its higher front axle loads, longer body on given lbase. C-950 Tandem, above, operated by Fair-lawn Supply and Concrete, Akron, has 15,000-lb. front axle, 34,000-lb. rear. Carries up to 6,500 brick, compared to 5,000 on a conventional tandem. Has 401-cu. in. V-8, 5-spd. main transmission, 3-spd. auxiliary, 201-in. wb. GCW (with pup trailer) 72,000 lb.

OST LESS ... *less to own ... less to run ... last longer, too!*

... for more details, circle No. 30 on Reader Service Postcard

National Forest Road System

- *80% of the roads will be in the Western states*
- *Definitions of terms that should be understood*
- *Relation to state and county road systems*
- *Financing regulations for construction and maintenance*

By ARVAL L. ANDERSON

Regional Engineer
U. S. Forest Service
Ogden, Utah

THE NATIONAL forests are particularly important to the Western states. It may be said that the most important watershed lands in the West are in the national forests. About 140,000,000 ac. of the 181,000,000 ac. in national forests are in the Western states. This area is predominantly in the higher elevations, the source of the greatest snow packs and highest precipitation.

For the purpose of this discussion, the term "forest roads" will include all roads in the national forest transportation system. The national forest transportation system is the network of: (1) highways, (2) development roads, and (3) trails which are on or adjacent to national forests and are needed for management, protection, and utilization of the national forest.

Nation-wide this system consists of 24,000 mi. of forest highways, 129,211 mi. of forest development roads, and 114,090 mi. of trails. Present tentative plans indicate the need for a system of about 70,000 mi. of forest highways, 480,000 mi. of forest development roads, and a trail network of about 80,000 mi. The trails would naturally be reduced somewhat by a more intensive road system.

With 140,000,000 ac. of national forest in the West, it it evident that about 80% of this forest road system will be in the states represented by the Western Association of State Highway Officials.

Meaning of "forest roads"

Most state highway department people use the term "forest roads" to mean roads on the forest highway system. This is natural because about the only forest roads which are on state systems are forest highways. And what are forest highways?

To be eligible for the forest highway system, a road must be on or adjacent to and serving a national forest as well as have general public travel and community value. It must also be placed upon either a state or county road system and the state or county must assume responsibility for maintenance when constructed from forest highway funds. Forest highways are commonly grouped into three categories. These are Class 1, Class 2, and Class 3. All forest highways on the Federal Aid Primary system are Class 1 forest highways. All forest highways on the Federal Aid Secondary system are Class 2 forest highways. All forest highways which are not on a Federal Aid system are designated as Class 3 forest highways. Note that the class number has no relation to whether the highway is on the state or county system.

Joint recommendation required

To be placed on the forest highway system, a road must be jointly recommended by the state highway department, the regional engineer of the Bureau of Public Roads, and the regional forester of the U. S. Forest Service. If this recommendation is approved by the chief of the Forest Service and the Commissioner of Public Roads, the road is then designated as a forest highway.

Forest roads which are not on the forest highway system are carried on the Forest Service records as forest development roads. These roads may or may not be on state or county systems. They are placed on the forest development system by unilateral action of the Forest Service because they are an essential part of the forest transportation system.

Where they are also state or county roads of adequate standard and adequately maintained, the Forest Service may never do any work on them. However, if need arises, the Forest Service could legally spend its funds on them. On the other hand, where a forest development road has been constructed by the Forest Service or where the maintenance work done by the Forest Service is not adequate to meet the demands of public travel, it is entirely proper for the state or county to improve the standard of the road or to take over its maintenance. In this case, the road would be placed on the state or county system and at the same time it would still remain on the forest development system. Forest Service action in placing a road on the forest development system does not in any way affect its status with respect to a state or county.

With very few exceptions, forest development roads constructed and maintained entirely by the Forest Service are open to public travel. The public is welcome on these roads even though they have been constructed primarily for timber hauling or service to some other national forest resource. Under exceptional circumstances, a road constructed by the Forest Service for a special purpose may be closed to public travel. This could never be done on a road placed on the state or county system. We must keep in mind all the time that the national forests are managed for multiple use and the forest development roads must therefore serve all of the resources.

The third part of the forest transportation system is the forest trail system. Trails supplement the road network and provide access into areas where roads are impracticable, uneconomic, or prohibited by administrative policy. As, for example, in wilderness areas trails are of great importance for fire protection and for administration of public recreation, hunting and fishing, and livestock grazing. They are, therefore, an essential part of the forest transportation network.

Essentially cooperative projects

Thus, the term "forest roads" covers quite a variety of standards and jurisdictions. In fact, they are essentially cooperative projects of one kind or another. The states, counties, the general public, and the Federal Government all have a

Subcontract Your Unusual Jobs to Armco

Get a firm price...
Completion on schedule...
Backed by the Armco name and experience

Parts of many big projects involving Armco Drainage or Construction Products often require special equipment, materials and manpower. You can avoid many of these "specials" and their related high cost by subcontracting with Armco.

You'll find it pays to get the services of the Armco Construction Department for jobs like tunneling with Armco Liner Plate; boring and jacking of conduit, sewers and other drainage structures; assembly and installation of Armco Corrugated Metal Pipe and big MULTI-PLATE® Structures, erection of Armco Steel Buildings and Armco Retaining Walls.

You know your exact costs in advance, and you are assured of a top-notch job. In addition, your own personnel and equipment are free for other work. Write us for complete information on the Armco Construction Service.

ARMCO DRAINAGE & METAL PRODUCTS, INC.
CALCO AND NORTH PACIFIC DIVISIONS
Berkeley • Los Angeles
Portland • Seattle • Spokane

Tunneling under railroad tracks for new sewer in Topeka, Kansas. The Armco Construction Department installed Armco Liner Plate on a subcontract for the general contractor.

Armco Pipe is jacked through an embankment where it will serve as a conduit for industrial utility lines. Specially developed jacking equipment helps Armco crews do this work quickly and efficiently.

ARMCO CONSTRUCTION DEPARTMENT

ARMCO®

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

vital interest in them. It is logical, as a result, to look into the question of who constructs them and how are they maintained.

Where sufficient forest highway funds are available, the normal procedure for construction of forest highways is for the state highway department to recommend a program for certain projects. The proposed program is then discussed at a joint meeting of representatives of the state highway department, the Bureau of Public Roads, and the Forest Service. When they reach an agreement, a jointly signed program letter is forwarded to the headquarters of the two Federal agencies. Upon approval, the Bureau of Public Roads proceeds to perform the necessary engineering and constructs the road under contract. Upon completion of construction, the road is taken over by the county or the state for maintenance and becomes a responsibility of that agency.

State may proceed under FAP

In a case where the forest highway is an important Primary Federal Aid road, and the urgency for construction does not permit waiting for forest highway appropriations, the state may proceed with construction under the Federal Aid Program. In this case, the Forest Service does not enter into the programming phase of the work. The same procedure would be followed on a road project to be constructed under the Secondary Federal Aid Program regardless of whether it is a state or a county road.

A forest development road which is on a state or county system can be constructed directly by the state or county entirely from its own resources. In this case, the road may or may not be on the Secondary Federal Aid system. The Forest Service will usually be willing to waive jurisdiction of a road to a state or county if that happens to be a factor in placing the road on the state or county system.

In situations where the state or county and the Forest Service have a mutual interest in improving a forest development road, this work may be accomplished under a cooperative agreement. This agreement could provide for the state or county to deposit funds with the Forest Service and the Forest Service to perform the construction by either contract or force account. Normally, it would be done by contract. If it is mutually agreed that the state or county should perform the work, it is possible to enter a cooperative agreement which would provide for the Forest Service to reimburse the state or county for its share of the project.

Usual method of procedure

The most common method for construction of forest development roads is for the Forest Service to undertake the whole job with forest development funds appropriated by Congress. In this case, Forest Service engineers would locate and design the road and it would be let to contract and constructed under Forest Service supervision.

Where construction of branch roads is needed in connection with a timber sale, and there is not a sufficient amount of appropriated forest development funds available, the Forest Service has the authority to require the purchaser of national forest timber to construct the road and to pay for it by deducting the cost of the road from the price he would pay the Government for the timber. By this method, the counties actually contribute 25% of the cost of the road. The cost of the road is taken from the national forest receipts before they reach the Treasury and, therefore, is not considered in computing the 25% fund which the Federal Government pays to the states for county roads and schools. Location, design, and construction engineering on a road constructed by the timber purchaser is handled by the Forest Service in the same manner as for a road to be constructed by regular contract methods.

Use will increase greatly

Use of the national forests can be expected to increase greatly. For example, by the year 2000 the national forests should annually produce 24,000,000,000 board ft. of timber if they are to carry their full share of the job of producing wood to meet the Nation's anticipated requirements by that time. This is an increase of 250%.

It is predicted that recreation visits to the national forests will increase to 66,000,000 by 1962, and 100,000,000 by 1975. Over 25% of the recreation visits presently are for fishing and hunting.

Total national requirements for water may increase four times by the beginning of the next century. With water supplies already becoming a limiting factor in development of parts of the West, the national forest share of production of usable water cannot be less than the optimum.

The large expansion in use of the national forests over the past ten years would have been impossible without a road and trail system. This transportation system is inadequate to meet present needs and must be expanded to keep pace with the sharply upward trend in use. An adequate system of access roads and trails is an important key to proper protection of the increasingly valuable national forests and to their proper multiple-use and sustained yield management.

What does this mean to the state highway people? It means more traffic on all of the roads in the state from the most remote forest development trail to the biggest inter-state highway.

I would like to impress you with the fact that in the eyes of the road user there is no sharply defined dividing line between state roads, county roads, and Forest Service roads. This is true whether he be a tourist, a local resident, a farmer, a lumberman, a stockman, or what. No matter what the purpose of his travel, he will move from super highway to secondary highway to forest development road in one continuous trip probably without stopping.

Impact on state systems

The development of forest resources and construction of a forest development road system creates an impact on state highways.

All agencies involved in road construction and maintenance have a community of interest. The public interest will be best served by road building agencies coordinating their work and cooperating where practicable in areas of overlapping or common interests.

A summary by the BPR in 1957 of the estimated costs for developing the Forest Highway System to a reasonable standard indicates the need for a total expenditure of Federal, State and local funds from 1958 to 1967 of $1,318,066,000. This total estimated cost for the 10-year period is for improvements needed on 16,180 mi. of highways and for 2,495 structures on the Forest Highway System. The estimate reveals that 85% of the total amount necessary to meet critical needs are for Class 1 and Class 2 highways. This would require an annual forest highway appropriation of $132,000,000 per year to meet the immediate 10-year needs for the present system.

This is a slightly condensed version of the paper presented by the author at the WASHO Conference in Salt Lake City, June 5.

California reveals freeway plan

Proposed system will take 20 years to build, will cost $10,500,000,000, will be 12,250 mi. long.

CALIFORNIA has plans to construct a comprehensive freeway network to serve the estimated needs of the state in 1980. The plan was presented before the Joint Interim Committee on Highway Problems of the California Legislature in September. A year ago the State Legislature had asked the Department of Public Works for a study of a freeway system.

Construction of the 12,250-mi. system would take 20 years at a cost of $10,500,000,000. No increase in highway user tax rates would be needed.

In creating the plan, the Division of Highways made the most comprehensive study of traffic, population, and economic conditions in California that has ever been undertaken by the Department of Public Works. Twenty-three meetings were held involving 730 county people and representatives of 280 cities. Giving valuable assistance were the City-County Advisory Group, the Automotive Safety Foundation, and the Institute of Transportation and Traffic Engineering. The result of the study is a proposal for highways that is of monumental proportions.

Main features of the California Freeway System are as follows:

It would serve every California city of 5,000 population—every city of the State which will grow to 5,000 by 1980—virtually every incorporated city and many communities not formally incorporated.

It would serve from one-half to three-fourths of all motor vehicle travel in California.

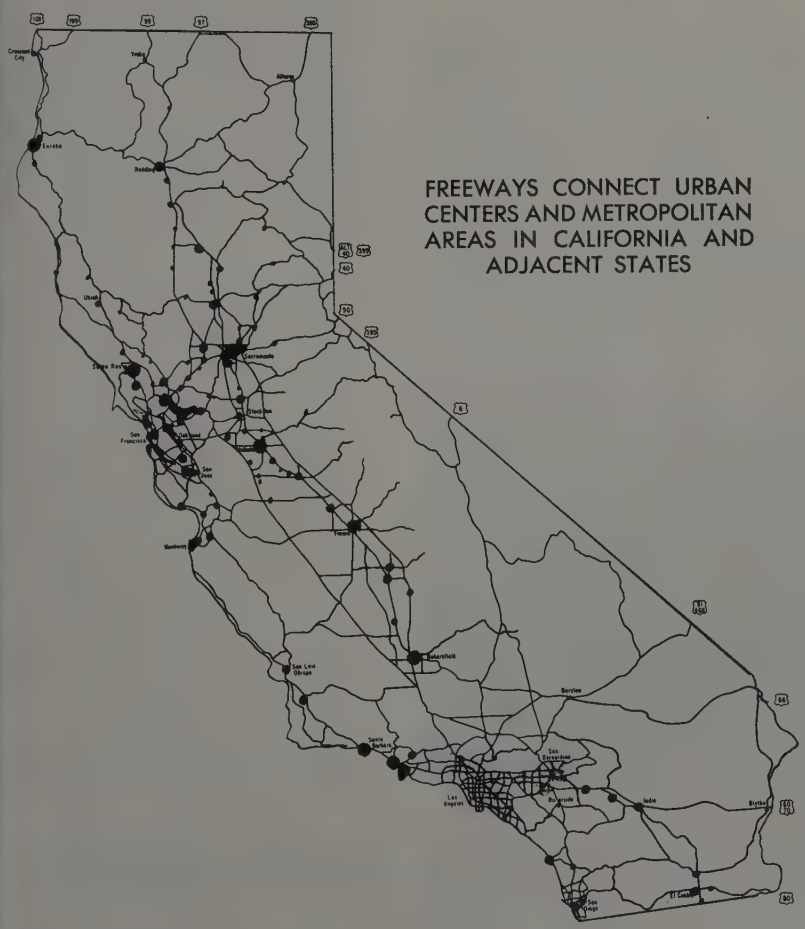
It would cut the death rate among motorists using its full freeways by two-thirds to three-fourths.

It would total 12,250 mi. in length, almost as extensive as the present State Highway System (which is largely two-lane roads).

In lighted populated mountain and forest regions where relatively few roads exist and long trips predominate, the limited number of roads proposed for the freeway system will accommodate nearly three-fourths of all travel in those areas. In the Central Valley regions where there are many farm-to-market roads and numerous smaller cities where shorter trips are frequent and alternative roads exist, slightly more than 60% of the travel will accrue on the freeways. In metropolitan areas, characterized by intense land use, a dense network of roads and streets to serve abutting property, and by large numbers of relatively short trips, from 52 to 62% of the tremendous volume of travel concentrated in such areas is expected to use the freeway system.

It is estimated that attempts to serve more than those proportions of the regional traffic would require excessive condemnation of costly urban land, would increase costs in both rural and urban areas more rapidly than the benefits to be gained, and would not provide the abutting land services which are as essential as through traffic.

For urban areas the growth patterns are changing so rapidly that there may be major changes from current estimates. Most of the metropolitan area freeway routes are, therefore, proposed as full freeways with complete access control by 1980 for the presently established needs and those which are reasonably certain in the foreseeable future.



FREEWAYS CONNECT URBAN CENTERS AND METROPOLITAN AREAS IN CALIFORNIA AND ADJACENT STATES

Ultimate need will be more

The system of 12,250 mi. is not considered to be the ultimate for California. It is recognized that should the system be adopted by appropriate action of the Legislature, there should be from time to time qualified additions to and deletions from the system. These future changes should be based on a continuous study of the highway transportation needs and growth patterns which cannot accurately be determined at this time.

Thus one state, California, proposes to build a freeway network more than ¼ as large as the entire national Interstate System now under construction.

CAT FUEL INJECTION EQUIPMENT CUTS COSTS BY PROVIDING MAXIMUM ENGINE PERFORMANCE

Presetting at factory for accurate performance eliminates field settings, makes installation of Caterpillar fuel injection pumps quick and simple.

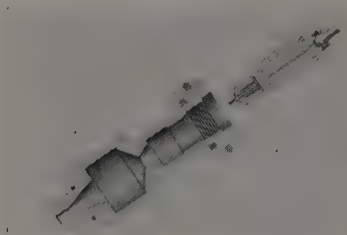
The fuel injection system is a key to peak engine performance. It must deliver to each cylinder equal amounts of fuel at precisely the right time. Deviation means a loss in horsepower. That's why it pays to use Cat fuel injection equipment.

Cat injection equipment can save you money in other ways, too. No field or operating adjustments are necessary. Installation is *quick and simple.* All pumps are interchangeable for different cylinders and between engines of the same model.

This interchangeability permits smaller parts inventories, makes replacement inexpensive by eliminating custom fitting, and makes replacement possible in a matter of *minutes* right on the job regardless of the experience of the mechanic.

Genuine Caterpillar injection equipment is built to last. With clean fuel, a life of 20,000 service meter hours is not unusual.

Pumps, plungers and barrels are manufactured from the finest chromium alloy, so hard that diamond dust is required for lapping the plungers and barrels. Pumps are tested and preset at the factory to provide accurate metering, timing and fuel pressure.



HIGHEST STANDARDS in the industry go into the manufacture of Caterpillar fuel injection equipment. Pump plungers and barrels, for example, are finished to tolerances so fine that the heat from your hand will expand a plunger enough to make it larger than the matching barrel.

SERVICE TIP

Your Caterpillar Dealer has the testing equipment to determine accurately when fuel injection systems parts should be replaced. And testing is the only sure way of knowing.

RUN-IN TESTS—four hours on pumps, two on valves — are conducted on these Caterpillar-built test machines before a pump or valve leaves the factory. Strict testing procedure means perfect performance of genuine Caterpillar injection parts.

Single-orifice fuel injection valves minimize the possibility of clogging or fouling. A spring-loaded plunger within the valve opens by fuel pressure at the proper time for uniform and precise injection. Extra protection is given by a fine-mesh screen. This clean, accurate injection means less down time and lowest fuel cost per unit of power.

Don't risk real damage to your Caterpillar equipment with an improperly functioning fuel injection system. Test systems regularly and replace worn parts with genuine Caterpillar parts. Your Caterpillar Dealer has the full story. See him today. And remember, he stands behind every part he sells.

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

Improper fuel injection equipment can be expensive. For instance, if a machine's owning and operating cost is $10 per hour, its total cost in a 2,000-hour season is $20,000. For a 200-horsepower machine that's $100 per horsepower. A poorly functioning fuel injection system which robs the machine of 5% of its horsepower (10 HP) could mean a season loss of $1,000 (10 [HP] x $100). Don't take chances. Standardize on Cat equipment.

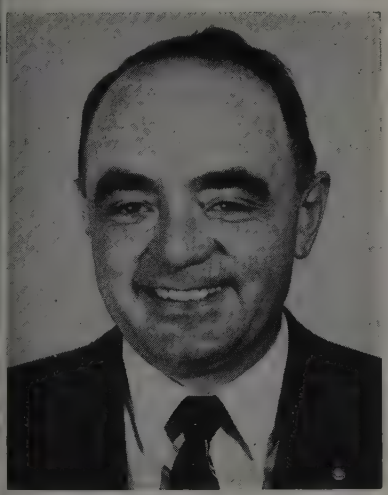
CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

WESTERN CONSTRUCTION NEWS

Ellis L. Armstrong named Commissioner of BPR

FOLLOWING a year of service as director of highways for Utah, Ellis L. Armstrong becomes commissioner of the Bureau of Public Roads with headquarters in Washington, D.C. The office has been vacant since the retirement of C. D.



Ellis Armstrong

Curtiss, last December. In his new position Ellis Armstrong will serve directly under Bertrand D. Tallamy, the federal highway administrator.

A native of Utah and a graduate of Utah State University in civil engineering in 1936, Armstrong has had 18 years of experience with the Bureau of Reclamation both in the office and in the field. He was particularly closely associated with the design and construction of the Anderson Ranch Dam in Idaho.

He spent several months in Egypt during 1953 as part of the task force of engineers engaged in plans for economic improvements in that country including the studies for the high Aswan Dam. Returning to this country he became project engineer in 1954 on the St. Lawrence power project for the engineering managers of that $700,000,000 development. Subsequently he served as assistant project manager.

With the reorganization of the Utah State Road Commission in 1957 he accepted the position of director last June. He was general chairman when the Utah Highway Department were hosts to a most successful WASHO Conference.

New building for Signal Oil

A $5,000,000 office building is to be started next month in Los Angeles to serve as headquarters of the Signal Oil & Gas Co. The structure will be 15-stories high and include 200,000 sq. ft. of floor area. Three levels of parking space will be provided in the building. General contractor will be C. L. Peck of Los Angeles.

Contract let for 17 more Colorado Aqueduct siphons

AMERICAN Pipe and Construction Co. has been awarded a $6,500,000 contract by the Metropolitan Water District for 17 siphons in the Colorado River Aqueduct Supply and Distribution System. American will manufacture the concrete pressure pipe and install it with the completion date of Jan. 1960.

The award covers 39,625 ft. of 13 ft. and 13½-ft. inside diameter reinforced concrete pressure pipe. The first schedule of the work includes six siphons south of San Jacinto Reservoir which will serve as links within the canal portion of the new San Diego Aqueduct.

ASPHALT INSTITUTE OPENS NEW PACIFIC DIVISION HEADQUARTERS

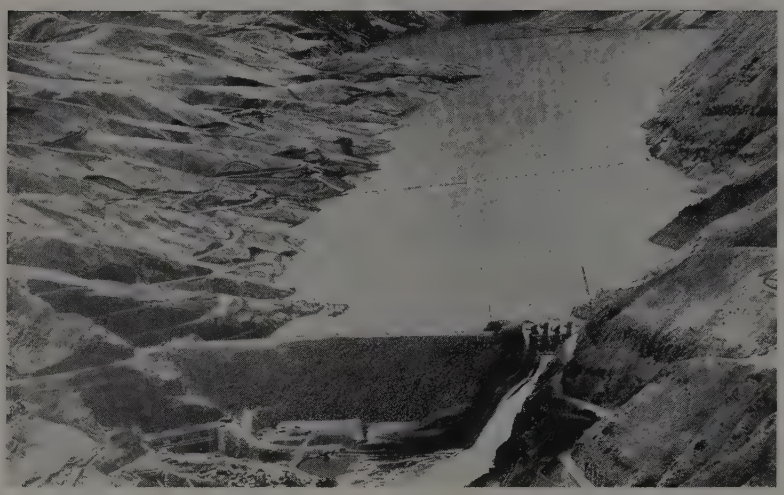
Dedication of the new Pacific Coast headquarters building of The Asphalt Institute (810 University Ave., Berkeley, Calif.) was attended by Institute President *J. E. Buchanan* from national headquarters at College Park, Maryland. In his dedication address, he cited the "... tremendous growth of the asphalt industry in the past decade spurred on by the great strides made in the advancement of asphalt paving technology." "This new building," said Buchanan, "marks the confidence of the petroleum industry in its very versatile product — Asphalt — which is used in modern pavement construction, roofing, waterproofing, and other applications."

Attending the luncheon were management and technical representatives of member companies on the Pacific Coast, headed by *E. J. Barnes* of Macmillan Petroleum Corp. who is currently regional vice-president of the Institute.

The Asphalt Institute is an international association of asphalt producers to advance the use of asphalt through programs of engineering, research, and education. It was organized in 1919 and the Pacific Coast Division was formed in 1931 when asphalt production on the West Coast was about 400,000 tons. Today annual asphalt production on the Pacific Coast exceeds 2,500,000 tons.

Shown in the picture are: Buchanan, Barnes, and *R. A. Vallerga* who is managing engineer, Pacific Coast Division.

Brownlee Dam starts on the line



POWER started to flow on Aug. 27 from Brownlee Dam in the Hells Canyon reach of the Snake River, center of a long and stormy controversy fought to the nation's highest court. With only a short ceremony marking the historic milestone, the 360,000-kw. project began production as its first generating unit on the line. The multipurpose project, which includes the world's second-highest rock-fill embankment, is the first of three new Idaho Power Co. dams to harness the Hells Canyon reach bordering Idaho and Oregon.

T. E. Roach, Idaho Power president, threw the switch to start Brownlee and said: "We promised to put Brownlee's first power on the line by September and here it goes."

Brownlee's entire initial output of new power for the Northwest will be on the line by December. A total of 1,200,000 kw. ultimately will be generated by Idaho Power's entire $164,000,000 development, including Oxbow and Hells Canyon dams in addition to Brownlee.

First Brownlee power began flowing less than three years after the start of construction and 11 years after the issue of private-vs-public development of Hells Canyon erupted into controversy that was carried to the U. S. Supreme Court and stirred explosive debate in Congress. Last June a House subcommittee killed a bill authorizing Federal construction of a single dam in the rugged gorge instead of Idaho Power's three projects.

The utility development provides for public flood control, navigation, recreation and fish conservation, in addition to harnessing the power potential of Hells Canyon.

Roach was surrounded by only a small group of Idaho Power and construction company supervisors in the din-filled powerhouse as he sent the first unit spinning into production. Final phases of construction continued at top speed during the simple, history-making ceremony.

"In spite of all the roadblocks put in our path by public-power-or-nothing advocates, we have reached our first goal," Roach said. "We have made good our promise to efficiently and economically harness the Snake at Brownlee and provide a new source of the power so urgently needed not only by our own booming service area but the entire Pacific Northwest as well."

With Brownlee's three other initial units on the line by December, the utility will increase its effort to complete Oxbow Dam by 1960. Construction of Oxbow, a 190,000-kw. producer, already is under way 12 mi. downstream from Brownlee. The company's Hells Canyon Dam, which will have an initial capacity of 272,000 kw. will be built an additional 23 mi. downstream on completion of Oxbow.

Brownlee, one of the Northwest's bigger hydro projects, was started in November 1955. It includes unique multimillion-dollar fish passage facilities designed to protect downstream runs of salmon and steelhead fingerlings and featuring a plastic and wire-mesh net 2,800 ft. long and 120 ft. deep, as well as elaborate trapping installations.

The dam is a rock-fill embankment nearly 400 ft. high (the world's second-highest), 1,380 ft. long and contains 6,000,000 cu. yd. of earth and rock. Its spillway is 168-ft. high set in a deep rock cut, its powerhouse is located in a similar cut in solid rock. The diversion tunnel, 38 ft. in diameter, was driven nearly a half-mile through rock.

Failure to renew license loses job for contractor

A TECHNICALITY relating to the license of a contractor resulted in the rejection of all bids for a 6-mi. freeway job in California. The apparent low bid was submitted by Healy Construction Co. at $740,-445. Bid opening was on July 9 and the State of California, through its attorney general, disqualified the bid on the ground that the contractor had not renewed his license for the fiscal year beginning July 1. With the low bidder disqualified, normal procedure, according to the Division of Highways, would be to award the contract to the next lowest responsible bidder, if that bid was considered reasonable.

However, the job involved Federal funds and the Bureau of Public Roads had to concur in this change. The headquarters office of the BPR did not agree with the state's point of view that the Healy firm was not a qualified bidder and did not concur in an award to the second low. This second low bidder was Stecker & Scott and Jesse H. Harrison of Burbank with a bid of $781,426. The project will be readvertised for bids as promptly as possible.

Nevada's Interstate jobs

THE SECOND section of Interstate freeway in southern Nevada has been advertised for bid, according to H. D. Mills, State Highway Engineer. The contract calls for construction of 8½ mi. of four-lane, limited access highway from the Nevada-California state line northeast along U. S. 91-466 to within 4 mi. of Jean.

Work on the estimated $1,750,-000 job is scheduled to begin this month under the supervision of Michael Colletti, resident engineer. This Interstate project is one of three between Las Vegas and the California state line to be let for bid before the end of 1958.

Earlier this year, Wells-Stewart

Construction of Las Vegas was awarded the first freeway contract in the area for their low bid of $2,074,530. Current work on this 10-mi. job is about 30% complete according to the latest report from Stanley Hansen, resident engineer.

Included in the new contract will be a trumpet type interchange to service traffic leaving the Interstate route for a mining area near the state line. Interchanges of a similar design have already been built on the freeway northeast of Las Vegas at Crystal and on the freeway through Truckee River Canyon, east of Reno.

Bidders invited to South Fork Project by irrigation district

The Oroville-Wyandotte Irrigation District in Northern California invites general contractors who may be interested in later bidding, to examine preliminary plans for the South Fork Project and other available data at the offices of the District's engineers, Bechtel Corporation, 101 California Street, San Francisco, Calif., on October 13, 1958, preparatory to a contemplated guided tour of the project sites on October 14-18. It is anticipated that bids will be invited in the winter when a physical review of parts of the project at higher altitudes will not be practical.

Briefly, the project comprises construction of 8 new dams and minor reconstruction of another; approximately 18 mi. of tunnels; 11,700 ft. of penstocks; 3 hydro-electric power plants of an aggregate rated capacity of 88,000 kw.; 17 mi. of power and irrigation canals; and appurtenant minor structures, access roads, road relocations, et cetera.

Arrangements for participating in the review and field trip may be made by contacting J. G. Thon, Chief Civil Engineer, at Douglas 2-4032, Extension 2497, or by writing him at the above address.

(More news on page 76, following Alaska Newsletter.

ALASKA Newsletter

By CLIFFORD S. CERNICK, Anchorage

NEW HEADQUARTERS — Starting next month, your Alaska Newsletter will originate in Fairbanks instead of in Anchorage as has been the case in the past. This will be advantageous to readers of these columns for several reasons. For one, most of the large construction projects now being let are closer to Fairbanks than to Anchorage, thus giving me a better vantage point for covering events in the Alaskan construction field as they happen. For another thing, Fairbanks is more centrally-located than any other city in the territory, a fact which should bring a wider Alaskan scope to this column. We believe this move will give those interested in Alaska a better, well-rounded monthly digest of happenings on the construction scene in the new 49th state.

BIG JOB IN BIG STATE — The biggest current job in the nation's biggest state is the recently-announced missile detection base at Clear, 60 mi. southwest of Fairbanks on the Alaska Railroad. Unofficial estimates place the ultimate cost of this giant project at about $250,000,000. Despite the fact that the bulk of this expenditure will go for installation of electronic equipment and technical facilities, a walloping percentage still will be paid out to contractors and construction workers.

FIRST PHASE — The initial step on this project calls for construction of an 810-man construction camp for the missile base. The contract on this phase of the work was won by the joint venture of Morrison-Knudsen Co., Boise, Idaho and Patti-MacDonald of St. Louis, Mo. The low bid was $2,657,827. Engineer's estimate for the work was $3,638,243. The contractors already have begun work on the big project and work on the campsite is expected to proceed all winter. Meanwhile, the Alaska Railroad has been making preparations to relocate 22 mi. of its main line around the base. The Bureau of Public Roads is reported to be designing a road to run from Nenana to the boundary of the missile base. According to this report, the road would be extended from the boundary of the missile area to the heart of the facility. A similar ballistic missile detection base is under construction at Shemya in the Aleutian Islands.

POWER FOR STATEHOOD— Some important points about the outlook for hydroelectric construction projects in the new state during the next few years were touched upon in a recent speech by Lt. Col. William Mullin, assistant district engineer with the U. S. Army Engineer District. Colonel Mullin reported on Federal plans and surveys for Alaskan power sites. He said the Engineers have studied possible sites which have a potential power output of 17,800,000 kw. in various sections of Alaska. According to Colonel Mullin, the project which offers the most immediate promise of any of the large sites investigated is Rampart Canyon at mile 756 on the Yukon River.

MIGHTY RAMPART — This Alaskan "Grand Coulee" is getting more attention — especially since statehood became a reality. The Rampart site has a drainage area of about 200,000 sq. mi. with an average annual runoff of about 85,500,000 ac. ft. or a controlled flow of about 118,000 cu. ft. per second. A dam at Rampart Canyon would raise the water surface about 440 ft. This site, if fully developed, would generate about 4,700,000 kw. of industrial power. This could be transmitted to ice-free tidewater ports less than 400 mi. away. Colonel Mullin said he believed Rampart power could be delivered to these potential use sites at a very attractive price. He added: "Our work is not far enough along to put a price tag on this power but we can definitely say that it will be cheap."

GOLDEN PAVING—Surfacing of some Alaska highways is so costly that the roadbed upon completion has cost more than the value of "paystreak" gravel from Alaska's big dredges. Despite this high cost, Alaskan planners are going ahead on a program of paving which will gradually accelerate year by year. Paving of the Alaska Highway is one project every Alaskan hopes will come to pass. Kenneth J. Burbridge, Canada's consul-general in Seattle, said recently in Anchorage that the Canadian Government will give an attractive ear to any American proposal to pave the highway. Anchorage City Manager George Shannon told Burbridge that paving the Alaska Highway would be a boon to both Alaska and Canada and probably would double Canada's tourist business as travelers stop through Canada on their way back from Alaska. Right now, the road is gravel-surfaced except for a few portions, and is tough going in the summer on some stretches.

ATOMIC HARBOR — Use of atomic energy in construction projects requiring a great deal of excavation may be tried out initially in Alaska. Early in August, a survey crew left Fairbanks for Cape Thompson on the Chukchi Sea south of Point Hope. According to the Fairbanks News-Miner, the Philleo Engineering Service survey party will do topographic and hydrographic surveying of the ocean floor in connection with Atomic Energy Commission plans to blast a harbor in the fall of 1960. A U. S. Geological survey party has been at Cape Thompson most of the summer and representatives of Holmes and Narver, a Los Angeles firm handling projects for the AEC, are there also.

BIG PORT JOB—DeLong Corp. of New York City has been named contractor on Anchorage's new $8,200,000 port project. The DeLong firm was low bidder for the construction last spring. Preliminary work is already under way for the project, which has a 1960 completion date. Construction of the new port will allow large ships to dock and unload at Anchorage, thus bringing about considerable savings in freight costs to Alaskans. At present, the bulk of freight shipped to Anchorage must be unloaded at the seaports of Seward and Whittier and transported to Anchorage by Alaska Railroad. The new job is expected to spur the growth of Anchorage which has been expanding faster than any other Alaskan city.

GIGANTIC SURVEY EFFORT — The federal Bureau of Land Management next year will launch one of the largest surveying projects ever undertaken at one time in the history of the nation. The project calls for carrying out surveys of vast areas which may be included in the land grants from the Federal government to the new state of Alaska in accordance with the terms of statehood legislation. A total of 103,350,000 acres of land will

THE PICTURE OF PROTECTION

for your plant operations

Pittsburgh-Des Moines ELEVATED STEEL TANKS

An ever-dependable water supply, as sure as the law of gravity—on your own property for your own plant service and protection! That's the net of modern water storage in Pittsburgh-Des Moines Elevated Steel Tanks. There's a type and size to match your process and fire protection requirements, at low cost and guaranteed satisfaction. Write for our comprehensive water storage brochure!

PDM
ELEVATED STEEL TANKS

Pittsburgh-Des Moines Steel Company

Plants at PITTSBURGH, BALTIMORE, DES MOINES, SANTA CLARA, FRESNO, and STOCKTON, Ca

Sales offices:

PITTSBURGH (25).....3420 Neville Island
NEWARK (2).....1719 Military Park Bldg.
CHICAGO (3)
.....624 First National Bank Bldg.
EL MONTE, CAL. .....P. O. Box 2012
ATLANTA (5)
.....361 E. Paces Ferry Rd., N.E.
DES MOINES (8).....921 Tuttle Street
DALLAS (1) .....1225 Praetorian Bldg.
SEATTLE (1).....Suite 328, 500 Wall St.
SANTA CLARA, CAL.....627 Alviso Road
DENVER (2) 323 Railway Exchange Bldg.
BALTIMORE (26) .....Curtis Bay Station

be taken over by the state from Uncle Sam during the next 25 years. However, the land cannot be turned over until it is surveyed. The Bureau of Land Management's area administrator, J. M. Honeywell, said in Juneau a task force of engineers will be recruited and trained in the states to carry out the job. Those interested in Alaskan survey jobs may receive additional information by writing to Mr. Honeywell in Juneau.

PRESTRESSED IN ALASKA—Increasing use of prestressed concrete construction in Alaska is expected with establishment this summer of a firm to provide the new-type construction material. A commercial firm has erected a new prestressing plant on an 18-ac. site on the outskirts of Anchorage.

CONSTRUCTION NEWS NUGGETS—The CAA (Civil Aeronautics Administration) plans expenditure of more than $6,000,000 in modernization and expansion of air navigational aids during the current fiscal year . . . The City of Anchorage plans another high school and already has arranged for acquisition of a 40-ac. tract for the site . . . Work began in September on the new $13,000,000 Cooper Lake hydroelectric project on the Kenai peninsula . . . The Federal Electric Corp. has been awarded a contract to maintain and operate the White Alice communications system in Alaska . . . Alaska's September moose hunting season has resulted in "absenteeism" on a number of construction jobs . . . "Rear echelon" military construction design engineers were rushed to Anchorage recently from Seattle to help out on a rush job being supervised by the U. S. Army Engineer District . . . Staff of the Army Engineer District is expected to double in next few years under the impact of accelerated defense construction projects.

Lake Mead at highest level since 1942

LAKE MEAD, the reservoir formed by Hoover Dam on the Colorado River, reached its highest level since 1942, according to a statement from the Los Angeles Department of Water and Power. The lake surface at the time was 1,204.89 ft. above sea level. The highest level ever reached by Lake Mead was in 1941, according to this report, when it was at elevation 1,220.05 and the spillway gates were in use, which are able to create this maxmium elevation of 1,220.00 ft.

The present reservoir level is a direct result of the above-normal precipitation over the Colorado River Basin with favorable runoff into Lake Mead. As a result, the power plant at Hoover Dam is producing at 100% of firm energy. During the 1952-53 operating year the Hoover Dam plant generated at less than its firm power commitments and this condition continued until the 1957-58 operating year as a result of the long drought in the Colorado River area.

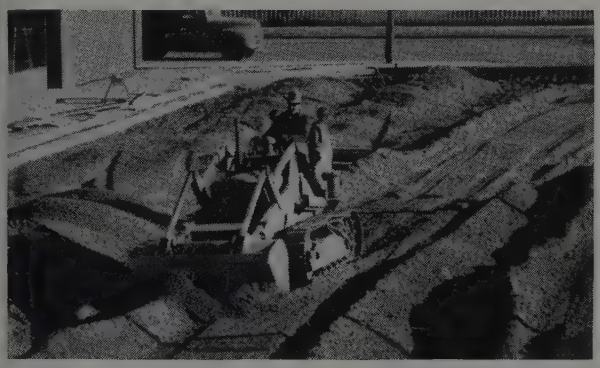
New consulting firm of well-known engineers

A NEW FIRM of consulting engineers — Goodenough, Sudman and Overholser, Inc. — has opened offices in Sacramento, Calif. (1833 Hough St.) Principals in the firm are Bertram W. Goodenough, president, Glenn F. Sudman, vice president, and S. Raymond Overholser, secretary-treasurer. The new firm offers consulting services based on a wide range of experience among the principals in the field of heavy construction, including elements of design, field engineering and administration. This all-inclusive service, from investigations to final inspection, is geared to include hydroelectric and irrigation works, municipal water supply, aqueducts and all types of dams.

All three of the partners are well known to engineers and contractors throughout the West. Bert Goodenough has a background of 34 years of heavy construction experience including Hoover and Shasta dams, with service in the Tennessee Valley Authority, and has just completed five years in directing construction of the Tri-Dam Project. Sudman has had a similar amount of experience in this country and abroad, concentrated primarily in the design of dams and hydroelectric projects. His experience included years with the Bureau of Reclamation and the Corps of Engineers. The last four years he served as chief design engineer for International Engineering Co. Ray Overholser has served as resident engineer on several projects built by the Corps of Engineers including Detroit and Lookout Point dams. He also served on the Tri-Dam Project beginning as resident engineer at Donnells Dam and concluding as assistant project engineer.

The No. 933 TRAXCAVATOR is the only tool for us when we're working in tight corners"

THAT'S the word from Deane L. Jensen of Long Construction Company, Inc., Billings, Montana. Operator C. L. Clark agrees. "It's a nice little rig. Handy for an operator because you can do anything with either hand. You can operate the bucket with the right hand and shift with the left. Loading out of a bank, I've loaded as high as 80 cubic yards an hour. I've backfilled in buildings in places so small you had to have the bucket clear up to turn around. Had it in places 24 feet square with a wall all around."

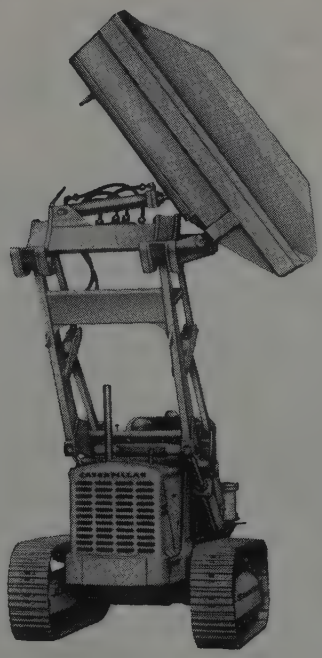


In the pictures on this page you see Mr. Clark and his Cat No. 933 Traxcavator working on a parking lot, street and driveways for the Fair Lane Shopping Center in Billings. The "nice little rig" scoops out dirt for loading onto trucks, spreads gravel for street foundation, dumps trash. 4,500 cubic yards of material were brought here by truck and spread by the No. 933. The Traxcavator sandwiched in this work with other construction jobs in the area for Long Construction Co.

See a demonstration of the No. 933 right on *your* job. Call your Caterpillar Dealer today. And after the demonstration, have him explain how his expert service and factory-quality replacement parts will protect your investment in Cat-built equipment.

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

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



The No. 933 offers a standard bucket of 1 cu. yd. capacity. Also available, as a directly interchangeable attachment, is this new 1⅛ cu. yd. *Side Dump Bucket* which dumps to the left as well as forward.

CATERPILLAR

Caterpillar, Cat and Traxcavator are Registered Trademarks of Caterpillar Tractor Co.

HARD-WORKING, LONG-LASTING LOADER VERSATILITY

Navajo Dam contract awarded

A $22,822,624 Bureau of Reclamation contract for construction of Navajo Dam on the San Juan River in north-central New Mexico has been authorized for award. Navajo Dam is the third largest dam of the Colorado River Storage Project.

The contract goes to the low bidder, a joint venture of Morrison-Knudsen Co., Inc., Henry J. Kaiser, and the F & S Contracting Co. The joint venture will be headquartered in Los Angeles. The contractor will have 4½ years to complete the job.

Commissioner of Reclamation W. A. Dexheimer said that Navajo Dam, with a volume of 26,000,000 cu. yd. of earth and rock materials, will be the second largest earth and rock-fill dam to be built by the Bureau of Reclamation. With a height of 405 ft., Navajo Dam will be second only to the 450-ft.-high Trinity Dam in California, now under construction by the Bureau.

Navajo Dam will be in Rio Arriba County, 39 mi. northeast of Farmington on the San Juan River. It will create a reservoir 34 mi. long at about 6,000 ft. elevation, with a total capacity of 1,700,000 ac. ft. The reservoir will serve as storage and river regulation, aid sedimentation control, and provide irrigation water. The estimated total cost of the Navajo Dam and Reservoir Storage Unit is $42,372,000.

In addition to river regulation and replacement storage, the Navajo unit will provide water to irrigate some 115,000 ac. for Indians of the Navajo Indian Reservation. The development will also supply water for diversion into the Rio Chama River in New Mexico for use in the Rio Grande River Basin.

Unique building of timber for Oregon Centennial

PLANS have been announced for a forest products pavilion at Oregon's centennial exposition and international trade fair next year. The pavilion is of a striking design unlike any other building of its kind in the world. Architect for the forest products pavilion is John Storrs of Portland, and engineer is James G. Pierson, also of Portland.

The building will consist of seven sweeping hyperbolic paraboloids, each 50 ft. square, supported at six points.

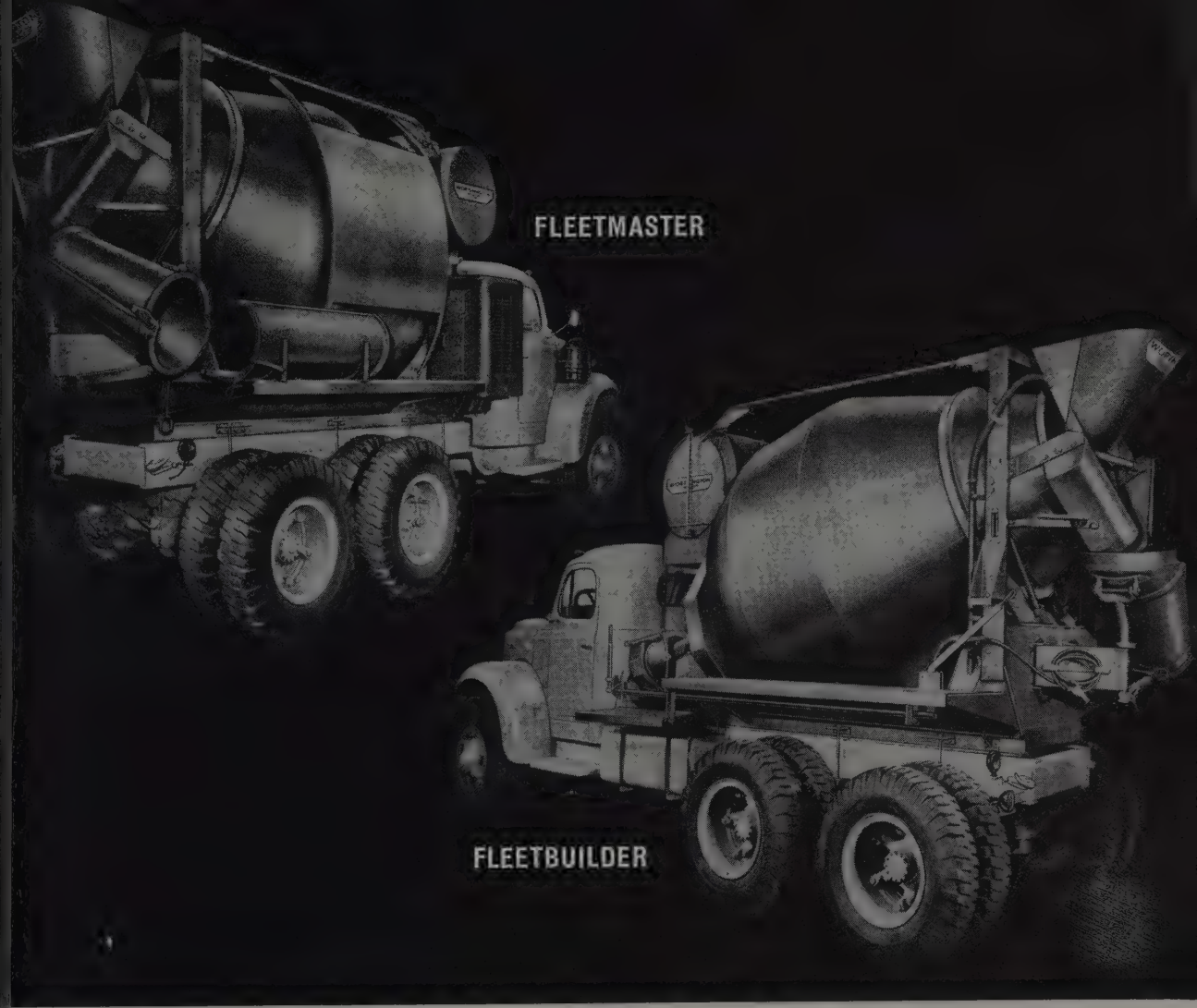
Most unusual feature of the pavilion is that it is designed to be constructed completely of wooden 2x4's. Each of the 50-ft. squares will be laminated from straight 2x4's. Each 2x4 will be offset slightly from the other to produce a functional surface.

Although hyperbolic paraboloids have been used in building design before, it is believed that this building will be the first to use as many as seven of the paraboloids. Also, the use of 2x4's in this manner is believed to be a completely new concept.

The committee pointed out that this particular design was approved for the forest products centennial pavilion because it demonstrates new uses for wood in architecture.

Total thickness of the roof is 4 in. The upper side of the entire roof will be built up with tar and white pebbles. Skylights will be constructed between each of the seven shells.

. . . *for more details, circle No. 38 on Reader Service Postcard*



New from Worthington in '58

2 HEAVY-DUTY MIXERS

With these new truck mixers, you get a choice of Worthington heavy duty transmissions—and you get a choice of price. The FLEETMASTER has all-new Worthington designed and manufactured multi-disc transmission. The FLEETBUILDER features all-new Worthington designed and manufactured sliding gear transmission. It's the only heavy duty unit at an economy price. Models available in 4, 5, 5½, 6, 6½, 7, 8 and 9 cu. yd. sizes—and with separate engine drive or front end power take off. Phone or write for a Mixerama demonstration today. 65-7

Western Equipment Co.
1360 West First Avenue
Eugene, Oregon
Phone: Diamond 4-4265

Western Equipment Co.
2244 N. W. Savier Street
Portland, Oregon
Phone: Capitol 8-4128

. . . for more details, circle No. 39 on Reader Service Postcard

HAWAII Report

By ALAN GOODFADER, Honolulu, Hawaii

HARBOR FUNDS GRANTED — Work may start by the first of the year on a second entrance for Honolulu harbor which has been sought by local shipping interests for 10 years. Congress has approved a $1,000,000 appropriation for the project. This will be enough to pay for most of the dredging needed for the entrance. In all, the project will cost about $3,000,000. Also planned is a lift bridge over the new channel to connect an island in the harbor with the shore. The appropriation bill allotted money for two other Island projects. Some $407,000 is granted for flood control work on the Hanapepe River and $1,352,000 is provided for more deep water harbor construction at Kawaihae on the Island of Hawaii.

MAGIC ISLAND — A measure passed by Congress and approved by President Eisenhower is going to beef up construction figures here for some time. This bill gave some 307 acres of submerged reef area adjoining the land-starved Waikiki area to the Territory. The plan is to fill in the reef land for a "magic island." Then the land will be used as a public playground, a site for hotel development or other tourist trade boosting project.

FLURRY COMING — While the magic island project may be a while in getting started, abandonment of a Honolulu public works project in Waikiki is expected to start a flurry of hotel and apartment building there. Honolulu city fathers have decided to drop plans for realignment of a section of Kalakaua Ave., Waikiki's main stem. When the formalities of wiping the plan from the city's books are completed, land that has been threatened with condemnation to furnish a site for the realignment and accompanying park will be open for development. Already, the firm of Roy Turner and Associates has asked for a building permit for $125,000 worth of foundation work for a 12-story apartment building on the realignment right-of-way.

APARTMENTS GOING UP — Apartment buildings are going up all over Waikiki, which is bulging with its usual summer crowd of tourists. Bids will have been opened before this appears on three-story apartment buildings. On the drawing boards are two more three-story buildings. And Stanley T. Kobayashi was low bidder on a contract to build two apartment projects for Finance Investment Co. here. He offered to do the work for $460,099.

GOVERNMENT GIVES BOOST —The rash of new apartment plans may have been stimulated by a recent Federal Housing Administration increase of from 20 to 25% in the size of loans it will insure here. The hike was made in recognition of high construction costs here. K. Tim Yee, FHA director in Hawaii, said the changes were the result of cooperation between the local construction industry and the local FHA office in working to adapt FHA programs to local conditions.

WORK FORCE CLIMBS — New hirings in the construction business helped Territorial employment jump by 10,000 in July, according to the Territorial Department of Labor. Total employment here that month stood at 206,540, highest since World War II. Biggest reason for the jump was seasonal hiring by the pineapple industry. But Honolulu contractors helped by putting new employees to work on Capehart housing projects, the mammoth Ala Moana shopping center and other construction. The new hirings helped cut Oahu's unemployment total by 2,000 to only 3.1% of the island's civilian labor force. Construction also absorbed new workers on the islands of Maui and Hawaii.

PERMIT TOTALS DROP — At the same time, however, the value of construction receiving building permits issued in Honolulu in July dropped to $5,447,943. This was $6,798,685 less than in June. The City Building Departments issued 856 building permits in July, compared to 1,022 during the record month of June. Civilian construction requiring building permits continues to exceed last year's figures. Through last July, the City had issued 6,191 permits for an estimated $62,460,024 in construction. In the same period last year, the City had issued 5,922 permits for $45,715,111 worth of building.

AIRPORT WORK UNDERWAY —On the Island of Kauai, two contractors are building additions and alterations to the Lihue Airport Terminal. Ichiji Matsumura, with a low bid of $83,300, received a contract to build a new restaurant, rest rooms and other alterations. E. F. Nilson, offering a low bid of $34,334, has a contract to build 70 more parking spaces on the airport grounds.

CITY FORSEES TROUBLE — A panel of financial experts has told the City of Honolulu it can't continue to borrow $15,000,000 to $20,000,000 a year for public works. This may mean the City will have to stretch out its program of building roads, sewers, parks and other improvements for the swelling population of Oahu. At this writing, city fathers hadn't decided what to do about the report. But Supervisor Herman G. P. Lemke, chairman of the Board of Supervisors' finance committee, remarked that the only other way to finance such projects would be to raise taxes. And that, he commented, is "political dynamite." Meanwhile, the City has issued $2,200,000 worth of park bonds and $2,500,000 worth of sewer bonds.

GOVERNOR ALLOTS FUNDS— Territorial Governor William F. Quinn has alloted $1,100,000 for four building projects. Biggest allotment was $880,000 for construction and $43,345 for site acquisition for a new Territorial Health Department building slated for construction at Miller, Beretania and Punchbowl Sts. in Honolulu. Besides this money, $340,000 in federal funds and more Territorial money is available for the $1,300,000 building. Depending on how soon the site can be purchased, work could start on the building in three months. The other projects and their allotments are: Hawaii National Guard armory at Ft. Ruger, $113,000; kindergarten for Koloa School on Kauai, $50,800, and maintenance shop for the Territorial Hospital at Kaneohe, $40,000.

SOMETHING NEW — Hawaiian Dredging & Construction is to build a $600,000 grain elevator here, something new for the Islands.

Low bids and contract awards

ARIZONA

W. J. Henson of Prescott submitted a low bid of $751,512 for 5.5 mi. of grading and surfacing north of Cameron on U. S. Route 89 in Coconino County. A low bid of $576,820 was submitted by **L. M. White Contracting Co.,** Tucson, for 7.9 mi. of grading and surfacing near Safford, Route 70, in Graham County. **Mohamed Earthmoving Contractor** of Phoenix submitted a low bid of $339,199 for grading and surfacing in city of Phoenix, Maricopa County. **Cyr & Evans Contracting Co.,** Tempe, submitted a low bid of $346,665 for grading and surfacing on the Benson-Douglas highway, Route 80, northwest of Tombstone in Cochise County. A low bid of $328,523 was submitted by **Haumont Contracting Co.,** Phoenix, for 6 mi. of grading and surfacing the Wickenburg-Kingman highway on Route 93 in Yavapai County. **Heiskell Construction Co.** of Phoenix submitted a low bid of $218,870 for grading and surfacing on the Ajo-Tucson highway on Route 86 in Pima County.

CALIFORNIA

Oberg Construction Corp. and **Oberg Bros. Construction Co.,** Northridge, received a $5,226,495 contract for 3.9 mi. of 8-lane freeway and 15 structures on U. S. Highway 101 in city and county of Los Angeles. A low bid of $4,140,558 was submitted by **McCammon-Wunderlich Co.** and **Wunderlich Contractors** of Palo Alto for 3.7 mi. of 4-lane freeway, together with frontage roads and construction of 8 bridges near Dunsmuir in Shasta and Siskiyou counties. **R. M. Price Construction Co.** of Altadena received a $3,205,968 contract for construction of a new bridge over the Yuba River on Highway 99E in and near Marysville, Yuba County. A $1,594,334 contract was received by **Cox Bros. Construction Co.** and **J. E. Haddock, Ltd.** of Stanton for 5.5 mi. of grading and paving to widen State Sign Route 22 in Los Angeles and Orange counties. **Madonna Construction Co.,** San Luis Obispo, received three contracts for highway work in San Luis Obispo and Tulare counties: a $1,085,577 contract to grade and surface 5.7 mi. and construction of one bridge west of Pennington and Morro Bay in San Luis Obispo County; and $1,022,594 for 8.7 mi. of grading, surfacing and construction of one bridge east of Estrella River, San Luis Obispo County; and $328,529 for reconstructing and widening FAS county road west of Porterville in Tulare County. **Baldwin Contracting Co.** of Marysville submitted a low bid of $837,933 for 5.7 mi. of grading and surfacing between Sacramento River Bridge and Mokelumne River Bridge in Sacramento County. A $561,084 contract was received by **Healy Construction Co.,** Palmdale, for 7.9 mi. of grading and surfacing in city of Lancaster, Los Angeles County. A low bid of $372,530 was submitted by **Thomas Construction Co.,** Fresno, for construction of bridge, grading and surfacing approaches in San Benito County. **Schroeder & Co.,** Sun Valley, received a $384,772 contract for resurfacing 6.9 mi. of the Los Angeles-

Water Power by PENSTOCK...

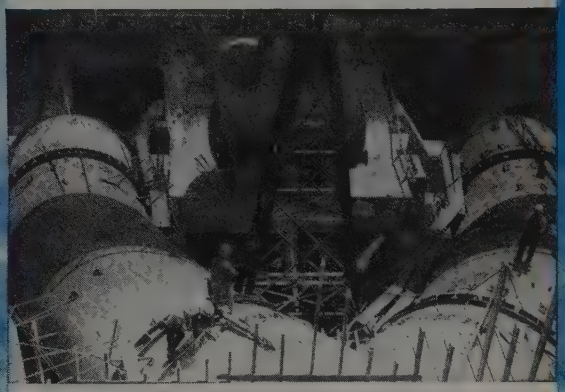
Penstocks for Mountain Home—CB&I built three, 22-ft. diam. penstocks for the Idaho Power Co.

Wherever water is diverted, harnessed or stored . . . you'll find the creative *craftsmanship in steel* of CB&I at work.

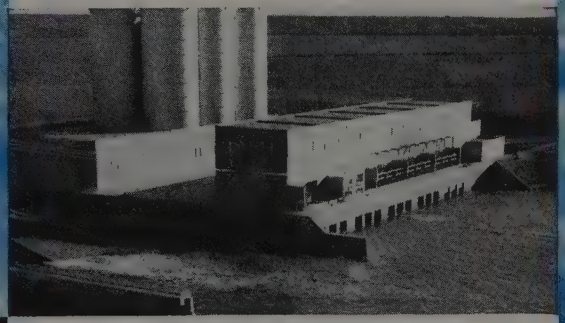
Seven decades of metallurgical know-how—under the expert supervision of engineering, fabrication and erection specialists who *know* pressure pipe and hydro-electric construction—go into each CB&I-built penstock, surge tank or power conduit.

This *single responsibility* service, backed by our four fully equipped and strategically located fabricating plants, is the reason why seasoned operators and contractors *rely on CB&I* to design, fabricate and erect to the most rigid specifications.

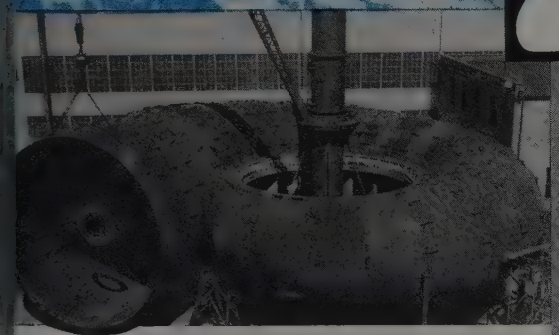
Write the nearest CB&I office for details. Ask for the *Blakely Mountain Dam* story.



Wye at Blakely Mountain Dam connects CB&I built power conduit, two penstocks and 149-foot high surge tank.



Six Surge tanks at Garrison Dam were fabricated and erected by CB&I to help control turbulence of the "Mighty Missouri" River. They are 65 ft. in dia. by 135 ft. high.



CB&I *Shop Fit-up of T-1 Scroll Case*—one of the largest ever built—for Noxon Rapids Dam. T-1 alloy construction of 24-ft. diam. case saved 50% in plate thickness. Reassembled and welded at site by a CB&I crew.

E60CB

Chicago Bridge & Iron Company

Atlanta • Birmingham • Boston • Chicago • Cleveland • Detroit • Houston • Kansas City (Mo.)
New Orleans • New York • Philadelphia • Pittsburgh • Salt Lake City
San Francisco • Seattle • South Pasadena • Tulsa

PLANTS: Birmingham • Chicago • Salt Lake City • Greenville, Pa. • New Castle, Del.

SUBSIDIARIES:
Horton Steel Works Limited, Toronto; Chicago Bridge & Iron Company Ltd., Caracas; Chicago Bridge Limited, London; Chicago Bridge Construcoes Ltda., Rio de Janeiro

REPRESENTATIVES AND LICENSEES:
Australia, Cuba, England, France, Germany, Italy, Japan, Netherlands, Scotland

Ventura freeway in Los Angeles and Ventura counties. A $341,495 contract was received by **M. J. Ruddy & Son** of Modesto for 5.3 mi. of widening Route 20, west of Williams, and constructing a bridge over Salt Creek in Colusa County. **Maino Construction Co.**, San Luis Obispo, received a $1,097,200 contract for general work for 2-story gymnasium at California State Polytechnic College at San Luis Obispo, San Luis Obispo County. **Stolte Inc.** and **M & K Corp.** of Oakland received a $2,347,828 contract to construct an 8-story State office building for Department of Finance in Oakland. **Carl N. Swenson Co., Inc.**, San Jose, received a $1,572,000 contract to construct a 4-story concrete health building at San Jose State College, San Jose, Santa Clara County. **Fredrickson Bros.**, Emeryville, submitted a low bid of $255,336 for 1.9 mi. of grading and surfacing on Route 954 in Tuolumne County.

COLORADO

Herren-Strong, Platteville, submitted a low bid of $522,714 for grading, structures and surfacing on 8.5 mi. on State Highway 3 in Weld County. **H. E. Lowdermilk Co.**, Englewood, submitted a low bid of $521,276 for 3.4 mi. of grading, structures and surfacing between Deer Creek and Bailey on State Highway 8 in Park County. **Schmidt Construction, Inc.** of Arvada, received a $470,000 contract for 4.8 mi. of grading and surfacing the Marvine-Phippsburg Route in the Routt National Forest, Rio Blanco County. A low bid of $461,181 was submitted by **Imperial Paving Co.** of Oklahoma City, Okla., for grading and surfacing over Wolf Creek Pass in Mineral County. **Hinman Bros. Construction Co.** of Denver submitted a low bid of $364,441 for 2.6 mi. of grading and surfacing on State Highway 2 in Grand County. A low bid of $315,310 was submitted by **Walker Bros.** of Franktown for grading and structures on 4.9 mi. of State Highway 65 northwest of Cedaredge in Delta County. **R. R. Atchison Co.** and **R. L. Atchison Construction Co.** of Littleton submitted a low bid of $265,112 for 3.2 mi. of grading and surfacing on State Highway 6 in Montezuma County. A low bid of $225,935 was submitted by **McMillon Construction Co.** of Englewood for 6.3 mi. of grading and surfacing in Prospect Valley in Weld County.

IDAHO

Diversified Builders, Inc., Paramount, Calif., submitted a low bid of $3,620,000 for construction and installation work on the second building phase of the Experimental Breeder Reactor No. 2 at the National Reactor Testing Station. **James Reed**, Salt Lake City, Utah, received a $889,224 contract for construction of 4-lane roadway and overpass in Power County. A $613,036 contract was received by **Carl E. Nelson Construction Co.** of Logan, Utah, for construction of roadway and drainage structures in Jefferson County. **Eagle Construction Co.** of Boise received a $593,792 contract for construction of 4 bridges, grading and surfacing on 5.8 mi. of State Highway 33 in Teton County.

MONTANA

Wickens Brothers of Suffolk received a $444,588 contract for 13.4 mi. of grading and surfacing on the Wyoming Line-Bridger highway in Carson County. A $565,293 contract was received by **Carlson Lien Co.**, Rapid City, So. Dak., for grading and surfacing on the Broadus-Olive and Crow Agency-Broadus highway in Powder River County. **Nilson-Smith Construction Co.** of Great Falls received a $439,966 contract for 5.7 mi. of grading and surfacing on the Augusta-Sun River highway in Cascade County. **S. Birch, Inc.** and **S. Birch & Sons Co.** of Great Falls received a $415,834 contract for grading and surfacing on the Shelby-Chester highway in Toole County. A $308,907 contract was received by **Asphalt Construction Co.**, Missoula, for grading and surfacing in city and county of Missoula. **Oster, Johnson & Pederson, Inc.** of Minneapolis, Minn., received a $291,727 contract for concrete dual structures on Bearmouth-Deer Lodge highway in Granite and Powell counties. **Billings Construction Co.**, Billings, received a $288,200 contract for 4.5 mi. of grading and surfacing on the Cardwell-Southeast highway in Madison County. A $264,790 contract was awarded to **G. E. Marshall** of Roundup for 6.3 mi. of grading and surfacing the Philipsburg-West highway in Granite County. **Albert Lalonde Co.**, Sidney, received a $196,779 contract for reshaping, and surfacing 13 mi. of the Wolf Point-North highway in Roosevelt County. **Dean R. Rounds** of Rapid City, So. Dak., received a $166,873

What's it worth to handle ticklish jobs?

DAVIS BACKHOE lets you work in Tight Spots!

Digs flush when you need to — only the Model 210 Davis Backhoe has the ability to dig flush alongside walls, buildings, fences. Has 200° continuous operating arc.

A Davis Loader and Backhoe combination will put money in your pocket by outperforming any other rig — pound for pound, dollar for dollar.

Digging near pipelines, conduits, utility mains, or other hidden obstructions is always a tough assignment . . . but a Davis Backhoe will let you handle those ticklish jobs easier and quicker with more safety and profit than any other make. Here's why!

DAVIS LETS YOU SEE YOUR WORK — Unobstructed visibility lets you work fast and accurately without having to "feel" your way around concealed objects or depend upon shouts and hand signals for instructions. Both seat and finger-tip controls swing with the boom, so you always face your work.

DAVIS HAS "ALERT" CONTROLS — Boom, dipper stick, bucket, and stabilizer foot respond lightening-fast to your command.

DAVIS GIVES MAXIMUM MANEUVERABILITY — Because of its exclusive flush digging feature, 200° continuous operating arc, and ability to dig at right angles, Davis lets you operate in places inaccessible to other machines. You can often complete jobs in the time it takes other makes to maneuver into position! . . . ***YET DAVIS STILL COSTS LESS THAN MOST OTHER MAKES!***

Davis Loaders and Backhoes are available for all popular models of International, Ford, Fordson Major, Ferguson, Case, Massey-Harris, Allis-Chalmers, Oliver, John Deere, Minneapolis-Moline, and Work Bull Tractors.

SOLD AND SERVICED EVERYWHERE BY BETTER DEALERS

For the name of your nearest dealers . . .
write direct. Please specify make of tractor.

MASSEY-FERGUSON INDUSTRIAL DIVISION

1009 S. WEST STREET • WICHITA 15, KANSAS

. . . for more details, circle No. 44 on Reader Service Postcard

contract for 9.1 mi. of grading and surfacing on the Wyoming Line-Broadus highway in Powder County. **Zook Bros. Construction Co.,** Bigfork, received a $147,394 contract for 6.3 mi. of grading and surfacing on the Helena North and East highway in Lewis and Clark County.

NEVADA

Dodge Construction, Inc., of Fallon received a $1,173,683 contract for construction of a portion of the state highway system on U. S. Highway 93 in Elko County. **Wells-Stewart Construction Co., Inc.,** Las Vegas, received a $1,144,177 contract for 15.2 mi. of grading on Highway 93 in Lincoln County. **Gibbons & Reed Co.** of Salt Lake City, Utah, received a $1,194,875 contract for 4.9 mi. of grading and surfacing on U. S. Highway 50 in White Pine County. **Isbell Construction Co.,** Reno, received a $157,306 contract for construction of a portion of the state highway system in Washoe County.

NEW MEXICO

Allison & Haney, Inc., Albuquerque, received a $1,422,824 contract for bridge construction between Menaul and Lomas, city of Albuquerque, Bernalillo County. A $776,487 contract was received by **J. W. Jones Construction Co.** of Albuquerque for 10 mi. of grading and surfacing on Highway 1-25 in San Miguel County. **Leslie Wheeler** of Albuquerque received a $226,793 contract for 6.8 mi. of grading and surfacing the Rocky Arroyo to end of route in Eddy County. **James P. Johnson** of Santa Fe received a $219,140 contract for grading and surfacing 3.3 mi. of highway, west of Roy in Harding County. **Robert R. Hewitt** of Deming received a $263,000 contract for grading and surfacing the Regina-Coyote route in Santa Fe National Forest in Rio Arriba County. A $173,079 contract was received by **Haake Construction Co., Inc.** of Santa Fe for 7.1 mi. of grading and surfacing west of Glorieta-West road in Santa Fe County.

OREGON

F. L. Somers, Medford, received a $631,055 contract for grading, paving and one bridge on the Coos Bay-Roseburg highway in Coos County. **J. A. Troxell** and **M. J.**

Brassfield Co., Seattle, Wash., submitted a low bid of $466,944 for removal and disposal of rock pinnacles in the Bonneville Dam pool on the Columbia River. **Peter Kiewit Sons' Co.**, Vancouver, Wash., submitted a low bid of $406,586 for 1.4 mi. of grading and paving, Hunter Creek-Buena Vista section of the Oregon Coast Highway in Curry County. A low bid of $171,368 was submitted by **Tom Lillebo Construction Co.**, Reedsport, for construction of Hunter Creek Bridge near Gold Beach in Curry County. **M. J. Brassfield Co.** and **J. M. Purcell Construction Co.**, Salem, submitted a low bid of $535,819 for 3.6 mi. of grading and surfacing south of Elkton in Douglas County. **Roy L. Houck & Sons** and **Roy L. Houck Sons' Corp.**, Salem, submitted a low bid of $739,796 for 6.8 mi. of grading and paving and construction of two bridges on the Pacific Highway north of Coburg in Linn County. A low bid of $1,699,492 was submitted by **Rogers Construction Co.**, Portland, for 14.3 mi. of grading and surfacing on the Columbia River Highway east of Portland in Multnomah County. **Warren Northwest, Inc.**, Portland, submitted a low bid of $290,489 for 1.2 mi. of grading and paving west of Portland in Washington County. A low bid of $497,258 was submitted by **Fred H. Slate** and **E. C. Hall Co.**, Portland, for 3.4 mi .of grading and paving north of Newberg in Washington County. **E. H. Itschner**, Molalla, submitted a low bid of $172,328 for 16.6 mi. of stone base and oiling on the Ukiah-Hilgard highway in Union County. **T. C. Wildish Co.** of Eugene submitted a low bid of $171,555 for paving the Junction City-Eugene highway in Lane County.

UTAH

V. C. Mendenhall Co., Las Vegas, Nev., submitted a low bid of $102,796 for structure over South Ash Creek between Pintura and Anderson Junction in Washington County. A low bid of $196,076 was submitted by **Olof Nelson Construction Co.**, Logan, for grading and surfacing in city and county of Salt Lake. **Witt Construction Co.**, Provo, submitted a low bid of $161,052 for Flaming Gorge community facilities, Green Division, Colorado River Project, Flaming Gorge Unit. **Woodward Construction Co.** of Rock Springs, Wyo., received a $111,000 contract for grading and surfacing in the Wasatch National

Forest in Summit County. **W. W. & W. B. Gardner Inc.,** Salt Lake City, submitted a low bid of $133,367 for 3.9 mi. of grading and surfacing Highway 106 in Davis County.

WASHINGTON

Scheumann & Johnson of Seattle received a $964,291 contract for construction of Lake Washington ship canal bridge in King County. A $414,000 contract was received by **Everett McKellar** of Chelan for 2.1 mi. of grading and surfacing in the Okanogan vicinity, Okanogan County. **J. P. Surace** of Seattle received two contracts for highway work in Clallam and Cowlitz counties: $464,974 for 1.3 mi. of grading and surfacing East Beach Road to Indian Creek in Clallam County, and $164,579 for 2 mi. of grading and surfacing Staples Creek to Johnson Creek in Cowlitz County. **Strong & MacDonald, Inc.,** Tacoma, received a $387,271 contract for 5 mi. of grading and surfacing from Deer Lake vicinity to Lone Lake Road in Island County. Two contracts were received by **Associated Sand & Gravel Co.,** Everett, for highway work in Snohomish County: a $322,056 contract for 3 mi. of grading and surfacing in city of Everett, and $266,358 for 2.4 mi. of grading and surfacing on PSH 1 to Jct. SSH 2-J. **United Paving Co.,** Spokane, received a $317,399 contract for 4.5 mi. of grading and surfacing Ephrata to Soap Lake in Grant County. A $296,865 contract was received by **S. W. Groesbeck** of Eugene for grading in the Sunset Lodge vicinity, Kittitas County. **Woodworth & Co., Inc.** of Tacoma received a $287,169 contract for grading and surfacing in Pierce County. **Anderson & Stoen** of Seattle received a $261,440 contract for grading and surfacing on 2.6 mi., Brender Park to Sleepy Hollow in Chelan County. A $175,066 contract was received by **McAtee & Heathe, Inc.** of Spokane for 10.8 mi. of grading and surfacing from Kiona to Richland Wye in Benton County. **F. H. De Atley & Co.,** Lewiston, Idaho, received a $171,609 contract for grading and improving Grant County road northwest of Othello in Grant County. **Richard L. Martin,** Oswego, Ore. received a $161,201 contract to construct Longview Wye undercrossing in Cowlitz County. **Porter W. Yett** of Portland, Ore. received a $159,880 contract for repaving 10.7 mi. of State Highway 3 near Waitsburg in Walla Walla County.

WYOMING

Woodward Construction Co., Rock Springs, received a $229,905 contract for grading and surfacing on 3.1 mi. of the Rock Springs road in Sweetwater County. **Ace Construction Co.** of Omaha, Nebr., received a $710,978 contract for 3.7 mi. of grading and surfacing on 4-lane divided highway and construction of two culverts on the Moorcroft-Sundance road in Crook County. A $680,630 contract was received by **Western Paving Construction Co.** of Denver, Colo. for grading, surfacing and connections on the Cheyenne-F. E. Warren Air Force Base road in Laramie County. A $648,990 contract was received by **Doolittle Construction, Inc.** of Wichita, Kan., for construction of guidance facility, Squadron 1, F. E. Warren Air Force Base in Cheyenne. **Rocky Mountain Construction Co.** of Missoula, Mont., received a $591,000 contract for grading and surfacing the Snake River Canyon Route in the Targhee National Forest in Lincoln County. **Summit Construction Co.,** Rapid City, So. Dak., received a $589,699 contract for grading, surfacing and structures on the New Castle-South Dakota State Line road in Weston County. A $493,157 contract was received by **Rognstad-Olsen Construction Co.** of Casper for structures and related work on 7.3 mi. of 4-lane divided highway on the Kaycee-Midwest road in Johnson County. **LeGrande Johnson Co., Inc.,** Logan, Utah, received a $342,000 contract for grading and surfacing on 22 mi. on the East Side and West Side roads in the Grand Teton National Forest, Teton County. **J. F. England's Sons, Inc.,** and **Lawrence Steele & Son,** Rapid City, So. Dak., received a $219,290 contract for grading, surfacing and structures on 3.6 mi. of the Moorcroft-Sundance road in Crook County. **Knisely-Moore,** Douglas, received three contracts for work in Hot Springs, Albany and Weston counties: a $177,555 contract for 2.5 mi. of grading and surfacing on the Thermopolis-Shoshoni road in Hot Springs County, and $162,133 for 7.3 mi. of grading and surfacing on the Laramie-Ft. Collins road in Albany County, and $143,892 for structures, grading and surfacing on the New Castle-South Dakota State Line road in Weston County.

HOW 1¼ YARD LORAIN 56 HELPS CONTRACTORS WORK MORE JOBS... BUILD PROFITS

A lighter, stronger boom with square-tubular-chords

Rugged 60-foot tubular-chord-boom with a 25-foot extension is used on this 25-ton crane to handle sheet pilings on a bridge job in Washington. Lorain's exclusive boom design provides greater lifting capacities, longer reaches. Main chords are of square tubing—the lacings of continuous round tubing welded at common points to create an extra-strong "banding" effect without any additional weight.

"Shear-Ball" mounting that eliminates adjustments

"Shear-ball" mounting on this 1¼-yard shovel provides fast, steady swings as it loads rock into trucks in Arkansas . . . requires no time-consuming adjustment. Another Lorain® exclusive that gives a "ball bearing," rock-steady swing. Over 60 steel balls interlock two races, hold the turntable on the crawler. Hook or top rollers and exposed roller path are eliminated. Gone too—the usual wear, adjustment, maintenance and lubrication problems.

Two-lever "Joy-Stick" control that cuts operator fatigue

Responsive "Joy-Stick" control on this Lorain 56 hoe simplifies digging a 74,000-foot long trench job for irrigation pipe in California. This air power control cuts effort, increases production. "Metered" air feeds power at any rate to all turntable clutches, yet retains normal feel of the operation. Permits single or combined operation for the simplest, most responsive control yet devised for power cranes and shovels.

Ask your Lorain distributor about the on-the-spot Lorain parts and service facilities that have such an important plus value when you buy Lorain.

ORAIN

HEW SHOVEL COMPANY, LORAIN, OHIO

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

INTERSTATE TRACTOR & EQUIPMENT CO.
Portland and Eugene, Ore.

MOUNTAIN TRACTOR CO.
Missoula and Kalispell, Mont.

NASH-DAVIS MACHINERY CO.

NEW MEXICO EQUIP. CO.
Albuquerque, New Mexico

LEE REDMAN EQUIP. CO.
Phoenix, Arizona

SANTA FE EQUIPMENT CO., INC
Los Angeles and San Bernardino, Calif.

SOUTHERN IDAHO EQUIPMENT C
Idaho Falls, Boise and Twin Falls, Idaho

TRACTOR & EQUIPMENT CO.
Sidney, Miles City and Glasgow, Mont.

WORTHAM MACHINERY COMPAN
Cheyenne, Casper, Sheridan and Rock Springs, Wyo.

YUKON EQUIPMENT INCORPORAT (for Alaska)
Seattle, Wash.

for more details, circle No. 48 on Reader Service Postcard

ENGINEERS and CONTRACTORS

Cherf Bros. & Sandkay Construction Co. of Ephrata, Wash., announces the appointment of **Ralph Wells** as general manager of all field operations for the company. Wells will have all project managers and superintendents under his supervision. Assistant to Wells is **Roy Johnson.**

* * *

C. R. Simmons, chief of the Palisades field branch, power division, Minidoka Project, Idaho, has been named plant superitendent at Priest Rapids Dam. Simmons will start his new job in October.

Jess Barksdale, assistant chief of operations and maintenance, U. S. Corps of Engineers, McNary, Ore., has been appointed assistant plant superitendent at Priest Rapids. Simmons and Barksdale are the first two operating employees to be hired for the Priest Rapids project.

* * *

Frank Castellucci, general manager of Peterson Tractor Co., San Leandro, Calif., has been elected to the Board of Directors of Northern California Chapter, Associated General Contractors of America, Inc. Castellucci succeeds **Edward D. Jones** of Standard Oil Co. of California. The other associate member directors are **William F. Ames, Jr.,** Miller and Ames, and **Mel J. London,** Calaveras Cement Co.

* * *

Robert H. Scarth has been appointed to the staff of Northern California Chapter, Associated General Contractors of America, Inc. as labor relations assistant. He fills a new position in the chapter office and brings the number of men on the staff to six.

* * *

Walter W. Brenner has been assigned to the Navajo Unit of the Colorado River Storage Project as construction engineer by the Department of the Interior. Brenner, who has been with the Bureau of Reclamation since 1935, transfers to his new job near Farmington, N. Mex., from the Lindsay (Calif.) Distribution System Projects Office. He served at Lindsay since 1950.

Emil V. Lindseth has been named assistant chief designing engineer of the Bureau of Reclamation at Denver, Colo. In his new position Lindseth will assist Chief Designing Engineer **Louis G. Puls** in directing the designs of structures for the Bureau's land and water resource development projects in 17 Western states and Alaska. Lindseth has been assistant director of the Bureau's regional office in Denver since October 1949.

* * *

Lester W. Griffiths ends 30 years of Federal service with his retirement from the U. S. Army Engineers, South Pacific Division. For the past seven years Griffiths has been assistant chief of the construction branch, primarily concerned with the military construction program of housing, airfields and space-age missiles.

* * *

Lt. Col. Robert P. Young has resumed his duties as the new deputy district engineer of U. S. Army Engineer District, Seattle. In his new job, Colonel Young will fill the position which has been held several months by **Roy O. Smith,** as acting deputy district engineer.

Mammoth Pool personnel

The comprehensive article on Southern California Edison Co.'s Mammoth Pool project which appeared in last month's WESTERN CONSTRUCTION failed to include a complete list of personnel.

W. L. Chadwick is vice president of Southern California Edison, and **R. W. Spencer** is manager of the engineering department. **P. B. Peecook,** assistant manager of engineering, is in overall charge of construction, assisted by **O. N. Kulberg,** chief construction engineer, **H. A. Barber,** project engineer, and **Neville S. Long,** resident engineer. Job inspectors are **Tom Sutton** and **Dean Barber.**

T. M. Leps, chief civil engineer, is in charge of overall design for Edison, assisted by **B. R. Laverty,** senior civil engineer.

For Utah Construction Co., which is driving the 40,000-ft. power tunnel, **Cecil Welton** is project manager, and **Al Simoneaux** is project engineer. **Steve Wilmoth** is general tunnel superintendent, assisted by **J. W. Robertson** and **F. H. Riggs.**

The $50,000,000 hydroelectric project is being built by Bechtel Corp., whose personnel was listed last month on page 30.

COL. WALTER L. WINEGAR, (right), is the 47th Corps of Engineers officer to be Portland District Engineer. He relieves *Col. Jackson Graham* (left). Winegar comes from Washington, D. C., where he was in the office of the Deputy Chief of Staff for Military Operations. He had previously served with the Alaska Engineer District. Graham, who has been district engineer since September 1955, is one of the two Army engineers selected to attend the 1958-59 course of the National War College.

Lewis E. Knerr, employee of the Portland District, Corps of Engineers for more than 29 years, is retiring as head of the design branch of the engineering division.

* * *

Norman L. Bock, former chief engineer of Bethlehem Pacific's Los Angeles plant, has been appointed to the same position at the Seattle plant. Bock has been in Seattle since January 1957, heading the engineering staff responsible for the company's $25,000,000 expansion and modernization program there. He has been with Bethlehem Steel nearly 30 years. After working in the engineering department of the company's Lackawanna plant, near Buffalo, N. Y., he was transferred to Los Angeles in 1937.

* * *

Paul S. Wright, 34-year veteran of the Los Angeles Department of Public Works, has been appointed to the post of commercial paving engineer for the Pacific Coast Division of The Asphalt Institute. He will serve under **B. A. Vallerga,** Institute division managing engineer, whose office is in Berkeley, Calif. Wright was chief field engineer for the City of Los Angeles. He is an expert in the fields of soil testing, design and control of asphalt mixtures and paving and has been called in as consultant for numerous municipal projects.

Deaths—

George D. Youngclaus, well-known in engineering and construction circles in Southern California, died in Whittier, Calif., at the age of 37. At the time of his death, Youngclaus was vice-president of Western Concrete Structures Co., Inc., a Los Angeles firm specializing in prestressed lift-slab construction. For seven years prior to his affiliation with Western Concrete Structures in 1956, Youngclaus was a structural engineer with the Los Angeles District Office of the Portland Cement Association.

* * *

Leland A. Young, prominent contractor and an active member of the AGC for many years, has died. Young was involved in the construction of highway projects throughout the Intermountain West and operated his own construction firm for the past 35 years.

SUPERVISING the jobs

Doug Baker is project manager on the $29,602,497 Flaming Gorge Dam and powerplant project in Utah. **Henry Scott** is project engineer; **Ford Johnson,** building superintendent; **Mike Evans,** excavation superintendent; and **Bernie Singsaas** is office manager. Contractor is the Arch Dam Constructors (Peter Kiewit Sons' Co., Morrison-Knudsen Co., Inc., etc.). Work started in July this year and is expected to run until July 1963.

* * *

J. F. Hill, construction engineer; **Bill Bindel,** superintendent, and **E. C. Price,** engineer, are the key men on Robert E. McKee's $1,198,500 contract for construction of barracks, administration and supply building, White Sands Proving Ground, Las Cruces, N.Mex. The work, which began in July, is expected to reach completion by May of 1959.

* * *

Harry Mitchell is job superintendent on a $434,078 project being carried out by Fred H. Slate Co. and E. C. Hall Co. Work consists of clearing and grading on a new highway from Knappton to Bean Creek, south of Nasell in Pacific County, Wash. The operation has been under way since June and is expected to be completed by November 1959.

* * *

Barton L. Bethers, partner and superintendent, and **Reed Bethers,** crushing and oiling superintendent, are in charge of a $265,377 award for grading and surfacing on 8.5 mi. of Highway 262 in San Juan County, Utah. Contractor is Harris Bethers & Bethers & Stoker Const. Co. Work, which began in July, is scheduled to end in November.

* * *

Superintendents on Peter Kiewit Sons' Co.'s $227,609 access road contract at Warren Air Force Base,

DIRECTING the rough highway project through Cock's Comb in southern Utah (see article on page 50) are (l. to r.) *Robert Wheadon,* engineer for the Utah Highway Department and *Lars Palfreyman,* superintendent for contractor W. W. Clyde Co. The 5-mi. contract covers part of the 63-mi. access road leading to Glen Canyon Dam.

"A plenty tough job so we called on Caterpillar equipment for this one"

South of Camarillo, Calif., J. E. Haddock, Ltd., is relocating and improving 5 miles of U.S. 101. Some 1½ million cu. yd. of rock are being moved, 7,000 cu. yd. on an average day. Three Caterpillar DW21-Athey PR21 rigs help, carrying 18 cu. yd. apiece. The round trip is a mile, including a 12% grade.

"This job is plenty tough," says Neal E. Saul, project superintendent, "so we called on Caterpillar equipment for this one. Caterpillar gives us satisfactory service with a minimum of down time."

Now Athey PR21 Rear Dump Trailers are powered by *new* Cat DW21 (Series D) Tractors. They feature *new* Super-Turbo Engines that provide 320 HP (maximum output) and twice as much torque rise as before! Results: faster cycles, greater production —*for you.*

Other features, as articulated design and non-stop 90° turns in 33½-ft. diameter, let the DW21-PR21 maneuver in crowded, cramped quarters. Three-stage, double-acting hydraulic rams, 60° tilt and straight body interior permit fast, clean dumping. The PR21 is 14 ft. 1 in. long, 9 ft. wide, allowing fast, easy shovel loading. Below are other Athey trailers suited to construction work.

The complete trailer line of Athey is available through your Caterpillar Dealer. Let him demonstrate on *your* job the hauling unit that's best suited to your requirements.

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

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

THE ONLY COMPLETE TRACTOR-TRAILER LINE... BY THE LEADERS

DW20-PW20, 40-ton capacity, speeds to 35.8 MPH. Exclusive 3-door, bottom dump design and high arch axle minimize dumping resistance.

"PR" Series — rear dump. Available for the DW21 (above), DW20 (34-ton cap., 23-second dump), DW15 (22-ton cap., speeds to 37.2 MPH, 13-second dump).

"PD" Series — side dump. Available for the DW20 (30-ton cap.) and DW15 (20-ton cap.). Both have 70° dumping angle and can dump on the run.

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

Wyo., are **Kenneth Andrews, C. M. Montgomery, D. J. Fry, D. L. Bennett,** and **S. J. McElhaney. Jack Sorvik** is office manager. Work consists of grading, drainage, base course, fencing, and hot-mix surface.

* * *

Dean Rule is superintending a $1,648,885 job for Eagle Construction Co. **Don J. Alexander** is general foreman; **Darrell E. Vail,** engineer; **Ralph Chilson,** grade foreman; **Robert R. Hobson,** grade foreman, **Bruck Newcomb,** pipe foreman, and **Don Nixon,** mechanic foreman. Work consists of grading and surfacing on 20.7 mi. of 4-lane divided roadway and construction of an overpass and a concrete bridge, on the Snake River-Raft River in Cassia County, Idaho.

* * *

B. R. Salveson, job superintendent, and **N. R. Reiman,** general superintendent, are in charge of a Riedesel-Lowe Co. project begun in June. The $121,513 contract is for construction of three machinery pass structures and miscellaneous work on 3.1 mi. of 4-lane divided highway in Sheridan County, Wyo.

Max Riggs, superintendent, and **Frank Huffman,** carpenter foreman, are in charge of General Contractors' $252,260 contract for construction of two overpasses and one underpass structure in Washington County, Utah. Work, which began in July, is scheduled for completion by November.

* * *

R. J. Schurger is superintendent on Roth Construction Co.'s $218,-441 job in Richland County, Mont. Work includes 7.4 mi. of grading and surfacing on the Wibauz-Sidney highway. Other key men are **J. T. Dugan** and **J. J. Jackson,** grade foremen, and **"Shorty" Martins,** pipe foreman.

* * *

Stan Wilson is superintendent for J. M. Steinmuller, Jr. on a $508,498 contract for construction of a lined channel at Amazon Creek near Eugene, Ore. **Lee Plants** is engineer on the job; **C. E. Heimark,** labor foreman; **Roy Landrum, Don Kendall,** and **Fred Farrer,** carpenter foremen. Begun in July, the project is scheduled for completion in November.

* * *

Spence Woolsey, foreman, and **H. B. "Red" Solt,** superintendent, are the personnel on Quigg Bros. and McDonald, Inc.'s $393,079 contract for construction of twin bridges across the Yakima River and across State Highway 2, in Easton, Kittitas County, Wash.

* * *

Richard Depiveg, project manager, and **Fred Stokes,** project superintendent, are head men for Basich Bros. Construction Co. and N. L. Basich on a $567,537 contract for realigning 6.6 mi. of Route 41, Kings County, Calif. Under way since July, work is expected to reach completion by December.

* * *

Carl Wright, job superintendent, and **Pete Larson,** plant superintendent are head men for Basich Bros. Construction Co. and N. L. Basich on their $158,899 contract which calls for 27.2 mi. of grading and surfacing portions of the highway between Sonora Junction and the Nevada state line in Mono County, Calif.

* * *

Joe Mansfield, project manager for Pioneer Construction Co., is in charge on a project consisting of 9.9 mi. of grading, structures and surfacing between Beshoar Junction and Kim on State Highway 100 in Las Animas County, Colo. Contract is for $254,975.

DIRECTING WORK ON WILLIAMS FORK DAM

EARL COOPER (left), project superintendent; and *L. Kay Waldron,* project engineer, are key men on Mountain States Construction Co.'s $4,500,000 dam project located on Williams Fork in Colorado. Work is being carried out for the Denver Water Board. See page 56 of this issue for project details.

DENVER Board of Water Commissioners personnel: *Roy Wright,* resident engineer, (left) and *Marvin E. Langsteiner,* office engineer.

LEFT TO RIGHT are Williams Fork personnel *Larry Woosley,* day shift superintendent; *Anthony Battilo,* excavation superintendent; *James Brock,* master mechanic; and *Gerben Houtman,* office manager.

RONNIE WELKE, hot plant and crusher foreman in the employ of Madonna Construction Co., is supervising the production of hot asphalt and base material for a $1,300,000 Madonna job which consists of 6 mi. of grading and surfacing on U. S. 101 in Los Alamos, Calif.

A. L. Blattner is superintending Pioneer Construction Co.'s $306,381 contract for 5.2 mi. of grading and surfacing and structures on State Highway 59 between Springfield and Campo in Baca County, Colo. Grade foreman is **Joe Miller,** and **K. LaCasse** is project manager.

* * *

Don G. Anderson, superintendent, and **Corbett Jarnagin,** foreman, are in charge of a recent award to Hagen Construction Co., Inc. for grading, surfacing, curbs and gutters on the Oracle Junction-Globe highway, east of Globe in Gila County, Ariz. This $343,624 project began in July and is now about finished.

* * *

V. E. Fielding, project manager; **John Wright,** grade foreman; **F. R. Alexander,** powder foreman, and **Jim Evans,** timekeeper, are head men on a $1,009,724 contract awarded to Isbell Construction Co. Work consists of grading, surfacing, and draining 6.5 mi. of the Cordes Junction-Flagstaff highway, south of Flagstaff in Coconino County, Ariz. Expected completion date for the job, which began in June, is November.

* * *

Harold Wilson, superintendent for Gardner Construction Co., is in charge of a $246,903 project which consists of 2.7 mi. of grading and surfacing through the city of Idaho Springs on State Highway 2 in Clear Creek County, Colo. **Clifford Gray** is foreman. Work has been under way since July and is now drawing to a close.

* * *

Fred Pankratz is general superintendent for B-E-C-K Constructors and Raber-Kief on their $3,295,805 Nike site project for the Army, near Ladd AFB in the interior of Alaska. Other personnel on the Army project, which began in June and is expected to be completed by September of 1959, are **E. C. Hendrickson,** carpenter superintendent, and **Lloyd Cleveland,** office manager.

* * *

Richard O'Donnal is superintendent; **Bob Passmore,** finisher foreman, and **Wyla Sollers,** carpenter foreman on a $127,680 contract for grading and surfacing the Miller Valley road, Prescott, in Yavapai County, Ariz. awarded to W. J. Henson, Contractor. The job has been in progress since July and is soon to be completed.

* * *

Jess Howard is superintending a $224,558 award to C. C. Meisel for 5.8 mi. of grading and oiling on the Kimberly-Long Creek section in Grant County, Ore. **Wilson House** is surfacing foreman; **Jack Hathaway,** grader operator and supervisor; **Dave Alexander,** crushing plant foreman, and **Clarence Lindberg,** shovel operator. G. D. Dennis & Sons are subcontractors on grading. Work on this project began in July of this year and is expected to be finished in April of 1959.

* * *

Tom Sorenson is project manager on construction of a laboratory and service building to serve the Experimental Breeder Reactor Project, Idaho. James Stewart Co. is handling the $1,385,000 project which is expected to reach completion by June of 1959, one year after its beginning. **Mark Barber** is superintendent on the job.

* * *

E. M. Tidmore is general superintendent on a $763,533 award to Flickinger Bros. Contracting Co. Other key men are **Glen Wells,** master mechanic, and **Charles Byrnes,** grade foreman. Work, which will be finished in February of 1959, consists of 3.7 mi. of grading and surfacing on the Globe-Show Low highway in Gila County, Ariz.

(More "Supervising" on page 100)

MODEL CW-320

INTERCHANGEABLE WITH MODEL CWD-321 REAR DUMP UNIT

20.0 cu. yds. STRUCK
27.0 cu. yds. HEAPED

MODEL CWD-321

INTERCHANGEABLE WITH MODEL CW-320 SCRAPER UNIT

21.0 cu. yds. STRUCK
31.0 cu. yds. HEAPED
35-TON LOAD CAPACITY

A SCRAPER FOR EVERY EARTHMOVING JOB . . .

CURTISS-WRIGHT

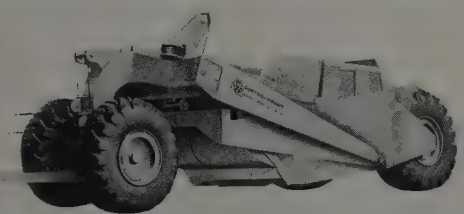
CONSTRUCTION MACHINERY

Curtiss-Wright Construction Machinery offers the most extensive scraper line in the industry! These rugged, dependable high speed machines — produced at South Bend — incorporate design features that give contractors the versatility and performance that pays off in lower costs-per-yard and bigger profits on any earthmoving job.

And supporting performance in the field is the nationwide network of Curtiss-Wright distributors with a staff of factory-trained service personnel and extensive parts stocks. Factory parts depots located strategically throughout the country cut downtime on major overhauls too.

For scraper performance that means bigger earth moving profits — see your Curtiss-Wright Construction Machinery distributor today.

SOUTH BEND DIVISION
CURTISS-WRIGHT CORPORATION
SOUTH BEND, INDIANA



MODEL CWT-30

30.0 cu. yds. STRUCK
39.0 cu. yds. HEAPED

MODEL CWD-214

INTERCHANGEABLE WITH MODEL CW-215 SCRAPER UNIT

14.0 cu. yds. STRUCK
21.0 cu. yds. HEAPED
25-TON LOAD CAPACITY

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

The three Houck brothers: *Roy Jr.* (left), *Cub* (center), and *Jim* (right), who, along with their father, *Roy, Sr.*, operate Roy L. Houck Sons' Co., one of Oregon's growing construction outfits. At present the family team is at work on a $1,262,095 contract for the reinforced concrete paving on 9.12 mi. of the new southbound, two-lane roadway of the U. S. 99 Freeway, north of Albany, Ore.

L. D. Bekker, Jr., is superintendent for M. Morrin & Sons Co., on grading and surfacing of 3.1 mi. of Highway 80 and construction of two bridges in Tooele County, Utah.

* * *

Presley Cleveland is superintendent and **Robert L. Walker,** plant foreman, on a $261,342 contract awarded to McAtee & Heath. Work consists of grading and surfacing 11.7 mi. of U. S. Highway 95, Grangeville, north of Fenn in Idaho County, Idaho. The work began in July and is expected to end in October.

* * *

Key men for San Xavier Rock & Sand Co. on a $1,469,354 project of grading and surfacing are **John Burke,** job superintendent; **W. H. Barret,** concrete superintendent; **Dewitt Green,** equipment foreman; **Odin McDonald,** field mechanic; **B. J. Shell,** job engineer, and **Andrew Slate,** labor foreman. The work, which began in June and is expected to be finished by November of 1959, covers 1.6 mi. and includes the construction of three grade separation structures on the Casa Grande-Tucson highway in Pima County, Ariz.

* * *

J. D. Griggs, superintendent for Cherf Bros. & Sandkay, Contractors, is in charge of a $347,819 award for structures on the Crow Agency-Hardin highway in Big Horn County, Mont. **S. C. Nelson** is carpenter foreman. Work commenced in July and is expected to end in spring of 1959.

* * *

Thomas F. Lillebo, vice president of Lillebo Construction Co., is general superintendent on a $569,819 contract awarded to this company. **Sharman Everett** is assistant superintendent on the work, which entails construction of the Grande Ronde River bridges near La-Grande on the old Oregon Trail Highway in Union County, Ore.

* * *

M. R. Pierson, superintendent, is in charge on O. B. Pierson's $192,383 operation calling for construction of five bridges over Apache Canyon, Oak, Corral Canyon, Round Spring and Castle creeks, and redecking five bridges on U. S. 399 north of Wheeler Springs, Ventura County, Calif. **L. R. Henderson** is foreman on the work, which began in June and is scheduled to end in October.

* * *

Thomas S. Miller is project superintendent on the Natt McDougall Co. $379,912 contract in Camas, Clark County, Wash. Work, which began in August, consists of clearing and paving a new alignment for State Highway 8. **Perry L. McDowell** is general foreman on the project, which is expected to reach completion in February 1959.

* * *

R. A. Mortensen is general superintendent on Kuckenberg Construction Co.'s $308,899 project for structures, grading, and paving on the Pacific Highway in Multnomah County, Ore. **Glen R. Damon** is general foreman, and **Merrill Henderson** is engineer. Work began in August and is expected to last for nine months.

* * *

Frank F. Fries, superintendent; **H. O. Davis,** assistant superintendent; **L. D. Mosier,** purchasing agent; and **C. Mitchum, Jr.,** office manager, make up the crew in charge on the Gordon H. Ball, Inc. and Ball & Simpson contract for grading and surfacing of 2 mi. of 6-lane freeway west of Lafayette in Contra Costa County, Calif. Award was for $3,662,946. Work started in August.

R. G. Webster is superintending the $2,273,500 contract for widening runway, and roads, Naval Air Missile Test Center, Point Mugu, San Nicolas Island, Calif. Gordon H. Ball, Inc. and Ball & Simpson is the contractor. **A. L. Covey** is in charge of shoreside, and **T. L. Webster** is office manager. The job began in July and is expected to be completed by July 1959.

* * *

James A. Read and **Robert Alexander** are foremen on Read Construction Co.'s $827,273 contract for grading and surfacing on 4.2 mi. and construction of three culverts on the Kemmerer-Granger Junction road in Lincoln County, Wyo.

* * *

John Harns is superintendent and **Ed Wacker** is general-foreman on two jobs for T. M. K. Construction Co., Inc. One is a $582,337 award for 5 mi. of grading and surfacing on the Yuma-Casa Grande highway southeast of Gila Bend in Maricopa County, Ariz. Work, began in August, is scheduled for completion March 1959. Second project is also on the Yuma-Casa Grande, and includes a 2-mi. stretch of grading and surfacing for $5,-36,822.

* * *

S. E. Craft is project manager for Fred J. Early Co. Work, which began in August, consists of construction of improvements to fuel storage and distribution system and the Naval Air Station, North Island, San Diego, Calif. Contract is for $1,525,600. Other key men on the project are **E. H. Applegate,** project engineer; **Glenn Moody,** office manager, and **R. N. May,** equipment foreman. Work will be finished by August 1959.

* * *

Ray McBride is superintending the installation of 74,440 lin. ft. of wire mesh type fencing on Trosper Road to Martin Way in Thurston County, Wash., for Alton V. Phillips Co. **Lloyd Schwieger** is clearing foreman. The $212,958 job began in July and is expected to end in December.

* * *

John Tyron is project manager; **H. Niswander,** project superintendent, and **Ray Hadley,** project engineer for S. S. Mullen, Inc., who began work in August on extensive rehabilitation of the runway and POL system at King Salmon Airport, Alaska. Bid on the work, which is expected to end in September 1959, was $1,866,000.

"Efficiency Experts"

on Every Job . . .

JOHN DEERE
WHEEL AND CRAWLER
Power Units

IT'S no wonder John Deere Wheel and Crawler Power Units are called "efficiency experts" wherever the big job is digging, loading, and hauling of dirt, sand, gravel, or other materials. That's a way of saying this equipment trims waste in every possible way, daily chalking up big savings for the owners.

It's common knowledge, for instance, that fuel costs drop when a John Deere goes on the job, thanks to its amazingly efficient power plant, famous for delivering so much for so little for so long. And it's just as widely known that these units have the convenient controls and operating responsiveness that mean getting the most out of every working hour —plus many construction features that give them greater stay-ability and assure greater savings in servicing and maintenance.

Your John Deere Industrial dealer will be glad to show you how you can trim operating waste, speed production with a John Deere Wheel or Crawler Power Unit. See him at the very next opportunity.

● There's a John Deere Industrial Unit to suit your needs exactly: Tractor-Loaders, Crawler-Loaders, Crawler-Dozers, and a complete line of interchangeable attachments including backhoe, winch, trenchers, fork-lifts, and many more.

JOHN DEERE Industrial Tractors and Equipment

Completely Engineered for Industry

SEND FOR FREE LITERATURE

JOHN DEERE INDUSTRIAL DIVISION
215 S.E. Morrison St. — Portland 14, Oregon
651 Brannan Street — San Francisco 19, California

Please send me your latest literature on the John Deere Crawler Tractors and Equipment, and information on the John Deere Credit Plan.

*Name*_____

*Firm*_____

*Address*_____

*City*_____ *State*_____

. . . for more details, circle No. 55 on Reader Service Postcard

MASTER MECHANIC®

Tips on tightening nuts

HOW MUCH should a bolt, capscrew or nut be tightened? Around the maintenance shop there are many definitions of tightness. It's quite common to hear such terms as "finger tight," "snugged," "seated" or "so many pounds-feet tight."

To tighten a bolt the nut must be turned down until the bolt begins to stretch. Any degree of stretching is due to the tension from the torque applied to the nut as it is moved up the bolt's thread. Air cleaner wing nuts, for example, are considered "finger tight" when enough torque has been applied by the hand to hold the cleaner tray securely in place. A drain plug is considered "snugged" when it is tightened just enough to hold it in place and keep oil from leaking past the gasket. A fitting is "seated" when it is turned into position although not necessarily placed in tension. Each of these terms is relative and amply describes non-critical degrees of tightness.

Naturally, it's impractical to torque all bolts to close tolerances. According to the Service Department of Caterpillar Tractor Co. there are, however, many instances where exact amounts of torque must be applied. Service Department personnel point out that hydraulic pumps and valves, for example, have small internal clearances. While it is desirable to have the parts of these units assembled tightly, too much tightening will reduce internal clearances to zero. Main and connecting rod bearings are round only when the correct torque is applied to the cap nuts. Too much torque will put these bearings out-of-round and cause failure of the parts when the engine is put back into service. Excessive tightening of cylinder head studs can distort the head, with a good probability of leakage, warping and cracking.

A torque wrench should be used to obtain a specific amount of torque when the amount of tightness is critical. If the torque is not measured it is easily possible to get an improper gasket crush from too little tightness, or cause distortion or bolt "set" from an excessive amount of torque. Additionally, the recommended tightening sequence should be followed.

The torque wrench will allow consistently accurate results every time. Like most tools, there is a correct way to use it. Torque should be brought up in increments by using a steady pull. Jerking the wrench will result in higher torques than are actually indicated on the wrench dial.

Reliable machine performance depends on correct adjustments. A torque wrench should be accurate and applied properly. The manufacturer's maintenance manual or dealer serviceman should be consulted for correct torque specifications.

Threaded inserts save down-time on crushers

CRUSHER DOWN-TIME to replace and repair mandrel rolls is expensive both in manpower and production time. Time lost in reparing damaged threads on crusher cores or mandrels can be cut many times over with a permanent repair technique developed by engineers of Heli-Coil Corp. of Danbury, Conn., a Division of Topp Industries, Inc.

The continual hammering and vibration of crusher mills plus frequent replacement of wear plates accelerates thread wear, eventually causing the threads to strip and loosening of the plates.

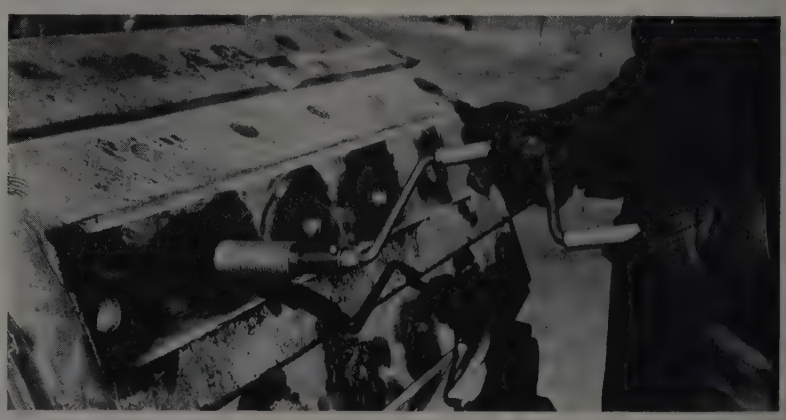
Since the counter sunk holes for fastening the chilled iron replacement wear plates to the core are of standard size it is impractical to redrill the core and tap for the next larger size.

The mandrels are made of cast iron and are pressed on the 16-in. shaft with 150 tons pressure. When threads become excessively worn, the only previous remedy was a replacement with new mandrels. This required disassembly of the crusher and transportation of the 9-ton shaft assembly with mandrel to a shop having an adequate press.

Now, worn threads can be drilled out, retapped and wire thread inserts installed to provide permanent threads of the original size without taking the machine apart. No future thread repair will be necessary on the insert protected holes.

Repair operations are as follows: (1) Damaged threads are cleaned out with a drill slightly larger than the original thread major diameter. (2) The hole is retapped with the standard Heli-Coil tap. (3) A stainless steel insert is installed bringing the hole back to the original thread size. The thread insert is installed with a hand tool so that the top coil is ½ turn below the surface. In blind holes such as these the driving tang is left intact as the assembled bolt does not reach this depth and interfere. For through holes, the tang is readily removed with a tang break-off tool. No amount of vibration will loosen the insert and being stainless steel, it will not corrode. Consequently, wear plates can be set up as tight as possible on the core—up to 4,000 foot pounds have been applied on heat treated bolts used to fasten the wear plate to the core.

Strength of the 18-8 stainless steel wire used in the manufacture of these inserts makes the inserts stronger and more permanent than either the original threads or those repaired by other methods.



Equipment supervisors can relax

HEAD TABLE AT THE ANNUAL PARTY OF LOS ANGELES CHAPTER, EMSA.

The Los Angeles Chapter of the Equipment Maintenance Supervisors Association recently held its third annual dinner dance. Over 100 members and wives attended the affair including guests from the Bay Area and San Diego chapters. At the head table were; (l. to right) *Keith Robertson,* San Diego chapter president and *Mrs. Robertson; Dan Stoddart,* program chairman and *Mrs. Stoddart, Mrs. Gibson* and *T. I. Gibson,* president of the Los Angeles Chapter.

Tractors, too, can be portable

AN UNUSUAL case of the use of an airplane to transport two crawler tractors which were to build a runway is part of the story of the lengthening and widening of an air strip at the remotely located Moose Creek Ranger Station, 100 mi. east of Lewiston, Idaho.

Bids were advertised for this project, and in spite of its remote location which the bidders knew would require flying in heavy equipment, 10 bids were received. The work to be completed in a year would require bulldozers pushing over and burning 25 acres of virgin timber and moving over 50,000 cu. yd. of dirt to build the new runway.

Henry Vanderwall of Grainsville, Idaho, was low bidder at $67,102. He was faced with the problem of getting two International TD-9 crawler tractors equipped with dozer blades into the area.

The tractors were first dismantled into small enough components so that they could be handled by manpower and could be placed aboard a Douglas DC-3. This was done and the equipment was flown to the site without mishap and later reassembled.

The tractors, working as a team, cleaned and burned the 25 acres of timber. They also helped excavate for the necessary drain tile. Finally, they were used to move 56,520 cu. yd. of dirt to construct the runway.

Over 8,000 gal. of diesel fuel, 1,000 gal. of gasoline, 610 ft. of 18-in. pipe and 985 ft. of 8-in. pipe, plus 7,000 ft. of wire also were flown to the job by the DC-3. The contractor found that air transportation in such cases can be expensive. Normally, he would pay 19¢ for diesel fuel oil and 30¢ a gal. for gasoline. However, because of the airlift required the price rose to 55¢ per gal. for the diesel fuel and 67¢ per gal. for the gasoline.

Cost of the project was shared jointly by the Civil Aeronautics Authority and the Forest Service.

Shipping cement to Alaska

IN A MOVE to increase cargo space and reduce handling costs, contractors Morrison - Knudsen developed a unique and efficient method for transporting 12,000 bbl. of bulk cement by barge to the new state of Alaska.

The specially-outfitted barge — probably the first and only one of its kind — had three huge storage tanks, each occupying the space of a 5-room house and measuring 39½ ft. in diameter by 14 ft. in height. Custom-fabricated in three sections by Puget Sound Fabricators of Seattle in about ten days' working time, the tank sections were first assembled on shore and then lifted into place on the barge where they were firmly reinforced, roofed and secured to the specially-prepared plywood deck laid over 4-in. timber planking reinforced by heavy wood sills firmly secured to the steel barge.

The tanks, each holding 600 tons of cement, were constructed to withstand the severest of weather conditions.

A device called the "bazooka" was used in unloading the bulk cement cargo. This method involved a Pettibone-Wood portable screw conveyor which projected the dry cement from a hopper into a 12-in. pipe at a rate of approximately 300 bbl. per hour.

Fans raise building

THE WORLD'S LARGEST air-supported building, and experimental grain storage unit of 1,800,000 bushels capacity, was raised in 5 hr. at Fort Worth, Texas, recently. The building, the first air-supported structure ever roofed with steel, was designed and built by Cargill, Inc., handler and processor of agricultural products.

The steel roof, 2.3 ac. of aluminized sheeting weighing more than 50 tons, was lifted from the concrete floor by fans to form a quonset-shaped building 158 ft. wide, 38 ft. high and 550 ft. long. End walls—steel half circles 40 ft. high—were already in place to guide the roof while flexible seals between roof and walls prevented escape of air pressure.

The structure will be kept rigidly inflated and able to withstand winds of hurricane force by fans maintaining an interior pressure of 25 to 30 psf. Entrance to the grain bin is through air locks at one end, and a person entering experiences a pressure change equal to descent from a 25-story building. One air lock is large enough to admit truck-sized vehicles and other large grain handling equipment.

Fabrication of the roof, in which steel replaced plastic and rubber film heretofore used in air-supported construction, was done on the site by a specially developed welding technique yielding air-tight seams. Some 335,000 welds were required to fashion the roof from 155 separate sheets. One edge of the expanse was anchored immediately to an edge of the concrete floor. The other roof-edge was left free, extending on the ground beyond the floor slab.

Inflation of the building required four 40,000-cfm. fans forcing air through ducts in the floor under the roof. As pressure increased, bowing the center upward, the free edge of the roof—kept air-tight against the ground by a weight of sand—was pulled inward until it reached the slab and the roof was fully raised. Then it, too, was anchored to seal the building tightly on all sides.

Project contractors on the Fort Worth elevator were: Lee Emmert, Dallas, fabrication and erection; Gorbett Bros. Steel Co., Inc., Fort Worth, machinery and conveyor installation; Burton Bros. Electrical Co., Forth Worth, electrical engineering; Day Sales Co., Minneapolis and Fort Worth, duct installation and aeration.

CONSTRUCTION BRIEFS

Steel rods tie sheet-piling together

SLENDER RODS of steel are "standing in" for Mother Earth in Burbank, Calif.

To provide for uninterrupted railroad train service, while constructing flood control channel facilities, Oberg Construction Co. is shoring up almost 100 ft. of Southern Pacific railroad track roadbed near Burbank Boulevard and Front Street in Burbank with steel Z-38 piling. The Burbank-Western System (Upper Part I) is under the direction of the Army Corps of Engineers.

On the main line track, Z-38 steel sheet piling was driven 40 and 48 ft. into the earth for a distance of 66 ft. on each side of the roadbed.

To contain the roadbed and hold the steel Z piling vertical, two rows of 2¾-in. and 3-in. diameter threaded steel rods, 43 ft. long, produced by the Los Angeles plant of Bethlehem Pacific, were jacked under the roadbed and bolted to the piling.

The rods were inserted through field-cut holes in the piling and driven under the roadbed by means of a 30-ton hydraulic pipe pusher. When the rods reached the facing rows of piling, their position was determined and holes were cut to allow passage of the rods for bolting through the piles.

New tires are developed for better tractor handling

For better handling of today's more powerful tractors, a new line of front and rear tractor tires is being marketed by Goodyear Tire and Rubber Co. The rear tire, the Traction Sure Grip, is said to be superior to previous tires of its type in traction, cleaning and wearing. Lugs are longer, wider, and tapered. Their wider spacing and increased depth at the shoulder gives better soil bite and penetration. The Super Sure Grip front tire is huskier than previous models and has deeper, wider ribs. The new tires are available in sizes ranging from 7-24, 2-ply rating, to 18-26, 10-ply rating. Front tires range in size from 3.00-12, 2-ply rating to 9.00-10, 8-ply rating.

Steel shoring for concrete pours

Safety rules for using this modern method of supporting forms

ONE OF THE most important safety rules for contractors who use sectional steel shoring to support formwork during concrete pouring operations is to realize that no two jobs are exactly alike —each job must be laid out by a shoring sub-contractor or by someone thoroughly familiar with the capabilities of steel shoring. If this one rule is followed religiously, shoring work of all kinds can be done with more efficiency, economy and safety.

Contractors can benefit by being fully aware of the safety precautions recommended by manufacturers of the equipment. One shoring sub-contractor and manufacturer, The Patent Scaffolding Co., Inc., makes the following suggestions of immediate concern to all users:

1. Carefully outline *all* elements of the particular shoring job, such as:

(a) weight and size of slab or beams

(b) type of slab — waffle, grid, pan joist, etc.

(c) height of slab or beam from the ground

(d) whether shoring sets on previously-poured slab, fill, solid ground, rock, etc.

(e) method of pouring — concrete bucket on hoist tower, motorized buggies, chutes, etc.

(f) forming lumber required

2. Make exact detailed computations of *all* these elements applying to the job so as to meet the load requirements with the appropriate factor of safety. If this work is done by someone other than the shoring sub-contractor, the latter should be consulted for allowable loads and other recommendations.

3. Make a complete layout of the job showing all engineering details and exact position of the shoring and spacing between the frames.

4. Formwork, built by the contractor, should have the following strength characteristics:

(a) extreme fiber bending — 1,200 psi.

(b) horizontal shearing—120 psi.

(c) modulus of elasticity — 1,600,000 psi.

5. The construction superintendent should follow the engineering layout of the job to make sure these safety precautions are taken:

(a) verifying spacing between shoring frames and towers

(b) correct timber and sill sizes

(c) plywood applied at right angles to joists for maximum strength.

(d) properly compacted fill (if not on concrete floor)

(e) adjusting legs not extended over 16 in. of exposed screw

(f) do not use motorized concrete equipment unless the layout states "designed for use with motorized concrete equipment"

(g) all load-bearing points are exactly as shown on the shoring layout

(h) all slab, beam and drop head forms are tied to and supported by column and wall forms

(i) test level of all shoring members

In addition to these precautions, the following general safety rules should be followed when using frame-type shoring:

1. Do not remove braces or other shoring units until proper authority is given.

2. Never climb on cross braces. Walk only on properly placed planking.

3. Check all wing nuts or locks for tightness.

4. Never use even slightly damaged material.

5. When rolling shoring towers over two frames high, use hand rope guys.

If more users of concrete shoring follow these precautions and safety suggestions, they will gain the advantages of speedier jobs, reduced costs, and certainly the highest possible profits from their work. Information about sectional frame and other types of shoring and how to use them can be obtained by writing to The Patent Scaffolding Co., Inc., Long Island City 1, N. Y.

New book on asphalt design and construction

A BOOK entitled "Design and Construction of Asphalt Pavements," by Martin and Wallace, has been published by McGraw-Hill Book Co. Price of the 312-page, 6 x 9-in., illustrated work is $11.50. It deals with such subjects as types of asphalt pavements, petroleum asphalts, mineral aggregates, design of hot-mix asphalt concrete, construction of hot-mix asphaltic concrete pavements, asphalt pavements and bases employing liquid asphalts, surface treatments and seal coats, reconstruction of old pavements, design of the flexible system, testing procedures, and design methods. The techniques presented in this book represent major practices throughout Continental North America.

The authors' treatment is completely practical, yet it includes the essential theory needed for a broad understanding of the principles involved in good design and construction. The volume also includes testing exercises to give a working knowledge of the fundamentals of control and design testing. It is suitable for self-study use.

J. Rogers Martin, as Engineer-Manager for the Hot-Mix Asphaltic Concrete Association of Oklahoma, has had wide experience in the construction of asphaltic pavements and related items.

Further information concerning **Design and Construction of Asphalt Pavements** is available from the McGraw-Hill Book Co., Inc., 327 West 41st St., New York 36, N. Y.

Electric heaters built into spillway gates at Ice Harbor

ELECTRIC HEATERS built into the spillway gates for Ice Harbor Dam prove there is reason for the name which has been applied to this major project on the Snake River. Ice Harbor Dam is a multiple-use project being carried out by the Walla Walla District, Corps of Engineers.

The ten tainter-type gates, each 50 ft. wide, are beginning to arrive at the construction site. These steel gates are being fabricated by the Calsteel Division of Yuba Consolidated Industries at Richmond, Calif.

The interesting element in design is the electrically-heated antifreeze units. There are two built-in units 44 ft. long on the curved inner side of each gate. These heaters are housed in a chamber running the width of the gate and are designed to prevent any possibility of freezing at the sealing edge.

This problem of freezing and the matter of ice control ties into the name of the dam and development project. At the site is a small bay on the Snake River where river boatmen during the early gold rush days found shelter against the early spring ice floes sweeping down the Snake River and jamming the river's mouth.

Emigrant Dam to be enlarged

FOLLOWING the award of a $2,635,493 contract by the Bureau of Reclamation, active construction work will be under way for enlarging Emigrant Dam on the Rogue River in southwestern Oregon. Contract went to R. A. Heintz Construction Co. of Portland, who submitted the low bid. Work will involve the construction of an earth and rock-fill dam 190 ft. high which will be built over the existing 110-ft. concrete arch. Construction will also include tunnel outlet and other minor work.

Located near the town of Ashland, Emigrant Dam is one of several features which the Bureau of Reclamation has designed to provide a full irrigation supply to 5,310 ac. of new land and a supplemental supply to about 10,000 ac. now being irrigated.

The present concrete dam was a non-Federal structure built in 1924. The Bureau of Reclamation has programmed $9,500,000 for the coming fiscal year to rehabilitate this non-Federal system.

Headquarters building for L. A. County Road Department

CONSTRUCTION is under way on a $3,159,999 County of Los Angeles road department administrative center near the civic center of Los Angeles, according to Twaits-Wittenberg Co., constructors and engineers. Facilities will consist of a modern two-story administration building of steel frame construction with concrete walls and slabs, and a yard office building. The structural steel frame and roof of the T-shaped administration structure have been designed to allow for additional floor space.

The road department is scheduled to occupy the new facilities late next year, according to Twaits-Wittenberg officials. Road Commissioner Sam Kennedy reports that at present, the department maintains 4,200 mi. of roads and 450 bridges in the county. It also maintains an additional 1,000 mi. of roads under contract with various cities in the county.

Upon completion, the new center will provide Los Angeles County with the most advanced facilities in the nation, Kennedy said. More than 500 engineering, administrative and clerical employees will be housed at the new Center.

Carl Fjellman is job manager and Chet Umbarger, construction superintendent for Twaits-Wittenberg Co.

Fish to be handled by barge at Wanapum Dam project

THE PUD OF Grant County is submitting a proposal to federal and state fishery agencies to transport migratory fish over Wanapum Dam in barges. The plan is based, in part, on experience gained by the fisheries agencies in other areas and on certain refinements recommended by their biologists.

"After giving the matter a great deal of consideration, we believe we have a plan that is beneficial to the fish," G. A. Smothers, manager of the PUD, said. "It will save the fish 3 to 4 days in their upstream migration time, and reduce the injury and loss ratio. It also will give the fish a rest period that will allow them to arrive at their spawning grounds in better shape."

In the plan now being studied by the PUD, the fish will be collected in barges anchored at the top of the Priest Rapids Dam fish ladders. As soon as one barge is filled it will be taken 18 mi. up stream to Wanapum. At Wanapum the filled barge will be lifted over the dam. The barge will then continue upstream to a point where there is enough current to enable the fish to be released and find their way on up the river.

The barge trip upstream is expected to require about 8 hr. in comparison to an average of 3 to 4 days believed to be the normal time for a fish to travel the same distance and climb a fish ladder.

Plans for ACI Convention

SAM HOBBS, local chairman for the 1959 convention of the American Concrete Institute to be held in Los Angeles, announces preliminary plans and committee appointments for convention activities. Dates for the convention are Feb. 23-26. The general committee to correlate all local planning will include John McNerney, Los Angeles district engineer of the Portland Cement Association; Byron P. Weintz, chief engineer for Consolidated Rock Products; William F. Norton, Pacific Coast regional manager of Ceco Steel Products Corp.; C. Taylor Test, director of technical services for Riverside Cement Co.; Glenn C. Thomas, president of Thomas Concrete Accessory Co.; and Lewis K. Osborn, associate with the architectural firm of Kistner, Wright and Wright; together with Hobbs and Ross Adams of the Portland Cement Association, who will handle publicity.

Hydro plant license for Sitka

LICENSE for a hydroelectric project has been issued to the City of Sitka, Alaska, by the Federal Power Commission. The plans include the construction of a concrete arch dam 180 ft. high located at Blue Lake on Baranof Island. The reservoir created by the dam would deliver water through a 1,500-ft. tunnel and penstock to a powerhouse containing two 3,000-kw. generators.

•

AN $8,394,835 contract has been awarded to Peter Kiewit Sons' Co. by the California Division of Highways for freeway construction in Los Angeles County. The contract involves construction of 4.1 mi. of 8-lane section on Ventura Freeway.

THE 1958 edition of American Road Builders' Association's convenient pocket-sized directory of highway officials and engineers is now available. The booklet contains more than 1,700 names, titles and addresses of administrative engineers and officials in the 48 state highway departments. It also contains the administrative personnel of the Bureau of Public Roads, including the heads of its regional offices and the division offices in each state; engineers and administrative personnel of the toll road authorities; officers and directors of ARBA, and a tabulation of states having legislative authority to construct toll roads. Directory is available at $1.00 per copy, net, from **American Road Builders' Association,** World Center Bldg., Washington 6, D. C.

Revised standard for power cranes and shovels

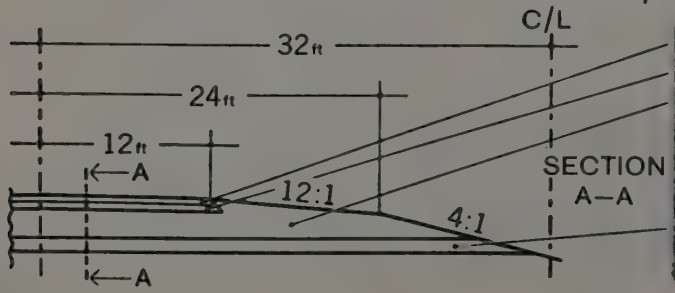
A NEW edition of "Power Cranes and Shovels," is now available, according to the Commodity Standards Division, U. S. Department of Commerce. It applies to machines of the convertible full-revolving type on crawler, truck, and wheel mountings. Sizes are in the so-called "commercial" ranges for shovels and cranes, with provisions for clamshell, dragline, pile driver and hoe operation.

The new standard is a revision that combines the former domestic and export standards, in accordance with recommendations of the Power Crane and Shovel Association, and has been widely endorsed by others in the industry. Its chief purpose is to establish uniform methods for guidance in specifying features of the machines, and in presenting data concerning their construction, performance, and control.

Copies of CS90-58 may be obtained from the **Superintendent of Documents, U. S. Government Printing Office,** Washington 25, D. C. The price is 20 cents per copy.

Asphalt-paved lanes of Arkansas' modernize

Profile of Van Buren to Alma Asphalt Pavement Design



1 1/2-inch SURFACE COURSE:
Arkansas State Highway Department Asphaltic-Concrete Hot-Mix Surface Course —Type 3

2-inch BINDER COURSE:
Arkansas State Highway Department Asphaltic-Concrete Hot-Mix Base Course—Type 2.

12-inch BASE COURSE:
8-inch crushed stone base over 4-inch selected sub-base. (P. I. not to exceed 3)

U. S. Route 64 prove their durability!

. . . only 12 man-days maintenance in first five years of service

During their first five years of traffic, the rugged Asphalt-paved lanes of U. S. Route 64 (dualized in 1953) between Van Buren and Alma, Arkansas have required *only* 12 man-days of maintenance.

This pavement handles over 700 heavy trucks and 5,000 other vehicles daily. The Asphaltic concrete has remained in almost perfect condition.

When new type, heavy-duty Asphaltic concrete roads are designed like this one . . . to take into account prevailing soil, climate and traffic conditions . . . you can expect many years of trouble-free service. That's because rugged Asphaltic concrete has the resilience to absorb impact and to adjust to sub-grade settlements.

What's more, suitable aggregates often can be found on or near the right-of-way. Ordinarily you can expect bids for a modern, Asphaltic concrete road to run from 10% to 50% LESS than for rigid construction.*

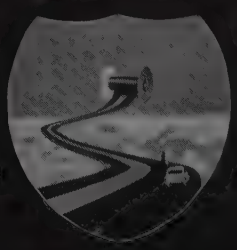
By using heavy-duty Asphaltic concrete any state can pave . . . *and maintain* . . . more and better roads with its tax dollars. This is the fundamental on which designers of many of today's outstanding roads have built their reputations . . . roads like the New Jersey, Will Rogers, Kansas and New Hampshire Turnpikes . . . and many others.

**Saves from $11,768 to $92,628 per mile. Write for details.*

2.80 per square yard! That's all it cost to lay this odern, flexible, Asphaltic concrete portion of U.S. 64.

THE ASPHALT INSTITUTE

Asphalt Institute Building, College Park, Maryland



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

for more details, circle No. 62 on Reader Service Postcard

NEW LITERATURE

Pioneer Auto-batch literature

Recently released is an 8-page folder describing in detail Pioneer's new Auto-batch bituminous plant. Included is a full page cutaway to show how the plant functions, with the flow of material clearly illustrated. Also shown in cutaway is the flow of material through the drier and elevators. Features of the plant that contribute to the benefits claimed for the user are fully explained. Complete specifications are given to enable bituminous mix producers to make comparisons with other types of plants on the market. **Pioneer Engineering.**

. . . Circle No. 156

Blaw-Knox spreader

A newly revised bulletin on its Concrete Paving Spreader is available from **Blaw-Knox Co.** The 3-color product bulletin contains 16 pages of on-the-job pictures, spreader operation diagrams and a job-proved paving method. The new literature also highlights the spreader's automatic transverse blade and vibratory paving attachment.

. . . Circle No. 157

Euclid offers new line brochure

Euclid Division of General Motors Corp. has released a new brochure describing its entire line of earthmoving equipment. Twenty-four different models are pictured and described in the compact folder. Included are condensed specifications on nine rear dumps, three bottom dumps, three coal haulers, six scrapers, one crawler tractor and two log haulers. Also included are illustrations and brief descriptions of the more important features to be found in each type of equipment.

. . . Circle No. 158

Cat discusses track rollers

The make-up and maintenance of track rollers is discussed in "Don't Buy In The Dark", an 8-page booklet released by **Caterpillar Tractor Co.** Each roller part is reviewed in detail with drawings, cutaways and photographs used to point up individual features. Included in this 2-color booklet is information on roller rims, bearings, seals and shafts. *. . . Circle No. 159*

Superior line detailed

Superior Scaffold Co. has published an 8-page catalogue, displaying the company's line of Auto-Lock Tubular Steel Scaffolds. Dozens of "how to" tips are included which provide economical solutions to a wide variety of scaffold problems

such as bracing for height, scaffolding flat, sloping and curved ceilings, how to cut costs on exterior scaffolds and shoring installations. Individual components, as well as many typical set-ups, are displayed in the catalog. These include the Auto-Lock Self Fastening Head, Heavy-Duty Rolling Scaffolds, the Fold-A-Way Rolling Scaffold, Light-Duty and Midget Rolling Scaffolds, the Jiffy Jack, the Waler Jack for concrete construction, the Masonry Scaffold, Tilt-Up Rolling Scaffold and general purpose exterior scaffolds. *. . . Circle No. 160*

Rubber products for construction

"Hamilton Rubber Products For Every Construction Job," a new 8-page catalog designed to serve as a reference for construction men, is available from **Hamilton Manufacturing Corp.** The illustrated catalog includes 26 types of hose and 4 types of conveyor belting. Information is given on each product's application, construction lengths and sizes. Also listed are working pressures, weights and plies. Hose applications are: water handling, suction, steam handling, pile driving, cement handling, sand blasting, welding and dredging. Conveyor belts listed will handle: bulky abrasive, wet abrasive and fine abrasive materials, oily and hot materials. *. . . Circle No. 162*

Koehring offers crane and shovel catalog

A 24-page catalog just released by **Koehring Division, Koehring Co.,** contains 11 on-the-job and 46 assembly photos of the Koehring 1205 excavator. Printed in two colors, the catalog has a special section devoted to the 1205 carbody and lower machinery. Included in the section are an explanation and photos of the six turntable and six hook rollers used to maintain operating stability under any digging or lifting strain. Schematic drawings trace the power flow through the turntable and carbody. Additional sections of the catalog deal with positive traction steering, split lagging for quick convertibility and exclusive 4-ft. "feel of the load" power clutches.

Capacities listed in the catalog for the 1205 are: 3 cu. yd. as a shovel (including the High Lift model equipped with 40-ft. boom and 29-ft. stick for strip mining), 3 to 4 cu. yd. as a dragline and 95 tons as a crane. A weight chart, important to 1205 owners who must transport their machine, plus a diagram showing disassembly, are included. *. . . Circle No. 161*

Bore before you build

Today, more than ever, the need for adequate investigation of subsoil before building is realized as both prudent and necessary. In "Subsoil Investigations for Foundations," the **Gow Division of Raymond Concrete Pile Co.** presents 11 pages describing the Gow method for making foundation test borings, explains the reasons for subsoil investigation, describes and illustrates the methods involved and goes into detail on samples for laboratory testing and exploratory reports. Illustrations show Raymond Gow equipment at work around the world. *. . . Circle No. 163*

...THIS

is modern, high speed concrete forming

S IS UNI-FORMING... THE FASTEST GROUND-TO-GROUND SYSTEM

of concrete forming capable of handling virtually any type of poured concrete structure. UNI-FORMING is faster because assembly of UNI-FORM Panels with UNI-FORM Ties and Tie Keys is a simple mechanical (and automatically accurate) process . . . faster because minimum alignment and bracing is required on 1 side only . . . faster because every forming requirement is engineered into the system. In addition to its speed you'll find that the UNI-FORM System of concrete forming has many other advantages you can use to save time, money and labor.

NI-FORMING HAS 3 SIC ELEMENTS

1.

The UNI-FORM Panel is plywood faced, steel framed to provide strength and rigidity plus all the advantages of a nailing surface. Made in standard heights from 1 ft. to 8 ft.; widths 2 ft., 18".

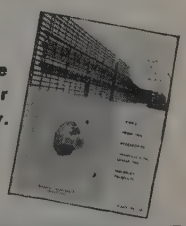
2.

UNI-FORM Ties lock and spread UNI-FORM Panels. Made for all wall sizes. Special ties available.

3.

UNI-FORM Tie Keys securely lock Panels and Ties together.

Want more information on the UNI-FORM System? Write for new full line catalog today.



NIVERSAL FORM CLAMP CO.

1238 N. KOSTNER • CHICAGO 51, ILLINOIS

CONCRETE FORM SPECIALISTS SINCE 1912

DISTRIBUTORS

UNIVERSAL EQUIPMENT CO.
1549 EASTLAKE AVENUE
SEATTLE, WASHINGTON

UNIVERSAL FORM CLAMP CO.
13210 SOUTH FIGUEROA AVENUE
LOS ANGELES, CALIFORNIA

UNIVERSAL FORM CLAMP CO.
2051 WILLIAMS STREET
SAN LEANDRO, CALIFORNIA

Armco steel sheeting

"Steel Sheeting for Trenches, Cofferdams, Cutoff Walls and Shore Protection" is the title of a catalog from **Armco Drainage & Metal Products, Inc.** Discussed are two types, flange and interlocking sheeting; fast driving with simple equipment; salvage and reuse. Physical properties and driving data are given, and typical jobs described and illustrated. Also included is a method of figuring size and spacing of wales and struts.

. . . Circle No. 164

Guide to hardsurfacing

A handy guide for selecting the correct electrode or wire to use on more than 400 different types of welding equipment is included in a new hard surfacing electrode catalog, put out by **A. O. Smith Corp.** The booklet outlines data on more than 25 different electrodes and wires, gives tips on when and where to hardsurface, tells which iron-base metals can be easily and quickly hardsurfaced, and outlines the advantages in so doing.

. . . Circle No. 165

Scaffolding bulletin

A 12-page bulletin available from **The Patent Scaffolding Co., Inc.** contains complete description, installation instructions, engineering data and a broad range of uses for TubeLox Scaffolding in construction, maintenance and repair work. The new booklet is profusely illustrated with application photographs and detailed technical drawings.

. . . Circle No. 166

The story of cement

Thirty excellent photographs, a lucid flow chart and simple explanatory text, in a recent booklet on the manufacture of cement give the reader as much information about the process as he would gather from an actual tour. Every operation — from limestone and shale quarries through to storage silos and loading bins are covered in this interesting publication. Unusual pictures of giant crushers smashing a ton of rock in seconds, huge rivers of cement slurry in thickener tanks measuring 150 ft. across, and mammoth cement kilns (the largest pieces of moving equipment found in any industry) emphasize the epic proportions of the cement industry. A truly fascinating booklet. **Calaveras Cement Co.**

. . . Circle No. 167

Lima Austin-Western Model 101-S Plant, owned by C. W. Allen, Wilburton, Okla., producing gravel filter for Table Rock Dam on White River.

LIMA Austin-Western 101-S Plant Speeds Dam Project in Missouri

This high-capacity Model 101-S Plant is being used to produce gravel filter for the slope of Table Rock Dam, on White River, near Branson, Mo. Using riverbed gravel, the plant turns out an average of 100 cu. yds. per hr. of material ranging in size from 3 in. down to fine sand.

This portable crushing and screening plant sets a new high standard for high production and low maintenance. While intended primarily for gravel operation, it performs equally well in quarry service when combined with a portable primary. Standard equipment includes a 10 x 36-in. primary jaw crusher, a 30 x 20-in. roll crusher, 30-in. conveyors, and a 4 x 12-ft. inclined, positive-throw type vibrating screen. It may be had with either a shovel-loading hopper or a swivel drive for feed conveyor. It is a completely self-contained unit that can be transported over most highways without special permit.

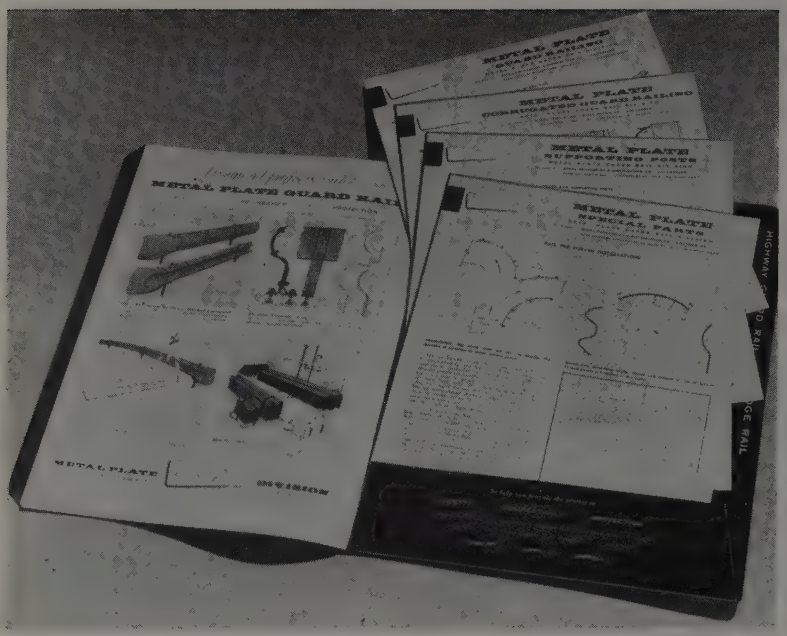
Make your next crushing and screening plant a Lima Austin-Western for all-around economy and greater returns on the investment. Call on your nearest distributor for full information. Or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

Edward R. Bacon Company ..... San Francisco, California
Columbia Equipment Company .. Portland, Ore.; Seattle, Spokane, Washington
N. C. Ribble Company ..... Albuquerque, New Mexico
Smith Booth Usher Company ..... Los Angeles, California
Western Machinery Company ..... Salt Lake City, Utah
Western Machinery Company ..... San Francisco, California
Keremi Tractor & Equipment Company ..... Cheyenne, Casper, Wyoming
Hall-Perry Machinery Company .. Billings, Butte, Great Falls, Missoula, Montana
Engineering Sales Service, Inc. ..... Boise, Idaho
Macdonald Equipment Company ..... Denver, Colorado
Graid Equipment Company ..... Reno, Nevada
Western Machinery Company ..... Phoenix, Tucson, Arizona

LIMA AUSTIN-WESTERN Crushing, Screening and Washing Equipment
BALDWIN · LIMA · HAMILTON
CONSTRUCTION EQUIPMENT DIVISION • LIMA, OHIO

5824

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



ENGINEER'S DESIGN KIT FOR HIGHWAY GUARD RAILING

For the first time, a design kit is offered that furnishes complete information, explaining and simplifying the design of highway guard rail applications. All details are clearly presented on separate sheets in order that they may be used more rapidly at the drawing table. Kit will fit standard files.

A real help to all highway engineers, this design kit will also prove valuable to architects and contractors as well as engineering instructors.

The kit has been developed and prepared by Metal Plate Guard Rail Division, Marwais Steel. ... *Circle No. 168*

Hi-Boy highlights

Specifications and illustrations of Hi-Boy Truck mixers and their component parts are highlighted in a 16-page bulletin available from **Blaw-Knox Co.** The 2-color bulletin describes 5, 6, and 7-cu. yd. Hi-Boy models and their features. Attention is devoted to cab control operation, transmission design, maneuverability, fast charging and discharging drum, and many other points. A section on specifications outlines basic machine requirements and optional equipment. ... *Circle No. 169*

Literature Briefs

CALCIUM CHLORIDE—A description of the calcium chloride road and its maintenance is given in a comprehensive 4-page bulletin by the **Calcium Chloride Institute.** ... *Circle No. 170*

FORMING—A bi-monthly news bulletin full of money-saving forming ideas will be sent regularly on request. **Simplex Forms System, Inc.** ... *Circle No. 171*

DRILLING TOOLS—Detailed specifications on their carbide drill bits, drill steel, couplings, adapters, extension steel, etc., are given by **Brunner & Lay, Inc.,** in a 12-page bulletin. ... *Circle No. 172*

TRUCK MIXERS—The features of Transcrete truck mixers are presented with lots of illustrations and cutaway drawings in a 12-pager by **Construction Machinery Co.** ... *Circle No. 174*

CONCRETE ACCESSORIES—Accessories for bridge abutments, approaches, grade separations, interchanges, and decks are covered in a 6-page foldout offered by **Superior Concrete Accessories, Inc.** ... *Circle No. 175*

HYDRAULIC CRANE—Two new pieces of literature on the **Austin-Western** hydraulic crane cover working ranges and capacities, basic specifications and attachments. ... *Circle No. 176*

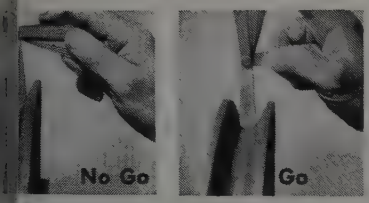
SPREADER—**Highway Equipment Co., Inc.**'s Hi-way Model E spreader is detailed in a 4-page illustrated spec sheet. ... *Circle No. 177*

Tips

ommended sizes:

Diameter of Rope	Minimum Dia.	Maximum Dia.
4-5/16	+ 1/64"	+ 1/32"
8-3/4	+ 1/32"	+ 1/16"
8-11/8	+ 3/64"	+ 3/32"
1/4-11/2	+ 1/16"	+ 1/8"
5/8-21/4	+ 3/32"	+ 3/16"
3/8 and larger	+ 1/8"	+ 1/4"

to check groove diameter:



lering is ABC-Simple!

complicated codes or long list of ifications. Just say "Tuffy," give (Scraper Rope, Dozer Rope, , length wanted and size. Just easy!

Good Man to Know— our Nearby Union Wire Rope Distributor

ether your wire rope need is a duled replacement or a red-hot rgency, your Union Wire Rope ributor is ready with "right-now" ice. He keeps varied stocks of on standard constructions and Tuffy Special Purpose Ropes. he's backed by quick service n his nearby Union Wire Rope ot.

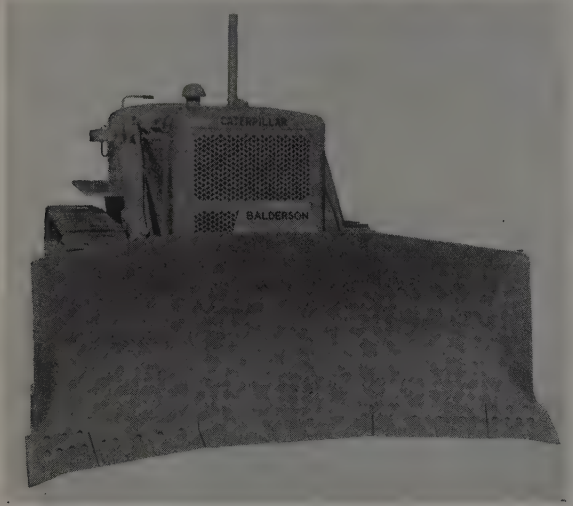
isn't rope you need, but advice wire rope problem, he's just as y to help. If you don't know your on Wire Rope distributor already, under "Wire Ropes" or "Slings" your telephone directory yellow es.

NEW EQUIPMENT

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

U-dozer for D7 tractor

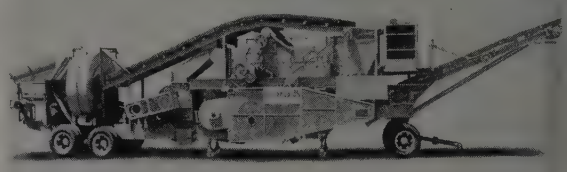
The Model BD7U 10-ft. 8-in. bulldozer for D7 tractors is now available from Caterpillar dealers, it was announced by **Balderson Inc.** The BD7U blade is designed with a high straight center section that rolls a greater concentrated load ahead while the two side sections, angling at 25 deg., cast the material



inward. Minimum side spillage adds to this higher dozing production. An additional feature is longer track life because the tracks run cleaner. Production is said to be up to more than 50% greater than straight blade dozers. The shearing action of the side sections, combined with the center section rolling action, requires less power per ton of material moved. The Balderson BD7U blade requires Cat No. 7S push beams and braces to complete installation, and is available for either cable or hydraulic control. *. . . Circle No. 178*

Tandem crushing and screening plant

Hammeroll, a new type of portable crushing and screening plant which uses a tandem arrangement of a roll crusher and a hammermill for high capacity secondary reduction, has been announced by **Iowa Manufacturing Co.** The new Cedarapids plant is primarily a rock plant, designed for secondary crushing operations in quarries where abrasive material is not a problem. In field tests the unit has produced from 450 to 500 tons per hour to handle the final crushing and grading of broken material from a big Cedarapids portable 3645 Double Impeller Impact Breaker primary plant. With the closed circuit design,



material fed to the 36-in. reciprocating feeder is conveyed to the 48-in. x 14-ft. tripledeck horizontal vibrating screen which takes off specification-size material. Large oversize is directed to the hammermill, smaller oversize goes to the roll crusher, and the crushed material is then recirculated to the screen for final sizing. Screen decks can be arranged to produce up to four finished sizes, including rock, chips, sand and fines. *. . . Circle No. 179*

Wheel tractor line added by Oliver

A complete new line of rubber-tired tractors has been announced by **The Oliver Corp.** Six models

GYRO-FLO *in the new*

Breaking old asphalt with an I-R PB8A paving breaker operating off a 125-cfm Gyro-Flo. This compressor will handle two such breakers.

Driving a special-type pile driver as sand casings are placed for a bridge approach, this big 900-cfm Gyro-Flo replaced two smaller compressors.

On a pole setting job in rocky soil a utility company uses the highly portable 85-cfm Gyro-Flo and an Ingersoll-Rand PB6 paving breaker.

Emergency air power to a manufacturing plant is furnished by this 900-cfm Gyro-Flo, while the plant's stationary unit is being repaired.

Artifical snow system for the ski slope of an eastern state park is powered by these Ingersoll-Rand Gyro-Flo units . . . a 600-cfm and a 210-cfm.

A Gyro-Flo for every job...

the right compressor...from the most complete line of rotary portables available

To get maximum efficiency and economy on *any job* requiring air power, you need a compressor that's the right size for the tools you want to operate. With the Ingersoll-Rand line of rotary portables, you can match the compressor to the job . . . get full, efficient pressure at the tools, yet avoid excess horsepower and fuel costs. The I-R Gyro-Flo line is the world's most complete: six models, capacities of 85, 125, 210, 315, 600 and 900 cfm. Backed by a nation-wide service organization.

And regardless of which size you choose, your Gyro-Flo compressor will give you unmatched dependability and efficient performance on every kind of job. The exclusive Gyro-Flo rotary design, developed by Ingersoll-Rand, has been imitated but never equalled in overall economy of operation. Ask your I-R dealer or representative for details on the units best suited for your requirements.

Ingersoll-Rand

2-850 11 Broadway, New York 4, N.Y.

COMPRESSORS • ROCK DRILLS • AIR TOOLS • CARSET BITS • PUMPS

. . . for more details, circle No. 70 on Reader Service Postcard

constitute the basic line which ranges from the Models 550, available with either gas or diesel engine, to the big 995 GM Lugmatic diesel with automatic torque convertor, most powerful wheel tractor produced by Oliver to date. Other members of the new line are the 770, 880, 990 GM diesel, and the 950. All except the 990 and 995 are available with gasoline or diesel power. The 550, a 35-hp. model, has completely independent PTO, built-in automatic hydraulic system, double-disc brakes, and rubber torsion spring seat. Power steering is optional. The 770 and 880 both have added horsepower in the 50 and 60-hp. classes. The heavier models include such features as rubber-spring seats to "float" bumps, and power steering as special equipment.

. . . Circle No. 180

Roper digger adapted to Chevrolet truck

Roper Manufacturing Co., announces the adaptation of its Industrial 72 Pole Hole Digger to the Chevrolet 4-wheel drive trucks. The Roper 72 Pole Hole Digger is a completely self-powered unit and does not require expensive PTO equipment. The truck need only to be equipped with a winch and a boom at either the front or rear

of the truck. This unit has interchangeable augers from 6-in. to 24-in. in diameter and is equipped with a 9.2-hp. Wisconsin gas engine. Standard digging depth is 6 ft. and extensions are available to increase this depth up to 25 ft. Different types of cutting heads are also available for all kinds of digging conditions that are encountered. . . . *Circle No. 181*

Fiber glass plastic job shack

The Kemhut, a 10-ft. wide, 12-ft. long, 7-ft. high job shack made of fiber glass reinforced translucent plastic panels has been developed by the Kemlite Corp. Designed for

use as a construction job office, the Kemhut can also serve as tool crib or equipment storage. When erected, it is light in weight and easily transported on a flat bed truck. When dismantled, it requires very little storage space. Easily assembled in a few hours, the hut may be staked to the ground like a tent or secured to a perimeter of wood 2x4's. If more permanent installation is desired, it may be bolted to a foundation. It can be quickly disassembled for shipment or storage.

The Kemhut comes ready to assemble, in a package 7-ft.x4-ft.x6-in., complete with pre-cut panels, ventilating louver, hinged door, aluminum angles, fastenings and hardware. Weighs approximately 150 lb. *. . . Circle No. 182*

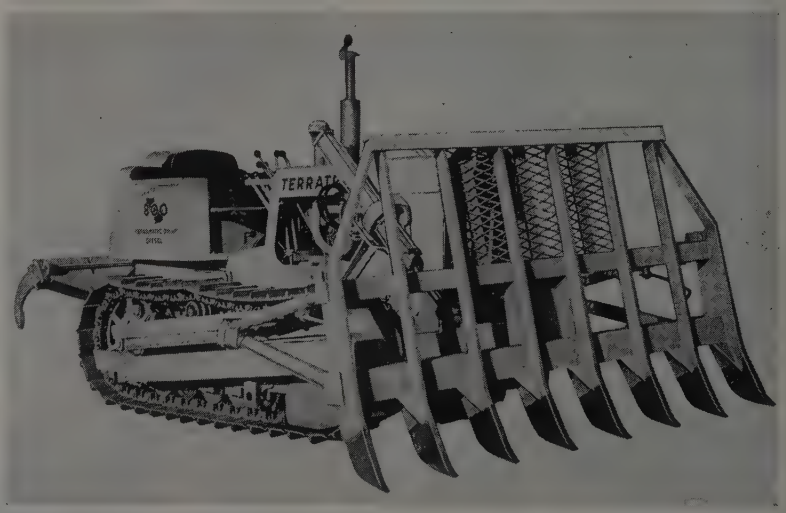
All-weather cabs for Michigan

The Construction Machinery Division of **Clark Equipment Co.** now offers a full line of all-weather cabs for Michigan 1¼ to 6-cu.-yd. Tractor Shovels, 162 to 600-hp. Tractor Dozers and 5,700 to 20,000-lb. capacity Tractor Loggers. The cab protects the operator from wind,

dust, rain, snow and cold—yet permits all-around and overhead visibility. The operator has an unobstructed view of the bucket, logging clamps or dozer blade at all times. The heavy-duty all-welded-steel cab can be installed easily in the field. All windows are made of safety glass, set in rubber molding. The rear window is hinged for opening and can be completely removed. The door on the left side pivots about one point for easy entry and exit. Simply by removing one cap screw, the operator can take off the door completely for summertime use. The right-hand safety door can also be easily removed. The inside of the cab is sprayed with "muffle-coat" compound to deaden noise.

. . . Circle No. 185

A DOUBLE action screed that attaches easily and quickly to the back of any standard dump truck is the latest development of the *Browning Manufacturing Co.* This makes a spreader out of any dump truck and can be used for asphaltic concrete, pre-mix, caliche base, gravel and many others. The double action gives a highly compact uniform layer and is the economical answer to the spreading problem. *. . . Circle No. 183*



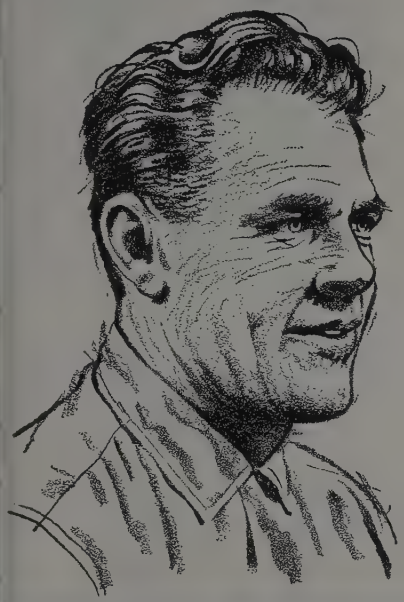
TO SPEED land clearing, interchangeable brush rakes are now available for Case TerraTrac Model 800 and 1000 crawler tractors. Rake shown above can be used in place of either power-angling and power-tilt dozer blades on these models. A similar type is also available for the new Model 1000 tractor shovel with rear-hinged bucket. *J. I. Case Co.* *. . . Circle No. 184*

Cat track shoe becomes "work-hardened"

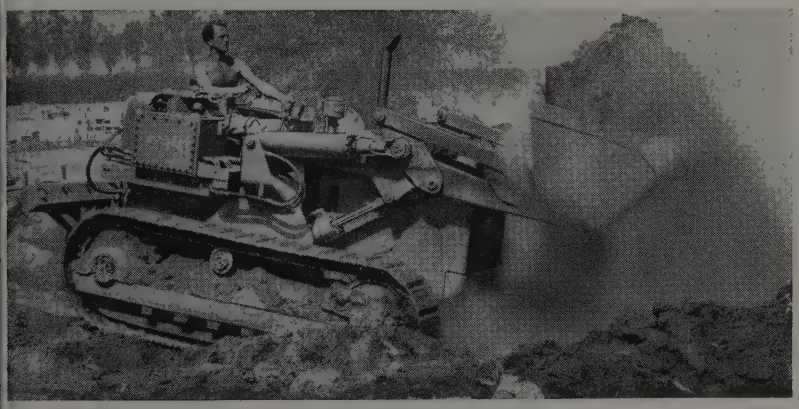
A new track shoe, which has the quality of becoming "work-hardened" under the continued pounding of extreme applications, has now been made available for the Caterpillar D8 and D9 Tractors, according to a current announcement by **Caterpillar Tractor Co.** Designed primarily for work in rock and slag, the new grouser shoes are cast from high manganese steel containing 12% to 14% manganese. This specially-alloyed steel becomes "work-hardened" under the continuous pounding of rock or slag particles, resisting wear better than a standard steel track shoe. The new shoes are initially ground smooth on the rail side to provide a smooth, secure shoe-rail fit. Man-

He tested them all

...then bought an Allis-Chalmers HD-6G tractor shovel



Don Nourse, a leading swimming pool contractor, rented tractor shovels until he found one that appealed to his operators, his sales force and company officials. Choice of all concerned—the HD-6G.



HD-6G
72 net hp
1½-yd bucket
19,600 lb

A heaping 1½-yd bucket comes out of the excavation for a 25 x 60-ft pool. There was time before lunch to start work on a wading pool.

Here's why the HD-6G is everybody's favorite at Fiesta

Talk first with Don Nourse, President of Fiesta Pools, Southgate, California, to find how the Allis-Chalmers HD-6G came to be selected as Number 1 production machine. Don's company is the nation's second largest swimming pool builder. Don tells how Fiesta rented tractors before buying their own unit. After trying them all, he's convinced there is nothing available to touch the HD-6G for excavating pools.

Jack Sweitzer runs the HD-6G And he's convinced it's the best machine he's ever been on. Jack now digs an average of two pools a day—and that's *double* the capacity of any excavating equipment they used in the past.

Roy M. Pederson, Vice-President responsible for sales at Fiesta, will tell you their new HD-6G has already added to company sales volume because of its ability to increase production.

Robert E. Franks, Vice-President and Production Manager, says their HD-6G is the first of several purchases of Allis-Chalmers machines. In his opinion, it has proved itself a great asset on their type of operation.

If you're not already using an Allis-Chalmers tractor shovel, you'll be convinced the HD-6G can do the best job for you when your dealer shows you one—*in action—on your job.* Call him today!

Look ahead...*move ahead* ...and stay ahead with ALLIS-CHALMERS

IZONA
il B. McGinnis Equipment Company—Phoenix

RTHERN CALIFORNIA
lustrial Tractor Sales—North Sacramento
sta Truck & Equipment Sales—Redding
st Coast Engine & Equipment Company—Berkeley,
Branch: San Jose and Ukiah
nity Tractor Company—Eureka

UTHERN CALIFORNIA
nstruction Machinery Co. San Diego
Joaquin Tractor Co.—Bakersfield
w Sales & Service Co.—Los Angeles

IDAHO
Southern Idaho Equipment Co.—Idaho Falls and Twin Falls
Southern Idaho Equipment Co. of Boise, Inc.—Boise

MONTANA
Mountain Tractor Company—Missoula and Kalispell
Seitz Machinery Company, Inc.—Billings

NEVADA
A D Machinery Company, Inc.—Elko and Las Vegas
Reno Equipment Sales Co.—Reno

OREGON
Haupert Tractor Company—Medford
Wood Tractor Company—Portland
Timber Tractor Company—Springfield

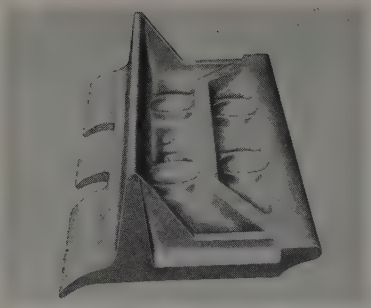
UTAH
Cate Equipment Company, Inc.—Salt Lake City

WASHINGTON
Pacific Hoist & Derrick Company—Seattle & Puyallup
American Machine Company—Spokane

WYOMING
Studer Tractor & Equipment Company—Casper

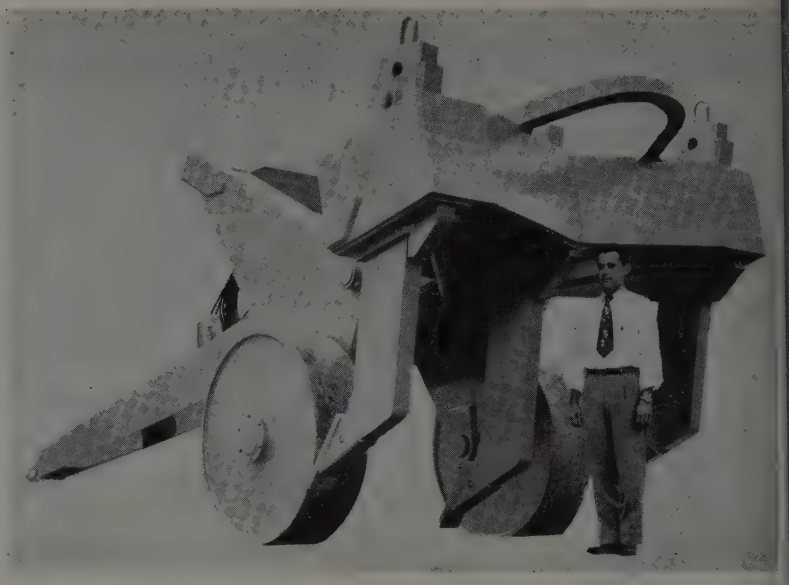
ALASKA
Yukon Equipment, Inc.—Anchorage, Fairbanks and Ketchikan

... for more details, circle No. 75 on Reader Service Postcard



ganese grouser shoes for the Caterpillar D8 and D9 Tractors are available in widths of 22-in. and 27-in., the standard widths respectively, for both tractors.

. . . Circle No. 186



Heavy-duty ripper

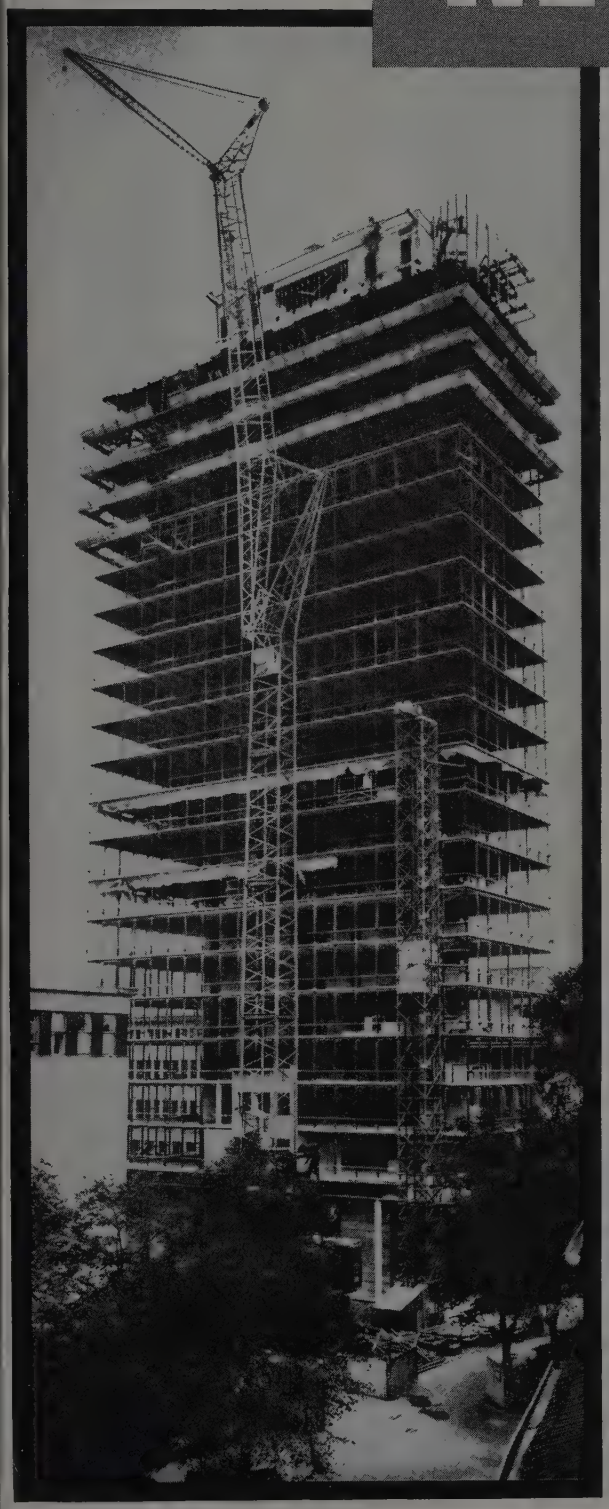
A 25,000-lb. wheel-type, drawn ripper has been announced by **Southwest Welding and Manufacturing Co.**'s Construction Machinery Division. Known as the Southwest Extra Heavy RXH-3, the new ripper boasts structural features such as box beam sections of special design to withstand the most severe job conditions. Through a predetermined and set angle of the ripper shanks, quick, positive penetration is assured. Shanks are of special alloy heat treated steel forging of correct ductility so as to resist shocks and strains imposed on them. Points are replaceable to the shanks, and are hardfaced to give maximum resistance to wear. Wheels of the Southwest RXH-3 are drum-type, mounted on Timken bearings. All rotating parts are designed for easy lubrication. Ripping depth is controlled through the cable and is quick and positive. The RXH-3 ripper is designed for 36, 42 and 48-in. depths.

. . . Circle No. 187

Beatty brings you a...

BEATTY
SCAFFOLDS
SHORING
CRANES
GRANDSTANDS
"Safety Plus"
BEATTY SCAFFOLD INC

NEW GIANT



to cut construction costs

BEATTY-PECCO CONSTRUCTION CRANES

Like a great giant robot reaching from 50 to over 300 feet in the air to place materials at the point of construction ...

- High maneuverability in traffic—travels from site to site without dismantling.
- Electronic remote control.
- Automatic safety factors.
- Practical, adaptable.
- Thousands in use.

Phone, write, or wire...

BEATTY SCAFFOLD, INC.

Tunnel Ave. & Beatty Rd. • San Francisco
JUniper 5-0581

or these Beatty Principal Distributors:

SEATTLE
Beatty Scaffolds, Inc.

SALT LAKE CITY
Lynn Hansen Co.

HONOLULU, T. H.
Islands Welding & Supply Co. Ltd.

BOISE
Beatty Scaffolds & Power Tool Co.

EL PASO
Booker-Walker Supply Co.

PORTLAND
Beatty Scaffolds Co. of Oregon

SPOKANE
Safway Scaffolds, Inc. of Spokane

PHOENIX
Baker-Thomas Lime & Cement Co.

... for more details, circle No. 77 on Reader Service Postcard

Convertible trailer spreads or windrows

A new type bottom-dump trailer for use by road builders, state highway departments, dump truck operators and others handling ballast, sand, gravel or aggregate, has been developed by **Transport Trailer & Equipment Co., Inc.**

The Converto Bottom Dump, of 10-yd. normal capacity, has a removable bottom hopper, held in place by four toggle-type locks. Air lines which actuate gates are connected to the main frame by conventional truck-type gladhands. In a matter of minutes, a bottom hopper with single transverse full-width spreader gate may be interchanged with a double clam-shell longitudinal gate to facilitate windrow spreading or fill work. Also available is a hopper and gate that can be used for cement transportation.

Gates are opened and closed through multiplier linkage, providing five times the closing force with air-cylinders 25% smaller. The right support member of the tubular frame provides nearly 2 cu. ft. of air storage for the gate system, which is entirely separate from the trailer's air-brake system.

Basic design also provides a heavy-duty tubular rear bumper, rugged enough to permit the trailer to be pushed by a bulldozer when extra help is needed.

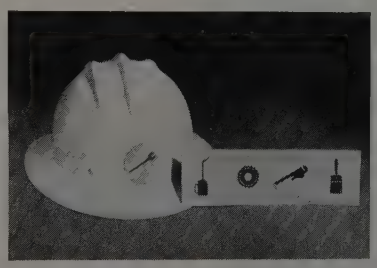
Inner skin of the hopper is smooth. The lower hopper is slightly larger than the bottom of the upper hopper, thus providing a shelf that helps break up materials that might otherwise cause bridging during spreading. In actual operation the trailer spreads 10 yd. of cement-treated ballast in 200 ft., without use of air vibrators.

All these features and more have been designed into the Converto Bottom Dump trailer designed for on and off highway operation while the weight of approximately 5,000 lb. remains lighter than competitive single purpose bottom dumps.

. . . Circle No. 188

Hard hat emblems for worker identification

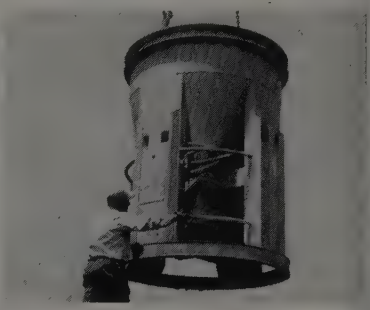
Self-adhesive worker identification hard hat emblems have been added to the line of industrial safety products manufactured by the **W. H. Brady Co.** The emblems provide unmistakable trade identification of workers on the job. Thirty different standard emblems are available from stock. Feature of the self-sticking emblems is that they can be removed quickly when hats are changed, sterilized and reissued. Emblems are applied without moistening; stick and stay stuck to metal, plastic, painted or unpainted hats until purposely removed.



. . . Circle No. 189

Self-powered concrete bucket

Sole source of power for this 4-cu. yd. concrete bucket is the concrete itself. Designed and built by **Blaw-Knox Co.**, the bucket utilizes the weight of its concrete load to generate the hydraulic pressure needed to operate the opening and closing mechanism. Described as "the latest concept in concrete placing methods," the self-powered bucket, with no outside source of power, is equipped with an integral hydraulic system. The bucket literally hangs on two hydraulic cylinders. The operator merely turns a hydraulic valve to open the bucket and releases the valve to close it. Every time the bucket is set down, the cylinder is, in effect, recharged. An auxiliary radio remote control system is also available, making it possible for an operator stationed 75 to 100 ft. away to open and close the bucket, without any physical contact with the bucket. One transmitter can operate any number of buckets without danger of the radio signal activating the wrong mechanism.



. . . Circle No. 190

Fuse for ammonium nitrate

A detonating fuse for firing insensitive blasting agents is announced by **Austin Powder Co.** A 175-grain fuse approximately ⅜-in. in diameter, it is said to improve the performance of ammonium nitrate powders by increasing their rate of detonation. In many cases, the new detonating fuse also eliminates the need for a high explosive primer. Austin detonating fuse is provided with a tough, waterproof, polyethylene coating that won't chip, peel or crack while being laid. It's insensitive to shock, abrasion and stray electrical currents. In addition, it can be detonated only with fuse and cap or electric blasting cap. The fuse is packaged in 500-ft. reels.

. . . Circle No. 191

Contractors prefer Bucyrus-Erie dependability ... prove it with REPEAT ORDERS!

Another repeat owner, Hamilton-Thoms, Eugene, Ore., used this ¾-yd. 22-B shovel and two heavy-duty 22-B cranes on a railroad relocation job, including erection of one steel bridge and two overpasses, in Eagle Gorge Canyon, near Cumberland, Wash.

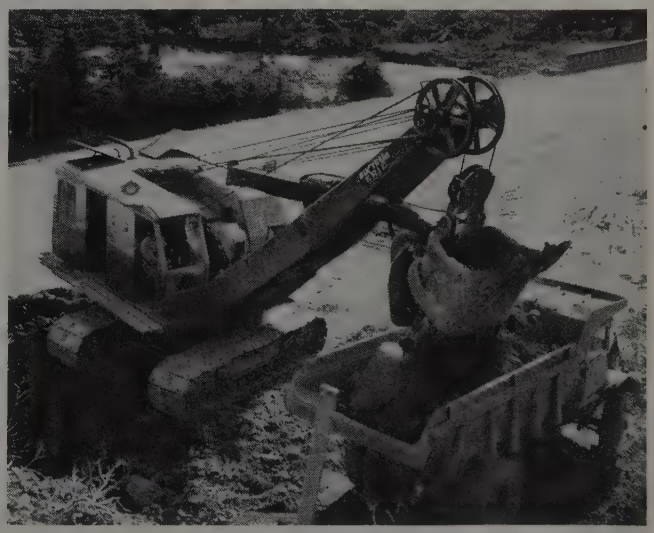
Murphy Bros., Inc., Spokane, Wash., owners of at least eight Bucyrus-Eries, used this 2-yd. 51-B shovel to load blasted rock and dirt on a 600,000-yd., three mile state highway job near Hyak.

Unmatched daily dependability explains why more and more contractors are placing repeat orders for Bucyrus-Erie excavators and cranes. These men have experienced the outstanding performance of these machines, and are convinced by steady high output, long machine life, all-weather stamina, and low cost maintenance.

They also enjoy an extra after-the-sale bonus — prompt, reliable service — available across the country. Trained service personnel, factory-approved service equipment, and complete stocks of quality-built parts keep Bucyrus-Erie machines in top operating condition.

Let one of our distributors introduce you to Bucyrus-Erie dependability — he'll gladly give you complete information on the model that best fits your needs. And he'll back each sale with prompt, reliable service. BUCYRUS-ERIE COMPANY, South Milwaukee, Wisconsin.

488E58-t



SEE US FOR COMPLETE INFORMATION

Border Machinery Company ... El Paso, Tex.; Carlsbad, N.M.
Great Northern Tool & Supply Company ..... Billings, Mont.
The Colorado Builders' Supply Company ..... Denver, Colo.
Casper, Wyo.
West Coast Engine & Equipment Company ... Berkeley, Calif.
Clyde Equipment Company Portland, Ore.; Seattle, Wash.
Crook Company Los Angeles and Bakersfield, Calif.
R. L. Harrison Company, Inc. . Albuquerque, N. M.
Lang Construction Equipment Co. ..... Salt Lake City, Utah
Northern Commercial Company Seattle, Wash. (Alaska)
Westmont Tractor Company .. Missoula and Kalispell, Mont.
Road Machinery Company ..... Phoenix, Ariz.
Intermountain Equipment Company
Boise and Pocatello, Idaho; Spokane, Wash.
Sanford Tractor & Equipment Co. ..... Reno, Nevada

A Familiar Sign . . . BUCYRUS ERIE *. . . at Scenes of Progress*

. . . for more details, circle No. 78 on Reader Service Postcard

News of DISTRIBUTORS

New plant for Cook Bros.

The Cook Bros. Truck & Equipment Co. has moved into brand new quarters at 7101 San Leandro St. in Oakland, Calif. The new location provides more than two acres of space, with 3,200 sq. ft. under roof for showrooms and offices, along with other buildings. Several hundred construction people attended the open house on August 23. A barbecue the night before was attended by 85.

The firm also announced the taking on of several new lines. Cook Bros. will now handle the Massey-Ferguson industrial tractor line; Scales, Inc., portable contractors' scales; Ko-Cal windrow sizers made by Koehring of California; and Walter trucks, heavy duty, two-axle, four-wheel drive haulers: in addition to its regular lines.

Changes at McCoy Company

Two changes in personnel have been announced by McCoy Company, the Caterpillar dealer for Colorado. Blaine Riley takes over as sales representative for a group of counties in western Colorado, replacing Jim Matney who moved to

Riley

Maples

West Virginia. Riley comes to the McCoy organization from the position of district manager for Union Wire Rope in Denver. John Maples who has been training in the Pueblo branch of McCoy has been appointed sales representative for several counties covered by Gene Carver. Carver retains the territory of four counties centering around Pueblo.

Bainter joins Century in Casper

Darrell Bainter, well known as a truck sales engineer throughout the Rocky Mountain area, has joined Century White Truck Co., Inc. of Casper, Wyo., according to an announcement from Stan DeVore, president. In addition to being a truck and trailer expert, he is qualified in parts and service operations as well. At one time he operated his own truck line.

Changes at Moore Equipment

Changes in personnel have been announced by H. W. Moore Equipment Co. of Denver following retirement of several well known employees. Keith Peetz becomes treasurer and Donald J. Fearon has been appointed controller. George Peak has taken over the territory in northwestern Colorado for Moore. Brad Martin, formerly with Fabick Tractor Co. in St. Louis, has been appointed assistant sales manager. Martin formerly traveled the Colorado territory as a factory representative and is well known throughout that area.

New home in Anchorage

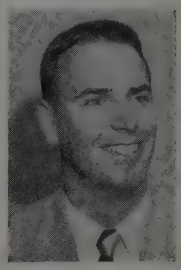
Yukon Equipment, Inc. of Seattle, with branches at Anchorage, Fairbanks and Ketchikan, Alaska, announces the construction of a new branch plant building in Anchorage. The new building, according to Everett P. Wood, Yukon president in Seattle, will encompass 6,500 sq. ft. of undercover space including 1,450 sq. ft. of shop area, 2,600 ft. of parts department area, and about 1,215 sq. ft. for display, with the balance being used for offices. Construction will be of concrete block principally. Bittman and Sanders, Seattle architects, designed the building which is expected to be completed and ready for occupancy by Thanksgiving time.

Balzer adds McCaffrey

The Balzer Machinery Co. of Portland has been appointed to handle the lines of M. P. McCaffrey, Inc. of Los Angeles, manufacturer of clamshell buckets, crane booms, backhoe attachments, sheaves and sheave blocks and similar equipment, according to an announcement by Patton Niles, Balzer sales manager. The Balzer sales territory includes Oregon and the southwestern counties of Washington.

Shepherd Machinery Co. names new managers

Shepherd Machinery Co., Caterpillar distributor in Los Angeles, has announced three promotions. John S. Cole, who has been with Shepherd since 1952, has been named industrial sales manager. He replaces Lloyd A. Sommers who has left the organization to manage his own business. Cole has had experience in all phases of industrial



John S. Cole

selling, most recently as assistant to the general sales manager of the organization. Ray T. Smith has been appointed manager, industrial field sales. He joined the organization in 1950 and since that time has held several positions in the selling staff of the organization. In his new position he will be available to assist all Shepherd salesmen and customers. "Chuck" G. Claypool, who has been with Shepherd since 1953, has been named assistant to the general sales manager, but will also continue to administer the sales promotion program at Shepherd.

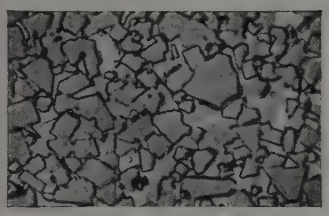
Hatten takes Thew line

Hatten Machinery Co. of Seattle has recently been appointed a distributor of the Thew Shovel Co., Lorain, Ohio, manufacturer of power shovels, draglines, cranes, hoes, clamshells and front-end loaders, according to J. T. Hatten, president. The Hatten company serves the sales territory of western Washington.

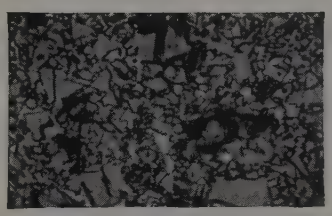
Guthrie adds Walter line

Walter Motor Truck Co. has recently announced the appointment of the Guthrie Machinery Co. to

Longer bit life— with *new* Sandvik Coromant Bits



Sandvik Coromant Tungsten Carbide (Microphoto) Uniformity of size, even distribution of grain are marked. Free from porosity and impurities —therefore stronger, longer-lived.



Low quality Tungsten Carbide (Microphoto) Black marks are contaminations caused by deficient production control. They weaken the carbide, reduce its working life.

Sandvik Coromant Detachable Bits are Available in the following Thread Sizes and Bit Diameters

Type	Thread	Available Diameters, in Inches														
		1⅜	1½	1⅝	1¾	1⅞	2	2⅛	2¼	2⅜	2½	2¾	3	3½	4	4½	5
SHOULDER	F	x	x														
	113	x															
	H		x	x	x	x											
	115		x	x													
	D					x	x	x	x	x	x	x	x				
	K												x	x	x	x	
BOTTOM	1" Rope			x	x	x											
	200			x	x	x											
	1¼" Rope					x	x	x	x		x		x				
	400						x		x		x						
	1½" Rope										x	x	x	x	x		
	600										x	x	x	x			
	700												x	x			
	J. 7.5														x	x	
	2" Rope													x	x	x	x

NEXT time you buy bits, specify Sandvik Coromant because they give more footage per bit, lower drilling costs. Here's why:

1 Only first-quality tungsten carbide is used —as shown in the microphotos above. This means less wear, longer life and a better job.

2 The bodies are precision-made of high quality alloy steel—tough enough to take the strain throughout the extra-long bit life.

3 The bigger Sandvik Coromant bits are all of X-design, which prevents rifling. No wonder Sandvik Coromant inserts are the most widely used in the world, drilling more than one billion feet every year.

SANDVIK COROMANT bits are supplied through Atlas Copco, the world's largest manufacturer of rock drills, who also supply Sandvik Coromant integral steels — the most widely used in the world — and Sandvik Coromant extension steel equipment.

Write or phone today for further details to either of the addresses below:

610 Industrial Avenue
Paramus, New Jersey
COlfax 1-6800

Atlas Copco

930 Brittan Avenue
San Carlos, California
LYtell 1-0375

. . . for more details, circle. No. 79 on Reader Service Postcard

handle the sales and service of Walter 4-point, positive-drive snow fighters and tractor trucks in Oregon. The Guthrie Machinery Co. is located at 5816 Northeast Lombard St. in Portland.

Air-Mac adds lines

Two new lines of construction equipment have been taken on by Air-Mac of Washington, Inc., to be distributed from its Seattle headquarters, according to A. H. Campbell, manager of the construction equipment division. One of these lines is the Heat-A-Mix, manufactured by the Wylie Manufacturing Co., Inc. of Oklahoma City, which is a compact pugmill and material heater mounted on the tail gate panel of a truck. The other new product line is the Sky-Walk, a prefabricated, portable pedestrian overpass structure designed for installations over busy streets, freeways, highways, etc. It is manufactured by the C. D. Scarlett Co., Inc. of East Lansing, Mich.

Cramer Machinery adds new lines

Four new lines of equipment have been added to the Oregon territory representation of Cramer. Included in the new lines are the Elgin Street King Sweepers, and the Elgin Eductor manufactured by the Elgin Corp. of Chicago, the Leach Packmaster manufactured by Leach Co., Oshkosh, Wis. and sold through the distributor organization of Elgin, the Hydro-Spreader for ice control and seal-coating manufactured by Central Engineering Co., Inc., Milwaukee, Wis., the asphalt cutter for mounting on moldboards of graders or buckets of loaders manufactured by the Asphalt Cutter & Machinery Co. of Klamath Falls, Ore., and the crushing, screening and conveying machinery of the Lippman Engineering Works of Milwaukee, Wis.

Hawthorne appoints new service manager

George Wallace, formerly service manager for Treanor Equipment Co., has been appointed service manager of Hawthorne Machinery Co. in San Diego. Wallace has spent a total of 18 years affiliated with Caterpillar dealers.

Garlinghouse, Fremon handles Mulkey conveyors

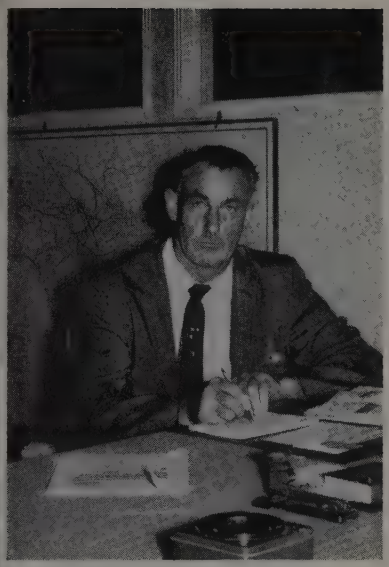
Garlinghouse, Fremon & Co., with headquarters at Los Angeles, has been appointed distributor for Southern California for Mulkey portable conveyors manufactured by Sam Mulkey Co.

Dodd takes on Fococrane

Robert Dodd Company, industrial truck and machinery distributor, has recently been appointed to handle sales in Oregon and southwest Washington of the McCullough Fococrane, a hydraulic crane attachment for all trucks for use in their loading and unloading operations. The Fococrane is manufactured in Sweden and distributed in the United States by McCullough Crane & Hoist Co. of Oakland, Calif.

New branch managers appointed by Brown-Bevis in Los Angeles

Two new branch manager appointments have just been announced by Brown-Bevis-Industrial Equipment Co., of Los Angeles. C. D. Chase, with years of business including distributor experience, has been made manager of the Riverside operations. John A. Cloes who has been with BBI for ten years will take over management of the Bakersfield office, having served in that location for the



C. D. Chase

last five years. In a further move of expansion the company has announced the addition of two new sales engineers to their tractor division. They are John J. McCulloch and Martin Badostain.

Heltzel Steel Form & Iron Co. has named Brown-Bevis Industrial Equipment Co., as distributor for Southern California. Heltzel is a well known manufacturer of batching plants, concrete forms, and other related products.

Roy Mullin appointed Onan sales manager

Announcement is made of the appointment of Roy E. Mullin as general sales manager of D. W. Onan & Sons Inc., Minneapolis, Minn. He succeeds Hiram Hascall, who is retiring at the end of the current year but remains on active duty until that time. Mullin has an admirable background of aggressive sales experience and technical competence and comes to Onan from a large automotive manufacturing company where he was vice president in charge of sales and marketing.

A-C works closely with companion equipment producers

According to recent announcement by Allis-Chalmers Manufacturing Co., Tractor Group, Milwaukee, Wis., Models D-14 and D-17 Utility tractors and companion equipment will be sold through dealers in its Construction Machinery, Farm Equipment and Engine-Material Handling divisions on a non-exclusive basis. Through its new Utility Tractor and Equipment sales department, headed by J. D. Morris, A-C is working closely with selected independent manufacturers of companion equipment for these two units. When Allis-Chalmers engineering clearance is given to companion equipment, a statement of such clearance may be used by the producer.

DFPA adds to field promotion staff

Douglas Fir Plywood Association, Tacoma, Wash., announces that Douglas Walker, DFPA regional representative in Boston, has been named to the dual capacity of regional manager in Tacoma and assistant to Stanley A.

Taylor, field promotion director. Announced simultaneously was the addition of five to its national field staff: John A. Philip, William H. Splaine, and William Benassi to New York regional headquarters; Gilbert D. Landes to Washington, D. C., regional headquarters, and Bruce F. Miller to Minneapolis.

Dick Nyman heads new Western outlet for Simplex forms

Richard Nyman has been named to head a new assembly and distribution outlet for Simplex Forms at Seattle, Wash. The organization is operated by Nyco, Inc., Denver, Colo., Western distributors and fabricators for Simplex. The new organization will operate as Nyco, Inc., of Seattle, with offices at 1111 McGilvra Blvd. In addition to selling direct to users and through dealers, the Seattle outlet will stock the complete Simplex line of concrete forms and accessories.

Top executive promotions at Caterpillar Tractor Co.

Promotions of three Caterpillar Tractor Co. executives have been announced: Vice President Gail E. Spain to president of the Foreign Trade Group; J. R. Munro, director of manufacturing for foreign operations, and W. K. Cox, manager of sales promotion, to vice presidencies.

O. A. Lee new Euclid district rep

Announcement is made of the appointment of Olin A. Lee as district representative of Euclid, Division of General Motors Corp. Headquartering in Denver, Colo., Lee will work with dealers in Colorado, New Mexico, Arizona, and sections of Wyoming, Texas and Nebraska. He has been a member of the Euclid organization since 1954.

New resident office at Salt Lake

Bethlehem Pacific Coast Steel Corp. opened resident sales offices at 455 E. 4th South, Salt Lake City, Utah. Heading up the new sales service for the Utah area is L. B. Gillette, San Francisco district salesman.

Hyster elects two vice presidents

Two new Hyster Company vice presidents, Ray M. Ronald and Frank A. Rostedt, are announced. Both officers will headquarter in Peoria, Ill. Ronald, in charge of the Tractor Equipment Division, has been with the company 28 years. Rostedt has been with Hyster for more than 20 years and was at one time located in the Portland, Ore., offices. He recently returned from The Netherlands to take charge of all company activities outside of the U. S. and Canada.

TECO opens new Western office

Joseph M. Fant, building materials specialist, has been named Western sales manager for the new West Coast office of Timber Engineering Co., Washington, D. C. TECO's Western office at 681 Market St., San Francisco, will provide timber fabricators and building supply dealers in the area with direct sales contact with the manufacturer.

New manager at Worthington Corp.

Already manager of the paver section of Worthington Corp., Graham Ross has recently been appointed manager of the truck and big mixer section. Ross has been with Worthington for 12 years, serving in different construction equipment sales capacities.

Executive changes at Bethlehem

Appointment of H. A. Schirmer to the position of manager of fabrication steel construction sales for Bethlehem-Pacific Coast Steel Corp., has been announced by S. S. Cort, vice president. At the same time B. B. Dunwoody, who was contracting engineer for the San Francisco district, was appointed contracting manager for the same district, succeeding Schirmer.

These changes resulted from the death of Edgar F. Gohl, vice president of Bethlehem-Pacific Coast Steel Corp., who died August 8, in San Mateo at the age of 75. Gohl had been in charge of both operations and sales for fabricated steel construction, and had served for more than 50 years in the steel industry. As a civil engineer he had been associated with many of the nation's largest construction projects including work on the Panama Canal and both the Golden Gate and San Francisco-Oakland Bay bridges.

Schirmer

Dunwoody

Howard Schirmer takes over new duties which will include management of all sales and contractual relations for the company's fabricated steel division in the seven Western states, Alaska and Hawaii. He is well known in structural engineering circles of Northern California, having been associated with some of the larger construction projects including many outstanding steel-frame buildings now under way. A civil engineering graduate from the University of California, he has served as vice president of the Structural Engineers Association of California.

Dunwoody joined Bethlehem-Pacific the year he graduated in civil engineering from the University of California. Following completion of his training course at company headquarters he was assigned to Bethlehem-Pacific's fabricated steel division serving in all departments from estimating to field erection. In 1951 he became salesman for fabricated steel in the San Francisco district and in 1956 was made contracting engineer.

UNIT PRICES

Selected abstracts for Western projects

BRIDGES—Four concrete structures in Utah

Utah—Box Elder County. A low bid of $449,201 has been submitted by Bettilyon Construction Co. for construction of 4 bridges over a 20-ft. span.

(1) Bettilyon Construction Co. $449,201
(2) W. R. Cahoon Construction Co. 458,685
Pritchett Construction Co. 475,599
V. C. Mendenhall Co., Inc. 477,786

		(1)	(2)
	One Concrete and Steel Overpass 157 ft. 0. to 0. Sta. 862+95.04 — Section 1		
572 cu. yd.	Excav. for structures, unclass.	$ 3.00	$ 3.00
955 cu. yd.	Concrete, class "A"	60.00	61.00
264,550 lb.	Reinforcing steel	.13	.135
19,920 lb.	Structural steel	.25	.30
668 lin. ft.	Steel handrail	9.00	8.90
1,824 lin. ft.	Piles (other than timber)	7.25	7.50
Lump sum	Furn. pile driving equipment	2,500.00	250.00
Lump sum	Furn. construction signs	200.00	500.00
	One Concrete and Steel Underpass 257 ft. 0. to 0. Sta. 975+00—Section 2		
142 cu. yd.	Excav. for structures, unclass.	2.00	3.00
685 cu. yd.	Concrete, class "A"	60.00	61.00
190,750 lb.	Reinforcing steel	.13	.135
14,600 lb.	Structural steel	.25	.30
534 lin. ft.	Steel handrail	9.00	9.00
3,808 lin. ft.	Piles (other than timber)	7.25	7.40
Lump sum	Furn. pile driving equipment	1,500.00	3,000.00
Lump sum	Furn. construction signs	200.00	500.00
	One Concrete Structure 29.5 ft. 0. to 0. Sta. 1115+00—Section 3		
1,100 cu. yd.	Excav. for structures, unclass.	2.00	1.50
764 cu. yd.	Concrete, class "A"	60.00	59.00
147,100 lb.	Reinforcing steel	.13	.135
	One Concrete and Steel Overpass 157 ft. 0. to 0. Sta. 1194+00 — Section 4		
572 cu. yd.	Excav. for structures, unclass.	2.00	2.00
975 cu. yd.	Concrete, class "A"	60.00	60.00
263,250 lb.	Reinforcing steel	.13	.135
19,920 lb.	Structural steel	.25	.30
7,036 lin. ft.	Piles (other than timber)	7.25	7.40
Lump sum	Furn. pile driving equipment	1,500.00	1,000.00

HIGHWAY—3.4 mi. of grading and draining in Colorado

Colorado—Boulder County—Bureau of Public Roads. H. E. Lowdermilk Co. has received a $348,110 contract for grading and draining 3.4 mi. of 32-ft. roadbed.

(1) H. E. Lowdermilk Co. $348,110
(2) J. P. Elliott & Co. 354,030
Z. H. Lowdermilk, Inc. 369,995
Colorado Constructors, Inc. 374,332

		(1)	(2)
Cont. sum	Miscell. force account	$1,000.00	$1,000.00
22 ac.	Clearing and grubbing	850.00	1,000.00
190,000 cu. yd.	Unclassified excavation	.95	1.00
27,000 cu. yd.	Borrow excavation, case 2	.50	.70
1,850 cu. yd.	Excavation for structures	4.00	5.00
24,000 ton	Special subbase, grading B	1.30	1.20
100,000 sta. yd.	Overhaul	.02	.03
2,120 units	Water	1.00	1.00
Lump sum	Prov. & maint. water plant or plants	5,000.00	1,200.00
1,000 hr.	Rolling	8.00	9.00
Force account	Obliteration of old roadways	1,000.00	1,000.00
387 cu. yd.	Class A concrete	70.00	58.00
41,600 lb.	Reinforcement steel	.15	.13
3.9 Mbm	Treated timber (creosote preserv.)	500.00	400.00
138 lin. ft.	18-in. galv. corrugated metal pipe	6.00	4.50
1,516 lin. ft.	24-in galv. corrugated metal pipe	7.50	6.50
82 lin. ft.	36-in. galv. corrugated metal pipe	14.00	12.00
136 lin. ft.	48-in galv. corrugated metal pipe	20.00	18.00
10 ea.	Metal end sec. for 18-in. pipe culv.	30.00	28.00
14 ea.	Metal end sec. for 24-in pipe culv.	50.00	38.00
1,800 lin. ft.	8-in perf. corr. met. pipe underdrain	5.00	3.50
600 cu. yd.	Porous backfill material, pipe underdrain	8.00	6.00
21 ea.	Maintenance marker posts	14.00	22.00
18,500 lin. ft.	Barbed wire fence, type 2	.38	.45
2 ea.	Gates (12-ft.)	60.00	70.00
1,000 lin. ft.	Woven wire fence	.60	.60
7,000 cu. yd.	Placing topsoil	.50	.60

HIGHWAY — 7.7 mi. of highway and concrete bridge in Montana

Montana—Park County—State. A $805,256 contract has been awarded to Albert Lalonde Co. for grading, aggregate surfacing of 7.7 mi. and construction of 118-ft. concrete bridge.

(1)	Albert Lalonde Co.	$805,256
(2)	Kiely Construction Co.	874,681
	Northwestern Engineering Co.	883,301
	Stanley H. Arkwright, Inc.	913,722

		(1)	(2)
576,742 cu. yd.	Unclassified excavation	$ .22	$ .25
6,575 cu. yd.	Culvert excavation	1.50	1.75
340,814 mi. yd.	OH unclassified excavation	.15	.18
1,153 unit	Rolling embankment	7.50	6.00
1,041 unit	Rolling aggregate surface Co.	8.50	9.00
96 unit	Rolling seal coat	9.00	9.00
8,651 M gal.	Water embankment	.50	1.35
4,851 M gal.	Water surface courses	.50	1.35
72 hr.	Water cover aggregate	7.50	10.00
61,870 ton	Sel. bor. base course	.55	.50
145,438 ton	Sel. bor. base course	.65	.70
35,238 ton	Type "A" cr. top surface	1.25	1.20
2,393 ton	Cover material	6.00	5.00
1,978.05 ton	150-200 pen. asph. cement	32.00	25.00
277.18 ton	MC-1 cutback asphalt	45.00	39.00
230.79 ton	RS-2 emuls. asphalt	45.00	39.00
35,964 ton	Plant-mix bituminous surface	2.75	2.99
4,033 rod	Remove fence	.35	.50
14 ea.	Pre. prest. conc. beam 35 ft.	900.00	616.00
7 ea.	Pre. prest. conc. beam 45 ft.	1,000.00	707.00
625 cu. yd.	Structure excavation	9.00	5.00
226 cu. yd.	Class "A" concrete	72.00	75.00
154.1 cu. yd.	Class "AD" concrete	92.00	77.00
49,383 lb.	Reinforcing steel	.18	.16
241.46 lin. ft.	Steel beam br. rail	7.50	8.00
100 lin. ft.	Relay pipe culverts	4.00	1.00
1,512 cu. yd.	Aggregate backfill	4.00	1.00
158 lin. ft.	24 in. corr. met. pi. sy. culvert	8.00	11.00
188 lin. ft.	36 in. corr. met. pi. sy. culvert	11.00	17.00
164 lin. ft.	60 in. ESPP culverts, 10 gal.	31.00	48.00
172 lin. ft.	8 ft., 10 in. S x 6 ft. 1 in. R SPPA culvert	47.00	71.00
192 lin. ft.	14 ft. 3 in. S x 8 ft. 11 in. R SPPA culvert, 5 gal.	90.00	165.00
236 lin. ft.	16 ft. 6 in. S x 14 ft. 3 in. R SPPA unpass.	135.00	188.00
560 lin. ft.	18 in. reinf. conc. pipe culvert	5.00	6.00
1,748 lin. ft.	24 in. reinf. conc. pipe culvert	6.00	9.00
430 lin. ft.	36 in. reinf. conc. pipe culvert	15.00	20.00
242 rod	Type F-4-M wire fence	4.50	6.00
5,245 rod	Type C-M wire fence	5.50	7.00
100 ea.	Metal fence panels	32.00	35.00
2 ea.	12 ft. stock guard	900.00	1,250.00
16 ea.	24 in. stock guard	1,500 00	1,500.00
2 ea.	Project markers	25.00	35.00
42 ea.	Station markers	7.50	10.00
46 ea.	Right of way monuments	6.50	8.00
Lump sum	Misc. work, sta. 702+31	500.00	1,000.00

HIGHWAY—Construction of 15.4 mi. of highway in Nevada

Nevada—Churchill County. A $288,635 contract has been awarded to Silver State Construction Co. for construction of 15.4 mi. of highway.

(1)	Silver State Construction Co.	$288,635
(2)	Healy Construction Co.	295,286
	Central Paving Co.	324,425
	Dodge Construction, Inc.	334,763

		(1)	(2)
Lump sum	Signs	$ 500.00	$3,000.00
1,700 hr.	Flagman	2.50	4.00
100 hr.	Pilot car	3.00	6.00
70 cu. yd.	Remove concrete	20.00	10.00
331 ton	Emulsified asphalt, type MS-1 (diluted)	40.00	45.00
151 ton	Emulsified asphalt, type RS-2	40.00	50.00
1,636 ton	Screenings, 3/8-in.	3.00	6.00
1,206 ton	Liquid asphalt, type SC-4	34.00	40.00
2,057 ton	Asphalt cement, 120-150 penet.	33.00	38.00
19,480 ton	Plantmix surf. leveling aggreg.	2.20	2.05
27,346 ton	Plantmix surface aggregate	2.35	2.15
7,060 ton	Open-graded plantmix surf. aggreg.	5.00	3.00
22.5 cu. yd.	Class AA concrete	90.00	40.00
920 lb.	Reinforcing steel	.20	.40
120 lin. ft.	Remove and reset guard rail	1.00	4.00
394 ea.	Culvert markers & guide posts	6.00	6.00
Lump sum	Repair bridge	2,000.00	1,500.00

HIGHWAY—6.8 mi. in Utah

Utah—Uintah County—State. Germer, Abbott & Waldron has been awarded a $226,123 contract for 6.8 mi. of 2½-in. road mixed bituminous surfaced road.

(1)	Germer, Abbott & Waldron	$226,123
(2)	Wheelwright Construction Co.	281,244
	W. W. Clyde & Co.	282,311
	L. A. Young Construction Co. & Vernal Sand & Gravel Co.	283,525

		(1)	(2)
768 ton	Bit. material, Type MC-3	$ 36.75	$ 38.50
135 ton	Bit. mat., Type MC-1 or MC-2	36.75	38.50
88 ton	Bit. material, Type RC-4	39.75	40.50
205 gal.	Bit. additive (comm. grade)	2.00	2.25
6,847 mi.	Scarifying and mixing	700.00	800.00
Cover material, 1,020 ton	Type "A"	4.50	4.50
Cover material, 1,020 ton	Type "A" (in stockpile)	4.00	3.00
34,400 ton	Gravel surface, Type "B"	.65	.90
35,600 ton	Gravel base course	.55	.85
99,000 cu. yd.	Unclassified roadway excavation	.36	.58
38,000 cu. yd.	Imported borrow	.20	.25
381,000 sta. yd.	Class "A" overhaul	.01	.01
33,500 yd. mi.	Class "B" overhaul	.15	.15
3,300 M gal.	Watering	1.50	1.50
1,250 hr.	Rolling, tamping roller	8.00	10.00
140 hr.	Rolling, pneumatic tire or power roller	9.00	6.50
120 hr.	Self propelled pneumatic tired roller	9.00	8.00
274 lin. ft.	15-in. C.M. pipe	3.40	3.40
670 lin. ft.	18-in. C.M. pipe	3.95	4.00
940 lin. ft.	24-in. C.M. pipe	6.10	6.15
62 lin. ft.	30-in. C.M. pipe	6.50	7.35
89 lin. ft.	36-in. C.M. pipe	11.70	11.75
135 lin. ft.	48-in. C.M. pipe	16.00	15.60
174 lin. ft.	C.M. pipe-arches, 22-in. x 13-in.	4.00	4.20
88 lin. ft.	C.M. pipe-arches, 29-in. x 18-in.	6.50	6.55
42 lin. ft.	C.M. pipe-arches, 43-in. x 27-in.	12.50	12.35
389 cu. yd.	Concrete, Class "A"	61.00	75.00
75,900 lb.	Reinforcing steel	.14	.15
1,200 cu. yd.	Excav. for structures, unclass.	2.00	1.50
1,000 cu. yd.	Small ditch excavation	.50	.75
95 hr.	Mechanical tamping	8.00	6.50
135 ea.	Guide posts	7.00	6.50
1,190 lin. ft.	Deep beam highway guard rail (concrete posts)	3.75	3.75
1,500 lin. ft.	Right of way fence, Type "A"	.30	.31
1 ea.	16-ft. gate	40.00	42.50
3,000 lin. ft.	Surface ditches	.10	.12
34 ac.	Clearing and grubbing	20.00	20.00
80 ea.	Right of way markers	7.50	6.50
2 ea.	F. A. P. markers	30.00	35.00
Lump sum	Furnishing water equipment	2,000.00	5,000.00
Lump sum	Furnishing construction signs	2,000.00	2,000.00

HIGHWAY—7.6 mi. of surfacing

Idaho—Twin Falls County—State. T & S Construction Co. has submitted a low bid of $138,659 for constructing the surface and a roadmix bituminous surface on 7.6 mi. of the Rogerson-Cedar Creek res. road, Rogerson-Salmon Falls Dam.

(1)	T & S Construction Co.	$138,659
(2)	Willis Bros.	154,898
	Hoops Construction Co.	161,795

		(1)	(2)
2 ea.	Removal of bridges	$ 800.00	$300.00
330 sq. yd.	Remove bituminous surface	1.00	.22
1 ea.	Remove cattle guard	300.00	50.00
200 cu. yd.	Excavation for structures	5.00	2.50
1,490 M gal.	Watering	1.00	4.50
425 hr.	Rolling, power roller	7.00	8.00
125 cu. yd.	Mechanical tamping	2.50	2.00
18,000 cu. yd.	Stripping material deposits	.30	.18
12,300 ton	Cr. gr. base course, type "B", ¾ in. maximum	1.45	2.10
30,400 ton	Cr. gr. base course 2 in. maximum	1.35	1.64
9,700 ton	Cr. gr. surface in windrows, ¾ in. maximum	1.50	1.90
26,600 gal.	MC-1 asphalt road material for pr. ct.	.18	.18
535 ton	Blotter material, class "B"	2.50	2.20
7,569 mi.	Mix., fin. & rolling cl. "B"	850.00	700.00
420 ton	MC-3 asph. rd. matl. for rdmix.	42.00	40.40
24,950 gal.	MC-5 asph. rd. matl. for seal ct.	.18½	.18
1,260 ton	Cv. ct. matl., cl. "3"	4.25	2.50
1,200 ton	Cv. ct. matl. cl. "3" in stockpile	2.00	.85
75 cu. yd.	Concrete class "A"	85.00	91.00
10,200 lb.	Metal reinforcement	.16	.14
2 ea.	Project markers	25.00	10.00
1 ea.	24 ft. cattle guard	1,200.00	800.00

HIGHWAY—Construction of 3.5 mi.

Nevada—Washoe County—State. Isbell Construction Co. was low bidder at $253,634 for construction of a portion of the State Highway system in Washoe County.

(1)	Isbell Construction Co.	$253,634
(2)	Healy Construction Co.	265,393
	Dodge Construction, Inc.	276,296
	Eckley Construction	280,323

		(1)	(2)
Lump sum	Signs	$2,500.00	$1,000.00
408 lin. ft.	Remove culvert pipe	2.00	1.50
1 ea.	Remove bridge	1,500.00	3,000.00
1,700 lin. ft.	Remove fence	0.10	0.75
86,921 cu. yd.	Roadway excavation	0.46	0.50
110 cu. yd.	Drainage excavation	1.00	1.00
64 sta.	V-type ditches	10.00	5.00
912 cu. yd.	Borrow	0.51	0.75
278,424 yd. sta.	Overhaul, yard station	0.02	0.005
5,916 yd. mi.	Overhaul, yd. mi.	0.20	0.15
520 cu. yd.	Structure excavation	2.00	2.50
510 cu. yd.	Backfill	2.00	2.50
5,387 M gal.	Water	1.00	2.00
Lump sum	Furnish water equipment	5,000.00	4,000.00
52 hr.	Power roller	10.00	8.00
4,036 ft. hr.	Tamping or pneumatic-tired roller	0.75	1.00
57,736 ton	Type 1 gravel base	1.25	0.95
13,454 ton	Type 2 gravel base	1.30	0.95
116 ton	Liquid asphalt, type MC-1	41.00	40.00

37 ton	Emulsified asphalt, type MS-1 (diluted)	38.00	50.00
26 ton	Emulsified asphalt, type RS-2	34.00	60.00
248 ton	Screenings, 3/8 in.	5.00	6.00
9,448 ton	Plantmix surface aggregate	3.10	5.00
1,280 ton	Open-graded plantmix surface aggregate	6.50	6.00
634 ton	Asphalt cement, 120-150 penet.	35.00	33.00
58 cu. yd.	Class AA concrete	85.00	150.00
9,660 lb.	Reinforcing steel	0.16	0.20
100 lb.	Structural steel	0.50	0.50
386 lin. ft.	22 in. x 13 in. corrugated metal arch pipe (dipped)	5.50	6.00
204 lin. ft.	29 in. x 18 in. corrugated metal arch pipe (dipped)	8.00	8.00
76 lin. ft.	36 in. x 22 in. corrugated metal arch pipe (dipped)	10.00	10.00
404 lin. ft.	15 in. reinforced concrete pipe, class III	4.00	7.00
116 lin. ft.	18 in. reinforced concrete pipe, class III	5.00	8.00
376 lin. ft.	24 in. reinforced concrete pipe, class III	7.00	10.00
72 lin. ft.	30 in. reinforced concrete pipe, class III	9.00	12.00
70 lin. ft.	36 in. reinforced concrete pipe, class III	12.00	12.00
880 lin. ft.	Construct type A-4B fence	0.45	1.00
705 lin. ft.	Reconstruct fence	0.25	1.00
2,390 lin. ft.	Standard steel guard rail	2.85	4.00
200 ea.	Culvert markers and guide posts	7.00	6.00
39 ea.	Right of way markers	7.00	8.00
28 ea.	Reference monuments	7.00	8.00
Force account	Miscellaneous work	350.00	350.00

HIGHWAY—11.9 mi.

Washington—Lincoln County—State. F. R. Hewett Co. has submitted a low bid of $839,832 for construction of 11.9 mi. of highway from Davenport to Reardan.

(1) F. R. Hewett Co. $839,832
(2) F. H. DeAtley & Co. 869,728
Grant Construction Co. 875,291
Curtis Construction Co. 892,085

		(1)	(2)
Lump sum	Clearing and grubbing	$3,000.00	$ 500.00
11,000 cu. yd.	Common excav. incl. haul	.55	.35
95 cu. yd.	Common ditch excav. incl. haul	1.00	2.00
54,470 cu. yd.	Common borrow incl. haul	.45	.35
2,040 cu. yd.	Unsuitable foundation excavation including haul	.35	.50
9,000 cu. yd.	Stripping quarries and pits including haul	.10	.10
480 cu. yd.	Structure excavation	5.00	2.50
9,370 M gal.	Water	2.00	1.50
39,300 cu. yd.	Embankment compaction	.05	.05
30 hr.	Grid roller	15.00	20.00
1,495 hr.	Pneumatic tired roller	7.50	6.00
1,495 hr.	Smooth wheeled power roller	7.50	6.00
29 hr.	Mechanical tamper	6.00	6.50
759 sta.	Finishing roadway	3.00	4.00
148,370 ton	Crushed surfacing top course	1.00	1.03
191,730 ton	Ballast	.85	.95
	Mineral Aggregate for Bituminous Surface Treatment Class C in Stockpile		
6,000 ton	Crushed screenings ½ in. to ¼ in. in stockpile	1.15	1.10
4,000 ton	Crushed screenings ¼ in. to 0 in stockpile	1.15	1.10
	Bituminous Surface Treatment Class A		
12.6 mi.	Processing and finishing	300.00	175.00
430 ton	Asphalt cement MC-3	45.00	47.50
3,160 cu. yd.	Mineral aggregate from stockpile	1.50	1.50
5,245 ton	Crushed cover stone in stockpile	1.05	1.10
	Cement Treated Base		
190 ton	Emulsified asphalt SS-1	41.00	55.00
10,750 bbl.	Portland cement	4.40	4.25
55,860 ton	Cement treated base	1.75	2.20
30 cu. yd.	Prime coat aggregate	2.50	2.50
	Asphaltic Concrete Pavement		
4,490 sq. yd.	Prep. of untreated roadway	.05	.10
7 ton	Asphalt cement MC-3 prime coat	45.00	60.00
50 cu. yd.	Prime coat aggregate	2.50	2.50
39 ton	Asphalt cement for tack coat	41.00	55.00
30,950 ton	Class B	6.00	5.75
310 ton	Mineral filler	10.00	25.00
	Other Items		
7,670 sq. yd.	Remov. cement conc. pavement.	.60	.70
8,828 lin. ft.	Asphaltic concrete curb	.45	.75
23 ea.	Concrete inlets	91.00	55.00
102 cu. yd.	Concrete class E	40.00	45.00
22,940 lb.	Steel reinforcing bars	.16	.15
1,456 lin. ft.	Type 1 metal drain pipe 8 in. diameter	2.80	2.50
348 lin. ft.	Standard reinforced concrete culvert pipe 18 in. diameter	5.00	4.75
54 lin. ft.	Relaying plain metal culvert pipe 18 in. diameter	2.00	3.00
10,225 lin. ft.	Beam guard rail	2.45	2.40
12 ea.	Right of way markers	10.00	8.50
133 ea.	Guide posts	3.75	3.00
36 ea.	Monument cases & covers	35.00	30.00
810 cu. yd.	Light loose riprap	1.00	2.00
25 cu. yd.	Hand placed riprap	10.00	20.00
16 ea.	Access control gates	35.00	36.00
5 ea.	Remov. concrete pipe headers	20.00	10.00
552 lin. ft.	Remov. precast concrete traffic curb	1.00	.50
550 lin. ft.	Removing cable guard rail	.70	.50
Est.	Flagging estimate $2,000.00	2,000.00	2,000.00

CLASSIFIED

Rates are $15.50 a column inch. Copy should be sent in by the 15th of month preceding publication date.

FOR SALE OR RENT

Four—Mine Locomotives. Approximately 4 years old—Complete with batteries. Priced to move.

6000' 60# rails, 15' lengths. Excellent condition with angle bars, switchpoing and frogs.

Weissbuch Steel Supply Co., Inc., Tenth & Virginia, MCRR., Gary, Indiana. P.O. Box 629.

USED

Steel Forms, Related Items, & Lidgerwood Cableways for all Categories of Heavy Construction. Conversions to New Uses & Estimates.

S. B. BAILEY CO.

P.O. Box 140 Millburn, N.J. Tels. DRexel 6-7530 6-1377

WANTED

Euclid Bottom Dumps or DW 20 Scraper

LONG CONSTRUCTION CO., INC.

P. O. Box 1875
Billings, Montana

Space is sold as advertisers' inches. All advertisements in this section are 1/8 in. short of contracted space to allow for borders and composition

Arizona distributors elect officers

Harold R. Bone of the Road Machinery Co. of Phoenix has been elected president of the Arizona Equipment Distributors. Other officers are Bob George of Western Machinery Co., vice president, and John Hazelett of Superior Equipment Co., as secretary-treasurer. The retiring president was Joe Angle of Arizona Equipment Sales. The group agreed to meet at least once every three months during the coming year to discuss problems of mutual interest and are inviting all other construction and mining equipment organizations to meet with them.

John King joins Calavar

John W. King, Sr., with many years of service in construction and the equipment distribution business, has joined the sales staff of Calavar Corp., Los Angeles. His experience includes work with highway departments, cement companies, equipment selling in Mexico and some years spent as sales manager of Tulsa Machinery in Tulsa, Okla.

Wemco names distributors

Wemco of San Francisco, manufacturer of aggregate equipment, has named Smith-Booth-Usher Co., of Los Angeles to distribute its complete line in Southern California and Clark County, Nev. A. W. Ginther is general manager of this distributor organization. At the same time, Wemco announced the appointment of Washington Machinery Co. of Seattle as distributor of its products in the northwestern part of the state. J. P. Studebaker is president of the Washington firm.

Pearce Equipment in Salt Lake appointed by Gar Wood

Appointment of Pearce Equipment & Steel Co., of Salt Lake City, as distributor for Gar Wood, St. Paul Truck Equipment, has been announced by Gar Wood Industries, Inc. Pearce Equipment will carry the full truck line including dump bodies, hydraulic hoists, elevating end gates and other products.

Seattle firm to handle Koehring-Johnson mixers

A. H. Cox & Co., well known distributor in Seattle, has been named to handle the Koehring-Johnson construction mixers in northwestern Washington. Organization personnel will include William H. Martin, vice president and sales manager, and Emil E. Dionne, treasurer. This well known line of mixers is available in 1, 2, and 3-yd. sizes in the non-tilting models.

Sierra Machinery Co. Inc. named distributor for Trojan

Yale & Towne Manufacturing Co. has announced the appointment of Sierra Machinery Co. Inc. of Reno, Nev. as distributor for its Trojan tractor shovels in northern Nevada and three adjacent counties in California. A full inventory of Trojan parts will be maintained.

Vaughn joins Scott Tractor

Howard Vaughn has joined the service department of Scott Tractor Co. Ltd. in Gridley, Calif. following six years of experience in Texas where he specialized on the Ford line of industrial equipment.

Western Machinery adds two

Raymond A. Schmidt, previously with Caterpillar Tractor Co. in Peoria, has been added to the sales staff of Western Machinery Co. in Phoenix, Ariz. At the same time, Arthur Ehrman, formerly with Schriver Machinery Co. for 12 years, has been named the new office salesman at Western.

New Marion district manager

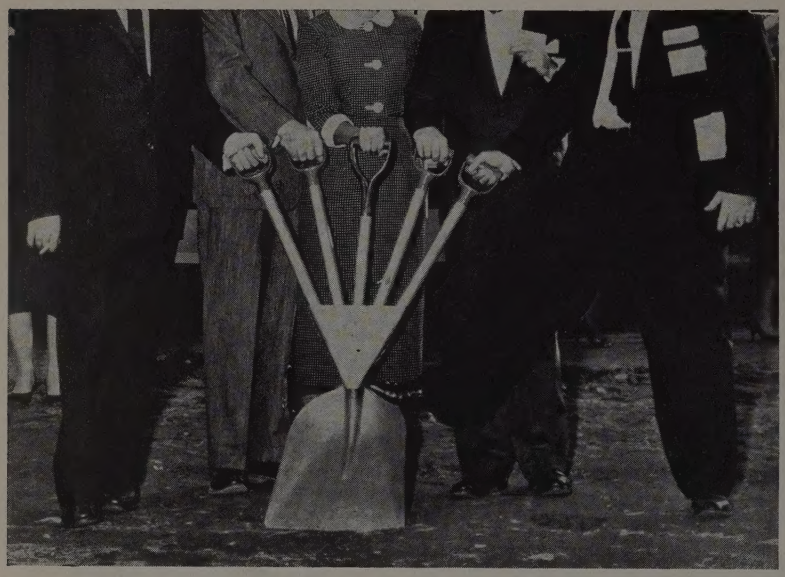
Eugene R. Johnsen is now the district sales manager of Marion Power Shovel Co., working out of the Phoenix, Ariz. office. His territory will include the states of Nevada, Utah, Arizona and New Mexico. He replaces E. J. Riggs.

Appointment by Highway Equipment Co.

C. "Doc" Meader has been named district representative for the Highway Equipment Co., Cedar Rapids, Iowa, according to Gale E. Allen, general sales manager. Meader will cover the 8 Western states for the company which manufactures asphalt spreaders and other equipment to handle bulk materials. Before joining Highway Equipment Co., he had sales experience with other companies manufacturing equipment for the construction industry.

ADVERTISERS in this issue

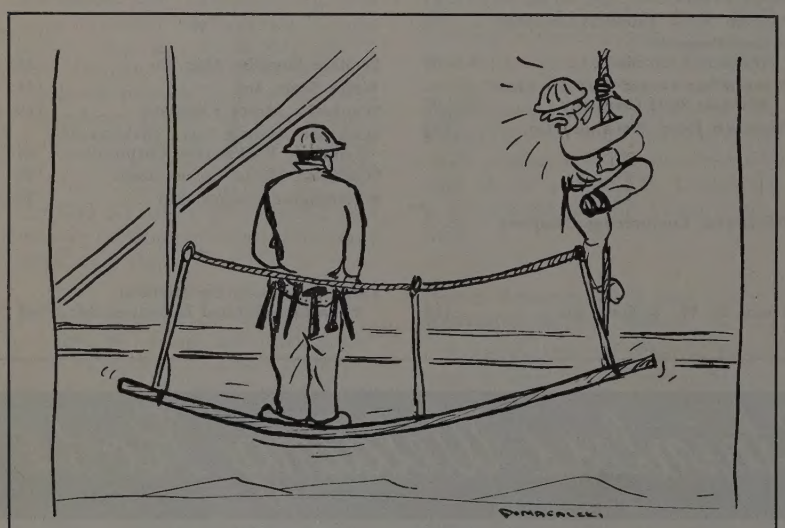
BACKFILL, uncompacted



KEEN NEW MACHINE SEEN

THE CONSTRUCTION MEN pictured above (heads omitted by request) are demonstrating a new high-speed shovel developed especially for force-account work. The clothes being worn by the laborers show how profitable this tool is, and how it was designed for maximum operator comfort. An important feature, as pointed out by the inventor, M. Brentwood Ridley, is that several of the five operators can knock off for a smoke or a drink without seriously affecting the output of the machine. In reply to the comment that the shovel appeared to be impractical, unwieldly, foolish, and stupid, Mr. Ridley said, "Don't knock it 'till you've tried it, man."

Down-time . . . . . By Domagalski



"Must you wear all those tools?"

Western Construction

Keep that cob

The Portland District Army Engineers has discovered a new use for corn cobs. It's the first time since March of 1937 that a use has been found for them other than as a holder for corn kernels. (It was on March 11, 1937, that the Joke & Novelty Industry announced its plans to market corn cobs in sets of three—two red and one white—despite warnings from powerful tissue interests. The idea eventually won the Good Housekeeping Seal of Approval.)

What the Army Engineers did was to take crushed corn cobs and hurl them with great force into the windings of Generator No. 2 at Bonneville Dam. They had learned earlier that blasting with sand was too harsh. The millions of tiny corn cob crumbs carried away the oil and dirt and left the generator looking like new.

Some industries load their sand-blasting machines with crushed walnut shells when cleaning electrical equipment. This seems to us to be an awful idea.

Good to be back

McNeil Construction Company of Los Angeles recently played host to a group of Spanish construction people who were touring the United States. When asked what they thought of Southern California, one of the Spaniards replied, "It's changed a lot since we were here 300 years ago."

Please rush

Other people have problems, too. Universal-Rundle Corp., which makes plumbing gear, got a letter from the personal secretary to His Highness Yuvaraj Shri Virbhadrasinhji, Maharaja Saheb of Bhavnagar, Saurashtra, India, requesting a copy of the firm's new booklet "New trend in Bathrooms," which describes the latest bathroom fixtures. The letter was accompanied by a draft from the Central Bank of India for 10c, the cost of the booklet.

The company is still trying to figure out how to follow its policy of referring inquiries to a plumbing contractor in the inquirer's area. Anybody know who the best plumbers are in Saurashtra?

. . . The Editors