

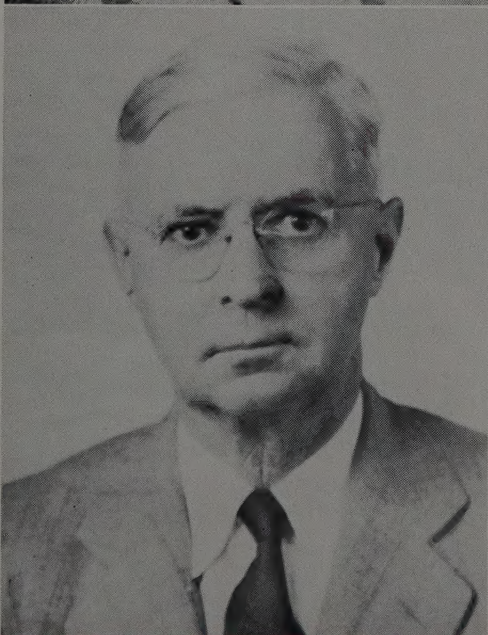
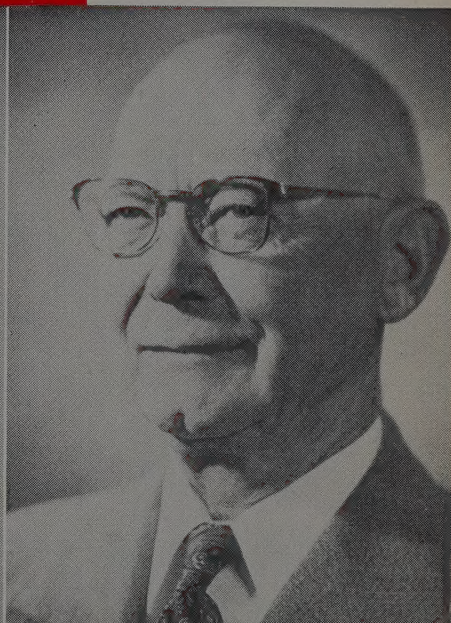
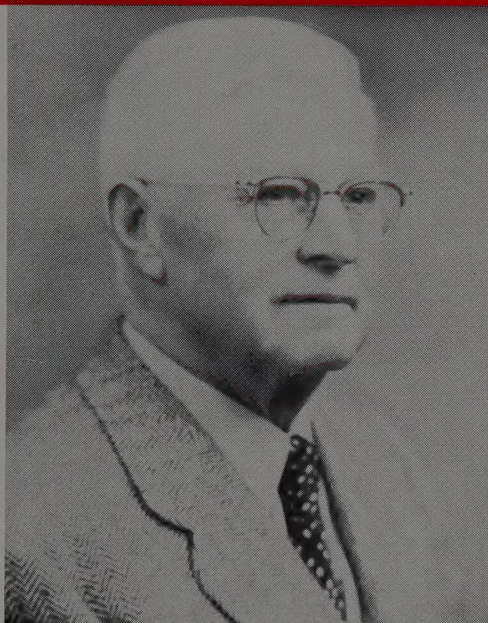
# WESTERN

# CONSTRUCTION

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## FEBRUARY 1958



OPEN PIT MINING SPECIALISTS, the Isbell firm relies exclusively on Texaco lubricants to keep 17 large dump trucks, 4 shovels, 2 'dozers and 2 rotary drills on 1

# "This truck has run over 7500 hours —and we've never removed the pan"

**"The Texaco Simplified Lubrication Plan keeps maintenance costs down, keeps the job on schedule," reports George L. Laughton, Supt. of Isbell Construction Company's Three Kids Mine project.**

Isbell Construction Company is doing strip mining on contract with Manganese, Inc., Henderson, Nevada. They are using a Texaco Simplified Lubrication Plan for this project, and it is piling up some outstanding records.

"As of January 17, the truck shown in the picture had operated 7,714 hours using *Texaco Ursa Heavy Duty SAE 40* exclusively, and it's never had the pan removed," reports Superintendent George L. Laughton. "We also use *Texaco Crater 2X Fluid* for wire rope, *Texaco Gear Lube HD* for transmissions, *Texaco Marjak* and *Texaco Marjak Heavy Duty*, for chassis and wheel bearings. We are entirely satisfied with Texaco lubricants," says Mr. Laughton, "and we have never had a failure due to lubrication."

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# WESTERN



# CONSTRUCTION

FEBRUARY  
1958

Vol. 33 No. 2

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The engineer involved with the project since its start reviews its 20-yr. history with emphasis on changing methods and machines.

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**FRONT COVER** — At their third annual dinner meeting the Beavers presented awards to nine outstanding individuals in the construction industry. The four men pictured were selected from the fields of Management and Supervision. Biographies on page 66.

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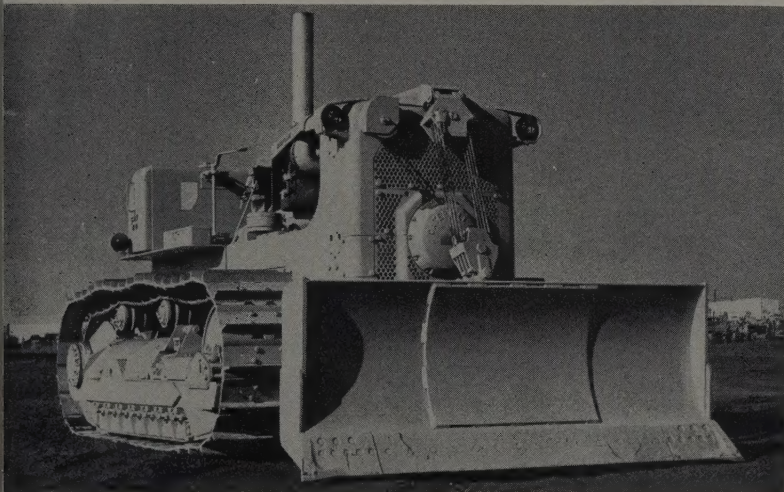
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## For 32 years serving the construction needs of the 11 Western States

# NEW EQUIPMENT

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



*One good pusher deserves another and*

## Tandem pushing cuts down loading time

Scraper-loading at maximum efficiency calls for brute strength. As scraper sizes have increased the need for more push power has been emphasized to maintain proper cycle balance. Excess time spent to get the last few yards in a 30-yd. scraper can be costly.

Under good loading conditions a Caterpillar D-9 can provide this necessary push for loading in the allowable time dictated by job efficiency. When conditions are anything worse than good, more power must be applied to get maximum load with proper time.

To provide means for carrying out this tandem pushing, Peterson Tractor & Equipment Co., Caterpillar dealer in San Leandro has developed the Peterson Cushion Push Dozer and Cushion Push Block. Each of the tandems in such a team is provided with a dozer with a 10-ft. blade and 48-in. height and a 39-in. maximum ground clearance. Pushing arms at the top of the dozer act against heavy rubber cushions, which are the key to effective operation. At the rear of each pusher is mounted the cushion block which is also equipped with heavy rubber cushions. This push block is 36 in. wide

by 19 in. high and extends a distance of 50 in. behind the tractor case. These rubber absorbing pads absorb the sudden heavy impacts from pusher contacts and also transmit power directly through the tractor rather than through the drive mechanism.

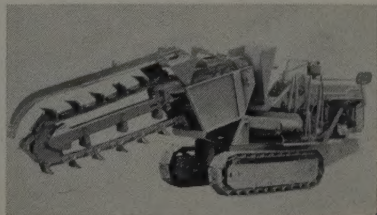
In operation all earth movers recognize that the last per cent of the scraper load represents the demand for time and power. Therefore, efficiency suggests that one pusher is effective in most of the loading cycle and the big advantage is a second booster near the end of the load. In operation, therefore, the tandem pushers complete one load and the back pusher drops off to pick up the next scraper and starts its loading cycle while the front pusher gets the scraper on its way and out of the pit. By this time the first pusher has helped for the early part of the loading and second pusher moves into position, allowing the rubber cushions to pick up the shock as it puts its power into getting the last part of the load into the scraper with minimum time. The poorer the loading conditions in the pit, the more this power and its sequence of operation proves effective.

The procedure and the push dozer and push block accessories to the D-9 have been tested in field experiments and actual job conditions.

Further information including specifications and results of field tests is available. **Circle No. 151**

## Compact trencher has all features of big models

Compactness in design, while incorporating all of the features found on larger machines, is one of the advantages listed for the Parsons 77 ladder-type "Trenchliner." Now in production at the Parsons plant, Newton, Ia., the model 77 underwent extensive testing



throughout the U. S., digging trenches for telephone and other utility lines.

Measurements on the 77 include a 5-ft. 10-in. roading and 5-ft. 5-in. digging height, 4-ft. width and a total transport-

ing weight of not more than 6,750 lb.

Digging range is to 5-ft. depth at 6 to 18-in. widths. Sixteen digging feeds—from 4.4 to 181 in. per min.—are available. Optional sprocket feeds also total 16, ranging from 6.2 to 252 in. per min.

Introduced for the first time is a new self-cleaning bucket line. Four bucket line speeds range from a 38.5 ft. minimum to a 246 ft. per min. maximum. Conveyor belt speeds (also 4) are from 75 to 480 ft. per min. Conveyor is shiftable and reversible so that spoil can be deposited on either side of the trench. Boom is telescopic type for depth variation.

Traction and steering on the Parsons 77 is handled through multiple disc friction clutches. Each crawler is independently driven, independently braked. The 77 can turn in its own length. A dual purpose excavator drive and safety clutch "slips" to protect machinery from shock loads.

Powered by an International Harvester U-175 engine, the model 77 has 4 forward speeds: .375, .778, 1.42, and 2.41 mph. Reverse speed is .307 mph. Low traction transmission provides for maximum production regardless of soil conditions.

Circle No. 152

## Euclid offers first front-end loader

The first, and smallest in capacity, of several loader models that will be built by Euclid, has been introduced. The L-7 is a rubber-tired front-end loader with a rated payload capacity of 19 cu. ft.



Struck capacity of the bucket is 14 cu. ft., maximum lifting load, 3,000 lb. Equipped with torque converter and power shift transmission having synchronized non-stop high-low shift, speeds on the L-7 range up to 11 mph. forward or reverse. There is an interconnecting valve between foot brake and the driving clutches within the transmission. This "inching" valve permits machine to ease into restricted areas merely by operation of foot brake. Wheel base is 4 ft. and overall length with bucket down is 10 ft. 1½ in. Turning radius is only 6 ft. 2½ in. and there is 5-in. ground clearance.

Circle No. 153



**RIPPER DESIGNED FOR RUBBER TIERED LOADERS**

Model R-25-75 Ripper, a product of The Ransome Corp., is for use with rubber tired tractor loaders in the 1-yd. to 2½-yd. class. Features include a one-man rack and pinion depth adjustment. The new model has 3 x 6-in. ripping shank with a replaceable 18-lb. cast manganese tooth. Applications include street patch work, sewer line construction, ripping shale, rock, Belgian Block and frost.

Circle No. 154

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Missoula and Kalispell, Mont.

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Albuquerque, New Mexico

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The SP-107 is fully convertible to shovel, crane, dragline, clamshell, or hoe.

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with big  
ideas...

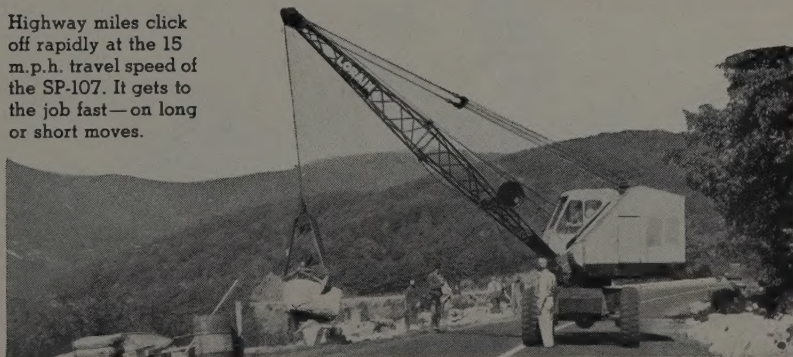
**LORAIN  
SP-107**

This economical, fast, maneuverable, "go-anywhere" Lorain SP-107 can tackle any kind of a construction job. It can speed down the highway, walk into the job with 4-wheel drive, backed up with lugging power, high tractive effort, and big, tubeless tires—and go to work anywhere on a maximum capacity basis without setting outriggers.

This new, 3/8-yd., 7-ton excavator-crane is ideal as a "one and only" tool for the small contractor, or as

a "handy-andy" on big construction jobs. The simplicity of this low-cost Lorain makes it easy to maintain — its hydraulically operated controls make it easy to use—and its 4-wheel steer, 4-wheel drive maneuverability will present exciting possibilities to you. A demonstration will convince you that the Lorain SP-107 really is the "fast little rig with big ideas" that pays off in profits. Your nearby Thew-Lorain Distributor can arrange to show you one at work.

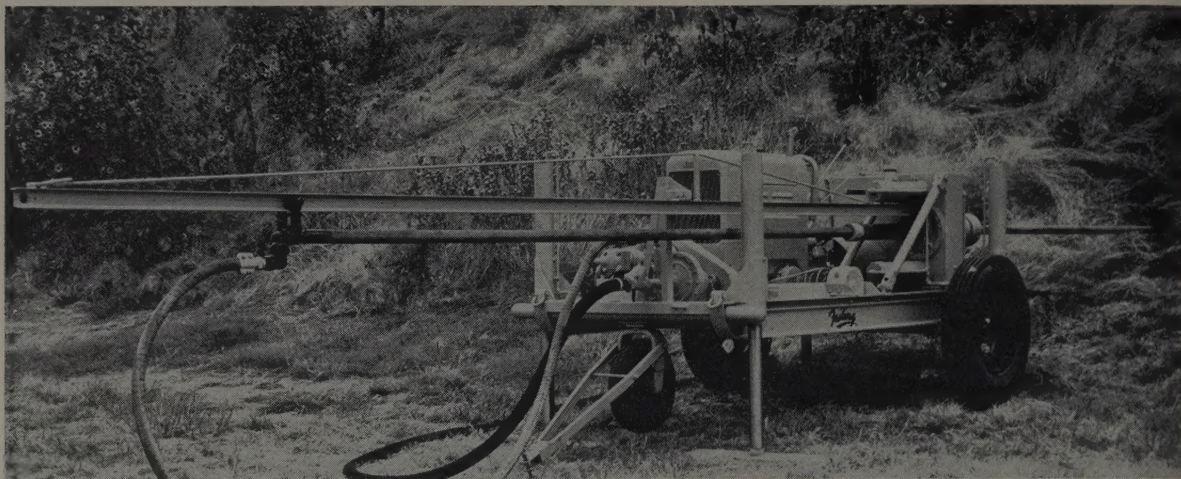
Highway miles click off rapidly at the 15 m.p.h. travel speed of the SP-107. It gets to the job fast—on long or short moves.



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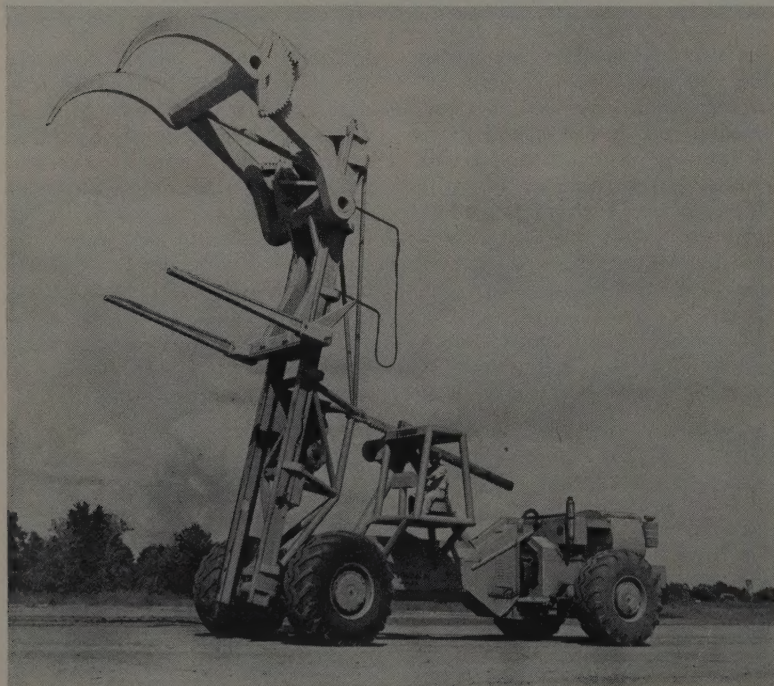
"WEEP HOLE" DRILL OF GEORGE E. FAILING CO. DESIGNED TO RELIEVE EARTH SLIDES

Newest addition to the line of rotary drilling rigs manufactured by the George E. Failing Co., a subsidiary of Westinghouse Air Brake Co., is a Horizontal "Weep Hole" Drill. This unit, which has a capacity for drilling 4 1/4-in. horizontal holes to a distance of 300 ft., was

designed to relieve the causes of earth slides along highways, railroad rights-of-way, etc., due to excessive moisture. Perforated casing is inserted in the horizontal holes which permits continuous drainage of the affected areas.

*Circle No. 155*

## Lift truck handles 22-ton loads



A giant fork-lift machine, with powerful steel "fingers" which can lift 22-ton loads of various materials as delicately as Aunt Tillie lifts a teacup, has just been built for a West Coast firm by R. G. LeTourneau, Inc., of Longview, Texas.

Many types of materials normally handled in unpaved areas—ranging

from steel products to pre-cast concrete structures—are said to offer work opportunities for this type of rough terrain fork lift. The first unit delivered, however, is being used for handling redwood logs at a California mill.

Depending upon the type of materials to be handled, the machine can be furnished with fork, crane, ram, fork

and tusks, or fork and jointed tusks.

At first glance, the giant appears to be not unlike a standard LeTourneau Log Stacker, which ranges in capacity from 25 tons to 50 tons, and which already has won wide acceptance by loggers throughout the United States and several foreign countries.

In action, however, the new "Series FJ Stacker" broadens application of the machine considerably.

Big difference between the two machines is that the new "Series FJ Stacker" has an electrically powered "joint" near the center of its tusks, making them function like two powerful steel fingers. This knuckle-like arrangement has made it possible to handle heavy loads of various materials with almost uncanny precision.

Like the LeTourneau standard "Series F Stacker" which was designed specifically for the logging industry, the new machine also has another joint which is located at the base of the tusks, where tusks are connected to the boom. Thus the tusks of the standard machine work much like tongs, while tusks of the second work more like fingers.

Because the machine has all-electric power—from wheel drives to raising and lowering of the tusks—there are no clutches, drive shafts or other mechanical drive mechanisms. High-torque motors are spotted over the machine to deliver geared power directly to whatever point power is needed.

*Circle No. 156*

(Turn to page 87 for more  
New Equipment and Literature.)

## Education Designed for Contracting

CONTRACTING and construction in these Western states have gained in stature by the program developed at Stanford University. In stride with the times the civil engineering department for more than ten years has been shaping a course to meet the needs of young civil engineers who desire education for careers in contracting.

The qualifications for executives in contract-construction have pointed toward a combination of civil engineering and business management education. A background in either engineering or business is fine, but the perfect education is one that combines the two. The building of modern engineering projects cannot be executed without engineering knowledge and appreciation. At the same time, contracting remains a business, as it always has been.

At an accelerating rate over the last two decades the contracting organizations in these Western states have been recruiting civil engineering graduates for training as embryo executives. In 1946 this trend was recognized by the civil engineering department at Stanford. With the aid of local AGC chapters as well as the assistance of individual contractors, a course was begun in 1946 which introduced a "Construction Option" into the regular four-year program. Students received all the fundamental engineering studies, but were able to work in electives on such subjects as construction equipment, law of contracts, and estimating procedure. Adequate for that date, this step received prompt recognition, was accepted by students, and the graduates recruited by contractors.

But in the last several years the demand for civil engineering graduates in contracting organizations has been further accelerating. It has also grown more selective. Recently the Education Committee of the AGC recognized the desirability for graduate work beyond the regular four-

year course. The committee expressed the hope that a five-year course might include civil engineering education plus all available time devoted to subjects in the field of construction and business management.

At about the same time this trend was recognized by the Stanford Civil Engineering Department through adoption of a full graduate year with subjects paralleling the ideas expressed by the AGC. This was not an academic effort since in both direction and substance the course had the counsel and the active support of local contracting organizations. This support included lecturers to bring practical information from field and office directly into the classroom. Courses already available at the university provided these students with the opportunity of further specializing within the construction field. They could elect geology, soil science and time-and-motion courses if they were interested in heavy field work; or labor relations, finance and management if their leaning was toward office administration. After two years the success of the graduate course has been demonstrated by its acceptance and growth as described in this issue.

The Civil Engineering Department at Stanford University has accepted the challenge presented by current trends in the construction industry. The West can use engineering graduates with this type of education to provide young blood for our contracting organizations.

*Jim Ballard*



Truck-mounted A-W Hydraulic Crane Equipped with ½-yd. concrete bucket shown working on job for Western Gravel Co.

## A-W Hydraulic Crane shows versatility at Western Gravel Co. plant

Western Gravel Company, Campbell, Calif., produces rock, sand and gravel and also sells Redi-mix concrete, made in two fully automatic batch plants. More than a year ago, this company bought an Austin-Western Hydraulic Crane unit for work in its own yard and to rent to customers. Mounted on a 6-wheel Army truck which has a platform large enough to transport a ½-yd. concrete bucket or a ¾-yd. clamshell bucket, the crane has an 18-ft. extensible boom with a 17-ft. manual extension. Four hydraulic outriggers are used to give extra stability on heavy lifts.

**Saves downtime of batch plant.** Western Gravel reports: "Downtime of one

of our batch plants not only costs the loss of the plant's production, but we lose the value of perhaps 10 of our Redi-mix trucks, worth \$8 an hour apiece. Not only this, but our contractor-customers may suffer because gangs on the jobs are idle and there are also equipment rental losses. These losses may easily snowball into \$300 an hour. Using the A-W, we can now change heavy motors on the plant in 30 minutes, an hour less than formerly. The value of this one hour saved might equal a month's cost of owning the A-W."

**Popular with customers.** "On most jobs, when a contractor rents a large

crane he has to pay the moving cost and setup time for many more hours than he pays for renting our lower-rate A-W, which goes and comes so much faster and is ready to work minutes after it arrives."

**Extremely versatile.** "We used the crane to assemble our second batch plant. It lifts engines out of earth-moving machines and tractors...hoists sacks of admixtures up 20 ft. to floor of batch plant... In our operation there seems to be nothing it cannot do to save time and labor in lifting things."

For the complete Western Gravel Co. story, write for Gould Certified Report No. 5601.

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FEBRUARY 1958



THE FIRST slip-form concrete paver to be mounted on crawlers, a Giffith & Zimmerman machine, enabled Griffith Co., the contractor,

to pour up to 3,000 lin. ft. per day of invert 10 in. deep and 24 ft. wide. The rig has automatic grade and steering controls.

## Concrete lining for river channel

*A crawler-mounted slip-form paver is the latest advance in construction methods on the concrete lining of the Los Angeles River channel, a project which after twenty years is nearing completion. A contrast between the first contract and the last one, both held by the same contractor, highlights the evolution of field techniques.*

By LEE R. HENNING

THE EARLY SPANISH settlers could never recognize the Los Angeles River as it is at this writing. By the end of 1957, channel improvement of the 50-mi. river will be completed, and it will be a concrete-lined "water freeway" most of the way from its beginning in the Chatsworth hills to its mouth in San Pedro Bay. The final construction contract on the lower river is being completed by Griffith Co. at a cost of \$5,142,063. Concurrently on the upper river, A. Eichert & Son will soon complete the final contract at a cost of \$4,418,000. These two jobs are the culmina-

tion of a project which began in 1936, with labor forces hired by the U. S. Army Corps of Engineers.

Since that time 14 contractors in 31 separate contracts have:

- (1) Moved 20,000,000 cu. yd. of earth,
- (2) Poured 2,025,000 cu. yd. of concrete, using 3,450,000 bbl. of cement,
- (3) Placed 147,350,000 lb. of reinforcing steel and
- (4) Set 460,000 tons of grouted stone slope protection.

Total cost of this channel improvement work has been \$120,000,000 to date.

Improvement of 50 mi. of main channel in the Los Angeles River is part of the overall comprehensive

### About the author . . .

Lee R. Henning is Special Assistant to the Chief, Engineering Division, on matters pertaining to civil works, U. S. Army Engineer District, Los Angeles. He is the perfect author for a description of improvements to the Los Angeles River channel, for he has been closely associated with the project throughout its 25-year history. Mr. Henning is a member of the American Society of Civil Engineers and the Structural Engineers Assn. of Southern California.





**1938** Hand labor was used twenty years ago to spread, screed, and finish concrete on the slope. Griffith Construction Co. won the first contract.

plan for flood control of the Los Angeles County Drainage Area. Authorized by six separate Flood Control Acts beginning in 1936, this plan provides for protection of Los Angeles County areas by control of the Los Angeles and San Gabriel rivers, the Rio Hondo, and Ballona Creek, through construction of flood control reservoirs, debris basins and channel improvements for safe conveyance of river flows. Total estimated initial cost of this overall comprehensive plan is \$370,300,000 in federal funds.

Griffith Co., which has the final construction contract, also had the first—back in 1939. Perhaps one of the most interesting features of their present job is the contrast it makes with their first one. Prior to World War II all slope and invert paving was placed by hand methods. Concrete was hand screeded and hand finished. About 200 lin. ft. of slope paving per day was considered par.

Today, 8-in. thick side slopes are placed, without jointing, at the rate of 800 lin. ft. per day. Concrete is placed in the invert in 24-ft. lanes at up to 3,000 lin. ft. per day with a single paving machine and two dual-drum paving mixers.

### Mechanization—key to progress

As in other phases of the construction industry, mechanization has been the key to progress in concrete channel lining. After World War II hand screeding gave way to heavy weighted screeds operated off the end of a tag line. Variations of this method of screeding were used until 1954. During that year the first slip form paver was introduced by Guntert-Zimmerman of Stockton, Calif., on the Rio

Hondo Inlet Channel to Whittier Narrows Basin contract under construction by A. Teichert & Son. The slip form paver eliminated the need for headers and was capable of paving continuous strips up to 60 ft. in width. The early slip form paver was operated on rails and could be used either for invert or slope paving. Triangular adapters placed between the frame of the paver and each side truck convert the machine from invert to slope paver. The low-flow section at the center of the channel could be handled simply by adding a “low-flow pan” to the bottom of the screed.

Grade control on the first slip form paver was maintained by mechanical activation of hydraulic jacks at each corner of the machine. Activation was controlled by a man on each side of the machine who observed the position of indicator arms relative to a taut grade wire. This system was improved later by wiring the indicator arms to operate lights at a central control station, where one man could operate a four-bank hydraulic valve. This system was finally improved to full automation. The indicator arms, pivoting about a horizontal axis, contact limit switches which, in turn, operate solenoid valves controlling vertical movement of the hydraulic jacks.

In July 1957, on Griffith Co.'s final contract, Guntert-Zimmerman introduced the first slip-form paver to operate on crawlers. Its success is acclaimed by both the contractor and the Corps of Engineers. The framework of the machine is similar to the rail-operated paver, being adjustable to widths up to 60 ft. by adding sections to the framework. It also in-

corporates both automatic grade control and automatic steeling. Grade control is maintained in the same manner as described above. By setting the grade wire on true alignment, it also steers the machine by activating an alignment indicator mounted on the side of the paver. The indicator, shaped much like a tuning fork, activates limit switches wired to regulate the speed of the separate crawler motors. The use of variable speed motors also facilitates operating the machine on curved sections of channel.

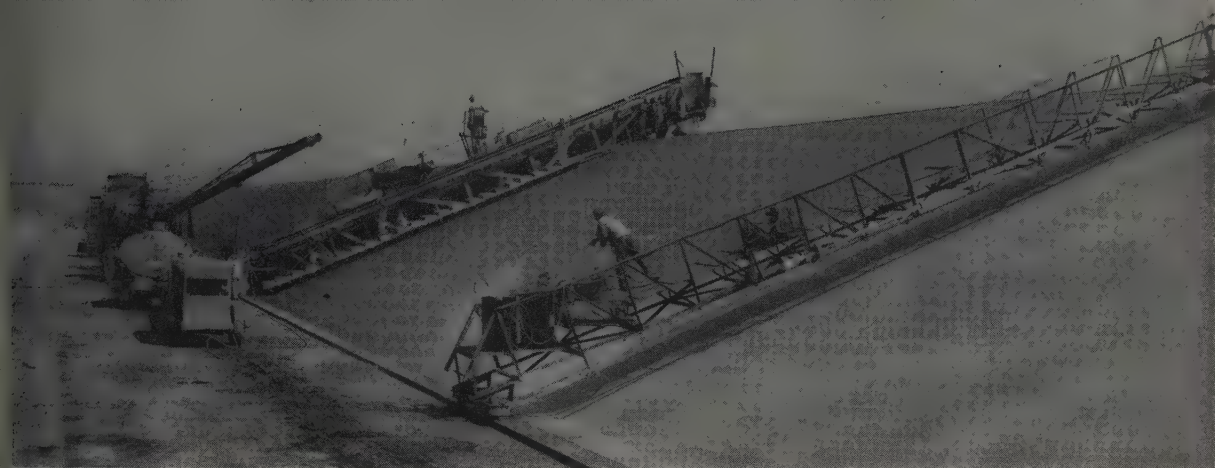
The crawler paver has some advantages over the rail-paver. Foremost, it eliminates the need for rails. Almost as important is its maneuverability. The crawler paver can either walk around obstacles such as bridge piers or turn around at the end of a strip of paving. A crane had to be kept on hand to move the rail paver for such purposes. As mentioned earlier, the paver handled up to 3,000 lin. ft. of 10-in invert, 24 ft. wide, in a single day on the Griffith contract.

### Final contracts completing 50-mi. channel

The Griffith Co. contract which finishes up the channel improvement on the lower river runs from 63rd St. to below Dominguez St. in Long Beach—a distance of 2.52 mi. The invert in this entire section is 300 ft. wide, with 60-ft. side slopes on a 2.25:1 ratio. Center section of the invert, including a 20-ft. low flow channel, was placed in a 60-ft. wide section using a rail-operated Wood machine fed by two concrete mixers operating just behind the paving machine. A 2-ft. toe was placed integrally with the side slopes, also using the Wood machine. Concrete for the remainder of the invert was placed in 24-ft. lines using the Guntert-Zimmerman machine operating on crawlers.

The low flow section of the invert is 12-in. thick reinforced concrete, with the remainder of the invert 10 in. thick and 8-in. thick slopes. This 2½-mi. contract required 158,200 cu. yd. of concrete for invert and slope paving, with a total cement requirement of 246,800 bbl. for the entire job. A total of 11,614,000 lb. of reinforcing steel was used.

To handle this huge amount of concrete, the contractor set up a batch plant near 63rd St. at the upstream end of his contract. The contractor set a possible record for batch plant operation by turning out 2,950



**1958** Some improvements have been made since the scene shown on the previous page. Concrete work on the slope is now done with a rail-supported paver and membrane curer, which place up to 800 lin. ft. of slope per day.

u. yd. of concrete in a single 11-hr. day. Average daily output was 1,750 cu. yd. of concrete.

The Griffith contract included simultaneous construction of a large steel girder bridge across Del Amo Blvd. The cost of this bridge (\$703,000) is included in the total contract cost of \$5,142,063 along with other items paid for with contributed funds from the Los Angeles County Flood Control District. Total contributed funds of \$969,000 also included the following items: drains, siphons, etc. \$187,700; concrete pier extensions on Long Beach Blvd. bridge \$50,000; and equestrian ramp \$28,300.

Joe Porcher was project manager for Griffith Co. Hal McGregor was construction superintendent. Work was begun on April 15, and the contract is scheduled for completion in late December 1957.

The Teichert contract completing improvement of the upper river is actually the extreme upstream section of the Los Angeles River project. The project begins at Corbin Ave. and extends  $2\frac{1}{4}$  mi. upstream to Owensmouth Ave. in Chatsworth, where the river begins with runoffs from Calabasas and Bell creeks.

Construction of this final upstream contract, while covering about the same distance of the channel, presented many different problems from the Griffith contract downstream. Almost half of the total contract cost of \$4,418,921 represents costs for other than channel paving operations, and is being financed by contributed funds from the Los Angeles County Flood Control District. The largest portion of the total contributed funds of \$2,038,300 is going to pay for

seven bridges included in the Teichert contract.

Two of these bridges are prestressed concrete and are of particular interest to this project. Both were designed by the City of Los Angeles Department of Engineering. The largest of the two prestressed structures is at Mason Ave., where a 197-ft. bridge was constructed. It is a two-span structure with reinforced concrete center pier and abutments. The prestressed T-girders measure 98 ft. 6 in. long by 4 ft. 1 in. deep. Top of the girders, which forms the bridge deck, measures 4 ft. 6 in. The bridge has a 50-ft roadway, plus a  $4\frac{1}{2}$ -ft. sidewalk and curb on each side.

A single span 90-ft. prestressed bridge was built at Owensmouth Ave. T-girders were also used for this structure, which has a 26-ft. roadway with a  $4\frac{1}{2}$ -ft. sidewalk and curb on each side. The girders are 90 ft. long by 4 ft. 1 in. deep, with a 4-ft. 6-in. top and 2-ft. 2-in. base. Girders for both bridges were post-tensioned on the job by Rockwin Prestressed Corp. as a sub-contractor. The Owensmouth Ave. bridge cost \$125,188 and the cost of the Mason Ave. structure was \$340,441.

From Corbin Ave. upstream to Brown's Creek, the channel invert was constructed 70-ft. wide with 2.25:1 slopes. The invert narrows to 45 ft. from there until about 500 ft. from the end of the channel, where it widens to 90 ft. where the Los Angeles River joins Calabasas and Bell creeks. The channel has vertical concrete walls in this 500-ft. section, with height of the walls gradually increasing to 21 ft. at the end of the project.

Channel invert in this section is 10-in. reinforced concrete, with 8-in. concrete side slopes. Invert and slope paving required 43,650 cu. yd. of concrete with a total cement requirement of 70,125 bbl. for the entire contract. Reinforcing steel totaled 4,048,100 lb. For the project a batch plant was set up near Van Owen St. by Consolidated Rock Products and operated for the contractor.

The Teichert job was begun last April 15, and completion is scheduled for February 1958. Completion of the channel portion is scheduled for Dec. 15, 1957. Berl Grounds is construction superintendent for the contractor, A. Teichert & Son.

### Channel design and construction

Many design problems were encountered during the construction of this overall 50-mi. channel improvement project. In one section, it was necessary to develop an invert paving design that would permit percolation of water into the ground. The scheme adopted was to pave the invert with a layer of cobblestone properly graded, approximately 30 in. in thickness, of a size capable to resist displacement by stream flows. The cobblestone invert paving was started in 1955 and completed the following year with work performed by construction contract labor.

Beginning in 1955, the channel invert paving has been placed with continuous reinforcing steel. The only construction joints now used are those formed at the end of the day's placement of concrete. Even then the reinforcing steel is continued through the joint.

Along with improvements in construction methods and paving design, improvements have also been made in the subdrainage system. In the early days the invert subdrainage system was a series of 4-in. weep holes on 10-ft. centers in the concrete invert slab with gravel underneath and about 4 rows of pipe surrounded by gravel and outletted into the channel at approximately 1,000-ft. intervals. In 1946 a system of filter and drain material layers and perforated pipe with outlets into the channel were used. The present practice is a system of perforated pipes and drain filter materials under the invert slabs. These pipes, which are double-gated, empty into manholes on approximately 500-ft. centers. This system prevents the possibility of silt entering the drainage system under the channel invert slab. Only maintenance required is keeping manholes desilted. It is necessary to tack down all covers to minimize vandalism.

The Corps of Engineers has used an air entraining agent in concrete for several years. The Corps designs its own concrete mix, with a design strength of never less than 3,000 psi. on this work.

After many years of low rainfall, the average Southern California tax-

payer, especially the newer citizens, may wonder about community benefits from such an expensive flood control undertaking. For those of us who can remember the 1938 flood, this is not such a difficult question. Damage in Los Angeles County from this one flood amounted to \$40,000,000 and 50 lives were lost.

The Los Angeles River runs adjacent to valuable industrial, residential, commercial and farm lands as it flows through many urban communities—Canoga Park, Reseda, Studio City, North Hollywood, Universal City, Burbank, Los Angeles, Maywood, South Gate, Compton, and Long Beach. The river ultimately collects flood water from the entire Los Angeles Basin with its 17 tributary canyons and 55 mi. of tributary channels. Major streams emptying into the Los Angeles River, beginning at the upstream end, are Bell and Calabasas creeks, Brown and Aliso creeks, Tujunga Wash, Burbank and Western, Verdugo Wash, Sycamore Wash, Arroyo Seco Channel, Rio Hondo Channel, Compton Creek.

Completed portions of the overall Los Angeles River Project including improvements in the tributary system have already prevented flood damage estimated at \$100,000,000.

Completion of the Los Angeles County Drainage Plan could prevent an estimated \$150,000,000 in damage in the event of a single "project design flood."

The large flood control program of the Army Corps of Engineers is closely coordinated with the local flood control representative, the Los Angeles County Flood Control District. Coordination is necessary on many problems connected with actual channel improvements, such as highway bridges whose reconstruction affects traffic, drainage, rights-of-way, utilities, sewers, water and gas lines, etc. Col. Harold E. Hedger is chief engineer of the Los Angeles County Flood Control District.

Work on the improvement of the Los Angeles River channel was begun under the administration of Major Theodore Wyman, Jr., as district engineer of the Los Angeles Office of the Corps of Engineers. Present district engineer is Col. C. T. Newton. Harry W. Thompson is chief of the Engineering Division, W. J. Leen is chief of the Construction Division of the Los Angeles District, Corps of Engineers, and project engineers on the final contracts are Leonard C. Hogue on the lower river and Robert E. Loudon on the upper river.



## Semi-automatic welding for bridge field splices

A MILESTONE was passed in field welding when the long plate girder spans of Willow Creek Bridge over the Trinity River in California were spliced in the air with semi-automatic welding. The highway bridge was opened to traffic in December 1957. It is 508 ft. long with two center spans 168 ft. in length. For shipping convenience each center span girder was fabricated in 40-ft. sections.

Four of these pieces were spliced by semi-automatic welding at the site. These 160-ft. long sections were then erected in one 50-ton lift, and final splices were made in place using semi-automatic welding on the flanges. The girders are 9 ft. 6 in. deep and the flange plates vary in thickness from 1½ in. to 2¼ in. The web plate is 11/16 in. thick.

The final splices made in the air were

accomplished by first welding the web from the center out in alternate passes on opposite sides. The joint was supported by erection clips and a temporary bent during this operation. The flange were then welded using hand welding for the first pass and semi-automatic welding for the balance of the work since the joints were prepared for all horizontal welding. A 600-amp. welding machine was used, which provided fast economical operation for a Lincoln "squirrel welder." It is believed that this is the first application of semi-automatic welding in a field connection of that magnitude. The Director of Public Works for Humboldt County, Mr. Charles Shaller, reports that joint preparation and field conditions were controlled to provide substantially the same as would be obtained in the shop. Fortunately it was possible to make the splice when prevailing winds were at a minimum.

The Willow Creek Bridge is located on County Road No. 531 which connects U. S. Highway 299 to the community of East Willow Creek on the north side of the Trinity River. The bridge has two lanes with a 24-ft. wide roadway. Welding inspection was provided by Humboldt County Department of Public Works engineers. The general contractor was Erickson, Phillips and Weisburg, Concord, Calif., and the steel was fabricated and erected by Independent Iron Works, Oakland, Calif.



# Constructing Arizona's newest city

**The Glen Canyon Dam project requires the building of a new town for 8,000 at a remote desert location. The City of Page will house the construction force and the permanent operating personnel.**

**By M. E. TRENAM**  
Chief Construction Engineer  
Bureau of Reclamation  
Denver, Colorado

ARIZONA'S NEWEST city is now rising on a remote desert mesa about 10 mi. south of the Arizona-Utah state line. Page is the name of the community being developed by the Bureau of Reclamation as an essential feature in the construction of the Glen Canyon Dam and Powerplant on the Colorado River. Construction of the dam and powerplant, principal features of the Glen Canyon Unit of the Bureau's Colorado River Stor-

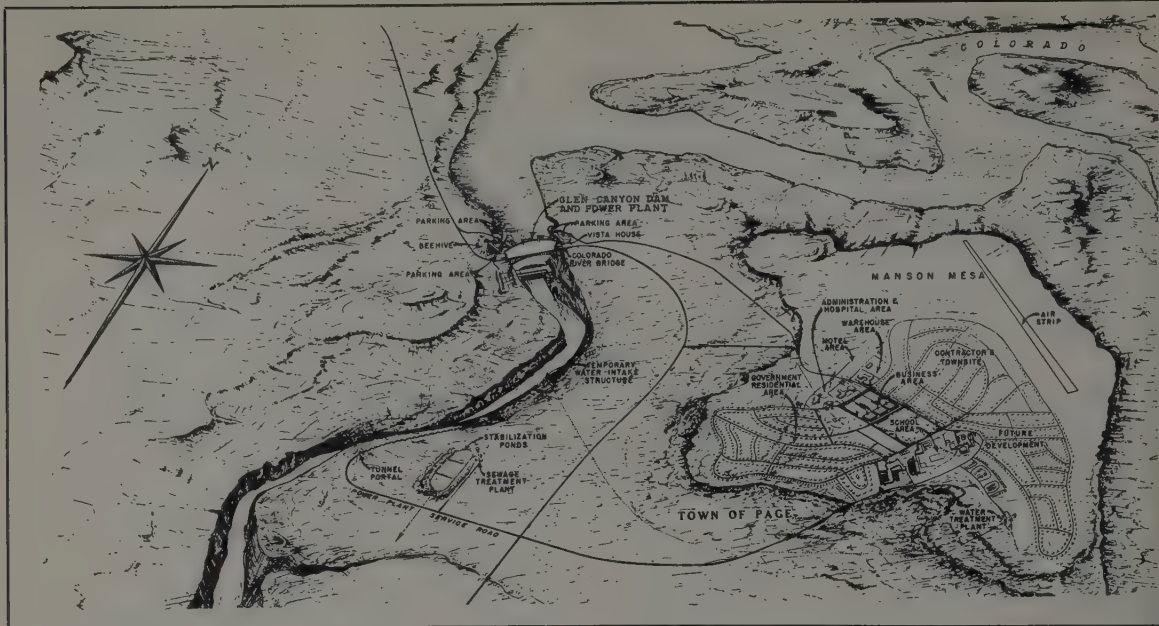
age Project, was begun in April of last year. A comprehensive review of the Glen Canyon project appeared in WESTERN CONSTRUCTION, February 1957.

The new town, named after the late John C. Page, Commissioner of the Bureau of Reclamation from 1937 to 1943, will be one of Arizona's larger communities. It will make available housing and community facilities and services for both the con-

tractor's forces employed in the construction of the dam and powerplant and the Bureau's engineering employees during construction, as well as personnel who will operate the dam and powerplant after they are completed.

The townsite is located 2 mi. southeast of the dam (see map) in Coconino County. It is 135 mi. north of Flagstaff, the county seat, and 72 mi. east of Kanab, Utah.

Maximum population of the town during construction may reach about 8,000. After completion of major construction which will be in about 8 years, the population may be stabilized at about 4,000. Page will be a permanent community and residents will be engaged in federal, state, and municipal activities and services; recreation and tourist services; personal services; general business en-



**RELATION OF TOWNSITE AND FACILITIES TO THE DAM**

terprises; and industries that may be attracted to the area.

#### Plan of city

The community, which will occupy about 550 ac., is being built on Manson Mesa at an elevation 4,200 ft. above sea level or about 1,000 ft. above the normal elevation of the Colorado River. Streets for the town are being laid out in a curving pattern to conform to the topography of the mesa. The principal avenues are to be 70 ft. wide. All other streets are to be 42 ft. wide. The master plan for the town delineates areas for Government residences, services, and businesses, schools, motels, and an administration and hospital area.

A large 13-ac. park is to be developed and a series of play areas are being set aside in each of the residential areas. Space is also provided for future additions to the town. The contractor's community area is being built northeast of the business area. Also under construction is a 6,000-ft. airstrip, near the contractor's residential area.

Several contracts have been awarded for construction of the community's major facilities. The largest contract is held by W. W. Clyde & Co. of Springville, Utah, for grading streets, sidewalks, and installation of drainage facilities in the townsite, construction of 3.3 mi. of connecting roads from the community to the dam, and construction of water dis-

tribution and sewage collection systems for the town.

Under this contract the contractor is supplying and laying more than 42,000 ft. of water mains ranging in size from 3 to 14 in. in diameter, and more than 30,000 ft. of clay sewer pipe ranging in size from 6 to 12 in. in diameter. He will also construct curbs and gutters and sidewalks, walkways, and a surface drainage system, as well as provide bituminous surfacing of the community streets in the Government area.

Also under construction are a municipal building, warehouse, and field laboratory building. These features are being built under a contract awarded last August to Security Construction Co., Salt Lake City. The municipal building, located in the administrative area, is to be a wood frame structure 40 ft. wide and 114 ft. long, and will have a wing approximately 24 ft. wide by 75 ft. long. The warehouse, in the service area, will be 100 x 320 ft., constructed of rigid frame steel bents, and will have insulated metal panel side walls and steel roof decking. The field laboratory building, also in the service area, will be a wood frame structure 39 x 64 ft.

#### Contractor provides hospital

Specifications for construction of the dam and powerplant require the contractor to construct, equip, and maintain a 25-bed hospital. This will be a permanent structure which will

be staffed and operated by the contractor during construction of the dam and powerplant, primarily for use by the contractor's employees. After construction of the dam and powerplant is completed, the hospital building, together with all equipment, will become the property of the Government.

#### Homes for U. S. personnel

Bids are to be invited soon for construction of 200 permanent 3-bedroom houses for federal personnel who will be stationed at Page. Options are also to be offered to the successful bidders for leasing of an additional 150 lots for construction of houses as a private development for sale or rental. The Bureau expects to save a considerable sum of money by advertising for bids on the large block of houses. Contractors can purchase and transport large quantities of materials to the new townsite and achieve significant savings in construction costs. Construction of all the 200 houses is to be completed 30 days after the contractor is given notice to proceed.

Invitations are to be issued for construction of an administration building, a police building, and a garage and fire station building. The administration building and police building are to be located in the administration area; the garage and fire station building is to be built in the service area.

The architectural design of Ge-

ernment buildings is of contemporary style. Permanent residences and buildings are to be air-conditioned and have electrical, water, gas, and sewage facilities. A contract awarded in July to the Petrolane Gas Service, Inc., of Long Beach, Calif., calls for the firm to supply and install propane gas service tanks and piping which will be used in heating the community buildings and residences.

Until facilities are available in Page, the Government's forces and the contractors engaged in the early phases of the work have chosen or have been assigned a site for their temporary camps, offices, or construction facilities, depending on their individual requirements. Most employees are now living in trailers.

Construction was recently completed by the Martin-Rice Construction Co., of Las Vegas, Nev., of foundations for 50 demountable houses which will be available to additional Government employees in the area. These houses are located on the outside of the perimeter street which encircles the permanent housing area. This location will permit these temporary houses to be demounted after they are no longer required, without affecting the permanently developed interior blocks. The area occupied by the demountable houses can later be available for construction of permanent housing or for recreational facilities. The demountable houses will be relocated and used on future construction jobs.

### Meeting the power needs

Temporary power needs at the townsite are being met by engine-generator sets. For several months, communication depended on mobile radio, field telephone, or messenger.

Recently, the American Telephone and Telegraph Co. completed the construction of a temporary building at the townsite. The temporary telephone system from the end of the Kanab line on the west side of the river, spanning the river and terminating at the townsite, was completed and telephones are now in operation at Page.

Under an agreement reached with the Bureau last July, Merritt-Chapman and Scott Corp. prime contractor for construction of the dam and powerplant, is to supply the electric power required for construction and for the construction camp. The contractor is to install multiple-engine diesel generator powerplants which will have a total capacity of between 15,000 and 18,000 kw. He will also supply up to 3,000 kw. of power to

the Government for operation of Bureau facilities at Page. Invitations were recently issued, calling for construction of the power distribution system in the townsite, which will provide electric service for residential, commercial, municipal, and Government customers and for street lighting.

## Water & Sewerage

Providing an ample and potable water supply is essential to the successful development of Page and the Glen Canyon Unit construction. At present, water is being hauled, pumped from deep wells, or pumped by temporary facilities from the Colorado River. However, for full domestic use at Page, a complete, modern water supply system is necessary and is under construction. The system, which is designed for a capacity of approximately 1,500,000 gpd., will pump water out of the Colorado River. Water will be raised about 1,200 ft. out of the canyon to serve the new community. The system is expected to be in partial operation by April.

### Turbidity and treatment

Turbidity of the Colorado River water varies from 350 to 80,000 ppm. After the water passes through the treatment system, the turbidity will not exceed 10 ppm. Hardness of the water varies from 130 to 700 ppm. The treatment system is not designed for water softening, but individual users may install water-softening units in their residences for softening water for domestic use, if they so desire.

The Southern Engineering and Construction Co., Inc., Long Beach, holds the contract for construction and installation of most of the major features of the system. The contract for construction of a 3,000,000-gal. steel water storage reservoir tank and a 150,000-gal. elevated water tank is held by Pittsburgh-Des Moines Steel Co., Santa Clara, Calif.

The water supply system has three essential elements: (1) a pretreatment area about 1 mi. downstream from Glen Canyon Dam, (2) a high-lift line, and (3) a treatment area on the highest ground at the southeast edge of town. For the pretreatment area, variations in river level necessitate an intake that can be raised or lowered by 7-ft. intervals so that water can be taken approximately 5 ft. below the normal water level. This will be accomplished by mount-

ing three 400-gal. per min. raw water pumping units on a carriage which will operate on inclined track.

### Initial treatment

Raw water pumped from the river will be raised to a 60-ft.-diameter steel presedimentation tank, where alum and lime from a chemical feed house will be added to it. The presedimentation tank and its sludge removal equipment provides for chemical flocculation, upflow clarification and internal sludge recirculation, and will have a minimum detention time of 3 hr. for the nominal flow of water. After detention in the presedimentation tank, the water flows into a sump tank which will provide water for the suction of high-lift pumps. A high-lift pumping plant will house three 400-gal. per min. high-lift pumping units. The units are of the horizontal, multi-stage, centrifugal type, and are to operate under a total head of approximately 1,300 ft.

The three raw water pumping units are being supplied by New York Air Brake Co., Aurora Pump Division. The three high-lift pumping units are being supplied by the Allis Chalmers Manufacturing Co.

Water from the high-lift pumping units will be raised 1,200 ft. through a 10- and 12-in.-diameter steel high-lift pipeline, about 11,500 ft. long, to the treatment area. The treatment area includes a sedimentation tank, a filtration plant, a wash water recovery pond, the 3,000,000-gal. storage reservoir, and the 150,000-gal. elevated water tank.

### Final treatment

Water from the high-lift pipeline will be treated with alum, lime, activated carbon and activated silica as it flows into the sedimentation tank. The sedimentation tank is similar to the presedimentation tank. The water then flows into the filtration plant where it is to be filtered by passing through a filter bed of anthracite coal and gravel to a clear well. Chlorine is to be added to the water as it flows into the clear well. Provisions are also made to pre-chlorinate the water when required. The water is then pumped from the clear well by two 600-gal. per min. pump units to the storage reservoir.

The storage reservoir is a steel tank 110 ft. in diameter by 42 ft. high, placed on the ground. It will hold in reserve 355,000 gal. for fire protection. There are three 600-gal. per min. pump units located in the filtration plant which will pump the

water from the storage reservoir into the 150,000-gal. elevated steel tank from which the water flows to the distribution system. All three tanks and the wash water recovery pond are located close to the filtration plant.

### Sewerage system

A complete sanitary sewerage system is being installed to serve all occupied areas of Page and will meet the requirements of the State of Arizona and the Public Health Service. The installation is being carried out in conjunction with construction of the water distribution system, in advance of the placing of curbs, sidewalks, and street paving.

The sewer pipe laterals and mains in the community are to lead to a 12-in. outfall sewer, then to a sewage treatment plant. The plant, to be built about 1 mi. west of the town near a small ravine, called Honey Draw, is of the separate sludge digestion type. It is designed to treat an average sewage flow of 100 gal. per capita per day.

### Sewage treatment

In brief, the sewage will enter a pretreatment unit equipped with a comminutor to screen and cut coarse material in the raw sewage. The comminutor is designed to handle flows up to short-period peaks of 1,600,000 gal. per day and average flows of 500,000 gal. per day. From the pretreatment unit the influent will enter a clarifier where approximately 60% of suspended solids settle out when the raw sewage passes through the clarifier tank. The settled sludge will then be pumped into a digester, while liquid effluent passes on and is discharged into nearby stabilization ponds which allow the oxygen-deficient effluent to become stable through contact with the air. The system is so designed that the effluent will be virtually free from nuisance-forming properties and will leave the plant clear and free from obnoxious odors. During a sustained period of maximum sewage flow, the effluent will be retained in the stabilization ponds for a minimum of 30 days before being conveyed through a discharge line into Honey Draw where it will flow into the Colorado River at a point approximately  $2\frac{1}{2}$  mi. downstream from Glen Canyon Dam.

The digestion process reduces all organic compounds to inorganic compounds. The digester is designed for a 60-day period of retention at maximum sewage flow.

The contract for construction of the sewage treatment facilities, including 6,850 ft. of 12-in.-diameter outfall sewer pipeline, concrete structures to house the sewage treatment equipment, installation of treatment equipment, and construction of the stabilization ponds and sludge drying beds, is held by the W. W. Clyde and Co.

### City administration

Although the land in the townsit will be initially owned by the Government, it is the intent of the Bureau to sell the land as soon as appropriate legislation is passed by the Congress. According to present plans, leaseholders will be given the opportunity to purchase the land on which they hold leases. It is also the Bureau's policy to work for and encourage the incorporation of the community as a city under the laws of the State of Arizona as early as practicable. These policies have been adopted with the belief that a stable economy will develop in the town and that the permanent population will desire independent municipal government for the sound management of its own affairs.

In the meantime, the community will be administered by a city manager who will be selected by the Bureau. The Bureau is providing police and fire protection for the community during construction. School construction and administration will be a state and county responsibility; assistance of federal aid will be obtained through the United States Office of Education.

In considering the permanent economy of Page, the Bureau has given thought to the tourist industry that may develop. Page is strategically located among several National Parks having high visitations. The total number of visitors to five National Parks and Monuments—Bryce Canyon, Grand Canyon, Zion National Park, Petrified Forest National Monument, and Lake Mead National Recreation Area (at Hoover Dam)—was about 5,000,000 in 1956. The location of Page, situated on a first-class highway among these recreational areas of national importance and adjacent to Glen Canyon Dam and Reservoir, is expected to result in the influx of an estimated 600,000 tourists annually.

### Permits for business

Widespread interest in business opportunities which are expected to

be available in Page has been indicated by persons in all parts of the country. Regulations have been established, governing issuance of permits, leases of land, and limitations on the number of businesses to be allowed.

The various businesses or other lines of service which are to be carried on in the new community were divided, with reference to granting of permits, into three categories: exclusive, personal, and general business. Applicants for the permits are required to certify to the validity of statements relating to adequacy of financial resources, equipment, and experience.

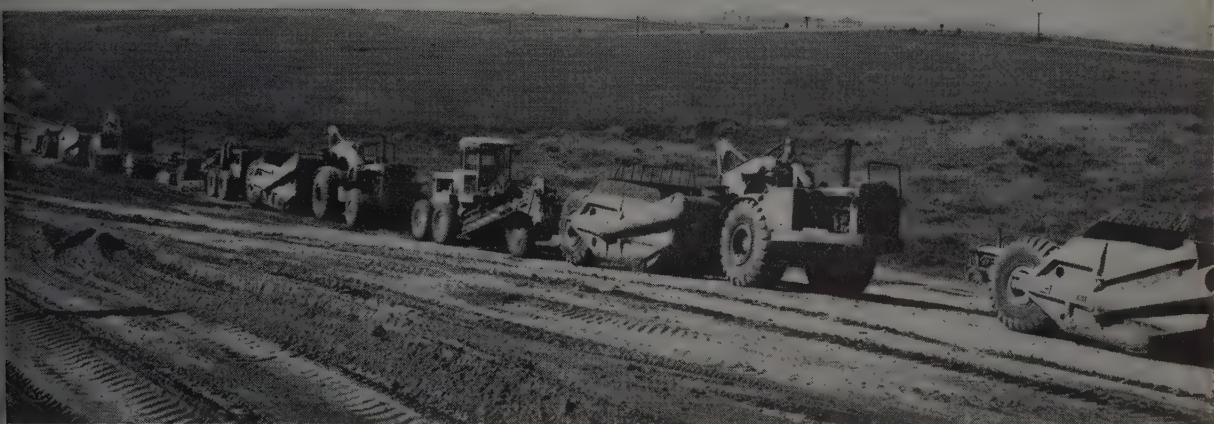
Exclusive permits are being issued for the operation of public utilities and where such limitation is clearly in the public interest, such as communications system, transportation services, garbage and refuse collection and disposal, and airport operation. Permits for personal services are being issued to members of the recognized professions who are authorized to practice under Arizona law, such as physicians, dentists, and others.

Competing permits are being granted to those engaged in the usual lines of wholesale and retail businesses. The number at first granted has been limited to three in each major category. Further granting of permits may be made as the public interest requires. When conditions stabilize, or upon completion of the dam, the limit upon permits may be completely removed.

Applications for leases of land on which construction will be undertaken will not be approved until plans for the construction have been approved and adequate financial arrangements for the cost of construction have been assured. Leases for land for business and residence purposes will extend for a period of 10 to 50 years as required to meet individual needs.

### Personnel

Development of Page and other features of the Glen Canyon Unit construction is under the overall jurisdiction of the Bureau's Region 4 office at Salt Lake City. E. C. Larson, Director. L. F. Wylie is the Bureau's project construction engineer at Kanab, Utah. Preparation of designs and technical supervision of construction are under the direction of the Bureau's engineering offices at Denver, administered by L. N. McClellan, Assistant Commissioner and Chief Engineer.



*Realigning Route 26 near Ririe, Idaho*

## JOB-ENGINEERED FINANCE PLANS

Part of the Wangsgaard Construction Company equipment fleet tackles one of the largest jobs let by the Idaho Highway Commission—a new alignment of a 12 mile section of Route 26 near Ririe. 1,610,000 yards of excavation were involved. 100,000 yards of this were solid rock.

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# Slurry seal for airport in Montana

**Old runway surfaces at Billings municipal field treated with modern maintenance procedure to stop moisture from reaching base material. Details of mix, costs presented. Contractor develops method for moistening surface ahead of spreader.**

**By KELTON E. BAINUM**

Assistant City Engineer,  
Billings, Montana

Furthering our reporting on this important Western development in road maintenance, **WESTERN CONSTRUCTION** presents another article describing a slurry-seal project. Previous articles were:

1955—April—Initial work of Los Angeles County Road Department.

1956—February—Review of developments to date, principally in Southern California, prepared with the aid of The Asphalt Institute, Pacific Division.

1957—February—Evolution advanced sufficiently to permit a discussion of "where and how to use it" by Merle L.

Nelson, California Division of Highways.

1957—September—Application to extreme desert conditions at the Naval Ammunition Depot in Nevada was described with cost data by the officers in charge.

These articles represent the most extensive information available on this subject, which is a distinct Western contribution to highway maintenance. To these articles is now added the airport adaptation in Montana with its further contribution in reporting on methods, equipment use, and results.

**EDITOR.**

LIMITED FUNDS and 170,000 sq. yd. of badly deteriorated runway surfaces created a frustrating combination of circumstances. It did, however, seem to typify the problems confronting a municipal administration of the size of Billings, Mont.

Billings' Logan Field, a city owned and operated airport, has three authorized and active runways. One of these, an 8,600-ft. instrument landing runway was completed in September 1955.

The other two, built back in the 1930's as a P. W. A. project, suddenly began breaking up last summer. Their original design—if it can be labeled such—merely consisted of a bituminous stabilized base of native material with a chip seal wearing surface. A couple of chip seal jobs in subsequent years constituted the entire maintenance program for these two runways.

In retrospect, it is now evident that two natural conditions contributed to what must be considered a long and useful life for these runway surfaces, having been built as they were. Utilizing the existing terrain to the maximum both runways carry a 1 to 2% longitudinal slope as well as a transverse grade of practically 1%. This, coupled with good shoulder drainage, unquestionably did much to preserve their utility.

Secondly, the airport itself lies on a tremendous sandstone escarpment immediately north of the city. It might be said that, as far as a base structure is concerned, they were

built on a solid rock base 300 to 400 ft. thick. A possible deficiency of proper maintenance, the extremes of the annual temperature range in these latitudes and increasingly heavier aircraft and traffic all contributed to the current failure of these runways.

## Heavier traffic and tough weather

Up until a few years ago, a DC-3 was about the largest plane ever seen on the field. Today, commercial carriers are bringing in DC-4's and 6's, Stratocruisers and Convair 220's. Due to the proximity of the northern air defense zone, a great number of National Guard and Air Force jet fighters use Billings as an alternate airport for the Great Falls installation. Fully loaded, some of these

craft impose over 3,000 psi. on a runway or taxiway.

Mother Nature dealt the crowning blow to the runways in 1957 with a record amount of precipitation. Normal annual figure of some 14 in. was on the weather bureau books before the first of July. As a result even the smallest cracks began pumping moisture and sub-surface material to the top. Functionally, portions of these old runways are used as taxiways to and from the heavily used instrument landing runway. This slow gross weight taxiing of military and commercial aircraft completed the breakup of the frail surface.

The time element precluded the procurement of matching funds from the federal government for 1957 construction. And, too, it was questionable whether the city's funds would be adequate for its share of the necessary work if constructed in accordance with C. A. A. standards.

## Decision to try slurry seal

After a thorough inspection, City Engineer Sam B. Ward, the author, and J. F. Pearring, then district engineer, The Asphalt Institute, Denver, were in agreement that these two runways could be preserved for one or two more years provided an adequate sealing could be accomplished. It was rather certain that all damaging moisture was entering through the "roof" and not the "basement." Ample area and shoulder drainage was protecting the base and subbase.

Previous articles in **WESTERN CONSTRUCTION** and advertisements had aroused considerable interest in the merits and possibilities of slurry sealing, in respect to both cost and

(Continued on page 44)



**WIDTH** of slurry sealing operations on an airport runway, as compared to a road job, is shown by the distance to the mixer truck and spreader. This seal will face a severe test during the Montana winter and spring seasons.



Put one track in high range, the other in low—and the TD-24 pushes straight ahead, despite the tremendous offset load of benching-out unshot rock strata. P. C. Cooper, Blountsville, Tennessee, first rented this TD-24—then bought it because of its rock-'dozing performance!



An 8-unit TD-24 fleet owned by Rusciano and Sons Corp., replaced 8 big competitive crawlers—because TD-24 performance "measured up" to the toughness of this big road job. There was a considerable tonnage of granite and other rock to bulldoze—on the White Plains (N.Y.) Section of the 'Cross Westchester Expressway!

"With the TD-24, I can outwork any other machine where you have to push and turn with a big load," declares Operator Dan Olmstead, for Gibbons & Reed, Salt Lake City, Utah. "The TD-24 keeps the load moving, because you don't lose power braking a track." The TD-24 is spreading rock on a tough million-yard project—widening U. S. 40 in the Truckee River canyon near Reno.



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## RUNWAY SLURRY SEAL

(Continued from page 40)

effectiveness. It appeared that the soupy consistence of a slurry would penetrate alligator cracks where an asphaltic chip seal might bridge across, only to again separate after a full cycle of freezing and thawing.

There were no illusions as to improving the runway structure with either this or any other type of surface sealing. The efforts would be directed toward achieving a tight and penetrating seal. The slurry, it was reasoned, should carry a certain amount of minus No. 50 and smaller material down into the cracks. Subsequent results proved this assumption substantially correct.

In preparing the specifications, the city engineering department was greatly indebted to W. H. McCallie, bituminous engineer for the Farmers Union Central Exchange, Inc., whose refinery would furnish the asphaltic emulsion, it being the only producer in the area. SS-1 was specified with an SS-1h (SS-2) as an alternate, depending upon the availability. Production limitations preclude the alternate, however, and SS-1 was used.

Specifications bid were as follows:

CONTRAST between the old chip-seal wearing surface and the fresh slurry seal (left) is shown in detail with texture and character of the surface (right).

### AGGREGATES: (Sand and/or rock dust)

| No. | 8  | 95 — 100 | Total | % passing |
|-----|----|----------|-------|-----------|
| 16  | 70 | 95       | "     | "         |
| 30  | 60 | 90       | "     | "         |
| 50  | 30 | 50       | "     | "         |
| 100 | 10 | 25       | "     | "         |
| 200 | 3  | 12       | "     | "         |

### EMULSION: SS-1 (100—200 penetration)

#### BATCH RATIO: (100 lb. aggregate)

100 lb. sand and/or rock dust

2 — 2.5 gal. emulsion

1 gal. water (variable)

These specifications were evolved as a reasonable compromise of the various projects undertaken in Southern California and Nevada. None of the city or contractor personnel had ever seen a slurry seal job, either during construction or upon completion. As someone rather facetiously remarked, we were all strictly on "instruments."

### Special box design

We prepared plans for a spreader box that was very similar to those built and used by the various municipalities in California. Here again we were indebted to the experiences of others.

On July 23 a contract was awarded to Long Construction Co., Billings, Mont., for approximately \$50,000 of runway repair work which included some 180,000 sq. yd. of slurry sealing. The original consideration was to prepare the bid proposal on a square yard basis. Further discussions within the office and investigation of the surfaces to be slurry sealed caused a change of minds.

The last previous seal on these two runways was a chip job using 1/2-in. maximum material. And, too, previous tracks of the spreader bar would require a certain amount of surface leveling along with the sealing. We therefore prepared the proposal on the basis of material quantities, mixed and spread as required to cover the areas. Using the batch ratio previously detailed, the contractors bid on 1,015 tons of aggregate, 50,665 gal. of SS-1 and 20,266 gal. of water.

The contractor had recently acquired a considerable stockpile of reject sand and rock dust completing a 30,000-ton chip and crushed road material contract for the city street department. A sieve analysis revealed a very small amount of scalping off of 1/4 in. and larger size would be required to put this stockpile within the limits of our aggregate specifications.

This was done in the unique manner of putting it through his hot plant dryer and screens. It therefore provided the batching operation with a constant moisture factor of practically zero.

The batching installation represented a minimum expense as to equipment. Dry aggregate permitted a volumetric batch method that worked very satisfactorily relative to both sand and water. As stated so emphatically on page 31, September issue of WESTERN CONSTRUCTION, the results of adding the emulsion to the dry aggregate are horrible. With a simultaneous charging of the sand and water, then the emulsion, the



BATCHING HOPPER is being filled, and the mixer truck is taking its load. Lines from the right deliver the emulsion. To the 6,000-lb. charge of aggregate was added 150 gal. of SS-1 and 110 gal. of water.

then described "soupy" consistency was readily attained.

The batching hopper, erected on an embankment about midway along the runway, permitted the transit-mix trucks to back in under the gate for charging. A small front-end loader was used to fill the hopper, water was measured on a volume basis and the emulsion was pumped and metered from a storage unit alongside the batching area.

The batch quantities were as follows:

6,000 lb. aggregate  
150 gal. SS-1  
110 gal. of water in the drum  
20 gal. of water in the truck water tank

This additional 20 gal. of water was a pay item and was used as a wetting medium immediately ahead of the spreader box. The contractor rigged a spray bar with a weed sprayer type of nozzle and tied it in with the pump and extra water tank which a transit-mix truck mounts. It worked very well in eliminating an extra piece of equipment for fogging, and it laid the water down in the right place at the right time.

A crossed cable hitch was made between the truck and the spreader box. Being attached to the truck frame about midpoint between the front and forward rear axle, it kept the spreader box tracking in proper alignment with the towing truck. This proved to be very satisfactory.

#### Material used and cost

An analysis of the actual quantities used was quite interesting. The total materials used under-ran the estimated quantities by approximately 22%. We were able to achieve a thinner coating than the surface texture indicated. This amply justified our earlier decision of having the contractors bid material quantities instead of surface areas.

Long Construction Co.'s bid prices, spread on the runways as a finished slurry seal coat, were as follows:

|                   |        |                    |
|-------------------|--------|--------------------|
| 19 tons aggregate | \$6.00 | \$ 4,734.00        |
| 2,450 gal. SS-1   | .194   | 7,653.30           |
| 1,190 gal. water  | .04    | 1,367.60           |
| <b>Total</b>      |        | <b>\$13,754.90</b> |

These quantities do reveal a greater moisture content than other such projects. One factor is definitely the use of thoroughly dry sand. Another is the use of a thinner mixture found necessary to adequately penetrate the rough chip surface. The actual area sealed was very close to



**MOISTENING** the old surface ahead of the spreader represents a good example of contractor ingenuity. The water tank on the truck was connected to a spray bar with weed sprayer type nozzles mounted on the front bumper. This fogged the surface at exactly the right place and time.

190,000 sq. yd. Cost per square yard was approximately \$0.0724 or 8/10¢ per sq. ft.

Final yield presented an interesting point. A batch quantity of 8,300 lb. through a 10-ft. spreader box would often go 10 to 15% farther on an uphill spread than on an identical surface being pulled downhill. The weight of the box seemed to effect a better wiping action when pulled uphill. The net result was approximately 11½ lb. of slurry applied per square yard of surface.

#### Equipment and time

The contractor used four transit-mix trucks—three 4-yd. units and one 6-yd. Maximum haul distance from the batching area was about 1.6 mi. and the minimum was slightly over ½ mi. There was several times when the spreader crew was waiting for a truck due to the delay in batching and haul distance.

Seven working days were required to do the total sealing job. Practically a week was lost due to rain and some snow during the last week in September. Considerable concern was felt as to the low temperatures and high humidity effect on the eventual curing. It was fully realized that the time of year in this part of the country was far from the ideal in undertaking such a job, but the runway conditions demanded the element of chance.

Two days after the last slurry had been laid, the airport was host to some fifty military aircraft participating in an air show. There were many current model jet fighters as well as heavy bombers and cargo

transports. While all the landings and takeoffs were made on the ILS runway which was not touched during the repair work, there was a considerable amount of taxiing and some jet heat on these freshly sealed runway surfaces.

There appeared to be no visible damage as the result of this traffic—no peeling or tracking. Some rutting occurred, but the seal seemed sufficiently flexible to flow into or form over these few minor deformations.

The results of our severe winter temperatures of —20 to —30 deg. remain to be seen. As is true with any asphaltic runway surface, the relative small amount of traffic imposes an unfair evaluation of the material. A thorough rolling with a pneumatic roller is planned for the coming spring to observe the results, if any, of such a treatment for this slurry seal.

As things now stand, every one involved with the continued operational condition of these treated runways is highly pleased with the "experiment." The only complaints were from some of the pilots landing on these runways. The very dense and uniform blackness of the new surface, prior to re-painting the centerline and end numbers, caused a little concern. One was never absolutely sure where the ground was. This condition, however, could be very effective as a heat reflecting medium for snow and ice removal.

Personnel for the contractor, Long Construction Co., included Deane L. Jensen, George Danielson, and Stuart Cousins. Frank L. Ferguson was project engineer for the City of Billings.

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# A progress report on Stanford's graduate course in — Education for contracting careers

EACH YEAR the construction industry is hiring engineers in increasing numbers. Of this group the bulk are being aimed toward field supervision and management positions rather than for the traditional jobs of technical engineer and estimator. As an example of this trend, one large heavy and highway construction firm has increased the number of its engineers from 10 to something over 100 in the last ten years. Every indication is that many other companies are moving in the same direction. A survey conducted in 1956 by the Associated General Contractors showed that contractors' needs for engineers in the following three years would exceed the output of all the civil engineering schools in the country.

Among contractors, there is a strong feeling that the traditional civil engineering education does not fully equip students for work in the construction industry. Particularly lacking is training in such subjects as estimating, equipment and methods, accounting, and management. At present, something more than half of the schools are attempting to meet the contractor's complaints, at least in part. The most common procedure is to offer one or more required or elective courses in construction as a part of the regular four year curriculum in civil engineering. Some 20 schools go further and offer an undergraduate "construction option."

Last year the Education Committee of the Associated General Con-

tractors endorsed a 5-year curriculum. This would include the full civil engineering curriculum *plus* training in construction subjects and management. Among the schools with such a program, in one form or another, are Cornell, Texas A. & M., the University of Missouri, and Stanford. This article reports in some detail on what Stanford is doing.

Two years ago, as reported in *WESTERN CONSTRUCTION*, January 1956, Stanford University instituted a full graduate year leading to the Master's degree in Civil Engineering-Construction. The first year's class consisted of nine full-time students; this year, the third, 24 men are enrolled. In this article, *WESTERN CONSTRUCTION* gives a second report on the Stanford Program.

For the last 25 years Stanford has had a graduate program in Civil Engineering Administration. Back in the early 1930's, Professor J. C. L. Fish, then head of civil engineering, and Professor Eugene L. Grant became aware that many civil engineers gravitated or were forced into administrative work. It was apparent that these men were badly handicapped because they had no background whatsoever in finance, accounting, law and the other subjects with which they, as administrators, had to deal. These lessons had to be learned after the men became administrators. It was to fill these gaps in engineering education that Professor Grant developed a graduate program

in civil engineering administration. It combined advanced work in technical subjects with administrative courses offered either in engineering or in the Graduate School of Business, the Law School, or other departments of the university. Over the years, a large number of graduate students have completed this program and many others have taken some of the course offerings.

In the fall of 1946, Stanford's undergraduate construction option was instituted. The curriculum was conventional civil engineering with courses in estimating, equipment and methods, business law, labor relations, and accounting substituted for technical electives. This option was thought of solely as an undergraduate program, terminating at the end of the fourth year. It was assumed that the engineer interested in construction would gain more by going to work than by continuing school.

As might have been expected, the undergraduate construction course attracted a number of graduate students each year from the civil engineering administration program. Some of these men developed strong interests in construction and were permitted to do individual work in areas not covered by the undergraduate courses.

By 1955, the number of students taking individual work had grown to a point that a series of graduate courses running through the school year was justified. At the same time it seemed appropriate to recognize this training by offering the Master of Science in Civil Engineering-Construction. Thus the graduate construction program represents the merging of two older curricula. Requirements for the M.S. degree in Civil Engineering-Construction are given in the accompanying table. Men with an accredited B.S. degree in civil engineering normally complete these requirements in three academic quarters, even though they have not had the undergraduate construction courses.

However, as undergraduates they almost always have taken advanced technical courses for which they are given offsetting credit, so that they take no more units than the other students. The situation is different for the occasional architect or industrial, mechanical, or electrical engi-



STUDENTS AND faculty on site of Palo Alto-Stanford Hospital. Tour was conducted by Robert Rothschild (holding plans) and Bennett Raffin (pointing) of Rothschild, Raffin, and Weirich, who hold a \$575,000 contract. Prof. John Fondahl is at extreme left, and Prof. C. H. Oglesby is at Rothschild's right.



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## REQUIREMENTS FOR M.S. DEGREE

### Forty-five or more quarter-units total

1. Required undergraduate civil engineering courses. (Fully satisfied if the candidate has an ECPD accredited B.S. degree in civil engineering.)
2. Undergraduate construction courses (6 quarter units)

#### Quarter Units

|                                                                                                                                                                                |        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| Construction Estimates and Costs . . . . .                                                                                                                                     | 3      |
| Construction Equipment and Methods . . . . .                                                                                                                                   | 3      |
| 3. Core group in construction and business (14 quarter units)                                                                                                                  |        |
| Construction Administration . . . . .                                                                                                                                          | 3      |
| Advanced Construction Equipment and Methods . . . . .                                                                                                                          | 3      |
| Concrete Construction . . . . .                                                                                                                                                | 3      |
| Advanced Engineering Economy . . . . .                                                                                                                                         | 2      |
| Depreciation . . . . .                                                                                                                                                         | 3      |
| 4. Electives in Business Management and Related Subjects<br>(Minimum—14 quarter units)                                                                                         |        |
| Construction Problems (special investigations) . . . . .                                                                                                                       | 3      |
| Civil Engineering Economy . . . . .                                                                                                                                            | 2      |
| Business Law—Contracts, quasi-contracts . . . . .                                                                                                                              | 5      |
| Business Law—Sales, Negotiable Instruments . . . . .                                                                                                                           | 5      |
| Business Law—Agency, Partnership, Corporations . . . . .                                                                                                                       | 5      |
| Industrial Organization & Management . . . . .                                                                                                                                 | 4      |
| Time and Motion Study . . . . .                                                                                                                                                | 4      |
| Engineering Accounting . . . . .                                                                                                                                               | 3 or 5 |
| Engineering Climatology . . . . .                                                                                                                                              | 2      |
| Business Economics . . . . .                                                                                                                                                   | 4      |
| Management Accounting . . . . .                                                                                                                                                | 4      |
| Cost Accounting . . . . .                                                                                                                                                      | 4      |
| Business Finance . . . . .                                                                                                                                                     | 4      |
| Industrial Management . . . . .                                                                                                                                                | 4      |
| Psychological Aspects of Business . . . . .                                                                                                                                    | 4      |
| Industrial (Labor) Relations . . . . .                                                                                                                                         | 4      |
| 5. Required and Elective Courses in Advanced Civil Engineering and Related<br>Technical Subjects (Minimum 10 quarter units)                                                    |        |
| REQUIRED                                                                                                                                                                       |        |
| Advanced Foundation Design . . . . .                                                                                                                                           | 3      |
| Harbor Structures . . . . .                                                                                                                                                    | 3      |
| ELECTIVES                                                                                                                                                                      |        |
| Structural Geology . . . . .                                                                                                                                                   | 5      |
| Engineering Geology . . . . .                                                                                                                                                  | 3      |
| Principles of Mining . . . . .                                                                                                                                                 | 3      |
| Mine Plant & Equipment . . . . .                                                                                                                                               | 4      |
| Introduction to Electronics . . . . .                                                                                                                                          | 3      |
| Advanced courses in civil engineering including those in structures,<br>soil mechanics, hydraulic engineering, and highways (50 or more<br>quarter units from which to choose) |        |
| Courses in engineering mechanics                                                                                                                                               |        |
| Courses in mechanical and electrical engineering.                                                                                                                              |        |

Methods. In it a deeper and more critical look is taken at the cost aspects of equipment selection and use. Preplanning and like techniques for reducing cost and making jobs safer are developed. (Incidentally, the instructors find it extremely difficult to obtain material on these subjects because contractors generally are unwilling to release information that may be of use to their competitors.) The third course, titled Concrete Construction, treats the subjects of concrete plant and equipment selection, form design, and field handling and placing techniques and methods.

Two courses in business management are required. These are Advanced Engineering Economy and Depreciation. Both provide background for proper decisions in money matters, particularly as they apply to the cost of equipment and plant ownership. In both courses special attention is given to income taxes and to their effects on business decisions.

Required engineering courses are Advanced Foundation Design and Harbor Structures. There are particularly valuable to men interested in heavy construction and in waterfront work. Since these subjects have little application to the commercial building and housing fields, substitution for them is permitted when the revised program better fits the man's overall objectives.

The majority of the students in the Stanford program have taken their undergraduate work at other schools. They come from many states and from foreign countries as well. This year's group includes, in addition to California residents, men from eight states ranging as far east as New York, from both Hawaii and Alaska, and from Norway and Lebanon.

As mentioned earlier, contractors and people from related activities have provided continued support by serving as guest lecturers and by offering their counsel and advice. In addition, several firms, including the Guy F. Atkinson Co., the Utah Construction Co., the Harney Foundation, the Vance M. Brown Co., and the C. L. Peck Co. of Los Angeles have provided fellowships, scholarships, or financial grants. According to the Stanford staff, this financial assistance has been a major factor in drawing able men from all over the country into the program and—finally—into the West Coast construction industry. Added information about the Stanford graduate program can be secured from the Department of Civil Engineering, Stanford University, Stanford, Calif.

neer who takes the program. He must make up the undergraduate civil engineering requirements to earn an accredited degree and this requires one, two, and sometimes three extra quarters.

A study of the elective lists in the accompanying table shows that enough courses of value in construction are available at Stanford to occupy a student for three or four years. However, the Stanford faculty and its contractor advisors agreed that the program should take no longer than one school year. It was therefore decided to give the student wide latitude in his program.

Choices are narrowed somewhat if the student has a well-defined goal. For example: Consider the man whose objective is eventually to be the owner of a construction company in the commercial building field. He probably will select his business electives from the courses in law, accounting, finance, and labor relations and his engineering electives in structures. On the other hand, the man interested in heavy earth-moving might

find time and motion study and climatology preferable to certain other business courses, and would surely need added background in soils and geology.

The heart of the graduate program is a series of construction courses running through the year. In all they total only nine quarter units, or one-fifth of the full program. However, it is in these courses that the ideas and facts learned in other areas are directed toward construction. Furthermore, the men are brought together to exchange ideas and experiences. As a part of these courses they meet and hear more than twenty first-rate speakers from contracting organizations of all kinds and also from equipment distributors, law firms, banks, insurance companies, bonding companies, and other fields closely related to construction.

The first graduate construction course is titled Construction Administration, and deals with organization, management, and business problems of contracting. The second is Advanced Construction Equipment and

# WILL OUTPERFORM ANY MACHINE IN ITS CLASS!"



Caterpillar-built Traxcavator is loading out soil from spoil heap for grade and shoulders—loads out 10-yd. trucks, servicing 5 trucks with a pile haul. Handling damp hard-pan, the husky No. 977 operates in

2nd and 3rd speeds and loads 10 yd. in 2½ min., averaging up to 2,000 yd. per 10-hr. day. The Minnesota State Highway job is 5.4 miles long and it calls for an excavation of 840,000 yd. of all classifications.

That's the way Mr. Markham of the E. Markham Construction Co., St. Paul, Minnesota, feels about the Cat No. 977 Traxcavator, shown loading out soil for grade fill and shoulders on a state highway improvement job in St. Paul.

Owner Markham feels that CAT-built equipment is the "most reliable and best mechanically." He says, "Caterpillar Tractor Co. has wisely shown an understanding of the contractors' equipment needs—no fancy do-dads that look good on paper and go in operation—just down-to-earth improvements that really work."

Dependable, versatile performance is typical of Caterpillar's line of Traxcavators, from the rugged No. 977 to its tough, agile smaller brother, the No. 933. These finely balanced work units are engineered for the *hard* work, with welded steel frames, boom arms and cross braces of strong, box-section construction, and tilt arms of solid steel. They're easy to handle with quick-acting hydraulic controls.

The 50 HP No. 933, as well as the larger No. 955 and No. 977, are available in the new Series E, with extra-sturdy undercarriage for applications which put the greatest stress on your equipment. And the new side dump bucket can be had for the No. 955 and No. 933 Traxcavators. For complete details, see your Caterpillar Dealer. He'll be glad to talk your kind of language in a deal for the best in earthmoving equipment. And he'll back you up on expert service and parts you can trust.

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THIS "RUBE GOLDBERG" arrangement was improvised by Macri Construction Co. to place concrete over a 100-ft. diameter area. The pole extended the Link-Belt boom and the Pumpcrete line was shortened

without interrupting operations as the pour advanced. The Jaeger mixer ground out 791 three-sack batches for the continuous 32-hr. pour. This improvised and under-capacity plant performed with credit.

## Alaskan bush breeds job-ingenuity

**Contractor adapts available equipment to pour 100-ft. diameter concrete slabs for fuel tanks at King Salmon. Welding and coating of steel presented other problems.**

ALASKA HAS always been a fertile breeding ground for improvised "Rube Goldberg" equipment and live-on-the-country "Joe McGee" methods caused by Old Mother Necessity. The Eskimo with his trustworthy skin and whalebone boats and sleds is the original example. Another is the Indians with their current-powered fish wheels that turn in the midnight twilight like ghostly ferris-wheels, scooping up tons of spawn-run salmon and sliding the silver horde into live boxes with nobody tending the clever contraptions. The goldrush sourdoughs had their efficient oil-drum, BTU-boosting Yukon stoves.

Today the Alaskan bush remains primitive and presents ulcer-causing supply and equipment problems to contractors. You cannot get on a phone, rent mere suitable equipment, and get it in high gear in a few days as you can Stateside. At times improvisations are imperative to fit your equipment to the job. High freight rates and the short summer working season cut your profits if

you wait and order from the States special equipment, tailor-made for the type of construction.

Macri Construction Co. of Seattle, Wash., and Anchorage, Alaska, improvised an ingenious "Rube Goldberg" to place concrete on their U. S. Corps of Engineers' contract for a U. S. Air Force jet fuel tank farm at King Salmon, Alaska. These three underground 25,000-barrel storage tanks are 18 ft. high with 100-ft. diameters, resting on an 18-in. concrete base pad. Concrete plant on hand was suited and intended for frame building concrete footings, floors, and stairwells and that's about all. It consisted of a 16S Jaeger portable mixer; a small portable Winslow "Binabatcher" for the aggregate which was charged by a Michigan TLDT16 crane with clamshell bucket; a 160S Rex Pumpcrete machine; and a Link-Belt crane with a 70-ft. boom.

The bottom tank slabs presented a serious problem with their 101-ft. diameters and 445 cu. yd. of monolithic concrete. A giant of a pour

(for the Alaskan bush) for a midget mixer, a 70-ft. boom and a concrete pump. Jerry Dodd, Macri's superintendent with eight years Alaskan experience, improvised the "Rube Goldberg" that was highly successful. The steps were as follows: (1) he walked the crane down into the hole; (2) lashed a power pole to the lowered too-short 70-ft. boom so that it could reach 101 ft.; (3) slung the Pumpcrete line underneath; (4) installed a swivel joint from plumbing fittings in the pipeline at the center pin of the crane; (5) ran the pipe back to the centrally located Pumpcrete mixer, and batch plant; and (6) cranked up for the first slab pour on May 29, 1957.

For 32 hr. the small-scale plant piped 791 (3-sack) .56-cu. yd. batches into the slab, averaging 13.9 cu. yd. per hr. With the concrete crew learning some placing shortcuts, the second tank bottom took 27 hr. and 787 batches averaging 16.5 yd. per hr. on May 31. Two days later the third slab took 27 hr. and 15 min. for 800 batches averaging 16.3 yd per hr.

### Sequence of pouring

The procedure was as follows: a 10-ft. wide segment was placed (see picture) by making three passes

with the swinging boom and a swivel chute at the end of the Pumpcrete discharge; then a 10-ft. length of pipe was taken off without shutting down the flow of concrete and another arc was placed. For the first  $\frac{2}{3}$  of the area, an operator was not needed on the crane as men had enough leverage to swing the boom by hand. The last  $\frac{1}{3}$  utilized an operator on the crane.

The contract for this \$1,026,188 tank farm facility for U. S. Air Force jet plane operations at King Salmon Airport is designed, administered, and inspected by the U. S. Army Engineer District, Alaska, Anchorage, Alaska. These are not run-of-the-mill fuel storage tanks as blast protection has entered into the design criteria. Structural steel T-bars were embedded in the concrete slab

and  $\frac{3}{4}$ -in. plug welds attach the bottom tank steel plates to these embedded members through slots in the 5/16-in. bottom plates. Inside the tank a structural steel framework "beefs up" the 7/16-in. shell and the  $\frac{1}{4}$ -in. top plates. T-bars are welded to the columns to brace against the shell plates and act as stiffeners. A 12-in. concrete slab and 4-ft. backfill cap the tanks. Concrete transfer and sump pump houses are mounted on top of the tanks.

#### Next problem was welding

Solving the concrete slab placing problem with a small plant was a highlight of the construction, but it did not eliminate all the headaches of the job. Maxwell Steel Co., Fort Worth, Texas, was the subcontractor on the tank fabrication, erection, and welding. As this was a new type of tank construction several methods were discussed and tried at the beginning. It was the consensus that the best way was to install the bottom plates, erect the framework, weld the T-bars to the columns, and then attach the shell plates.

Elevations were a problem as the tank bottom sloped 5 in. to a sump in the middle. Joints of the bottom plates were staggered to help eliminate some of the welding stresses. Some difficulty was encountered in plug welding the bottom plates to the embedded T-bars by such factors as some T-bars and concrete being out of elevation, some plates being bent in shipment, "growing" of the plates as the welding progressed, and temperature changes which caused plates to hump up from expansion.

A crane and later a dozer were utilized to iron out the plates and hold them down during welding. The plate metal was very difficult to weld as the specifications called for high strength, low alloy, anti-corrosion, ASTM A-242 steel with a minimum yield point of 40,000 psi. Few of the welders had ever worked on this type of plate which is inherently difficult to weld as its hardness prevents it from flowing freely. The top plates also had  $\frac{3}{4}$ -in. plug welds to attach them to the line-backing structural steel framework which was also welded.

A portable vacuum box was used to test the welding of the top and bottom plates. Then the tanks were filled with water to the top of the hatch projection to test the shell and give an additional check on the other welds. The plug welds proved to be the dead-end kids as a high percentage leaked on the initial testing and had to be repaired. As a factor of safety it was decided in the field to weld small caps over the bottom plate plug welds.

#### Next came coal-tar

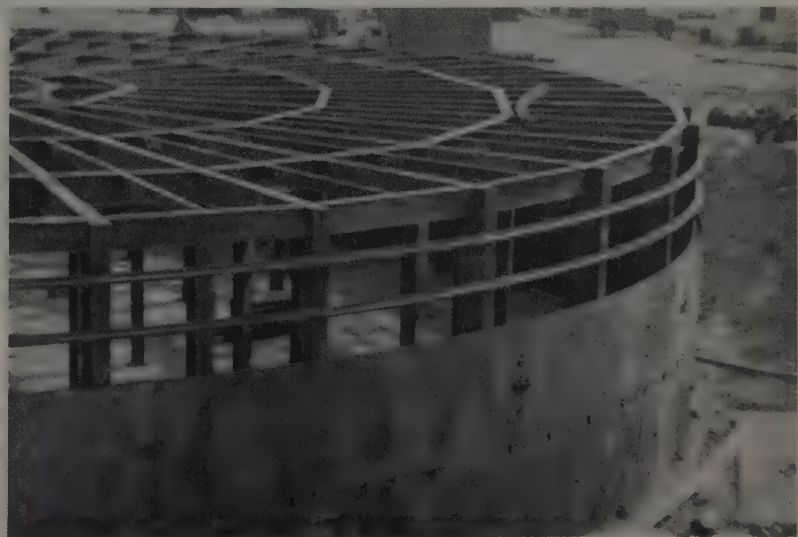
The exterior of the tanks was painted with unheated primer and a finish coating of hot-applied coal-tar enamel. The weather was the problem as the welding was not completed until late in September near the end of the normal Alaskan construction season. Specifications called for the primer to be brushed on at steel temperatures from 60 to 80 deg. with the relative humidity below 80%. The paint manufacturer

(Continued on page 58)

SPANNING the 100-ft. diameter, the 70-ft. boom and its timber-pole extension provided enough leverage to enable the crew to swing the discharge end by hand. On the final third of the pour an operator in the crane was required to swing the boom.



FIELD WELDING of the frame and the plates of high-strength, low alloy, anti-corrosion steel presented job problems. Coating with hot coal-tar also had its problems with rain and cold weather as the Alaskan winter approached.





OC-4

—28 net engine h.p. Only crawler tractor in its class designed specifically for heavy construction work. Able, agile, versatile. Full allied equipment: dozer, trencher, backhoe, scraper, winch, side boom. Also 5/8-yd. loader.



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## ALASKAN INGENUITY

(Continued from page 55)

recommended that the enamel not be applied at air temperatures below 40 deg.

It looked impossible to complete the work when it started October 2 with frequent rains, cold snaps, and the threat of an early winter chopping off operations until next spring. The priming started during chilly weather, but an airplane heater with its canvass duct proved handy in blasting BTUs into the interior of the tank to warm up the steel shell.

October had the sourdoughs shaking their beards in amazement. Low pressure areas congregated out in the Aleutian Chain as regular as geese heading south and pushed warm air in from as far away as Hawaii.

### Coal tar placing was tricky

The coal-tar enamel turned out to be tricky stuff to apply in Alaska. The painters soon learned that the temperatures of the paint were temperamental and had to be handled with care. If the enamel was heated in the pot above 500 deg., it produced carbon which caused tiny pop-outs in the coating. These "jeeped" from the electric holiday tester like fireworks sparklers. Then if it was applied at less than 450 deg., it tended not to bond properly to the prime coat. Care had to be taken with the sand blasting on windy williwaw days as dust on the prime coat would prevent good bonding with the enamel.

### Moisture a problem

Moisture acted the same way. After some experimenting, the following system was devised with success. Work was carried forward on all three tanks in rotation by sand-blasting, priming, and enameling a ring before sandblasting again on that same tank. Rain usually spear-headed the low pressure areas as they moved in on the job and often caused suspension of painting operations. This necessitated long overtime hours and Sunday work double-time on the warm sunny days.

It was found that trying to apply the enamel in one coat was a waste of time as many "jeep" marks were produced and necessitated a second application. The painting crew switched to two coats before "jeeping," and this proved to be more workwise and economical in the long run.

A 1/16-in. minimum coating was

specified, but before a "jeepless" cover was produced the paint averaged 1/8 in. thick plus extra patching. It was observed that the smoother the paint was applied the less "jeep" holidays would be found upon testing, even if the rougher areas were thicker.

Between squally spells of rain which shut down operations for several days at a time, the tank painting was completed from October 2 to November 5 with one crew and one heating kettle. This would have been impossible without the warm fall which smiled on the construction.

Macri pushed tank backfill operations right behind the painting which gave the casting progress a boost by eliminating the need for scaffolding. As soon as one 6-ft. ring was painted and tested, backfill would be placed while the painters were working on another tank. When the painting crew switched back to

the original tank, they could use the backfill in lieu of scaffolds.

For the U. S. Army Engineer District, Alaska, the following personnel were involved in the construction: Col. P. V. Kieffer, Jr., District Engineer; Col. W. C. Gribble, Jr., and Lt. Col. Richard Hennessey, assistant district engineers; Warren George, Chief, Engineering Division; John England, Chief, Construction Division; Ed Smith and Dan Nicholls, Construction South; George Avery, resident engineer; Leo Ocean Smith, project engineer.

Macri Construction Co. had the following supervisory staff: Jerry Dodd, general superintendent; Ray Heinrichs, general foreman. Carl Ouist was superintendent for the Territorial Mechanical Co. R. W. Rapsch was superintendent for Northwest Painting Service; Eugene Wigley, superintendent for Maxwell Steel Co.

## Construction films available

**A remarkable number of films on all phases of construction are made available through manufacturers. Here are a few of them.**

**HOW THE PROBLEMS** of laying a pipeline in rocky country are conquered is told in a new movie, "Overland Underground," produced by Gardner-Denver Co. The 19-min. sound film in color tells the story of men and machines battling the unusual terrain found in the pipeline's path between Ignacio, Colo., and Moab, Utah. The film can be obtained for showing without charge to interested groups by addressing Film Library, Gardner-Denver Co., Quincy, Ill.

**CHAIN SAW SAFETY PAYS OFF**, a new 25-min. 16-mm color film designed to show proper safe practices in logging and wood pulp operations, has been released by Homelite division of Textron Inc., manufacturers of gasoline powered chain saws. This film is available to members of the American Pulpwood Association and other groups or individuals interested in chain saw safety and maintenance. For further information write to J. Howard Maxwell, Jr., Sales Promotion Manager, Homelite, Port Chester, N. Y.

**THE ROAD AHEAD**, a new color motion picture designed to explain the Highway Program to the public, was recently released by Caterpillar Tractor Co., in cooperation with the Bureau of Public Roads. Narrated by popular commentator Walter Cronkite, the 23-min. film illustrates how the 41,000-mi., \$50,000,000,000 program will be

planned, built, and used. The film shows how completed interstate highways will look and explains the provisions of the road program in easy to understand terms. Copies for showings to interested groups can be obtained from Caterpillar dealers or by writing the Advertising Division, Caterpillar Tractor Co., Peoria, Ill.

**AN EDUCATIONAL** motion picture film, "Take-It-Away," is released by Macwhyte Company, wire rope sling manufacturer. The 700-ft., 16-mm black and white film with sound, traces the history of slings and shows various types in action. For additional information and reservations write to Macwhyte Company, Public Relations Manager, Kenosha, Wis.

**BUILDING MAN-MADE LAKES** along Colorado's mountains is the topic of "A Cup for Adam's Ale," a 33-min color film produced by the Gardner-Denver Co. The motion picture shows construction of Gross Dam in Colorado's scenic mountains 35 mi. from Denver, and illustrates how construction crews used special rock-drilling equipment to shave the mountains down to smooth, solid rock to allow adhesion with concrete. Available for group showing from the Film Library, Gardner-Denver Co., Quincy, Ill.

**MAKE MINE SAFETY**, a 16 mm sound-color film, demonstrating the use of rock bolts in various mine applications, is being made available by T. Colorado Fuel & Iron Corp., Denver, Colo. You may send your requests to the company headquarters or to any of the CF&I regional sales offices.



## Joy Blast Hole Drilling Systems... Performance We Can Prove

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# EARTHMOVING . . .

## Seventh in a series—Rock Trucks

By **RICHARD BENNETT**

Construction Consultant  
Saratoga, California

ARTICLES 5 and 6 of this series, which appeared in November and December, dealt with power shovels. Equally important to job efficiency are the trucks used to remove the excavated material. For the purpose of analysis, this article will work with data collected by the Production Cost Unit of the Bureau of Public Roads. The study covered 2,200 truck operation hours in the Western states in which 30 trucks with capacities of 9.7 to 13.1 cu. yd. hauled blasted shale, limestone, and clay. These figures are so important to profits that all earthmoving contractors would do well to carefully analyze their own operation for comparison. You may be unknowingly suffering costly job losses.

Job operation time analyses seem to frighten many earthmovers. They feel they are too technical for practical use. Actually, such analyses can be very simple. For studying your truck job a form can be used similar to the one shown on page 57 of the December issue of *WESTERN CONSTRUCTION*. This is a job-tested form created by the author which any timekeeper or foreman can grasp in a few moments. The instructions for its use are given on page 54 of the December issue. Such a form can be made easily by drawing the necessary lines, typing in the headings, and blueprinting as many copies as you need. For truck analysis the heading under Time would be: Elapsed, Cycle, Load, Haul, Dump, Return, Turn in Cut, Exchange, Waits and Delays.

Analysis of over 6,000 loads revealed the round trip cycle data shown in the large table. Daily variations frequently exceeded the ranges shown. Yardage was obtained by load counts and cross sections of the excavations. The important point is under good conditions the average pay yardage did not exceed 89% of truck struck capacity, while under average conditions it was only 78%. Too many feel that a 10-cu. yd. truck with a heaping load is carrying 12½ cu. yd. of pay earth, when in fact it may be carrying only 7 or 8 cu. yd. To determine this information for

your own conditions, count the number of loads for a given cut and then compare the yardage with that calculated from cross sections by the engineer. Or better yet, weigh a few loads—if the in-place weight of the material per cu. ft. is known.

This series of articles continually stresses the impact that delays have

on profits. For rock trucks the figure on delays are shown in the table labeled Total Available Working Time. Minor delays, even though short in duration, account for a staggering percentage of the net available working time, as shown in the table labeled Minor Delays. Major delays accounted for a loss of 42% of the total available working time with weather being the principal factor, as shown in the table.

The frightening losses incurred by delays can be minimized by competent planning and job control. Contractors must learn, and adopt, these techniques to secure maximum job profit. They are not difficult, and their use denotes good business sense.

### ROCK TRUCKS—ROUND TRIP CYCLE

|                                                          | JOB CONDITIONS AND MANAGEMENT |      |               |
|----------------------------------------------------------|-------------------------------|------|---------------|
|                                                          | Poor                          | Avg. | Good          |
| Load .....                                               | 3.4                           | 2.4  | 1.3 min.      |
| Dump & turn .....                                        | 2.0                           | 1.4  | 0.8 min.      |
| Turn at shovel .....                                     | 0.7                           | 0.5  | 0.1 min.      |
| Exchange .....                                           | 0.5                           | 0.3  | 0.0 min.      |
| Total time constant .....                                | 6.1                           | 4.6  | 2.9 min.      |
| Haul speed-loaded .....                                  | 3.1                           | 7.2  | 15.3 mph.     |
|                                                          | 273                           | 630  | 1350 ft./min. |
| Return speed-empty .....                                 | 3.4                           | 7.3  | 11.6 mph.     |
|                                                          | 298                           | 640  | 1020 ft./min. |
| Average pay yardage—<br>percent of struck capacity ..... | 65                            | 78   | 89            |

### DISTRIBUTION OF TOTAL AVAILABLE WORKING TIME

|                                        | JOB CONDITIONS AND MANAGEMENT |      |      |
|----------------------------------------|-------------------------------|------|------|
|                                        | Poor                          | Avg. | Good |
| Total available working time .....     | 100                           | 100  | 100  |
| Major delays (15 min. up) .....        | 45                            | 42   | 38   |
| Net available working time .....       | 55                            | 58   | 62   |
| Minor delays (less than 15 min.) ..... | 23                            | 15   | 12   |
| Actual productive time .....           | 39                            | 43   | 46   |

### MAJOR DELAYS

|                     | % of net<br>working time |
|---------------------|--------------------------|
| Weather .....       | 21                       |
| Truck repair .....  | 7                        |
| Standby idle .....  | 7                        |
| Shovel delays ..... | 4                        |
| Blasting .....      | 2                        |
| Other .....         | 1                        |
| TOTAL .....         | 42                       |

### MINOR DELAYS

|                            | % of net<br>working time |
|----------------------------|--------------------------|
| Wait at shovel .....       | 21                       |
| Maintenance of truck ..... | 1                        |
| Maintenance of road .....  | 1                        |
| Truck operator .....       | 1                        |
| Other .....                | 2                        |
| TOTAL .....                | 26                       |

## Earthmoving movies are better than ever

MOVING A MOUNTAIN INTO A LAKE is the story of a huge earthmoving operation told in a 17-min. color sound film. The location is near Salt Lake City, Utah, where giant electric shovels are working around the clock tearing down a 30,000,000-ton mountain of earth and rock for construction of the new 12-mi. roadbed across The Great Salt Lake for the Southern Pacific Co. It's two miles from the mountain to the lake and the earth

and rock are transported by a Hewitt-Robins belt conveyor system of unusual design. Groups interested in seeing the story on film may borrow a print from Hewitt-Robins, Inc., Stamford, Conn.

A comprehensive article on the project was presented in the December 1957 issue of *Western Construction*. Tea sheets of the article are still available on request. For reviews of other construction films available, see page 58 of this issue.



Dumping rock on a road-widening operation on Highway #10 in Washington's Cascade Mountains. Prior to this road job, Goodfellow's 22½ ton Macks were used in the 3,000,000 yd. excavation and backfill for the Rocky Reach Dam near Wenatchee, Washington.

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## EXCAVATION COMPLETE FOR KAISER CENTER

Northern California's biggest man-made hole—for the Kaiser Center in Oakland, Calif.—is completed, and work has started on phase two: pouring concrete for the 5-ft. thick foundation slab. The excavation for the huge skyscraper office building measures approximately 420 ft. by 60 ft., and is 40 ft. deep. The scheduled completion date for the foundation work is mid-March. Between now and then, approximately 11,500 cu. yd. of concrete and 1,600 tons of reinforcing steel will go into the 7.3-ac. location, which fronts on Lake Merritt between 20th and 21st streets. The cost of the excavation and foundation project which MacDonald, Young and Nelson, Inc., is doing for Kaiser is \$1,296,345. The Kaiser Center, when completed, will serve as general headquarters for the world-wide Kaiser enterprises.

## C. D. Curtiss retires

CHARLES D. CURTISS, Commissioner of Public Roads, has retired after 38 years of distinguished public service



with the Bureau of Public Roads of the Department of Commerce. Mr. Curtiss joined the Bureau in 1919 as Assistant to the Chief, rose to Chief of the Division of Control in 1927 and to Deputy Commissioner in 1943, and became

Commissioner in 1955. He was born in Michigan in 1887 and obtained an engineering degree from what is now Michigan State University in 1911.

In World War I, he served in France with the Corps of Engineers as lieutenant and later as captain. It was from this experience that he acquired the title of "Captain" which has come to denote the familiar respect of his associates and friends.

In his increasingly important positions, Mr. Curtiss has played a vital part in the federal government's road building activities. The Bureau of Public Roads administered the program of Federal Aid for highway construction, which has grown to the authorization of \$2,875,000,000 for the fiscal year 1959.

Mr. Curtiss has been an active member of a number of policy making committees of the American Association of State Highway Officials and of the Highway Research Board of the National Academy of Sciences, including their executive committees. In November of 1957 the joint board of award of AASHO, the HRB, and the American Road Builders Association presented Mr. Curtiss with the George S. Bartlett Award, the highest recognition in the

highway field, for his outstanding contributions to highway progress.

He was the first secretary of the American Society of Civil Engineers Highway Division, carrying on that work for 25 years. He relinquished that position in 1948 to become president of the District of Columbia section of the ASCE.

In 1951 he received the exceptional service Gold Medal Award of the Department of Commerce for major contributions in the administration of the Federal Aid Highway Program.

He has been honored twice by Michigan State University for distinguished public service: he received the Alumni Award in 1953, and the University Centennial Award in 1955.

## Huge Portland project

PLANS and specifications are ready for a gigantic shopping center for Portland, Oregon, the largest project of its kind yet undertaken in the United States. Called the Lloyd Center, the project is becoming a reality after eight years in the planning stage. The main construction contract will be for the \$40,000,000 center structures, which will be divided into 4 parts so local builders can participate. Another key feature will be the \$7,000,000 Sheraton Hotel. An indication of the magnitude of the project can be gained by considering the printing job on the plans and specs. At \$280 a set, the printing bill for the 300 lithographed copies of the plans will come to \$84,000.

John Graham & Co., a firm which has designed some 30 shopping centers, architects and engineers for the project.

## Two Western skyscrapers

IN 1958 WORK will begin on two skyscrapers in the West, one in the north and one in the south. In Seattle, a 20-story office and garage structure planned for University Properties Inc. at 4th Ave. and Union St. Official approval of the project has been announced by the Board of Regents of the University of Washington. Architects are Naramore, Bain, Brady and Johnson. Cost will be close to \$10,000,000.

In Southern California on a 2-ac. site near Beverly Hills, construction will start on a 22-story apartment building, the tallest of its kind in the southwest. Cost of the building is estimated at \$12,000,000, according to Paul Troudale, developer of the project.

# "OUR EIMCO 105 'LOADER-CARRIER-CRANE-EXCAVATOR-DOZER'

## SURE SAVED TIME AND COSTS ON THIS JOB"

... Says Coast Contractors' President, Frank McHugh



TACOMA, WASH. - Debris loosened by flash floods clogged culvert drainage and 100 feet of county roadbed were washed out. Contracted to handle the "rush" repair job, COAST CONTRACTORS INC. moved their Eimco 105 Front-End Loader on the site. The

versatile Eimco cleared debris; dug and dozed its own access way to the bottom of the gully; trenched and graded a new culvert; transported and positioned 48" concrete piping, and (above) rebuilds the roadway.



NOW IT'S A CRANE! Coast Contractor's work crew comes up with a cable hitch attachment that converts the Eimco 105 into a crane for positioning pipe. NOTE: Loader's tough construction, high reach... operator visibility... tractor stability (with weight on slope side).

"Equipment has to be flexible to fit into our scheme... and our Eimco 105 has proven — IT FITS!"

The object of **Frank McHugh's** praise — an Eimco 105 Front-End Loader — "subbed" for many specialized machines in the speedy completion of a road repair job.

As president of Coast Contractors Inc., Frank's big problem is the same as that facing most every general contractor-builder: Getting a variety of odd jobs done fast without having profit "chewed up" by special equipment investments, labor and maintenance costs.

The Eimco 105 is a "hell-for-stout" earthmover with 40,000 lbs. breakout power to handle "tough"

jobs normally performed by specialized big equipment. Yet, it is faster and outmaneuvers tractors half its size.

Hydraulic boom and bucket cylinders respond quickly and simultaneously to lever control. The loader assembly is capable of 15,000 lb. lifts and 14 ft. discharge. Two final drives provide independent track reversal for quick, sharp turns or any operation requiring extreme maneuverability.

The Front-End Loader's overhead loading companion (Eimco 105 Excavator) provides discharge without turning plus these features.

Get the facts on both of these versatile machines before you buy!

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B 308

# Western construction men honored at third meeting of the beavers

Annual dinner attended by more than 1,000 from the heavy construction industry with "Beavers" awarded to nine. George H. Atkinson concludes year as president.

AT THE third annual dinner meeting of The Beavers held in Los Angeles January 16, more than 1,000 members of the contracting and construction industry honored nine more men with "Beavers." The recipients are outstanding contractors, engineers, and men of allied services in this Western region. Those honored were:

|              |                                   |
|--------------|-----------------------------------|
| Management—  | J. C. Maguire<br>L. S. Corey      |
| Supervision— | R. M. Conner<br>A. E. Graham      |
| Engineering— | Ross White<br>H. E. Hedger        |
| Supply—      | R. G. LeTourneau<br>Guy C. Kiddoo |
| Special—     | L. N. McClellan                   |

George H. Atkinson concluded his presidency of The Beavers with this annual meeting.

Details of the annual meeting and biographical sketches of the other five recipients will appear in the March issue of **Western Construction**.

The four recipients honored under the classifications of Management and Supervision are shown on the front cover of this issue, and the records of their careers follow.

## J. C. Maguire

John Charles Maguire has been actively engaged in the heavy engineering construction industry for a half century and the result has been prodigious achievement on many of the most important construction projects of this period.

He was born and reared in Ogden, Utah, but started in the contracting business at Salt Lake City in 1907 as a partner in the firm of Strange and Maguire. In 1913, he moved to Butte, Montana, and established the J. C. Maguire Construction Co. as a public works contractor specializing in street paving and highway construction. His firm successfully completed many projects and became well known throughout the Intermountain States.

Maguire's first venture in dam construction was in the early thirties when, associated with L. T. "Tim" Lawler of Butte, he became a partner in the joint venture that built Seminole Dam on the Platte River in Wyoming under the sponsorship of Winston Brothers Co. Next, he participated in the construction of the San Gabriel Dam No. 1 for the Los Angeles County Flood Control District built under the sponsorship of Foley Brothers Co. of St. Paul. In 1937, Maguire closed out his business in

Montana, moved to Los Angeles, and was hardly settled there when the great Shasta Dam came along and the group of contractors with which he was associated was the successful bidder.

Along with William A. Johnson, Maguire was chosen co-sponsor and from 1938 to its completion in 1945 he devoted all of his time to this project. With the great Frank Crowe as general superintendent, this dam was built during the trying war years. The prominent part that Maguire played in this project established him as a major dam builder.

Next came Bull Shoals in the Ozarks with Brown & Root, Inc., as sponsor; then, Mt. Morris Dam on the Genesee River in upstate New York; and, last but not least, Canyon Ferry Dam on the Missouri River in Montana. Maguire sponsored and "lived" this job from start to finish and regards it as his greatest dam-building achievement. A little dam on a big river is difficult at best. This one was beset throughout by adverse conditions, treacherous foundation, floods, underground water flow, severe weather and chronic shortage of labor. Nevertheless, it was completed on time and stands as a tribute to a loyal organization that struggled through the many trials and tribulations which constantly confronted them.

Throughout his career Jack Maguire has preferred the firing line to the office and there, after the tradition of other great leaders of the industry, he has always given his best and inspired those around him to do the same.

## Lester S. Corey

Born in Utah in 1880, Lester Corey is another of the men who have devoted their entire productive lives to the construction industry to the benefit of that industry and the country as a whole.

Upon graduation from Junior College in Ogden, Utah, in 1901 he joined the Utah Construction Co. as timekeeper and was continuously employed by this company for 53 years, or until his retirement in 1954.

He advanced by stages from timekeeper to president in which capacity he served for about twenty years.

Les, as he is called by his friends, has had a career which spanned much of the development of the West, having to do with the building of railroads, dams and other types of heavy construction.

He has had his share of work in foreign countries, too, once spending nearly four years on the construction of a railroad for Southern Pacific Company through a mountainous section of Mexico. The success of this project was repeated on other foreign jobs through the years.

His career has brought him in contact with many other contractors, with whom he has frequently associated in joint ventures. These ventures included Hoover Dam, Bonneville and Grand

Coulee dams, as well as Davis and Imperial dams, the New York Aqueduct and several shipyards and industrial plants. Les always liked to keep his office door open to anyone who wished to see him, was quick to recognize ability, and eager to allow employees to realize their full potential.

The measure of the man is to be seen in the magnitude of his accomplishments, the high personal and business standards to which he always adhered, and the many warm friendships he has made and maintained through the years.

## Ralph M. Conner

The life of Ralph M. Conner is typical of many of the outstanding men of the heavy construction industry in that it is one of complete dedication to and joy in doing a kind of work that is so vital to the growth and progress of America. In point of length in years of service to the industry there are many parallels to Mr. Conner's half-century of service which, too, is illustrative of the kind of men who are the core of this great industry—men of steadfastness and purpose who have made ours the most advanced nation in the world.

Mr. Conner was born in East Wilton, Maine, in 1878, and after receiving his degree from the University of Maine, he taught mathematics at the university for a year and then accepted a job with the Bureau of Reclamation in 1904 on an assignment in Boise, Idaho. Working in various capacities on river, dam and related construction work, chiefly in the states of Idaho and Montana, he acquired a wealth of valuable experience and in 1921 he was promoted to the position of construction engineer on the important Riverton Project.

His career from 1926 until the year of his retirement in 1950 was a series of signal successes as construction superintendent with private companies on many of the great construction projects of those years. To name a few of the more familiar of these: the Don Martin Project in Mexico for the J. G. White Engineering Corp., the Madden Dam in Panama, and the Imperial Dam for the joint venture of Morrison-Knudsen, Utah Construction Co. and Winston Brothers.

At the time of his retirement, Mr. Conner had been with Morrison-Knudsen Co. for something like 15 years and was held in the highest esteem both for his abilities as an engineer and for his principles as a man.

## A. E. Graham

Andrew Ernest "Jack" Graham achieved his position of prominence in the heavy engineering construction industry and the recognition and esteem that go with it by dint of sheer determination to succeed and, of course, the development of his latent abilities.

He was born on his father's farm near Hemlock, Michigan, July 26, 1891, the youngest of six brothers and four sisters. His formal education was scanty but he

(Continued on page 70)



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# Hawaii Report

**ALAN GOODFADER**

Honolulu, Hawaii

## ALA MOANA SHOPPING CENTER

—The Equitable Life Assurance Society of the United States recently approved a \$12,000,000 loan to finance development of the proposed Ala Moana Shopping Center. Hawaiian Dredging and Land Co. officials expect construction to cost \$15,000,000. Planned are a three-story Sears store costing

\$5,000,000, a 14-story business and professional building and parking structures. The center will be about 800,000 sq. ft. in size. Architect John Graham said working grounds are ready for immediate construction.

**SEWER WORK PLANNED**—The City of Honolulu plans to let out more than \$2,500,000 in sewer construction projects in 1958. Projects scheduled for the year include: Kapalama relief

sewers, \$650,000; Kamehameha Highway pumping station and force main, \$650,000; Kaneohe sewage treatment plant, \$667,000; Kaneohe Stream interceptor sewer, \$270,000; Waialae-Kapahulu sewers, \$175,000; Niu pumping station and force main, \$140,000; Wahiawa interceptor sewers section two, \$125,000, and Waialae-Iki sewer extension, \$35,000.

## TERRITORIAL ROAD PLANS—The

Territory plans a record road construction program during 1958 that will cost about \$18,000,000 in construction expenses alone, William Wachter, Territorial highway engineer, told the American Society of Civil Engineers here recently. Included in the program will be the largest contract ever granted by the Territory's Highway Department. The contract, for a three-level traffic separation structure, will run more than \$4,000,000. The structure is to be at the Fort and School Sts. intersection as part of the Nuuanu Highway project and will be in a contract which will include the Nuuanu-Pele section of the Lunalilo Freeway. All but five of the 19 projects slated for 1958 will be on Oahu. Major Oahu projects include completion of approach roads for Likelike Highway, three contracts on the Nuuanu Highway and extension of the Lunalilo Freeway system. On the Neighbor Islands, the Territory plans work on the Hamakua Coast route on the Big Island, 3.4-mi. extension of the Federal Aid highway north from Lahaina, Maui, and replacement of the Kalihiwai-Wainiha section of the Belt Road on Kauai.



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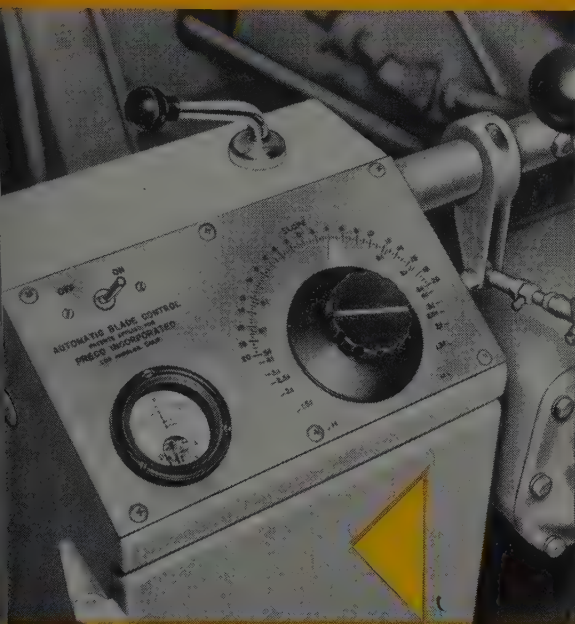
**PALI TUNNEL ROAD**—Work on the second Pali tunnel road has gone 300 ft. into volcanic rock. The tunnels will take about 15 months of work more than the first tunnels, because large charges of dynamite can't be used. This is because engineers fear damage to the completed bores alongside the road under construction. Charges are limited to 75 lb. in 6-ft. bores, with most of the work being done with drills and muckers. Twin 8 x 10-ft pilot tunnels are being driven first, so steel footings and supports can be placed before the center core of the rock is extracted.

**BARTELS HONORED**—William R. Bartels, bridge engineer for the Territorial Highway Department, has been honored on the completion of 25 years of service to the department. He received a pin and certificate from the American Association of State Highway Officials. He is one of six engineers holding the pins. A native of Germany, Bartels was graduated in 1909 from the Advanced Institute of Technology in Germany. He came here in 1932 to work for the Territory as bridge design engineer and now heads the Territory's bridge design division.

JOB REPORT FROM NEVADA ON

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Though the No. 12 has earned the reputation of "standard of the industry," Caterpillar constantly looks for and finds ways to improve this machine. Automatic blade control is an example. Here are some other, even more recent improvements:

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**Better visibility**—31% more glass area in cab increases operator's visibility and efficiency.

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## BEAVERS HONOR

(Continued from page 66)

supplemented this later by studying at night on technical correspondence courses. He left the farm to log in the Michigan north woods when only sixteen years of age. He was attracted to construction work and moving to the West Coast in 1913, he began his career with Pacific Bridge, of Portland, operating a rock crushing plant loading rail cars at Mosier, Oregon. Working on a variety of jobs he gained much useful experience and knowledge and in the early 1920's he began working on a long series of bridge jobs which helped to establish the firm's fine reputation for subaqueous foundation work.

Relocating in California in the early thirties, Pacific Bridge began work on the main piers for the Golden Gate Bridge, one of the most difficult underwater jobs ever undertaken. The part that Jack took in this ambitious project led to further recognition and a huge mural of him appears in San Francisco's famous Coit Tower as a symbol of the construction industry.

He had been building two graving docks at Pearl Harbor when the Japanese struck. Well ahead on their contract, Pacific Bridge was given the important salvage work assignment, the success of which was the result of great resourcefulness, direction and a maximum work effort earning this project the Army-Navy "E."

It was followed by construction of other naval facilities, and Jack Graham, as vice president and superintendent of construction for PB, stayed in the Islands throughout the war. For his exceptional performance during the war years he received three Presidential Citations from President Roosevelt.

Jack is known throughout the industry for his tremendous initiative and drive, his willingness to meet the challenge implicit in any great bridge building project and for his ability to get the job done under the most unfavorable conditions.

## Low bids and contract awards

### ARIZONA

Heiskell Construction Co. of Phoenix received a \$214,841 contract for grading and surfacing south of Payson, in the Tonto National Forest in Gila County. **Fisher Contracting Co.** of Phoenix submitted a low bid of \$2,424,501 for grading, surfacing and draining, beginning at the Apache-Navajo County Line and extending westerly on U. S. Rte. 66 toward Holbrook for approximately 9.4 mi., Holbrook-Lupton Highway in Navajo County. A low bid of \$782,686 was submitted by **Royden Construction Co.**, Phoenix, for 5.4 mi. of grading and surfacing the Tucson-Benson Highway on U. S. Rte. 80 to-

ward Benson in Cochise County. **Tiffany Construction Co., Inc.**, of Phoenix submitted a low bid of \$531,742 for grading, surfacing and construction of two overpass structures on 4.4 mi., Yuma-Gila Bend Highway in Maricopa County.

### CALIFORNIA

**Clyde W. Wood & Sons, Inc.** and **Kurst Construction Co.** and **Alwood Corp.**, North Hollywood, submitted a low bid of \$5,052,434 for 6 mi. of grading, surfacing and bridge construction on 4-lane roadways west of Soda Springs in Placer and Nevada counties. A low bid of \$4,878,927 was submitted by **Ukropina, Polich and Kral** of San Gabriel for grading, surfacing and separation structures in Glendale and Burbank, Los Angeles County. **Griffith Construction Co.** of Los Angeles submitted a low bid of \$3,317,563 for grading, surfacing, construction of five bridges, one bridge widened and two bridges to be reconstructed in San Diego County. **Gordon H. Ball, Gordon H. Ball, Inc.** and **Ball & Simpson** of Danville submitted a low bid of \$2,576,412 for grading, surfacing 13.7 mi. of 6-lane freeway and construction of one bridge in Solano and Yolo counties. A low bid of \$2,328,523 was submitted by **Match, Sundt & Bevanda** of Colton for 8.6 mi. of grading and surfacing and construction of six bridges in San Bernardino County. A low bid of \$2,226,908 was submitted by **Winston Bros. Co.**, Monrovia, for grading, surfacing, construction of seven bridges and one pumping plant in Riverside County. **Madonna Construction Co.**, San Luis Obispo, submitted a low bid of \$1,052,253 for 9.9 mi. of grading and surfacing between Rancho Santa Fe and Escondido in San Diego County. **C. K. Moseman** of Redwood City submitted a low bid of \$1,245,891 for grading, surfacing and construction of eight bridges and widening one bridge in city and county of San Diego. **A. Teichert & Son, Inc.**, Sacramento, received a \$693,442 contract for 5.1 mi. of grading, surfacing and construction of one bridge and one culvert in San Joaquin County. **Darkenwald Construction Co., Inc.**, and **Vinson Construction Co.** of Sacramento (joint venture) submitted a low bid of \$1,537,473 for Putah South Canal, Green Valley Conduit and subconduit, Solano Project.

### COLORADO

**Pioneer Construction Co.** of Pueblo submitted a low bid of \$428,041 for grading, stabilizing and structures on 1.1 mi. in city and county of Pueblo. A low bid of \$406,510 was submitted by **Graham Construction Co.**, Pueblo, for grading, surfacing and structures on 5.4 mi. between Craig and Lay on S. H. 2 in Moffat County. **Gardner Construction Co.** of Glenwood Springs submitted a low bid of \$283,949 for 2.1 mi. of grad-

ing, structures and surfacing north and south of Carbondale on S. H. 133 Garfield County. A low bid of \$274,800 was submitted by **Pioneer Construction Co.**, Pueblo, for 11.4 mi. of grading, shaping and surfacing between Chiverton and Towner on S. H. 96 in Kiowa County.

### IDAHO

**Earl L. McNutt Co.** of Eugene, Oregon, received a \$630,972 contract for constructing the roadway and drainage structures on 4.4 mi. of U. S. Highway No. 30 in Gooding County. **Mountain States Construction Co.**, Pocatello, received a \$136,778 contract for grading and surfacing on 4.1 mi. of U. S. Highway 3 on McCammon East in Bannock County. **Idaho Rock, Inc.**, Twin Falls, received a \$418,834 contract for grading and surfacing U. S. Highway No. 20 in Bonneville County. **A. D. Stanley**, Boise, received a \$353,253 contract for grading and surfacing on 21 mi. of State Highway 68, Old Jct. S. H. 4 on U. S. 93 in Camas and Blaine counties.

### MONTANA

**Hilde Construction Co.** of Great Falls received a \$1,198,101 contract for 12 mi. of grading, gravel surfacing and draining the Cascade-Ulm Highway in Cascade County. A \$687,696 contract was received by **N. A. Nelson Construction Co.**, Sheridan, for construction, steel and concrete bridge on the Libby-Rexford Highway in Lincoln County. **Zook Bros. Construction Co.**, Bigfork, received a \$294,471 contract for 9.1 mi. of grading and gravel surfacing on the Fort Benton-Chester Highway in Chouteau County. A \$299,240 contract was received by **S. S. Mullen, Inc.**, of Seattle, Wash., for 6.2 mi. of grading and surfacing the Gallatin Gateway-Southern Highway in Gallatin County. **S. Birch & Sons** of Great Falls received a \$292,055 contract for 8.8 mi. of grading, gravel surfacing and draining the Belt-Highwood Highway in Cascade County. **O'Brien Construction Co.** of Great Falls received a \$160,092 contract for 4.8 mi. of grading and gravel surfacing the Pablo-Kalispell Highway in Big Arm Section in Lake County. **Hill Construction Co., Inc.**, Havre, received a \$148,828 contract for 11.3 mi. of grading and gravel surfacing the Hardisty-Custer Highway in Big Horn and Yellowstone counties. **Cahill-Moon Construction Co.**, Butte, received \$1,184,860 contract for construction a hospital building and facilities in Butte.

### NEVADA

**Hoops Construction Co.**, Twin Falls, Idaho received a \$400,197 contract for 10.9 mi. of grading and surfacing between Cordero Mine and McDermitt Humboldt County. A \$220,546 contract was received by **Silver State Construction Co.**, Fallon, for grading and surfacing in Ormsby County.

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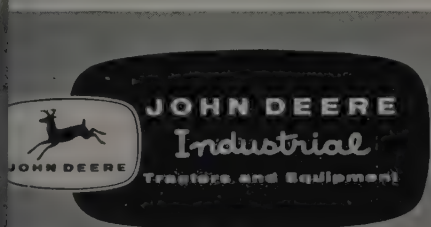
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## NEW MEXICO

Boswell Construction Co., Albuquerque, submitted a low bid of \$133,548 for earthwork and structures North Reach Extension, Middle Rio Grande Project. McGinnes Brothers, Inc., Houston, Texas, submitted a low bid of \$239,340 for channelization of the Rio Grande, San Marcial Lake Area, Middle Rio Grande Project. J. H. Marshall of Clovis received a \$534,416 contract for 12.3 mi. of grading, surfacing and structures on the Grady-Broadview and South road in Curry County.

## OREGON

Peter Kiewit Son's Co., Medford, received a \$1,056,025 for 4.1 mi. of grading and surfacing the Cape Ferrel-Brookings Section of the Oregon Coast Highway north from Brookings, in Curry County. Kuckenberg Construction Co., Portland, received a \$1,142,973 contract for 2.7 mi. of grading and surfacing Harbor Drive-Washington County Line Section of the Pacific Highway in Portland, Multnomah County. Earl L. McNutt, Eugene, received a \$292,886 contract for 5.2 mi. of grading

and surfacing the Wasco-Heppner Highway southeast of the city of Wasco in Sherman County. Elte Construction Co., Boring, has been awarded a \$159,066 contract for repair of the drainage Peninsula Drainage District No. 2.

## UTAH

L. A. Young, Vernal Sand & Gravel Co., Salt Lake City, submitted a low bid of \$675,257 for grading and surfacing on 6.3 mi., and construction of two bridges on U.S. 40 in Duchesne County. Wheelwright Construction Co., Inc., Ogden, submitted a low bid of \$186,000 for 8.1 mi. of grading the Central-Pine Valley Rte., Dixie National Forest in Washington County. R. M. Jensen, Contractor, D. W. Brimhall and Nelson Bros. of Salt Lake City received a \$714,031 contract for 12 mi. of grading and surfacing on State Rte. 259 in Kane County. W. W. Clyde & Co., Springville, received a \$1,203,416 contract for 5.4 mi. of grading and surfacing and bridge construction on State Rte. 259 from Cock's Comb to Paria Creek in Kane County. Morrison-Knudsen Co., Inc., Salt Lake City, received a \$358,028 contract for 6.2 mi. grading and surfacing Harpers Corner Road in Utah and Moffat counties, Utah and Colorado. Tiago Construction Co., Salt Lake City, submitted a low bid of \$1,351,505 for construction of a graded and drained roadway in Davis County. Whiting and Haymond Contractors of Springville received a \$308,472 contract for grading and surfacing in the Bryce Canyon National Forest in Garfield County.

## WASHINGTON

Morrison, Kaiser, Puget Sound and General, Boise, Idaho, received \$14,000,000 contract for the Hood Canal Floating Bridge Structure, Unit 1 in Jefferson and Kitsap counties. Fioriti Bros. of Seattle received two contracts for roadwork in Spokane and Whatcom counties. A \$704,161 contract for grading and surfacing in city and county of Spokane and \$596,526 for grading and surfacing in Bellingham, Whatcom County. A \$679,611 contract was received by C. E. Oneal, Inc. and Maurice Gredvig, Ellensburg, for 7.2 mi. of grading and surfacing in Yakima County. James Crick & Sons and Cliffe & Applegate, Inc. of Yardley received a \$390,043 contract for 4.7 mi. of grading and surfacing in Benton County. J. Welcome Construction Co., Redmond received a \$394,079 contract for 4.7 mi. of grading and surfacing Kachess River to Easton in Kittitas County. McClure Construction Co., Ltd., of Vancouver, B. C., received a \$212,489 contract for construction of Moses Lake Bridge in Grant County. A \$1,046,735 contract was received by Scarsella Bros. of Seattle for 3.3 mi. of grading and surfacing N. P. Railway to 72nd St. in Tacoma Pierce County.

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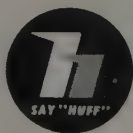
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- ✓ You get a **FULL** load to start with . . .
- ✓ You **KEEP** a **BIGGER** load with a 40° tip-back of the bucket at **GROUND LEVEL!**
- ✓ You can carry the load **LOWER** and **CLOSER** to the machine for **BETTER STABILITY!**
- ✓ With **LOAD SHOCK ABSORBER** you spill less, retain more of the load while traveling!
- ✓ With **NO-STOP** power-shift transmission you complete faster cycles . . .
- ✓ With better weight distribution you eliminate excessive dead weight and engine horsepower . . . get **MORE CARRYING CAPACITY** per pound of machine!
- ✓ Since you **GET MORE . . . SPILL LESS . . .** and complete faster cycles . . . you **DELIVER MORE . . .**
- ✓ and that is what **PAYS OFF!**

It's no wonder that there are more PAYLOADER unit-design, rubber-tired tractor-shovels in use than all other makes combined. Arrange for a demonstration with your nearby Hough Distributor and prove to yourself that PAYLOADER gives you more profitable production.



Modern Materials Handling Equipment

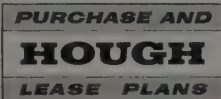
**THE FRANK G. HOUGH CO.**

LIBERTYVILLE, ILLINOIS

SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY



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Now your Hough Distributor has at his disposal the broadest and most complete set of financing plans ever offered: — **TIME PAYMENT . . . LEASING PLANS,\*** with or without **OPTION TO PURCHASE** — any and all kinds of financing to best fit your needs for the purchase of "PAYLOADER" equipment. See him today.

## THE FRANK G. HOUGH CO.

707 Sunnyside Ave., Libertyville, Ill.

Send more data on 4-wheel-drive "PAYLOADER" tractor-shovels as checked:

- ☐ HO — 9,000 lb. carry cap. (1 to 4 cu. yd. buckets)
- ☐ HH — 7,000 lb. carry cap. (7/8 to 3 1/4 cu. yd. buckets)
- ☐ HU — 5,000 lb. carry cap. (5/8 to 2 1/2 cu. yd. buckets)

NAME \_\_\_\_\_

TITLE \_\_\_\_\_

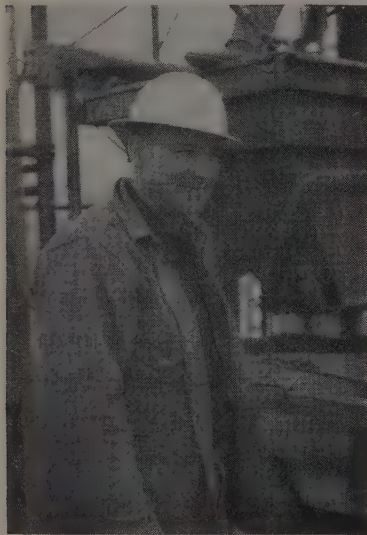
COMPANY \_\_\_\_\_

STREET \_\_\_\_\_

CITY \_\_\_\_\_

STATE \_\_\_\_\_

# SUPERVISING the jobs



**DELBERT SHELDON**, general superintendent for **George E. Teufel Co.**, contractor on construction of the new addition to the City Light Building moving toward completion in Seattle.

**H. P. Bosworth**, projects manager; **T. L. Anderson**, general superintendent, and **Joe Hayes**, project engineer, are at the top of the list of personnel chosen by **Cheney-Cherf-Sandkay-Green & Birch** to handle the \$2,894,330 job of constructing **Keene Creek Dam** and **Green Spring power conduit station**, part of the **Rogue River Project** in Oregon. The job started last November and will be finished about June 1959.

**Art Duke**, superintendent, assisted by **Tom Bingham**, foreman, is in charge of constructing two reinforced concrete bridges on the **Bellingham Freeway** in **Whatcom County, Wash.** This \$219,586 contract started in October and is expected to be finished this June, according to **S. S. Mullen, Inc.**, the successful bidder.

**Fred Muth**, general superintendent; **Elmer Andrews**, grade foreman, and **Mike Berosik**, equipment superintendent, are key men on **Herman Kathman's** recent award for 1.3 mi. of grading and surfacing **North Fork Bridge approaches**, **Skagit County road, Wash.** **Kathman** received the award on a low bid of \$125,936, started working Oct. 2, and now has the job about finished.

**Howard Durbin** is superintending a \$368,264 award to **Durbin Brothers**

covering grading and structures on the **Mapleton-Richardson road** in **Lane County, Ore.** Foreman is **Lewis Butler**. Work got under way last November and will probably end in July.

**R. C. Slaughter**, superintendent for **Phoenix-Tempe Stone Co.**, is handling a \$116,641 job of 2.3 mi. of grading and surfacing the **Kirkland-Prescott highway**, **Yavapai County, Ariz.** Field office manager is **Charlie Lukin**. Under way since October, the job is now finishing.

**R. W. Richardson** is supervising construction of an undercrossing in **Pierce County, Wash.**, for **John E. Alexander, Inc.**, contractor. A \$150,581 contract, job involves a 6-lane flat slab with cylindrical voids over 8 lanes of new **Interstate Highway 5**. Foremen are: **Ted Jones**, piledriver; **Lloyd K. Morris**, carpenter, and **Jack Hildebrand**, laborer. The job will be finished in February.

**Frank C. Scott** is superintendent, and **Harry G. Fahlgren** is field office manager on **R. A. Heintz Construction Co.'s** recent \$258,292 award for 1.6 mi. of grading and surfacing, in the vicinity of **Vancouver Lake, Clark County, Wash.**



**FORREST JONES**, GENERAL SUPERINTENDENT for **Merritt-Chapman & Scott Corp.**, prime contractor for construction of **Glen Canyon Dam**, goes over plans with **Glen Roper** (right), rigging superintendent, and **Donovan "Whitey" Candaux**, carpenter superintendent. A key structure of the **Colorado River Storage Project** **Glen Canyon** will be the second highest dam in the United States.

Started last November, the work will be finished in August.

**Bob Phillips** is superintending a \$685,764 job in **Bear Lake County, Idaho**, for **Jack B. Parson Construction Co.** Contract covers construction of roadway drainage structures and surfacing 5.1 mi. of **US 30, Bennington-Montpelier**. Other key supervisors at the site are: **D. Hodges**, grade foreman; **LaMar Jones**, pipe foreman; **Mel Krambule**, hot plant foreman; **Rus Tarbet**, gravel plant foreman, and **Paul Krambule**, master mechanic. Work started in November and is expected to finish in August.

**Robert Merrill** and **Marlin Green**, project manager and job superintendent respectively, are **Helena Sand & Grave Co.'s** key appointments to handle grading, surfacing, sidewalks and miscellaneous work on the **Unionville-Helena highway** in **Lewis and Clark County, Mont.** This is a \$206,006, 150-day project which is expected to start in April.

**Frank J. Pakar**, partner in the firm of **Pakar Construction Co.**, is acting as his own superintendent on the construction of two 200-ft. long prestressed girder undercrossings in **Lewis County, Wash.** Other important personnel on this \$185,405 job are **Harlen Roberts** and **James Ingram**, carpenter foremen; **Leroy Gray**, labor foreman, and **Gene Bazinet**, equipment operator and foreman. Under way since October, the job will be finished in March.

**L. A. Young, Jr.**, is supervising a \$164,212 job recently awarded to **L. A. Young Construction Co.**



## The sign of the safest buy in used equipment

Only your Caterpillar Dealer offers "Bonded Buy." This protection up to \$10,000 when you buy a used Caterpillar-built machine. Here's how it works.

When you make a "Bonded Buy" purchase from your Caterpillar Dealer on any used Cat-built machine, he gives you his Guarantee Bond of up to \$10,000, assuring you of satisfactory performance of all parts for a period of 30-90 days. His bond is backed by a master bond issued by Lumbermens Mutual Casualty Co. Its insurance is effective anywhere in the U. S. and Canada.

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Over any units of any make, in good condition, your Caterpillar Dealer offers you a "Certified Buy." This kind of protection includes the dealer's written guarantee of satisfactory performance.

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AND USED EQUIPMENT**

... for more details, circle No. 40 on Reader Service Postcard

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**ELEVATED TANKS**



**PRESSURE VESSELS**



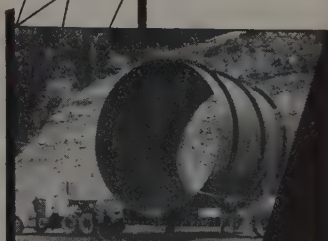
**WELDED STEEL PIPE**



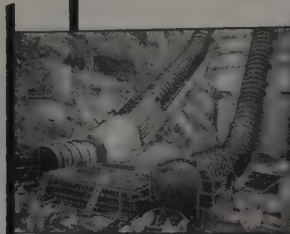
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**STACKS • BREECHINGS**



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**STEEL PLATE FABRICATION**  
*at your service!*

You can realize substantial savings in time, trouble and money by taking advantage of American's long experience in fabricating a wide variety of steel plate products. Design and manufacturing know-how developed through the years, together with the complete facilities of a 19 acre plant with 183,000 sq. ft. of covered shop area, results in quality products at lower cost. Illustrated here are the solutions to typical problems. Bonus values built into every one of these jobs are the knowledge of the skilled craftsmen, the precision of modern machines, exhaustive testing to assure satisfactory operation, job-timed delivery by our own fleet of trucks, and engineering counsel constantly available.

We'd like to work with you on your job. If it's already designed—call us for estimates. If we can help plan it—our sales engineers are at your service.



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 Phone BUtter 5-2531  
 Los Angeles • Hayward • San Diego • Phoenix

... for more details, circle No. 42 on Reader Service Postcard

Calif. Hibbert is at Andrew Hill, and Tower at Samuel Ayer school. The job, a \$1,093,201 contract, got under way last November and is now almost complete.

\* \* \*

A. R. Taylor, superintendent, and Leonard Gantz, project engineer, are top men for Osberg Construction Co. doing clearing, grading, draining and erecting a bridge in Bellingham, Wash. This street construction contract was awarded to Osberg on a low bid of \$1,089,713.

\* \* \*

R. J. Scalzo is superintendent; Primo Raghianti, foreman, and Ralph Curtin, master mechanic, on Thomas Scalzo Co.'s contract covering 1.5 mi. of grading and surfacing, Ponders to N. P. Railway in Pierce County, Wash. This \$347,929 job has been under way since last October.

\* \* \*

H. A. Harbordt, project manager, and R. W. Bailey, superintendent, head the list of job personnel on \$19,877,500 construction of Veterans Hospital project including 15 buildings, paving, sidewalks, etc., at Palo Alto, Calif. Other top men are Ray Hackerott, office engineer; Bob Opalecky, field engineer, and H. H. Perkins, field office manager. Robert E. McKee, General Contractor, Inc., the successful bidder, started work in November, with the job earmarked for completion February 1960.

Carl B. Hartley, engineer and assistant superintendent with Robert E. McKee, General Contractor, is presently

engaged in construction of the Cadet Social Center at the Air Force Academy at Colorado Springs, Colo.



KEY MEN on Washington Asphalt Co.'s paving job at Snoqualmie Pass near Seattle, Wash., Dick Jackson, paving foreman, and Glen Howard, plant foreman, took full advantage of unusually good late fall weather at that altitude to get in some extra work before winter close-down.

# Ferguson



Ferguson  
12 TON



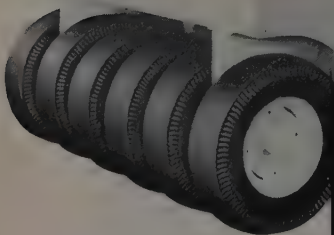
Ferguson  
12 TON

**11 WHEEL, 12 TON  
SELF PROPELLED RUBBER  
TIERED ROLLER**

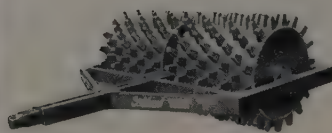
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reversomatic transmission, hydraulic  
steering, wide tread tires.

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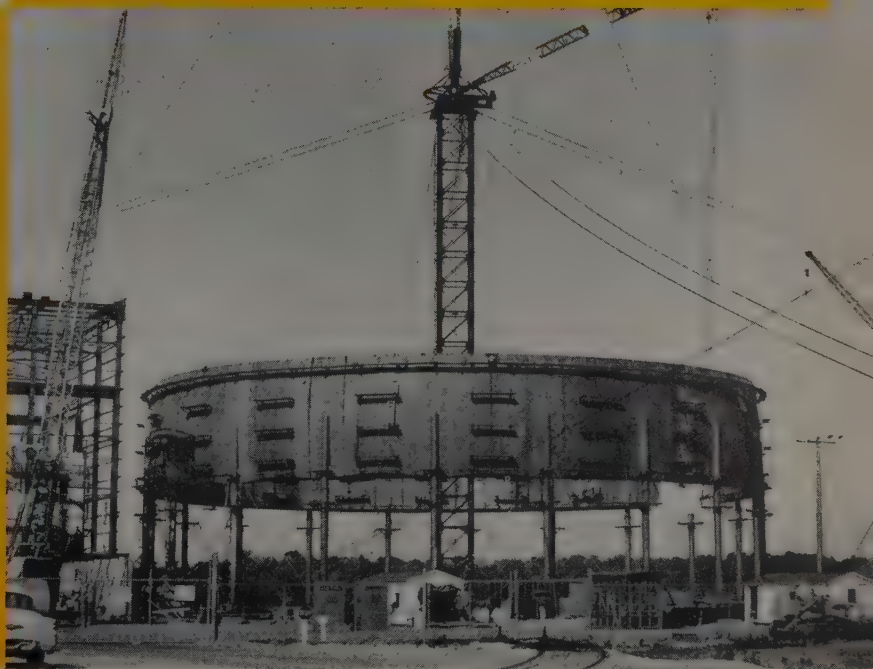
... for more details, circle No. 43 on Reader Service Postcard

WESTERN CONSTRUCTION—February 1958

2.

...ion service with 190-foot mast), lifts steel sections into place from 210-foot tower during erection of 190-foot diameter Hortonsphere used to house atomic reactor for Dresden (Illinois) Nuclear Power Station.

# SHAPES OF things to come in the atomic age



## Structures to Silhouette Major Reactor Projects

For CB&I engineers, fabricators and erection specialists, the challenge of things to come in the atomic age is, to a large extent, a reflection of existing accomplishments.

In 1954 the world's largest sphere, a Hortonsphere® measuring 225 feet in diameter, was built by CB&I for the AEC Knoll Atomic Power Laboratory at West Milton, New York, for testing a prototype of the atomic power plant which now serves our atom sub fleet.

Today, near Chicago, a skilled CB&I crew is completing the erection of a 190-foot diameter Horton-

sphere to house an atomic reactor for the Dresden Nuclear Power Station. Near Detroit, another CB&I crew erected a reactor containment vessel of a different design for the Enrico Fermi Atomic Power Plant. Silhouettes of similar structures, being designed, fabricated or erected by CB&I, are shown here.

Yes, for CB&I, the shape of things to come in an atomic tomorrow had their beginnings *yesterday*. Experience gained in almost 70 years of furnishing *craftsmanship in steel* to serve Industry, Government and scientific research is now meeting the exacting requirements for reactor containment vessels.



Enrico Fermi Atomic Power Plant, Lagoona Beach, Michigan. (Power Reactor Development Co., Architect-Engineers)

U. S. Air Force, Dayton, Ohio

Atomic Energy Commission, Livermore, California. (John W. Cowper, Purchaser)

Massachusetts Institute of Technology, Cambridge, Massachusetts. (Foster Wheeler Corp., Engineers)

Dresden Nuclear Power Station, Dresden, Illinois. (Bechtel Corp., Constructor-Contractor)

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

# ENGINEERS and CONTRACTORS

**Milo S. Ketchum, Jr. and Edward V. Konkel**, consulting engineers of Denver, Colo., and members of the American Society of Civil Engineers, have opened a new building at 730 Kalamath St. Their new headquarters are of thin-shell concrete construction without interior support columns or wall, a type of construction in which this firm has been especially interested. They have served as designer or consultant on many such structures in the past. In addition to the two partners, other principals in the consulting firm are **James M. Hastings**, **Rayburn A. Horton**, and **Edward R. Bierbach**.

\* \* \*

**Herbert R. Lutz** has been named San Francisco resident manager of The Austin Co., national engineering and construction firm, and will have his office in the Russ Building, San Francisco, Calif., serving San Francisco and the peninsula area. The company has its Northern California district headquarters in Oakland. Joining the Austin organization in 1942 as an estimator, Lutz has been a member of the Los Angeles district organization since 1943, and has been serving as project engineer there since 1947.

\* \* \*

**Otto F. Miller**, Boring, Ore., general supervisory construction inspector with the Portland District, Corps of Engineers, recently retired after more than 21 years of Federal service.

\* \* \*

**Carl S. Larson** has been assigned as district engineer at the district office recently opened in Portland, Ore., by The Asphalt Institute. Larson joins the Institute field staff from the California Division of Highways in Sacramento where he was assistant engineer in the Headquarters Construction Department. He is the author of a bituminous surfacing and inspection manual now in general use in the several California highway districts. The new Portland office augments the Institute's Pacific Coast operations centered at San Francisco where **Bernard A. Vallerger** is managing engineer.

\* \* \*

**Dexter R. Smith**, engineer employee of the Oregon State Highway Commission, retired the end of October. A nationally known bridge designer, Smith was codesigner of the \$45,000,000 Chesapeake Bay Bridge, was design

engineer for the Tacoma Narrows Bridge, and also designed the Interstate Bridge over the Columbia River now under construction. While in Oregon, Smith supervised construction of several major spans including the Coos Bay Bridge and the Umpqua River Bridge.

\* \* \*

**Edward Ochs** has joined the John W. Maloney architectural firm as architect supervisor and at present is supervisor on the construction of the \$1,600,000 Admissions and Security Building at the Washington State Penitentiary at Walla Walla, Wash. Until his recent retirement, Ochs for the past twenty years had been employed as inspector, supervising inspector, chief inspector and superintendent of general construction for the Corps of Engineers and the Bureau of Reclamation. Headquarters of the Maloney organization are at 754 Central Building, Seattle.

\* \* \*

**L. A. Bernardi** is project engineer for Baker & Ford Co., general contractor of Bellingham, Wash., currently working on a \$4,500,000 DEW line site on the Aleutian Chain in Alaska.

\* \* \*

**Robert H. Brenner** is chief engineer of the newly formed contracting firm of H. J. Roberts Corp., Burlingame,



**Robert H. Brenner**

Calif. Members of the new construction company consist of **Hampton J. Rob-**

**erts, Richard E. Hix, Robert Overman and LeRoy Reynolds**, all formerly with Grove, Shepherd, Wilson & Kruger. Brenner was project engineer on GSWK's Oakland freeway contract in 1956.

\* \* \*

**C. M. Gilliss** is the newly appointed Director of Public Works for the State of California, succeeding **Frank B. Durkee** who recently retired. Gilliss entered public service for the first time a



**C. M. Gilliss**

a system expert for Riverside County in 1946, and in 1947 was named assistant road commissioner and highways administrator for that county. He was appointed special representative of the State Department of Public Works the end of 1952, assistant deputy director of the Department in 1953, and has been deputy director since 1955.

\* \* \*

**McDonald, Young and Nelson, Inc.**, San Francisco general contracting firm, is moving its headquarters from San Francisco to Oakland on Feb. 15. The new address will be 8907 Railroad Ave., which will also be the headquarters of Spanall of the Pacific.

## CALENDAR

**Feb. 10-13**—The Associated General Contractors of America, national convention, Dallas, Tex.

**Feb. 13-15**—Engineering and Grading Contractors Association, 1958 state convention, Hotel St. Francis, San Francisco, Calif.

**Feb. 24-27**—American Concrete Institute, annual convention, Morrison Hotel, Chicago, Ill.

**Feb. 26-28**—American Society of Civil Engineers, annual convention, Chicago, Ill.

**Feb. 27-28**—Annual Highway Engineering Conference, University of Colorado, Boulder, Colo.

**March 3-5**—University of Utah, annual Highway Conference, Salt Lake City, Utah.

**Apr. 17-19**—American Society of Civil Engineers, Pacific Southwest Council conference, Phoenix, Ariz.

**June 3-6**—Western Association of State Highway Officials, annual conference, Hotel Utah, Salt Lake City, Utah.

# NEW EQUIPMENT

(Continued from Page 22)

For more information on items described in this section, circle the corresponding numbers on reply postcard.



## Reader adjustable while moving

A special-purpose base spreader box has been added to its CMETCO Rola-Driver line by Creative Metals Corp. The reader box is equipped with front lift wheels which are instantly adjustable while the paver is in forward motion. While primarily designed for spreading cement treated or crusher run base, it is equally suited to asphaltic mixes. The wheels are raised or lowered independently of each other to lay passes

from 1/2 to 8 in. deep or even deeper, either in uniform or tapered pass thickness and may be used to overlap a previous pass even when one wheel rides up on material from a previous pass. Independent lift wheel operation is accomplished by means of manually operated screw jack controls mounted on the control side of the spreader. The screw jack controls for operating the surfacing and compacting screed plate are banked close to wheel lift controls.

... Circle No. 157

## Berkeley pumps unveiled

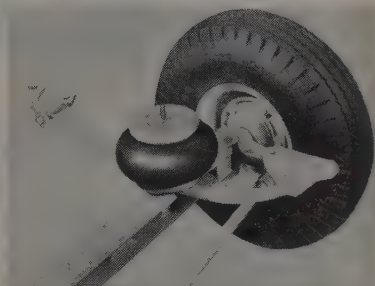
Berkeley Pump Co. this month unveiled nine new models in their line of

self-priming centrifugal pumps. Ranging in capacity from 4M to 40M, the new pumps are compact, rugged units ideally suited to the strenuous demands imposed on this type of equipment. The new Berkeleys are available in 1 1/2-in. through 4-in. discharge sizes and can be purchased with steel rail base, skid base, or can be obtained on a trailer mount. Performance data and contractor's price list are available.

... Circle No. 158

## Aluminum running gear has hydraulic brakes

Lightweight aluminum running gear is now being produced by the United Manufacturing Co. Identified by the name Air Flite, the gear assemblies offer the maximum possible strength at the minimum possible weight. Specially featured are mechanically or hydraulically actuated brakes and the latest type air

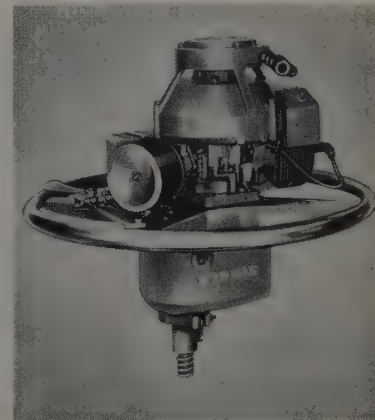


springs for reduced weight and cushioned riding qualities. Automotive steering provides positive trailing at high and low speeds. Of special interest to manufacturers and designers of equipment for use in construction and heavy contracting, the new assemblies feature long service life with negligible corrosion due to the extensive use of aluminum in the wheels, hubs and axle construction.

... Circle No. 159

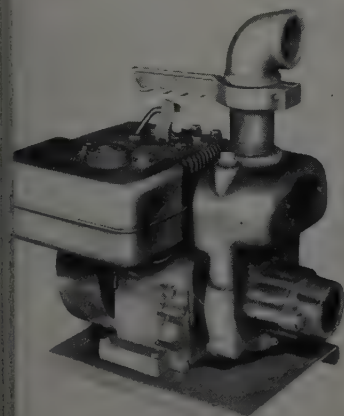
## Mite-size drill goes to 200 ft.

Although the Winkie rotary diamond drill is light enough to be lifted above the head with no difficulty at all—it weighs just 37 lb.—it has stout abilities.



For example, coring capacities up to 200-ft. depths, obtaining 15/16-in. rock cores. Larger core diameters up to 6 in. are easily handled, to lesser depths according to the diameter. Economic advantages include fuel consumption of only 2 gal. per shift and as little as 1 1/2 gal. of water consumed per foot of drilling. An overhead drive principle allows up to 10-ft. strokes without rechucking the drill rod. Maximum core recovery and diamond bit economy are results of the machine's exacting dynamic balance. Penetration speeds in excess of 1 ft. per min. have been obtained at depths of 100 ft. The Winkie is a product of The Wink Corp.

... Circle No. 160



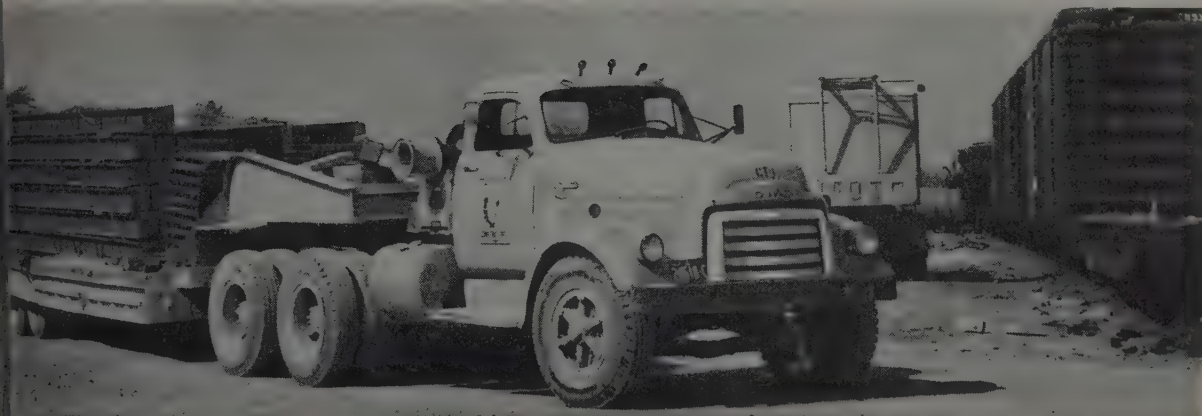
# *With millions of tons to move fast—* **St. Lawrence Seaway**

**GMC MONEY-MAKER DUMPS**—like these Model 550's—are in on the moving of millions of tons of earth and rock—2,400,000 cubic yards of it from one spot alone. Their dependable hustle comes from GMC's 232-h.p. V8—the engine that won its spurs on extra-tough jobs like this one. Super-thrifty 6-cylinder power is available in other Money-Maker Models.

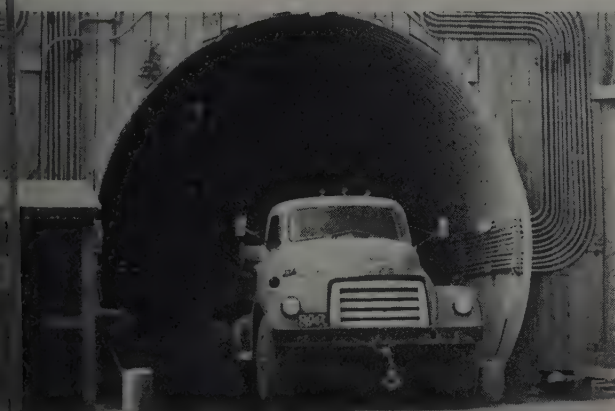


# Builders called for GMC's!

*GMC Money-Makers available in models from ½ to 45 tons*



**AWNY GMC MONEY-MAKER TANDEM**s — like this big Model W660 — are holding down some of the toughest assignments on the Seaway project. Extra-stamina engineering — including full-length frame reinforcements installed at the factory — let users haul thousands of tons of steel — day after day — without strain. GMC Money-Maker Tandems blanket the 28,000 GVW-90,000 GCW field.



**C's 2-CYCLE DIESEL POWER PAYS OFF** — again and again — when you're hauling big loads up steep, underground passageways. Secret is the massive torque output that gives you pulling power to spare — even with a big-size load. And GM Diesel engines — dramatically improved in the newest GMC models — are already setting new efficiency and economy records for truck-users everywhere.



**CONTRACTORS CHOOSE GMC PICKUPS** for their on-the-job transportation and equipment-servicing work for just one reason: GMC light-duty Money-Makers are "built like the big ones" — with extra-stamina, extra-performance features that pay off in longest truck life — at lowest cost of all.

*GMC TRUCK & COACH — A General Motors Division*

## GMC—America's Ablest Trucks

*... for more details, circle No. 47 on Reader Service Postcard*



**TO GO WITH** its recently introduced steel stake, *Symons Clamp & Mfg. Co.* is manufacturing a steel stake bar. The bar is a steel unit which offers six positions for holding steel stakes in positive distances apart—distances varying in multiples of 2 in.—from 16 to 24 in. and is particularly adapted to low wall forming. The stake is being marketed in the following sizes: 12, 18, 24, 30, 36 and 42 in. Its flat surface with nail hole spaces 1 in. apart make it easy to drive and nail firmly with no possibility of rolling. A pullout hole at the top permits fast removal with no special tool. Both the bar and the stake can be reused indefinitely.

... Circle No. 161



**AIDING** reconstruction and extension of the Redondo Beach breakwater is this 16-ft. wide truck turntable, manufactured by *M. P. McCaffrey, Inc.* Turning on wheels and rollers, the table swivels on a 24-ft. diameter circle. The all-welded device, which weighs 32 tons and whose main steel members are 16 and 18-in. beams, is powered by a 25-hp. Waukesha gasoline engine that provides the rotating force as well as supplies power for raising of ramps before turns are made. The Redondo Beach project is being handled by Connolly-Pacific Co. and T. E. Connolly, Inc., joint venture. J. B. Stringfellow Co. is subcontractor.

... Circle No. 162

## Grinder developed for drill steels and rock bits

Weighing in at only 12 lb. is Atlas Copco's heavy duty, all-purpose portable air grinder. The LSR-61 has been specially developed for grinding drill



steels and detachable rock bits, and is provided with an aluminum frame for this purpose. This easily-handled grinder is available in two sizes—for 5- and 6-in. wheels, both with an offset handle that offers higher utilization of grinding wheels. Special motor and governor design enables the unit to attain high torque under all loads, giving high output and low wheel wear with a lower consumption and power costs.

... Circle No. 163

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# SHORING

## SIDEWALK BRIDGES HOIST TOWERS

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Capitol Scaffolding & Equipment Co.....North Sacramento, Calif.  
Borchers Brothers.....342 North Second Street, San Jose, Calif.  
The United Materials.....814 West 14th Ave., Denver, Colo.  
Crissey Fowler Lumber Co.....117 Vermijo St., Colorado Springs, Colo.  
Strouck & Irwin Fuel Co.....826 Williamson St., Madison, Wisconsin

... for more details, circle No. 48 on Reader Service Postcard  
**WESTERN CONSTRUCTION—February 19**



## New advantages for truck owners introduced in all-new **Dodge Power Giants for '58**

**power, payload, economy and styling features make Dodge 4-way leaders of low-priced 3**

Recent introduction of the new '58 Dodge *Power Giants* brings truck owners a series of the most outstanding advances in Dodge truck's 40-year history.

**power**, for instance, Dodge offers three new *Power Giant* V-8's that provide up to 234 hp. . . as much as 24% more than other low-priced makes. These extra-powered engines can take it easy under normal loads . . . keep going longer, too.

**payload capacities are up** to an all-time high. Chassis construction features the elimination of excess weight while actually increasing strength. You get as much as  $\frac{1}{2}$  more payload capacity.

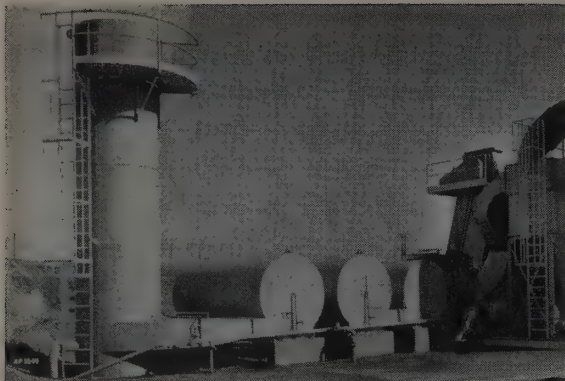
When it comes to **economy**, Dodge sweeps the field because of its exclusive Power-Dome V-8 engine design that reduces harmful carbon deposits. This improves gas mileage . . . practically eliminates the need for major engine overhauls.

**Dodge styling** gives truck owners a real prestige bonus. Striking dual headlights, massive new grilles and luxury cabs are exceptional highlights.

All in all, truck owners would be well advised to check into the '58 *Power Giant* line-up before replacing or adding units. These Dodge trucks are definitely four-way leaders of the low-priced three.

## **DODGE *Power Giants***

... for more details, circle No. 49 on Reader Service Postcard



## Triple wet tube dust washer for asphalt plants

Madsen Works of Baldwin-Lima-Hamilton Corp. has developed a triple wet tube dust washer for the purpose of dust abatement and air washing of asphalt plant dryer exhaust to meet requirements of air pollution control. Internal construction of this air washer will withstand the corrosive effect of the dilute acids resulting from fuel combustion. The washer is readily serviced through large manholes in the ends with sprinkler manifolds easily removed in one assembly, assuring low cost maintenance. Water control to each unit tube is arranged from a central valve unit. The dust-laden hot air and gases from the dust collector exhaust enter the whistle connection of the first tube and spiraling rapidly under the action of the water sprays, continue their passage through each of the tubes in series, and finally pass from the third tube into a large diameter stack equipped with one final washing spray.

... Circle No. 164

produce sand more efficiently...  
use

## CF&I GRINDING RODS



ESTIMATING sand- and sized aggregate-production costs? Make your bids more competitive—specify CF&I Grinding Rods.

With CF&I Grinding Rods, you get these benefits:

- Even wear—because end taper is held to a minimum.
- Superior hardness and bending resistance—because CF&I Rods are made from special analysis steel.
- Increased grinding efficiency—because CF&I Rods are machine-straightened with ends cut exactly square.
- Quick delivery—from CF&I's centrally-located Colorado mill. Add up these benefits and you get long service life and economy in your grinding operations.

CF&I also makes Wire Rope and Industrial Screens for the sand and gravel industry. Get full details and quotations on any CF&I product from the nearest office listed below.

## CF&I GRINDING RODS

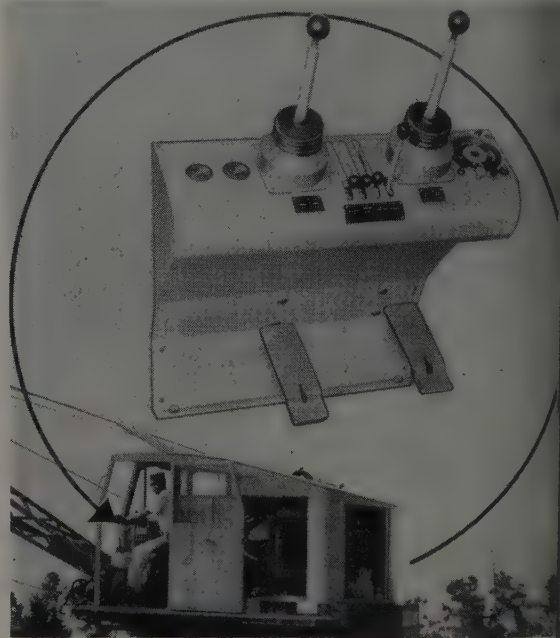
THE COLORADO FUEL AND IRON CORPORATION

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

## Joy-stick controls for Lorain-26

Two-Lever, Joy-Stick power controls are now available on the Lorain-26, a crawler-mounted machine with a heavy duty 3/4-yd. rating as a shovel and 17½ tons as a crane. The Lorain feature controls swing, travel, hoist, crowd and retract, or powering load lowering and boom derricking by



## PROFIT-BUILT by ABC...for MORE earning power

... AS MUCH AS ONE TON MORE EACH TRIP

This revolutionary hard-working aluminum hauler features a new section design which adds 4 to 6 inches to the width and permits a payload gain of more than 1800 pounds.

Its unique, interlocking construction and integral flooring can be designed to meet special size hauler requirements. This

13' dump 10-12 yd. body weighs only 1350 pounds. Call or write for information.



Aluminum body corporation

Washington Blvd. at Vail, Montebello, Calif. (E. Los Angeles)  
Mailing Address:  
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Trailers • Truck Bodies • Dump Truck Bodies  
Sleeper Cabs • Edbro Front Mount Hoists

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

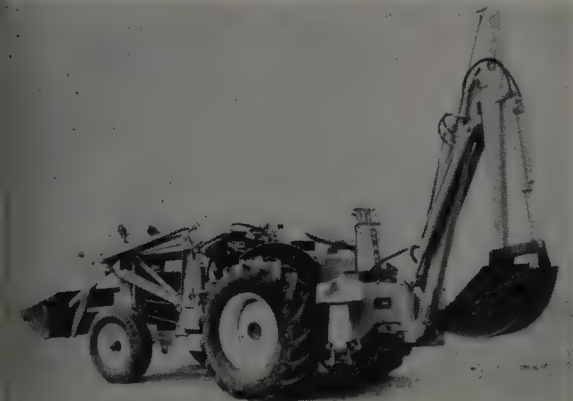
WESTERN CONSTRUCTION—February 1964

hydraulic power. The conventional three or more levers are reduced to two and this fact, in addition to the power control itself, reduces operator fatigue, improves control, response and speed of operation. All series of Lorains can now be had with Joy-Stick power controls. The 26 when used as a crane can be equipped with the new internal gear boom hoist which provides a final planetary gear reduction drive to the drum which gives greater precision by providing slower speeds and improved control. A larger boom hoist drum will accommodate heavier derricking cable as well as increasing cable winding capacity. The Lorain-patented square-tubular-chord boom is standard on Lorain-26 cranes. Made of special alloy steel it is lighter, stronger, has increased capacities and can be used in greater lengths than conventional angle types.

... Circle No. 165

### Powerful backhoe for IH tractors

Increased speed and power, plus greater loading height, enable the Model WR-350 backhoe to handle a wider variety of difficult trenching jobs and foundation excavations. Manufactured by the Wain-Roy Corp. for mounting on the IH 300-350 utility tractors, the backhoe has a digging range of 190



ft., a digging depth of 12 ft. below grade, and a loading height of 9 ft. A link-lever swing system provides extra smooth cushioned swing. Smooth operation is increased as normal swing linkage wear is automatically compensated and adjusted. The boom and dipper stick are welded box sections of high strength steel designed for best load distribution and minimum weight. Powerful crown cylinder provides maximum digging power, plus high-speed retraction.

... Circle No. 166

### All-weather cab for popular make tractors

The J. Frank Sims Cab Co. has announced the manufacture of a sturdy all-weather cab for use on International, Ford, Gordon Major, Case, Minneapolis-Moline, John Deere and



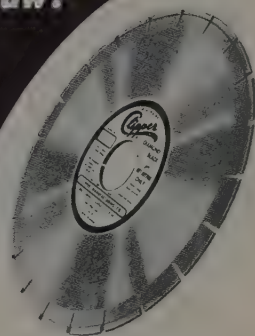
## SAW CONCRETE & ASPHALT FASTER WITH THE ALL-NEW

**Clipper**  
SALES RIGHT THRU  
SELF-PROPELLED

### 36 H.P. CONCRETE SAW

**Over 32 Outstanding  
Features Found on No  
Other Concrete Saw!**

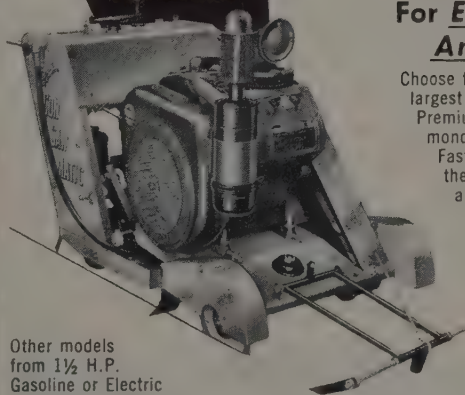
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Know the  
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Sawing  
Industry



### BEST BLADES For Every Saw Any Job!

Choose from the world's largest selection of Premium Quality Diamond Blades for the Fastest Cutting at the Lowest Cost on any job. Let your Clipper Factory Trained Representative help you select the right Saw and Blades for your job!

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

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MAKES THE DIFFERENCE  
BETWEEN

WET

AND

DRY

DIGGING

## Deas Island Tunnel approaches DUG IN THE DRY—thanks to Stang dewatering

On any project, you can depend on Stang to start the job right—IN THE DRY. Remember, the responsible handling of water, in any situation, is Stang's sole business. Don't fight water, and lose time and money doing it. For the practical, economical answer to all your water problems, call on **water-handling specialists**... call on STANG!

CONTRACTORS FOR THE APPROACHES:  
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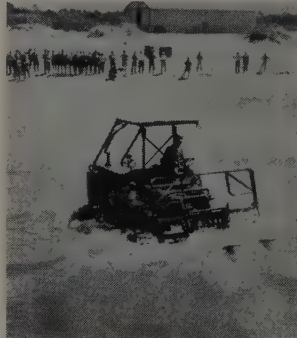
City  State

... for more details, circle No. 53 on Reader Service Postcard

Oliver tractors. The cabs are designed to fit either the bare tractor, or tractors equipped with most combinations of front and rear-mounted equipment, such as loaders, back-hoes, dozers, brooms, snow plows, post hole diggers, mowers, scrapers, cranes or trenchers. Operating controls may be mounted inside the cab to allow full use of the tractor in all weather, the year around. The cab fits tightly to the tractor, providing warm, windproof comfort for the operator in cold weather. By merely snapping off or rolling up the side and rear curtains, the operator has cool, shady protection in hot weather. The frame is constructed of rugged 12 and 14-gage steel and mounted to withstand vibrations and hard usage. Side panels, that may be either rolled up or snapped off in warm weather, are of sturdy fire, water and mildew resistant canvas with heavy-duty vinyl plastic windows. ... Circle No. 167

## Amphibious fork truck

A fork lift truck that "swims," climbs sand dunes, pulls itself out of holes, drives sideways, reaches for its load and then holds the load on an even keel over any terrain has



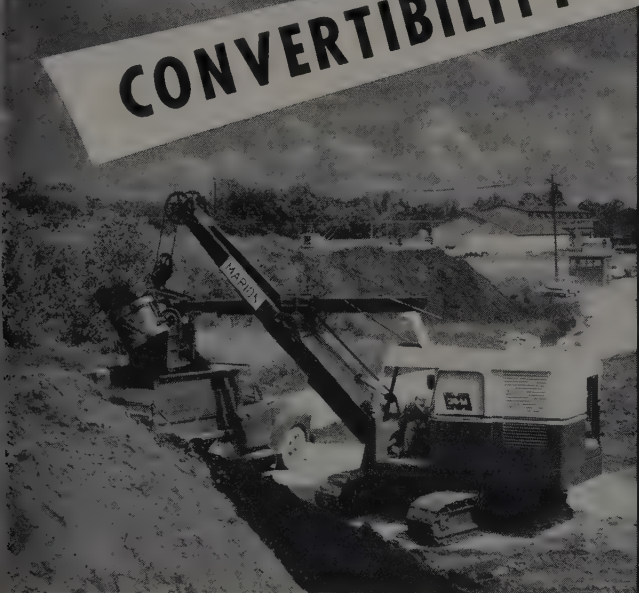
been designed for the U. S. Army Quartermaster Corps. by Clark Equipment Co. Officially designated a "tough terrain fork truck," but nicknamed the "Ranger," applications of the machine include handling materials on beaches, across snow fields and in similar areas inaccessible to conventional handling equipment, as well as military uses. It will operate in 5 ft. of water. With both front and rear axle steering it can move sideways at a 20-deg. angle. The body and forks can be tilted left or right, independent of the axles, to permit pick-up of loads set at an angle or to carry loads at a level across a hillside. There is no conventional upright. Forks are extensions of hydraulic telescoping "arms" which reach out up or down to pick up loads. A side-shifting device moves forks two feet either side of center to lift off-center loads. An oscillating rear axle keeps the Ranger level passing over bumps or depressions. Both two-wheel and four-wheel drive take it through sand and up hills. Tubeless tires are used and each wheel has spot-type disc brakes similar to those used on large aircraft. The machine will travel 25 mph. in both forward and reverse. ... Circle No. 168

## Gardner-Denver adds to compressors

Gardner-Denver Co. has announced the addition of two new models, the RP125 and RP365, to its line of rotary compressors. A clutch between the engine and the compressor has been retained in the new units. The engine starts freely and warm engine water circulates through the compressor oil cooler and reservoir. Thus, warm, free-flowing oil is supplied to the compressor as soon as it starts turning. The Model RP125 is available with either gasoline or diesel engine. It is 10 ft. 6 in. long (from the end of the stationary tow bar to the back of the compressor), 4 ft. 8 in. wide and 5 ft. high. The Model RP365 is equipped with a diesel engine as standard equipment. It is 10 ft. long (with movable tow bar in vertical position), 5 ft. 7 in. wide, 6 ft. 5 in. high and has a net weight of 7,730 lb. ... Circle No. 169

# If you Want

# CONVERTIBILITY or MOBILITY



## you'll buy a MARION

### PROFIT FEATURES THAT MAKE THE DIFFERENCE

#### The 35-M, A Big $\frac{3}{4}$ -Yard Machine!

- **CONVERTIBILITY**—fast, field conversion to all types front end equipment
- **COMPLETE AIR CONTROLS**—boost output substantially
- **WORM-TYPE BOOM HOIST**—positive, quick, safe power-up—power-down control
- **SELF-CLEANING CRAWLERS**—they clean as they work and travel
- **ANTI-FRICTION BEARINGS**—generously used for efficiency and years of low maintenance service
- **ADJUSTABLE HOOK ROLLERS**—keep wear at a minimum
- **OPTIONAL FEATURES**—torque converter, independent travel; high gantry

#### The 35-M Truck Crane, A Versatile 25-Ton Unit!

- **MOBILE**—37 mph speed holds time between jobs to a minimum
- **RUGGEDLY BUILT CARRIER**—highly maneuverable in every situation
- **FAST CONVERSION**—to dragline or clamshell operation
- **BIG OUTPUT**—air control gets more work done faster
- **STABILITY**—telescoping-type outriggers give more stability for extra heavy lifts; screw jacks optional
- **PERFECT SPOTTING**—independent boom hoist has power-up—power-down for safe, accurate operator control. Torque converter optional.

## MARION

**MARION POWER SHOVEL CO.**  
Marion, Ohio, U.S.A.

Whether you want convertibility or mobility, buy a Marion 35-M for the high performance, low maintenance and long life dividends you'll receive on every job.

Send us complete information on the  
☐ 35-M truck crane, ☐ 35-M.

Name

Company

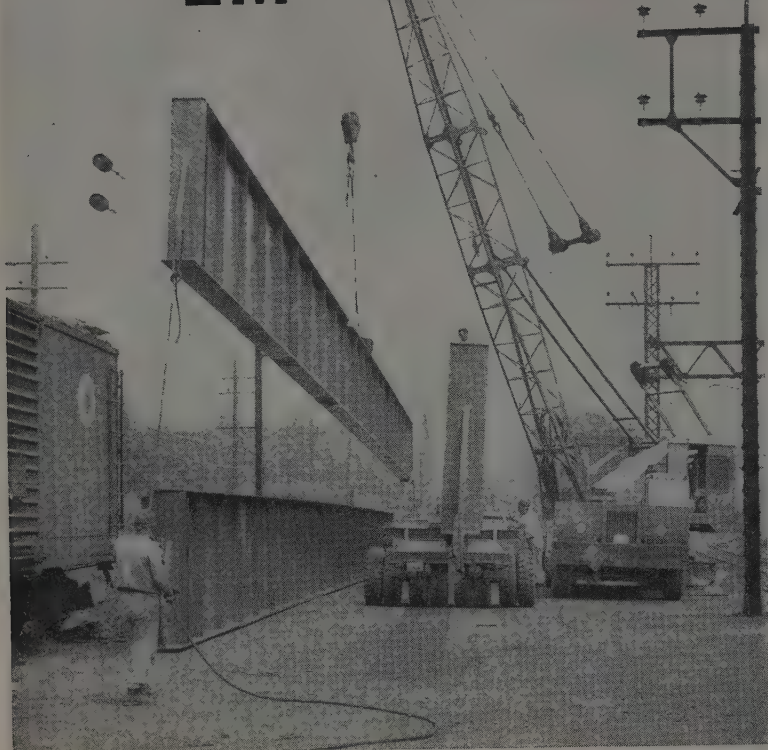
Address

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

# MOVES 'EM

*...here  
...or there!*

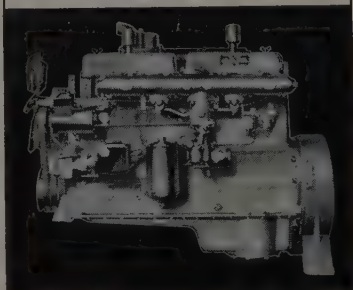


## WAUKESHA *Power*

Loading steel beams—up to 102 ft. long, weighing almost 15 tons each—for transport from the railroad at Cos Cob, Conn., to the Nianus River viaduct site, a part of the Connecticut Thruway project. It's a P & H crane, with 55 ft. boom—Waukesha powered with a 140-GK engine—owned and operated by the Klevens Corporation of Yonkers, New York.

### POWERING P & H CRANE

**Waukesha 140-GK Gasoline**—6-cyl., 4½ x 5½-in., 525 cu. in., 155 hp @ 2250 rpm. Send for descriptive bulletin 1548.



368

**WAUKESHA MOTOR COMPANY, WAUKESHA, WISCONSIN**

NEW YORK

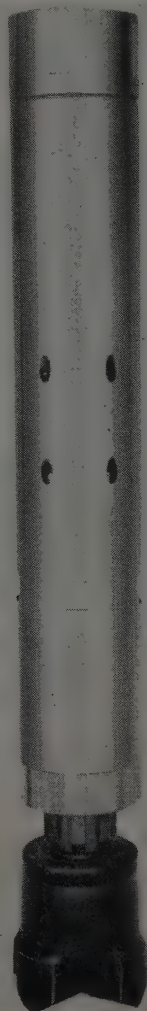
TULSA

LOS ANGELES

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

### Gardner-Denver introduces powerful drill for blast holes

Mole-Dril, the new Gardner-Denver percussion drill, will make 4¾ to 6½-in. water well, blast, and seismograph holes with unusual speed. Whenever hard formations are encountered, the drill may be attached to the drill stem in place



of the rotary bit. The stem conducts the compressed air supply to and rotates the drill. A tungsten carbide insert bit is attached to the tappet, thereby becoming an integral part of the drill. As a result, the Mole-Dril gives maximum drilling efficiency, regardless of depth. The drill rod between the drill and bit is eliminated, and with it, the inherent energy dissipation of the conventional surface drill. Two models are available. The Model AM-4 weighs 98 lb., is 35½ in. long, has an outside diameter of 4 in. and uses a 4¾ bit. Model AM-6 weighs 200 lb., is 39 in. long, has a 5¾ in. outside diameter, and uses a 6½-in. bit. Additional specifications available.

... Circle No. 1

# Symons Forms Ganged for Anchor Walls

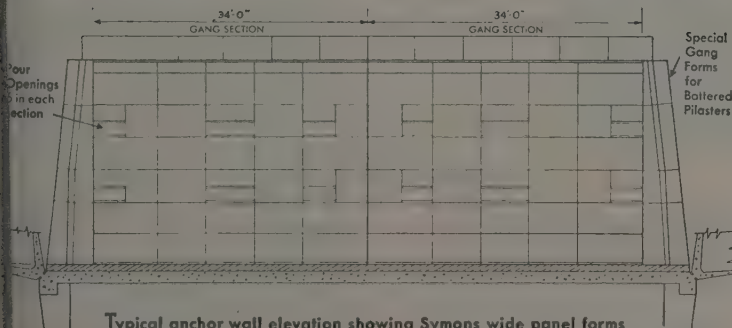
**ASSEMBLY COST  
ONLY 5c A SQ. FT.**

*Modern forming methods answer the need of the jet age on the new TWA hangar at New York's International Airport. Symons 4 x 6 and 4 x 8 foot panels ganged in units 34 feet wide by 27½ feet high were used for forming the 28 anchorage walls which straddle the full 80 foot roof width of the main building.*

*By using this method of forming, the contractor, Grove, Shepherd, Wilson & Kruege, Inc., poured the hangar in place at the cost of a precast structure. Panels were assembled on the ground at a cost of only 5¢ a square foot. It took about 15 minutes for a crane to tilt a gang form off the slab and inch it into place on the roof. 15,000 square feet of Symons wide panel forms were used in this gang forming operation. Symons wide panel forms have steel struts and 2 x 4 cross members to strengthen the panel and minimize deflection during pouring. Tie holes in the steel struts allow insertion and removal of special ties. Any strength tie may be used, including Williams removable end ties. Individual panels are built in 6' and 8' lengths and 30", 36" and 48" widths.*

*Project Manager, A. R. Maxwell, working closely with the local Symons forming engineer, devised this fast, efficient method of forming. This type service is available to all contractors, as well as the preparation from your plans, complete form layouts, bill of materials and recommendations for the best and least costly method of forming—there's no charge or obligation.*

*Symons Forms Shores and Column Clamps may be rented with purchase option—rentals to apply on purchase price. For more information on Symons products and service send for our FREE catalog.*



Typical anchor wall elevation showing Symons wide panel forms ganged into units 34 feet wide by 27½ feet high. There are a total of 28 cable anchor walls on roof of the main building.

**Symons**  
**SYMONS CLAMP & MFG. CO.**  
634 Williams Street, San Leandro, Calif.  
Phone: Lockhaven 9-9159

Warehouses located in  
California, Kansas, Minnesota and New Jersey  
Sales offices and agents in principal cities.

# NEW LITERATURE

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

## Keep your materials moving

Theme of Pioneer's 36-page conveyor catalog is "built to keep your materials moving." It is compact and complete with a visual indexing system which makes it very easy to use. The catalog describes the two lines of job-engineered



conveyors and pre-engineered (packaged) conveyors manufactured by Pioneer. Much attention has been given to conveyor accessories such as drive types, of which there are three. Other accessory items are included. . . . **Circle No. 171**

## Versatile hydraulic hammers

Arrow mobile hydraulic hammers, a product of Arrow Manufacturing Co., are featured in a bulletin put out by that company. Used for asphalt cutting, concrete breaking, backfill tamping, and driving posts or piling, the hammers offer a range of power from gentle earth-packing pats to blows of 8,000 ft. lb. In pavement breaking, with use of the proper accessory, the Arrow hammer can crush, or make clean accurate cuts with no back fracture. Bulletin contains on-the-job photographs and specifications. Write to **Arrow Manufacturing Co., Box 4120, South Denver Station, Denver 9, Colo.** . . . **Circle No. 172**

## Allis-Chalmers motor scraper

Performance and design features of the TS-160 Motor Scraper, recently added to the Allis-Chalmers motor scraper line, are described in an eight-page illustrated catalog. Photographs, illustrations and specifications help tell the new model's design and construction story. . . . **Circle No. 173**

## PM grader features given

Pettibone Speedmatic graders are the subject of an illustrated brochure published by Pettibone New York Corp., a division of Pettibone Mulliken Corp., Rome, New York. Described are the three models which make up the Speedmatic series—Model PM-12 with tandem drive and leaning front wheels; Model PM-412 offering four-wheel drive and four-wheel steering; and PM-612 which has six-wheel drive, and steering and powered front wheels. Booklet is extensively illustrated with pictures of standard features of the graders as well as optional equipment and accessories. . . . **Circle No. 174**

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

WESTERN CONSTRUCTION—February 1958

# SUPERIOR STRESS EQUALIZER SYSTEM REDUCES LIFTING STRESS IN TILT-UPS

## NEW SYSTEM SAVES STEEL AND CRANE TIME ON TUCSON JOB

On a recent tilt-up job in Tucson, Arizona, Harold Ashton, contractor, used a newly developed SUPERIOR Stress Equalizer System which offers two important advantages, especially on panels over 20 ft. high:

- (1) Permits use of SIMPLIFIED crane operation instead of vertical 3-point lift which requires a rather elaborate rigging system.
- (2) Less reinforcing steel is required—steel that is normally required only for stresses at time of lift.

Progress photos of this job are shown here.



A—START OF LIFTING OPERATION. Note Superior Stress Equalizer Beams at top position and regular Superior Lifting Angles at bottom.



B—SIMPLIFIED RIGGING is an important advantage of Superior System as only two running lines are needed. The 27 1/2' high panel shows virtually no deflection during pickup.



C—LOAD STILL IN TENSION. Superior's System provides necessary strength and saves omission of reinforcing steel which is used only for stresses which occur at time of lift.



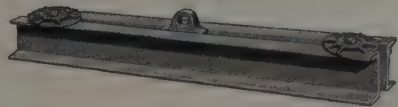
D—AS LOAD TRANSFERS TO SHEAR, Superior Pick Up Inserts, Bolts and Stress Equalizer Beams resist the forces which occur at this time.



E—CRANE MOVES PANEL towards final position. Simplified pickup speeds up crane operation considerably and provides faster and safer control.



F—PANEL PLACED IN POSITION. Superior Adjustable Braces which have exclusive pivoting action, were used in final positioning.



Superior Stress Equalizer Beams (shown above) are available on a nominal rental basis. All Superior accessories for tilt-up construction are designed for fast and efficient handling of all types of precast panels and structural members. Write for bulletin.

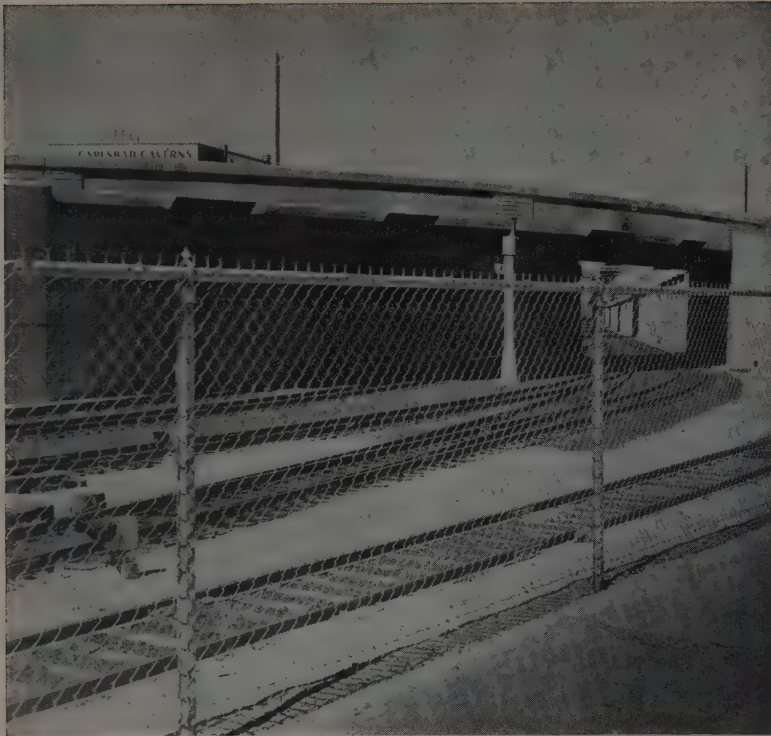
## SUPERIOR CONCRETE ACCESSORIES, INC.

9301 King St., Franklin Park, Ill. (A Suburb of Chicago)

New York Office  
1775 Broadway, New York 19, N. Y.

Pacific Coast Plant  
2100 Williams St., San Leandro, Calif.

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



# REALOCK

## "right-of-way" fence pays dividends . . .

**...in low-cost upkeep**—Realock Fence is sturdy, durable. Hefty steel posts and strong, top-grade steel wire fabric are made to uncompromising standards. Galvanized after weaving, Realock has long-lasting corrosion- and weather-resistance. Rigid quality controls and inspections throughout every stage of production ensure long years of maintenance-free protection.

**...in ease of erection**—Realock Fence is designed and produced by highly skilled specialists. Our engineers will help you plan every detail. Realock erection crews will install your fence quickly, professionally. Or, if you prefer to erect it yourself, we'll tailor-make the fence to meet your specifications.

Realock Fence is available in a wide variety of types . . . with barbed or knuckled selvages . . . with or without barbed wire tops . . . in Light or Heavy Construction . . . in all standard heights up to 12'.

Complete information and free estimates available. Consult your classified directory or contact the nearest sales office listed below.

5691

THE COLORADO FUEL AND IRON CORPORATION—Denver and Oakland

WICKWIRE SPENCER STEEL DIVISION—Buffalo, New York



# REALOCK FENCE

THE COLORADO FUEL AND IRON CORPORATION

BRANCHES IN ALL KEY CITIES

... for more details, circle No. 59 on Reader Service Postcard

### Refractory catalog sheets from Gladding, McBean & Co.

Two refractory catalog sheets prepared by the Refractory Division of Gladding, McBean & Co. give complete descriptions of Diablo-D refractory brick and the extra strong castable Refracrete which resists abrasion at service temperatures to 2,500 deg. The Diablo-D catalog sheet shows typical installation pictures, describes the physical characteristics and gives applications. The Refracrete catalog sheet contains a complete description of the material and describes its use.

... Circle No. 173

### Answers on friction materials

"Friction Facts," a booklet that answers questions about friction material in clutch facings and brake lining has been released by Caterpillar Tractor Co., Peoria, Ill. This 8-page booklet points out vital characteristics friction material must have in order to withstand the severe conditions imposed by earthmoving machines. Loss of friction, chipping, wear and torque capacity are discussed. Booklet is illustrated throughout with photographs. "Friction Facts" describes the tests Cat friction material must pass before they are approved for use in new tractors or in replacement parts for older models.

... Circle No. 176

### Surveying instruments detailed

David White Instrument Co. can be proud of their handsome, four-color publication on Surveying Instruments. The 25-page booklet contains detailed illustrations and specifications on White equipment ranging from hand levels and targets to \$688 transits. Prices are given on all items. Included are Dumpy levels, tripods, optical and mechanical plummets, various accessories, and many other pieces of equipment. A section on the company's manufacturing facilities and service and repair department adds to the interest of the booklet.

... Circle No. 177

### Tool bulletin for winter workers

A fall tool bulletin that contains nearly 500 items which contribute to the winter comfort of builders, contractors and workmen has been issued by the Goldblatt Tool Co. The book features heaters, clothing, and new tools to make winter work easier, plus tools developed by the company since it published its last catalog in April of this year.

... Circle No. 178

### Post-tensioning with Stressteel

The use of Stressteel post-tensioning tendons for prestressed concrete is illustrated in a folder showing four Basa Rock Co. jobs. The jobs used T and shaped girders and channel deck units. All girders were post-tensioned, using stressteel bars and wedge anchors.

... Circle No. 179

# How to make a Pony do a Plow-horse Job



**New Allison CT-3340 brings TORQMATIC muscle for the first time to 7-yd. scrapers and small materials handlers.**

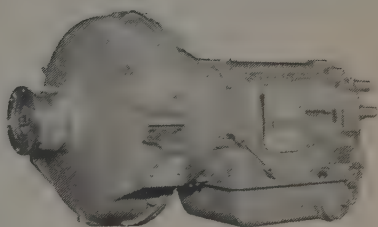
A scraper with TORQMATIC delivers more power at the blade—faster work cycles—more time on the job.

Any operator of a TORQMATIC-equipped giant scraper can vouch for that. Now, for the first time, the proved advantages of TORQMATIC are available in several small scrapers, haulers and other materials handlers with the new TORQMATIC CT-3340.

Take a tip from more than 80 manufacturers of 122 different types of construction and road-building equipment.

Get the Allison TORQMATIC story. Ask your equipment dealer, or write:

**Allison Division of General Motors, Indianapolis 6, Indiana**



- New "straight-through" design provides maximum capacity in minimum space.
- Full power shifts in all speeds: 4 forward, 2 reverse, including high-speed overdrive for return trips.
- Net torque input—350 ft.-lbs.
- Multiplies engine torque 300%.
- Total torque ratio: 15.9:1.

*Allison*



**TORQMATIC® DRIVES**

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

**EASY TO REPLACE**  
ON THE JOB

# Tamprite Tips

**NO WELDING!**

**DRIVE OFF WORN TIPS**

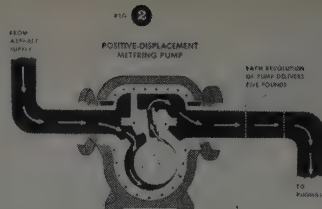
**DRIVE ON NEW TIPS**

**PREVENT COSTLY DELAYS** by equipping your sheeps foot rollers with Tamprite Tips and Shanks. Simple to replace on the job. Available for immediate delivery. Write for information.

PATENT NO.  
2,127,641

**LOS ANGELES**  
STEEL CASTING CO.

6100 So. Boyle Avenue, Los Angeles 58, California  
... for more details, circle No. 61

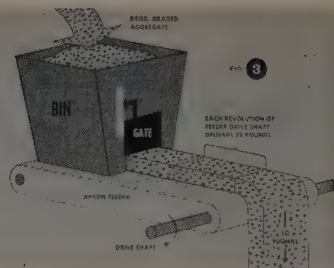


## Principles of asphalt plants discussed

A 24-page, full color folder, titled "Principles of Barber-Greene Continuous Asphalt Plants" has been announced by the Barber-Greene Co. Thirteen of the booklet's pages are devoted to graphic descriptions of exactly how a continuous asphalt plant operates, the differences between continuous and

## Cat grease

Benefits from using genuine Cat grease seals in Cat-built equipment are explained in a new booklet, "The Big Three," recently released by Caterpillar. "The Big Three" are special leather facings, proper contact pressure and heavy-duty diaphragms designed into each Cat seal. In two colors, the illustrated booklet outlines why every owner or prospective owner should place extra emphasis on the grease seals used in his machine to get the proper work from it.



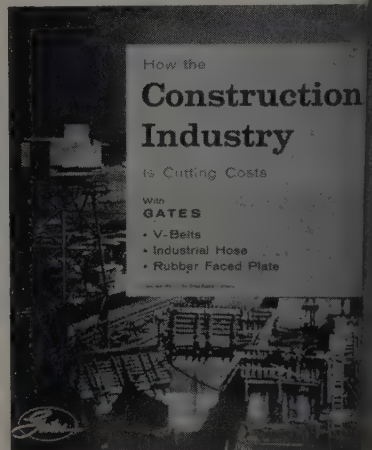
batch-type plants; plant functions and the methods of continuous measurement of both aggregate and asphalt. Large half-page and full-page drawings explain the operations described in the accompanying text. Three pages of laboratory analyses of continuous mixes and a two-page section devoted to questions and answers on the plants complete the booklet. ... Circle No. 180

Copies are obtainable in French, English, Portuguese and Spanish.

... Circle No. 181

## Cost cutting with rubber

A recent survey made by field engineers of the Gates Rubber Co. shows how contractors and builders are getting more profits from their facilities by cut-



ting unnecessary labor and maintenance costs, and by reducing downtime. More than 50 illustrated case histories outline specific results obtained by construction companies, and should prove of considerable assistance to others with similar problems. Copies are available to construction industry operators.

... Circle No. 182

## Let there be light

If you're interested in roadway and road construction lights, or tunnel lighting, you'll do well to have a look at Croun-Hinds' 52-page bulletin on their light equipment, since these are among items covered. Also mentioned are flood lights, searchlights, aviation lighting, etc. Description of each item is given along with catalog number and price. The book is punched to fit any standard ring binder.

... Circle No. 183

# PORTA HOUSE



## YOU CAN TAKE IT WITH YOU!

The field office or tool shed that you can move on a pick-up truck. Pays for itself on the first job.

Quickly assembled and disassembled by unskilled labor.

SIZES: 9' or 12' widths—to any length (in 3' modules)  
(9x6, 9x9, 9x12, 9x15, 9x18, etc.—to any length)  
(12x12, 12x15, 12x18, 12x24, etc.—to any length)

Light, watertight, strong.

Mass produced cheaper than you can build it!

Rental arrangements if you wish.

Write or phone collect.

**PORTA HOUSE**

Manufactured and Distributed by  
**RIDGELY K. DODGE**

6767 Broadway Terrace • Oakland 11, Calif.  
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**AVAILABLE IMMEDIATELY**  
Plan to include  
Porta Houses in  
all future jobs.



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

Most complete line  
of standard  
structural shapes  
produced in the West!



BUILT TO SERVE THE GROWING WEST

For specifications write: KAISER STEEL CORPORATION • Los Angeles • Oakland • Seattle • Portland • Phoenix • Denver • Tulsa • New York

February 1958—WESTERN CONSTRUCTION

... for more details, circle No. 63 on Reader Service Postcard

## ECONOMY offers 3 FORM SERVICES

FOR CONCRETE CONSTRUCTION

① **EFCO Steel Forms.** Available on a purchase basis for a wide range of form requirements. Free form erection drawings are supplied.

② **ECONOMY Steel Forms.** Rental forms for larger, more difficult and unusual form requirements. Supplied with supervisory service.

③ **SPECIAL ECONOMY Forms.** Custom-built forms on a purchase basis for your special forming needs. Included are forms for:

**PRECAST PRESTRESSED CONCRETE**

### ECONOMY FORMS CORP.

FOR CATALOG write  
Economy Forms Corp., Box 128V,  
Des Moines, Iowa, or contact  
the nearest office below.

Denver, Colo. .... 2863 Walnut

Los Angeles, Calif. .... 5718 Long Beach Ave.

Oakland, Calif. .... 190 MacArthur Blvd.

Other offices coast-to-coast

... for more details, circle No. 64

## Heavy duty crawler tracks

A series of descriptive sheets on Utility crawler tracks has been issued by **Industrial Parts Depot, Inc.** Described and illustrated are the complete tracks, shown ready for installation, and component parts. Included are price lists which show the weight as well as price of the parts. Utility tracks are available for Cat D-7, D-8, and D-9 tractors, for the IH TD-24, and the AC HD19, HD20, and HD21.

... Circle No. 184

## Tempest in a track rail

A colorful piece of literature, highlighted by no less a commodity than Tempest Storm, is available on the Hensley track rail which has been added to the line of crawler tractor replacement parts manufactured by **Hensley Equipment Co.** Specially designed for use on the Cat D-8, D-7, D-6, and D-4 tractors, and soon to be available for IH, Allis-Chalmers, and the remaining Cat sizes, the new rail is forged from the highest quality steel, heat-treated to insure correct Brinnell hardness. Pins and bushings are carefully machined for precision fit. Links will not stretch, nor fail to mesh correctly with the drive sprocket. Also available for use with the Track Rail are heavy duty grouser pads.

... Circle No. 185

## Literature briefs

**DITCHER**—An illustrated leaflet on **Barber-Greene's** Model 702 ditcher presents 4 pages of on-the-job photographs.

... Circle No. 186

**CONCRETE CARRIERS**—**Oshkosh Motor Truck** has made available an 8-page illustrated brochure on their 4- and 6-wheel drive concrete carriers.

... Circle No. 188

**GAGES AND VALVES**—Dimensional drawings, graphs, and specifications on liquid level gages and valves are included in **Jerguson Gage and Valve Co.'s** 8-page catalog.

... Circle No. 188

**STATIONARY AIR COMPRESSORS**—Three pamphlets by **LeRoi** describe their entire line of Westinghouse unit type and Le Roi stationary air compressors.

... Circle No. 189

**ROTARY COMPRESSOR**—Unit illustrations, complete specifications, and a rotary compression cycle diagram are features of bulletin E-267 on **Davey Compressor Co.'s** Model 125 Rotary Compressor.

... Circle No. 190

**PORTABLE HEATING**—**Insto-Gas Corp.** has published a 4-page catalog covering blower, heaters, salamanders, and infra-red heaters.

... Circle No. 191

**ELECTRIC DRILLS**—Four-page folder (JE-2263) featuring the **Thor Power Tool Co.** electric drill series, screwdriver-nutsetters, and impact wrenches is available.

... Circle No. 192

**PRECAST FLOORS AND ROOFS**—**Foldout** describes **Gratiot Community Hospital** in Michigan, showing how the precast floor and roof system is adaptable to a wall-bearing structure. The **Flexicore Co., Inc.**

... Circle No. 193

**TRANSIT**—**David White Instrument Co.'s** contractor's transit No. 8200 is detailed in a 4-page color catalog.

... Circle No. 194

**TWO-WAY COMMUNICATION**—Speakers, speaker assemblies, microphones are amplified in the 6-page folder, Bulletin 1601-9 by **Mine Safety Appliances Co.**

... Circle No. 195

**CONCRETE REPAIR**—Case histories involving structural repair with **Gunitite** are presented in **Gunitite Contractors Association's** 6-page Bulletin 130.

... Circle No. 196

**CLUTCHES**—Lots of diagrams and specifications in **Rockford Clutch Division's** 4-page brochure on clutches power take-offs, and gear-reduction units.

... Circle No. 197

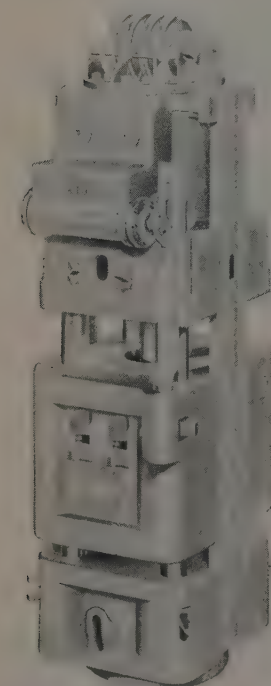
**BATCHING PLANT**—**Noble Co.'s** Batch-A-Bout is pictured and described in a 1-page bulletin.

... Circle No. 198

# VULCAN

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when you specify  
or buy

PILE DRIVING HAMMERS  
and PILING EXTRACTORS



Manufacturers of Pile Driving Hammers and Piling Extractors Since 1852

**VULCAN**

IRON WORKS INC. 327 North Bell Avenue, Chicago, U.S.A.

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



**BIG PROJECTS PROVE IT!**

**Firestones are carrying more loads per dollar!**

From the St. Lawrence Seaway to the Priest Rapids Dam in the State of Washington, records prove that Firestone Rock Grip Tires with S/F—safety-fortified—Nylon outwork and outwear them all. Tough cord bodies withstand severest punishment to slash downtime losses. You cut tire costs because two great tread designs match these off-the-highway tires to *any* job. You get the *flotation and traction* you need in loose earth and wet going. You get *armored* protection for hauls over splintered shale and knife-edged rocks. Firestone Tires defy cuts and slugging impacts like no other tires made. Ask your Firestone Sales Engineer about these *tubed* or *tubeless* heavy-duty tires. Call him today at your local Firestone Dealer or Store.



ROCK GRIP WIDE BASE

ROCK GRIP

Enjoy the Voice of Firestone on ABC television every Monday evening.  
Copyright 1958, The Firestone Tire & Rubber Company

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**Firestone**

BETTER RUBBER FROM START TO FINISH

# News of DISTRIBUTORS



**NEW BUILDING** of Columbia Tractor Co. just 4 mi. north of Wenatchee, Wash., on Chelan Highway 97. Columbia is distributor for Caterpillar equipment in north central Washington. With expanded quarters and new facilities, they are equipped to fully service all types of Caterpillar construction equipment, and also maintain a large replacement parts stock as well as service facilities to do repair work either in their own shop or on the job.

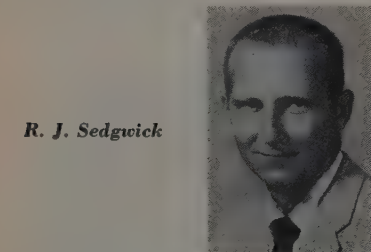
## Viber names Salt Lake representative

A new distributor in the West has been appointed by Viber Company of Burbank, Calif., pioneer manufacturer of concrete vibrators. Holland Equipment Co., Salt Lake City, Utah, headed by Jack Holland, now covers Utah, eastern Nevada, western Wyoming and a corner of Arizona.

## Pump company expands Western outlets

R. J. "Bob" Sedgwick, Ralph B. Carter Co.'s Western representative with headquarters at Arcadia, Calif., announces the appointment of the following distributors to handle Carter's complete line of self-priming centrifugal, diaphragm, and centrifugal

opened an equipment depot at 582 Sixth St., San Francisco, which, according to George Thurling, sales manager, will improve distribution to the Western distributor network.



**R. J. Sedgwick**

pressure pumps in California: The Rix Company, Inc., San Francisco; Central Equipment Co., Berkeley, Hayward and Sacramento; McGaraghan Supply Co., Eureka; Lowry Equipment Co., Inc., Redding; Fullerton Equipment Co., Ukiah; Siskiyou Tractor & Equipment Co., Yreka; Blystone Equipment Co., Santa Ana. As a further expansion of Western facilities, Carter recently

## New Mexico firm adds three accounts

H. E. Leonard, president of Construction Machinery Co., Albuquerque, N. Mex., announces the acquisition of three new lines: J. I. Case Co., Marion Power Shovel Co., and Pettibone Mulliken Corp. Officers and key personnel in the company headed by Leonard are L. G. McDonnell, secretary-treasurer; W. H. Evans, manager; C. L. McClaskey, manager of truck equipment division; E. W. Haack, parts manager, and Dave L. Near, service manager. A branch at Colorado Springs is located at 2721 N. Nevada St., where Oliver Ray is in charge.

## San Diego outlet for B-K equipment

Construction Machinery Co., 2175 Newton Ave., San Diego, Calif., is representing the Blaw-Knox Equipment Division in the sale of construction clamshell buckets, and the Construction Equipment Division in the sale of B-K construction machinery. Besides San Diego County, Construction Machinery Co. represents Blaw-Knox also in Imperial County.

## Foulger increases sales force

Foulger Equipment Co., Salt Lake City, Utah, announces two additions to its sales department. Walt Summerhays, formerly assistant parts manager, is one, and the other is Guy Toombes, formerly sales representative for General Petroleum Co., traveling Utah and eastern Nevada.



**THE LARGEST DISPLAY** of construction equipment ever shown by a single manufacturer on the West Coast took place when Harnischfeger Corporation displayed its entire line of P&H power shovels and truck cranes at the Los Angeles headquarters of Brown-Bevis Industrial Equipment Co. Equipment valued at more than \$1,000,000 was viewed by 600 representatives of contractors and others allied to the construction industry on the West Coast. The event marked the first showing here of P&H's gigantic Model 575-TC, the largest over-the-highway truck crane.

## Seven 900-cfm Units Provide ALL AIR POWER for Drill Barge "Hornet IV"



### DREDGING DETROIT RIVER

Now in operation at the lower end of the Detroit River, off Amherstburg, Ontario, the special drilling barge "Hornet IV" has fired the opening rounds in a five-year program that will deepen all connecting channels on the Great Lakes. This project, undertaken by the U. S. Army Corps of Engineers, will deepen limiting channels by about 6 feet, permitting fuller cargo loadings and the use of larger vessels, with an anticipated saving of about \$10 million per year in transportation costs.

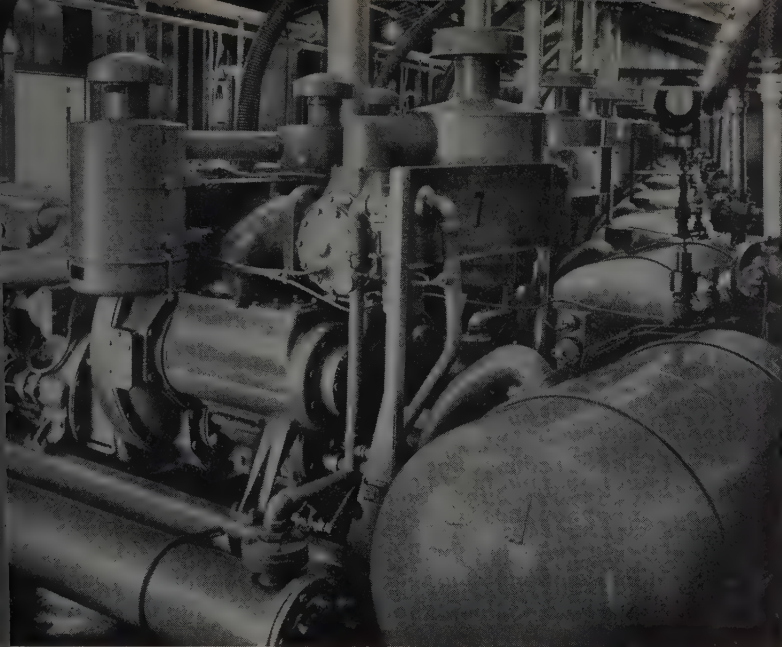
### GIANT DRILL BARGE

Built by Marine Operators, contractors for the Amherstburg job, the "Hornet IV" is a giant 160 ft. by 30 ft. drill barge that is blasting 6 feet of solid rock from a 6-mile stretch of channel bottom. All air power for the "Hornet IV" — for operating the submarine drills, the hauling winches and leveling posts — is provided by seven 900-cfm Gyro-Flo compressors. Also included are forty I-R air hoists and seven special I-R air motors.

### DEPENDS ON AIR

With 6300 cfm of dependable Gyro-Flo air power, the "Hornet IV" is drilling and blasting at the rate of one charge (500 lb. of dynamite) every hour and 45 minutes. Here, virtually everything works by air — and the ability to maintain this unprecedented blasting rate depends on the compressors. Hence service-proved performance and exceptional freedom from maintenance were major factors in the selection of Gyro-Flo units for this important installation.

For information on how Gyro-Flo air power can help you do a better job, faster and at lower cost, just call your nearest Ingersoll-Rand representative.



seven 900-cfm Gyro-Flo compressors, arranged for stationary mounting, meet all air requirements for drill barge "Hornet IV". Water-cooled heat exchangers replace the old radiators normally used for portable units. Rugged dependable Ingersoll-Rand Air's insure quick positive starts at all temperatures on six of these units.



Ingersoll-Rand air motors raise and lower the studded beams that "anchor" the "Hornet IV" firmly to the channel bottom in drilling position.



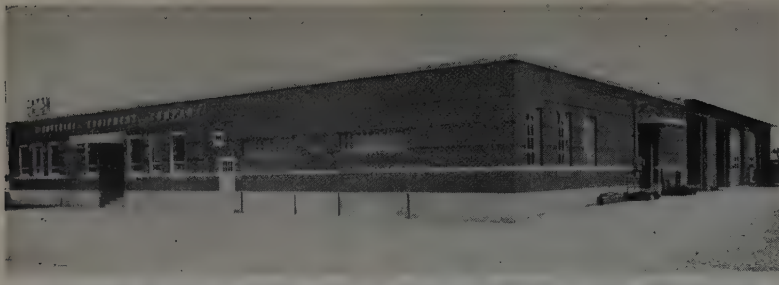
Above: The Ingersoll-Rand heavy-duty air hoists — provide the motive power on the drilling towers. Each pair of hoists is provided with a single set of centralized remote controls for easier operation.

Left: Two sets of winches, mounted on opposite ends of the barge and driven by I-R air motors, pull the "Hornet IV" to and from the drilling site between rounds by means of anchored steel cables.



**Ingersoll-Rand**  
2-723 11 Broadway, New York 4, N. Y.

COMPRESSORS • ROCK DRILLS • AIR TOOLS • CARSET BITS • PUMPS  
... for more details, circle No. 67 on Reader Service Postcard



APPROXIMATELY 800 persons visited the new home of Industrial Equipment Co. located at 1800 Sixth Ave., North, Billings, Mont., at its official opening recently. On hand to greet them were sales representatives: Front (l. to r.), Donald D. Bentley, Carl Bakkum, B. F. Beiler (sales manager), Rowland Throssell (sales promotion manager); rear (l. to r.) A. M. Livingston, Wm. F. Fagan, and Jack Patterson.

#### Business management staff changes

Interstate Tractor & Equipment Co. announces that Charles E. "Ted" Wain-

wright is moving from Salem to handle credit at the Portland store. Arthur J. Somner has assumed the duties of ac-

*When you need  
to MEASURE—  
do it the fast  
easy way  
with  
Rolatape*



Cut your estimating and layout time *in half* by using the ROLATAPE Model 400 Measuring Wheel. ONE MAN can measure accurately at normal walking speed . . . and the total measurement is recorded automatically in full view of the operator. And you can measure with complete confidence, since accuracy is assured by its scientifically calibrated counting mechanism.

Construction men all over the country are turning to ROLATAPE for speed, convenience and efficiency in their measuring work . . . Why not see for yourself?

See your nearest ROLATAPE dealer or write today for complete information.

**Rolatape Inc.**

1741 Fourteenth  
Street

Santa Monica,  
California

... for more details, circle No. 68 on Reader Service Postcard

countant. Both men will have offices at Interstate Tractor's headquarters store at 2855 N.W. Front Ave. in Portland. The Oregon-owned firm has a unit also at 1041 Highway 99 N. in Eugene, and is exclusive distributor for Thew-Loran shovels, Euclid earthmoving equipment and Chicago Pneumatic air compressors and tools.

#### Western Machinery opens new branch

R. B. George, sales manager of Western Machinery Co., Phoenix, Ariz., announces the transfer of Les Hall from head of service in Phoenix to office manager in the company's new Tucson branch. Homer Humphries, formerly of Smith Booth Usher Co., replaces Hall as service manager. The new Tucson branch opened Jan. 2 at 1109 West S. Mary's Road. Here 4,000 sq. ft. of space provides adequate offices, parts department, warehouse and shop. Western Machinery Co. recently added to its lines Austin-Western graders, hydraulic cranes, street sweepers and steel wheel rollers.

#### Recent appointments by Hall-Perry

M. D. Appino has joined the Hall-Perry Machinery Co., of Butte, Mont., as manager of its branch at Great Falls and Kenneth Moore is a new salesman at the Billings branch.

#### Essick takes on Worthington account

Essick Machinery Co., 1950 Santa I Ave., Los Angeles, has been appointed to represent the Worthington Corporation in that area, according to E. West Hammond, district manager of Worthington.

## MANUFACTURERS

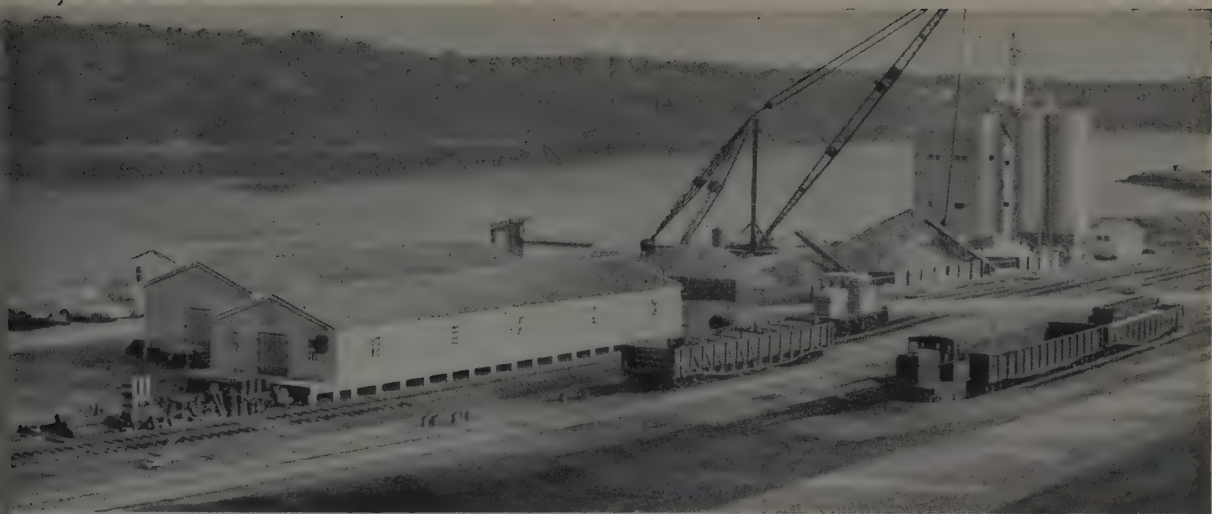
#### Robert Campello joins Wooldridge

Mortimer S. Gordon, president of the company's Wooldridge Manufacturing Division plant in Sunnyvale, Calif. This division manufactures earthmoving equipment and self-propelled scrapers for the construction industry. Associated with the excavating industry since 1929 in both distributor and manufacturing organizations, Campello moves to Continental from Marine Power Shovel Co.



Robert Campello

this capacity, Campello will also be general manager in charge of operations of the company's Wooldridge Manufacturing Division plant in Sunnyvale, Calif. This division manufactures earthmoving equipment and self-propelled scrapers for the construction industry. Associated with the excavating industry since 1929 in both distributor and manufacturing organizations, Campello moves to Continental from Marine Power Shovel Co.



Of the 88 Armco Steel Buildings at the new Allen Steam Plant of the Duke Power Company, nearly half of them are at their third site. An equal number are at their second location.

## These Armco Steel Buildings are at Their Third Power Plant Construction Site

Erected three times at different sites . . . and ready to go again!

That's the record of 37 Armco Steel Buildings used by the Duke Power Company to house workers and machines during construction projects at their various power plants in the Carolinas.

Formerly, wooden buildings were erected at construction sites and later abandoned because relocation was too costly. Then, in 1950, the Duke Power Company erected 37 Armco Buildings—bunkhouses, family-type houses, foremen's offices and tool rooms—during expansion of their Buck Steam Plant. Upon completion of work here, the buildings were dismantled and re-erected for construction crews at the Dan River Plant site.



These 16- by 60-foot Armco Buildings in the foreground have been dismantled, moved and re-erected twice. First time they were moved 90 miles; the second time it was 140 miles.

Recently, ground was broken for the new Allen Steam Plant. The Armco Buildings, already used at two previous construction sites, were again dismantled and re-erected—their *third* location.

\* \* \*

Armco Steel Buildings are available in more than 5,000 sizes, in clear-span widths from 5'-4" to 100'. Offering high quality at lower cost, they are widely used by contractors, engineers, industries, municipalities and highway departments.

### ARMCO DRAINAGE & METAL PRODUCTS, INC.

CALCO AND NORTH PACIFIC DIVISIONS

Berkeley • Los Angeles

Portland • Seattle • Spokane

Please send details about Armco Steel Buildings for the following use: \_\_\_\_\_

Name \_\_\_\_\_ Title \_\_\_\_\_

Company \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

## Armco Construction Products



... for more details, circle No. 69 on Reader Service Postcard

### New Southwest sales representative

Paul V. Hyland has been named Southwest sales representative for Moffett Engineering Inc., Albany, Calif., manufacturer of overhead cranes and other materials handling equipment. According to announcement by Edward J. Schneider, company president, Hyland will cover Southern California, Arizona, Nevada, Utah, Colorado, and New Mexico. Hyland, who recently rejoined Moffett, has been in the crane business since 1925.

### Keuffel & Esser moves

The Pacific Coast selling organization of Keuffel & Esser Co. recently moved into new headquarters at 23rd and Folsom Sts., San Francisco. Containing 21,500 sq. ft. of space, the ground floor front will be devoted to display and sales room and the service department. The entire second floor of this part of the building will contain the general offices.

### Ogden Corp. acquires Eimco

Ogden Corporation announces acquisition of The Eimco Corporation and the American Foundry & Machine Co., both of Salt Lake City, Utah. M. L. Sindeband, executive vice president of Ogden, said the companies' operations would continue to be managed by Eimco president Joseph Rosenblatt and executive vice president Morris Rosenblatt.

### Changes at Thor Western offices

Alfred W. Escoffier, service engineer at Thor's San Francisco branch, has been appointed manager of the Seattle branch of Thor Power Tool Co. of Chicago. Escoffier's headquarters are at the Seattle branch's new location, 414 Eighth Ave. North. R. J. Horrocks, former Seattle branch manager, transferred to the Denver branch to cover industrial sales in that area.

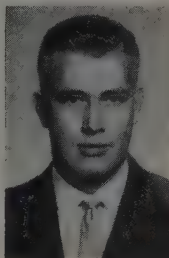
### Aero promotes Mosher

Aeroquip Corporation, Western Division,

announces the appointment of E. I. Mosher, Jr. as industrial sales manager, with headquarters at Burbank, Calif. Mosher has been associated with Aeroquip for six years as sales engineer in the Southern California and Arizona territory. Aeroquip produces flexible hose assemblies, fittings, couplings, etc.

### Leon Moss made Portland branch mgr.

Announcement is made by Goodall Rubber Co. of California of the appointment of Leon Moss as Western Division



Leon Moss

Manager with headquarters at Portland, Ore. This permits Jink Williams to devote his full time to his many customers in the area. Moss has a well rounded education in the rubber industry, having served at various posts in Salt Lake City, Los Angeles, and Denver, with considerable time also spent at factory headquarters in Trenton, N. J.

### Sales appointments by Yale & Towne

The Yale & Towne Manufacturing Co., Contractors Machinery Division, has appointed John E. Becker as Western regional sales manager for the Trojan line of tractor shovels. A Trojan sales representative prior to Y.&T.'s acquisition of Contractors Machinery Co., Becker served as regional sales manager for fourteen Eastern states until his present appointment. Also announced is

the appointment of Edward D. Gorton as district sales representative for the Trojan line in Washington, Oregon, Montana, Wyoming, Idaho, British Columbia, and Alaska. Headquarters of both men are at the company's new plant in S. Leandro, Calif.

### Engineering changes at Waukesha Motor

A number of Waukesha Motor Co. engineering personnel have been assigned new positions and responsibilities. Appointed to the post of chief engineer is J. R. Merriman, former assistant chief engineer, who assumes the duties of Lloyd Bower, recently retired. A. Pope will serve as chief research engineer. E. R. Rutenber and H. M. W. were named to two posts of assistant chief engineers, and J. P. Kelly has been promoted to chief design engineer.

### Austin Co. district appointments

Appointment of Michael P. Superville as the Austin Company's district engineer in Northern California, is announced by George A. Bryant, president of the national engineering and construction firm. His headquarters are in Oakland. At the same time Bryant announced the appointment of Brown Saveland as Austin's assistant district manager in the Pacific Northwest, with headquarters at Seattle.

### Personnel changes at Joy

W. R. Swiler has transferred from district manager of Joy Manufacturing Co.'s Duluth office to Salt Lake City, the same capacity, replacing K. Lehner, who is now with Machinery Center. H. I. Felgenhauer has been added to Salt Lake City's staff as salesman, replacing F. L. Buehler. Ray Swartz is transferring from Dover, N. H. to base in Spokane as Joy salesman in the Spokane-Coeur d'Alene area.

(Continued on page 116)

## Notice to publisher of CHANGE OF ADDRESS

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|                       | San Francisco 5, California   |      |       |
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# UNIVERSAL PRODUCTS

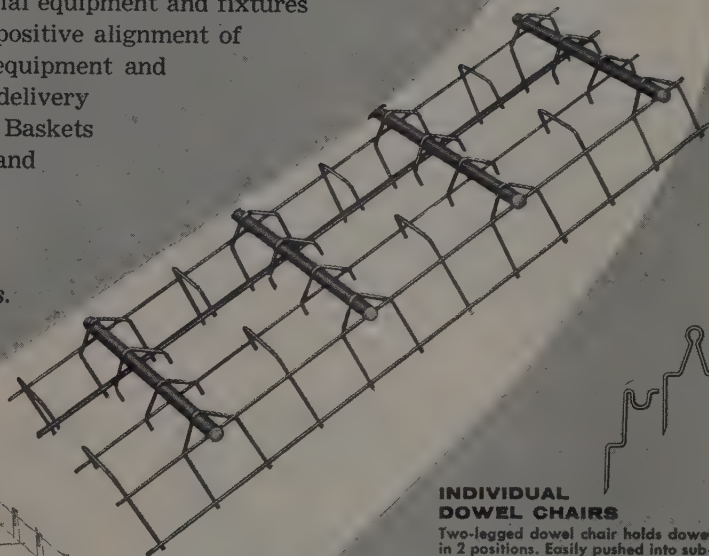
## for highway construction

### DOWEL BASKET ASSEMBLIES

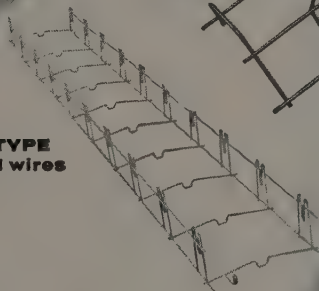
Universal Dowel Basket Assemblies are designed and fabricated to specifications. Special equipment and fixtures guarantee accurate spacing and positive alignment of dowels. High speed production equipment and modern facilities insure prompt delivery of your requirements. Universal Baskets are approved by Federal, State and private authorities for highway and airport construction.

*Let us quote on your requirements.  
Write for complete details today.*

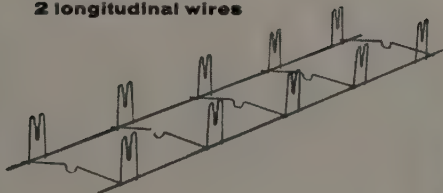
**HEAVY DUTY TYPE**  
Maximum strength  
and support



**STANDARD TYPE**  
4 longitudinal wires



**STANDARD TYPE**  
2 longitudinal wires



### INDIVIDUAL DOWEL CHAIRS

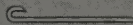
Two-legged dowel chair holds dowel in 2 positions. Easily pushed into sub-grade — won't turn after installation. Wide range of heights.

Single Leg Dowel Chair permits quick snap-in of Dowel. Sizes to support Dowel from 3" to 6" above sub-grade.



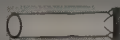
### STAKE PINS

Keep Dowel Bar Assemblies in place during the pour. Lengths from 4" to 15" in 1/4" increments.



### DOWEL SLEEVES

Metal Dowel Sleeves for covering 3/4" Dowel Bars; overall length covers 2 1/2" or 3" Dowel. Special sizes and lengths available.



### HOOK BOLT ASSEMBLY

For providing required tying element along longitudinal joint. Eliminates necessity of bending tie bars or drilling road forms.



R 1301

# UNIVERSAL FORM CLAMP CO.

GENERAL OFFICES AND FACTORY: 1238 N. KOSTNER • CHICAGO 51, ILLINOIS  
OFFICES AND WAREHOUSES:

UNIVERSAL EQUIPMENT CO. 2051-59 Williams St., San Leandro, Calif.  
1519 Eastlake Ave., Seattle 2, Washington  
UNIVERSAL FORM CLAMP CO.  
13210 S. Figueroa, Los Angeles, Calif.

DISTRIBUTORS IN PRINCIPAL CITIES

Service

Wherever

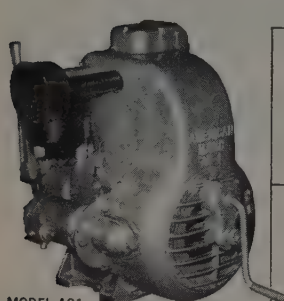
You Build... Coast to Coast



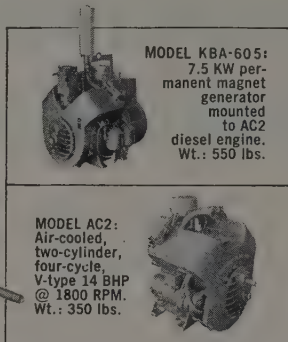
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# LIGHTWEIGHT CHAMPIONS

by America's largest manufacturer  
of AIR-COOLED DIESELS



**MODEL AC1:**  
Air-cooled, one-cylinder, four-cycle,  
6.5 BHP @ 1800 RPM. Wt.: 220 lbs.



**MODEL KBA-605:**  
7.5 KW permanent magnet generator mounted to AC2 diesel engine. Wt.: 550 lbs.

**MODEL AC2:**  
Air-cooled, two-cylinder, four-cycle V-type 14 BHP @ 1800 RPM. Wt.: 350 lbs.

AMERICAN MARC Inc. is the acknowledged leader in the field of lightweight, air-cooled diesel prime movers for all uses requiring 6.5 to 15 BHP. Prominent in the American MARC line is the new permanent magnet generator, available from 3 to 7.5 KW output. (AC or DC, and industrial three-phase). American MARC also manufactures rotating armature generators, refrigeration power units and diesel pumping units of various capacities for industrial and marine installations.

## AMERICAN MARC INC.

### DIESEL ENGINES

1601 West Florence Ave.

Dept. WC-28

Inglewood, California

Telephone OR 8-7174

6-104

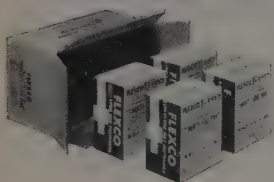
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## NEW FOR YOUR CONVENIENCE...

### FLEXCO

## "25-PAK"

**TWENTY-FIVE COMPLETE SETS OF FLEXCO HD BELT FASTENERS NOW AVAILABLE IN ONE EASY-TO-HANDLE ECONOMY BULK PACKAGE**



Standard shipping carton contains four "25-PAK" boxes of one size fastener. Keep a supply of "25-PAKS" on hand... easy to store and inventory. Sturdy boxes and shipping cartons have many uses!

Ask your FLEXCO distributor or write to us for additional information.

*Flexible* **STEEL LACING COMPANY**  
4704 LEXINGTON ST. • CHICAGO 44, ILL.

FOR THE SPLICE OF A LIFETIME!

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112

# UNIT PRICES

## Selected abstracts for Western projects

### HIGHWAY—Construction of 4.16 mi. of road in New Mexico

New Mexico—Otero County—State. Haake Construction Co., Inc., has been awarded a \$640,206 contract for construction of the Tularosa-Alamo gordo road—4.16 mi. in length.

|                                  |           |
|----------------------------------|-----------|
| (1) Haake Construction Co., Inc. | \$640,206 |
| (2) Skousen-Hise Contracting Co. | 655,625   |
| Henry Thygesen & Co.             | 659,648   |
| Brown Construction Co.           | 677,942   |

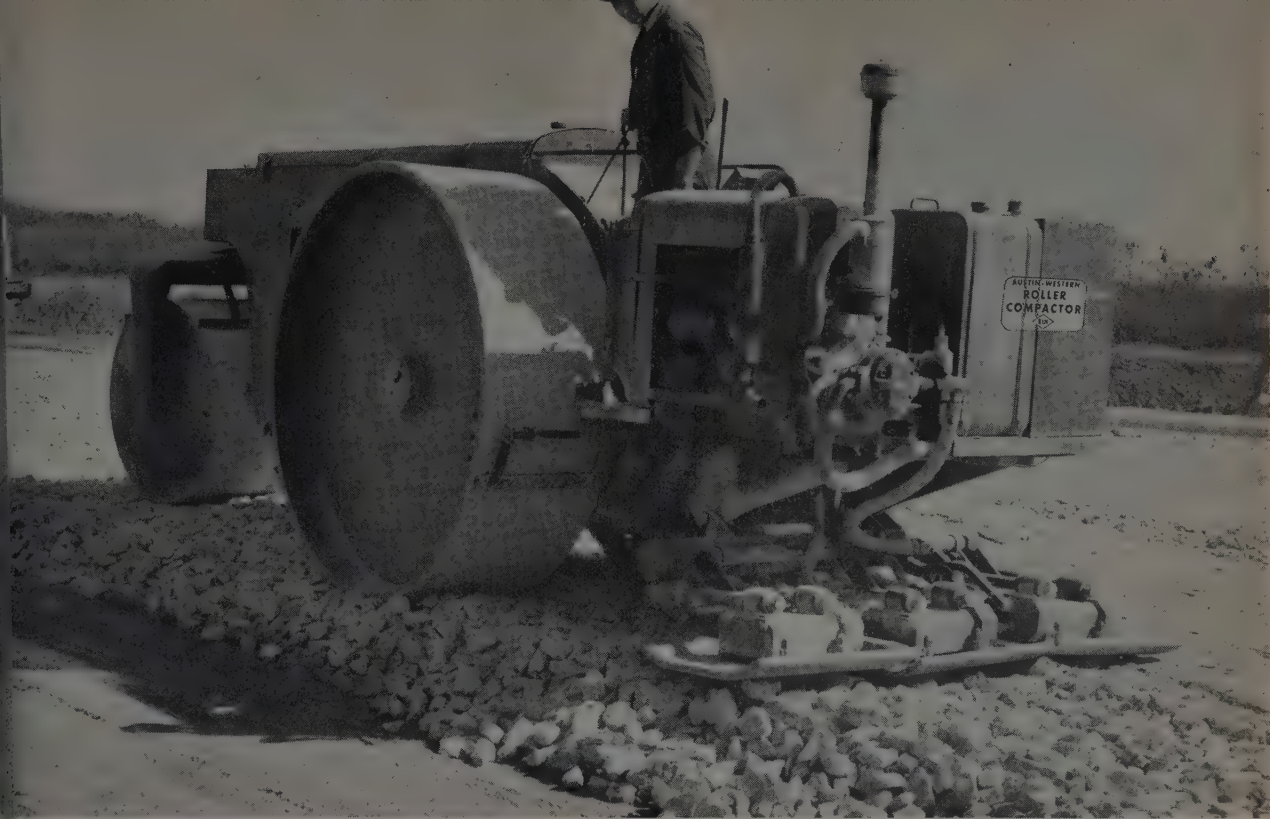
|                                          | (1)        | (2)         |
|------------------------------------------|------------|-------------|
| Lump sum                                 | \$4,500.00 | \$10,000.00 |
| Removal of old structures                | 500.00     | 1,000.00    |
| Removal of obstructions                  |            |             |
| Excavation—unclassified                  | .25        | .25         |
| Excavation for structures                | 2.50       | 2.50        |
| Ordinary borrow                          | .22        | .22         |
| Watering                                 | .60        | .60         |
| Rolling (tamping roller)                 | 12.00      | 10.00       |
| Rolling (pneumatic tired)                | 5.00       | 4.00        |
| Rolling (steel tired)                    | 6.00       | 6.00        |
| Fifty (50) ton roller operation          | 9.00       | 10.00       |
| Mechanical tamping                       | 5.00       | 6.00        |
| Station yard overhaul                    | .02        | .02         |
| Quarter mile yard haul                   | .05        | .05         |
| Ton mile haul                            | .065       | .065        |
| Wire enclosed riprap                     | 9.00       | 10.00       |
| Wire fabric for riprap                   | .35        | .35         |
| Excavation for riprap                    | 3.00       | 2.00        |
| Galvanized barbed wire fence             | .20        | .20         |
| Gates—standard type                      | 45.00      | 50.00       |
| Bracing                                  | 8.00       | 10.00       |
| Right-of-way markers                     | 6.00       | 7.00        |
| Std. Fed. aid proj. markers, Type I      | 60.00      | 75.00       |
| Trtd. thr. warn. psts. ref. (6 in. dia.) | 8.00       | 10.00       |
| Controlled gradation subbase             |            |             |
| Base course                              | .80        | .80         |
| Bituminous material, Type MC-1           | 7.25       | 7.50        |
| Emulsified asphalt, AE-3                 | 8.00       | 10.00       |
| Bituminous material, Type 120-150        | 8.25       | 8.00        |
| Cover material                           | 4.00       | 5.00        |
| Plant mix surface course                 | 3.40       | 3.50        |
| Bit. mat., Type 85-100 (plant mix)       | 6.50       | 6.25        |
| Bit. mat., Type 85-100 (tack coat)       | 7.00       | 8.00        |
| Class "A" concrete                       | 44.00      | 50.00       |
| Reinforcement for conc. structures       | .15        | .15         |
| Culvert pipe—18 in. diam.                | 4.50       | 5.00        |
| Culvert pipe—24 in. diam.                | 7.00       | 7.00        |
| Culvert pipe—30 in. diam.                | 9.00       | 9.00        |
| Culvert pipe—36 in. diam.                | 12.00      | 13.00       |
| Structural plate pipe—144 in. diam.      |            |             |
| bevel 2:1 gage 710-18                    | 120.00     | 87.00       |
| Remov. & resett. right-of-way mrks.      | 4.00       | 6.00        |

### HIGHWAY—5 mi. of highway in Arizona

Arizona—Maricopa County—State. A low bid of \$430,462 was submitted by the Isbell Construction Co. for grading and surfacing 5 mi. of highway northeast of Mesa.

|                                |           |
|--------------------------------|-----------|
| (1) Isbell Construction Co.    | \$430,462 |
| (2) Western Constructors, Inc. | 437,426   |
| Dale F. Payne, Contractor      | 456,488   |
| Copper State Construction Co.  | 456,905   |

|                                   | (1)      | (2)      |
|-----------------------------------|----------|----------|
| 236,500 cu. yd.                   |          |          |
| Roadway excavation                | .50      | .50      |
| Overbreakage                      | .375     | .375     |
| Slides                            | .25      | .25      |
| Drainage excavation               | .50      | .50      |
| Grader ditches                    | .10      | .10      |
| Crown ditches                     | .30      | .30      |
| Structural excavation             | 3.00     | 2.00     |
| Overhaul                          | .25      | .25      |
| Borrow (CIP)                      | .50      | .50      |
| Provide water supply              | 1,000.00 | 1,000.00 |
| Apply water                       | 2.00     | 2.00     |
| Rolling                           | .90      | .90      |
| Select material (CIP)             | .64      | .64      |
| Aggregate base (CIP)              | 1.25     | 1.25     |
| Blotter material for B.S.T.       |          |          |
| (special) (CIP)                   | 4.85     | 6.00     |
| Blotter material for B.S.T.       |          |          |
| (standard) (CIP)                  | 4.00     | 2.00     |
| Liquid asphalt for B.S.T.         |          |          |
| (gr. MC-2 or MC-3) (CIP)          | 51.00    | 52.00    |
| Emulsified asphalt for B.S.T.     |          |          |
| (gr. B) (CIP)                     | 52.00    | 54.00    |
| Structural steel (CIP)            | .25      | .25      |
| Handrail (CIP)                    | 9.00     | 9.00     |
| Class "A" concrete (CIP)          | 50.00    | 45.00    |
| Reinforcing steel (bars) (CIP)    | .15      | .15      |
| 12 in. C.M.P. (CIP except excav.) | 3.50     | 3.50     |
| 18 in. C.M.P. (CIP except excav.) | 4.00     | 4.00     |
| 24 in. C.M.P. (CIP except excav.) | 6.20     | 6.20     |
| 30 in. C.M.P. (CIP except excav.) | 7.50     | 7.50     |



single-purpose A-W Roller-Compactor shown in use on a highway relocation job near Harrisburg. The machine has been approved by

Pennsylvania for complete compaction of stone base aggregates up to 10 in. thick on highway construction in that state.

## New A-W Roller-Compactor\* cuts highway building costs

*Three states prove that machine makes large savings possible*

Deep penetration vibratory compaction and static weight surface rolling can now be accomplished in a single operation by the new A-W Roller-Compactor. On-the-job operation of this machine in Oklahoma, Louisiana and Pennsylvania has shown that it makes significant savings in man and equipment-hours.

The original test in Pennsylvania, which led to State approval of the machine, was carried out on a highway relocation job near Harrisburg. Preparation of the roadbed required eight excavation, with no borrow. The largest fills were 25 ft. After grading and soil compaction, stone for a 10-in. thick base was put down in a single lift. All the stone passed a 4-in. screen, 100% a 3½ in. Following spreading and initial compacting with the

A-W Roller-Compactor, the stone was choked with screenings, 100% passing a ¾-in. screen, 85-100% a No. 4 screen, 10-30% a No. 100. In this operation, the static weight of the roller (10 tons) held the stone in place while the deep, penetrating action of the vibrating shoes quickly filled the voids with screenings. No auxiliary rollers were necessary.

Engineers of the Pennsylvania Department of Highways testing laboratory checked the job with inspection holes to determine if the screenings were evenly distributed throughout the thickness of the stone base and if the stone itself was firmly keyed together. This check, plus measurements based on the yield needed to compact 1 cu. yd. to the required 10-in. depth, showed that the new machine had

done a job exceeding the minimum requirements. The engineers then recommended that it be approved for highway construction work in Pennsylvania.

Time studies on this job showed a saving in man and equipment-hours of better than 25% compared with methods then employed which used a single-purpose vibratory compaction unit followed by a separate 3-wheel, 10-ton roller. It was estimated that a contractor using the A-W Roller-Compactor on stone base could reduce his compaction bid on the job by 10¢ per square yard.

Spectacular results were also obtained with this machine in on-the-job operations in Oklahoma and Louisiana. For complete details see your nearby A-W distributor or write to us.

ment applied for

**Austin-Western**

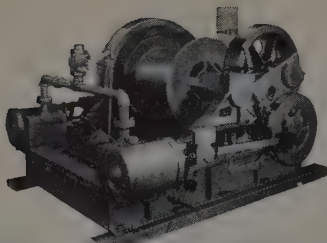
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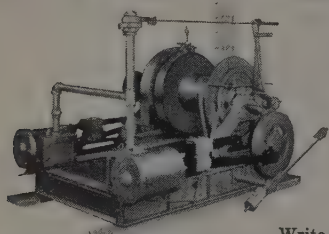
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Single Drum  
Double Drum  
Specials

# STEAM HOISTS



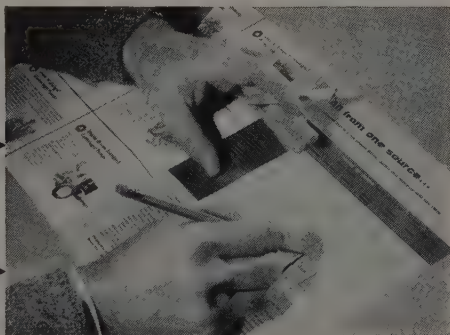
A specialty of  
**Superior-Lidgerwood-  
Mundy Corp.**  
who can supply  
any type or size  
of **Steam Hoist**  
you may require.  
Make your next  
**Steam Hoist**  
a **Lidgerwood**  
for dependability.

Write for Bulletins and Catalogs

## SUPERIOR-LIDGERWOOD-MUNDY CORPORATION

Main Office and Works: SUPERIOR, WISCONSIN, U.S.A.  
Pacific Coast Representative: **GEORGE E. SWETT & COMPANY**  
100 Howard Street, San Francisco 5, California

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IT'S NEW!

IT'S FREE!

## Contractors Get This!

New idea in "job-applied" pump selection shows ways to speed construction projects—keep "on schedule"—by moving more water more efficiently, *job after job!*

**Handy chart inside** lists operations you perform regularly—matches them up with pumps that do those jobs better, faster, at lower cost. Get a Barnes Construction Pump Selector from these distributors:



5701

Central Equipment Co., Berkeley, Calif.

The C. H. Jones Equipment Co., Salt Lake City, Utah

Larson Equipment Co., Los Angeles, Calif.

Lowry Equipment Co., Redding, Calif.

The Rix Co., Inc., San Francisco, Calif.

Write Department L-28 for details

... for more details, circle No. 75 on Reader Service Postcard

|                 |                                            |          |          |
|-----------------|--------------------------------------------|----------|----------|
| 74 lin. ft.     | 36 in. C.M.P. (CIP except excav.)          | 12.00    | 11.50    |
| 42 lin. ft.     | 42 in. C.M.P. (CIP except excav.)          | 13.75    | 14.00    |
| 80 lin. ft.     | 48 in. C.M.P. (CIP except excav.)          | 16.00    | 16.50    |
| 72 lin. ft.     | 54 in. C.M.P. (CIP except excav.)          | 19.00    | 19.00    |
| Lump sum        | Misc. removal and other work               | 750.00   | 1,500.00 |
| 2 ea.           | Cattle guard (4-unit) (std. C-14)          |          |          |
|                 | (CIP except excav. & concrete)             | 1,400.00 | 1,100.00 |
| 100 lin. ft.    | Road guard (std. C-7) (Type A or B)        |          |          |
|                 | (CIP)                                      | 4.50     | 4.25     |
| 88 ea.          | Guide posts (std. C-8, Type "BR")          |          |          |
|                 | (CIP)                                      | 6.50     | 8.00     |
| 30 ea.          | R/W markers (std. C-1) (Type C or D) (CIP) |          |          |
|                 | (CIP)                                      | 12.00    | 10.00    |
| 18,800 lin. ft. | Line fence (std. C-15 or C-16) (CIP)       | .22      | .25      |
| 135 lin. ft.    | Bank prot. (std. C-23) (Type A) (CIP)      | 23.00    | 18.50    |

## BRIDGE—Construction of a .2-mi. bridge in Washington

Washington—Grays Harbor County—State. Andy Johnson & Co. has received a \$168,205 contract for construction of a reinforced concrete bridge, .21 mi. in length.

|                                   |           |
|-----------------------------------|-----------|
| (1) Andy Johnson & Co.            | \$168,205 |
| (2) Grays Harbor Construction Co. | 171,390   |
| Quigg Bros.                       | 173,020   |
| Owens Bros.                       | 173,844   |

|               | (1)                                         | (2)             |
|---------------|---------------------------------------------|-----------------|
| 5,000 cu. yd. | Unclassified borrow including haul          | \$ 1.55 \$ 1.15 |
| 1,220 cu. yd. | Common trench excavation incl. haul         | 1.65            |
| 890 cu. yd.   | Structure excavation                        | 3.50 1.95       |
| 42 hr.        | Mechanical tamper                           | 9.00 9.00       |
| 6.5 sta.      | Finishing roadway                           | 16.50 17.00     |
| 50 M gal.     | Water                                       | 4.00 4.20       |
| 10 cu. yd.    | Gravel backfill for foundations             | 9.00 6.00       |
| 660 cu. yd.   | Selected roadway borrow                     | 4.50 3.25       |
| 250 cu. yd.   | Furn. & pl. cr. stone surf. top course      | 5.80 4.50       |
| 120 lin. ft.  | Bit. ctd. corr. met. pipe 36 in. dia. #12   |                 |
|               | gage, Type #2                               | 19.00 14.00     |
| 1 ea.         | Tide gate 36 in. diameter                   | 200.00 205.00   |
| 840 lin. ft.  | 1/4 in. steel plate water pipe 28 in. diam. | 23.00 20.85     |

### BRIDGE AND APPROACHES

|                |                                         |          |           |
|----------------|-----------------------------------------|----------|-----------|
| 672 cu. yd.    | Structure excavation                    | 3.25     | 4.00      |
| 10 ton         | Type I-1 asph. conc. pave., Class "B"   | 34.10    | 34.00     |
| Lump sum       | Shoring and cribs                       | 6,820.00 | 16,655.00 |
| 350 cu. yd.    | Concrete Class "A"                      | 71.50    | 83.00     |
| 154 cu. yd.    | Concrete Class "B"                      | 72.50    | 57.00     |
| 64 cu. yd.     | Concrete Class "D"                      | 87.50    | 42.00     |
| 7,700 sq. ft.  | Precast concrete bridge deck            | 3.85     | 4.10      |
| 131,500 lb.    | Steel reinforcing bars                  | .16      | .127      |
| 838 lin. ft.   | Steel bridge rail                       | 7.50     | 7.18      |
| 9.6 m.b.m.     | Timber & lumber (creosote treated)      | 300.00   | 465.00    |
| 2,880 lin. ft. | Furnishing timber piling (untreated)    | .65      | .75       |
| 3,420 lin. ft. | Furn. timber piling (creosote treated)  | 2.00     | 2.40      |
| 172 ea.        | Driving timber piles (untreated)        | 50.00    | 38.50     |
| 57 ea.         | Driving timber piles (creosote treated) | 55.00    | 63.00     |
| 2 ea.          | Furnishing & driving timber test piles  | 575.00   | 1,104.00  |
| 2,500 lb.      | Structural carbon steel                 | .30      | .23       |

## HIGHWAY—Grading and draining of 6.2 mi. in Wyoming

Wyoming—Park County—State. A \$107,601 contract has been awarded to Forgey Bros. Co. for grading, draining, and miscellaneous work on 6.2 mi. of the Greybull River road in Park County.

|                                   |           |
|-----------------------------------|-----------|
| (0) Forgey Bros.                  | \$107,601 |
| (2) C. A. Reeves Construction Co. | 114,626   |
| Knisely-Moore Co.                 | 121,376   |
| Jones, Hinkley & Jones, Inc.      | 125,403   |

|                    | (1)                                     | (2)               |
|--------------------|-----------------------------------------|-------------------|
| 205,500 cu. yd.    | Excavation                              | \$ .18 \$ .215    |
| 21,800 cu. yd. mi. | Cubic yard mile haul                    | .16 .20           |
| 1,174 lin. ft.     | 18 in. C.M.P.                           | 4.25 4.00         |
| 544 lin. ft.       | 24 in. C.M.P.                           | 6.00 6.25         |
| 1,172 lin. ft.     | 30 in. C.M.P.                           | 7.00 7.50         |
| 532 lin. ft.       | 36 in. C.M.P.                           | 11.00 11.50       |
| 420 lin. ft.       | 42 in. C.M.P.                           | 12.50 13.75       |
| 212 lin. ft.       | 36 in. x 22 in. C.M.P. arch culverts    | 7.50 8.00         |
| 65 lin. ft.        | 72 in. x 44 in. C.M.P. arch culverts    | 25.00 28.00       |
| 850 cu. yd.        | Excavation for pipe culverts            | 2.00 1.50         |
| 44 hr.             | Mechanical tamping                      | 7.00 6.00         |
| 14 ea.             | 18 in. C.M.P. flared end section        | 25.00 27.50       |
| 2 ea.              | 24 in. C.M.P. flared end section        | 35.00 45.00       |
| 10 ea.             | 30 in. C.M.P. flared end section        | 55.00 65.00       |
| 6 ea.              | 36 in. x 22 in. C.M.P. flared end sect. | 45.00 45.00       |
| 9.2 cu. yd.        | Class "C" concrete                      | 80.00 65.00       |
| 720 lb.            | Reinforcing steel                       | .20 .20           |
| 9140 lb.           | Structural steel                        | .25 .17           |
| 3,100 M gal.       | Watering                                | 1.75 1.50         |
| 20 cu. yd.         | Structural excavation                   | 3.00 2.50         |
| 4,100 lin. ft.     | Barbed wire fence (4 wire)              | .22 .21           |
| 7,500 lin. ft.     | Barbed wire fence (5 wire)              | .23 .215          |
| 7,400 lin. ft.     | 36 in. woven and 3 barbed wire fence    | .32 .25           |
| 30 ea.             | End panels                              | 14.00 15.00       |
| 23 ea.             | Brace panels                            | 12.00 12.00       |
| 2.94 mi.           | Old road obliteration                   | 100.00 100.00     |
| Cont. sum          | Miscellaneous force account items       | 2,000.00 2,000.00 |
| 300 cu. yd.        | Grouted riprap                          | 15.00 18.00       |
| 150 cu. yd.        | Class 1 riprap                          | 12.00 5.00        |
| 670 hr.            | Sheep's foot roller operation           | 11.00 12.00       |

# **A New Western Construction Reader Service**

## **The Product Data You Want in a Quick Easy Way**

Starting with this issue, **WESTERN CONSTRUCTION** provides you with convenient **READER SERVICE POSTCARDS**, bound in every copy. Use them to get more information on equipment and materials, latest catalogs, bulletins and literature—the product data you want in a quick, easy way.

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**WESTERN  
CONSTRUCTION**

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# CLASSIFIED

(Continued from page 110)

Rates are \$15.50 a column inch. Copy should be sent in by the 15th of month preceding publication date.

## WANTED:

All or major interest and management of concrete ready-mix business in town 6,000 to 25,000 population.

ROGER V. EVANS  
620 N. 10th St. Fredonia, Kansas

## POSITION OPEN

### ASSISTANT WATER DEPT. DIRECTOR

\$623-\$721

City of Santa Cruz, Calif. (24,000)  
Requirements include registration as a civil engineer with State of California, at least two years in a supervisory position and experience or knowledge in engineering design and hydraulics.

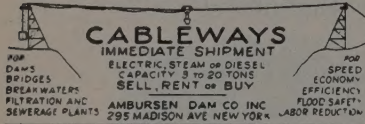
Written examination on a continuous basis after Jan. 20, 1958.

New position—to be filled immediately.

Apply to: Rm. 9, City Hall,  
Santa Cruz, Calif.

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LOW COST INSTALLATION AND OPERATION



**CABLEWAYS**  
IMMEDIATE SHIPMENT  
ELECTRIC, STEAM OR DIESEL  
CAPACITY 3 TO 20 TONS  
SELL, RENT OR BUY  
AMBURSEN DAM CO. INC.  
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## CONTRACTORS & DEALERS

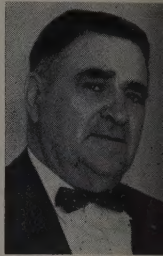
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Gene Daily made construction manager. E. F. Daily, manager of the San Francisco district of Atlas Powder Co., has been appointed Western construction



E. F. Daily

manager. James E. Ellis, former assistant manager at Seattle, becomes district manager. The new post of Western construction manager has been established to provide better service to contractors in this region, according to George W. Thompson, director of the company's explosives sales department.

### DFPA opens new field promotion office

Douglas Fir Plywood Association, Tacoma, Wash., announces the staffing of a new regional office in California. According to Joseph Weston, field promotion director, Earl Pennington has been named regional manager at this newly established field promotion office in San Francisco, serving Northern California and Nevada, with Byron Oberg as field promotion representative for the same area.

### Basalt Rock division appointments

Basalt Rock Co., Inc., Napa, Calif., announces the appointment of James Tobin as manager of the company's Structural Concrete Products Division. Tobin, who has been assistant manager of the division, replaces Harold A. Price who resigned recently. Basalt also announces that Don McCall, chief engineer, and Ray McCann, assistant, will direct all design and technical information, with Jack Streblow heading sales. Ross Rudolf will continue as technical sales representative for the division. The Structural Concrete Products Division manufactures precast and prestressed products.

### Link-Belt transfers Seattle man

R. E. Tennery of Seattle, Wash., has been appointed general superintendent of Link-Belt Co.'s Los Angeles plant according to announcement by R. C. Christiansen, Southern general manager of Link-Belt's Pacific Division. Tennery comes to Los Angeles after eleven years with Link-Belt's Seattle plant where he was general superintendent. Link-Belt is a leading manufacturer of material handling and mechanical power transmission equipment.

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# BACKFILL, uncompacted

## Life in trailer courts

The following item appeared in the free advice column of the *San Francisco Chronicle*.

DEAR ABBY: I was recently married to a man who does construction work, so naturally we have to travel wherever the job takes us. My problem is that the wives of these construction workers use terribly foul language and their idea of a good time is telling dirty stories. If I don't associate with these women (we all live in a trailer court) I am going to be pretty lonesome. How can I listen to this kind of talk and pretend I don't object when I do?

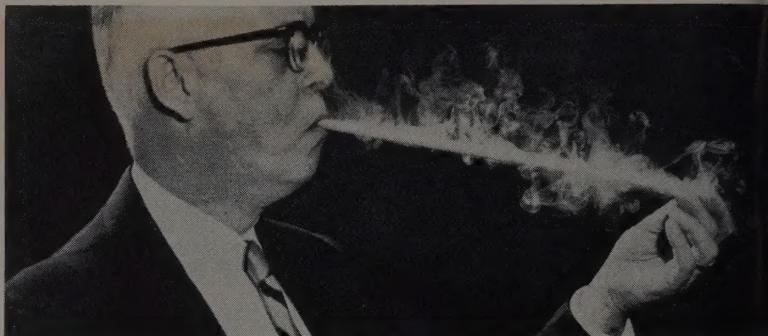
MARCELLA

## Mr. McAdam and his roads

If you've never read anything by Will Cuppy you're only getting out of life about 38.7% of what it has to offer. He wrote such books as *How to Attract the Wombat*, *How to Become Extinct*, *How to Tell Your Friends from the Great Apes*, and *The Decline and Fall of Practically Everybody*. Although a humorist especially at home in the fields of history and zoology, his style bears one characteristic which is of prime importance in technical writing—he was always scrupulously exact concerning facts. Before writing a piece on any subject, even if it was to be only a few paragraphs long, he would saturate himself in all the literature available bearing on it. His apartment contained filing cabinets filled with thousands of cards carrying all sorts of factual information.

The passage reprinted below is one of the few examples of Will Cuppy's writing touching on engineering or construction, but is fairly representative of his style. It appeared under the heading "September 21" in his book *How to Get from January to December*, published in 1951 by Henry Holt and Company, edited by Fred Feldkamp, with drawings by John Ruge. It appears here with the permission of the publisher.

"Where would we be today if John Loudon McAdam hadn't been born in Ayr, Scotland, on September 21, 1756? We would have no macadam roads, that's what! We might have macsweeney roads or macsmithized roads, but things wouldn't be the same.



## NEW KING-SIZE, ALL-FILTER CIGARETTE

We could make a lot of foolish remarks about the new family-size cigarette which has no nicotine because it has no tobacco, and which can be carried in a flip-top golf bag, but they would all be lies. Actually, the above picture came to us from the Electric Storage Battery Co. It is supposed to show the permeability of their new tubing for diffusion of electrolyte. The tubing encases Silvium grid spines and active material of the positive plates and is made of continuous-filament glass fibers within polyvinyl chloride armor. Sorry we brought the subject up.

"Mr. McAdam began to macadamize roads in Scotland in 1783, after he had lived in New York for a while and made a fortune, as people did in those days. He bought an estate at Sauhrie, Ayrshire, and started filling roads with pieces of broken stone, and nobody could stop him. There were so many complaints that the government became interested and gave him authority to place broken stone on roads without let or hindrance.

"Before he died, in 1836, Mr. McAdam had macadamized most of the roads in the British Isles. He held that each successive layer of broken stone should be ground down by the wheels of carriages and wagons passing over it in the ordinary way of business and pleasure, and by no other method. You see how that would work out.

"The carriages and wagons would finally grind down the stones, however, so that people could ride on them without jolting themselves silly, and the nervous wrecks would begin to chirk up. Then Mr. McAdam would put on another layer of stone.

"Macadam roads have been greatly improved. Today we have concrete, tar, asphalt, and what not on our roads, and the jolting is done by ma-

chinery. So far as I know, there was no Mr. Asphalt."

## Experience helps

There's no substitute for experience in the construction business, as is evident from glancing at the figures which show the number of firms failing every year. People thinking about becoming contractors should consider Mitty Constructors, a Southern California company which has built more than 60 public school structures. According to F. K. Mitty, his family has been in the construction business since they built a village in Lebanon in the 12th century. Probably was the first subdivision. (The figure 60 quoted above is based on the present century only.

## Tractor for sale—cheap

The Associated Press wires recently carried a bulletin which will be of interest to all equipment bargain hunters. It read: "A stripped down tractor weighing seven tons fell out of control in an air drop tonight and buried itself in 20 ft. of snow at the South Pole."

We held this space open for a very funny story about something that happened to a friend of ours on a construction job. He said he would come over and tell it to us just before press time. He did. It was one of the dullest we ever heard.

## ...The Editor