

WESTERN CONSTRUCTION



This month . . .

More ideas developed on
record highway cut



Trinity River Project
will have record dam



How specifications can
affect field costs



COVER see page 4

APRIL 1957

Part of M-W & W's equipment task force that includes 29 scrapers and 20 dozers at work on 1.75-million-yard cut being made at a 30,000-yard-a-day rate. All equipment is 100% Texaco-lubricated and fueled.

"We're moving 30,000 yards a day— and that Texaco Plan certainly helps."

—says Project Manager Floyd Helm

Mr. Helm heads all field work for this joint venture of McCammon-Wunderlich Co. and Wunderlich Contracting Company. *The job:* construction of 4.9 miles of highway (relocated U.S. 40)—part of the approaches to new bridge across Carquinez Straits, California. All equipment is 100% Texaco-lubricated and fueled.

"Toughest part of this job," says Mr. Helm, "is a 1.75 million-yard cut. We're trying to keep blasting to a minimum and our rippers and scrapers really have a rough assignment. We're moving some 30,000 cubic yards per one-shift day and we couldn't do that if our equipment wasn't staying right on the job. That Texaco Simplified Lubrication Plan certainly helps. Our maintenance crew can handle all major lubrication with only six lubricants—no waste motion, no mistakes—and those Texaco Lubricants really stand up. We haven't had a single equipment failure due to lubrication."

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For hydraulic units: *Texaco Regal Oil R&O*—keeps systems free from sludge, rust and foam.

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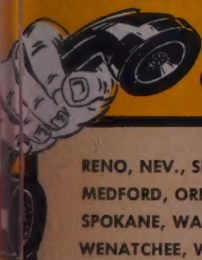
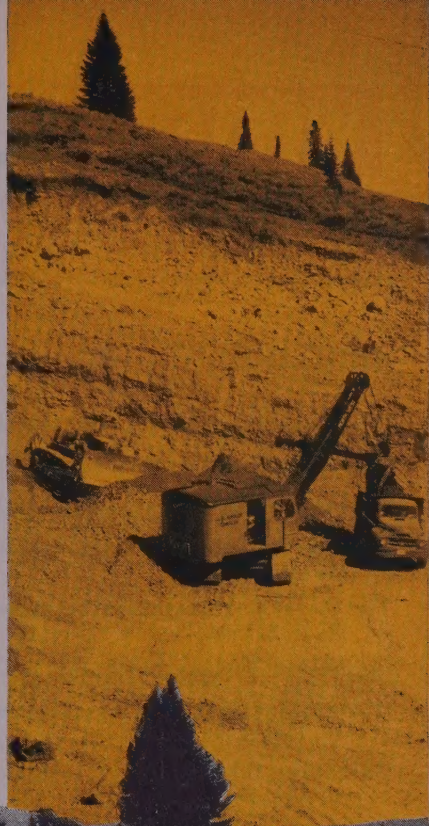
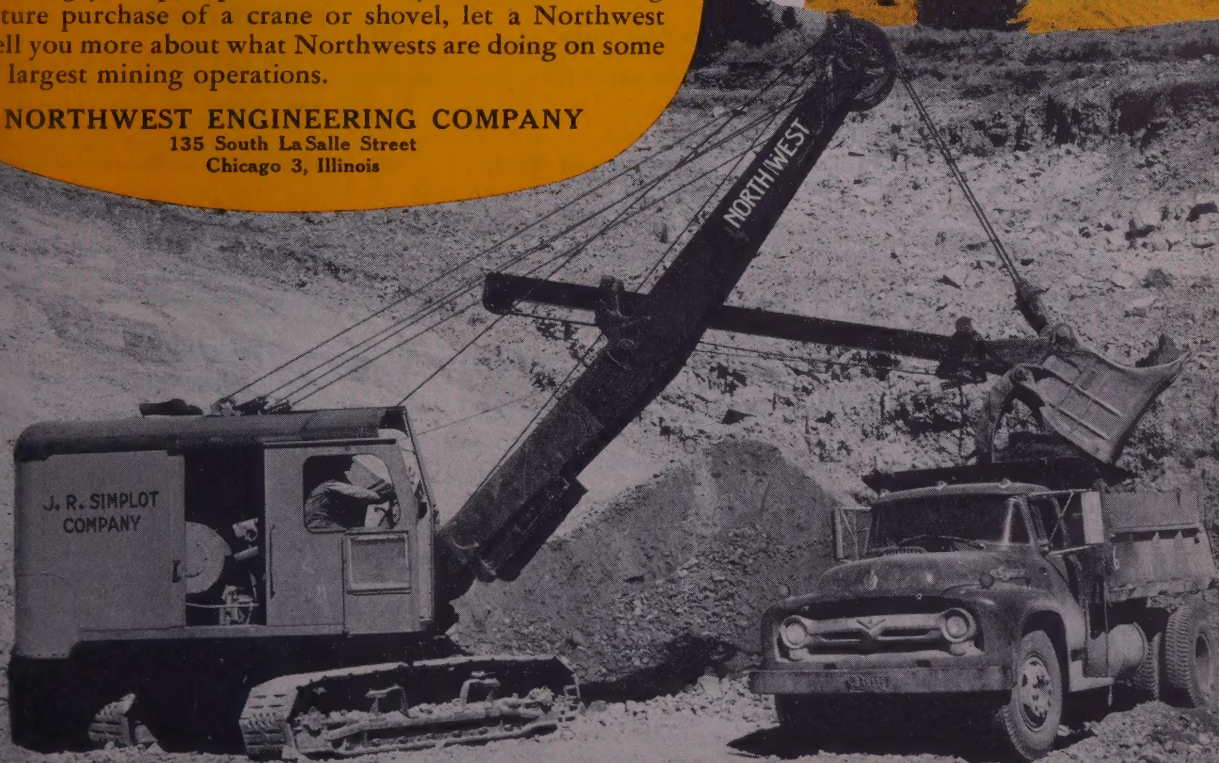
There is a phosphate operation of the J. R. Simplot Company in Boise, Idaho. The machine is a Northwest Model 41, 1-yd. shovel and it's keeping 52 trucks on the go making three or four trips a day with an average load of 12 tons, on a 7 mile haul.

This is a short season job on the Continental Divide at an altitude of 9,500 ft. Smooth operation tells the story of a properly engineered power plant plus the Northwest Dual Independent Crowd that utilizes force most independent crowd shovels waste.

J. R. Simplot knows shovels. They now own their ninth Northwest. A short season job calls for equipment that will stay on the job day after day. It is significant that J. R. Simplot Company buys Northwests for this class of work. If you are modernizing your pit operations, or if you are considering the future purchase of a crane or shovel, let a Northwest man tell you more about what Northwests are doing on some of the largest mining operations.

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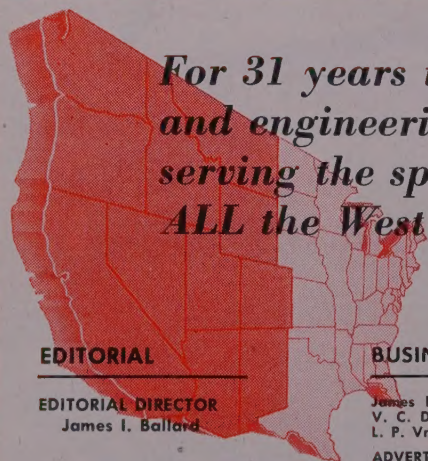
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FRONT COVER

OVER THE SIDE goes a 13-ton Euclid as work gets started on the right diversion tunnel at Glen Canyon Dam. Mountain States Construction Co. has the contract, is faced with very difficult access problem. More pictures on p. 94



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Highway Specs Should Stress Results

CONTROLS have never promoted progress. But the setting of goals provides an incentive for new ideas. This difference is particularly true in the West where construction has a strong flavor of innovation and a flare for ingenuity. The effect of controls compared to the stimulus of incentive has been receiving much attention from all concerned with highway building.

Specifications prepared by engineers of state highway departments represent directives that regulate the work of contractors and, indirectly, the developments of equipment manufacturers. Expressed as an over-simplified comparison, these specifications are usually slanted either toward describing "results" to be secured in the field, or the "methods" to be followed by the contractor. There are valid reasons that favor both principles. Extremes in either direction become ridiculous.

Arguments favoring the specifying of results, as compared to describing methods, received heavy backing at the closing session of the recent conference held in Los Angeles, where the highway engineers of the West met to study means of increasing productivity of highway engineering personnel. Representatives of contractors and equipment manufacturers placed heavy stress on the progress and advances that could result from specifications slanted more toward telling contractors what results they are to produce, leaving methods and the selection of equipment up to them.

Before getting completely carried away with this approach, it is well to examine the position of the highway department and its responsibility. The public's money is entrusted to the highway engineering departments, and theirs is the responsibility for its proper investment. As highway building has become more complex, with refinements in materials, design and techniques,

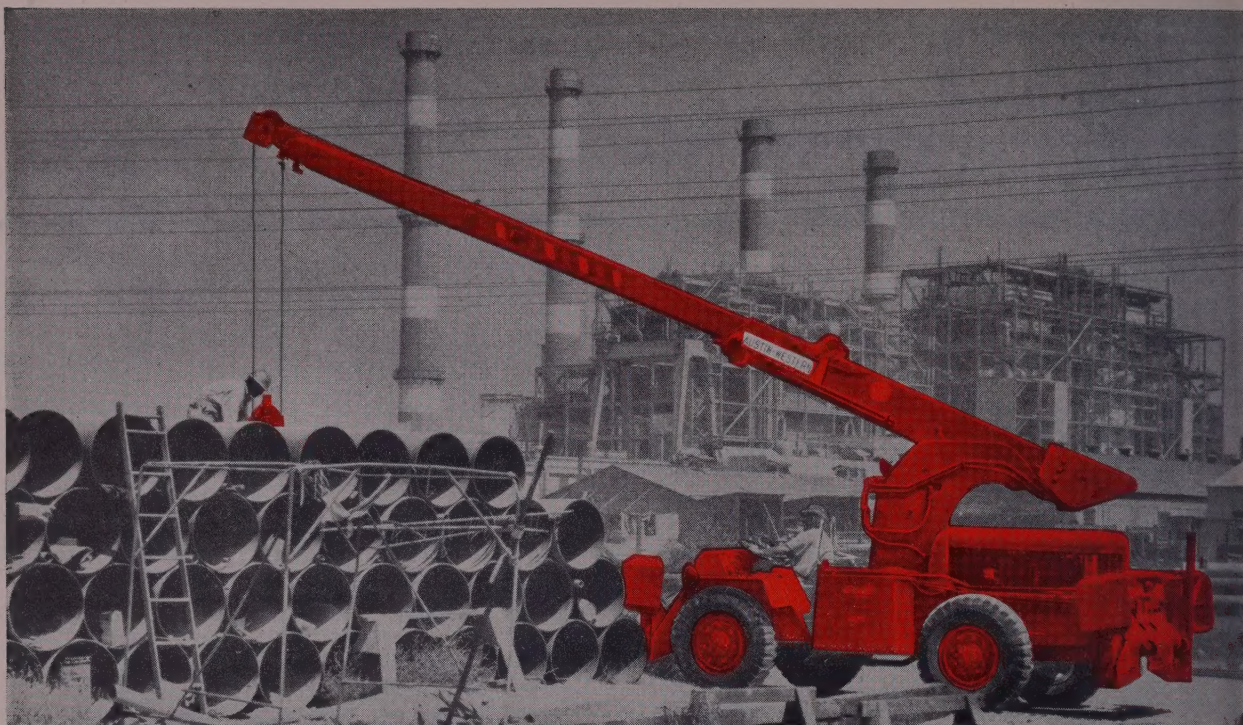
it was natural that engineers leaned toward describing the methods to be used by contractors, to insure the results they wanted. This procedure certainly secures the required results, even though it tends to place field operations in a strait-jacket.

Another factor which tends to reinforce this emphasis on methods is its advantage in keeping out the bidder with the fantastic ideas and wild procedures. He disrupts normal bidding and requires an undue amount of field inspection. These are a few of the reasons why the specifying of methods has earnest proponents.

Now let's look at the other side. Any trend that puts procedures into specifications can ultimately obscure their main purpose—to get roads built efficiently and fast. Further, such directives limit the challenge that spurs contractors and manufacturers alike. Earth-handling costs of today are a good example of meeting the road-building challenge with improved equipment and its effective use in the field. These same forces are ready to attack the expanding work load with new ideas.

Today, there is every reason to have specifications turned toward the objective, and away from procedure. Both equipment manufacturers and contractors are eager to step up their continuing search for means of securing required results with further savings. Western progress has been fostered by this type of construction urge and initiative. The principle should have a chance at applying its influence in the expanding highway program of the coming decade.

Jim Ballard



A-W Hydraulic Crane handling sections of pipe near power plant

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"In August 1955, the Department purchased an Austin-Western Hydraulic Crane to take advantage of its particular capacity for doing certain jobs more economically, swiftly and safely than the machines then operated. . . . The economy of the new hydraulic unit was quickly apparent. For instance, a larger crane had been used to load bolsters on trucks, and to handle pipe and line material. The larger crane required a driver in addition to the operator, further adding to its higher hourly cost. The new Austin-Western unit performed several of these jobs faster and at a much lower cost. Examples like these increased demand for the unit with the Department of Water and Power by both the water and power crews. . . . A second A-W unit has been recently purchased.

Extremely versatile. "The maneuverability of the A-W unit with its 4-

wheel steer is an advantage in setting steel footings for the legs of the power line towers. This unit can certainly get around.

"The A-W crane handles bearing caps on large condensers where the men formerly used chain falls. The speed, labor saving, and greater safety of this new crane increase the demand for it in this service.

"One of the first jobs for which the A-W was requisitioned was at the Seal Beach Steam Plant where, equipped with a bucket, it hoisted the sea life at the ocean end of the intake tunnel 22 feet into dump trucks. This was a three weeks' job.

"... It is easy for the A-W unit to raise a transformer weighing from one to three tons and place it on racks 18 ft. off the ground. . . . It is ideal for loading reels of wire in 2-wheel wire dollies. . . . The hooks on the A-W enable it to pull one of these dollies. . . . For excavating or pouring concrete, a

small stock bucket is used. Convenience slings make it easy to carry steel plates.

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APRIL 1957

New attachment speeds ripping

Earthmoving ideas developing on the Carquinez "Big Cut":

- "Soil Breaker" is promising new ripping tool.
- Sideboards on sideboards total 27 in.
- Contractor investigates economics of paving haul road.
- Vibratory compaction successful on structural backfill.
- Scrapers pulled in tandem begin 7,000-ft. haul.

AT RIGHT is the "Soil Breaker," a flat triangular plate which trails behind a special ripping shank and tooth. It's new and first field try-outs are impressive. Breaker doubled one contractor's ripping output.



CONTRACTOR Ferry and Crow's contract in connection with the Carquinez Project is the most talked about earthmoving job in recent years. This is with good reason, for not only is it the largest earthmoving project in highway history (the "Big Cut" is 8,500,000 cu. yd.) but under the contractor's imaginative execution of the work the job is a proving grounds for new ideas in equipment usage. WESTERN CONSTRUCTION described the job and its unusual construction methods in detail in the October 1956 issue. Recent developments merit taking another look.

The Carquinez Project

The Carquinez Project is located about 40 mi. northeast of San Francisco, Calif., and involves relocating 10 mi. of freeway in four contracts

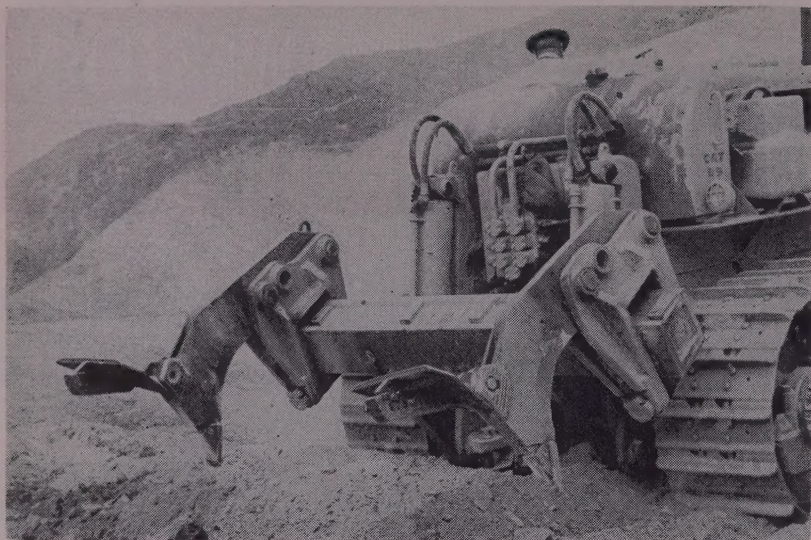
financed by \$46,000,000 bond issue. The substructure for the new Carquinez Straits bridge is under construction by Mason & Hanger-Silas Mason Co., Inc., and F. S. Rolandi, Jr., Inc., under a \$5,500,000 contract (WESTERN CONSTRUCTION, Sept. 1956). Chief feature of substructure contract is sinking to bed-rock 135 ft. below water surface three huge caissons 53 ft. wide and 102½ ft. long. The bridge superstructure will be erected by United States Steel under a \$9,500,000 contract which is now getting under way. This is the largest award ever made by the California Division of Highways. At the south end of the bridge the approaches and interchange are being constructed by Peter Kiewit Sons' Co. for \$4,660,000. Kiewit used a slip-form technique in making 50

piers in heights up to 106 ft. This work was described in the September 1956 issue.

Adjoining the Carquinez Project to the south is a 4.9-mi. freeway under way by McCammon-Wunderlich Company and Wunderlich Corp. being built out of State gasoline tax money. The job features a single cut of 1,850,000 cu. yd. Total yardage is 5,300,000 cu. yd.

New ripping device

An interesting innovation in rock ripping was being tested by the contractor in late February and his first reactions were very favorable. It is a flat steel plate in the shape of a triangle which fastens horizontally to the ripper tooth. As it is dragged through the soil it greatly extends the fracturing caused by the tooth, lifts



SOIL BREAKERS now in use on the Ferry and Crow contract were first used in October 1956 by contractors Silva and Hill and Peyton on the Burbank, Calif., golf course project pictured on this page. The breakers eliminated blasting, doubled D9 ripping output.



RIPPING through tough granitic soil with soil breakers is much smoother since flat horizontal plate holds tooth and shank in ground at full depth. Note great width of disturbed soil. Shank is knife-edged to facilitate rock fracturing. Breakers were developed in 1955 for agricultural use.

up layers of rock and soil, and prevents the tooth from riding out of the ground in heavy going.

The device is called a Soil Breaker and was developed in 1955 by the Forrest Johnson Landleveling Co., in Southern California. Johnson found that by the use of the breaker the number of passes needed to loosen up agricultural soil in land leveling operations was reduced by 60 or 70%. He soon found it could be used in cultivation and plowing as it can aerate soil without turning it over, and at twice the usual depths. Patents are applied for.

In October 1955 Johnson and two

others formed the Double J Breaker Co. for manufacturing the breaker and began to investigate the possibilities their product had for ripping in the construction industry. Figuring that the best test would be the toughest one, they designed a beefed-up shank and a 22-in. wide triangular breaker which could take the loads imposed by a Cat D9.

The breaker was brought to the Burbank, Calif., golf course project, a \$1,100,000 contract being carried out by Silva & Hill Construction Co. and J. A. Peyton, a joint venture, for a trial run. This was the result: The contractor had been using two D9s

with standard rippers to rip for four scrapers—with the breaker attachment he needed just one D9 for five scrapers.

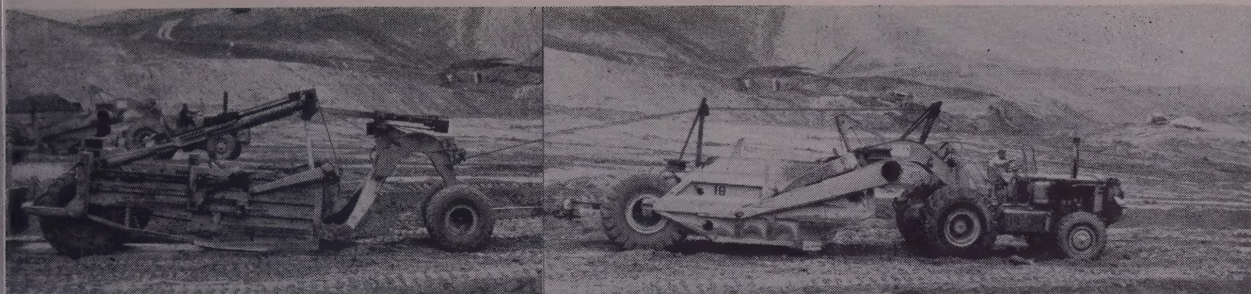
On the Ferry and Crow "Big Cut" job things look just as promising. The flat blade pulls the shank in to its full depth (30 in.) and holds it there, breaking rock in a wide path and giving the operator a smooth ride. The shank and tooth are knife-edged—the triangular plate does the bulk of the ripping and fracturing. The angle of the breaker can be adjusted to meet soil conditions. In conditions where teeth wear out in about 1½ hr. the breaker has to be hardfaced about once every 10 days. The Double J Breaker Co. is located at 3474 East Gage Ave., Bell, Calif.

Earthmoving methods

The most spectacular feature of the job from a construction methods viewpoint is the contractor's use of scrapers hauled in tandem. Leading off is a Caterpillar DW20 followed by a 12-year-old Le Tourneau RU. This is the first major use of two scrapers pulled on rubber and the rigs are moving in speeds up to 40 mph. without any trouble. It has been necessary to beef up the double rigs to withstand the unusual loadings, and the maintenance problems have increased slightly over what they would be if scrapers were operated singly, but the greatly increased production has far outweighed these disadvantages.

At the end of January 1957 the 4,200,000-cu. yd. fill between the Big Cut and the main disposal area was completed enabling the earthmoving units to make a 7,000 to 8,000-ft. haul from cut to fill on a ½% down-grade. This is the situation which the contractor had in mind when he submitted his low bid of 25.6c per cu. yd. and is the situation in which the double units can function most efficiently. Eight are now in use. This number will be increased to twelve as soon as four new Caterpillar 90 scrapers are ready.

Now that good operators have been trained and most of the bugs have been worked out of the operation of the doubles, the earthmoving has settled down to a smooth routine. In general the doubles move about 50% more dirt than the singles. The losses occur in loading (It takes 60 sec. to load a double compared to 30 sec. for a single) and a slightly slower speed traveling uphill from the fill to the cut. This latter disadvantage is minimized by having the single DW20s fall in behind the doubles to help push them up the grade whenever



TANDEM SCRAPERS—A Cat DW20 pulling a LeTourneau RU, have attracted wide attention. Rear scraper is operated through overhead cable system powered by front-mounted PTO. The operation and

necessary modifications of the tandem scrapers were described in Western Construction, Oct. 1956. This job marks the first time that two scrapers have been pulled in tandem by a rubber-tired tractor.

they happen to be in the right position. Firestone 28-ply tires are used on the DW20s, with 36-ply on the RUs.

Sideboards on sideboards

The average weight of the soil from the Big Cut is about 114 lb. per cu. ft., light enough to encourage the use of high sideboards. Fourteen inches were added to the DW20s with no ill effects so another 13 in. were added, making a total of 27 in., still with no ill effects. This has upped the combined capacity of the doubles to about 43 yd.; 20 yd. for the DW20s and 23 yd. for the RUs. Sideboards are not put on the RUs as their construction makes it almost impossible to do so. However, the four new Cat 90s which will be used as trailers behind the DW20s will be sideboarded.

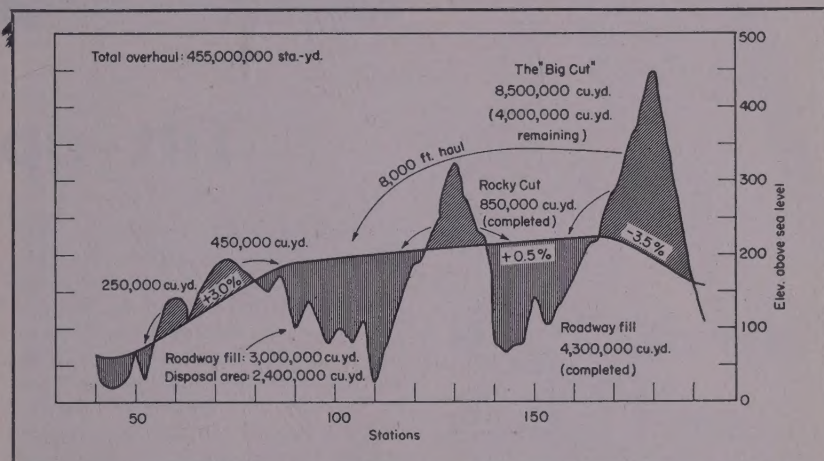
Vibratory compaction

Compaction on the fills is being carried out by six Southwest sheepsfoot tampers and a Ferguson pneumatic roller pulled by a Cat DW21 tractor. Specs call for 90% relative compaction. For compacting select material around structures vibratory compaction was used with excellent results.

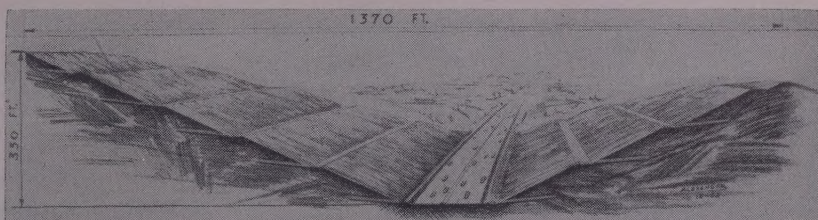
An unusual rolling wrinkle is being used by contractor McCammon-Wunderlich on the adjoining job to the south. They are using a Cat D9 to pull a pneumatic roller and a sheepsfoot roller in tandem.

Should the haul road be paved?

The contractor is seriously considering paving the haul road, possibly with soil cement, to eliminate or greatly reduce haul road maintenance. The 7,000-ft. haul road at present takes three motor patrols to maintain. With over 200 days left on the job and figuring a cost of about \$10 an hour per motor patrol 14 hr. a day, the road maintenance cost turns out to be somewhere in the neighborhood of \$100,000 for the remainder of the job. A good riding surface would not only reduce this



EARTHMOVING DIAGRAM shows how 8,000-ft. haul could be begun as soon as intervening rock cut was completed. Most of haul road is now at grade, an easy 1/2 %.



THE BIG CUT is 1,370 ft. wide at the top and 350 ft. deep and totals 8,500,000 cu. yd., the biggest highway cut in history. New alignment breaks a bottleneck.

maintenance cost but would reduce tire and equipment damage, fuel and oil consumption and down-time. One serious drawback of the plan is the damage and danger which would result if a cable broke on one of the scrapers on a downhill run, dropping the scraper blade to the ground. Perhaps oil retarders to reduce speed could be used or perhaps a lane of soft material could be kept available for scraper dragging in case of an emergency.

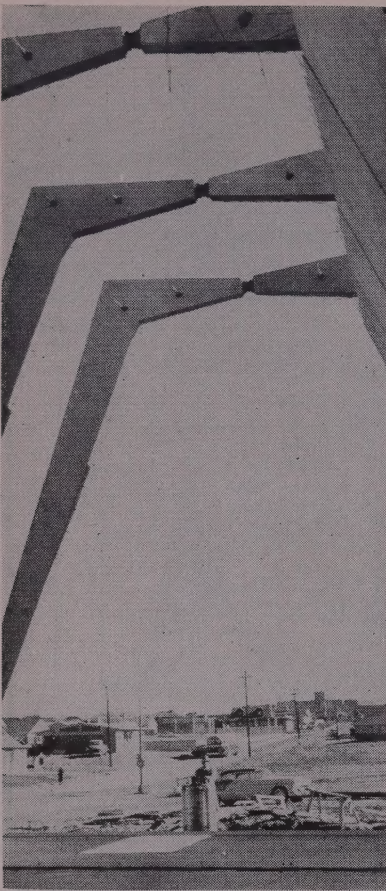
Another possibility which is being considered is the construction of a huge grader out of a 300 or 400-hp. tractor with, say, a 25-ft. blade. Whether or not these ideas are economical will not be known until further detailed studies are made. But when you have 4,000,000 cu. yd. of material to move 7,000 to 8,000 ft.

something unusual may pay big dividends.

Personnel

For the California Division of Highways, B. W. Booker is assistant highway engineer of District 4 in charge of the overall freeway south of the Carquinez Straits Bridge. L. A. Weymouth is district engineer of operations, Leonard C. Hollister is project engineer, Vincent Smith is construction engineer. Charles Sweet, Jr., is resident engineer on the Ferry and Crow job. Frank White is resident engineer on the McCammon-Wunderlich job.

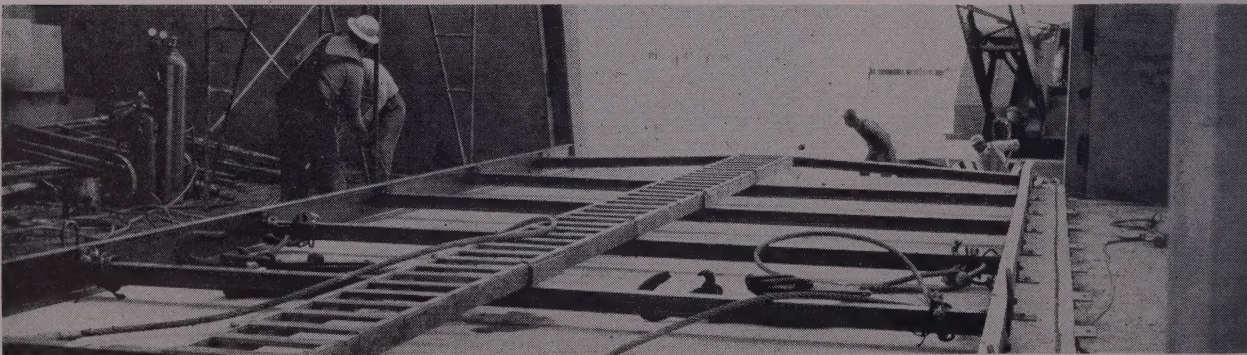
For Ferry and Crow, R. C. Philbert is general superintendent, assisted by Norman Gilliam and Pat Ferry.



Tilt-up church

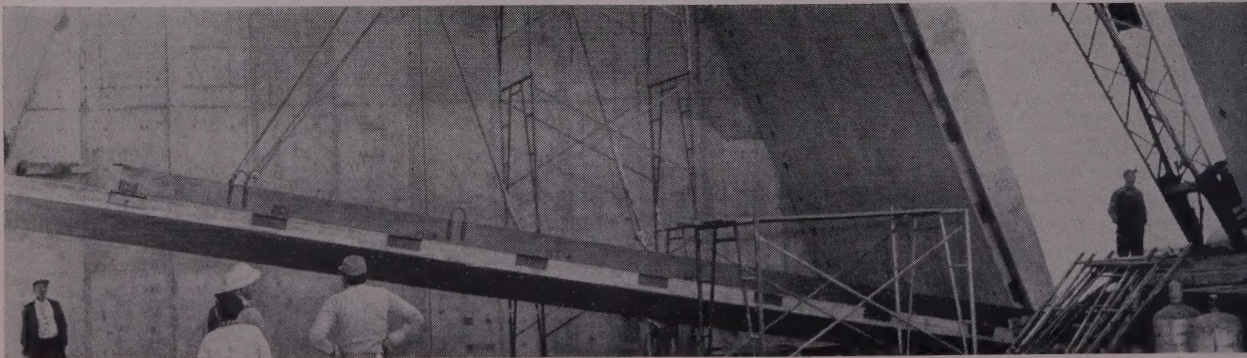
TILT-UP slabs 45 ft. high raised and fastened to precast arches provided the simple, dignified and relatively low-cost design selected by Baume and Polivnick, architects of Denver for the Grace Lutheran Church in that city. Structural design was done by Ketchum and Konkell of Denver, and the general contract was carried out by Lippert Brothers, Oklahoma City.

Wall panels 6 in. thick were cast on the floor using lightweight aggregate, with a mix designed to develop 2,500 lb. Full size panels were 18 x 45 ft. and weighed about 2.7 tons. When raised by a pair of truck cranes the lower edge of each panel fits between the floor slab and inside of the arch. Panels are fastened to the arches by angle anchors spaced at 2-ft. intervals along the sides.



STRONG-BACK (above) of structural steel members is shown fastened by bolting to the wall panel cast on the floor slab. The panel fills the 18-ft. opening between the arch ribs.

LIFT is under way (below) with this 27-ton panel. The two truck cranes worked as a team, but each operated independently during the lift, pulling through an equalizing block.



GOING UP to final position against the inside of the leg of the three-hinged arch. The arches are about 50 ft. wide at the bottom, and provide an 18-ft. width of ceiling. Height of arches from floor to center is 46 ft. They were precast, raised into position and guyed with cables at the top, as shown. The end wall had been cast-in-place prior to the lifting of the walls. The roof was also cast-in-place. Note the clearance of the panel from the opposite wall.

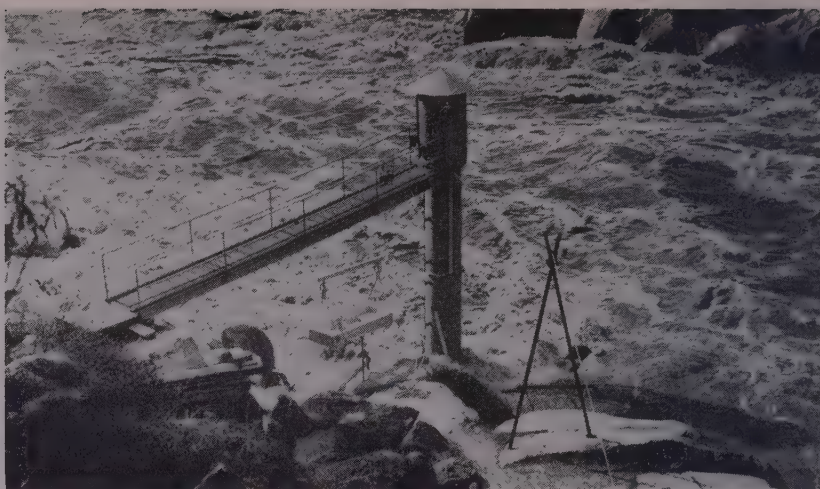


ALMOST in position, the panel is shown with the pair of cranes making the closure-lift on this side. The strong-back has a ladder attached to provide a quick means of getting up to fasten side anchors and release lifting bolts. The structure has a radiant heat system in the floor slab, and a forced ventilating system.



Constructing stream gaging stations—

Small jobs with big headaches



ENGINEERS of the Surface Water Branch of the U. S. Geological Survey may not erect the most awe-inspiring structures, but they remind us that all construction problems can't be solved with 300-hp. tractors or cranes with 80-ft. booms. On modern dams hundreds of cubic yards of concrete can be poured hourly. But years before a dam site can even be considered some engineer has probably been satisfied to place two yards of concrete in a single day for a gaging station along some remote mountain stream.

The Surface Water Branch—Water Resources Division of the U.S.G.S. is the agency responsible for collecting accurate data and maintaining records of stream run-off throughout the country. The work of collecting stream data and devising stream gaging methods has been continuous since the first Congressional appropriation for such work in 1888. This article describes some of the construction work necessary in accurate stream gaging work.

First order stream gaging requires the construction of a stilling well for the automatic and continuous recording of water level, and a cableway spanning the stream from which discharge measurements are made. In many parts of the country the stilling well is a 5 x 5-ft. concrete structure. Sometimes these structures are wooden and on some occasions a stone masonry type of construction is used. In California the stilling well commonly used is made from corrugated steel pipe 48 in. in diameter and 8 ft. or 10 ft. in length. A 6-ft. section, with a pagoda-like roof, tops the well and houses the recording device which keeps an hour by hour graphic record of stream rise and fall.

For hydrologic purposes it is nec-

essary not only to gage the flow of the main river in a valley system, but also to record flow in tributaries and headwaters. For this reason many gaging stations are built in remote areas where roads are poor to non-existent and stream banks are excessively steep.

The usual crew consists of three men, an engineer in charge and two engineering aids. The power equipment is generally limited to a truck mounted winch and a 60-cfm. portable air compressor, except in extreme mountainous regions where no power equipment is at hand. Obviously in this kind of work versatility is important. Each man must be prepared to help cut and thread pipe, weld, drill and blast rock, build formwork, sulfur in anchor bolts, run levels, set steel and pour concrete, rig high lines, and in short solve any problem that arises.

The stilling well must be set far into the bank where its foundation and lateral supports will not be subject to erosion damage. From this position it is connected to the stream by 2-in. intake pipes. On the streamward end these intake pipes are fitted with special perforated fittings to prevent any "draw down" effect from the swiftly moving water. To make sure the records will be continuous even in very dry periods the bottom of the stilling well must be set below the level of the stream bed. From the stilling well a narrower excavation is made out to the stream bed for the intake pipes. This is done as much as possible during dry periods so that most of the pipe fitting can be done above water. Commonly four intakes are used one foot apart, the lowest one entering the stream a foot or so below the normal stream bed level.

Construction of the station on Hay-

fork Creek in Northern California can be taken as an example. The bank consisted of a fairly soft black shale that could be broken up by an air hammer so no blasting was done. This was once gold mining country so the crew tried to convince themselves the yellow flecks on the surface of the shale were gold. (It was a form of bismuth.) At first the broken rock had to be removed by pick and shovel. Later the truck was parked on the opposite bank and the winch cable attached to a small hand guided skid. The broken rock could then be dragged out of the cut by the winch and dumped into the stream.

The corrugated steel sections were placed by rigging a highline across the stream from a large pine tree, through a snatch block in a tree on the other bank, and then down to the truck winch. In this way the winch could pull the highline taut.

A double block was put on the highline. The highline ran through the top sheave and a cable from a second winch to the steel well section ran through the bottom sheave. The second winch was an air winch powered by the compressor. In this way the top of the steel well section was raised to the highline and could slide into position over the excavation. The bottom end was pushed over the bank by hand.

In the state of California alone there are over 600 first order gaging stations steadily and silently recording stream flow. These stations are operated in cooperation with the State Water Department, the U. S. Corps of Engineers, Bureau of Reclamation, private power companies and other agencies directly concerned with stream run-off. Each of these stations presents a small but unique construction problem.

How specifications affect job costs

The importance of good specification writing in keeping costs down has not yet been fully appreciated. Grant Gordon reviews the problems involved with wit and insight, using specific job examples. These remarks were first presented at the 1957 Conference on Construction Operations conducted by the College of Engineering, University of California, Berkeley.

By GRANT P. GORDON

Vice President
Guy F. Atkinson Co.
South San Francisco, Calif.

FIRST OFF, perhaps we should say what we are talking about. Mr. Webster in his interesting, if somewhat voluminous, book has this to say: A specification is "a statement containing a minute description or enumeration of particulars, as of the terms of a contract, details of construction not shown in an architect's drawings, etc.; also any item of such a statement."

We are all familiar with the usual meaning of the term "specifications"—that uninteresting mess of fine print, which comes along with the drawings for a construction job. What we frequently lose sight of is the fact that the definition above is a two-part affair, the first part being—"description or enumeration of particulars, as of the terms of a contract." This is usually the more important phase of a specification and one which merits a great deal more attention than it usually gets.

"Specifications — that uninteresting mess of fine print . . ."

The other part of the definition—"details of construction not shown on an architect's drawing" is also important, but note that it is really subordinate to the first part. We will have more to say about both parts later.

If we can agree on the general definition of a specification, let's narrow our subject further. Let's say that we are talking about construction specifications and further narrow our scope to cover particularly the field of heavy construction, simply because we feel more at home there, and say that we are talking about specifications for the construction of dams, powerhouses, bridges, etc. We thus narrow the field considerably, but there appears to be no good reason why any

basic principles we can discover will not apply with equal force to all other fields of construction work.

The elements of specifications

The basic purpose of any specification is to define the particulars of a definite job, but we should bear in mind its larger purpose of providing for a meeting of minds—the owner's and the contractor's—on the terms of the contract—of which construction, as such, may be only a part. The specifications, as part of the contract, must provide among other things for the following:

The location, nature and scope of the work;

Provision for a site, right-of-way, right-of-access, necessary permits;

Time period for completion and any bonus and/or penalty provisions;

Bond and insurance requirements;

Delineation of responsibilities of each party;

Method and terms of payment;

Method of adjustment of variations in quantity of work;

Provision for changes and extras;

Provision for settlement of disputes;

Any special conditions to be met;

Technical specifications for the work, materials or equipment to be furnished and/or installed;

Performance requirements or guarantees of finished product;

Provision for completion and acceptance.

There are many types of specifications and you are all familiar with most of them. They range from the broad and general to the particular and specific. From the voluminous standard specifications of the government bureaus and large private constructing agencies to the most casual of informal specifications like "Joe, I want you to build me a rail fence."

At about this point you should be asking "What does this have to do with reducing job costs?" The answer is simple: A good specification reduces

job costs, a poor one cannot help but add to them. One way to reduce job costs, then, is to improve our specifications. We should all be very much interested in that whether we are owner, engineer, architect, builder, contractor, or just plain taxpayer.

A good specification is one that meets the definition, in that it gives a minute description or enumeration of particulars of the terms of the contract, and the details of construction not covered by the drawings. Sounds simple doesn't it? It would be, except that specifications deal with words, and words are both slippery and inadequate for the complete transmission of ideas from one mind to another.

First of all, any written specification is subject to all the basic rules of English composition. It must therefore meet the tests of unity, coherence, and emphasis, and it certainly helps if it at the same time achieves clarity, brevity and accuracy. I realize that most engineering students, and engineers in general shun any association with English or grammar courses as being sissy. But believe me, the results of such dissociation are plainly evident in the documents we produce!

"... informal specifications like, 'Joe, I want you to build me a rail fence'."

Secondly, whether we like it or not, a specification is a legal document. Once it becomes a portion of a contract, the final and binding interpretation of its intent and meaning no longer belongs to the man who wrote it, or for that matter to either party to the contract individually. In any case of major dispute only a court having jurisdiction can finally determine what the specification meant to say.

And on this same point, regardless of how carefully we may prepare and word our specifications, back of every provision looms the long shadow of years and years of the customs and traditions of the trade. Criteria for judgment, areas of responsibility, and standards of workmanship, practice, and performance, have been developed, and have been certified by the courts so often that they are an unwritten but acknowledged part of every construction contract.

Isn't that a terrific load for a spec writer to bear? It has even been known to crush some of them. But all too frequently it is an owner or a contractor who is crushed, and therein lies the moral of our little story. Being by nature crafty and suspicious, and much given to cherishing longer the memory of his defeats than his triumphs, a contractor just naturally inclines to protect himself. However naive he may seem, a singed contractor is hard to catch the second time. The ultimate effect of mistakes and omissions in specifications is to raise the cost of construction without much benefit to anyone, with the possible exception of lawyers and undertakers.

"No one ever deliberately raised his son to be a specification writer."

It is certainly in the best interests of all parties to prepare a contract specification which tells in simple understandable language what each party agrees to perform. That much is obvious, but much more important may be the corollary that not only should the language of a contract be understandable, it should also be *incapable of misinterpretation*. Which is not the same thing at all, and hearkens back to decades of arguments and disputes settled the hard way.

Typical errors and sad experiences

Let's take a look at some typical errors which cause trouble, and see what we may learn from others' sad experience.

No one ever deliberately raised his son to be a specification writer. It is a thankless, unglamorous and usually underpaid job. That situation is the root of most of our specification troubles.

Let's start with a project, any old project. The engineer draws some preliminary sketches, makes estimates, performs a certain amount of field work such as surveys of exploration; some one worries about finance and repayment, the well-oiled brains work out the project details and the plans begin to take shape. After usually some months the plans and the finances begin to draw a common meeting point and the boss begins to talk about taking bids. Some one usually remembers about that time, "Golly! We've got to get together some specs, who can we spare?" So the poor spec man gets a job and a deadline all at the same time, one

which is usually carefully set as the very earliest day a full set of plans can be assembled.

The first result is the one we see most often; poor coordination between the design and specifications. It results in overlaps, divergent requirements, and gaps or omissions, all of which are costly.

Our company recently bid a dam and powerhouse on which the addenda actually contained a greater volume of specs and plans than the original issue. If you consider that the printing bill on each of these sets was at least \$200.00 and that a minimum of 100 sets were probably sent out, it isn't difficult to see an expenditure of \$20,000 which did no one any good and could have been avoided by taking just a little more time in the beginning. This does not start to estimate the cost to a relatively large number of bidding contractors who had to re-do or re-check their quantity takeoffs and adjust their bid figures at the last minute. All this extra cost shows up somewhere in the total. I can further testify to what is even more serious in this case, that the changes made lacked a lot, of covering all the discrepancies noted, and it all points up our first conclusion, that there is no

". . . mistakes and omissions in specifications . . . raise the cost of construction without much benefit to anyone, with the possible exception of lawyers and undertakers."

substitute for careful thinking, careful study, and close liaison between the designer and his specification writer. A lot of money is needlessly wasted every day by the simple failure to make certain that competent people spend adequate time and care in preparing and checking specifications before their issuance.

From this same source stems another of the evils of bad specifications which one might call "fuzzy writing." It can stem from "fuzzy" thinking, from lack of close liaison with design, or simply from the hurried attempt to rush together a set of specs in insufficient time (one hesitates to call it laziness). Its most common form is the ill-considered use of paragraphs, clippings and even whole sections from other specifications without careful study to determine their ap-

plicability, or sufficient re-writing to make them appropriate. The general result can be pages of specifications which look official enough but afford neither instruction nor protection for either party.

Unity and coherence

Let's go back to the principle of unity and coherence in our specifications. The provisions affecting any given phase of the work should be written in similar language and using the same terms of reference throughout. Yet one often sees the use of three or four different descriptive

". . . most engineers shun any association with English or grammar courses as being sissy."

terms for the same item, with paragraphs obviously written to cover general considerations lifted bodily and placed in with specific references, to the amazement of all who later read.

This is not to deplore the use of standard specifications. They certainly have a valuable place in the business, but it is highly unwise to gather up a batch of old paragraphs which might accidentally apply and dump them in, without first giving them a careful scrutiny and analysis.

You will note that all we have complained of so far might be due to a poorly conceived, or at least a hurried, approach to the job of specification writing, and most of it could be cured fairly simply if some one competent and familiar with the project would sit down and carefully read the specifications from a contractor's standpoint. It's as simple as that!

Often you hear an engineer say, "I know what the specs mean, I wrote 'em!" I have yet to see anyone who could objectively and accurately evaluate the full effect of his own specification paragraphs. One of the main causes of our difficulties, then, resolves into the simple failure to get an independent review of the specifications before publication.

The "general disclaimer" paragraph

Now to get some more specific problems. There are many types of what one might call "eager beaver" specifications, but one of the worst is the "general disclaimer" paragraph. The one which goes something like

(Continued on page 61)

Profitable companion to the new B Tournapull is the big 420 hp Le-Tourneau-Westinghouse Twin-C* push-tractor. With its 2 big 210 hp motors synchronized for maximum push-power, its 80,400 pound weight, big 29.5 x 29 tires, and speed to 20 mph, you have the push necessary to get capacity 27-cu. yd. loads in less than a minute.



See for yourself why the BIG "B" is your top money-maker for moving big yardages...FAST

When you estimate your next big-yardage project, figure it first on the basis of using your present equipment. Then figure it again with 27-yd. B Tournapulls handling the production hauling. Compare these figures. You will see how the BIG "B's" — with their advantages of bigger capacity and faster movement — haul more yardage in less time. You will see how they can help you beat job-completion dates, make it possible for you to submit winning bids, help you make bigger profits.

Your LeTourneau-Westinghouse Distributor has all the facts and figures necessary for you to use in making comparative estimates. He can give you information, also, concerning price, trades, and deliveries. Since the new B Tournapull is bound to have a place in your equipment spread of the future, it will pay you to write or 'phone now for full information. Plan to order well ahead of required delivery . . . the best equipment for you is best for others, too.

*Trademark BP-1431-G



LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS
A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

Using plastic film in construction

Western contractors are finding more and more uses for inexpensive polyethylene film and it is rapidly becoming an essential construction material. It can be used for everything from protecting machinery and temporary excavations from the weather to forming and curing concrete. Here is a rundown of recent applications, with a look at costs.

By E. B. CAHN

General Manager, Plastics Division.
Visking Company

A Division of Union Carbide and Carbon Corp.

INTRODUCED as a vapor barrier several years ago, polyethylene film has found its way into many phases of construction. Imaginative contractors and builders are finding new applications almost daily.

Characteristics of Visqueen polyethylene film which make it so useful in the construction industry are: its pliability which is retained in temperatures from 70 deg. below zero to 160 deg. above; lightness (a 1,000-sq. ft. piece of four mil film weighs less than 20 lb.); price, which ranges from 1½ to 3½ cents per sq. ft. depending on the thickness and quantity purchased. Furthermore, it is waterproof, translucent, and chemically inert. It is also available in colors.

Polyethylene film is used extensively in mining operations to protect materials and equipment from dampness. Conversely, it is the material from which high-altitude weather balloons are made.

Polyethylene film is second to no material as a vapor barrier, either in slab-on-ground, full cellar, or crawl space construction, or as a vapor, wind and dust barrier in many types of wall construction to prevent condensation, cracking and peeling of paint and other moisture-caused problems. Many California residents are enjoying the benefits of Visqueen film applied on the warm side of the wall, because of the material's extensive use by Joseph Eichler, Northern California home builder.

It is effective as a curing material in concrete slab and tilt-up construction; as a bond breaker for separating tilt-up panels from base slabs and as a low-cost replacement for conventional forming materials in pouring concrete roofs.

(Continued on page 46)



PLASTIC FILM REPLACES FORMS—Washington contractor R. D. Schrier came up with a startling new use for film during the construction of a restaurant in Twisp, Washington. No conventional forms whatsoever were used for the pouring of the 72 x 24-ft. roof. Concrete was poured directly onto plastic film supported by a grid of reinforcing bars, as two pictures above show.

**Save time and transport
costs on off-the-road
tire retreading**



THOMPSON
Retreading Plant
is close-at-hand in San Francisco

The world's largest tire retreading plant is centrally located at the hub of truck transport to the construction areas. Thompson gets your tires in and back faster and at minimum cost. This close-at-hand service immediately reduces your present inventory of spare tires. As Thompson's sole interest is in *retreading* tires, and NOT in the sale of new tires, you save the frequent unnecessary expense of purchasing costly new tires because your worn tires are supposedly "beyond repair." When there is

reasonable service left in a casing, Thompson has the equipment, skill and experience to convert it into a safe, dependable retread.

All Thompson retreads are fully guaranteed and give new tire performance, wear and appearance at a fraction of replacement cost. Available in all sizes through 27.00-33, they are non-directional for use on all wheels . . . traction or free-rolling . . . and provide maximum grip with a self-cleaning design.

THOMPSON SERVICE IS AS CLOSE AS YOUR TELEPHONE . . .
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Mail this coupon for price list on all sizes of off-the-road retreads.



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TILT-UP contractors can use polyethylene film as a bond breaker between slabs cast on top of each other. Film can be used the same way in lift-slab construction.

Backed with paper, polyethylene film is an excellent form-lining material which imparts a smooth finish by preventing concrete from coming in contact with the wooden forms which leave wood-grain impressions.

A permanent water barrier for basement or foundation can be obtained by being placed as a loose lining in forms. When forms are removed, the water-proof film remains permanently adhered to the concrete.

Inside construction during cold or otherwise inclement weather can proceed at a normal pace by using polyethylene film as a temporary enclosure. It retains heat well enough to have found application as a replacement for glass in greenhouses and admits enough light to eliminate the need for artificial lighting.

And the film is used extensively as a protective cover for newly-laid concrete, including highways, and for materials and machinery which must remain out of doors.

One dramatic use of the film recently was made by R. D. Schrier, a contractor in Twisp, Washington. Schrier installed a 72 x 24-ft. roof using no conventional forms whatsoever. He simply laid plastic film over reinforcing rods, covered the film with reinforcing mesh and then poured the concrete directly onto this arrangement. Strategically placed I-beams supported the job.

Schrier placed 16-in. I-beams spaced 8 ft. on centers to support $\frac{3}{8}$ -in. reinforcing rods laid at intervals of 6 in. The rods were transverse to the I-beams and supported other $\frac{3}{8}$ -in. rods parallel to the I-beams, at 6-in. intervals. The rods were tied to form a mesh, it was covered with film 0.006 in. thick and then standard reinforcing mesh covered the film. One-half inch of concrete was

poured over the roof and when it set, the temporary braces were removed.

A new 180,000-sq. ft. building at San Jose State College, San Jose, Calif., is protected by a plastic film moisture barrier beneath the concrete slab. Under the film is a gravel base. On top of it is reinforcing mesh on which are placed the building's heating pipes over which the concrete is poured. Contractor was Anderson & Hathaway & Co. of San Jose.

Cost of vapor barrier

A vapor barrier of this type can be laid for an average, 1,100-sq. ft. house by one man in an hour and a half. Material would cost approximately \$15. Used as a vapor, dust and draft barrier, \$65 would be the total builder's cost for purchase and application of the film.

Use of polyethylene film as a bond breaker for tilt-up walls is simple. First, the base slab is swept clean and then flooded with water to help the film cling closely. After placing, wrinkles are removed from the film with an ordinary push-broom. When ready, the tilt-up slab and film will separate easily, and will have an excellent architectural surface.

What about your job?

Could you add to this article? Have you used plastic film in a way not described here? Send us a note giving the details, with a picture if you have one. We'll present the ideas we receive, with proper credit to the sources, in a future issue of *Western Construction*.

THE EDITOR

Concrete curing is simplified with film. It will retain the original moisture of the mixture without additional sprinkling. The concrete should be completely covered with the film (it comes in widths up to 32 ft.) with edges of the film overlapping 4 to 6 in. It is possible to seal these joints by heat or with pressure sensitive tapes, but this usually is not necessary. Complete curing is accomplished in three to five days.

In other applications where the film is to be secured it is tough enough to be sewn, nailed or stapled.

An Eastern builder recently discovered another use for polyethylene film—preventing leakage into concrete block foundations. After it is set, the outer wall is brushed with ordinary tar. Over this is applied a 4-ft. counterfold roll of film, which allows a single worker to cover the entire surface with one roll. Then the film is brushed down to make it adhere tightly and permanently providing a permanent moisture barrier between earth and wall.

The acceptance of polyethylene film by builders who have tried it is demonstrated by R. G. Hughes, head of Hughes Development Company, Pampa, Texas.

A past president of the National Association of Home Builders, Hughes said his firm already has used the film as a moisture barrier for slabs in 2,000 homes.

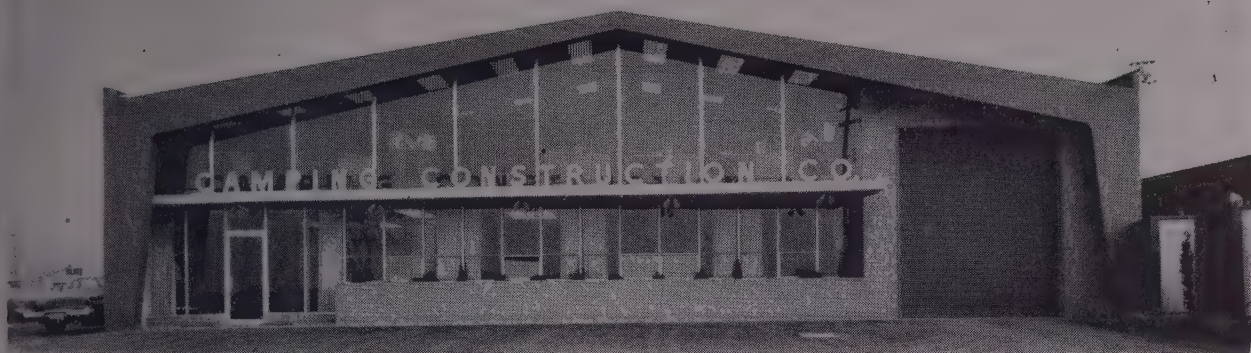
Hughes even goes so far as to use the film for merchandising purposes. He "wraps" an entire home in the translucent film and ties it with a big bow of red polyethylene film.

Cost of applying polyethylene film is consistently low but varies with the type of job, and labor rates.

In one instance, the total cost of placing Visqueen film under a 782 ft. concrete slab was \$.075c per sq. ft. This entailed 45 min. work by two men at \$2.60 an hour, wrapping the film around fibre glass insulation and then laying a sheet of the film over heating pipes and gravel.

In another case, the placement was 4c per sq. ft. The job was placing 3,726 sq. ft. of film under a slab for a hospital. Three men worked 1½ hr. each at \$3.20 an hr. In addition to simply laying the film, they wrapped 30 protruding pipes and conduit outlets. The labor cost would, of course, have been substantially lower had the conduits and pipes not had to be wrapped.

With the inventiveness which can be expected of contractors there is no doubt that the applications for polyethylene film in the construction industry will continue to grow.



Contractor builds a headquarters

Building contractor plans and constructs a new home combining office and shop. Layout provides adequate and efficient space for all operations, and serves as a display of the firm's concrete construction techniques.

IF YOU were a contractor designing a building to house your own operations, what would you put into it?

Here's one contractor's answer: the new plant of Camping Construction Co., 290 Hegenberger Road, Oakland, Calif. It's a concrete building, 75 x 130 ft., of job-cast, tilt-up construction, with concrete 3-hinge arches spanning 75 ft., with offices that are both functional and beautiful.

Says Harold E. Camping, president: "In designing this building we had two basic thoughts in mind. First, the building should provide space for efficient functioning of all our headquarters operations. Second, it should be a show place where customers might study actual design and construction examples. In short, we

wanted a plant for ourselves that also would demonstrate to our prospects the utility, flexibility and beauty of concrete construction as done by our firm."

Specialists in concrete

Camping Construction specializes in job-cast, tilt-up concrete industrial and commercial buildings—electronics plants, factories, food processing plants, freezer plants, truck terminals, warehouses, machine shops. A subsidiary, Camco Engineers, provides design services for investors and land developers both nationally and internationally. The company literally expanded right out of its old building, a rented structure so close to the rail-

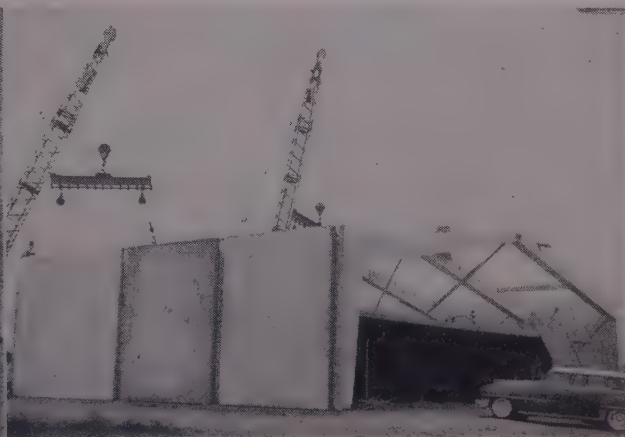
road tracks you could almost feel steam from the locomotives. Prior to completing its new home, operations were housed in two buildings about a mile apart.

Offices now are housed on two floors at the front of the new building. Ground floor offices and departments include a reception area, offices of the president and his engineering sales manager, Lloyd V. Lindquist. In addition, there is space for purchasing, bookkeeping, estimating, printing, dark room, plus a sub-contractors' plan room and a conference room with provision for showing color slides and movies to customer groups. Kitchenette, consisting of built-in refrigerator, electric hot plate and stainless steel sink, has been provided for convenience of employees. The second story office space is devoted in its entirety to engineering and design functions.

Camping Construction used a variety of materials in the offices to illustrate their application to concrete construction. For instance, the entry



ARCHES of precast concrete of three-hinge design span 75 ft. to provide a clean floor area. The second floor is a 55 x 28-ft. slab 7 in. thick poured on the ground and raised on pipe columns.



WALL panels of tilt-up design were 17 ft. high and varied from 15 to 30 ft. wide. The building features the job-cast, tilt-up type of construction which is a specialty of Camping Construction Co.



TWO LOAD-SPEEDING **"95" Payhauler** **average 2400 cu. yds. of rock**



TWO-TON CHUNKS OF LIMESTONE bang down into the huge Payhauler body—the rugged high-tensile steel sides, triple-section bottom, and super-duty "spring cushions" are built to take rock-shock! And the "95" Payhauler frame is strongest known of any off-highway truck in its class.



WITHOUT LOSING A SWING, 3 cu yd shovel always finds "95" waiting for load. Powerful, fuel-saving 335 hp Turbo-charged diesel engine keeps power high, reduces fuel consumption 10% or more. Maximum engine torque is transmitted efficiently through new cerametallic clutch and shock-saving planetary final drive into greater pay-off work power!



BODY UP... DOWN... IN ONLY 12 SECONDS! Three-stage, double-action hydraulic hoist provides full-time power control. Built-in hydraulic snubber valves assure smooth, over-center dumping action and gentles body return. Proper weight distribution permits safe dumping at edge of fill, yet drive wheels carry ample weight for steep-grade traction.



2,000 ft.
cycle includes
12% grade

NO FOOT-BRAKING DOWN-GRADE! Heap-loaded "95" Payhauler rolls along safely down to the fill at 10 mph. Hand-operated Torqmatic brake, "torque converter in reverse" is standard equipment, gives accurate, confidence-building control

at any speed...on any grade. Earl and Roy Schenewerk, operators of the "95's" say, "Because of Torqmatic brakes, these Payhauler units operate easier, smoother and safer than any others we've ever driven. Now, we have no worry on this steep grade!"

Units

per 10-hour day!

Clarkson Construction Co., Kansas City, Mo., buys three more!

As this story went to press, Clarkson Construction Co. was awarded another contract for moving 600,000 yards of rock. In order to finish this job at Bonne Terre, Mo., and to start their new 600,000 yard project, Clarkson decided to add three new haul units of "95" Payhauler size. A competitive articulated-type rock hauler was brought in for testing against the Payhauler. After 300 hours use, the articulated unit was voted down because the "95" (1) dumped 25% faster...(2) climbed a 4%, 1200-foot long grade in 40 seconds less...(3) offered higher speed on long flat hauls and greater spotting maneuverability under the shovel. Now, Clarkson owns 5 "95" Payhauler units.

High speed (up to 38 mph.), 16 cu yd capacity, and next-to-automatic operating control of two new International "95" Payhauler trucks are getting Clarkson Construction Co. record-breaking rock production of 2400 cu yds per 10-hour day. Payhauler units are producing this outstanding yardage on the company's 1000-foot cut through dolomite limestone—part of their 7.5 mile, 2-lane highway contract between Bonne Terre, and Halifax, Mo.

The Payhauler units are operating on a 2000-foot cycle which includes a 12% grade. On this grade, too tricky and treacherous for Clarkson's other rock haulers, a Payhauler maneuvers speedily and safely downgrade—under positive Torqmatic braking control!

Payhauler high speed of up to 38 mph also permits the fast average round-trip travel time of only 2 min, 45 sec. That's faster than the 3 cu yd shovel can load one!

H. D. Brown, Project Superintendent, says, "The Payhauler units have got all other rock trucks beat. Control we've had on this job is something we didn't have on any other truck. We've averaged 150 to 162 loads of 16 to 18 cu yds per 10-hour day. It's the best production I've ever had!"

Other veteran rock men who have used or seen the International "95" Payhauler in action say the same thing. You'll join them, too! Ask your nearby International construction equipment distributor to give you a demonstration.



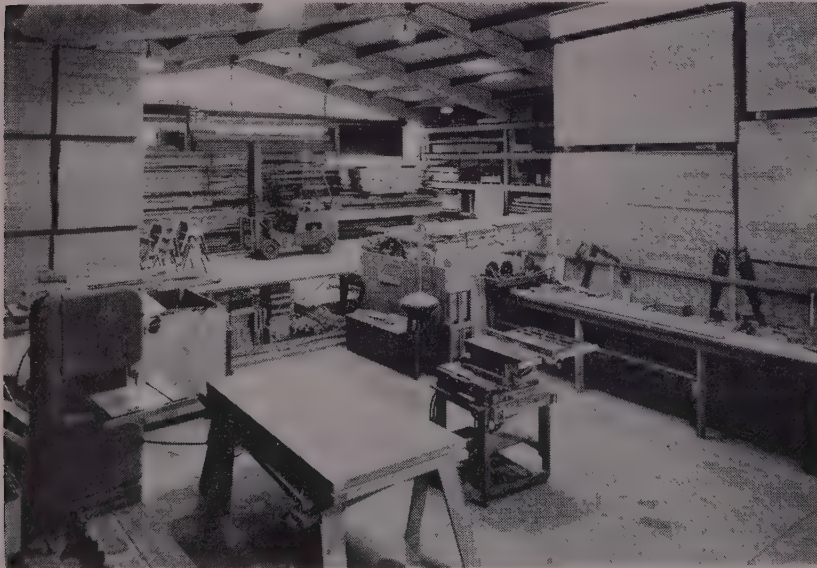
INTERNATIONAL Construction Equipment

International Harvester Company, 180 N. Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE INCLUDING: Crawler, Wheel, and Side Boon Tractors . . . Self-Propelled Scrapers and Bottom-Dumps . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Trucks . . . Diesel and Carbureted Engines . . . Motor Trucks



OFFICE of the president and other office areas were designed to show a wide variety of materials and their application to concrete construction. Windows look out toward Oakland Airport.



SHOP provides for form fabrication as well as enough storage space to permit materials to be purchased by the carload. A lift truck is used to handle stored materials in warehouse area.

(Continued from page 47)

floor is quarry tile, other floors are asphalt tile; one office has wall to wall carpeting over a rubber mat laid on concrete; and in the warehouse section the bare slab is exposed.

For the second floor, a 55 x 28-ft. slab was cast on the ground and raised into position on pipe columns. The 7-in. slab provides a completely sound-proof separation between the two floors without any further insulation. Load bearing walls are split-face colored concrete blocks, selected for their utility and texture. To connect the ground floor with the second floor, a monolithic reinforced cantilever stairway was poured in position.

Several different wall treatments are used in the office areas, includ-

ing split-face colored concrete block, painted sheet rock, mahogany and walnut paneling, and one entire wall on the second story is of industrial freezer cork facing which has an acoustical as well as insulating characteristic. Ceilings are of the newly developed "Travatine" acoustical tile with drop panel slim line lighting.

Plant features

The company plans to do considerable form and component fabrication inside the plant, as well as warehousing enough construction materials to permit carload purchasing. To expedite loading, unloading and handling of supplies, the company uses a fork lift. All this calls for a large space,

free of obstructions, and a floor capable of bearing considerable weight.

To meet these requirements a 75 x 100-ft. monolithic concrete floor slab 4 in. thick was poured, reinforced with 6 x 6-in. steel mesh of 10 x 10 gage. The floor is designed for 2,000-lb. per sq. ft. loads. To keep this floor free of obstructions, the plans called for eight reinforced 3-hinge precast concrete arches (75-ft. clear span) 23 ft. high at the peak of the arch. Arches are joined at the wall by job-cast, tilt slab reinforced concrete wall sections 17 ft. high and varying from 15 ft. wide to 30 ft. wide, and at the roof by Douglas fir purlins overlaid with 2-in. tongue-and-groove pine sheeting.

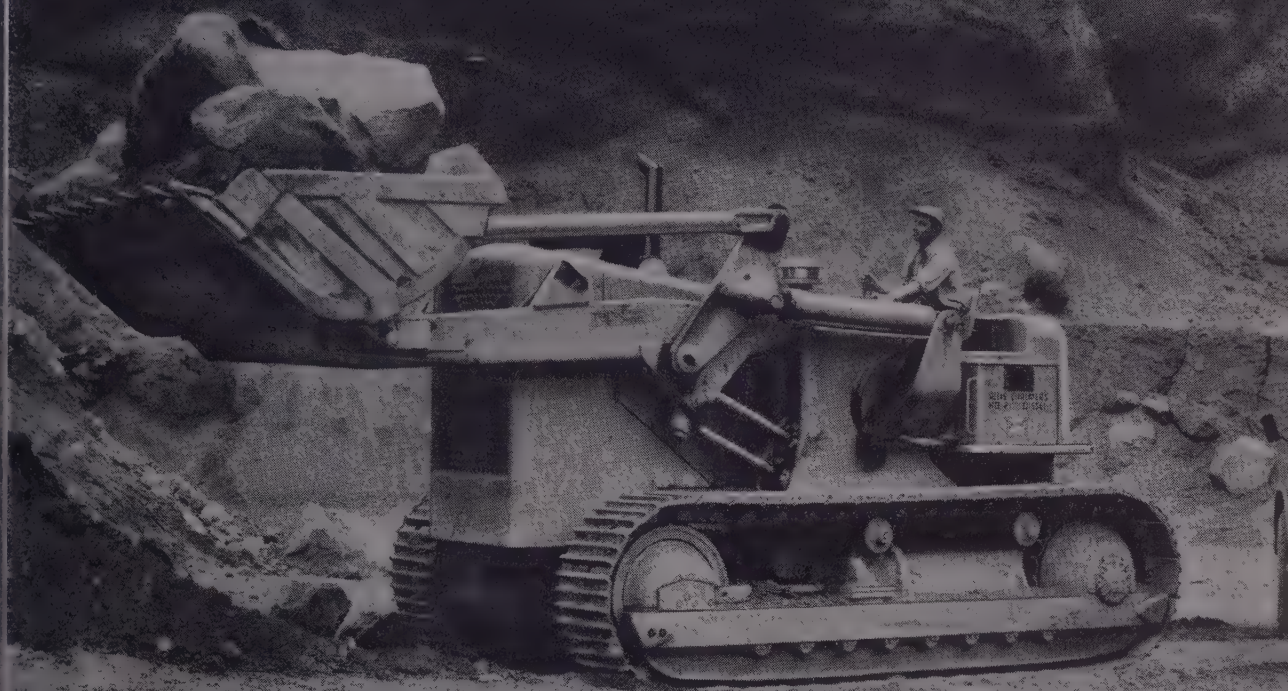
Forced air heat is used throughout the building. The ducts, plus the plumbing for three rest rooms, are laid in the monolithically poured ground slab.

The front of the building is dominated by several design and construction features. The first of the concrete arches was painted and left fully exposed. Windows in aluminum sash run the full height and width of the building front, interrupted only by the main entry on one side and a fully automatic electrically operated steel overhead door on the other.

A split-face colored concrete block planter provides horizontal design balance, plus a decorative effect in texture and line contrasted to the sweep and smooth surface of the exposed arch. The reinforced concrete second floor slab projects through the aluminum sash and windows to give the appearance of an unrailed 55-ft. balcony.

Camping Construction, together with its affiliated firm, Camco Engineers, applied the same principles of design used for its industrial customers. The job emphasizes the versatility and flexibility of job-cast, tilt-up concrete. The well-appointed completely functional building was built at a cost well below conventional types of construction.

Summing it up, Harold E. Camping says, "Now the company has all of the space it needs, and will need, to continue to expand its activities. It meets our requirements for efficient design and construction, and it's centrally located for our convenience as well as the customers'. We can consult with a customer individually in our offices or a group in our conference room. Following consultation, we can show customers specific design and construction features we have discussed as a possible solution to their problems, and let them see for themselves we practice what we preach."



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Studer Tractor & Equipment Company—Casper

Wyoming traffic counter uses radio

Wyoming scores a national first by putting into operation a radio-controlled traffic counter which transmits figures directly to main office. A state-wide system providing a continuous flow of information is foreseen.

By **ROBERT C. O'CONNELL**

Traffic and Planning Engineer
Wyoming Highway Department

COUNTING TRAFFIC by means of radio-controlled equipment has become a reality in Wyoming, and the results obtained so far from the first such installation in the United States promise a highly useful future for this method of obtaining traffic figures.

The single unit now being used experimentally by the Traffic and Planning Division of the Wyoming Highway Department has been in operation since June 13, 1956. Traffic recorded by this installation has an average daily volume of 1,700 vehicles. A check of the accuracy of the instrument shows less than 1% error, with most of this error resulting from the poor method of detection. This kind of accuracy, plus the savings in maintenance costs which are anticipated from the installation, has given Wyoming's engineers good reason to believe that they have taken a long step toward the ultimate goal of efficient and inexpensive traffic counting. Preliminary engineering has already begun on a radar-type detector to improve the counter's accuracy still further.

One very real obstacle, however, to the full development of the radio-controlled method for expanded counting operations is the present lack of a proper radio frequency. Current use of the experimental civilian frequency of 27.255 megacycles for "mock up" work on the counter has already been proved unsatisfactory in several respects, and Wyoming's hoped-for extension of radio control to an ultimate coverage of the entire state has been stymied.

It was realized at the time the radio equipment was installed that the experimental frequency was not satisfactory and would be subject to many false impulses which might be picked up by the counter. This pre-

diction became a matter of cold fact during January and February. Atmospheric conditions, consequent "skip" pickup, and so forth have played havoc with reception, and at times the recorder has chattered as though a parade were passing over the counter's magnetic detector.

Wyoming's experience to date with the first radio-controlled counter has been sufficiently encouraging for Highway Department engineers to suggest quite seriously that the effort be made to secure a new frequency band for the operation of traffic control devices and counting units, preferably in the newly opened frequencies of the 152-162 megacycles band. As they see it, the further use or perfection of all such equipment depends entirely upon the assignment of a practicable transmission frequency to the states for this kind of work.

At the 1956 conference of the Western Association of State Highway Officials the author of this article was named as co-winner of the Hewes Award in recognition of his work in the fields of traffic control and safety. The Hewes Award is presented annually by WASHO and WESTERN CONSTRUCTION to an engineer or engineers selected by the Executive Committee for outstanding work in the highway field. Bob O'Connell appeared in the February 1957 issue of WESTERN CONSTRUCTION writing on the subject of traffic problems during construction.

EDITOR

Operation of Wyoming's radio-controlled counter can be briefly described. Its installation, three miles west of Cheyenne, replaced a conventional recording unit that had been located at the site for many years. The distance covered by radio transmission is about 4.5 mi., because the tone is received at the Radio Maintenance building in Cheyenne.

The radio counter unit itself is composed of a magnetic detector

placed under the centerline of the roadway, with wires leading out to an amplifying unit and radio transmitter at the side of the road. Impulses created by passing vehicles are received through the magnetic detector, amplified, coded into a tone, and transmitted to the Radio Maintenance building. Here the tone is decoded back to an impulse and relayed via a leased telephone circuit to the recording unit installed at the headquarters of the Traffic and Planning Division in Cheyenne's State Office Building.

No maintenance costs so far

During eight months' continuous operation of the equipment, maintenance expense has been absolutely nothing, and this economy alone would be one obvious advantage in locating the recording unit or others like it at the headquarters office. It would no longer be necessary to replace tapes in the field or make other routine field repairs, and by eliminating the expense of sending a man out to a series of conventional recording units every week to pick up tapes, the use of radio-controlled units would effect a very respectable saving for the state.

Potentially, the use of radio-controlled counters on a state-wide basis could bring about great improvements in the accuracy and efficiency of Wyoming's traffic counting system, and therefore in the economy of its entire maintenance. At the present time there are 36 permanent traffic counters in operation throughout the state. Through utilization of the Highway Department's microwave communications system tones could be relayed from all of these counters into Cheyenne for recording, thus supplying a continual, hour-by-hour traffic count from each field installation.



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30-ton crane handles 68-ton girder

By careful advance planning a single 30-ton capacity crane was sufficient to unload three 68-ton girders from flat-cars and load them on a truck for hauling to site of new railroad bridge.

By C. T. DOOLEY

Field Engineer
Bethlehem Pacific Coast
Steel Corporation

ERECTION of the steel superstructure for a railroad bridge near San Jose, California, recently presented a major problem in the unloading and placing of four riveted plate girders. Each girder was 100 ft. long, 11 ft. deep and weighed 68 tons, but each was a separate problem because of site conditions, the sharp skew of the bridge, and the sequence of erection.

The East San Jose Underpass is a grade separation structure which carries the Western Pacific Railroad

over the Bayshore Highway (U. S. 101 Bypass) three miles east of downtown San Jose. The four plate girders form two simple spans, each 98 ft. from center to center of bearings. These through girders support rolled structural floor beams (30 WF 132 silicon steel) and a half-inch deck plate (low alloy steel, ASTM A242). A ballasted deck supports one track with room for a second in the future.

Shipping

The girders were shipped by rail from the steel fabricator's plant at Alameda, California, to a spur track approximately two miles from the

bridge site. The transporting of each involved a series of three flat cars, with the center car carrying all the load. Seventy-ton capacity flat cars were obtained for this purpose, and the girder was supported and shored directly over the trucks, at approximately 40-ft. centers.

Unloading

Unloading operations at the spur were planned so that a single 30-ton capacity truck crane might be used. The idler car at the rear of the girder was pulled clear and a timber crib was constructed approximately 20 ft. from this end of the girder, adjacent to the load carrying car. The topmost member of this crib was placed while the truck crane held the end of the girder slightly suspended, so that when the load was released the girder rested at one end on the timber crib and at the other end on its original support on the flat car.

The crane then moved to the forward end of the girder, lifted this end and allowed the remaining flat cars to be pulled clear. While the girder was supported in this manner (at one end by the crane and at the other by the crib) a heavy-duty low-bed trailer was backed into position under it and the girder was placed on the trailer, supported by a swinging bolster.

The truck crane then moved to the rear of the girder and lifted it, allowing removal of the timber crib and placing of a 16-wheel dolly.

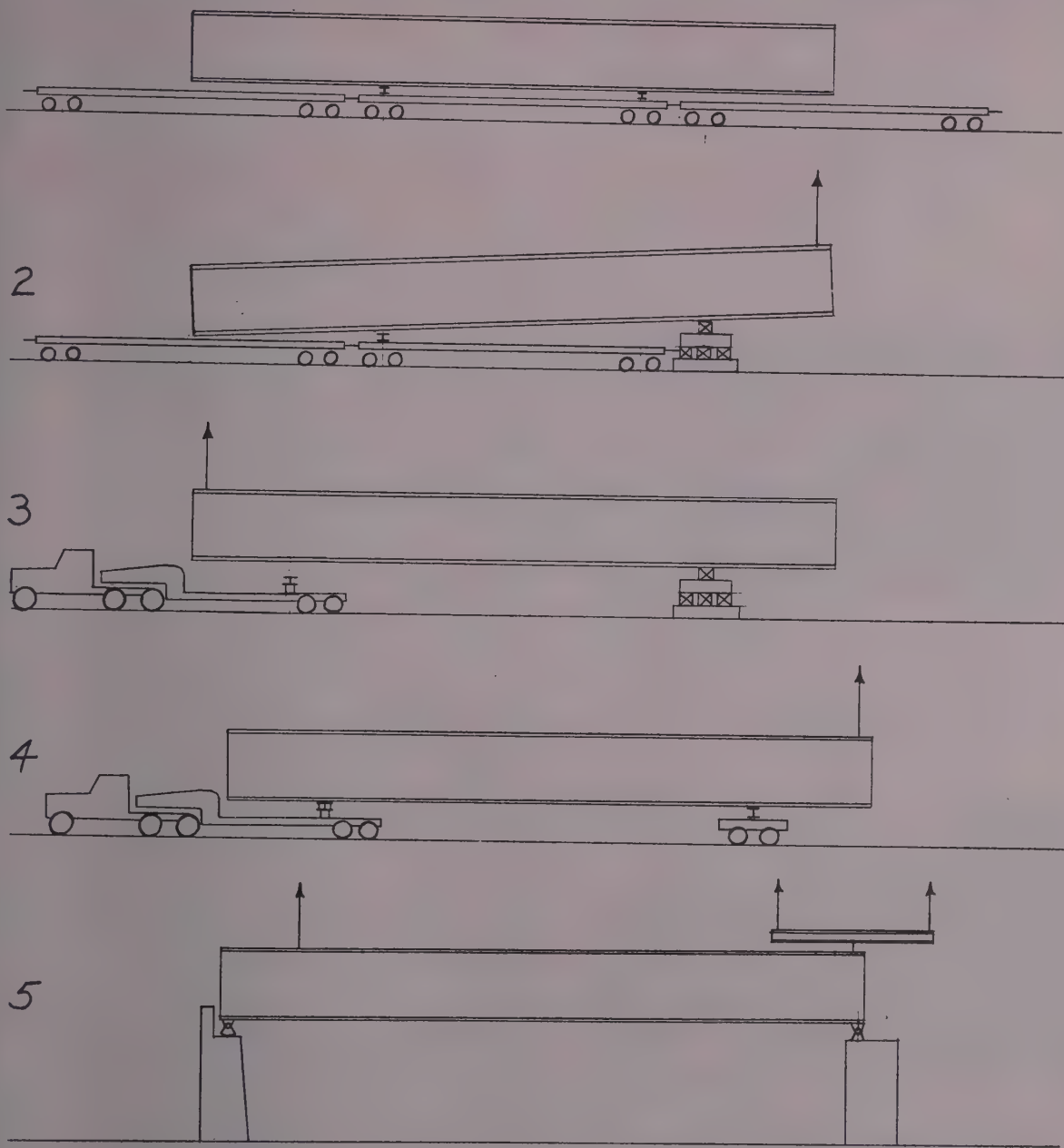
So supported, the 100-ft., 68-ton girder moved out of the unloading area, preceded by a police escort to help with traffic and followed by a crane to help in negotiating corners. This assistance from the rear proved a necessity, for the truck dolly employed could not be guided, and its natural track led it too close to the inside of one sharp curve. Each girder, as it rounded this curve, had to be halted on several occasions while the crane picked up the rear and set it to the outside of the curve.

Upon reaching the job site, the truck was required to back down an inclined dirt road for 200 yd. to a



THE CRANE also escorted the truck to the site in order to move the rear dolly to the outside of sharp curves in the road. Three cranes lifted girders onto the bridge piers.

Unloading, moving, and erection sequence



DRAWINGS SHOW how a 30-ton capacity crane was able to transfer a 68-ton girder from flatcars to truck. Trick was to keep girder canti-

levered over the pivot points to keep crane load less than half the girder's weight. Girders were 100 ft. long.

position between the abutments of the new bridge. To facilitate this backing operation a crane preceded the truck down the slope, making directional corrections where necessary by lifting and replacing the rear of the girder and its dolly.

Erection

After each girder had been moved on the truck as near as possible to its erected position, it was erected by

three cranes. Picking about 12 ft. from one end was a 50-ton capacity crawler crane, and picking approximately 2 ft. from the other end were two truck cranes, one of 20-ton and one of 30-ton capacity. This latter crane had come from the unloading spur with the girder, and it commuted between the spur and the bridge site during the unloading and shipping of subsequent girders.

The two truck cranes worked at opposite ends of a 25-ft. balance

beam, which allowed equal loading on the cranes and better positioning for the final lift.

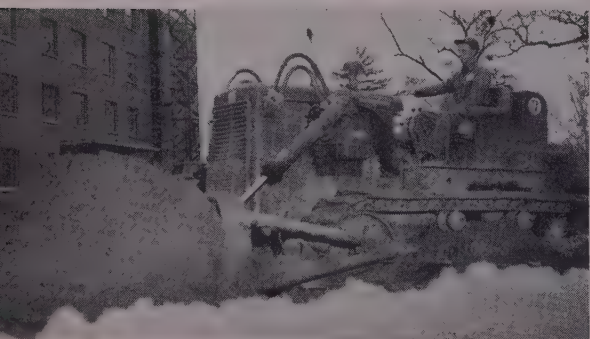
Each girder was so placed that its erection required the crawler crane to travel about 10 ft. The truck cranes were so positioned that no movement was required, and they had only to boom up slightly to effect the setting of the girder. The short lifts involved enabled all cranes to use 40-ft or 50-ft. booms.

(Continued on page 71)

On any-size dirt job, anywhere power-up profitably with



In the 200-acre Knollton Heights Subdivision, Hughey Construction Company, Indianapolis, stays ahead of the lot-grading with this TD-9 Four-In-One. Here, they're getting inch-close grading accuracy—boiling in dirt with Four-In-One "carry-type scraper" action! Excavating, loading, dozing, or clamshell action is instantly available with a Four-In-One!



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"One of our TD-24's—a 1951 model—ran 7,500 hours before major overhaul on rails and engine," states P. H. Morris, for Morris Enterprises, Owensboro, Ky. "It's still in use with original rollers and sprockets. That sold me on TD-24's for my operation." This Morris-owned TD-24 moves 50% of the 45-foot earth-shale-soapstone overburden, ahead of the 3½-yard dragline.

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Precast roof panels for warehouse

Contractor sets up casting yard at job site to manufacture 9,200 thin shell roof panels for warehouse at McClellan Air Force Base in California.

SOME 9,200 thin shell precast roof panels of lightweight aggregate will roof 1,500,000 sq. ft. of warehousing under construction at McClellan AFB near Sacramento. Air Force Installation Engineers monitoring the project consider construction of these panels presents one of the more intriguing features of the new warehousing.

Each panel is 33 ft. 4 in. x 5 ft. They measure 12 in. in depth at the rib and only 1¼ in. thick at the center. Manufactured in a casting yard near the site, they are being cast 60 at a time. The contractor now has approximately 6,500 finished and most of these have been installed.

Actually there are two single-story warehouses involved, separated only by a railroad spur. Floors are 3 ft. 9 in. above track height, and each warehouse is divided into bays 200 x 400 ft. Almost 23 football fields could be set within the perimeter of the warehousing. One is 400 x 1,800 ft. and the other 400 x 2,000 ft.

Contract for the warehouses includes railroad spur, roads, and utilities for the immediate warehouse area. It was awarded to four Sacramento firms, the Heller, Campbell, Erickson, and Lawrence construction companies who formed a joint ven-

ture for the job. Estimated cost of the project is \$7,264,000.

Original design for the warehouse was prepared by the L. P. Kooker Co., Baltimore, Maryland. This design was modified and adapted to the site by Tudor Engineering Co., San Francisco.

Construction began July 1955 and the work is now 65% complete. All during the summer months of 1956 the contractor worked a 10-hr. day, and this will be repeated during the summer of 1957. Estimated date of completion is January 1958.

Essentially a concrete project, the ground floor of slabs and frame columns are of Class AA concrete, all roof beams and girders are Class A concrete, and all footings and foundation walls are of Class B concrete. Concrete floor slabs were poured by the Carson & Peters Co., Los Angeles. Soil at the Base is particularly well adapted to construction. Surface soil is sandy silt and sandy clay, but underlying this is 3-ft. of hard-pan.

In grading the site a total of 38,500 cu. yd. of unsuitable material was removed. For preparation of the subgrade 81,000 cu. yd. of select aggregate fill was required, supplied by Pacific Coast Aggregate Co. of Fair Oaks. H. Earl Parker Co. of Marys-

ville did the grading, excavation and filling.

As excavations progressed, pouring of the column footings began. Values of 4,000 lb. per sq. ft. for live loads plus dead load and 3,000 lb. for dead load only were adopted for the bearing capacity of the footings on the hard-pan. Size of the footings runs from 4 ft. square to 12 ft. 6 in. square.

A Noble batch plant was used at the site, and concrete was mixed in 6-yd. transit trucks in 5-yd. batches. As soon as the footings were in, the ground to be used for casting surface was smoothed and compacted and the foundation wall panels were cast. As these were erected, the foundation wall pedestals were poured up to the soffit of the floor.

With the footings in, the area around them was backfilled and compacted, and pouring of the floor slabs began. The slabs are 8 in. thick and, for the most part, are unreinforced. They were poured in 25-ft. lanes. In constructing the floors, which are now entirely completed, over 40,000 cu. yd. of Class AA concrete was used. Minimum compressive strength of 3,750 psi. at 28 days was met.

Temperatures at McClellan range from 85 to 110 deg. F. from May through October. W. A. Campbell of the joint venture contracting team, cited these temperatures when discussing one of the more interesting aspects encountered during construction. Because of the size of the project, the contractor had the opportunity to do the same thing day after day under approximately the same conditions, and was therefore able to develop construction procedures to a fine degree. During the hot summer months some of the floor slabs started to cure improperly. Surface cracks were appearing in the slabs and, strangely enough, the defective slabs were the ones poured during the morning hours. It was considered that the aggregate cooled down during the night and retained its coolness until the poured concrete started to set. Then under morning sun conditions the aggregate suddenly experienced a rapid change of temperature. In the afternoon the aggregate had warmed up before the pouring operations and the surface checking did not occur. The trouble was eliminated by fog spraying the slabs immediately after troweling.



EARLY CONSTRUCTION view shows reinforcing steel for the continuous framing. Re-steel is being supplied by F. A. Klinger Co. of Stockton, Calif. An estimated 126,400 bbls. of cement is being trucked to site from San Andreas plant of Calaveras Cement Co.

Soon after the floor slab was approved, casting of exterior wall segments and firewall segments began. The floor slab was used as a casting surface. Erection of the cast-in-place, continuous reinforced concrete framing being used throughout the structure began simultaneously. Cast-in-place girders are continuous in the 400-ft. direction of the building, except for an expansion joint near the middle. They span 67 ft., and are spaced 33 ft. 6 in. on centers. Curing period for the girders is 21 days, but shoring was left in up to 28 days.

Tilt-up walls are precast, reinforced concrete. Exterior and shear walls are 6 in. thick. The firewalls are 8 in. thick. These firewalls are of portland cement concrete with lightweight expanded shale. Wherever a firewall occurs, the shear walls and firewalls are erected before their columns are poured. Subsequent pouring of the columns ties the two together and this manner of construction gives the wall a 6-hr. fire rating.

Wall panels are hoisted into place by two 30-ton Lorain cranes. As soon as they are in place, steel from adjacent panels is looped together and welded at the top, middle and bottom of the panels. Reinforcing steel for the warehousing is being supplied by the F. A. Klinger Co., Stockton.

The contractor had the option of casting-in-place or precasting roof beams for the warehousing, and elected to precast the 800 beams. Contractor set up nine roof beam forms and nine can be cast each day for they are stripped from their forms in 18 hr. The specially designed metal forms for these beams, which worked exceptionally well otherwise, presented quite a problem during the hot summer months. Ralph Irving, Corps of Engineers project engineer for the work, stated that during the summer the beams had to be covered with wet burlap and an automatic fog spray used to keep the concrete damp enough to cure without cracking and checking. This same water treatment was used for the precast roof panels.

Since this is the first time that roof panels of the type being used for the warehousing have been used in such quantity at an Air Force Base, manufacturing of the panels is under close supervision. AF Installations Engineers require every 250th panel be tested for deflection and recovery of deflection.

A tolerance of only $\frac{1}{4}$ in. is permitted in overall dimensions of the castings so units are cast in rigid

steel molds. A mineral oil bond breaking agent is applied immediately before the light mesh reinforcement is placed. As the mix is placed in the forms an air vibrator is used along the top of the panels. The vibrator serves primarily as a screed, vibrating only the very top of the mix.

Panels are left in the forms 48 hr., then they are stripped and a light Hunt Process curing spray is applied. They are then stacked near the casting yard and allowed to cure for 60 days. A modified lumber carrier is used to pick up the panels and transport them from casting yard to site.

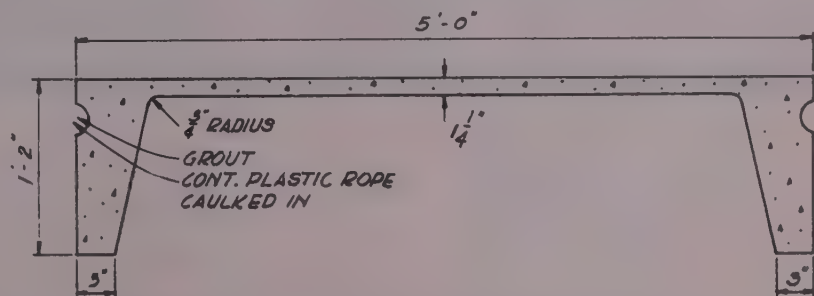
A 2-in. thickness of Perlite concrete is applied for roof insulation. Then roofing felt and five-ply asphalt will be used over the entire surface to form a built-up roof.

The new warehouse is based on a standard design that has been used at other Air Force Bases throughout the United States. However, some roof failures were experienced in previously constructed warehouses and, based on investigations which followed the failures, corrective changes are reflected in the McClellan warehousing.

Both girders and columns were strengthened over the original design. Critical areas in the top of the girders gained as many as six more No. 11 steel bars. The number of steel bars in the bottom of the girders remain the same, but the minimum size was increased from No. 9 to No. 10 bars. These changes give the girders approximately 40% more strength. Also, four additional bars were specified in the columns, and the size was changed from No. 10 to No. 11.

U. S. Air Force Installations Engineers developed criteria for the facility. The office of the Air Force Installations Representative, South Pacific Region, headed by Col. Edwin M. Eads, is responsible for monitoring the work. Lt. Col. Jack B. Marshall, Installations Engineer for McClellan, is performing Base supervision for the Air Force.

Design and construction contract responsibility is that of the South Pacific Division, Corps of Engineers, headed by Brig. Gen. William F. Cassidy. Contract for the project was let through the Sacramento District, Corps of Engineers, headed by Col. A. E. McCollam.



PANELS are 33 ft. 4 in. x 5 ft. and only $1\frac{1}{2}$ in. thick at the center. Contractor is casting 60 at a time in special forms. Warehouse when finished will cover 1,500,000 sq. ft.



SPECIAL FORM-STRIPPING RIG was able to strip a panel and move on to the next within 3 min. Panels are left in forms 48 hr., then stripped and treated with Hunt's Process.



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SPECIFICATIONS

(Continued from page 36)

this—"Notwithstanding anything which might be written, said, thought or imagined to the contrary, and regardless of how wrong the information may be, or how late and how poor the plans may be, or how many times the engineer changes his mind, the contractor shall be deemed to have known all the time what was there below ground, and what should have been done about it, and how the structure should have been built in the first place, and shall be liable to pay all costs, damages and extra expense of any kind that may arise, now or ever after, for any reason-whatsoever, and shall hold the owner, the engineer, and all their relatives and assigns, forever free and harmless from all costs, damages, suits, expense or inconvenience of any kind, and what is more shall be cheerful about it." This is not as exaggerated as you might think.

"Being by nature crafty and suspicious . . . a contractor just naturally inclines to protect himself. However naive he may seem . . ."

We find such a paragraph more frequently in specifications prepared by private firms than in those of government agencies. It usually stems from a misguided ambition to protect the engineer and his client from errors and contingencies due to insufficient exploration or insufficient engineering. But it is a miserable substitute for adequate exploration and engineering study. Regardless of the reason for its inclusion, its first effect is to put the contractor on notice that there probably is a contingency buried somewhere, and certainly that does not reduce the cost to the owner. In the second place, I am sure that any contract lawyer will tell you that you cannot disclaim any bona fide legal responsibilities so easily.

How not to reduce costs

This opens up the general subject of risks, the element which makes contracting such an exciting sport. How far is the owner justified in taking it all upon himself, and where should he insist it be borne by the contractor? This problem will vary widely with the individual circumstances and a discussion in detail

would be much beyond the scope of this paper. The point to be made here is this: the more carefully any potential risk can be examined and spelled out, the less it is apt to cost every one. Simply dumping a risk upon the contractor will not in the long run reduce its cost.

That is not to say that the contractor should not be required to assume any risk. He does it every day. But whenever a risk is implied, any prudent contractor will make some calculations and provide some sort of contingencies against it. If he isn't a prudent contractor, the owner will certainly land in trouble anyway. Thus some cost will always be paid by the owner whether or not the risk actually materializes. On the other hand, if an unanticipated subsurface condition develops into major trouble, a "disclaimer paragraph" will not usually prevent its becoming a claim against the owner, and he stands to pay for it all over again. The best practice is still to face the question of risks squarely and honestly, and spell out as well as possible who will be responsible for each. In the event the hazards are not highly probable, it would appear only sound business for the owner to try for the benefit of those that do not happen. The net result of careful evaluation will normally be a lowering of construction costs.

Another frequent source of extra cost is the failure to make provision for necessary right-of-way for the structure, for the necessary working area, for borrow or aggregate sources, and necessary access to and from such areas.

There seems to be a growing tendency to pass such chores to the contractor. Certainly there is no objection to the idea of the contractor acting as the owner's agent, but our subject here is the means for reduction of costs. Right-of-way deals are frequently complicated and involved, and many of the necessary legal actions consume time. When such actions are delayed until such time as

". . . risks, the element which makes contracting such an exciting sport."

the contractor is selected, it usually means a delay in starting the work. This is always an expensive matter and results in some attempt at short-cutting the acquisition process, which in turn costs money. This is usually fully covered in the bid and must eventually be borne by the owner.

Then too, there are some psychological problems. Most right-of-way acquisition is cheaper if done quietly and with attention to proper timing. When a construction project has developed to the contract stage, every one involved is on notice, and the contractor is usually fair game. All of this should be considered in planning the scope of specification requirements.

". . . as directed by the Engineer."

Next, let's look at one favorite trick of specification writers—the controversial phrase, "as directed by the Engineer." Much has been said about it and this is not the place to settle it. The important point is that indiscriminate use of the phrase can usually cost the owner money.

One cannot help observing that the phrase pops up on items that are a bit difficult to describe in simple terms. It takes a considerable load off

"I have yet to see anyone who could objectively and accurately evaluate the full effect of his own specification paragraphs."

the shoulders of the spec writer to simply throw in the phrase in lieu of further study, but I submit that he has not done his job for the owner.

If the specification requirements are clear there is no need for the phrase. To the degree necessary it is inherent in the terms of the contract. If the specification is inadequate the phrase is not a good answer. It is like a red flag to the contractor, pointing out a trouble spot against which he must protect himself, and it is also the point at which the shenanigans begin. It is actually a form of contingency and a potential double-pay item for the owner. Engineering problems are not usually licked by ignoring them, and sidestepping them by use of this phrase can be very expensive and troublesome to all concerned.

Closely allied to this tricky subject, is another, that of "approved materials." Where this is not carefully spelled out, but left to the discretion of the engineer we have a condition which further raises costs.

But far more expensive is another phase of the materials problem. Most designers and probably spec writers too have their pet ideas and theories. But they can sometimes be very expensive. Any specialized item which

(Continued on page 64)



"Material-handling worries ended," reports leading Wisconsin building contractor

TIME, LABOR COSTS CUT IN HALF by versatile Michigan Tractor Shovel

Savings of 40 to 90% in time and 50 to 75% in labor costs resulted when the Selmer Company, Green Bay, Wisconsin, assigned material handling to this Model 75A Michigan Tractor Shovel.

"You might say the Michigan combined the mobility of a pickup truck with the traction of a crawler," explains one Company official. "It certainly eliminated the usual problems of unloading and moving building supplies: the slow expensive hand labor . . . the slowness and lack of mobility of crawler-loaders . . . the lack of capacity of easy-to-get-stuck farm-type tractors."

Saves 3 man-hours unloading blocks

In the two years since its purchase, Selmer has handed dozens of jobs over to the 1¼ yd 80 hp Michigan. Above is a common assignment—moving palletized concrete blocks from trucks to scaffolding. Unit lifts 68 blocks, weighing 3,800 lbs AT ONCE. These are stacked 10 ft high so laborers can skid blocks direct onto scaffolds. Entire job, including

stacking, takes two men 10 minutes. Unloading alone used to take five hand-laborers an hour. And an elevator had to be set up and used continually.

Saves \$15 to \$25 per brick truck

Similar savings are reported when brick is handled. It used to take four men using brick tongs three hours to unload a semi-trailer. Now, Selmer has the bricks palletized in 500-unit lots, 12 pallets to the semi . . . unloading takes the Michigan and two men 10 to 15 minutes. Smaller trucks carry 4 pallets, take 5 minutes to unload with the Michigan compared to 1½ hours with four hand laborers. Savings average \$15 to \$25 per truck *including* extra charges for palletizing!

Replaces expensive crane to unload marble

Unloading carloads of marble or cast stone always gave Selmer Company a costly headache too. Formerly, they

rented a crane. Recently, however, their veteran shop foreman, Norb Tilkens, designed and fabricated a special boom which attaches to the tilt bracket. With this, the Michigan reaches across a truck, lifts two or three slabs of marble from the railroad car, gently lowers each 700 lb load to the truck bed. In a few hours, the car is completely unloaded. Savings on a typical 15-car shipment run \$500 or more.



Eliminates ramps, pump set-up for concrete

Above is another home-made attachment . . . a concrete bucket which can be lifted on the Michigan forks. It carries four wheelbarrowfuls per load. Pour is made simply by tilting forks slightly forward so concrete flows out of 6" square spout into forms. Time and labor of barrow-men are saved. Nor does Selmer have to build ramps or, on small pours, set up a pump.

Handles wide variety of other materials

Lots of other materials have been handled from time to time. Some of them are:



Rip-rap — old brickbats and concrete dozed into river to protect building.



Lumber — as much as $\frac{3}{4}$ of a truck load (3500 to 4000 lbs) unloaded at once, stockpiled, later carried to hoist.



Rolls of reinforcing wire—carried on forks, stockpile to hoist. Fork spacing changed in seconds to fit roll openings.



Trash — cleaned from around building site.

One man changes bucket, forks

Some of these jobs, you'll note, call for fork lift, some for tractor shovel bucket. These two attachments (and others) are easily interchanged. It takes Selmer's operator, John DeMoulin, working alone, 10 minutes.

In two years, NO breakdowns

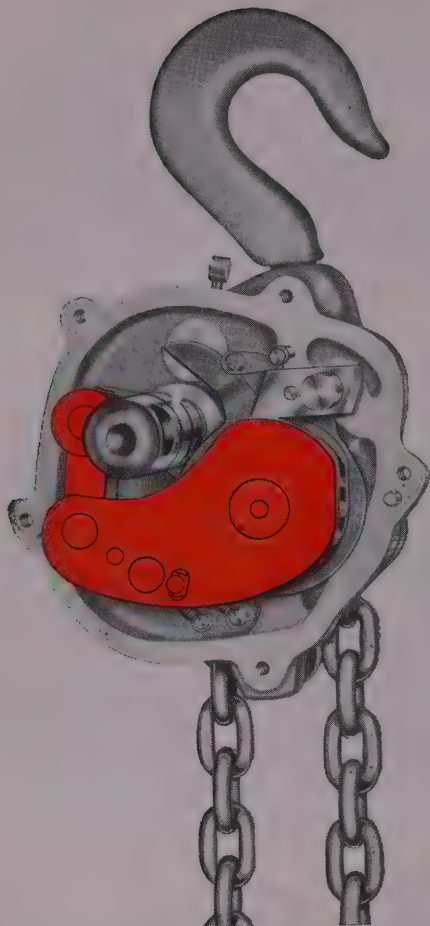
No matter what the job, Selmer Company can depend on their Michigan working a full day! "In two years . . . over 6,000 operating hours," recalls Shop Foreman Tilkens, "we've NEVER had the machine break down on the job. It has saved us over 50% in time and manpower!"

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Ratchet Jacks, Screw Jacks, Hydraulic Jacks, Special Worm Gear Jacks

SPECIFICATIONS

(Continued from page 61)

is not standard manufacture, or off-the-shelf, should be thoroughly scrutinized for its necessity.

Closely related is the practice of specifying slight changes in standard items such as motors, switches, controls, valves, hoists, gates, etc. The changes seem minor, and indeed they usually are, yet they frequently represent a staggering cost, all out of proportion to their worth. On line-produced items like motors, transformers, generators, etc., such minor changes can result in long and expensive delays in delivery because of

"... it seems downright foolish to specify a quality which cannot . . . be obtained."

their disruption of production schedules. Such points should be carefully scrutinized by some-one competent, to make certain that their extra cost is both realized and justified. Careful analysis can usually minimize or avoid completely such useless waste of money.

A case in point

Another important source of extra cost and therefore an area where cost reduction can be accomplished is in the specification of quality. This is certainly not to discourage the specifying of high-quality work, but to point out that there should be some consonance or uniformity of quality throughout a job. Such items as wrought iron pipe, solid brass hardware, double extra strength cast iron pipe, etc. have a very definite value, and in the proper place are essential, but *not* as in the recent case we had, in an engineer's temporary field office! The wrought iron pipe had to be specially ordered and the hardware had to be searched for all over the West, and was finally delivered by air express to meet the deadline.

Similarly, while it is expensive to specify a quality which is not required it seems downright foolish to specify a quality which cannot and will not be attained. This paradox usually comes about by specifying both methods and results at the same time, requiring a method which cannot possibly obtain the desired result. I need not bore you with illustrations on this one. It usually results from "fuzzy thinking" in the engineering end, but it can also happen right in the specification department.

Many of these last enumerated costly items frequently come about from a misuse of standard specifications, so perhaps it is now time to talk about them.

Standard specs can be a boon

Properly used they are a boon both to contractors and engineers. Developed over years of experience they are known and understood by all concerned and can be trusted to fulfill their function. In particular some standard clauses on "changed conditions," "disputes," etc. have been court-tested so often that they may be relied upon. To change them even in minor respects destroys their usefulness. On the other hand nothing is more pitiful than a standard clause which does not fit.

Standard specs can be a bane

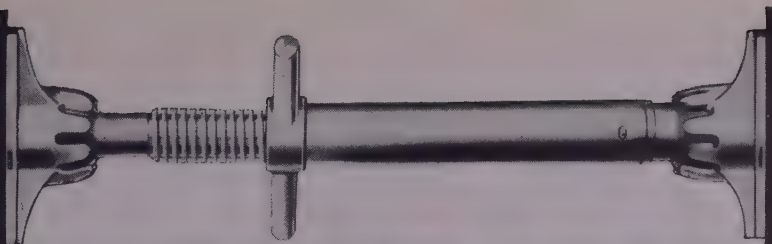
Many construction agencies have adopted standard specifications for use by subordinate offices. Several Government agencies, for example, have published elaborate sets of standard paragraphs which may be used by local offices without the necessity for prior approval, provided they are used intact. This can lead to trouble. It is so much easier to use the standard paragraph than to risk an argument with higher authority, and suffer the delay it causes. But the result can be costly to the taxpayer.

"... not only should the language of the contract be understandable, it should be incapable of misinterpretation."

Summary

We can safely conclude, I think, that:

1. There is no substitute for careful planning, engineering and checking, and this applies with equal force to the writing of specifications.
2. A specification is a legal document surrounded by tradition, and it is a vital part of the contract, just as important as the design.
3. A specification must fit the job, and it must face its problems squarely.
4. Standard or boiler plate specifications are not a substitute for careful thinking and should be used with care.
5. Since poor specifications always cost us money one of our first moves in a cost reduction program is to write good specifications.



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New Mexico bridge cast on earth fill

Instead of conventional shoring methods, the contractor chose to support the bridge deck forms with a compacted earth fill. Unusual technique reduced forming costs from an estimated \$18,000 to \$3,000.

By A. G. DELONG
Assistant District Engineer
New Mexico State Highway Department

CONTRACTOR Skousen-Hise of Albuquerque has completed a 7.9-mi. freeway project 16 mi. north of Santa Fe, New Mexico. He used only 70% of the 250 days to complete the \$991,-000 job.

The most interesting feature on this project was the construction of an overpass at Pojoaque. This particular intersection probably has the highest daily rural traffic count in the state. At this junction, traffic can either go to Los Alamos, or to Colorado via three different routes. This overpass was not only interesting because of the design, but also because of the way the deck of this structure was formed by the contractor.

The estimated quantities were as follows:

Excavation for structure ..	186 cu. yd.
Mechanical tamping	174 hr.
Class A concrete bridge superstructure	375 cu. yd.
Class A concrete bridge substructure	261 cu. yd.
Reinforcement steel	109,548 lb.
Structural steel	11,400 lb.
Treated timber piles	4,000 lin. ft.

The approximate cost of this structure to the State Highway Depart-

ment was \$93,000. This structure is located on a 4-deg. curve with super-elevation of .08 of a foot per foot. It is 178.50 ft. from back to back of backwalls, consisting of three spans of 53 ft., 68 ft., and 53 ft. This structure is a continuous concrete slab bridge with a 28-ft. roadway and 18-in. safety curbs. It was designed with concrete strength of 2,500 psi. in 28 days, and AASHO specifications of 1953. The maximum computed pile loads for the piers is 19.5 tons, and for the abutments, 19.9 tons. The minimum clearance for this structure is 15 ft., 1 1/8 in. The foundation for the piling consisted of clay, adobe and sand.

The contractor drove his piling and poured his concrete and steel columns in the conventional manner. However, instead of forming and shoring in the conventional manner, the contractor decided to haul in borrow material and fill up the area under the overpass. A borrow pit for building the embankment was located nearby. For this operation the con-

tractor used three Euclid 15 1/2-yd. scrapers and a pusher in the borrow pit. It required the contractor three days to complete this operation. Seventy hours of tamping roller and 40 hr. of pneumatic tire rolling, and 350,000 gal. of water were used to secure compaction. This procedure for forming the overpass deck had been approved by Bridge Engineer W. E. Strohm and Fred Hartford of the Bureau of Public Roads. The idea for using this method should be credited to E. R. Hise, structure superintendent and a partner of the contracting firm.

Embankment material was hauled in and compacted and shaped almost to blue top grade, but was not fine graded in that manner. When the embankment had been brought to approximate grade, sills were set transversely on the embankment to the grade of the bottom of the deck less the thickness of the plywood form. In between the sills was filled with dry sand which was struck off level with the tops of the sills. Then the plywood forms were placed. In this manner it was easy to obtain blue top grade and also have a firm foundation for the grade. (This was similar to the construction used by Lembke-



SONOVOIDS were used to lighten deadload. Contractor solved problem of resisting the flotation tendency with straps, No. 9 wire, reinforcing steel, and U-bolts. Earth fill made access easy. When fill had been

brought close to grade sills were placed exactly at grade (less form thickness) and dry sand was placed in between and leveled. Plywood forms were placed next. Unusual method saved about \$15,000.

Clough & King on the construction of the new Civic Auditorium in Albuquerque. However, they utilized the existing material for forming the dome roof of their structure.) The forms were left in place on the two concrete circular pilings to prevent discoloration and possible damage. These columns had a 6-ft. outside diameter with a hollow core of 30 $\frac{7}{8}$ -in. outside diameter. They were 19 ft. high.

The contractor's biggest difficulty in constructing this overpass was holding the Sonovoid tubes in place while he poured the concrete. He used a combination of straps, No. 9 wire, reinforcing steel and "U" bolts to keep from floating the tubes upwards and out of position. The flotation force was about 450 lb. per lin. ft. These Sonovoid tubes are 2 ft., 2 $\frac{3}{8}$ in. in diameter with a $\frac{3}{8}$ -in. thick shell. They were supplied by the W. J. Burke Concrete Co. of Albuquerque.

After the deck, backwalls, and curbs were poured and had reached their design strength, this borrow material was then removed and used in the roadway embankment nearby. For this operation the contractor used two Euclid scrapers, one dozer and one HD-5 loader. This operation required three days. The contractor first used the loader to make a hole in the embankment; when the hole became big enough for the dozer to move in, he used the dozer. When the hole became

big enough for the Euclid scrapers, he used them to complete the operation. As the earth was being removed, the concrete crew was removing the plywood forms.

The contractor should be complimented on his concrete operations because there was no honeycomb concrete whatsoever on the underside of the structure. In fact, it was one of the nicest looking structures the writer has ever seen. Mr. Hise figured that the method of hauling in earth for

forming this structure cost \$3,000 including removing the material. Had he formed in the conventional manner, he figured it would have cost him \$18,000. Therefore, he had a saving of \$15,000 by using this unusual method.

W. E. Strohm is New Mexico Highway Department bridge engineer. John A. Fairly, Jr., is district engineer, District 5. A. G. DeLong is assistant district engineer. Project engineer was Baker Flowers.

GIRDERS

(Continued from page 55)

Conditions at the site presented special problems in addition to those already posed by the size and weight of the construction. Recent backfilling operations had left a soft working surface around the abutments and piers, so that planking had to be used under all cranes and heavy equipment. The new highway being constructed will be depressed as it passes under this railroad bridge, but at the time of steel erection only limited excavation had been completed, restricting the working area. Access to the site from the south was prevented completely by a temporary embankment carrying a railroad shoo-fly.

Special preparatory clearing and grading was carried out by the gen-

eral contractor in order to make best use of available space, and special planning by the steel erector was required to make sure that his heavy equipment could get into the site, do its job, and then manage to get out.

Where shoring of the girders after erection was required, it was accomplished through the use of two 30-ft. long telephone poles, wedged at an angle against the center of the girder, one on each side, with a wire rope tie between them at ground level.

General contractor was Lew Jones Construction Company of San Jose, California. Bethlehem Pacific Coast Steel Corporation, as a subcontractor, fabricated and erected the 639 tons of structural steel. Design of the structure was by the California Division of Highways and the Western Pacific Railroad.



ACCESS ROAD is pushed through mountain areas to reach site of Trinity Dam. Nearest railroad facilities are 40 mi. away. Road will connect with U.S. 299.

AWARD of a \$36,644,556 tunnel contract opens up the first major construction feature of the Trinity River project in Northern California. Carried forward by the Bureau of Reclamation, this is the first project designed to import surplus water from rivers in the northwest corner of the state to the Central Valley, with its growing deficiency in water supply. The development, which is officially the Trinity River Division of the Central Valley Project, will store available surplus and deliver it by means of tunnels aggregating eleven miles in length through three power plants with an ultimate installed capacity of about 370,000 kw., finally discharging into the upper Sacramento River above Keswick Dam.

General supervision of the project is under the direction of C. H. Spencer, director of Region 2, U. S. Bureau of Reclamation, Sacramento, California. A. Norman Murray is

assistant regional director. Louis B. Ackerman is project construction engineer.

General features

The overall water problem of the State of California has been reviewed in **WESTERN CONSTRUCTION** during past years, together with several outlines of engineering plans devised to equalize supply and demand. The designation of "surplus," applies rather exclusively to the rivers in the north and northwest sections, of which the Trinity is an outstanding stream.

Basic engineering solutions to storage and delivery problems have been on paper for a good many years, but the political aspects have remained in legislative halls during the same time, and today continue unreconciled. Most recent difference relates to whether the power features of the project will be carried out by the

TRINITY RIVER PROJECT

Record dam, 10.8-mi. trans-mountain tunnel and three powerplants will provide for conserving water in northwest California, making it available for use in water-deficient areas. Bureau of Reclamation awards a \$36,644,556 tunnel contract for the first of two major features.

Bureau of Reclamation or the Pacific Gas and Electric Co. The following review of the project will be confined to its engineering features; construction problems and progress to date.

Trinity River

A major tributary of the Klamath River, the Trinity rises in a rugged mountain area about 20 mi. west of the upper Sacramento River, flows south, then turns west and finally northwest toward the ocean. It drains about 730 sq. mi. above the town of Lewiston (see map). Average annual precipitation in the upper basin varies from about 40 in. near Lewiston to nearly 80 in. at the highest elevation. Resulting runoff is extremely seasonal with 75% occurring through the months of February through June. More than 1,000,000 ac.-ft. originating in the upper basin is wasted annually into the Pacific Ocean. Total average annual runoff of the river where it joins the Klamath River is about 3,500,000 ac.-ft.

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5 POWER UP AND DOWN BOOM, HOIST IS STANDARD. Simple precision design makes safe, sure operation. A one-piece cast steel unit contains pawl teeth, windlass and brake drum. The cable end is located in an easily accessible place for quick attachment change-over.

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7 ALL SHAFTS SPLINED, ALL ANTI-FRICTION BEARINGS. All shafts extra large for maximum strength, precision splined for easy maintenance. Anti-friction bearings used on all high-speed, continuous rotating shafts and drums. All shaft bearing surfaces are precision ground.

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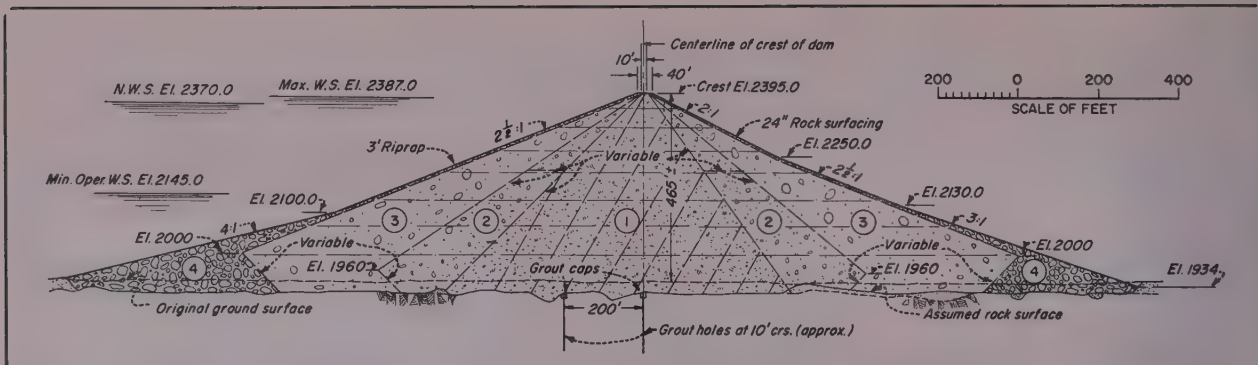
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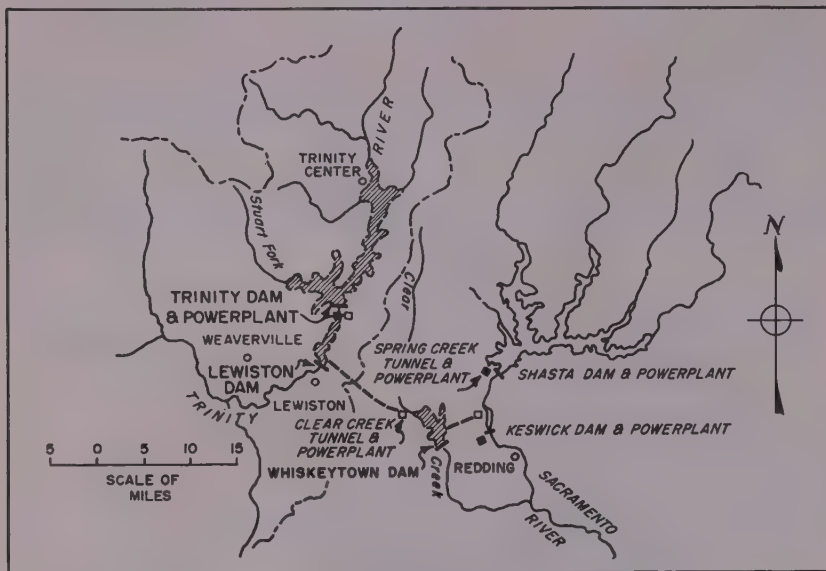
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RECORD SIZE Trinity Dam will have a volume of 33,180,000 cu. yd. Zone 1 will be of selected weathered rock (clay to gravel) compacted to 6-in. layers. Zone 2 will be of the same general material (silt to cobbles) compacted to 12-in. layers. Zone 3 will be alternate layers

of dredger tailings (gravel, cobbles and boulders) compacted by crawler tractor in 12- and 18-in. layers. Zone 4 is rock fill in 3-ft. layers. Availability of these materials in millions of yards determined the type of dam.



KEY MAP OF TRINITY PROJECT

MAJOR CONTRACTS

Diversion tunnel. \$ 1,348,000

Gates & Fox Co.,
Burlingame, Calif.

Trinity Dam . . . 48,928,101

Guy F. Atkinson Co.
M. J. Bevanda
Chas. L. Harney, Inc.
Ostrander Construction Co.
A. Teichert & Son, Inc.
Trepte Construction Co.

Clear Creek tunnel 36,644,556

The Shea Co.
Henry J. Kaiser Co.
Morrison-Knudsen Co., Inc.
Macco Corporation
Raymond Concrete Pile Co.

Access road . . . 1,489,290

(Approach road to dam)
M. W. Brown,
Redding, Calif.

**Access roads and
bridge piers . . 869,631**

(Piers for Trinity River Bridge)
Transocean Engineering Corp.,
Hayward, Calif.

Bridge superstructure . . . 135,860

Bos Construction Co.,
Berkeley, Calif.

Camp . . . 1,576,589

Barry J. Richards, Inc.,
Studio City, Calif.

Present use of water in the Trinity River basin is extremely small, being confined to irrigation where available land exists in the river valley. There are no storage reservoirs and the winter and spring runoff is not conserved. Flow in the river is needed primarily to support commercial and sport fishing interests.

Extensive studies of ultimate water requirements in the basin show them to be extremely small in comparison to the available water supply. For example, the flow passing any main storage site to satisfy the fish resource has been estimated at 120,500 ac.-ft. annually, as compared to a runoff of 1,000,000 ac.-ft.

Trinity County, following an early mining development and subsequent decline, has been sparsely populated, and today has a total population of not more than 10,000. The county seat of Weaverville has a population of around 1,500, and with the exception of one or two other small communities the population is scat-

tered in rural areas. A more extensive review of the county, with emphasis on its road and transportation system, appeared in the preceding issue of *WESTERN CONSTRUCTION* (March 1957) under the authorship of Melvin E. Dale, County Road Commissioner.

There are no railroads serving the Trinity River area, and the nearest facilities are at Redding about 40 mi. to the east by highway. U. S. Highway 299 extends through the area from east to west.

MAJOR CONSTRUCTION FEATURES

Trinity Dam

Major storage element of the project is located immediately downstream from the entrance of Stuart Fork (see map). Rock in this general area is a hard, massive greenstone formed from old volcanic tuffs and lava flows; in most respects it is similar to the foundation rock at Shasta Dam site. Geological reports indicate this rock affords a hard and water tight foundation providing adequate support for an earth-fill dam.

Adequate materials for an earth and gravel embankment of the volume required are available within a suitable radius of the Trinity Dam site. Most of the materials will be available in borrow areas not more than 2 mi. from the site. It was the availability of materials that led to the economy of a rolled-earth structure with the usual zoning of materials.

About 3 mi. north of the dam site lie several million cubic yards of gravels mixed with silt and fines. This provides an adequate source of impervious fill. To the west of the site is an area underlain by weathered gravels, and at least 15,000,000 cu. yd. of this material provide a

further source of impervious fill and considerable semi-pervious fill.

Design of dam

With these conditions of favorable site and adequate, suitable material the dam has been designed with record breaking proportions including a height of 465 ft. above stream bed and a volume of embankment totaling 33,180,000 cu. yd. Arrangement of the material in zones is shown in the accompanying cross-section drawing.

A 3-ft. layer of riprap is provided on the upstream face and a 2-ft. rock covering on the downstream face. The design calls for two lines of grout holes at about 10 ft. centers. One line is directly under the crest and the other line at a distance of 200 ft. upstream.

The impervious zone will be compacted in 6-in. layers, while the transition zones on either side will be compacted in 12-in. layers. The impervious zone has a minimum thickness of 15 ft. at the crest, which is designed to provide a 4-ft. camber. Crest length is 2,440 ft.

Gross storage of 2,500,000 ac.-ft. is provided with active storage capacity of 2,160,000 ac.-ft. Area of the reservoir when filled will be about 16,400 ac.

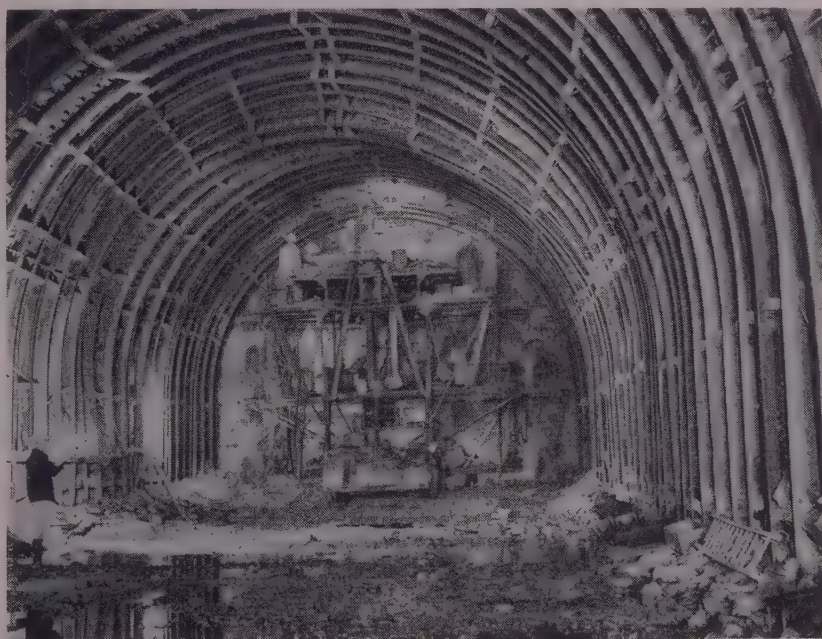
River control program

During construction the full flow of the Trinity River will be diverted around the dam site through a 33-ft. diameter tunnel along the east bank now nearing completion. This bore extends from an upstream point beneath the later location of the intake structure, approaches the crestline of the dam on a line away from the river, and then returns toward stream bed to a point later to be occupied by the power house and outlet works. The lining of this diversion tunnel with concrete to a diameter of 28 ft. will be accomplished under the general dam contract.

Control works located at the crest of the dam will operate the intake of a 16-ft. steel penstock inside the tunnel which will continue downstream from the dam axis to a bifurcation at the power plant location, and continue onward at a reduced diameter to the discharge point downstream from the powerhouse. On line away from the stream bed a second tunnel will operate from a modified "morning glory" spillway to a discharge point approximately



CAMP SITE type of area in the Trinity River valley, now occupied by trailers housing employees on some of the preliminary contracts. Pipe on suspension span is sewer outfall.



DIVERSION TUNNEL around the Trinity Dam site was driven under separate contract. Truck mounted jumbo with three decks was used to drive 2,280-ft. tunnel.

on line downstream with the power plant and outlet discharge structure. The diversion tunnel itself during its operation in that function is about 2,280 ft. long.

Trinity power plant

Provision is made for a power house located at the downstream toe of Trinity Dam. This plant will utilize a 375-ft. head from the reservoir and will have an installation consisting of two 48,000-kw. units. Discharge through the power house will be 1,850 sec. ft. through each turbine.

Lewiston Dam

About 6 mi. downstream from Trinity Dam, Lewiston Dam will be

built to serve as an afterbay. It will re-regulate the water discharged from Trinity reservoir and control the releases made to serve downstream interests in and along the Trinity River. Its reservoir also provides the best location for the long tunnel which will carry the surplus water through the divide and into the Sacramento watershed. This 10.8-mi. tunnel represents the key to the entire program.

Lewiston Dam will also be an earth embankment with a height of 70 ft. above streambed, containing 320,000 yd. of material or approximately 1% of the volume in Trinity Dam.

Bids for the long tunnel were re-

(Continued on page 98)

Increasing engineering productivity

Los Angeles is scene of highly successful Western Regional Conference on Increasing Highway Engineering Productivity.

WITH a registration of 475, representing highway departments and engineers throughout the entire West, the Western Regional Conference on Increasing Highway Engineering Productivity held in Los Angeles March 5-7, exceeded all expectations as to size and interest.

Similar conferences have been held during the past year at two or three locations in Eastern states but this is the first and only one of its type to be held in the West under national sponsorship. The U. S. Bureau of Public Roads was the coordinating agency, but sponsorship and active participation extended through such agencies as the Institute of Transportation and Traffic Engineering, University of California, California Division of Highways, Western Association of State Highway Officials and the American Association of State Highway Officials. The conference was called to review present progress and plans for utilizing all types of modern engineering aids to reduce the man-hours of engineering work in connection with highway design and construction. Stated in the reverse, the purpose was to use these modern developments to increase the productivity of the highway engineer, both in the office and in the field.

General chairman of the conference was George T. McCoy, State Highway Engineer of California, and C. E. Waite, Deputy State Highway Engineer, presided at all sessions. Objectives of the conference were outlined by H. A. Radzikowski of the Bureau of Public Roads in Washington, D. C., who has been coordinating all efforts of state highway departments using or planning to use electronic computers in the solution of design problems. In addition to the conference sessions, which were well and continuously attended, there were exhibits of computers and other engineering instruments.

The entire first day was occupied by sessions at which panel members discussed the present work of state highway organizations in the use of electronic computers on such problems as highway location, design,

earthwork determinations, bridge design and traffic studies. Practically every state in the West was represented on these panels indicating that highway departments in this region, within the last year, have accepted this type of modern calculating instrument in the solution of difficult highway engineering problems. It was evident that the advantages of these computers applied not only to the routine operations of the office force but also were beginning to be effective in reducing the man-hours of field engineering. Particularly the tedious computation relating to the volume of earth work can be reached to a large extent by machine computations, and it was evident that contractors are willing to accept the results as the basis for final payment.

Knowledge must be shared

One important development was the expressed eagerness to exchange ideas and share in the expanding knowledge of this technique. The preliminaries to actual machine operations represent the major part of the time and technical effort to be expended. When programs have been developed and set up for the solution of general engineering problems, either in highway design or bridge computations, these can be made available to other state highway departments and thereby eliminate much duplication of time and technical skill. One evening session was devoted to discussing the establishment of a central library for this type of material, with the information to be available to all interested parties.

Construction considerations

The concluding day of the conference was given over to the consideration of problems which had a more direct effect on field operations, the work of contractors and construction equipment. Representatives of several Western states described short-cuts in the preparation of plans working toward confining the data to that which is strictly essential to contractors' field operations. For example,

right-of-way lines must be shown on drawings, but the necessary coordinates and ties for these surveys can be eliminated as far as contractors' operations are concerned.

Representatives of several bridge departments indicated that they were beginning to standardize on designs for small structures, to the point of using precast and possibly prestressed members as standards.

One session explored the use of new and improved construction machinery in speeding up field operations. This session was presided over by Radzikowski who is the recognized authority in the U. S. Bureau of Public Roads on the subject of equipment operation and effectiveness. Representatives of Caterpillar Tractor Co., Barber-Greene Co., Koehring Co., and Chain Belt Co., reviewed various types and classes of construction equipment, pointing out how highway departments fail to take advantage of improvements and new models because of specifications which do not permit the use of field equipment before it has been extensively tested and approved by each individual department.

These representatives of well known construction equipment manufacturers pleaded with the highway engineers to work toward specifications which would relate more to "results" than "methods." Such a development, according to these representatives, would go a long way toward accelerating new ideas and designs in equipment that would ultimately speed and improve highway building. Lack of uniformity in connection with state highway specifications was considered another serious problem by these representatives. In one state, a contractor could use a particular type of machine, whereas in a neighboring state it might not be permitted. In this connection the mixing time for asphaltic materials varies from state to state so that the same plant may have a variation of as much as 25% in output from one state to another.

Lastly, this panel expressed the hope that in the future there might be a clearing-house among state highway departments for testing and approving new machines. As it is today, a manufacturer simply cannot afford to spend the money to go through the extensive demonstrations and tests to have his new unit approved by each

THE CASE OF THE IDEA THAT SAVED TWO DAYS

...I'M GOING TO LOSE ABOUT TWO DAYS WHILE WE REBUILD THAT FLYWHEEL CLUTCH!



IS IT EXPENSIVE?



NOT AT ALL...



WHY SHOULD YOU? PUT IN A REBUILT ASSEMBLY FROM OUR EXCHANGE STOCK AND YOU'LL HAVE YOUR TRACTOR GOING THIS AFTERNOON!



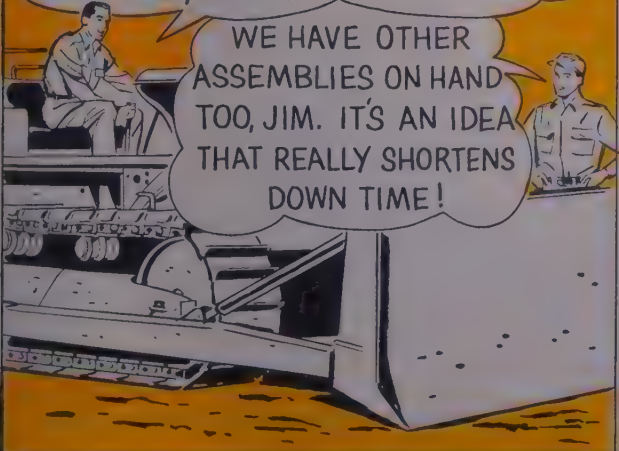
-- YOU PAY ONLY FOR THE PARTS AND REPAIR SERVICE TO PUT YOUR CLUTCH IN THE SAME FIRST-CLASS SHAPE AS THE EXCHANGE UNIT. THEN YOUR REBUILT ASSEMBLY GOES INTO OUR EXCHANGE STOCK.



EXCELLENT IDEA!
GO AHEAD...

THAT AFTERNOON

SURE AM GLAD I FOUND OUT ABOUT YOUR PARTS ASSEMBLY EXCHANGE PLAN, ART!



WE HAVE OTHER ASSEMBLIES ON HAND TOO, JIM. IT'S AN IDEA THAT REALLY SHORTENS DOWN TIME!

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.



LET ME HELP KEEP YOUR CAT* EQUIPMENT ON THE JOB!

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

and every state highway department. If such a testing program could be carried out through a central agency, or if it could be agreed that approval by several state highway departments would be accepted by others there would be faster stride in developing new machines. As it is, many good ideas are stifled by manufacturers because of the cost of promotion and securing adoption.

The final panel brought together highway contractors from the Midwest, the South and the West. This session was presided over by H. L. Plummer, Chairman, Wisconsin State Highway Commission, and a vice president of ARBA. Several points were common to the remarks made by all contracting representatives. Some of the more important ones follow:

Standardization in plans, particularly as they relate to details of structures and curb-and-gutter, was stressed as being important to reducing field costs.

Specifications should be revised annually with the aid of contractors (this would appear to be standard practice in the West) to incorporate new ideas and study the possibility of permitting use of new equipment.

State highway departments should make greater efforts in the use of local materials in the interest of saving construction costs.

All representatives urged the expediting of purchasing rights-of-way and of getting utilities out of the way before the construction contract was awarded.

Faster payments and particularly the speeding up of the final payment following the completion of field work were stressed in the interest of permitting the contractor to finance the next job.

The rather common complaint was voiced that resident engineers and inspectors, too often, are not fully qualified and do not have enough responsibility to meet and make day-to-day decisions.

Apparently there was no objection on the part of contractors to the increasing amount of photogrammetric work in the preparation of plans and the computing of earthwork. The contractor representatives indicated they were willing to bid on, and receive payment based on this type of surveying, provided that any inaccuracies which developed during actual field work would be corrected and adjusted when they were discovered.

Contractors deplored the sudden invasion of new and inexperienced competition rushing into the field to

secure some of the highly publicized volume of highway work. Strict adherence to the rules of pre-qualification were requested.

Summarizing

In a summarizing statement, Harmer E. Davis, Director, Institute of Transportation and Traffic Engineering, University of California, pointed out the acceleration in the use which state highway departments had made of electronic computers and photogrammetry during just the past year or so. This interest makes obvious the fact that expansion will

continue, with all departments profiting through a constant exchange of ideas, reducing duplication of effort to a minimum. He also pointed out that these new machines did not in any way reduce the creative aspect of engineering design, but merely provided short cuts through tedious mathematical solutions. However, they do open up the important possibility of developing an entirely new segment of employment within highway departments. These would be employees at the level of technician, both in the office and in the field, who would be educated for this type of position and career.

18th Utah highway meet

THE EIGHTEENTH annual Highway Conference sponsored by the Civil Engineering Department of the University of Utah at Salt Lake City was held on March 4, 5 and 6. The conference was held in recently completed \$2,500,000 Student Union Building and was attended by more than 250 persons. About 325 were present at the traditional banquet on Tuesday evening.

The general theme of the conference was the National Highway Program. The general committee, headed by Prof. Preston D. Linford, assembled speakers with wide reputations to furnish authoritative and up-to-date information on every phase of the highway program as it affects the Western States.

Dr. S. S. Kistler, Dean of the College of Engineering, officially opened the conference. He expressed the hope that a mathematical framework would be developed in which to study transportation problems, somewhat as has been done in the field of communications.

The first speaker was K. S. Chamberlain, regional engineer of the U. S. Bureau of Public Roads, who reviewed the role the BPR is playing in the road program. Ezra C. Knowlton, executive vice-president of the Utah Sand and Gravel Products Corp., discussed Utah's problems, in particular the location of the Salt Lake freeway.

The economic impact of the highway program was described by Dr. Elroy Nelson, vice president of the First Security Corp. in Salt Lake City. He pointed out that the population of the 11 Western States is expected to be 50% higher than it is now by the time the 41,000-mi. system is completed.

Wayne Snowden, associate engi-

neer of the Institute of Transportation and Traffic Engineering, Berkeley, Calif., delivered a paper on the manpower supply. He reviewed the experience of Wisconsin, which in two years of self-analysis and administrative re-organization, with greater use of aides and technicians, reduced the number of engineers required for every \$1,000,000 spent on highways from 10 to 4. It is partially true that this is shifting the shortage from one classification to another, but it is to a classification much easier to build up and replenish.

One of the highlights of the conference was the presentation made by Dr. Arthur R. Anderson of the Concrete Technology Corp., Tacoma, Wash., who discussed standard designs for prestressed bridges. He gave an economic analysis of the four standard sections and found that the T-section was the most economical. On 50-ft. spans sections of this shape cost about \$3.95 per sq. ft., in place. The cost is about \$4.60 per sq. ft. of bridge surface for 70-ft. spans.

The place of concrete, steel, and asphalt in the new highway program was described by (respectively): Leo M. Arms, Portland Cement Association, Chicago, Ill.; R. L. Mueller, Armco Drainage and Metal Products, Inc., Denver, Colo., and J. F. Pearing, The Asphalt Institute, Denver, Colo.

The activities of the Utah State Road Commission were given by T. Nielson, speaking for C. Taylor Burton, Chairman of the Commission.

Luncheons were sponsored by the Intermountain Branch of the AGC, the Utah Motor Transport Association, and the Utah Safety Council.

Grant K. Borg is head of the Civil Engineering Department of Utah University.

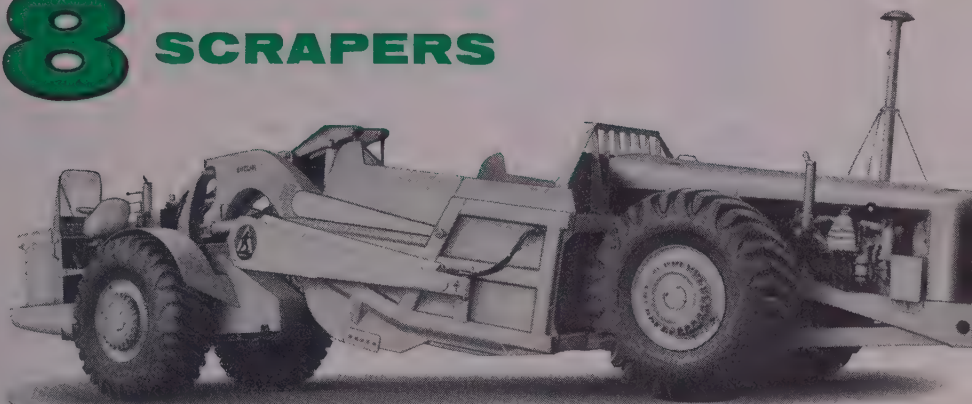
line of JOB-PROVED earthmovers



Three types of scrapers with struck capacities of 7 to 24 yds.—9 to 32 yds. heaped...143 to 518 total h.p....standard gear transmissions and Torqmatic Drive...hydraulic lever action of bowl, apron and ejector...overhung engine scrapers have struck capacities of 7, 12 and 18 cu. yds....4-wheel tractor models carry 12, 18 and 24 yd. payloads struck.

8 SCRAPERS

Twin-Power models have 8 and 24 yd. struck capacity—25 and 32 yds. heaped...two engines, each with separate Torqmatic Drive for tractor and scraper axles...143 and 518 total h.p.



4

BOTTOM DUMPS



Struck payload capacities of 13, 17 and 25 yds.—19 to 38 yds. heaped...218 and 300 h.p....Torqmatic Drive and standard gear transmissions...loaded speeds to 34 mph...overhung engine Model S-12 has 13-yd. struck capacity.

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permits speedy re-
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for shoring or when
flush working decks
are required.

CAM LOCK

a new and improved
design with locks
welded to ends of
all braces—provides
absolute "Position
Lock" to all panels
with but a twist of the
wrist—no tools need-
ed—no loose parts.

STACK LOCK

furnished as an inte-
gral part of each
panel column—easy
to operate—permits
quick vertical locking
of panels for maxi-
mum safety.

When it comes to scaffold, first cost
isn't everything. What really counts is
how well it's made . . . how fast and
easy it assembles . . . how safe it stands
. . . how long it lasts.

These four points can mean money-in-the-
pocket to scaffold users. They're four points in
which ADVANCE Scaffold knows no equal.

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Cam Locks and Stack Locks are an integral part
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time consuming nut, bolt
and clamp methods of
assembly have been
entirely eliminated.

Yes, it's true—ADVANCE Scaffold
does cost a little more. But first
cost is only relative. It's the last
cost that counts.

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cause a demonstration of ADVANCE
Scaffold speaks much louder than
mere words . . . proves every
one of the points that we make.
Your signature on the coupon below will assure
an early, without-cost-or-obligation demonstration.

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EQUIPMENT DISTRIBUTORS



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Structural Design Chart—IX

By
THOMAS HARAN
Civil Engineer

THE DATA presented on the op-
posite page are an illustrated con-
densation of the author's interpreta-
tion of the structural analysis and
design requirements for walls of
"ACI Building Code" (ACI 318-51).
Since this chart was formulated the
American Concrete Institute has
adopted some revision to the Code.
However, since these revisions are
of a minor nature concerning walls
Chart No. 9 is presented without
connotation to said revisions.

The Chart is headed by a section
limiting wall thickness which is sub-
divided into categories of bearing
walls of fire-resistive and non-fire-
resistive construction, panels and en-
closure walls, party walls, and bear-
ing walls without built-in columns
that take all the vertical load.

At the bottom of the Chart, win-
dow and door opening requirements
are indicated, and the effective area
assumable for the support of vertical
concentrated loads is illustrated.

Requirements for walls with mini-
mum steel greater than and less than
10 in. in thickness are shown in the
center of the Chart.

For the benefit of readers who have
not been following this series the
charts are being published in the fol-
lowing order:

1. Structural Analysis of One-Way Reinforced Floor Members.
2. Structural Analysis of Two-Way Reinforced Floor Slabs.
3. Structural Analysis of Flat Slab Floors.
4. Structural Analysis of Flat Slab Floors (continued.)
5. Structural Design of Floor Slabs.
6. Structural Design of Floor Beams.
7. Anchorage and Shear.
8. Structural Analysis and Design of Columns.
9. Structural Analysis and Design of Walls.
10. Structural Design of Walls with Minimum Steel.
11. Structural Analysis and Design of Isolated Footings.
12. Miscellaneous Supplementary Data.

ARBA elects officers for 1957

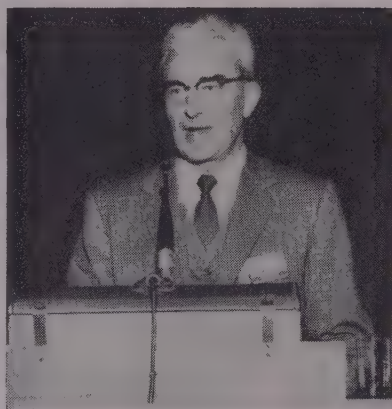
OFFICERS AND DIRECTORS of the American Road Builders' Association for 1957 were elected at the recent ARBA annual convention in Chicago. The ARBA national officers are as follows: President, Julien R. Steelman, President of the Koehring Co., Milwaukee, Wis.; Vice President, Northeastern District: J. E. McCracken, Sales Engineer, Bethlehem Steel Co., Bethlehem, Pa.; Vice President, Southern District: Nello L. Teer, Jr., President, Nello L. Teer Co., Durham, N. C.; Vice President, Central District: Harold L. Plummer, Chairman, Wisconsin State Highway Commission, Madison, Wis.; Vice President, Western District: W. A. Bugge, Director of Highways, Department of Highways, Olympia, Wash.; Treasurer, Jennings Randolph, Assistant to the President, Capital Airlines, Washington, D. C. Among those serving on the Board of Directors is Howard S. Kaulbach, Street Maintenance Engineer, Oakland, Calif.

Direction from the West

Vice president of the Western District of the County and Local Roads Division is T. W. Switzer, Visalia, Calif. Serving as directors, from the eleven Western states are F. A. Robb, Coos County Engineer, Coquille, Ore., and Paul Rynning, Jackson County Engineer, Medford, Ore.

Officers and directors of the Educational Division include Bob Glenn, Engineer and Extension Representative, University of California, Richmond, Calif., who will serve as vice president of the Western District. Directors include Dean F. Peterson, Head, Department of Civil Engineering, Colorado A&M College, Ft. Collins, Colo.; Martin P. Coopey, Professor of Civil Engineering, Oregon State College, Corvallis, Ore.; Robert G. Hennes, Professor of Civil Engineering, University of Washington, Seattle, Wash.; Richard H. Meese, Professor, Department of Civil Engineering, University of Washington; and H. B. Blodgett, Department of Civil Engineering, University of Nevada, Reno, Nev.

Serving as vice president of the Western District of the Municipal and Airport Division is Howard S. Kaulbach. Western members on the Board of Directors are Frank W. Wiley, Director, Montana, Aero-



Julien R. Steelman

navics Commission, Helena, Mont.; R. W. F. Schmidt, Manager, Tucson Airport Authority, Tucson, Ariz.; R. W. McLeese, City Engineer, Salt Lake City, Utah; K. L. Chrysler, City Engineer, Great Falls, Mont.; and G. M. Nelson, Director, Wyoming Aeronautics Commission, Cheyenne, Wyo.

Bidders' names to be released by B. of R.

DEPARTMENT of the Interior agencies henceforth will supply the names of prospective bidders on construction contracts to those interested, particularly prospective subcontractors, Secretary of the Interior Fred A. Seaton announced recently.

The Departmental construction program totals about \$250,000,000 a year. The Bureau of Reclamation, the agency with the largest part of the program, has 84 projects actively in construction.

The new procedure is designed to help small subcontractors by providing them with information enabling them to approach prospective prime contractors. The objective is a wider spreading of business opportunity and more favorable bids for the Government.

In the past, the names of prospective bidders have been available only at the office of the contracting officer where they are compiled from the requests made for job specifications.

This arrangement was not convenient for the small subcontractors who could not maintain offices or send representatives to the cities in which the contracting officers are located. The new arrangement will also be helpful to material suppliers.

Commissioner of Reclamation W. A. Dexheimer said the principal contracting officer for the Bureau of Reclamation is Assistant Commissioner and Chief Engineer L. N. McClellan at Denver. He is prepared to supply the information on most Bureau of Reclamation construction bidders upon request to his office.

Court rules against double license fee

IMPORTANT to all licensed contractors in the State of California is a recent decision of the District Court of Appeals which has ruled that contractors licensed by the state are not required to pay for additional permits from cities or counties to conduct business anywhere in the state. The decision was handed down in the case of a licensed electrical contractor of Los Angeles against Culver City and in effect eliminates double taxation from the 75,000 licensed contractors in California. It is estimated that this will eliminate an aggregate payment of almost \$20,000,000 a year in local fees and permits assessed by cities and other political sub-divisions. The Court apparently concurred with the contention of the contractors that when the state has issued a license to a contractor, indicating the qualification of the contractor to do business in the state, it is no longer fair or legal for such a contractor to be subject to further taxation for conducting his business.

Work starts at Ice Harbor

ACTIVE CONSTRUCTION work has now begun at the site of Ice Harbor Dam on the Snake River. Within the last few weeks the contractors have moved heavy equipment to the job and the work of excavating more than 500,000 cu. yd. of overburden has been started. This work will be required to expose bedrock inside the first stage cofferdam. Lights have been installed over the working area to permit night shifts when required.

REPORTS from the COURTS

By **HOWARD S. BURNSIDE**, Low and Burnside
Attorneys at Law, San Francisco—Menlo Park

Municipal sponsorship of industrial development approved

Occasionally a judicial opinion reflects the social or political movements of our dynamic society and, in effect, approves or disapproves the thrust into new areas or shifting of powers so that the new feature of our society may be exploited or discarded. The case at hand has the aspects of a trail-blazer in the economic development of New Mexico.

The Supreme Court of New Mexico gives its stamp of approval to legislation which enables municipalities to undertake industrial development and promotion and pass a tax immunity along to its customers.¹ The Act authorizes municipalities to "acquire, own, lease or sell projects for the purpose of promoting industry and trade by inducing manufacturing, industrial and commercial enterprises" to locate in the state. Tax exemption is afforded the revenue bonds authorized by the Act "and the income from said bonds . . . all lease agreements . . . and revenue derived from any lease or sale by the municipality shall be exempt from all taxation by the state of New Mexico or any subdivision thereof."

The law came up for review of its constitutionality in several respects when the Village of Deming undertook a \$15,000,000 manufacturing project. Under the Act the Village had the power to acquire a project by construction, purchase, gift or lease and to either sell or lease it. The cost of acquiring a project includes cost of construction, architects, attorneys' and engineers' fees, etc.

The advantage which a municipal project has over a privately sponsored project seems apparent. An argument may be made that this is for the public good because it encourages industrial development. A counter argument of economic significance (but of no legal consequence) is that the advantage is gained at the expense of privately financed projects which sustain a pro rata share of the tax load in New Mexico. If the burden becomes sufficiently disproportionate, no doubt private will depart for healthier climes.

The Supreme Court disposes of the tax problems by observing that the

corporation which leases the properties from the municipality will still have to pay income taxes and property taxes, etc. However, no mention is made of the project development organizations which have been booming the construction business throughout the United States. These private organizations cannot compete with tax-immune promoters. Also, the manufacturer who leases from private capital may not be able to compete with the manufacturer who leases from the tax-free municipal owner. Only time will tell if the long range effect is beneficial or detrimental to the city that competes with its taxpayers.

1. *Village of Deming v. Hosdreg Company*, 303 P. 2d 920.

Newly developing liability for designers

The leading case of MacPherson v. Buick Motor Car Co. was decided in New York in 1916 and is well known in the field of torts. Before this case was decided one who purchased an auto could not sue a manufacturer or assembler of a dangerously defective machine for injuries or damages caused by the defect. It was said there was lack of privity—the owner had bought the car from a retailer, not the manufacturer. The MacPherson case held that the owner could sue the party that assembled the auto for using a wheel with a defect that could have been discovered by inspection. This principle spread until now it is generally accepted that an ultimate consumer may sue a manufacturer directly in certain situations involving defective or inherently dangerous articles and is not limited to a suit against the store where the article was purchased.

This principle may now be seen coming into the field of building construction with respect to design. Architects and engineers may expect an enlarged scope of liability in their professions in the next decade.

In the case of *Inman v. Binghamton Housing Authority*, 152 N.Y.S. 2d 79 (New York) a tenant's young child fell from the back porch or steps of an apartment. In a suit brought for the injuries against the architects and the builder it was alleged that the porch was so im-

properly designed and constructed as to create a dangerous and hazardous condition for the users. The defendants entered the defense of lack of privity—that is, they sold the building to someone else, not the plaintiff who was injured. This defense was good in the trial court but the case was reversed on appeal. In the opinion of the appellate court "the imminence of danger" was the proper test to apply and no distinction should be made between personal property such as automobiles and real property in applying the principles involved.

Suppliers and "subs" must rely on joint venture

An agreement or arrangement between two people will establish a legal relationship between them. They are bound to act toward one another in accordance with their agreement. Thus, two or more people often enter into a relationship called a joint venture to accomplish a specific job of construction. It does not always follow, however, that others, such as suppliers, may enforce payment of obligations against a particular joint venturer as though he were a partner.

"There is an important difference in construing a relationship as between the parties themselves, and as between the parties themselves and those who have dealt with one of them."¹

In the case cited the plaintiff who was in the flooring business extended credit in excess of five thousand dollars. According to the evidence he had done business with one of the defendants, a contractor, for a long time and placed reliance on this. He was told, however, that the contractor and the owner were together in the venture of building a series of duplexes. The plaintiff never saw the contracts between the contractor and the owner and sent his statements to the contractor. The reviewing court held the evidence conclusive that the plaintiff relied on the contractor only and did not allow a recovery against the owner as well.

The plaintiff had not followed up on his right to enforce a mechanic's lien in proper time and had to accept only a judgment against the contractor. The simplified rule of this case is that although a joint venture may in fact exist, a materialman can enforce the duties and obligations of this legal relationship only if he relies on it from the outset. This is a harsh rule against third persons when compared to the broader liability of joint venturers in tort cases. The victim of a vehicle accident is not required to know of and to rely on a joint enterprise in order to recover his damages arising from the pursuit of the joint venture.

1. *Hayward's v. Nelson* 299 P. 2d 1013

Gorge Dam contract may be terminated by Seattle

Project is a year behind schedule and conferences are under way to see if the construction contract can satisfactorily be terminated. Statements obtained from the contractor and from Seattle City Light show a wide difference of opinion as to the reason for the delay.

NEGOTIATIONS are under way which could result in terminating the contract of the Gorge High Dam which is another unit in the Skagit River development by the City of Seattle. The contract is held by Merritt-Chapman & Scott and Savin Construction Co., a joint venture, and the city interests are represented by the Board of Public Works and the City Council.

Contract for the project was awarded December 8, 1954, and was scheduled for completion February 4, 1959. At the present time, according to the City of Seattle, the project is about one-third completed and the contractor has been paid approximately \$6,000,000 for the work accomplished. Work is continuing during the present period of discussion relating to possible termination of the contract.

Briefly, the Gorge High Dam project consists of building a new dam a few hundred feet downstream from the existing Gorge Diversion Dam to replace this diversion structure and to provide more head for the generators in the Gorge Powerhouse. Foundation conditions have presented a major engineering and construction problem. The river channel at the site includes a considerable depth of sand, gravel and boulders through which water escaping under and around the present diversion dam flows in a considerable volume. As a result, the engineers designed and included in the project plans the establishment of an ice dam or a frozen curtain between the old and the new structure, to facilitate excavation of the site to bedrock and at the same time protect the old dam. Details of this ice dam, its design and operation were reviewed in **Western Construction** November 1956, page 30.

On February 14, Seattle City Light made public a statement relating to negotiations being held with the contractor. The release included the following paragraphs:

City Light's statement

"The work is now about a year behind schedule and the Department is dissatisfied with progress of the project. The contractor submitted a proposal which Superintendent Paul J. Raver said he could not personally recommend to the Board of Public Works and the City Council who will determine what action is to be taken.

"If the work were to proceed without any further delays, it would be the fall of 1959 before it would be completed. The delay is important to City Light as its commitment to supply power for the two Bethlehem Pacific Coast Steel Corp. electric furnaces was based on having the additional Gorge power available in 1959.

"Work on the project is about one-third completed and the contractor has been paid approximately \$6,000,000 for the work done. Work is continuing while the discussions are proceeding. Current progress is slow because of the winter weather and because leakage through the ice barrier has stopped work on excavation for the first-stage construction of the dam.

"Difficulties were experienced with the contractor almost as soon as work commenced. Several work schedules furnished by the contractor to the city were not approved, and the contractor's approach to various phases of the work was regarded as unrealistic. The city cautioned the contractor that the contract completion date could not be met unless the contractor manned the job more adequately and adhered more strictly to schedules. Work on the project dragged to the point where the contractor fell behind the original schedule approximately one year. At this point the city notified the contractor and the surety on its bond that substantial improvement would have to be shown. Mr. Savin, of the Savin Construction Corp., came to Seattle in response to this letter and assured the city that action would be taken immediately to correct the deficiencies and to accelerate the work. The contractor did, in fact, employ a new project manager, and it appeared that the project would move more rapidly and efficiently toward completion. However, after a short time, the project appeared to bog down again.

"The ice dam was complete enough to permit excavation work to commence downstream from it in October 1956. There remained only a few 'hot spots' which appeared would shortly be frozen. Early in January 1957 some distance downstream from the ice dam a boil of water developed which indicated that water was escaping through a breach in the ice dam some 50 to 80 ft. below the bed of the river. To correct this condition, excavation was interrupted Jan. 5, 1957, and pit downstream of the ice curtain was flooded, to equalize the pressure. Since that date gradual improvement has been noted in the condition of the ice dam.

(Continued on page 92)

Contractor's statement

Western Construction has secured an authorized statement directly from the construction department of Merritt-Chapman & Scott. This statement follows.

"Problems that have developed on construction of Gorge High Dam are a direct result of a failure of engineering specifications and methods under which the Seattle Department of Lighting directed that construction operations be conducted and are not the fault of the contractor. Delays that have occurred because of this failure are the direct responsibility of City Lighting, and not of the contractor.

"Merritt-Chapman & Scott can only regard the statement issued by City Light as an attempt to shift responsibility from itself to the contractor.

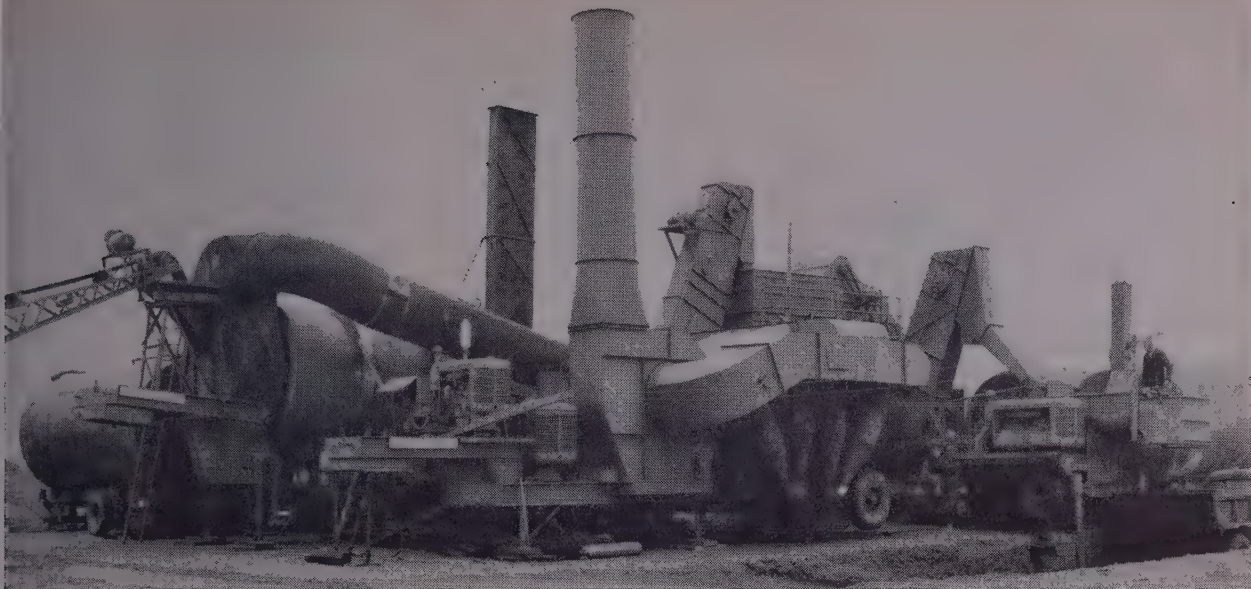
"We do not feel that a public debate offers any solution for the situation, and under no circumstances would have initiated such debate. In view of City Light's apparent attempt to divert responsibility from itself by attempting to discredit the contractor—we now feel compelled, however, to point out these facts.

"Engineering specifications have been the direct responsibility of City Lighting, and all construction operations by the contractor have been in accordance with these specifications.

"In specifications for construction of the dam, City Light directed that a 'freeze curtain' be established to divert the Skagit River from the dam site. Under terms of the contract, City Light assumed complete engineering responsibility for the structural adequacy of this 'freeze curtain.' (A 'freeze curtain' is a novel technique to solidify subsoil by refrigeration preparatory to excavation, and had never previously been employed in similar circumstances involving an operation of this scope.)

"The 'freezing' operation was carried out by the contractor exactly as specified, but without the result

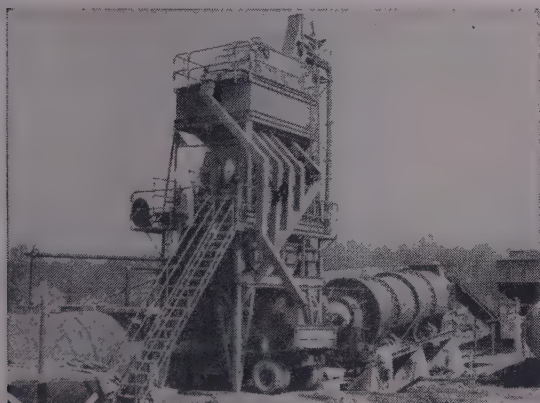
(Continued on page 92)



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Gorge Dam-City Light

(Continued from page 90)

"During this period the contractor has on several occasions been ordered by the city to take measures designed to accelerate the freezing of the ice curtain. The contractor has repeatedly refused to comply with these instructions and has challenged the city's authority under the contract to issue such instructions. At a meeting in Seattle on Jan. 14, 1957, the contractor's representative, Mr. Savin, suggested that since the city was dissatisfied with the progress of the project, the contractor would be willing to negotiate a mutual termination of the contract on a reasonable basis. Since the city has committed itself for the additional power which will be available upon completion of the project, and since it appeared that the project was being further delayed by the contractor's refusal to follow its instructions and to prosecute the work diligently, the city requested the contractor on Jan. 25 to submit a proposal which would provide a basis for mutual termination.

"On Jan. 30, 1957, the contractor made a written proposal for mutual termination which would give the contractor its costs to date plus a profit and would provide for the sale of the equipment purchased by the contractor for this project at approximately its original cost.

"Dr. Raver stated that on Feb. 8 he wrote the contractor advising that he could not personally recommend any proposal which provided as a basis for mutual termination for payment of the costs incurred by the contractor on the project rather than the sums owing to the contractor in accordance with the terms of his contract.

"Dr. Raver further said that he has invited discussions with the contractor to determine whether there is an acceptable formula for mutual termination."

Late news on Gorge Dam

On March 16 word was received from Seattle City Light that Mr. Raver and Mr. Savin had agreed to call in refrigeration engineers to study the possibility of lowering the temperature of the brine below the present minus 20 deg. F. It was hoped that the engineers would find a plan that would effect complete closure and would be satisfactory to both City Light and the contractor. Excavation for the dam foundation has been suspended but other work on the project is continuing.

THE EDITOR

Gorge Dam-contractor

(Continued from page 90)

anticipated by City Lighting. Preparatory to actual freezing, and at City Light's request, the contractor drove approximately 150% more brine shafts than were originally specified, and during the course of the freezing operation, the contractor reduced brine temperatures to a point considerably lower than called for in the original specifications—still without the desired result. The Skagit River breached the 'freeze curtain,' forcing a suspension of excavation. This failure was one of engineering design—which is entirely the responsibility of City Light rather than execution on the part of the contractor. Such delays as have occurred because of the failure of the 'freeze curtain' are the direct responsibility of City Lighting, and not of the contractor.

"City Light then requested that the freeze point be further reduced. Since this could not be done without threat of damaging the contractor's already expanded refrigeration plant, City Light was requested to assume responsibility in the event of loss.

"In subsequent consultations on this point, which are still continuing, the contractor indicated readiness to continue under terms of the original contract, with such modifications as the circumstances require. The contractor also suggested that it was prepared—if City Light so wished—to terminate the contract by mutual agreement. In the latter event, the contractor advised that it was prepared to cooperate further in every way possible, including the sale to City Light of plant and equipment now at the dam site."

PG&E to double-barrel natural gas line

PACIFIC GAS AND ELECTRIC CO. plans to make its Super Inch natural gas transmission main a double-barreled operation by the end of this year, it said when an application for that purpose was filed with the California Public Utilities Commission.

Since the original 502-mi. length of 34-in. steel pipe was placed in operation late in 1950, PG&E has been adding paralleling sections between the line's southern end, on the Colorado River side of San Bernardino County, and its northern terminus near Milpitas, Santa Clara County.

Only 138 mi. of single sections remain. The CPUC already has authorized parallel pipelines for 64½ mi. of this length and PG&E requested authorization for the remaining 73½ mi., which, with compressor installations, represents an investment estimated at \$9.3 million.

Bur. of Recl. to make restudy of Snake River

THE BUREAU OF RECLAMATION will make a study in greater detail of the feasibility of the Pleasant Valley site for multipurpose development. When this study is completed it will be submitted for further comments to the Federal Power Commission.

The Pacific Northwest Power Co. has applied to the FPC for a license for the Mountain Sheep and Pleasant Valley Dam sites. The two sites are located in the Hells Canyon reach of the Snake River immediately upstream from its confluence with the Salmon River and on the border of Idaho and Oregon. Secretary Seaton said that since the current flood control plan of the Corps of Engineers indicates the need for development of additional flood control capacity on the Snake River he instructed the Bureau of Reclamation last September to evaluate data available concerning the potentials of the Pleasant Valley site for the joint major purposes of flood control and power development.

The special report prepared by the Bureau, contemplating a dam backing water upstream to the Oxbow site, shows that the reservoir thus developed could provide 1,300,000 ac. ft. of firm flood control capacity and a total storage capacity of 2,570,000 ac. ft. The appurtenant power plant would provide for 1,250,000 kw. of generating capacity.

Analyses of the data contained in the special report suggests that "it may be economically feasible to construct such a multipurpose dam at the Pleasant Valley site and, if so, to obtain flood control and power generation on a greater scale than that envisaged by the application for license for the Pleasant Valley site pending before your Commission," Secretary Seaton said in a letter to Jerome K. Kuykendall, chairman of the Federal Power Commission.

Evaluation of the Pleasant Valley Unit in the special report presumes the development of a dam and reservoir project downstream at Mountain Sheep and the existence of the Brownlee Dam and Reservoir upstream.

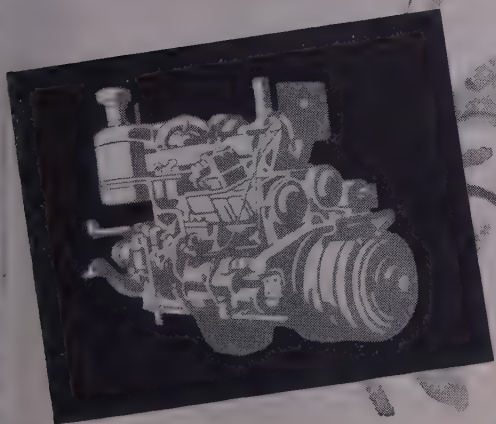
Under these conditions, Secretary Seaton said, the Pleasant Valley Unit would have an adverse effect on the resident fishery, but no significant effect on the anadromous species, principally salmon, ascending the river from the sea.

"In the light of the possible values of the Pleasant Valley site for multipurpose development, I am requesting the Bureau of Reclamation to study the feasibility of such development in greater detail and report its recommendations expeditiously," Secretary Seaton said.

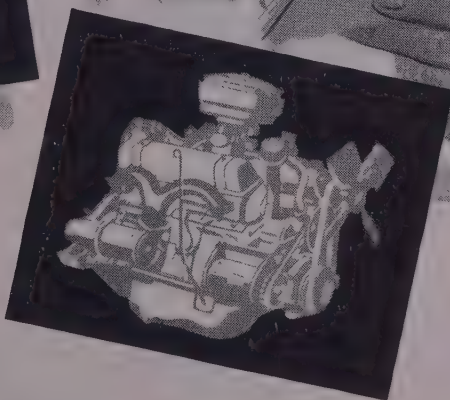


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Hawaii Report

By SYD LOVE
Honolulu, Hawaii

FIRST OF ITS KIND—Hawaiian Trust Co.'s new \$1,500,000 building was scheduled for completion April 1. It is the first in the Territory to feature bolted structural steel. General contractor was Pacific Construction Co. of Honolulu. The architectural firm was Wimberly & Cook, Honolulu, in association with Paul D. Jones. Structural engineer was

Richard R. Bradshaw, ex-Honolulu resident who makes his headquarters in Van Nuys, Calif. In the bolted steel construction method, high tension bolts are used to connect the various members. The bolts develop such enormous pressures that rigidity is formed by friction between the surfaces rather than by the shear in the bolts. The 8-story structure is the

tallest office building in Honolulu. It has a penthouse and basement. It rests on a 10-in. slab of concrete. The foundation was poured over a water-proof membrane which was spread over a thinner concrete slab. As a result, the basement, so near to sea level and the water-table, is expected to be watertight.

PROJECT STARTS—Concrete pilings were scheduled to be poured and tested in March for the \$3,500,000 Sears building. The piles were to be cured only one week. C. W. Watson, general superintendent for Hawaiian Construction and Dredging Co., says the normal curing period is 30 days. The 3-level Sears building is the main structure of a \$25,000,000 shopping center in Honolulu. The project is being designed by John Graham and Co., of Seattle, Wash. and New York.

NAVY JOB DONE—Completion of the \$10,000,000 central power plant for the Navy at Subic Bay, Philippine Islands, is scheduled for April. The project, in which Hawaiian Construction and Dredging Co. of Honolulu is participating, was dedicated in February. It is supposed to be the largest power plant designed especially to use heavy fuel.

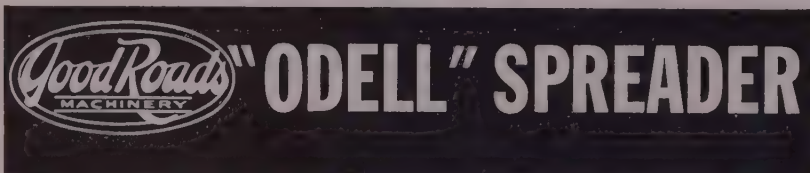
LOW BID IS HIGH—The Tower Construction Co.'s., of Honolulu, bid of \$1,034,000 for the new Wahiawa Community Hospital on Oahu was too high. Three other bidders were over \$1,000,000, too. The hospital has \$900,000 with which to build.

HARBOR BOND ISSUE ENDORSED—The Honolulu Chamber of Commerce has endorsed legislation to authorize a \$12,000,000 bond issue to construct a passenger-cargo terminal in Honolulu Harbor.

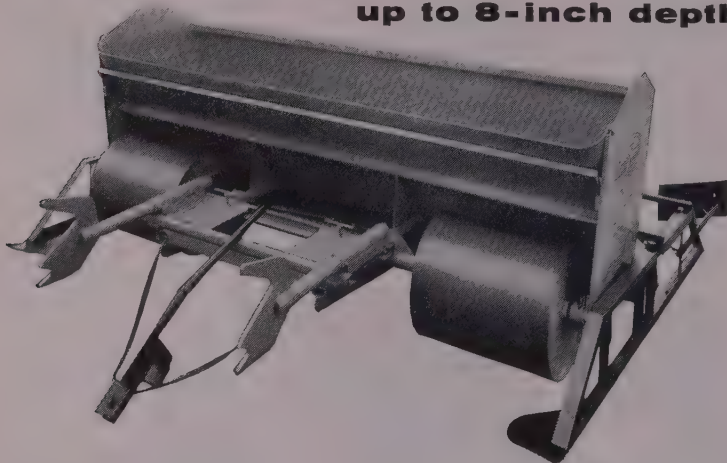
ENGINEERS NEEDED—The Territorial Department of Public Works is making a strong pitch to lure young engineers onto its payrolls. Tours of offices and shops and field trips are being sponsored for University of Hawaii students.

TUNNEL NEARLY COMPLETED—The \$3,000,000 Nuuanu Pali Tunnel Project on Oahu is scheduled for completion in April or May, depending on the rainy season. One tunnel is 1,000 ft. long, the other 500. J. M. Tanaka of Honolulu, is the builder.

MEDICAL CENTER PLANNED—Industrialist Henry J. Kaiser wants to build a \$1,000,000 executives' health center on his Hawaiian Village Hotel grounds in Waikiki. A construction date has not been set. Emphasis would be on preventive medical care, such as in Kaiser Foundation hospitals on the Mainland. It would have seven stories. The City Planning Commission is examining the proposal.



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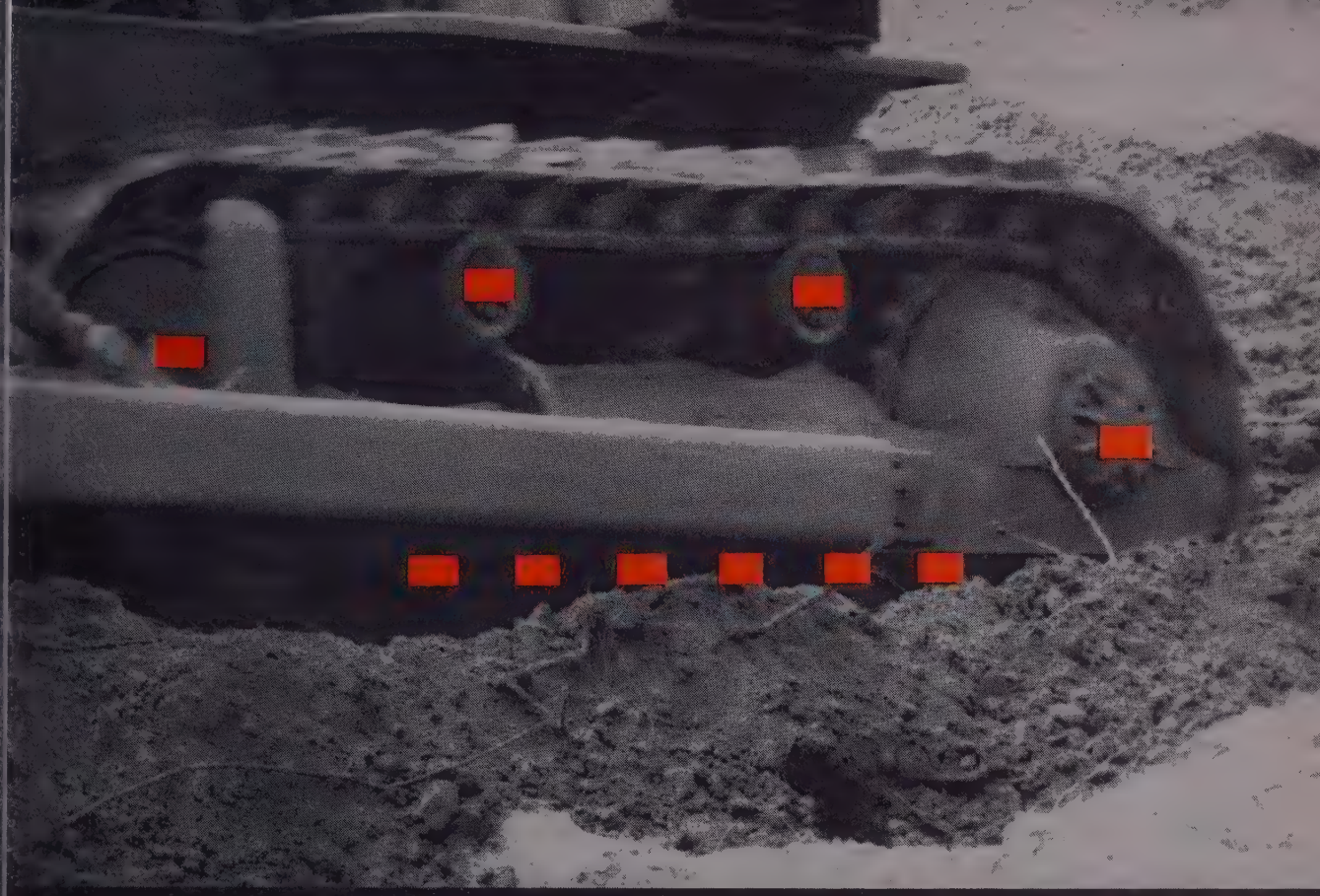
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Tilting tower for guided missiles

A UNIQUE guided missile service tower has been unveiled by the Noble Company, Oakland, California, designers and builders of the steel structure.

Built for Patrick Air Force base near Orlando, Florida, the Air Force's guided missile test center, this tower stands 10 stories high (120 ft.), has a base span of 24 ft., weighs 340,000 lb. and moves under its own power on two parallel sets of standard gage railroad tracks. In tests conducted by the Army Engineers, who supervised its construction, the tower was tilted from normal vertical position to horizontal by self-contained motors, and then raised back to its normal position again by the same power source.

Raising and lowering of this tower is an impressive project, considering the mass of equipment and machinery in and on the structure, which moves with it. For example, there are five elevator work platforms spaced at vertical intervals, each one capable of holding a 2,500-lb. load; one hammer-head crane and trolley with two 15-

ton hoists; and two passenger elevators.

Control of the tower and its movements is held by a single individual, who operates it from a console panel (a flying bridge) atop the base section.

Underneath the base section there are four rail trucks, each with its own individual motor drive. The complete tower unit travels on rails to and from the missiles, and with the missiles to position them on the firing pad.

Tilting of the mast is provided for both protection against hurricanes and for ease of assembly and disassembly. It can be assembled in the field in 3 to 5 days.

This unit is used to handle large guided missiles into place for firing and to provide access to all parts of the missile, for servicing and adjusting after the missile is placed into the firing position.

This is the only type of stand now in use with a tilting mast, and the only one in use with completely movable work platforms. Each of these five platforms provides 360 deg.-

access to the missile, and each platform moves vertically to any point desired.

About 11 minutes is required to raise the mast to vertical.

Project engineer on this tower is William H. Griffith, who was responsible for the original mast design when he adapted the idea from an earlier project he developed for use in the drilling operations in oil fields.

Trinity project

(Continued from page 77)

ceived Dec. 20, 1956. The low bidder was a joint venture (see table) submitting a figure of \$36,664,550 which was considerably higher than the estimate. The proposal was taken under advisement by the Bureau and evaluated in relation to increases in construction costs since the estimate was made, combined with the uncertainties of a major construction undertaking which would extend through the next five years. Further the location of the tunnel and the entire project is not particularly convenient as to sources of labor, access and community facilities. Contract was awarded late in February

Characteristics of the tunnel

From portal to portal the Clear Creek tunnel is 10.8 mi. long. Inside diameter will be 17 ft. 6 in. Plans provide for a 9-in. minimum concrete lining in the unsupported section and the same 9-in. minimum thickness of concrete where steel supports are required. Total excavation in tunnel, according to the bidding schedule, is 675,000 cu. yd. The bidding schedule also refers to 8,000,000 lb. of steel supports as well as 1,300 mbm. of timbering and 12,000 lin. ft. of bolts for supporting the tunnel roof as required. Concrete for the tunnel lining totals 166,000 cu. yd.

The profile of the ground surface along the tunnel line indicates the possibility of some short adits or shafts to permit opening up the work with more than the two portal headings. However, the major length of the bore will have to be driven from two headings.

Clear Creek power plant

At the end of the long tunnel will be one of two major power developments on the project. The drop from the tunnel portal into Clear Creek will provide a designed head of 56 ft. for power development. The plan



RISING into position, this 120-ft. tower can transport, tilt upright and provide servicing platforms for various types of guided missiles. Self-contained power units move the tower on two parallel sets of standard railroad rails.

at this location will include two generators with a capacity of 65,000 kw. each.

The diverted water flowing through the Clear Creek power plant will enter Clear Creek which is a tributary of the Sacramento River. At this point in the project the transmountain diversion of surplus will have been accomplished, but another tunnel and power drop (see map) will not only add to the power revenue, but will also deliver water into the Sacramento River upstream from the existing Keswick Dam and power plant.

To re-regulate the flow from the

trans-mountain tunnel, as well as the natural flow of Clear Creek, Whiskeytown Dam will be built about 2½ mi. southeast of the village by the same picturesque name.

This dam, as now planned, will be another earth and rock-fill structure having a volume of 4,140,000 cu. yd. and a height of 278 ft. above streambed. Crest length will be 2,150 ft. and spillway capacity will be 30,250 sec. ft. Storage capacity of the reservoir will be 250,000 ac.-ft. covering about 3,250 ac.

From the reservoir formed behind Whiskeytown Dam a 2.9-mi. tunnel will pierce the divide between Clear

Creek and the main Sacramento River. This will be an 18.5-ft. diameter tunnel having an effective flow capacity of 3,330 sec. ft.

Spring Creek power plant

Discharge from the tunnel will be delivered to the Spring Creek power plant. This plant will have a design head of 569 ft. and will contain power units of 71,500 kw. each. Discharge per turbine will be 1,800 sec. ft. Water discharged through the Spring Creek power plant will go practically directly into a reservoir behind Keswick Dam.

Large contract awards in the West

ARIZONA

Tanner Bros. Contracting Co., Phoenix, submitted a low bid of \$337,237 for grading and surfacing the Prescott-Ashford Highway in Yavapai County. **Western Constructors, Inc.**, of Phoenix submitted two low bids for road and construction work in Cochise County. A \$225,095 low bid for grading, surfacing and construction of underpass, city of Lowell, and \$225,898 for grading, draining and surfacing the Wilcox-Chiricahua National Monument Highway near the town of Dos Cabezas. **San Xavier Rock & Sand Co.**, Tucson, submitted a low bid of \$387,607 for 7¼ mi. of grading and surfacing the Tucson-Benson Highway in Pima County.

CALIFORNIA

Baldwin Contracting Co., Inc., and **H. Earl Parker, Inc.**, of Marysville submitted a low bid of \$2,400,697 for 3.6 mi. of grading, surfacing and construction of one bridge and one bridge to be widened in Auburn, Placer County. **Fredrickson & Watson Constructing Co.**, Oakland, submitted a low bid of \$3,144,444 for 9.4 mi. of grading, surfacing and construction of three undercrossings, west of Santa Barbara in Santa Barbara County. **Guy F. Atkinson Co.** of South San Francisco received a \$2,695,357 contract for 4.2 mi. of grading and surfacing and construction of three bridges in Mendocino County. **Ben C. Gerwick, Inc.**, and **J. H. Pomeroy & Co., Inc.**, of San Francisco submitted a low bid of \$2,309,498 for construction of detours, a combination reinforced concrete and structural steel bridge and bridge approaches to be graded across Petaluma Creek, near Black Point in Marin and Sonoma counties. A low

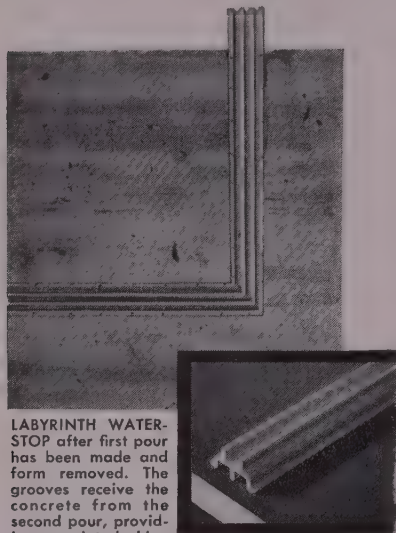
bid of \$2,254,719 was submitted by **Cox Bros. Construction Co.** and **J. E. Haddock, Ltd.**, of Stanton for 6.6 mi. of freeway, together with frontage roads and ramps to be graded and surfaced and four bridges to be constructed on Rt. 185 in Orange County. **Granite Construction Co.**, Watsonville, received a \$1,396,039 contract for 7.9 mi. of grading and surfacing north of Salinas River Bridge of King City, Monterey County. **Lord & Bishop, Inc.**, of Sacramento submitted a low bid of \$971,926 for the substructure for a portion of a bridge to be constructed across the Sacramento River in Solano and Sacramento counties. **M. W. Brown of Redding** submitted a low bid of \$793,423 for earthwork, structures and surfacing the Trinity River Bridge to Trinity Dam, Trinity River Div., Central Valley Project. **Charles MacClosky Co.** of Gardena received a \$497,695 contract for grading, surfacing and constructing two bridges and a flood control channel on San Bernardino Freeway in West Covina, Los Angeles County. **H. Earl Parker, Inc.**, of Marysville submitted a low bid of \$243,659 for 2.4 mi. of grading and surfacing and drainage facilities to be constructed on Rt. 65, El Dorado County. **B. C. Richter Contracting Co.**, Oroville, received a \$224,771 contract for grading, surfacing and construction of one bridge southwest of Redding in Shasta County. **Brighton Sand & Gravel Co.**, Perkins, submitted a low bid of \$242,150 for 1.9 mi. of grading and surfacing in Sacramento County. **Healy Tibbitts Construction Co.**, San Francisco, submitted a low bid of \$211,265 for repairing two bridges in San Mateo County. A low bid of \$2,658,816 was submitted by **Thompson Construction Co.** of Inglewood for 1.5 mi. of grading, surfacing and construction of five bridges, one pedestrian under-

crossing and one pumping plant and five retaining walls to be constructed all to provide a six-lane freeway in the city of Los Angeles. **Westway Engineering Co., Inc.**, and **L. M. Preece & Union Construction Co., Inc.**, of Los Angeles submitted a low bid of \$634,239 for 2.3 mi. of grading and surfacing west of Refugio in Santa Barbara County.

COLORADO

Harrison Construction Co. of Denver submitted a low bid of \$563,139 for grading, structures and surfacing in Montrose County. A low bid of \$699,997 was submitted by **Pioneer Construction Co.**, Pueblo, for 10.2 mi. of grading, structures and surfacing between Delta and Whitewater in Delta and Mesa counties. **Peter Kiewit Sons' Co.**, Denver, submitted a low bid of \$285,972 for construction of structures on S. H. No. 185, Denver and Arapahoe counties. **Lawrence Construction Co.**, Littleton, submitted a low bid of \$319,999 for construction of bridge and approach at the 6th Ave. interchange on the Valley Highway, city and county of Denver. **Monaghan & Smith Construction Co.** of Darby submitted a low bid of \$224,762 for construction of two overpasses, Denver and Barr Lake on S. H. No. 2, Adams County. A low bid of \$694,273 was submitted by **N. W. Engineering Co.** of Denver for grading, structures and concrete pavement near Gilcrest on S. H. No. 3 in Weld County. **Schmidt Construction Co.** of Arvada submitted a low bid of \$328,215 for 4.2 mi. of grading and structures in the city and county of Boulder. **Corn Constructors, Inc.**, of Grand Junction submitted a low bid of \$105,627 for grading and structures at Gateway on S. H. No. 141 in Mesa County. **C. L. Hubner Co.**, Denver, submitted

Waterstop in place in seconds!



LABYRINTH WATER-STOP after first pour has been made and form removed. The grooves receive the concrete from the second pour, providing an interlocking joint.

Just a few seconds were needed to nail this LABYRINTH WATERSTOP to the form... just a few seconds and water seepage worries were over before they could ever have a chance to start.

LABYRINTH WATERSTOP forms a waterproof bond between two pours. The corrugated ribs bond firmly with the concrete.

LABYRINTH WATERSTOPS are made of flexible polyvinyl plastic... that has superior weathering qualities, is not affected by temperature changes and chemical activity.

LABYRINTH WATERSTOPS are easy to work with, can be cut to any desired length. "L" and "T" joints can be welded with just a hot knife. Find out now how your costs can be cut... and end your seepage problems.

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a low bid of \$133,190 for grading, structures and surfacing 3.9 mi. of S. H. 96 in Kiowa County.

IDAHO

J. H. Wise & Son, Inc., Boise, received a \$469,100 contract to construct a Hot Cell area in the Aircraft Nuclear Propulsion area of the AEC's National Reactor Testing Station. Andrew L. Gladney of Kentfield, Calif., received a \$144,904 contract for extension of railroad from CPP Junction to NRF Area at the National Reactor Testing Station. Arrington Construction Co., Inc., of Idaho Falls submitted a low bid of \$398,635 for construction of a radioactive disposal system at the Naval Reactor Testing Station. Paul Harde-man Inc. of Los Angeles, Calif., is low bidder at \$3,392,000 for construction of the expended Core Facility at the Naval Reactor Testing Station. Mel Brown of Idaho Falls submitted a low bid of \$157,411 for construction of laterals in two areas of the Ma-chaud Flats Project.

MONTANA

Witty & Cowan, Great Falls, received a \$1,483,400 contract for construction of a new East Junior High School in Great Falls. Misco-West Coast, Seattle, Wash., is low at \$1,056,383 in rebidding for construction of the Helena Valley pumping plant at Canyon Ferry. McCormack Construction Co. of Pendleton, Ore., submitted a low bid of \$2,220,293 for construction of a "TM Site 178" military installation near Lewistown.

NEW MEXICO

Armstrong & Armstrong of Roswell received a \$1,811,361 contract for 7.9 mi. of grading, surfacing and one structure on the Socorro-North road in Socorro County. A \$1,866,829 contract was received by Metropolitan Paving Co. of Oklahoma City, Okla., for 3.8 mi. of grading, surfacing and structures on the Canoncity-East road in Santa Fe County. Haake Construction Co., Inc., of Santa Fe received a \$156,055 contract for 9.5 mi. of grading and surfacing the Zuni-Ramah road in McKinley County. O. D. Cowart of Albuquerque received a \$1,213,019 contract for 6.1 mi. of grading and surfacing the Valencia-Bernalillo County Line-East road in Bernalillo and Valencia counties. Jack Adams of Santa Fe received a \$559,587 contract for 2.7 mi. of grading and surfacing the Portales Urban road in Roosevelt County. A \$571,386 contract was received by Skousen Construction Co. of Albuquerque for construction of

21.6 mi. of highway in Valencia and McKinley counties.

NEVADA

Wells-Stewart Construction Co. Inc., of Las Vegas received a \$1,075,791 contract for the construction of a portion of the State Highway System in Clark County near Las Vegas.

OREGON

A. T. Fox of North Bend submitted a low bid of \$1,206,880 for construction of major naval facilities at Coos Head, 95 mi. north of the California-Oregon State Line on the Coast. E. A. Kruse, Yoncalla, received a \$398,465 contract for 8 mi. of grading and oiling the Pauline Highway in Crook County. Peter Kiewit Sons' Co. of Vancouver Wash., received a \$688,986 contract for 6.1 mi. of grading the Pacific Highway north of Grants Pass in Josephine County. Babler Bros., Inc. Portland, received a \$118,927 contract for 31.9 mi. of oiling the Central Oregon and Lakeview-Burns Highways in Lake and Harney counties. Rogers Construction Co. of Portland received a \$404,452 contract for 2.1 mi. of grading and paving a section of 122nd Ave. east of Portland in Multnomah County. E. H. Itschner of Molalla received a \$108,937 contract for 1.5 mi. of grading; 12 mi. of oiling the Pendleton-Adams section of the Oregon-Wash Highway in Umatilla County. A \$103,560 contract was awarded to Valley Construction Co. of Portland for the Mohawk River Bridge over the Eugene-Marcola Highway near Springfield in Lane County.

UTAH

Fisher Contracting Co. of Phoenix, Ariz., submitted a low bid of \$783,796 for 21.1 mi. of grading and surfacing in San Juan County. L. A. Young Construction Co. and Verna Sand & Gravel Co. of Richfield received a \$312,965 contract for construction of bridge and approaches at Veyo in Washington County. W. W. Clyde received two contracts for roadwork in Salt Lake and Grand counties: \$612,336 for construction of Beck's Spring Overpass in Salt Lake County and \$348,465 for 2.9 mi. of grading, surfacing and construction of one bridge in Grand County.

WASHINGTON

P. J. Anderson & Sons of Seattle received a \$280,232 contract to construct 5 mi. of highway from Stimson road to the Stillaguamish River

and bridging the river in Snohomish County. **James I. Barnes Construction Co.** of Seattle received a \$1,800,-128 contract for construction of Hospital Building on Larson Air Force Base in Moses Lake. **Northwest Construction Co.**, Seattle, received an \$828,246 contract for 4.2 mi. of grading, surfacing and construction of one bridge on highway No. 2 in King County. A \$119,965 contract was received by **John E. Alexander** of Seattle for construction of one bridge on highway No. 1, Martin Way in Thurston County. **Lake City Gravel & Materials, Inc.**, of Seattle received a \$102,026 contract for 1.6 mi. of grading and surfacing the Pe Ell-McDonald Road in Lewis County.

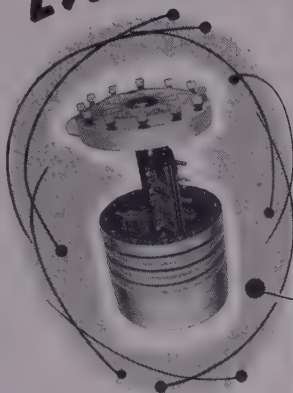
WYOMING

Northwestern Engineering Co., Denver, Colo., submitted a low bid of \$243,423 for construction of runway extension, Natrona County Airport in Casper.

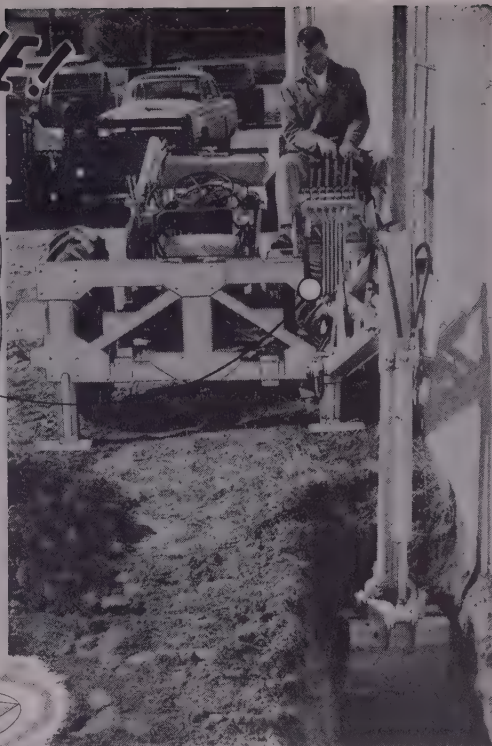
ALASKA

Scheumann & Johnson of Seattle, Wash., submitted a low bid of \$815,-915 to the city of Ketchikan for construction of the Ketchikan Lakes hydroelectric project in Southeastern Alaska. **Birch-Green Co.** of Seattle, Wash., received a contract of \$1,238,193 for construction of taxiway shoulder stabilization on Elmendorf Air Force Base. **Wayne Construction & Engineering Co.**, Seattle, Wash., submitted a low bid of \$1,893,023 for design, manufacture, shipment and engineer services for erecting NIKE antenna covers. A low bid of \$7,246,724 was submitted by **Manson-Osberg Construction Co.** of Seattle, Wash., for construction of first two of 6 DEW-line (Distant early warning) facilities to be built along a 1,000-mi. stretch of the Aleutian Islands. A \$447,900 contract was received by **Reed & Martin** of Fairbanks for construction of an addition to the operations building at Campion Air Force Station and for construction at Galena Airport of Navajds, Tacan facilities. **Chris Berg, Inc.**, of Seattle, Wash., submitted a low bid of \$943,600 for construction of a White Alice communications facility at Sitkinak Island for the Alaska District, Army Corps of Engineers. The work involves construction of a tower foundation and erection of the tower, an equipment building and access road, area grading and installation of antennas and feed-horn towers. **Reed & Martin, Inc.**, Fairbanks, submitted a low bid of \$2,219,561 for construction of ammunition storage facilities at Ladd Air Force.

EXCLUSIVE!



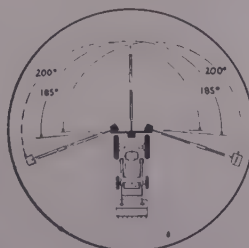
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ROTARY BOOM
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FLUSH DIGGING... with a 200° continuous operating arc... that's what the new Davis Model 210 does that no other machine can do. It will dig flush alongside buildings, fences, and other installations where you normally have to dig by hand! The exclusive hydraulic rotary boom swing cylinder and interchangeable mounting points on the frame are the key to its profit-making operation. The simple, compact cylinder with only one moving part replaces conventional swing rams, cables, and the inherent limitations as employed by all other back-hoes. The entire mast and boom assembly can be moved from center to either side for flush digging. It has smooth starts...cushioned stops, and because hydraulic pressure is constant, it permits a steady, controlled swing all the way around. This, plus all the other features that have made Davis America's largest selling back-hoe — right-angle operation, rotary seat, vertical stabilizer, 13' depth, and **7,000 pounds of breakaway** mean more jobs...more profit...less time on each job. Get complete information on both the new 210 and the popular 185 Davis Back-hoes today. Available for most popular tractors and 1-ton or larger flat-bed trucks.



PROVIDES 200° CONTINUOUS OPERATING ARC

This diagram illustrates the degrees of continuous operating arc from each of the three mounting locations — 200° when side mounted, or 185° center mounted. Has no pins to change or cable to break

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416 hp pusher loads 25-yd. Tournapull® in 40 sec

The construction industry's most powerful rubber-tired pusher, the 416 hp LeTourneau-Westinghouse Twin-C*, set records for speed, mobility, and power recently when it worked with 2 big 25-yd. Model B Tournapulls on an 840,000-yard grading job for Nick Pinello of Colorado Springs. The job involved leveling the site of a new shopping center in a suburb south of

the city. On this contract, scrapers moved tight shale and clay, with some gravel—checked at 15% in-place moisture, on the average.

Pinello had L-W scrapers in two other work teams on the project. Four 18-yd. self-propelled C Tournapulls were push-loaded by a crawler as were three crawler-drawn 23-yd. scrapers. (Chart shows performance of all teams.)

With powerful 416 hp dual-engine Twin-C behind the big 25-yard Tournapull, each Tournapull was heaped with material in less than 40 sec.

Twin-C's air-actuated, constant-mesh transmissions, with torque converter drive 40-ton pusher at speeds up to 2 mph. Work records show it could easily handle up to 4 big scrapers working 1½-mi. round-trip hauls.

Production for all teams averaged 14,000 yds. in an 8-hour day. Work teams "B" and "C" worked shorter hauls than average hauls (1,200'), but moved 18,000 yds. Pinello finished 3 days ahead of schedule, without wearing his machines to capacity.

TOTALS OF TEAM PERFORMANCE

Here are team figures for one 9-hr. day's production of all scrapers and pushers on Pinello's spread:

Team 1: 2 B Tournapulls (25-yd.) with Twin-C Pusher.

Cycle time	3 min.
Trips per hr.	16
Average load	20 yds.
Hourly output per "B"	320 yds.
One-Way haul	1,200'
Load	40 sec.
Haul	60 sec.
Dump	20 sec.
Return	60 sec.
Cycle time	3 min.
Team daily total	5,000 yds.
Output per scraper:	2,500 yds.
1,200' haul	

Team 2: 4 C Tournapulls (18-yd.) with two 190 hp crawler-tractor pushers.

Cycle time	3 min.
Trips per hr.	16
Average load	12 yds.
Hourly output per "C"	192 yds.
Approximately same haul and cycle time as Team 1	
Team daily total	6,000 yds.
Output per scraper:	1,500 yds.
1,200' haul	

Team 3: 3 Scrapers (23-yd.) drawn by 190 hp crawler-tractors with a 190 hp crawler-tractor pusher.

One-Way haul	750'
Team daily total	3,000 yds.
Output per scraper:	1,000 yds.
750' haul	

Tires compacted spread material

The operation was a balanced cut-and-fill job. Maximum cut was 45', maximum fill, 30'. Soil was fairly tight. With big tires on scrapers aiding in compaction, and sheep's foot roller for final compacting, Pinello had no trouble getting 90% Proctor density.

Production on steady level

Pinello ran this 840,000-yd. grading job with the precision of an 8 o'clock. Production was good and steady above average at all times.

When Twin-C push-loads this big B Tournapull, a total of 709 hp is concentrated in forward thrust. Machines shown here were among 10 L-W units used by Nick Pinello in moving

840,000 yds. for a new shopping center near Colorado Springs, Colo. Twin-C and 2 "B's" worked as a team. Loading time in tight shale-clay-gravel was only 40 secs.



Hauling to fill, B Tournapull takes advantage of high speed. Rig completed $\frac{1}{2}$ -mi. cycle in 3 min. Bank at right is part of fill. At this stage, material moved by Pinello's scrapers was used to dress edge of fill.

An Adams heavy-duty grader was used by Pinello for haul-road maintenance and leveling of fill area. High-speed grader was able to keep up with production of three "B's", four "C's", and three L-W tractor-drawn scrapers.



machines sidelined for costly repair work. He educates his operators to go after the steady profitable production.

Men, machines well managed

Besides good men and good machines, a third factor deserves credit for Pinello's success in business. Third profit producer on all his jobs is Pinello's own good management of men and ma-

chines. He schedules a precision timetable to get maximum team output and insists that all units roll on schedule all day long, every working day.

Investigate the new 27-yd. "B" Fullpak* Scraper and the 18-yd. "C" Tournapulls for your production dirt-moving. And, for that faster loading, check the 416 hp Twin-C Pusher. Call or write for detailed information.

*Trademark F-1298-H

According to Pinello: "That's all I want — good steady production. I keep scrapers rolling at 14 miles per hour, even though they could double that on the straightaway. Excessive shoveling costs a contractor money. Labor costs go up, and so does downtime. At the end of the job, the profit margin reads zero."

Machines are money-makers

Pinello is proud of his men and his machines. "Today's machines are money-makers," he says. "I like the reliability of course, that's why I got 'em. The all-electric controls are fast, and the machine is easier to maneuver with electric controls. Maintenance is low, and repair is a snap."

Pinello gives each of his operators a strong sense of responsibility for controlling operating cost of rigs, by having them handle their own service and repair work at end of shift. According to Pinello, "Any operator who can't do his job can tear 'em down and fix 'em." This unusual feature of Pinello's operation pays off.

Pinello doesn't believe that racing his machines pays off. He doesn't want operators to "give-it-the-gun", trying to lap another operator. He doesn't want his



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WHERE QUALITY IS A HABIT

ALASKA Newsletter

By CLIFFORD S. CERNICK, Anchorage

DATE FOR DEADLINE — The District Engineer office reports that work will get under way in April or May on extension of the DEW-line along the Aleutian chain. Six new Distant Early Warning stations will be built in what has been estimated as a \$20,000,000 project. Completion dates for various phases of the work extend into 1958.

SAFETY MEET — Construction men from all parts of Alaska and the States are scheduled to gather in Alaska late in March for the second annual Pre-construction Season Safety Conference held by the Alaska District Corps of Engineers. The conference, initiated by the Alaska District last year, set a precedent and attracted widespread attention and approval in the construction industry. At this second annual conference, all prime contractors and subcontractors who will be working on projects supervised by the Alaska District on military construction and on civil works are required to have representation.

PHOTOS NEEDED — Photos, snapshots and negatives of persons, construction and events connected with the early or later history of the Army Corps of Engineers in Alaska are being urgently sought by the Alaska District. The photos are wanted in connection with anniversary celebrations of historic events in Alaska's history in which the Engineers had a part. For example, 1957 is the 15th anniversary of the dedication of the Alaska (Alcan) Highway and also the 15th anniversary of the Japanese attack on Dutch Harbor in the Aleutians. The Japanese planes in that attack were repulsed by fighters from a secret airbase rushed to completion by the Corps of Engineers.

JUNEAU PROJECT — Alaska's capital city of Juneau will receive flood protection this summer under a new civil works project calling for a paved channel 2,220 ft. long on Gold Creek which flows through the heart of Juneau's business and residential area. Gold Creek has caused four major floods in the past during the fall months when storms bring unusually heavy rainfall to the southeastern Alaska city. The project, when completed, will give the city protection from floods approximately 75% greater than the largest flood in the city's history, which occurred in 1918.

TWO PER CENT TAX—A measure, which, if passed, would take a greater chunk of the seasonal construction worker's salary in Alaska, has been introduced in the territorial legislature at Juneau. The bill is a 2% retail sales tax. Strong opposition to the measure was registered by Alaskan labor unions immediately after it was introduced.

NIKE SITES—In the last Newsletter, we gave you details of the plans for construction of Army Nike guided missile sites at Eielson Air Force base near Fairbanks. In this month's Newsletter we can report that missile sites are to be constructed also in the vicinity of Fort Richardson and Elmendorf near Anchorage at a total cost of about \$7,500,000. Bids were being accepted on the job up to March 26 by the Alaska District Corps of Engineers. Construction will start this summer and completion date is Oct. 1, 1958.

WORKMANSHIP—Federal inspectors on contracts held by construction firms will continue to be as "tough" as ever when checking on the quality of construction work. Recently, a new crew of bricklayers building dormitories at Elmendorf Air Force base walked off the job charging that District Engineer inspectors were too strict and also were "arrogant and insolent." The District Engineer office at Elmendorf immediately issued a statement to the effect that there would be no letdown in the quality of inspection and work performed had to comply with requirements set forth in the specifications. After a series of meetings, the workmen decided to return to the job. The same inspectors were retained by the District Engineer. A note to unions: Although it was not generally known, government photographers took scores of photos of the job in question to back up their assertion that workmanship did not measure up to specifications. Several Anchorage labor leaders and newsmen also visited the site to check on the quality of workmanship. Before any publicity could be given to conditions at the job site, the walkout was settled.

MOOSE MENACE—The problem of marauding moose still faces Alaskans, particularly at this season of the year when deep snow in the mountains drives the big animals down to lowlands and populated

places. Bill Jekic, an employee of Federal Electric, reports that he and other workers at the Wasilla communications site about 40 mi. north of Anchorage have counted as many as 20 calves and cows in one moose herd. "At night the moose can become a problem when they suddenly dart out from the brush to cross the road," says Jekic. "This happened to me on two successive evenings."

AIRBORNE SUPPLY—A unique air supply operation by the Air Force should be of interest to private contractors having supply difficulties at remote Alaskan sites. Recently, a 5½-ton bulldozer and other supplies were dropped to a radar site near the Bering Sea from a C-124 Globemaster. Four 100-ft. parachutes were used to keep the dozer from smashing to pieces when it landed. Each of the big "umbrellas" is capable of supporting 3,500 lb., giving a total safe load strength of approximately 7 tons for the four parachutes. Smaller equipment, such as oil drums and prefabricated siding required use of smaller chutes.

HIGHWAY PLAN — A "master plan" for proposed highway construction has been mapped out by the Bureau of Public Roads in Alaska. The plan includes provisions for both primary and secondary arteries in the far-flung territory. Highway system planning is being coordinated by Bureau of Public Road officials in both Washington, D. C. and Alaska. Irving Reed, territorial highway engineer, also is sitting in on the conferences which will determine the future of Alaska's roads. Actual construction of the highway will be a subsequent part of the master plan. Meanwhile, the legislature at Juneau is being bombarded with requests for "priority road construction" in all four of the territory's divisions. However, the only action taken so far on the legislative level was a "memorial" to the Bureau of Public Roads and road officials suggesting certain road construction priorities.

JOBS LIMITED—With the peak of the construction season still more than four months away, stateside jobseekers are being warned again by Alaska employment officials and union leaders that job opportunities at this time are very scarce. The author of this column has received several letters inquiring about job opportunities in the territory and must repeat that we are unable to give detailed data on job openings to individual correspondents. Job seekers are advised to check with the union involved as to any current opportunities or write to the Territorial Employment Service in the city in which employment is sought.

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to develop!

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hard look ...



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PARTS WAREHOUSES IN LOS ANGELES AND NEW JERSEY

ENGINEERS on the move



NEW OFFICERS of San Francisco Post, Society of American Military Engineers, shortly after their election to office. Second from right, **Comdr. William J. Valentine**, Deputy District Public Works Officer, 12th Naval District, San Bruno, is the new president. Shown with him (l. to r.) are **Col. Edwin M. Eads**, USAF Installations Representative, South Pacific Region, who was elected first vice president; **K. Webb Kennedy**, U. S. Forest Service, guest speaker for the evening; **Brig. Gen. William F. Cassidy**, South Pacific Division Engineer, retiring president.

George T. McCoy, California State Highway Engineer, announced the appointment of **R. A. Hayler** as a new district engineer in District IV of the Division of Highways, the 9-county area centered around San Francisco Bay. Hayler has for eight years been assistant district engineer—planning for District XI, with headquarters in San Diego. In making this new appointment, McCoy said that the increased funds becoming available under the Federal highway program and the resulting stepped-up schedule of highway route determinations and planning in the Bay region made necessary establishment of an additional position at the district engineer level. * * *

Maurice L. Dickinson has been elected chairman of the Board of Directors of the Engineers Club of Los Angeles, and **Finley B. Laverty** was appointed a director. Dickinson, a member of the American Society of Civil Engineers, is chief hydraulic engineer for the Bechtel Corporation at Los Angeles. Laverty, a director of ASCE, is chief hydraulic engineer for the Los Angeles County Flood Control District. * * *

Duane F. Lent, formerly with Tudor-Goodenough Engineers as an inspector, has joined the Guy F. Atkinson Co. at its headquarters in South San Francisco, Calif. Here he is employed on form design and detailing in connection with heavy construction-engineering.

Francis N. Hveem, materials and research engineer for the California Division of Highways, received the 1956 Roy W. Crum Award for Distinguished Service from the Highway Research Board.

Engineering and Sciences Extension, University of California, is presenting a course for resident engineers, hot plant and street inspectors, contractors, superintendents, foremen, and others in need of new knowledge of asphalt concrete paving. The course is being given at Mountain View by **Raymond Harsch**, who was Asphalt Department Manager of Shell Oil Co., San Francisco, until his recent retirement. Called "Design and Control of Asphaltic Mixtures, X 402AB," details for enrollment may be obtained from **University Extension, University of California**, 2441 Bancroft Way, Berkeley 4, Calif., or from any University Extension office.

Vinton W. Bacon, executive officer of the California State Water Pollution Control Board at Sacramento, has been appointed secretary of the Northwest Pulp & Paper Association. This is a new organization formed for the purpose of sponsoring permanent research in water and

air pollution in the region. Bacon's headquarters will be in Tacoma, Wash. **Paul R. Bonderson**, succeeds to Bacon's former position as executive officer, and **Raymond Walsh** takes Bonderson's place as executive officer for the Board at San Luis Obispo. All three men are members of the American Society of Civil Engineers. * * *

Louis R. Hovater, Jr., former area engineer for The Asphalt Institute at Los Angeles, and a member of the American Society of Civil Engineers is now with Globe Engineering Co., Long Beach, Calif., as assistant chief engineer. * * *

R. J. Lyman has accepted a position as special projects engineer with the Atlas Building Products Co., El Paso, Tex. He resigned as chief of the military works branch of the Albuquerque District of the Corps of Engineers to take the position. Lyman is a member of the American Society of Civil Engineers. * * *

William E. Stinchfield, chief of civil projects section in Design Branch, Seattle District, Corps of Engineers, has been assigned as resident engineer at Chief Joseph Dam on the Columbia River near Bridgeport, Wash. The appointment fills the position vacated when **Byno L. Jeter** transferred East. * * *

Warren Hunter and **Elmer Clark** have been elected by Fisher Contracting Co. to fill newly created positions in the company. Hunter has



Hunter



Clark

been promoted to vice president in charge of all domestic construction operations. Clark was also made vice president, in charge of all Superior Sand & Gravel operations. Hunter joined the Fisher organization in 1947. He served in the capacity of chief engineer for several years before he was made construction division manager in 1954. Clark started in the construction division in 1934, progressed through various steps to construction superintendent, and later transferred to the Sand & Gravel Division. * * *

Gunite Contractors Association, Los Angeles, Calif., announces the following officers for 1957: president **Don W. Shupp**, Macco Corporation; vice president, **James Enbody**, H. I. Enbody & Sons; secretary, **J. Moore**, California Gunite; treasure

"Cross country or cross town, our Buckeyes deliver more ditch"

—says Raymond F. Pitman, President, Universal Pipeline Constructors, Inc.



"We chose six Buckeye ditchers to dig the 1,200,000 feet of ditch called for in our contract with Intermountain Gas Company," reports Mr. Pitman, "and whether it's been rugged cross-country work or narrow-alley city ditching, these machines have been more than a match for any conditions we've met!"

"Because wheel hoist and conveyor drive are hydraulic and work independently of each other, we can dig a straight-line ditch exactly where we want it . . . place spoil on either side and at any distance from the machine . . . work over and around existing pipes and lines without stopping forward travel. And, all adjustments are made right from the operator's seat.

"In the 70,000 feet we've already dug, these Buckeye ditchers have really proved themselves. The 308's have kept production high on overland segments. Our 305's have given us the accurate control needed for close-quartered city jobs and have turned in dependable performance on in-between-sized jobs!"

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 STUDER TRACTOR & EQUIP. CO. Casper, Wyoming
 SEITZ MACHINERY CO., INC. Billings and Great Falls, Montana

SOUTHERN IDAHO EQUIPMENT CO. Idaho Falls and Boise, Idaho
 WARNOCK-BANCROFT EQUIPMENT CO. El Monte, California
 RENO EQUIPMENT SALES CO. Reno, Nevada
 SHASTA TRUCK AND EQUIPMENT SALES Redding, California
 WESTERN MACHINERY CO. Salt Lake City, Utah
 SMITH MACHINERY CO., INC. Roswell, New Mexico
 WESTERN MACHINERY COMPANY Denver and Grand Junction, Colorado

J. A. Fredericks, F. W. Case Co.; and recording secretary and manager, **Stanley G. Zynda**.

* * *

P. D. Koon of B-E-C-K Constructors has been elected president of Alaska Chapter, Associated General Contractors. He will serve with **W. R. Johnston** of Peter Kiewit Sons' Co., vice president, and **Harold Gill** of Patti-MacDonald Construction Co., secretary-treasurer. The new officers were chosen at the Chapter's recent meeting in Seattle, according to **Charles J. Wolfe**, temporary manager in the absence of **Larry Moore**, who is on a six-month vacation.

* * *

Ford J. Twaits and **Carl H. Wittenberg**, co-partners of Ford J. Twaits Co., contractors and engineers, announce a change in the company name to Twaits-Wittenberg Co. The firm was first established in 1919 as



Carl H. Wittenberg

Scofield Engineering Construction Co., with Twaits as partner and general manager. In 1927 it became Scofield-Twaits Co., and in 1934 it was established as Ford J. Twaits Co. Wittenberg joined the original company as an engineer in 1922. Subsequently he was with Columbia Steel Co., and with Gladding, McBean & Co. In 1951 he rejoined Twaits as co-partner and general manager. Both men have taken an active part in the affairs of the construction industry. Twaits was one of the founders of the Southern California Chapter of the Associated General Contractors and served as its president. Wittenberg also served as its president in 1955. Headquarters for the firm are in Los Angeles.

* * *

Alton V. Phillips, head of the construction firm of the same name in Seattle, Wash., has been elected by Mountain Pacific Chapter of Associated General Contractors as its 1957 president, succeeding **M. P. Butler**. Also elected at the annual meeting were **Cliff Gailey**, first vice president; **Hugh A. Anderson**, second vice president; **J. A. Samuelson**, treasurer, and **W. H. Landaas**, secretary-manager.

* * *

Leo L. Strecker, chairman of the board of Karl F. Tuttle Engineering Co., Inc., Arcadia, Calif., recently announced the merger of his company with **Harold Field Kellogg** in the forming of a new firm of engineers and architects to be known as Tuttle-Kellogg Architectural & Engineering Co.

Keith F. Jones of Port Townsend, Wash., has replaced **William A. Stancer** as County Engineer of Pierce County following Stancer's resignation. Recently, Jones has been serving as Jefferson County Engineer. At one time he was with the State Highway Department, and is currently serving on the executive committee of the National Highway Research Board.

* * *

John D. Griffiths of Boise was recently elected president of the Southern Idaho Section of the American Society of Civil Engineers. Other officers chosen were **M. Boyd Austin**, Boise, first vice president; **Melvin V. Davenport**, Caldwell, second vice president; **Carl L. Lawrence**, Boise, secretary, and **Fletcher W. Pearce**, also of Boise, treasurer.

* * *

William E. Parker, former city engineer of Seattle, Wash., has accepted an appointment by the City of San Diego, Calif. He will make a study of San Diego's engineering and public works department for the purpose of "effecting such changes in methods of operation as may be desirable."

* * *

Max J. Kuney, Jr., Spokane, is the newly elected president of the Pacific Northwest Branch of Associated General Contractors. **Sam Guess**, manager of the Spokane Chapter, AGC, was elected secretary-treasurer for the Northwest branch.

* * *

Sam Cook, for the last several years Bureau of Public Roads inspection engineer on direct Federal highway construction in Oregon and Washington, has retired. At the same time, **Ray B. Fryer**, also with the BPR in connection with road building by the Federal Government in the four Northwest states, retired after 35 years' service. Cook has a record of 38 years of continuous service with the Bureau.

* * *

Promotion of **L. L. Funk** to the newly established position of photogrammetric engineer for the California Division of Highways was recently announced by State Highway Engineer **G. T. McCoy**. Funk became actively interested in the use of photogrammetry in highway planning when he was assistant district engineer of District V at San Luis Obispo, and is nationally recognized as an authority in the application of photogrammetric techniques to highways.

* * *

At the 53rd annual convention of the American Concrete Institute **Walter H. Price** was elected 1957 president. Price is head of the engineering laboratories of the Bureau of Reclamation at Denver, Colo., and has been with the Bureau since his graduation as a civil engineer in 1930.

The names of those receiving ACI

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GENERAL EQUIPMENT CO.
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**INTERSTATE
TRACTOR & EQUIPMENT CO.**
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MCCOY COMPANY
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NEW MEXICO EQUIP. CO.
Albuquerque, New Mexico

LEE REDMAN EQUIP. CO.
Phoenix, Arizona

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

**SOUTHERN IDAHO
EQUIPMENT CO.**
Idaho Falls, Boise and Twin Falls, Idaho

TRACTOR & EQUIPMENT CO.
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INDEPENDENT TRAVEL . . . This standard feature makes it possible to (1) travel, (2) hoist, (3) swing, and (4) derrick the boom—separately, in any combination, or all at the same time, with each operation controlled by an independent hydraulic clutch. Gives you greater maneuverability and flexibility of operation.

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(Available)



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"Crabbing" Sideways

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awards were also announced at the meeting. Of the seven winners, four are from this Western region: **Lewis H. Tuthill**, concrete engineer of the California State Department of Water Resources; **William A. Cordon** of the civil engineering faculty at Utah State Agricultural College; **Kenneth R. Lauer**, assistant professor of civil engineering at Montana State College, and **Roy R. Clark**, special assistant to the district engineer, Portland District, Corps of Engineers.

* * *

Two promotions in the Seattle District of the Corps of Engineers are announced. **Samuel B. Lamb** has been made chief, flood control section of Operations Division, replacing **Iner C. Nelson** who recently retired from Government service after 23 years. **Jerold B. Van Faasen** succeeds to the position of resident engineer in the special projects office. He replaces **Glenn A. Barcroft** who retired also with more than 23 years' service.

* * *

After two years abroad on a technical assistance mission to India, Iran, and South Africa, **O. W. Israelson**, professor emeritus of irrigation and drainage at Utah State Agricultural College, and a member of the American Society of Civil Engineers, is returning to the college. He will conduct research in the engineering phases of land drainage and irrigation.

Lewis K. Maires, civil engineer, and a member of the American Society of Civil Engineers, recently retired from the Bureau of Reclamation at Denver, Colo. He had been with the Bureau continuously since 1933 and when he left was supervisory engineer. He was considered a specialist in the design of irrigation canals and canal structures.

* * *

Sam D. Burks, products manager with the construction specialties division, Dewey and Almy Chemical Co.



Sam D. Burks

Division of W. R. Grace & Co., has taken up new duties as products manager in the firm's San Leandro, Calif., office, covering the eleven Western States. Burks was formerly materials engineer with the Corps of Engineers and was assistant project engineer during construction of Folsom Dam. He has been at Dewey and Almy's home office in Cambridge, Mass., for the past few years.

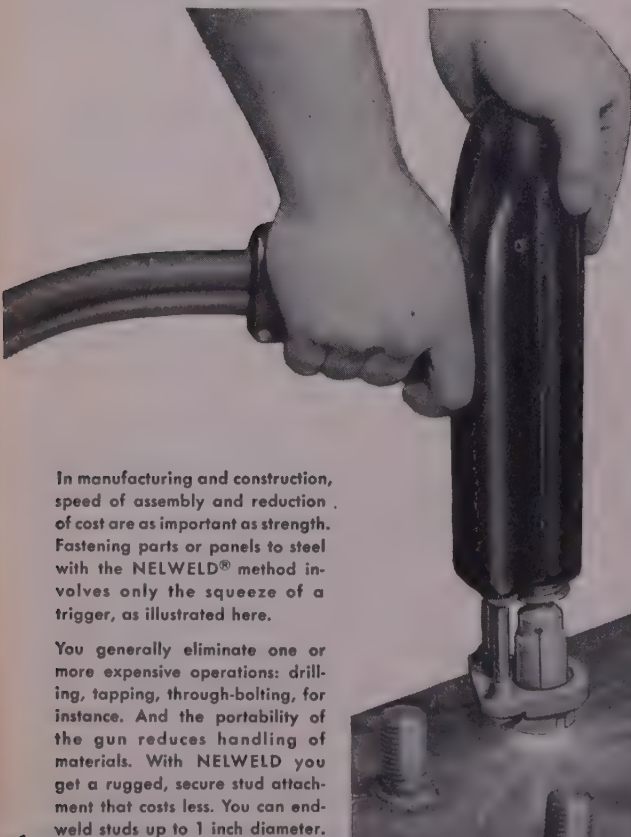
Robert W. Davis, Bureau of Reclamation engineering authority or lower Colorado River channelization and other protective works, retired after more than 30 years of service with the Federal government. In 1945 he was named chief, division of engineering, Office of River Control, Region 3, Boulder City, Nev. When the Bureau's regional office was reorganized in 1954, he was named chief channel control branch of the Regional River Control Division.

* * *

Capt. Alfred J. Rabogliatti has been assigned as assistant resident engineer supervising construction of six Dewline stations along the Aleutian Island chain, which stretch 1,000 stormy miles between Bering Sea and the north Pacific Ocean. He will work with **James L. McNamara**, acting resident engineer in the administration of \$20,000,000 in construction supervised by the Alaska District Corp of Engineers for the U. S. Air Force.

* * *

A new Bureau of Reclamation assistant regional director has been appointed for Region 2, Sacramento, Calif. **A. Norman Murray** has succeeded **Robert S. Calland**, who retired from government service after 43 years. With an active engineering career with private firms prior to joining the Bureau in 1939, Murray has advanced steadily as an engineer-



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ing administrator. He is a member of the American Society of Civil Engineers.

* * *

James J. Kesler, formerly with Daniel, Mann, Johnson and Mendenhall as project manager, has joined in a partnership with **Walter W. Beeson**. Known as Beeson & Kesler, the new architectural and engineering firm is located in La Canada, Calif.

* * *

Emil J. Kaleschke, well known civil engineer of Oakland, Calif., is retiring from the City Engineer's office as of April 1. His 33-year-long public service career began in 1924 when he went to work as a draftsman for the City Engineer, progressing through various engineering classifications to that of supervising civil engineer, the title he holds on retirement.

* * *

Fred J. Grumm, past president of the Sacramento Section of the American Society of Civil Engineers, was recently honored and presented with a scroll by The Engineering Council of Sacramento Valley, for outstanding community service. **Ridgeway M. Gillis**, Grumm's successor as deputy state highway engineer when he retired in 1950, delivered the presentation speech. He pointed out Grumm's many contributions to the advancement of highway engineering in California, and since then to his unselfish contribution to the community as

chairman of the Sacramento Redevelopment Agency.

* * *

Ken Amon, Monrovia, Calif., is the newly appointed executive secretary for the Engineering and Grading Contractors Association. Amon has

Ken Amon



been a Federal employee since 1941. During World War II he served at Edenton Naval Air Station and with the 120th Seabees in Africa. His latest position was Chief, Technical Liaison Branch, Los Angeles District, Corps of Engineers.

* * *

E. W. "Wally" Elwell, of the Washington State Highway Department, where he was assistant State Aid engineer since 1945, retired recently after 33 years with the Department. **James Gray**, District 2 State Aid engineer, replaced him.

* * *

Francis H. Hveem, materials and research engineer, California Divi-

sion of Highways, received the Roy W. Crum Award for distinguished service given at the 1957 meeting of the Highway Research Board of the American Association of State Highway Officials.

* * *

Walt L. Treadwell was recently appointed assistant chief engineer of Pacific Coast Engineering Co., Alameda, Calif., designers, engineers and fabricators.

* * *

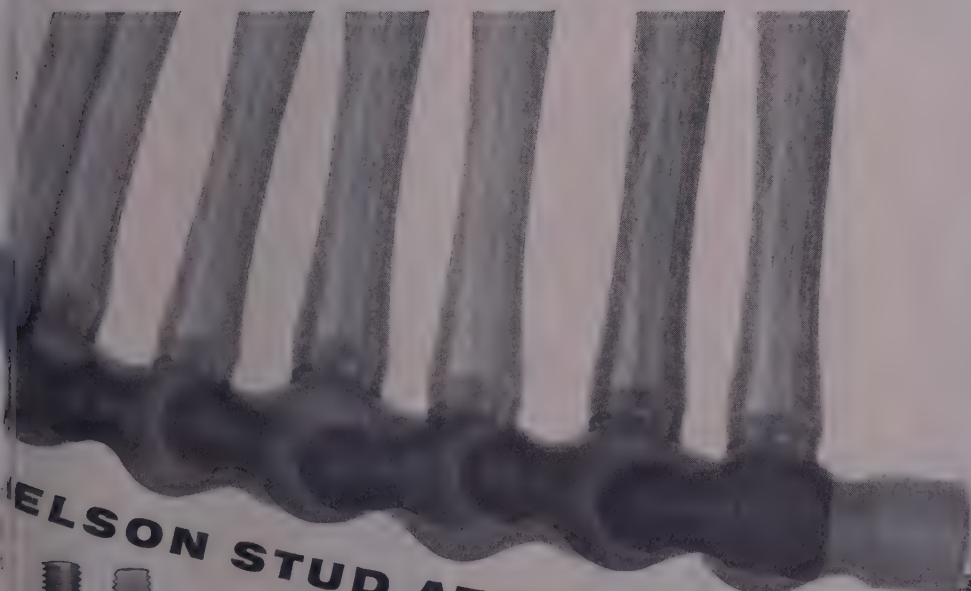
Bob F. Roberts, San Bernardino, Calif., is the newly installed president of the Building Contractors Association of California. Chosen to serve with him are **Frank Yates**, first vice president; **Leo Volk**, second vice president; **Stuart L. Seymour**, secretary, and **Warren Hanby**, treasurer.

* * *

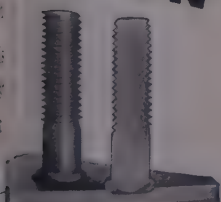
D. E. Stein of the headquarters office of the Washington State Department of Highways recently assumed his duties as district engineer of District 5, Yakima. He succeeds **T. P. Doyle** who retired from the department.

* * *

R. A. Hayler, for eight years assistant district engineer-planning, District XI of the California Division of Highways at San Diego, has been promoted to a district engineer in District IV, San Francisco. Replacing him is **J. F. Jorgensen**.



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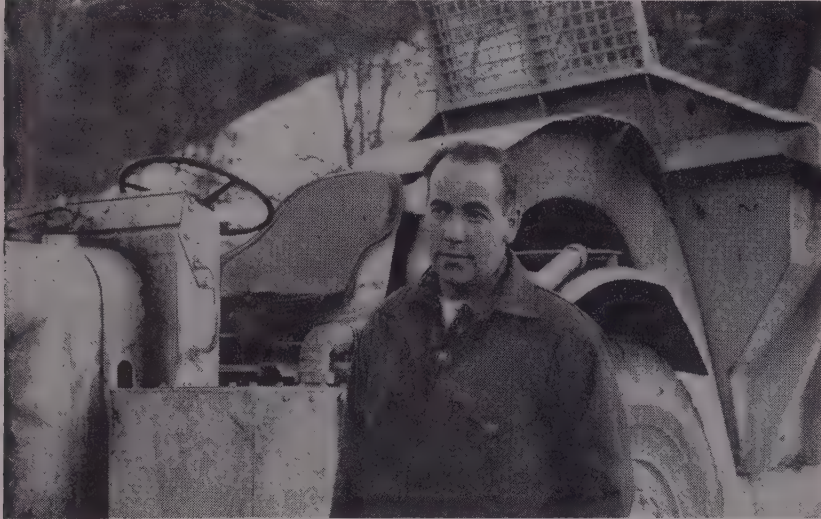
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SUPERVISING the jobs



KIRK H. FOX is partner and field manager of Gates & Fox, the outfit that drove the diversion tunnel for Trinity Dam. This \$1,348,000 job is an important preliminary to the Trinity River project of the Bureau of Reclamation which is described starting page 72 of this issue. Gates & Fox of Burlingame, Calif., holed through the diversion tunnel late in February. Their operations will be described in an article to appear next issue.

Vern Galloway, project manager, and **Richard Holland**, superintendent, are in charge of work on the \$2,757,835 project for completion of Williams Fork Dam and appurtenant features for the City and County of Denver, Colo. Contracted to Mountain States Construction Co., work got under way Dec. 3 last.

Gordon A. Zwissler was recently appointed as assistant general superintendent in charge of services at

Kaiser Steel Corp.'s steel plant in Fontana, Calif. Prior to this present appointment he was division superintendent of rolling mills.

Don Leman and **Jack Brown**, grading foremen; **Sven Lobek**, crushing superintendent, and **Harold Weidner**, maintenance superintendent, are key men on Roy L. Houck & Sons' job of grading, surfacing (crushing), and paving on the Columbia River Highway in Wasco County, Ore. This is

a \$632,587 contract under way since January, and expected to be completed about July.

* * *

Robert Davis is superintending the job of constructing an addition to the Washington Township Hospital at Centerville, Calif. John E. Branagh & Son won the award on a low bid of \$1,743,115. Work started in mid-December.

* * *

V. E. Clayton, superintendent for Charles L. Harney, Inc., is supervising construction of portions of a separation structure in San Francisco. Other key men on this \$7,075,009 contract, under way since last December, are **Herman Dauberman**, job engineer, and **Robert Waylett**, carpenter superintendent. Completion is set for June 1959.

* * *

Harry Claterbos, Jr., project manager; **Bill Bond**, project engineer, and **Ad Pearson**, are key men for S. S. Mullen, Inc., on a recent award to this firm for erection of Hoagley Creek, Carlanna Creek, and Park-Harris bridges, Sunnyside Creek culvert, part of waterfront arterial project, Ketchikan, Alaska. Work on this \$620,553 project started Dec. 21, with completion date set for Sept. 1.

* * *

E. E. Yeager, partner in the firm of E. L. Yeager Co., is in charge of this contractor's recent award in the amount of \$1,689,866 for 1.4 mi. of grading, paving, and construction of 7 bridges in San Bernardino, Calif. General superintendent is **Paul Wittig**. Superintending the job is **Rick Lambie**. **L. E. Anderson** is structures superintendent. Job has been under way since early December, and will probably run till January 1958.

* * *

George Van Dyl, general superintendent; **Ned Nelson**, project manager; **Norris Cushing**, job superintendent, are MacIsaac & Menke Co.'s top men on construction of a \$2,500,000 factory located at Santa Ana, Calif. Started Dec. 10 last, the build-



UNDER DIRECTION of these men contract awarded to Kiewit-Judson Pacific Murphy for construction of the Colorado River Bridge is now under way. Left to right: **Francis J. Murphy**, project manager; **William A. Choate**, project superintendent; **Al Tokala**, field engineer; **Leroy Smith**,

safety engineer; **William E. Dreusike**, office manager-office engineer. This \$4,139,277 steel arch span is a feature of the Glen Canyon Unit of the Colorado River Storage Project, a pre-bid description of which appeared in *Western Construction*, Feb. 1957, p. 28-34. Completion date, June 1959.

ing is expected to be finished about the end of November.

* * *

A. L. Blattner is superintending a \$658,057 job of grading, structures and surfacing 5.3 mi. of highway in Washington and Yuma counties, Colorado, for Pioneer Construction Co., headed by **Clarence O. Brown**. Grade foreman is **Joe E. Miller**. This job which has been under way since Feb. 15 is scheduled for completion about Aug. 1.

* * *

E. H. Bernard is superintending construction of a dam northeast of Paradise, Calif., for John Delphia-Williams & Burrows Contractors, Inc., joint venture firm who received the contract from Paradise Irrigation District at a cost of about \$956,000. Other key contractor men are **William F. Boone** and **P. E. Lutes**, engineers. Foremen are **T. Foster** and **J. Clarke**, equipment; **N. I. Meyer**, carpenter. **C. Cox** is master mechanic.

Representing the District are **R. Dacher**, resident engineer, and **M. Yezzi**, assistant; **A. T. McLaughlin**, office engineer, and **W. Wirth**, assistant soils engineer. Project is in the completion stage.

* * *

Al Regalia, project manager, **C. M. Shafer**, structures superintendent, and **Buster Morrison**, earthwork superintendent, comprise top personnel of Baldwin & Parker's State highway job at Marysville, Calif. Other key supervisors are **Floyd Beavens**, structures; **N. Brown** and **Earl Forterhays**, earth; **Karl Alt** and **C. Callahan**, underground. For the State, **K. C. Jones** is resident engineer; with **Pat Ryan**, **L. Griugich** and **N. Williams**, engineers. Resident on bridges is **Charles Nogis**. **Tony Stockovich** and **Koi Honi** are engineers, and **John Goutz**, office engineer.

* * *

R. Jensen is superintending a \$11,000,000 hospital construction in Napa, Calif., for Barrett Construction Co. **Thomas Seffords** is carpenter foreman on this precast, poured-in-place project. Plumbing is by **E. C. Braun** Co. and is superintended by **J. A. Goodyear**.

* * *

Bob Rose is superintending a \$143,941 job for Guy J. Norris who recently received the award for 2.2 mi. of clearing, grading and surfacing of Little Kalama River road in Cowlitz County, Wash. Other key personnel on the project, which started Mar. 1 and is expected to be complete about mid-July, are: **Al Johnson**, general foreman; **Palmer Johnson**, master mechanic; **Bob Kliner**, truck foreman, and **V. Brewer**, office manager.

* * *

William Pankovich, superintendent, **Karl Buonstrup**, field engineer, and **James Thomas**, foreman, comprise the top men on a \$115,728 contract awarded to Brannan Sand &

Gravel Co. to widen a portion of Federal Blvd. in Denver, Colo. Brannan started work Mar. 1, with July 1 the probable completion date.

* * *

R. B. Keutz, project manager, and **Grant Brown**, superintendent, are in charge of a recent award to Fredrickson & Watson Construction Co. and Ransome Company for grading and surfacing 5.8 mi. of 4-lane divided highway and construction of 4 bridges and alteration of an existing one, in Placer County, Calif. Scheduled for completion in October 1958, this \$3,685,555 project got under way in January. The office is in charge of **Fred Robie**. Master mechanic is **Joe Manabo**.

* * *

John P. Schmidt and **James Peek**, foremen, are key men working for James B. Kenney, Inc., on this contractor's recent award for three bridges under construction east and west of Idaho Springs in Clear Creek County, Colo. Job started last December and will probably be completed this June. Contract price is \$337,227.

* * *

J. H. Harrison is acting as project manager on a \$613,779 award to the Harrison contracting firm for grading, draining and surfacing 5.7 mi. of road east of Tedoc in Tehama County, Calif. Engineer-superintendent on the job is **K. H. Miller**, assisted by **W. C. Smith**, foreman. **N. C. Dayton** is master mechanic. Under way since January, the work will run to August.

* * *

Louie Hilliard, superintendent, with **Jack Griffin**, foreman, is supervising grading of Myrtle Creek-Canyonville section of Pacific Highway in Douglas County, Ore., for Kuckenberg Construction Co. which is doing the job at a cost of \$1,049,843.

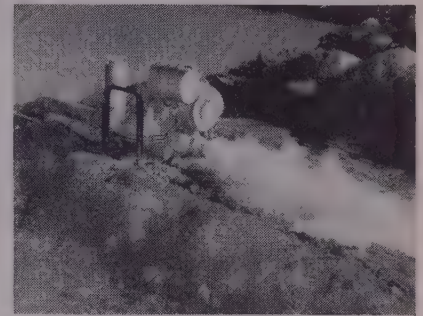
* * *

Dee Wangsgaard of Wansgaard Construction Co. is acting as project manager on a recent award for heavy grading work on Clark Hill-Granite Hill section in Bonneville County, Idaho. General construction superintendent on this job is **R. B. Crookston**. Contracted at \$771,329, it involves 11.1 mi. of grading, surfacing, culvert removal and construction. Other key men are: **R. O. Peterson**, mechanical superintendent; **E. J. Munro** and **Odell Anderson**, grading superintendents. Work here is now starting and according to Crookston will be finished about Oct. 1.

* * *

John H. Tanner, engineer, **Carl C. Jacobson**, general superintendent, and **Lyle R. Fish**, project superintendent, are top men on a recent award to Tanner Brothers Construction Co. for grading, surfacing and widening So. Central Ave., Phoenix, Ariz. Other key men on this \$166,672 job, started in February and ending in May, are **E. O. Willis**, concrete

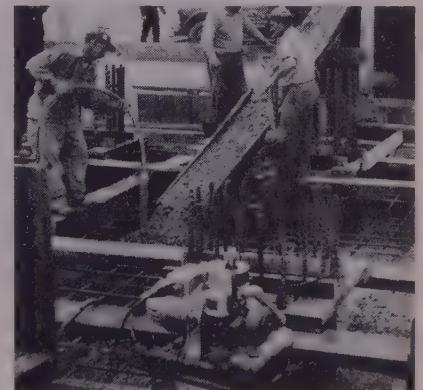
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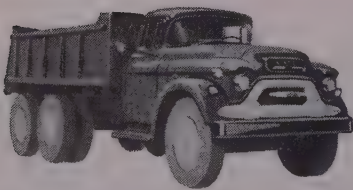
available with *factory-installed*, L-type or full-channel reinforcements—if needed for extra-severe service.

And *all* axles—front and rear—are oversize. There's a selection of rugged transmissions. Safety Power Steering* is available on every model. **And many of them now offer GMC's new front engine PTO* for transit-mix work.**

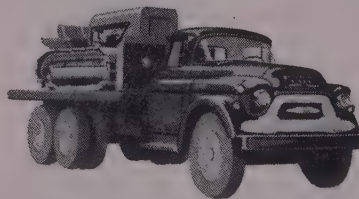
Add it all up and it's easy to see what's making these GMC Money-Makers the hands-down choice of more and more truck-users. For the full story on any one of them, see your GMC dealer!

**Optional at extra cost*

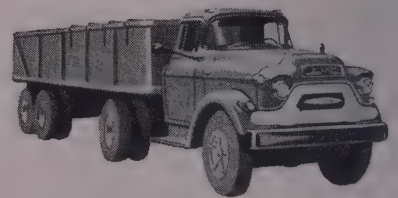
GMC TRUCK & COACH—A General Motors Division



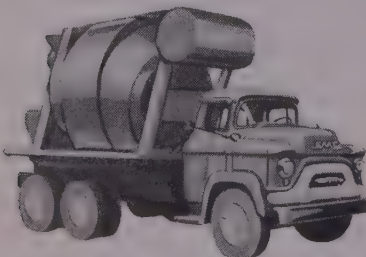
SERIES W500 Tandem Money-Makers
—206-h.p. V8 engine. 32,000 lbs. GVW—55,000 lbs. GCW. Axles: 7,000 lbs. front; 28,000 lbs. tandem rear. Three wheelbases 158"-194".



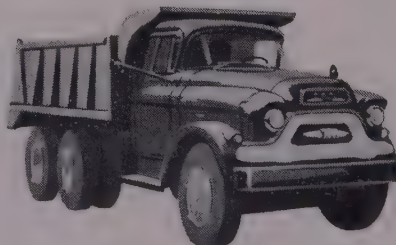
SERIES W550 Tandem Money-Makers
—232-h.p. V8 engine. 40,000 lbs. GVW—60,000 lbs. GCW. Axles: 9,000 lbs. front; 34,000 lbs. tandem rear. Four wheelbases 146"-194".



SERIES 630A Money-Makers—220-h.p. Six. 29,000 lbs. GVW—55,000 lbs. GCW. Axles: 9,000 lbs. front; 21,000 lbs. rear. Five wheelbases 141"-201".



SERIES FW550 Tandem Money-Makers
—232-h.p. V8 engine. 89" cab. 42,000 lbs. GVW—60,000 lbs. GCW. Axles: 9,000 lbs. front; 34,000 lbs. tandem rear. Five wheelbases 139"-175".



SERIES W630 Tandem Money-Makers
—220-h.p. Six. 42,000 lbs. GVW—65,000 lbs. GCW. Axles: 9,000 lbs. front; 34,000 lbs. tandem rear. Four wheelbases 153"-201".



SERIES 660 Money-Makers—220-h.p. Six. 30,000 lbs. GVW—65,000 lbs. GCW. Axles: 9,000 lbs. front; 22,000 lbs. rear. Three wheelbases 141"-165".

BLUE CHIP

GMC

MONEY-MAKERS



SERIES W660 Tandem Money-Makers
—220-h.p. Six. 46,000 lbs. GVW—70,000 lbs. GCW. Axles: 11,000 lbs. front; 36,000 lbs. tandem rear. Four wheel-bases 165"—201".



SERIES W670 Tandem Money-Makers
—220-h.p. Six. 59,000 lbs. GVW—90,000 lbs. GCW. Axles: 11,000 lbs. front; 48,000 lbs. tandem rear. Three wheel-bases 177"—191".



SERIES D930 Diesel Money-Makers
—236-h.p. Turbopower Diesel. 33,000 lbs. GVW—70,000 lbs. GCW. Axles: 11,000 lbs. front; 22,000 lbs. rear. Two wheel-bases 152"—164".

superintendent, and **W. L. Paddison**, office manager and field timekeeper.

* * *

Jack Wheat is superintending **Alfred DeCoria's** contract recently awarded for 1.2 mi. of grading and surfacing in Skagit County, Wash. Job involves 160,000 cu. yd. solid rock, 40,000 cu. yd. common excavation, with drainage pipe, etc. Other key men on this \$327,238 job are **Eric Bergquist**, drilling foreman, **James W. Bedford**, grading foreman, and **W. Osterloh**, office manager.

* * *

Charles H. Calkins, project manager, **M. K. Piercy**, superintendent, **Fred Muth**, grade foreman, and **Mike Berosik**, equipment superintendent, comprise the principal personnel on a recent \$277,422 contract award to **Herman Kathman**. The job started the end of January and covers clearing, grading, drainage on 2.5 mi. of S.S.H. 2A, 132nd St. to Woodinville, King County, Wash. Work will probably be finished by September.

* * *

Duncan Manning is general superintendent on a recent award to **Cox Brothers Construction Co.** at \$682,-696 for 3.9 mi. of grading and surfacing of Santa Ana Freeway from El Toro Air Base and Laguna Canyon Road to San Miguel Road, Orange County, Calif. **Orvel Burnett** is excavation superintendent, **Vernon Crabb** is paving superintendent, and **Otis Fox** is equipment manager. Scheduled for completion about March 1958, work here got started in February.

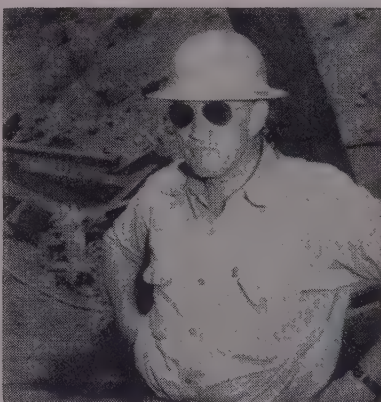
* * *

Carlos Houck, superintendent, **Swen Lobeck**, crusher superintendent, **Harold Widner**, master mechanic, and **Laray Johnson**, grade foreman, are top supervisors working for **Roy L. Houck & Sons** on a recent award for paving a section of North Santiam Highway, Marion County, Ore., involving 200,000 yd. of crushing and 32,000 tons asphalt paving.

Houck won the award on a low bid of \$560,153, started work in February, and expects to finish about September.

* * *

L. E. Huntington is **Walsh Construction Co.'s** project manager on this contractor's award from **Pacific Gas & Electric Co.** for construction of tunnels and powerhouse in the



Jess W. Hoopes

vicinity of Butt Valley and Caribou, Plumas County, Calif. **Jess W. Hoopes** is outside superintendent. Tunnel superintendent at Caribou is **Orville Allen**, while **Wayne Wilmoth** is tunnel superintendent at Butt Valley. **Jess Blakley** is engineer, and **K. Thomason** is office manager. Master mechanic is **Robert McAvoy**. **R. C. Schultz** is chief electrician. Among the foremen are **Jim Story**, carpenter; **Jay Bird** and **Bill Lloyd**, mechanic; **Nebb Bedross**, outside mechanic; **Pete Whitehurst**, grade; **Neil Smith**, electrical; **William Ward**, tunnel; and **H. Fossum**, **Jack Johnson** and **H. Foster**. Walkers are **Bill Delp**, **Jimmy Smith**, **John Sadlon** and **Mel Ackers**. Under construction since May 1956, project is expected to be finished by the end of 1958.

L. C. Snell, project manager, **H. A. McCagin**, general superintendent, and **W. C. Covington**, superintendent, with **Johnny Woods**, plant superintendent, comprise the top personnel of **Rice Brothers, Inc.**, on 11.4 mi. of grading and surfacing in Inyo County, Calif., a \$228,063 project starting April 1, and running till mid-July.

* * *

Thomas N. Beall, project manager and **Lyman Monson**, superintendent, head the list of job personnel on a recent award to **Arrington Construction Co.** for building a low power test facility at **AEC's National Reactor Testing Station**, Arco, Idaho. Other important men on this \$1,119,280 undertaking are **Oliver Warren**, field engineer, **John Johannesen**, office engineer, and **Doyle Burnside**, carpenter foreman. Under way since Feb. 11, construction is scheduled for completion early in 1958.

* * *

I. L. Buttram, job superintendent for **Martin Construction Co., Inc.**, is in charge of work on a \$229,827 contract for grading and surfacing **Sonoita-Mountain View** highway in Pima County, Ariz. Key foreman is **Earl Nelson**; carpenter foreman, **W. Briggs**. Job is expected to be complete about August.

* * *

Harold L. Doty, superintendent for **Lord & Bishop, Inc.**, is supervising substructure construction for portion of bridge to be built across the **Sacramento River** in Solano and Sacramento counties, Calif. A 15-month job, work got under way the first of March. Contract price is \$971,926.

* * *

George Singes, superintendent for **Oscar C. Holmes, Inc.**, is in charge of 5.9 mi. of grading, surfacing and bridge widening and repairing in Santa Cruz County, Calif. Going since the first of February, the job will probably end Aug. 1. Contract price \$374,690.

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KOLMAN 36" Model 101 Can Load and Screen Over 800 TPH

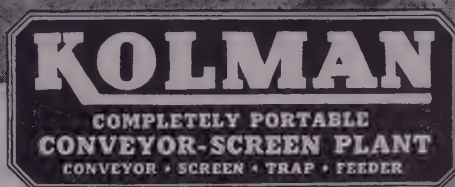
Kolman's rugged construction in the Model 101 portable conveyor-screen plant makes it a brute for production. The 36" x 50-foot unit shown is capable of loading over 800 tons per hour! Owned by Lindquist-Olson & Co., Cambridge, Minn., it is one of many such plants in use throughout Minnesota in highway construction. It is pictured grading and loading base lift material for a Minnesota Trunk Highway 66 improvement project in Aitkin county.

Included on the plant is the SB-80 Kolman single-deck Vibrating Screen—over 30 square feet of vigorous screening power. It is capable of carrying either a single, double or triple-deck vibrating screen without additional support.

The Kolman Model 101 is available in belt widths from 18" to 42" and in lengths up to 60 feet on portable plants. It can be equipped with a dozer trap, casting hopper, feeder-trap, or feeder-hopper. The complete plant is portable with no disassembly whatever. Adaptable to any type of feeding—dozer, dragline, shovel, front-end loader and others.

Contractors throughout the country have found they can handle heavy loads at constant rates with a Kolman, without fear of excessive expense or breakdown time loss.

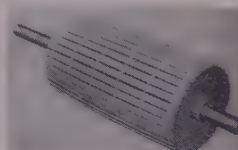
Best of all, you'll find the Kolman 101 costs less than comparable heavy-duty conveyors. Better check into it now!



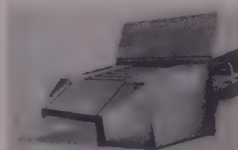
Head pulley clutch permits operation of screen while conveyor or belt is idle.



Folding feature permits weight of screen to be shifted back under conveyor.



Bar type head pulley eliminates the necessity of lagging. Extended shaft.



Easily-portable dozer trap is built onto tail section. Grizzly bars stop large rocks. Designed for easy access to tail section.

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☐ Traps ☐ Feeders

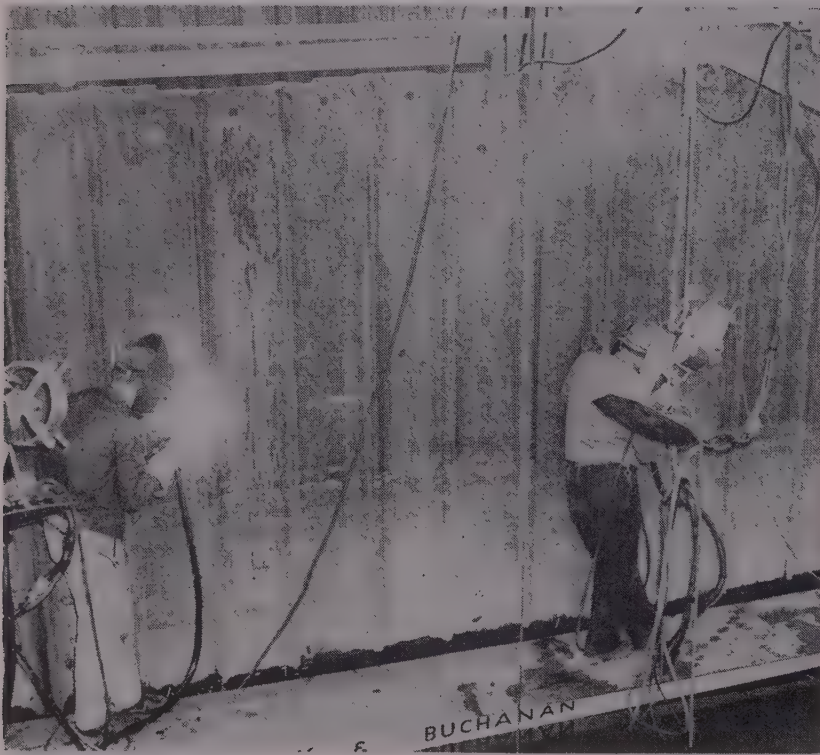
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TRICKS of the TRADES



68,000 ft. of fillet welds for loading dock made by two Sigma machines

TWO SIGMA welding machines made 68,000 lin. ft. of fillet welds in low-carbon steel sheet piling needed to construct a large cellular bulkhead for a 2,600-ft. loading dock at Marine Terminal No. 2 of Richfield Oil Corporation in Long Beach, Calif.

Each of the 70 cells in the dock averaged 31 ft. across the center and 31 ft. in length, while sheet piling ranged from 45 to 100 ft. in length. Inside and outside welds on the cells were 4 ft. 9 in. long, while welds on both sides of the diaphragms were 9 ft. long.

All welding was done in a vertical position, with two 500-amp. rectifier units supplying the sigma machines with power. Chadwick & Buchanan Construction Company of Long

Beach completed all the welding for Guy F. Atkinson Company in approximately one year.

In order to make the sigma machines even more portable for welding the diaphragms, both the wire drive units and wire reels were separated from the control units and suspended under the gantry bridge. After all welding was completed and a final elevation established, the tops of the sheet piling were powder-cut to a finish line.

The 1/16-in. diameter steel wire used to produce the welds in the low-carbon steel contains a special deoxidizing agent that imparts a fine grain to the weld metal. Inert argon gas was used in the operation to protect the weld zone from contamination by the atmosphere.

Contractor solves problem with screed

A CONTRACTOR had a difficult concrete finishing problem on a highway widening job. The 10-ft. lanes they had to put in on each side of the present two lane highway had to be several inches higher than the existing pavement in the center in order to reduce the crown in the present road. This meant that the contractor had to put in wooden forms on top of the old pavement in order to get the correct height. The problem now came up of how to finish this roadway; these wooden forms would not stand up under the heavy weight and transverse movement of the contractor's large self-propelled road paver.

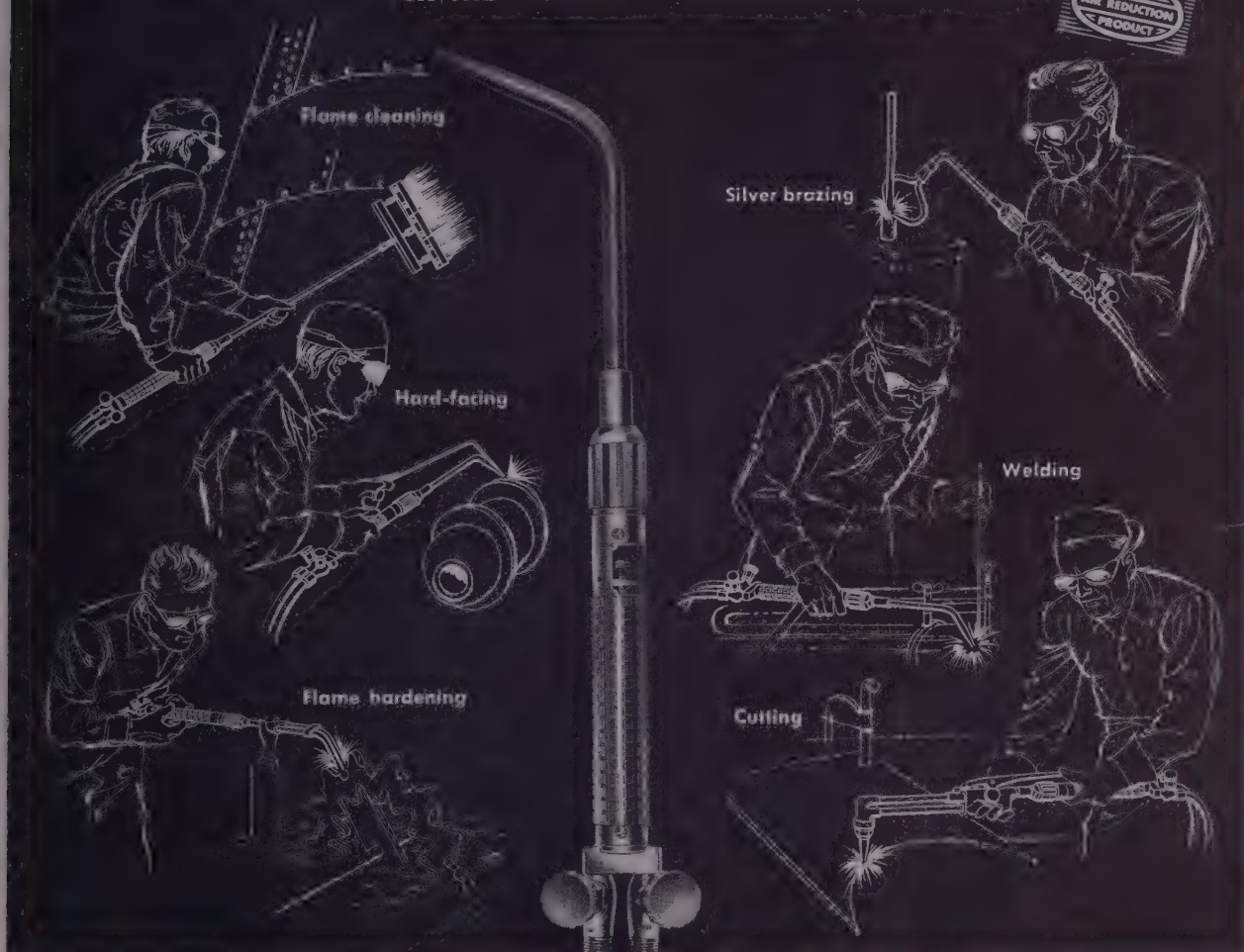
The contractor realized, also, that finishing by a hand strike-off beam would be uneconomical. What they decided to do was use a 10-ft. vibrating screed made by the Stow Manufacturing Co., Binghamton, New York. Since the beam is supported 1/8 in. above the forms and the screed's vibration is isolated from the beam by rubber mounts, no vibration would be transmitted to the wooden forms.

A 2-in. slump concrete was poured ahead of the screed by a large self-propelled mixer, and several men spread the concrete to the approximate height of the forms. Then the screed, which has a 2 1/2-hp. engine that powers the vibrating unit at 5,000 vibrations per min., was pulled along by two men. The screed struck off and vibrated the concrete at the same time. The few rough spots remaining were touched up with bull floats, and then the surface was broomed.

Welding movie is available free

COLD WELDING, a new 16 mm sound movie and 10-minute documentary account of maintenance welding operations at Thule Air Base, Greenland, has been produced by Technical Information Service, Eutectic Welding Alloys Corp., 40-40 172nd St., Flushing 58, N. Y. The welding operations shown take place 900 miles from the North Pole. The film is available on a free loan basis to technical societies, government installations, groups of welders in industry in the United States and Canada, and to schools.

AT THE FRONTIERS OF PROGRESS YOU'LL FIND...



AIRCO 800 TORCH DOES THEM ALL

Airco 800 is the most useful torch you can buy. With one Airco 800 Torch and a suitable selection of tips you can perform brazing, welding and heating jobs better than with any other single torch. You can:

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- hard-face
- flame harden
- cut steel to 8" in thickness

Airco's high gas flow capacity and precision-drilled mixer provide the smooth constant supply of well mixed gas and steady flame that makes for top performance on all jobs, regardless of size.

Over 30 types of tips — each instantly interchangeable — from size 0 single flame up to size 15 multiflame are available. You can get either long or bulbous flame. Separable tips may be used with a Universal or Jet mixer. Cutting attachments will enable you to cut up to 8" plate. Catalog #818 tells all about the Airco 800 Torch, the light and medium Airco 700 Torch, and Airco's complete line of welding and cutting torches, tips and accessories. Contact your nearest Airco office or authorized Airco dealer; ask for your free copy.



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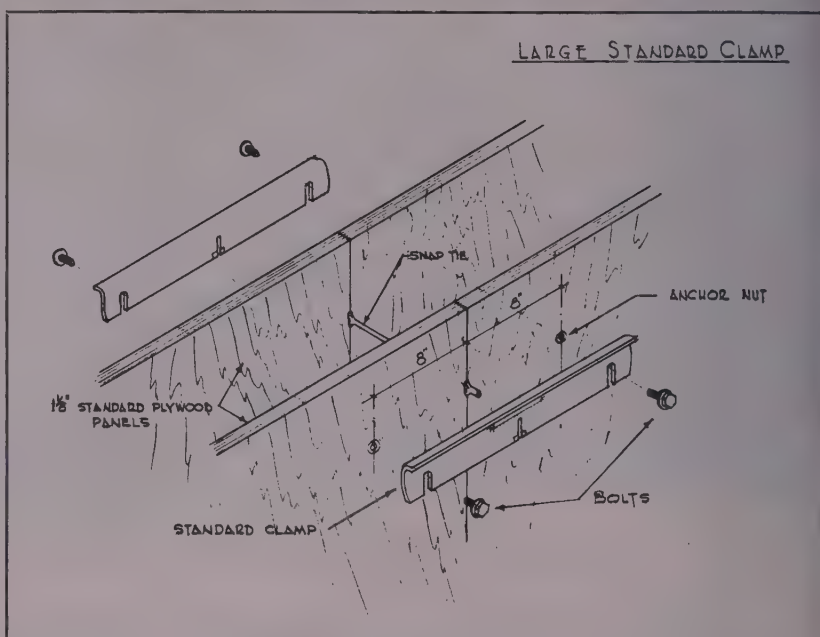
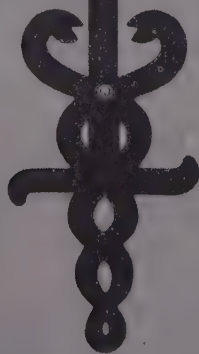
Air Reduction Pacific Company is a division of Air Reduction Company, Incorporated. Principal products of other divisions include: PURECO — carbon dioxide — gaseous, liquid, solid ("DRY-ICE") • OHIO — medical gases and hospital equipment • NATIONAL CARBIDE — pipeline acetylene and calcium carbide • AIRCO — acetylenic chemicals • COLTON — polyvinyl-acetates, — alcohols, and other synthetic resins.

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1 out of 4
that
Cancer Strikes

Strike back
with
dollars

To the
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Forming system eliminates studs

A CONCRETE forming method which completely eliminates conventional studs and walers has some contractors reporting form work going twice as fast. Other builders say a 50-60% reduction in labor costs is possible by using the forms, which consist of thick fir plywood panels and special fastenings.

The forming technique was developed by FormCo, Inc. of Rockford, Ill.

The method has been engineered to save on-the-job construction time and to minimize the amount of fabrication necessary before the materials are shipped to the job site. The panels are 1 1/8-in. exterior type fir plywood which have been pre-drilled and pre-fitted with rust resistant fastener hardware. DFPA grade-trademarked fir plywood is used.

The panels are fitted with anchor nuts and edged-routed for form tie insert. The anchor nut is counter-bored into the plywood, so there is no protruding surface hardware until the panels are assembled. The steel clamps which hold the panels together and are used in place of walers are quickly attached to the plywood at the job site by means of a cap bolt which screws into the anchor nut.

Inner or outer walls may be constructed separately or simultaneously. All panels are interchangeable. As the concrete sets up, bottom panels may be easily detached and used to build a wall to any height. In addition, panels may be removed at any height for easier pouring access or inspection.

(Continued on Page 128)



TEXAS CITY STREETS Contractor reported highest pouring ever. Credits Flex-Plane. Note amount of concrete in front of screed here.

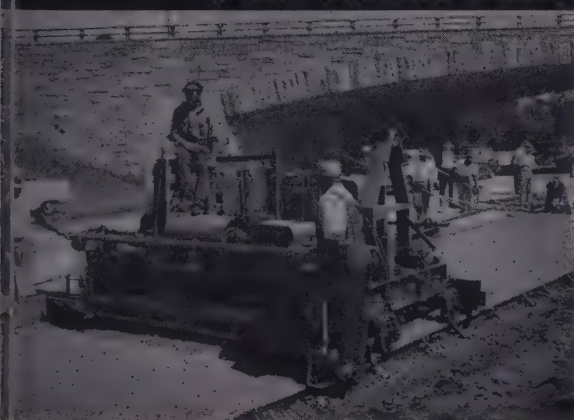
better! It is more flexible, stronger and faster than ever! Inherent frame design features allow the greatest amount of flexibility—even as much as 12 to 25 feet in one machine! And, there is a complete line of FLEX-PLANES to cover any width range desired. Only FLEX-PLANE self-widening offers independent control of extension frames, which means both sides of the machine can be extended or retracted to-

gether—or *individually*, for the negotiation of complicated interchange patterns involving variable width and short radius super-elevated curves. But, more important, it is the only really proved self-widening machine available today. More than 60 units operating throughout the nation attest to this.

The FLEX-PLANE carries the largest screeds in the industry—delivering the most satisfactory finish possible. Exclusive butt joint screed design enables screed lengths to be changed faster, easier than ever before. It is completely portable—a flick of the finger and it, instantaneously, becomes its own trailer.

Why not let FLEX-PLANE put you in contact with a FLEX-PLANE user? Talk to him and we are sure you, too, will GO FLEX-PLANE IN 1957!

NEW STATE PARKWAY Contractor watched machine operate on nearby Route 1 project. Bought immediately.



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QUAKER CONVEYOR BELTING FOR TOUGH SHOCK RESISTANCE!

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H. K. PORTER COMPANY, INC.

FORMING METHOD

(Continued from Page 124)

The process is especially applicable to stepped-up footings, pilasters, columns and beams. The panels and steel clamps may be used either horizontally or vertically, and the clamps are provided with a grooved slot for holding the ties. The ties have a safe load of 5,000 lb. The clamps and ties can be located in such a manner that the fluid pressure of the poured concrete makes the forms self-aligning and rigid without the use of walers or studs. FormCo concrete panels are sold by the square foot in sizes of 2 x 4 (25 lb.), 2 x 8 (50 lb.), 4 x 4 (50 lb.), and 4 x 8 (100 lb.). Contractors can make their own filler panels by buying 1½-in. fir plywood from their regular source and purchasing the panel hardware from a FormCo jobber. Since no walers or nails are needed and there is no protruding surface hardware, the materials require about 75% less storage and truck space than average forms.

Complete information on the FormCo method and suppliers may be obtained by contracting local plywood jobbers or writing FormCo, Inc., Rockford Trust Building, Rockford, Ill.

Water repellent for fabrics

A CHEMICAL "RAINCOAT" in the form of a water-repellent will increase the service life of sandbags, tentage, knapsacks, tarpaulins, and other items, according to tests conducted by the Corps of Engineers.

Tests showed that untreated bags, when used in areas that have high temperature and humidity, rot within three or four weeks. Fungicidal treatments will protect the sandbags for a year or more, when exposed to tropical conditions, but further service life can be achieved by the use of a water-repellent.

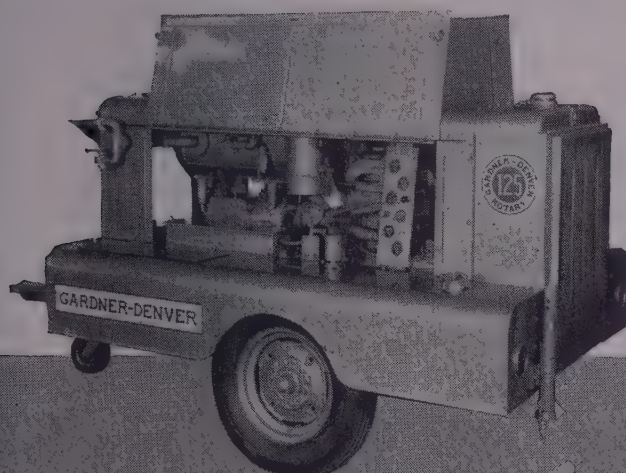
Use of the water-repellent to protect the fungicidal treatment not only increases the life of the fabrics, but also means a savings in fungicides.

Film on lift truck

HYSTER'S new look in lift trucks, their exclusive "Monomast" single upright design development, is the subject of a new highly informative 10-minute color and sound film. Comparative action views are utilized to illustrate the big improvement over conventional units afforded by lift truck with "Panoramic Visibility." Reservations to view the 16 mm film without charge can be made through Hyster industrial truck dealers or Hyster Company, 2902 N. E. Clackamas St., Portland 8, Ore.

compressors by Gardner-Denver

feature the Gardner-Denver Water-Oil Cooling System

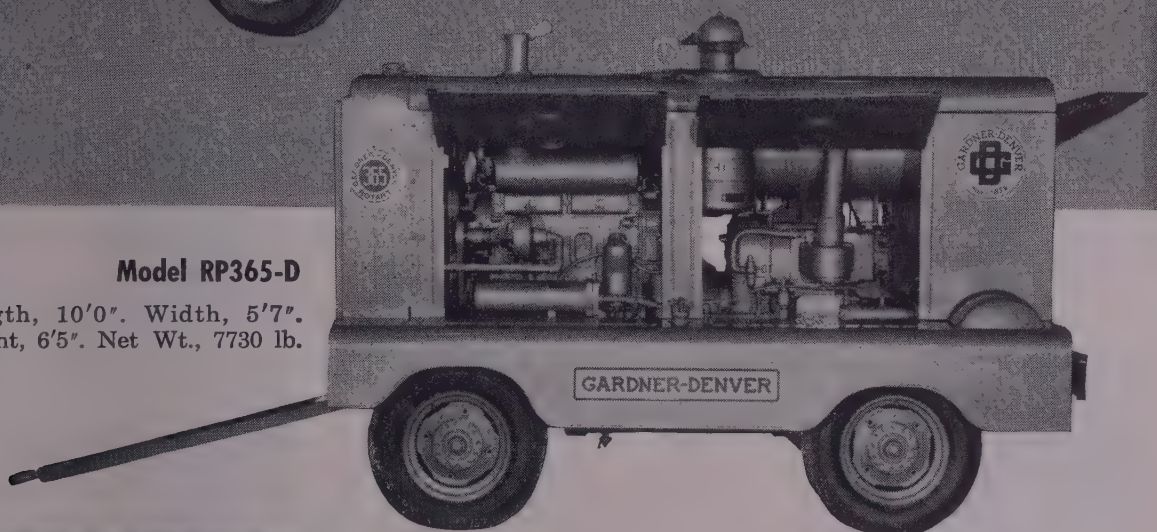


Model RP125

Length, 10'6". Width, 4'8".
Height, 5'0". Net Wt., 3540 lb.
Available with gasoline or diesel engine.

Model RP365-D

Length, 10'0". Width, 5'7".
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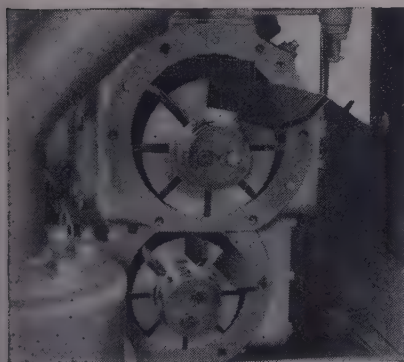


Plus these field-proved features of the Gardner-Denver RP600 and RP900 portables

Inspection of working parts can be made in minutes. Removing screws from easily accessible end plate exposes blades for service. No piping or tanks block the way.

- Thriftmeter Control
- Vibrationless Operation

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NEW LITERATURE

For your convenience in obtaining free copies of literature described, the company address is provided with each review.

Eutectic welding chart

A new "Selec-Tic" welding shop wall chart (TIS 2616) or 150 Eutectic Low Temperature Welding Alloys is now available from Technical Information Service, **Eutectic Welding Alloys Corp.**, 40-40 172nd St., Flushing 58, N. Y. The two-color chart lists torch and arc welding applications for cast iron, copper and copper alloys, stainless steels, nickel and nickel alloys, aluminum, impact, wear and corrosion resistant overlays and for metal-working jobs.

Mobile Pacemaker drill

A compact two-page bulletin describing the new Model B-52 Pacemaker drill is available from **Mobile Drilling, Inc.**, 960 N. Pennsylvania St., Indianapolis 4, Ind. Outstanding features of this variable speed, rotary drill are described and explained and basic specifications are given.

Bulletin on tubular steel scaffolds

A new illustrated bulletin has been published by **Beaver-Advance Corp.**, Ellwood City, Pa. Bulletin No. 62 features various applications of Advance Tubular steel scaffold in building construction, maintenance, and repair. Such features as the stack coupling release, cam lock and stack lock are described in detail. The brochure is heavily illustrated with photographs of scaffolding in advance shoring, masonry and general use. Reference is made to the company's line of material hoisting towers as well.

Gen-A-Matic catalog

The Gen-A-Matic Corp. has just completed a 36-page catalog covering its complete line of Gen-A-Matic portable, standby and sole power electric plants; self-priming centrifugal and diaphragm pumps; Super Hole-A-Matic earth-boring machines; and the Gen-A-Matic two-way flasher lights. The catalog contains specifications, diagrams and photos of all Gen-A-Matic equipment, plus information on operation, maintenance and service. In addition, company sales policies and procedures and product guarantees are fully detailed. The catalog is available on request from the **Gen-A-Matic Corp.**, 14741 Bessemer St., Van Nuys, Calif.

Facts about hard hats

A new 12-page cartoon booklet, "Attempted Murder," explaining the importance of safety head protection

and the "care and feeding" of hard hats, has been prepared by **E. D. Bullard Co.** It is available to all safety engineers for distribution to men who wear hard hats. The booklet contains case histories graphically illustrated with cartoons to dramatically demonstrate the importance of wearing safety hard hats and the importance of wearing them correctly. "Attempted Murder" is available from **E. D. Bullard Co.**, 2680 Bridgeway Blvd., Sausalito, Calif.

Operation Traxcavator

Another of a series of Operator's Guides published by **Caterpillar Tractor Co.** is now available. The 12-page, four-color Operator's Guide for Caterpillar No. 977, No. 955 and No. 933 Traxcavators presents basic information on the operation of Traxcavators and the jobs they can do. The booklet pictures operating components found on all three Traxcavator models. Step by step, each phase of the complete operating cycle is explained in detail. Then, the operator is shown the fundamentals of basement excavation, the proper method of loading, back-filling, clean-up work, grading, spreading, etc. Information on various Traxcavator attachments is also included. For this informative booklet, write for Form No. 32109-DE636 to **Caterpillar Tractor Co.**, Peoria, Ill.

Rosco spec sheets

Two specification sheets, punched for notebook filing, describe the Rosco Model MCC Calcium Chloride Applicator for road treatment and soil stabilization, and the Rosco Self-Propelled Roller with nine pneumatic tired wheels. Features and specifications are listed and photographs accompany the text. Write to **Rosco Manufacturing Co.**, 3118 Snelling Ave. So., Minneapolis 6, Minn., for data sheets 564B and 560B respectively.

Typical Lumber Designs

Nearly 300 designs of wood structures are listed and illustrated in the new 1957 edition of "Typical Lumber Designs," just issued by **Timber Engineering Co.**, 1319 18th St. N. W., Washington 6, D. C. The typical designs, employing the Teco connector system of engineered timber con-

struction, illustrates recommended design practice with timber connectors. Quantities and material lists accompany each design. More than 220 of the listed designs are available from **Timber Engineering Co.**, a majority of which are free to designers. Also listed are many typical designs available from Southern Pine Association and the West Coast's Lumbermen's Association.

Thermoid Company issues catalog

Twenty-three products for the construction industry are described in a new "Contractors' Products" catalog published by the Industrial Rubber Division of **Thermoid Company**, Trenton 6, N. J. The 12-page manual sets forth application data, construction details and size specifications of three types of conveyor and elevator belting; 14 types of air, water, steam and welding hose and the various types of brake lining and blocks manufactured by Thermoid Company for automotive and construction equipment. Dimensional and construction data on standard and "Hi-Capacity" V-belts produced by the firm are given. Nineteen cutaway drawings show construction details of many of the products included in the manual.

Cleveland Trencher brochure

The Cleveland 80W, a three-way machine for the construction and utilities fields, is the subject of a new 12-page color bulletin published by **The Cleveland Trencher Co.**, 20100 St. Clair Ave., Cleveland 17, Ohio. Special design and construction features of the 80W are explained in detail and on-the-job photographs and case history reports demonstrate the versatility of this machine which performs the related functions of pipelaying, backfilling and tamping. Complete dimensions and specifications of the unit are given.

Tractor attachments by Hyster

An eight-page illustrated pamphlet offered by **Hyster Company** shows the complete line of tractor-mounted accessories for Caterpillar-built tractors, including heavy-duty Towing Winches, Worm Drive Winches, Hyspeed Winches, Oil Well Servicing Winch and the Hyster "Donkey" hoist and Hyster yarder. Also presented is the Hyster developed and exclusive tractor-mounted "Hystaway" excavator-crane which can be equipped as a Dragline, Clamshell, Crane, Pile Driver, Shovel or Back-

Coming VERY SOON!



A FAR MORE POWERFUL, FASTER AND EFFICIENT JACKSON VIBRATORY COMPACTOR

Combines all the versatility and wide adaptability features* that contributed to making the present JACKSON VIBRATORY COMPACTOR the predominant compacting medium on nearly all major paving projects! By all means get the complete facts concerning this new machine before making any commitments! Write today for literature which will soon be available!

There are more Jackson Vibratory Compactors in use than all other makes of pan-type compactors combined.

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* ADAPTABILITY FEATURES OF PRESENT JACKSON COMPACTOR WHICH WILL ALSO CHARACTERIZE THE NEW MACHINE.



6 COMPACTING UNITS in work-head for maximum coverage.



2 COMPACTING UNITS in twin hook-up self-propelling. One man readily compacts up to 4,000 sq. ft. per hour in 10" layers.



1 COMPACTING UNIT fitted with operating handle and narrow base. Just right for the otherwise unreachable spots.



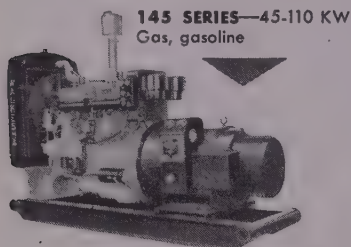
3 COMPACTING UNITS in tandem and staggered. One of many hook-ups to exactly suit conditions.



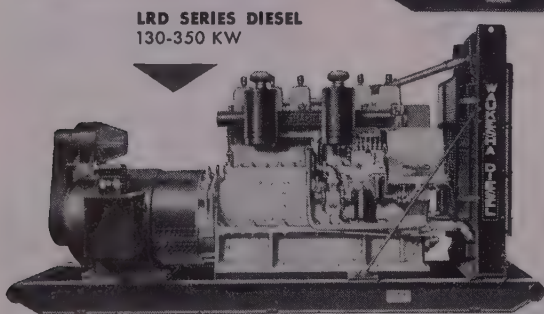
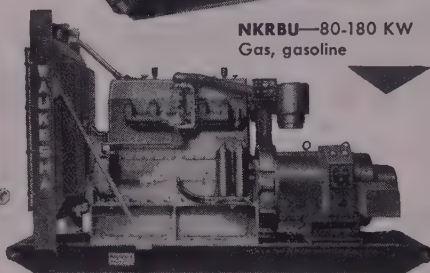
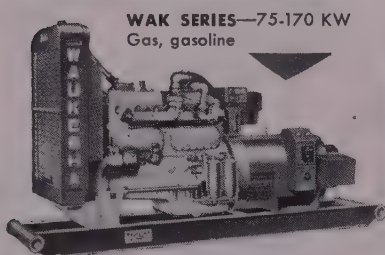
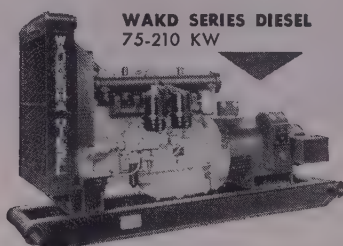
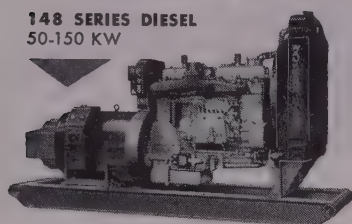
4 COMPACTING UNITS just fit this widening job. Change required only a few minutes.

NOW— a complete line of WAUKESHA Industrial ENGINEATORS®

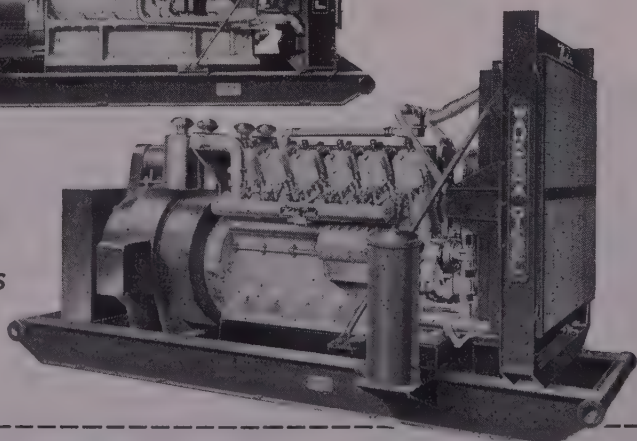
50-700 KW • NATURAL GAS • LPG • GASOLINE • DIESEL



A superb line of Enginators— backed by over 50 years' experience in building heavy-duty engines and electrical equipment. For reliable performance on all fuels, these accurately balanced Waukesha engine-generator combination units supply smooth, steady power in continuous, intermittent and standby service.



VLR SERIES—250-730 KW
LPG, natural gas, Diesel



WRITE FOR
BULLETINS FOR
THESE AND
OTHER MODELS

hoe. The brochure can be obtained by contacting any Caterpillar-Hyster dealer or writing Hyster Company 2902 N.E. Clackamas St., Portland 8 Ore.

White asphalt plant described

A new circular, describing the new White Model L-10 asphalt plant, is available from **White Manufacturing Co.**, Elkhart, Ind. The brochure opens to a full picture of the unit and is accompanied by a complete and concise text covering the features, dimensions and operating costs of this stationary or portable asphalt plant which has a hot mix capacity of 20 tons per hour. Photographs of typical installations are included. Ask for Catalog No. 47.

Small Diesel information

A new catalog of small Diesels has been issued by **American Marc Inc.**, 1601 West Florence Ave., Inglewood, Calif. Last year this company purchased the Diesel Engine Division of Hallett Manufacturing Co., and are producing an improved line of Hallett low-horsepower, lightweight air-cooled engines. The new 30-page catalog gives full data and specifications of the complete line of American Marc-Hallett engines. Complete specifications are given on 20 basic American Marc prime movers and conversions. Also included are full installation data and profile drawings, performance curves, complete lists of available attachments and accessories, and a detailed discussion of air-cooled small Diesels.

New arc welding machine catalog

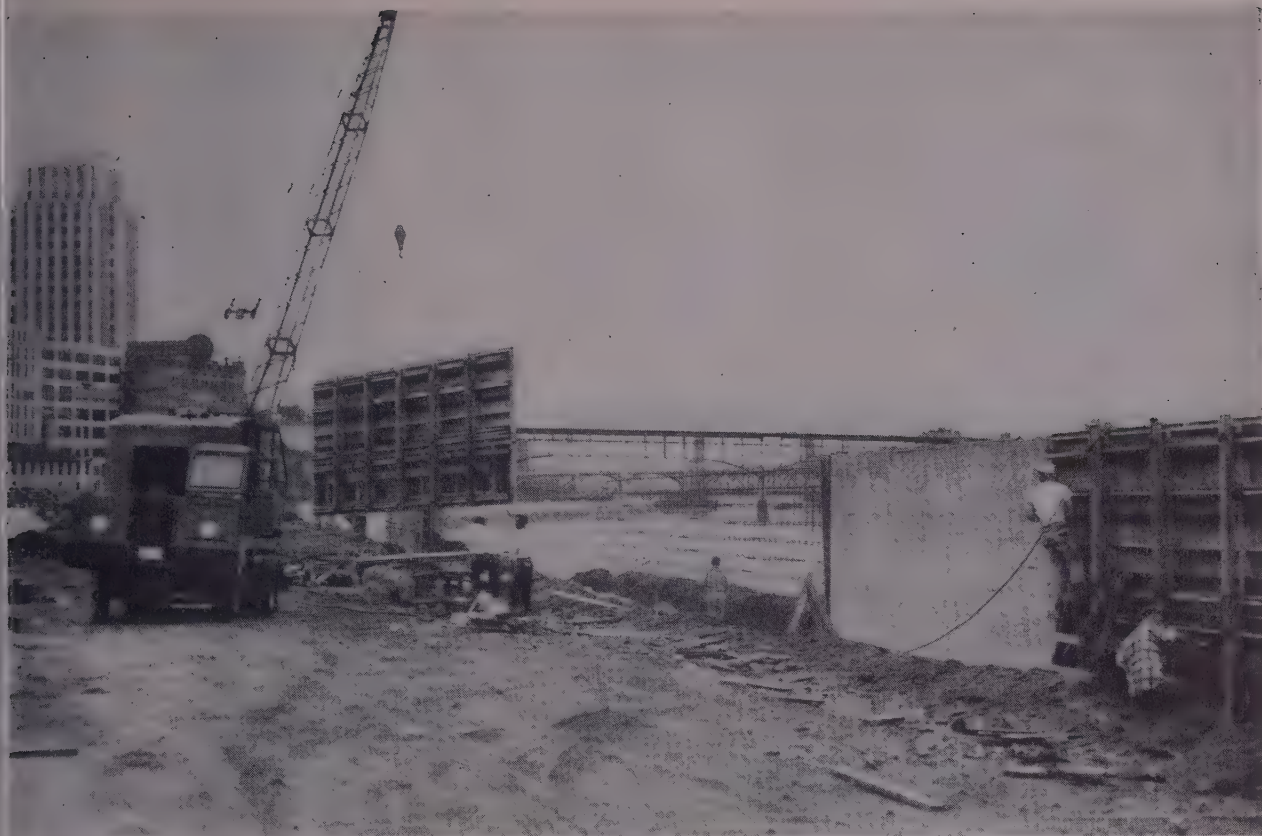
A new arc welding machine and accessory catalog is now available from **Air Reduction Pacific Co.** Described and illustrated are ac. and dc. engine driven arc welders for construction and maintenance. Specifications for each machine, from ampere ratings to outside dimensions are included. A copy can be obtained by writing Air Reduction Pacific Co., 220 Bush St., San Francisco, Calif. Specify form ADC 708C.

Equipment costs and bidding

"Lowest and Best Bid" is the title of a new booklet just released by **Caterpillar Tractor Co.** which shows the points that a prospective construction machinery buyer should consider in evaluating the real costs of owning and operating that machinery. The booklet emphasizes the importance of cost-per-hour through charts comparing machines actually in operation on the job. Write to Caterpillar Tractor Co., Peoria, Ill., specifying Form No. 32323.

Portable duplex plants

The new Pioneer 44-45 Series of portable crushing and screening plants is the subject of two pieces of literature just issued. Form 661, an eight-page brochure, contains a large



2,400 foot retaining wall poured prior to construction of Shepard Road, a main traffic artery in St. Paul, Minnesota.

70 feet of river retaining wall completed in one pour by **GANG FORMING**

SYMONS Wide Panel Forms



Symons Steel Strut Wide Panel Forms have 2 x 4 cross members to strengthen the panel and minimize deflection when pouring. Panels are built in 6' and 8' lengths and 30", 36" and 48" widths. Fewer panels per job are required with Steel Strut Wide Panels.

Pouring of a 2,400 foot retaining wall along the north bank of the Mississippi River in downtown St. Paul was accomplished with Symons Wide Panel Forms made up in gang sections of 10' x 24' and 15' x 24'. Panels 4' x 6' and 3' x 6' were used to form the sections.

Hurley Construction Company, St. Paul, contractor on the job, used only 5,400 square feet of Symons Wide Panel Forms. By gang forming, Hurley was able to speed construction and meet tight time schedule. 70 lineal feet of concrete was poured in one pour with a maximum pour of 700 lineal feet in one week. Walls were battered, 19 inches at the bottom and 12 inches at the top.

Handling of the sections with a crane was made easy by using a cable behind the top waler and a 3 by 8 plank permanently bolted about 18 inches from the bottom of the section. Walers and stiff backs were put on permanently.

Engineering Service—Our Engineering service includes preparing, from your plans, a complete form layout and costs sheets—no charge or obligation. For additional information on Symons products and services send for our **FREE** catalog.



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Phone Lockhaven 9-9159

San Leandro, California

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North
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St. Louis Pk. (Mpls.), Minn.
Tel.: West 9-4678

South
509 Yorktown St.
Dallas, Texas
Tel.: Randolph 5502

East
John A. Crockett, Inc.
King of Prussia (Phila.), Pa.
Tel.: Broadway 5-2691

cutaway illustration showing flow of material for simultaneous production of four product sizes, diagrams of nine different screen arrangements, field reports and photos, text explaining plant features, and brief specifications. Complete specifications, as well as diagrams showing arrangements of delivery conveyors, are given in Form SED 32. Both can be obtained by writing to **Pioneer Engineering**, Division of Poor & Co., Inc., 3200 Como Ave., Minneapolis 14, Minn.

Yale publishes bulletin on new rail king tractor

Yale Materials Handling Division, **The Yale & Towne Manufacturing Co.**, has published a comprehensive bulletin describing its new Rail King Tractor for use with monorail hand and electric hoists up to three tons capacity. The literature includes all the features of the electric powered unit complete with dimensions, travel speeds and performance curves.

Asphalt liners manual

An informative 32-page manual containing complete and detailed information on Seal Tight Hydromat asphalt liners is now available from **W. R. Meadows, Inc.** The manual discusses applications and design factors of Hydromat liners, provides technical data for engineers and guide specifications for materials. One section is devoted to guide specifications for Hydromat reservoir lining, and general engineering data are presented in easy-to-read conversion tables. The text is illustrated with photographs and line drawings. For your copy of this comprehensive manual, write to **W. R. Meadows, Inc.**, 2-18 Kimball St., Elgin, Ill.

Motor scraper catalog

Design, engineering, construction and operating features of the Allis-Chalmers TS-360, 20-cu. yd. motor scraper are described in a new 16-page catalog (MS-1104) now available from the Construction Machinery Division, **Allis-Chalmers Manufacturing Co.**, Milwaukee, Wis. Augmenting the text in the two-color catalog are pictures and illustrations.

Le-Hi hose couplings

A new eight-page bulletin describing and illustrating Le-Hi heavy duty high pressure hose couplings was recently published by the Le-Hi Division of **Hose Accessories Co.**, 2704 No. 17th St., Philadelphia 32, Pa. This new publication covers applications of high pressure air, steam, gas, hydraulic, liquid, etc. in the construction industry. Ask for Bulletin No. 115.

Tips on diamond core drilling

Publication of the second edition of a helpful handbook on diamond core drilling has been announced by the **Joy Manufacturing Co.** Entitled "Do's and Don'ts for Diamond Core Drilling," this revised edition sets forth in simple terms basic techniques which apply to all diamond drilling. The 200-plus operating tips listed in the booklet range from care of bits to use of wrenches. In addition, there are sections on diamond bit recommendations for various geological formations and general information about diamonds. Write to **Joy Manufacturing Co.**, Oliver Bldg., Pittsburgh 22, Pa., for a copy of Bulletin D-38.

New series of educational bulletins on wire rope

"Rope Dope" has become a familiar title of a series of educational bulletins published by **Union Wire Rope Corp.** Now off the press is Volume No. 5, in which the accumulation of recommended practices has been reorganized and is carried in more normal sequence through seven different bulletins. Much new information has been included. For example, in Rope Dope No. 1 of the new series is an entirely new formula to predetermine the relative service life of different rope constructions. Upon request, wire rope users will be put on the mailing list for this new series. Address **Union Wire Rope Corp.**, 2146 Manchester Ave., Kansas City 26, Mo.

Libby facilities brochure

The **Libby Steel Construction Corp.**, steel fabricators on major bridge, dam, and building projects in the West for the past 39 years, has announced the release of an informative new facilities brochure. Setting forth the company background and personnel, listing and illustrating various important jobs handled by the firm and describing Libby's varied services, the booklet is available upon request from the company, 1107 North Highland Ave., Hollywood, Calif.

Bituminous hauling tanks

A four-page bulletin on Etnyre Model LW "Load-Topper" bituminous hauling tanks illustrates and describes these new aluminum jacketed tanks for transportation of hot bituminous materials and heavy fuel oils. Bulletin discusses design and construction advantages, illustrates and gives specifications on standard and auxiliary equipment. Numerous photographs and line drawings give fast evaluation of features. Write **E. D. Etnyre & Co.**, Oregon, Ill.

Shunk offers new literature on reversible automatic spreader

An illustrated bulletin describing the new Shunk Torwel Front and

Rear Reversible Automatic Highway Spreader has been released by **Shunk Manufacturing Co.**, Bucyrus, Ohio. Key feature of the machine is its versatility. It can be installed to spread in front of the rear wheels for ice control work and then be reversed as a single unit for asphalt sanding and other types of material spreading. Request Bulletin 1-57, "Shunk Torwel Highway Spreader."

Water repellent for highways

"Spallbar Water Repellent for Modern Highway Protection," an illustrated six-page folder, tells how repellents based on silicones protect concrete highways, bridges, and other concrete constructions from spalling and other troubles. Twenty-four hour immersion tests with concrete treated with Spallbar water repellent showed that the amount of water absorbed was reduced by 75%. The brochure can be obtained by writing to **Silicones Division, Union Carbide and Carbon Corp.**, 30 East 42nd St., New York 17, N. Y.

Mobile drill accessory catalog

A 50-page catalog of accessories for mobile drills has been published by **Mobile Drilling, Inc.** Included in the catalog is complete information on mobile augers and accessories; drilling heads and bits; core barrels, bits and accessories; fishing taps and casing; drill rods, couplings and subs; hoisting and driving equipment; winches and water accessories; and soil sampling equipment. Specification tables and parts diagrams aid selection of proper accessories. Literature on the complete line of Mobile Rotary Drills is included in the catalog, a copy of which may be obtained from the company at 960 N. Pennsylvania St., Indianapolis 4, Ind.

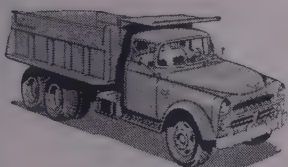
Selection guide for air compressors

A new data sheet listing construction details, specifications and models of air compressors in the ¼- to 20-hp. range has been issued by the **Brunner Manufacturing Co.**, 11 Fisher St., Utica, N. Y. This bulletin provides data useful in selecting the right compressor for a specific job in every industry. Brunner air compressors, single and two stage are available either for electric motor or gasoline engine drive. Simple compressors, single or two stage are also available with or without flywheel.

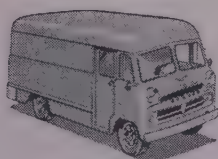
Fisher issues 1957 catalog

The new 1957 Fisher Utility catalog of M-Scope electronic instruments for utilities is now available. Included are the M-Scope Pipe Finders, two new transistorized leak detectors, a completely new line of

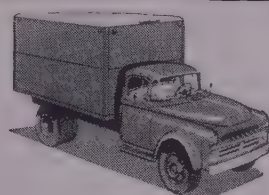
DODGE *PowerGiants*



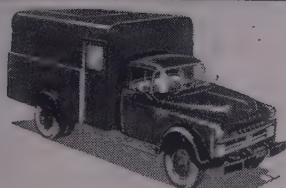
Dodge T700
Tandem



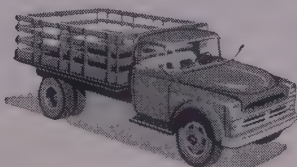
Dodge P300
Forward-Control



Dodge 600
with Van Body



Special bodies fit readily
on any Dodge chassis



Dodge 500
Stake



Dodge 400
with Beverage Body

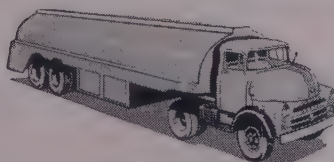
MOST **POWER** OF THE LOW-PRICED **3**

... In every weight class

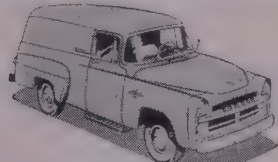
Dodge Power Giants give you an extra bonus of power.

From 204-hp. pick-ups to 232-hp. tandems, Dodge V-8's outpower the "other two" by as much as 31%. This extra power reduces engine strain, saves wear. What's more, Dodge engines, both V-8's and 6's deliver full power on regular gas.

Dodge hauls more payload, too . . . up to one-third more. And Dodge offers major advantages in driving ease, cab comfort and prestige-building good looks. See for yourself. Your Dodge dealer has a Power Giant to meet every trucking need.



Dodge C.O.E. 700
Tractor



Dodge 100
Panel

Collect Your Extra Dividends April is Extra-Dividend Month

Get extra dividends in power, extra dividends in payload, extra dividends in performance . . . plus a special extra-dividend deal on a new Dodge Power Giant.

DODGE TRUCKS WITH THE FORWARD LOOK 



This sure beats workin'

ALL-NEW MASTER TURN-A-TROWEL HAS POWER BLADE ADJUSTMENT

"This sure beats workin'", said one operator after he'd tried the all-new Master "Powermatic" 34" trowel. "I've never had it so easy in my life . . . or done a better job."

No wonder he likes it. He pushes or pulls a knob and *engine power* tilts the combination blades to float or finish.

Know what that means? He gets exactly the job he wants, faster and easier.

He doesn't have to "fight" this trowel, either. The Master's only 14" from the slab to the *top* of the engine . . . has the *lowest center of gravity* of any power trowel. Wobble's a thing of the past. And the direct drive puts *all* the engine's power to work.

You'll like the all-new Master, too. The *automatic* clutch that let's the Briggs & Stratton engine get to operating speed before engaging the blades. The "dead man" control that *idles* the engine when you let go the handle. The stationary guard ring. They all make troweling easier and better.

The all-new Master in 34" gasoline-drive is now ready. Three or four blades, whichever you prefer. *Power blade-adjustment*, *direct drive*, *lowest center of gravity* and other new features make it your best buy. You'll like it. See it at your distributors or write us for full details.

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ANDREWS MACHINERY OF WASHINGTON, INC. Seattle, Washington

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OREGON RENTAL & EQUIPMENT SALES CO. Portland, Oregon

POWER EQUIPMENT COMPANY Denver, Colorado

SHRIVER MACHINERY COMPANY Phoenix, Arizona

SIERRA MACHINERY COMPANY Reno, Nevada

WEST COAST MASTER, INC. Los Angeles, California

WORTHAM MACHINERY COMPANY Casper, Cheyenne, Newcastle,
Riverton, Rock Springs and Sheridan, Wyoming

transistorized corrosion control instruments, and water well testing equipment. **Fisher Research Laboratory, Inc.**, 1961 University Ave., Palmdale, Calif.

Verti-Line industrial pumps

Verti-Line close-coupled industrial pumps are described in a 12-page brochure published by **Layne & Bowler Pump Co.**, 2943 South Vail Ave., Los Angeles 22, Calif. Included is an easy-to-use table for determining horsepower, capacity and head for vertical pumps. The brochure also contains sectional views, material specifications, schematic application drawings, and photos of installations.

White-Autocar Cost Record Book

The 35th annual edition of the White-Autocar "Cost Record Book" has just been issued by **The White Motor Co.**, 842 East 79th St., Cleveland 1, Ohio. The book provides a comprehensive yet simple system for analyzing truck operating costs for any size fleet in both highway and off-the-road operation.

On the job with the Austin-Western hydraulic crane

Two illustrated folders describe specific case histories of contractors, one Eastern and one Western, in using the Austin-Western Hydraulic crane. Each brochure describes the particular job application and operating characteristics of the rig. An itemized list of operation costs is included. These brochures are available from **Austin-Western Works**, Baldwin-Lima-Hamilton Corp., 601 Farnsworth Ave., Aurora, Ill.

Allis-Chalmers literature

Three new pieces of literature are available from the Construction Machinery Division, **Allis-Chalmers Manufacturing Co.**, Milwaukee, Wis. Usage information of the HD-11G and the HD-6G Diesel powered crawler tractor shovels highlights brochures MS-1137 and MS-1126, respectively. The matched attachments designed specifically for each model are shown both through line drawings depicting them in action, and with catalog views. The four pull-type scrapers in the Allis-Chalmers Construction Machinery line are featured in the third piece of literature MS-1149. Each scraper model is shown in action. Catalog views of each model scraper, and illustrations of some of the design features of the Allis-Chalmers scraper line highlight the literature.

Brochure on highway guardrails

"Flex-Beam guardrail for safer highways" is a new publication from **Armco Drainage & Metal Products, Inc.** It gives a brief history of early protective devices, describes the requirements for good guardrail, and details the advantages of continuous



A-W Crushing Plant of J. J. Cronin Co., showing primary crusher at extreme left. Washer is in center of photo. Washed sand is delivered by the conveyor on left of washer, specification material by the three stock-piling conveyors at the right.

AUSTIN-WESTERN Crushing Plant giving high-speed production for J. J. Cronin Co., North Reading, Mass.

John Cronin reports: "We spent more than a month checking all makes before we purchased our Austin-Western plant in April, 1954. Since then, we have had every reason to be pleased with our decision. Production is fast, and we have very little downtime, as a result of the excellent engineering and rugged construction of the equipment. Present production includes: concrete sand and specification material in $\frac{1}{2}$, $\frac{3}{4}$ and $1\frac{1}{2}$ in. sizes."

In this operation, raw feed is delivered to a 36-in. feeder-grizzly combination and passes into the primary crusher, which has a jaw of 20 x 36 in. This is V-belt driven by a 75 hp slip-ring motor. The material is then conveyed to a 4 x 12 ft. single-deck screen. Larger sizes pass into a cone crusher,

which is V-belt driven by a 60 hp slip-ring motor. The washer is a 4 x 16 ft., 3-deck screen type, equipped with spray pipes. A single convenient push button station controls the entire closed-circuit system.

It will pay you to compare Austin-Western design and construction features before you invest in a crushing and screening plant. Each Austin-Western plant is designed to solve a particular production problem. Our engineers would welcome the opportunity to discuss your needs with you and to recommend the proper equipment.

See your nearby Austin-Western distributor today, or write to Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

Edward R. Bacon Company San Francisco, California
Columbia Equipment Company
Portland, Oregon; Seattle, Spokane, Washington
N. C. Ribble Company Albuquerque, New Mexico
C. D. Roeder Equipment Company Reno, Nevada
Shriver Machinery Company Phoenix, Arizona
Smith Booth Usher Company Los Angeles, California

Western Machinery Company Salt Lake City 15, Utah
Western Machinery Company San Francisco 7, California
Keremi Tractor and Equipment Company, Cheyenne, Casper, Wyoming
Hall-Perry Machinery Company
Billings, Butte, Great Falls, Missoula, Montana
Engineering Sales Service, Inc. Boise, Idaho
Macdonald Equipment Company Denver 16, Colorado

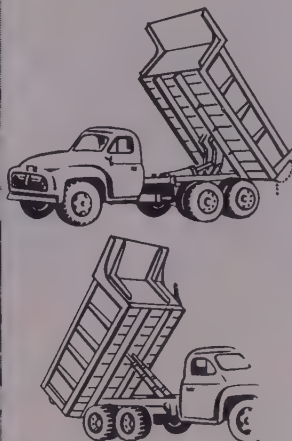
AUSTIN-WESTERN
CRUSHING, SCREENING AND WASHING EQUIPMENT



BALDWIN-LIMA-HAMILTON
Construction Equipment Division — LIMA WORKS



"Job Insurance" FOR HEAVY-DUTY HAULING



Marion builds a complete line of underbody hoists (top illustration) and telescopic hoists (bottom illustration); standard, medium and heavy duty dump bodies. The photo shows an MFR 80, 8 cubic yard body with horizontal and vertical side bracing; an HD-105 double arm underbody hoist is used for dumping.

MARION HEAVY-DUTY BODIES & HOISTS

Marion heavy duty bodies and hoists are designed for performance, dependability and long life to give you the most in results for your money.

First quality materials and workmanship . . . simple design . . . heavy duty construction mean increased payloads with minimum down time. It will pay you to compare! You'll then know why profit-conscious owners all over the world insist on Marions for all types of hauling and dumping operations.

MARION

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MARION METAL PRODUCTS CO.
MARION, OHIO, U.S.A.

SEE YOUR MARION DISTRIBUTOR AND SAVE!

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2626 South Fourth Avenue
Tucson, Arizona

J. H. Holan Corp
302 East Pima St.
Phoenix, Arizona

Truck Body Company
2865 East 26th Street
Los Angeles 23, California

Ruckstell California Sales Co.
2985 Ford Street
Oakland 1, California

Ruckstell California Sales Co.
452 West Yolo
Fresno, California

Woebler Auto Body & Mfg. Co.
4950 Jackson St.
Denver 16, Colorado

Pacific Body Builders, Inc.
1812 N. E. Grand
Portland 12, Oregon

Alloy Manufacturing
Route No. 4 (West on U. S. 10)
Spokane, Washington

Washington Truck Equipment, Inc.
3626 Airport Way
Seattle 4, Washington

Erwin H. Johnson, Inc.
Box 1831, 1101 3rd St., N.W.
Great Falls, Montana

flexible beam action inherent in the Flex-Beam type. The booklet also contains reference data, illustrations of typical installations, including close-ups of joints, data on curved Flex-Beam, and a representative case history safety record. Copies may be obtained by writing to the company's Product Information Service, Middletown, Ohio, and asking for FB-3456.

Pressure treatment of Western woods

A handbook of specifications for pressure treatment of Western woods is now available for distribution by the American Wood Preservers' Institute. This is the first time a specification book devoted exclusively to Western woods has been issued in the pressure treating field. The books are available by writing American Wood Preservers' Institute, 1410 S.W. Morrison St., Portland 5, Ore.

Sales and service directory

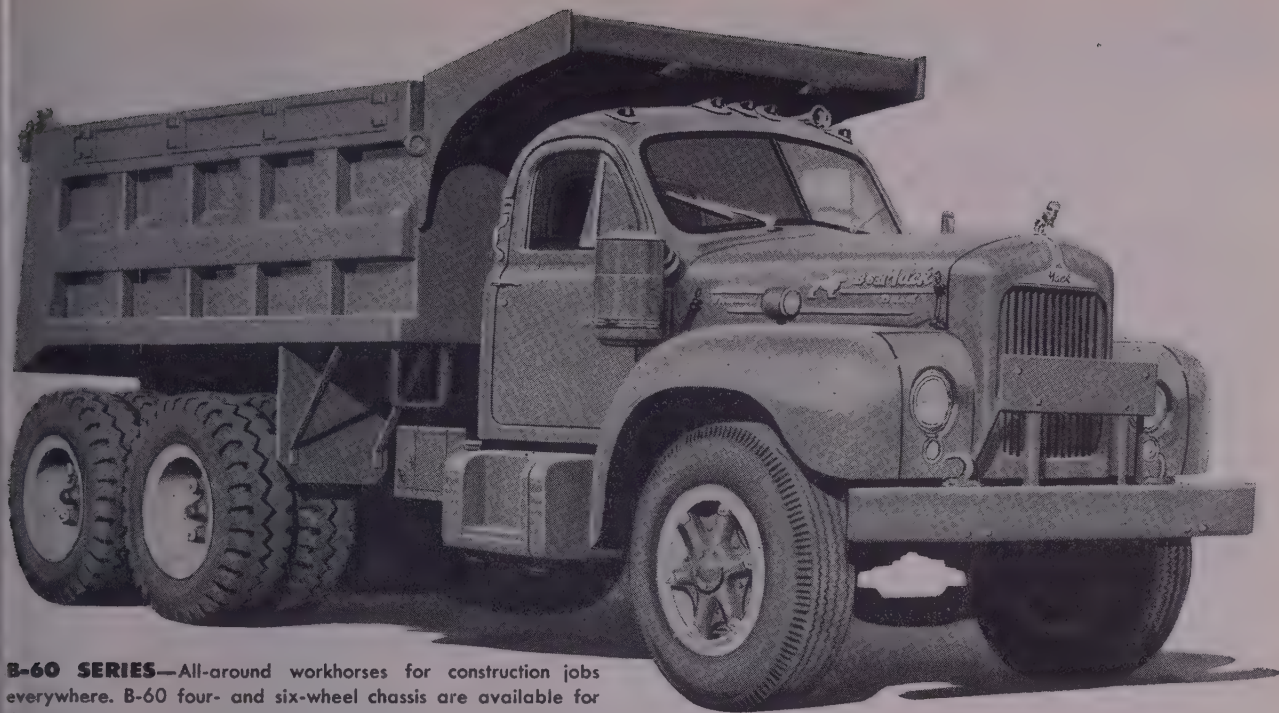
Hartford Machine Screw Co., Division of Standard Screw Co., manufacturers of Roosa Master, the modern fuel injection pump, has released a new directory of their authorized sales and service agencies around the world. Copies may be obtained by writing direct to Roosa Master Fuel Injection Division, Hartford Machine Screw Co., Hartford 2, Conn.

New Dumpcrete catalog

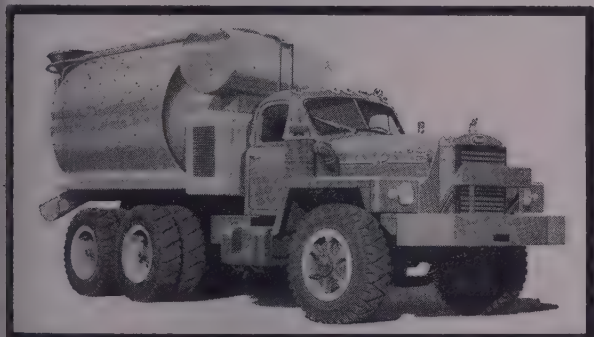
Information on the newly-designed Dumpcrete is now available. The new catalog describes how the new body can handle up to 4 cu. yd. of concrete when mounted on single-axle truck and up to 6 cu. yd. when mounted on tandem-axle truck. The new Dumpcrete catalog illustrates all features, and can be obtained by writing Manufacturing Division, Maxon Construction Co., 2600 Far Hills Ave., Dayton 9, Ohio.

Construction pump brochure

A ready-reference chart enabling contractors and builders to quickly spot the type of pump best suited to specific construction jobs is featured in a new catalog bulletin prepared by Barnes Manufacturing Co., Mansfield, Ohio. The chart lists, down vertical columns, such pumping applications as dewatering, sprinkling, equipment cleaning, tunneling, gravel washing, sewer lines, dam building, etc. Typical users of the pumps are tabbed horizontally. Numbers appearing under these columns refer to various types of Barnes pumps, recommended for the use given, which are described and correspondingly numbered on the opposite page. The pumps illustrated include engine-driven, electric and universal driven self-primers, portable, diaphragm, and standard centrifugal pumps.



B-60 SERIES—All-around workhorses for construction jobs everywhere. B-60 four- and six-wheel chassis are available for dumpers, concrete mixers, equipment hauling tractors, and flat-bed trucks ... powered with Mack Thermodyne® gasoline or diesel engines in the 170 or 205 horsepower range.



B-80 SERIES—Largest and most powerful highway and off-highway chassis in the Mack line. B-80 tractors for heavy carry-all trailers and B-80 truck chassis for mixers and dumpers are available in four- or six-wheel models ... powered with 170 to 205 hp Mack Thermodyne gasoline or diesel engines, or stock diesels in the 250 to 300 horsepower class.



B-40 SERIES—Widely popular for maneuverability and rugged strength. B-40 four- or six-wheel dumpers, mixers, flat-bed trucks and tractors are especially valued for their bonus capacities, economy, and handling ease. Powered by Mack 150 hp Thermodyne diesel or Magnadyne gasoline engines.

Most in demand ... for the most demanding jobs

For dump, mixer, or flat-bed truck service in highway and off-highway hauling, Mack large-capacity trucks and tractors will do your toughest, most demanding jobs more efficiently, more economically, and more profitably. More, Mack offers you the widest selection of heavy-duty units with gross vehicle weights ranging from 25,000 to 65,000 lbs. and tractors for carry-all trailer service up to 175,000 lbs. G.C.W.

Have your local Mack representative give you complete details and specifications. Mack Trucks, Inc., Los Angeles, Denver, San Francisco, Seattle, Portland, Salt Lake City, Albuquerque.

MACK
first name for
TRUCKS

AK39

NEW EQUIPMENT

For your convenience in obtaining more information quickly, the manufacturer's address is provided with each review.

Telescoping boom for Quick-Way crane-shovels

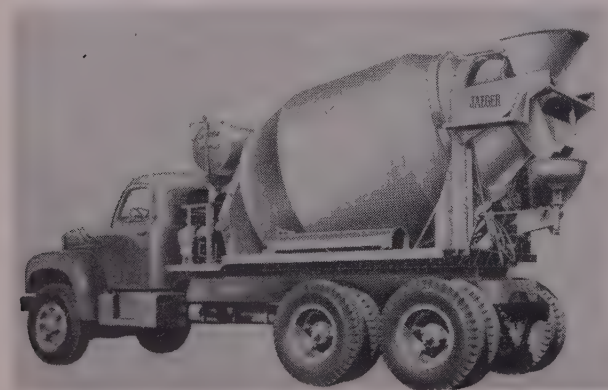


A new hydraulic reaching, grading, digging attachment for Crane-shovels has been introduced by the **Quick-Way Truck Shovel Co.**, P. O. Box 1800, Denver 1, Colo. The "Chore-Master" is a telescoping boom which mounts on a special gantry and is interchangeable with other standard attachments on "Quick-Way" cranes. The tele-

scopic action is operated by a large hydraulic cylinder. A second hydraulic ram opens and closes the bucket with a wrist action. A hydraulic motor rotates the bucket 50 deg. in either direction on the end of the boom. The hydraulic system includes a tank and a tandem pump which operates off the crane engine. Hydraulic hoses extend to the front of the machine where they attach to the hydraulic lines on the boom by "quick-disconnect" couplings for rapid removal or installation of the attachment. The boom is raised by cable from the main hoist drum of the crane. Down pressure is applied by cable from the haul back drum. A cable from the boom hoist raises the special gantry which collapses for easy mounting and for traveling. All hydraulic actions are controlled by a single lever in the cab. The telescoping boom extends to a radius of 33 ft. with the bucket open or retracts to a radius of 21 ft. The boom can be raised to an angle of 45 deg. enabling it to grade slopes as high as 27 ft. A digging depth of 13 ft. is also possible. These wide ranges make the "Chore-Master" an ideal tool for such specialized jobs as reaching in close quarters, digging close to obstructions, under bridges, digging and cleaning ditches and grading roadsides and slopes. The "Chore-Master" can be removed and other standard crane-shovel attachments can be installed on the machine in a few hours. The "Chore-Master" is available now on the "Quick-Way" Model 125A and will soon be available for other "Quick-Way" cranes and shovels.

Design improvements on truck mixers

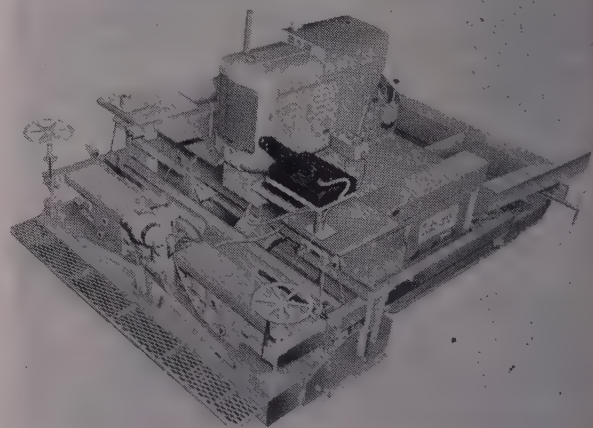
A new line of fast charging and discharging "F" model truck mixers, offering major design advancements and several hundred pounds reduction in weight, has been announced by **The Jaeger Machine Co.**, Columbus 16, Ohio. Choice of three-speed automotive or hydraulic reversing transmission is available with separate engine drive or



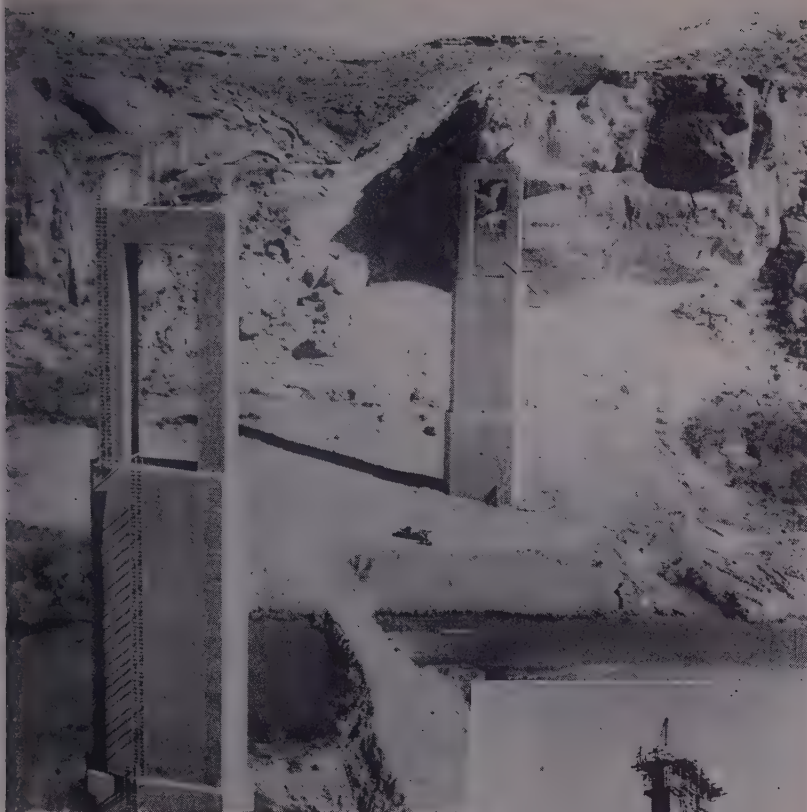
either front-of-engine or transmission power take-off. Design of front trunnion stand makes possible 4-in. shorter center of gravity in pto. applications. Rear cradle is of open-type design to prevent build-up of material and the drum rollers are fully enclosed with grout-proof bearings. All body weight is carried within the width of the truck frame. A water measuring tank in which a new type of controlled gravity feed replaces syphon feed, now eliminates all need for self-priming pumps, goosenecks, special valves or fittings. A 1½-in. straight centrifugal pump of simplified, compact design and increased (60 gpm.) capacity, is now standard on all models.

High speed bituminous paver features electrically-vibrated screed

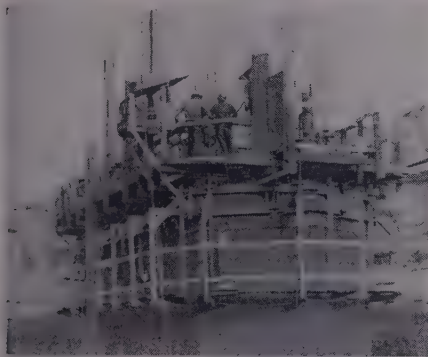
A completely new concept in bituminous paving has been incorporated into the Cedarapids Bituminous Paver, according to the manufacturer, **Iowa Manufacturing Co.**



of Cedar Rapids, Iowa. The use of an electrically-vibrated screed which "irons" the bituminous material into a smooth, uniform, high-density mat permits paving at higher speeds than before because the vibrating action of the screed greatly reduces the possibility of tearing the mat or causing voids. The screed is of one-piece construction and is vibrated at 3,600 impulses per min. by four electric vibrators, each of which is controlled by a rheostat to regulate the intensity of vibration. It is made of special ½-in. steel plate which resists abrasive wear



COMPLETED 210' high reinforced concrete piers for Pecos River Bridge near Langtry, Texas. Designed under supervision of D. C. Greer, state highway engineer, Texas State Highway Department. Randle B. Alexander, bridge engineer. Whittle Contracting Co., Dallas, Texas, contractor. B. M. Heede, Inc., Long Island City, N. Y., consultant.



SLIP-FORMS start up bottom section of a pier. Three forms were used, one for each section.



BOTH RECTANGULAR COLUMN LEGS of upper tier were poured simultaneously. In about 90% of the pier elevation, alignment is within 1/16".



TEXAS HIGHWAY DEPARTMENT sketch of 1,310' long bridge on Highway 90, near Langtry, Texas. The 3-span continuous deck truss cantilever structure runs from rim to rim across top of the canyon—272' above the traditionally treacherous Pecos River.

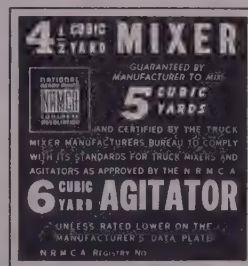
Texas Outwits an Outlaw

Hydraulically-jacked slip-forms raise monolithic piers a safe 210' above bad-acting Pecos River

ON U. S. HIGHWAY 90, near Langtry, Texas, where Judge Roy Bean pronounced rough Western justice and tender homage to the "Jersey Lily", Texas has built a "sky-high" span to lick the outlaw river that washed-out 2 lower-level structures in two successive years.

The new 1,310' long deck truss cantilever bridge is supported on 210' monolithic piers which were poured with slip-forms hydraulically raised by one man. Concrete of 3" 4" slump was placed in layers 2" to 4" deep and hand puddled. The seepage of excess water eased upward movement of the slip-forms.

A 1" jacking cycle averaged 1½ minutes. Use of 150° mixing water reduced concrete set-up time 20%, making possible a rate of placement as high as 11" per hour and never less than 5" per hour. In 20 weeks, 5,600 cu. yds. of Class A, 5-sack mix structural concrete were placed. Properly processed material and on-site deliveries paced to hourly progress were provided by truck mixers of certified design, capacity, mixing speed and water control accuracy.



You have a right to insist on this Rating Plate. It certifies compliance with the high industry standards maintained for your protection by the Truck Mixer Manufacturers Bureau.

BLAW-KNOX CONSTRUCTION EQUIPMENT DIV.
Mattoon, Ill.

CHAIN BELT COMPANY
Milwaukee, Wis.

CHALLENGE MANUFACTURING CO.
Los Angeles, Calif.

CONCRETE TRANSPORT MIXER CO.
St. Louis, Mo.

CONSTRUCTION MACHINERY CO.
Waterloo, Iowa

THE JAEGER MACHINE COMPANY
Columbus, Ohio

LeTOURNEAU-WESTINGHOUSE CO.
Indianapolis, Ind.

THE T. L. SMITH COMPANY
Milwaukee, Wis.

WHITEMAN MANUFACTURING CO.
Pacoima, Calif.

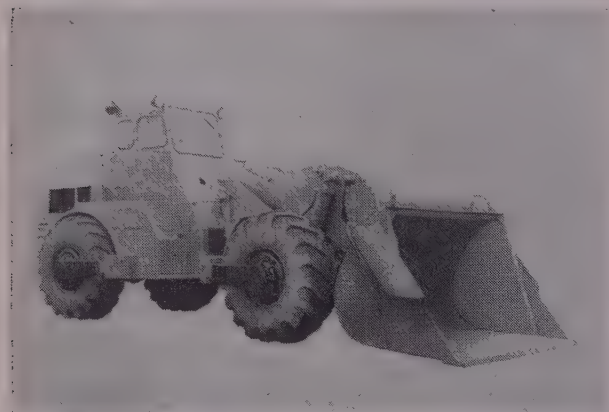
WILLARD CONCRETE MACHINERY CO., LTD.
Lynwood, Calif.

WORTHINGTON CORPORATION
Plainfield, N. J.

and distortion and is equipped with two screw adjustments with vernier type gages for controlling mat thickness. Paving width can be adjusted from 6 ft. to 14 ft. in 1½-in. increments. Heat from a 150,000 BTU oil burning heater is evenly distributed to the screed by an enclosed flue. Fifteen working speeds range up to 103 ft. per min., and three travel speeds vary from 1.15 to 2.19 mph. A separate reversing gear provides the same speeds in reverse movement. Featured also are automatic depth feelers, electric clutches and brakes. Full information available.

New model Scoopmobile has 4 wheel steering

A 6-cu. yd. Scoopmobile, a front end loader with a "break-out" lifting capacity of 35,000 lb. and a working

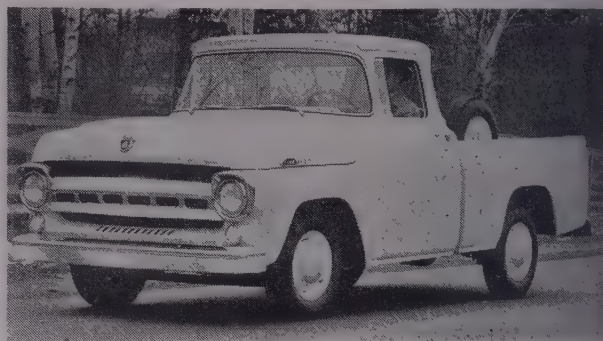


capacity of 25,000 lb., has been announced by **Mixer-mobile Manufacturers**. According to the manufacturer, exclusive features incorporated into the model LD20AD

are four wheel steering, two-axle oscillation, center pin coupling, non-rigid frame, complete operator safety and excellent visibility, interchangeable axles, steel fenders on all wheels, lateral bucket spotting, 100% "breakout" bucket action, and full chassis width cab. The LD20AD comes equipped with torque converter, powershift full reversing transmission, power steering, four wheel planetary drive, and roll-out high discharge bucket with variable discharge height. Complete details may be obtained from **Mixer-mobile Manufacturers**, 8027 N.E. Killingsworth St., Portland 20, Ore.

Ford introduces 1957 truck line

Ford's new 1957 truck line, introduced by Ford dealers in February, offers nearly 300 different models. The new line features new "Styleside" pickup models with streamlined load area 25% bigger than last year; a new series



of six tilt-cab transport truck models; a new Ranchero model which combines passenger car styling with all-around pickup truck utility; greater payload capacities



Switch off your Geiger counter

You won't need it. For whatever you need — from abrasives to zippers — the Yellow Pages will tell you where to call.

Look in the Yellow Pages whenever any business problem comes up. The chances are you'll find a complete list of qualified people to help you.

You'll find it fast in the YELLOW PAGES

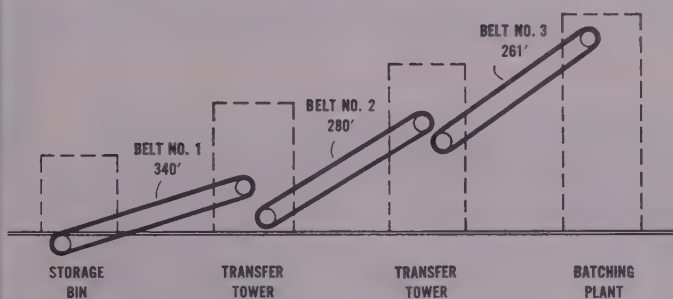




CONVEYOR BELTS

Push-Button Control and U. S. Conveyor Belts help turn out 120 cu. yds. of concrete per hour

FLOW CHART OF CONVEYOR BELT SYSTEM.



View from the top of the batching plant, looking down Belt #3. The excellent troughability and perfect alignment of this belt result from the use of Nylon in the carcass.

"This is the largest concrete plant* of its type in the world," says the plant's manager. "In aiming to turn out the best concrete at the lowest possible cost we require a highly mechanized operation."

And that's what this plant has. Almost 2,000 feet of U. S. Rubber's 30" wide U. S. Matchless patented Style XN conveyor belting carries raw materials through the reclaiming tunnel, then up a steep grade to a turn head—electrically controlled—and finally discharges the cargo into the always-

hungry jaws of the huge batching plant.

One man in a control tower oversees the entire operation, from storage pits to plant bins. The control board tells him when a bin is getting low. By pressing a button he can start one of the three U. S. Belts hauling sand, stone, or other aggregates to the proper bin. "We expect many years' service from these belts," adds the plant's president, J. Roy "Cap'n" Pennell.

This is another good example of U. S. Rubber's Three-Way Engineering, in which "U. S." engineers work as a team with the plant engineers and the conveyor system engineers . . . to obtain the *right* belt for the job. This type of assistance, plus a complete line of conveyor belting, can be obtained at any of our 28 District Sales Offices, or contact us at Rockefeller Center, New York 20, New York.

In Canada, Dominion Rubber Co., Ltd.

*Greenville Concrete Co., Greenville, S. C.



Mechanical Goods Division

United States Rubber



ZOILDEEZ

SERIES 3

Here is a supreme quality lubricating oil, specially blended to meet the exacting requirements of Caterpillar tractors. ZOILDEEZ, Series 3, keeps contaminants in fine suspension prevents deposits from forming on friction surfaces. It is especially effective where fuels of high sulphur content are used. Every performance factor is improved: equipment starts quicker, valve action is more efficient and less oil and fuel is consumed. Zoildeez, Series 3, a new but proven product, is offered with the Pennzoil Company's assurance of economy consistent with protection and dependability.

An Approved Product of

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New Aid To Contractors!

Barnes Construction Pump Selector can help you avert costly delays—improve job-to-job efficiency—by moving more water faster, "on schedule!"

Unique chart inside shows typical construction jobs matched to pumps that do the job best—conveniently keyed to give you the right combination at a glance. Get yours from any of these Barnes distributors:



5702

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.

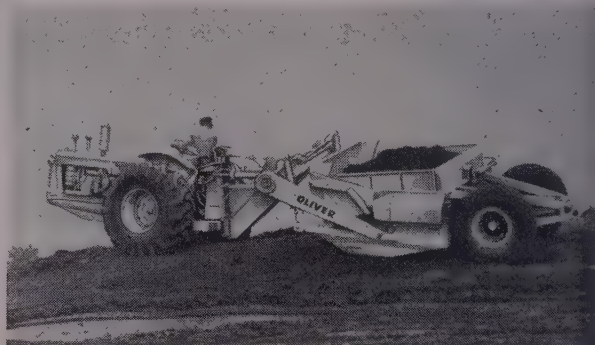
The Rix Co., Inc., San Francisco, Calif.

Write Department L-47 for details

in medium and heavy duty models; and an expanded parcel delivery series. Engine power throughout the line has been raised an average of 8%. Engines have a new rotor oil pump for more effective lubrication, a dry-type air filter that is more easily cleaned, new economical heavy duty carburetors, and lighter flywheels to permit faster acceleration. Hydraulic clutches are a new feature, standard for the whole line at no added cost. Four basic power plants are offered, with 27 different modifications available for special hauling service. Light duty models have new hypoid rear axles, with pinion gears straddle-mounted for longer life. In the new tilt-cab series, 1,100 lb. of vehicle weight have been shifted to the front axles to allow an extra payload of more than a half ton. The "Styleside" pickup body, with its 25% greater load area, is available on nine light duty models. Complete information on the new Ford truck line is available from the Ford Division, Ford Motor Co., P. O. Box 638, Dearborn, Mich.

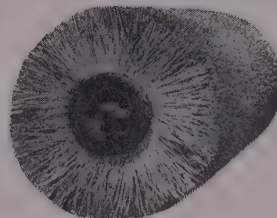
Oliver offers new, low-cost scraper

An entirely new scraper incorporating many new ideas of design and construction is now in production by The Oliver Corporation. The Model 990 has 6.7-cu. yd. capacity and is powered by a three-cylinder GM diesel of 77.4



drawbar hp. with six-speed transmission. Torque converter is also available as optional equipment. Power was selected to give the machine maximum working ability with low operating costs. Its compact size (8½ ft. width) with ample road speeds is designed to make job to job driving fast and easy. The new scraper has all-hydraulic design which gives smooth, responsive, positive steering and scraper operation, even in loose or sloping ground. Offset cutting with curved bowl arrangement results in rapid loading. Hydraulic pressure ejection provides a fast unloading cycle. A new bulletin, I-1051, is available upon request to The Oliver Corporation, Industrial Division, 400 West Madison St., Chicago 6, Ill.

Fast, expert service on SWEEPER REFILLING!



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

Ship us your worn street sweeper brooms. We refill cores up to 9' long with any of the standard sizes of Flat Steel Wire, Palmyra Stalks, Split Hickory or African Bass. Gutter brooms refilled. Service is very prompt, even during rush season. Contact your regular equipment dealer or send us his name.



PACIFIC COAST BRUSH CO.

1507 Santa Fe Ave., Los Angeles 21, Calif.



Close-up view of the Cat D9 push-loading a DW21 and scraper near Globe, Ariz. Twin Disc Torque Converter components are standard in the torque converter version of the powerful D9 and D8. Inset (left) shows Roy E. Hale, Superintendent, and Link L. Colvin, Co-owner of Copper State Construction Co.



"Torque converter gives the Cat D9 that extra 'boost' when you need it"

Roy E. Hale, Superintendent, Copper State Construction Co.

When Copper State Construction Co., Mesa, Ariz., took on the contract for building a clover-leaf on U. S. Highway 70 about 20 miles east of Globe, Ariz., it had to move some 70,000 cubic yards of earth—fast and profitably. So one of the powerful Cat D9's (equipped with Twin Disc Torque Converter components) was put on the job, push-loading Cat DW21's and scrapers.

Sizing up the D9's operations, Copper State's Superintendent Roy E. Hale commented: "This D9 is the machine we've been looking for. We like the torque converter drive. It makes the machine operate smoothly and will give it a lot longer life. And

when we need that extra 'boost' for tough material, the torque converter gives it to us—with full engine power!"

Little wonder contractors are specifying so many Cat D9 and D8 Tractors with torque converter drive. The torque converter permits the engine to operate at all times in its most efficient speed range . . . it automatically matches output torque to load demands . . . and its fluid connection absorbs those jolts and shocks that cause excessive wear and parts breakage.

Contractors everywhere agree that crawler tractors equipped with torque converter drives mean just this: less

maintenance, more production—and greater-than-ever profits! Specify a hydraulic torque converter drive in your next D8 or D9 crawler tractor . . . and don't overlook the advantages of Twin Disc Torque Converter drives in other types of industrial equipment or repowering jobs.



TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division) Rockford, Illinois

Branch Office: 2950 Leonis Blvd., Los Angeles 58, Calif., Phone LOgan 8-3309

Carrier among optionals on Pitman Hydra-Lift

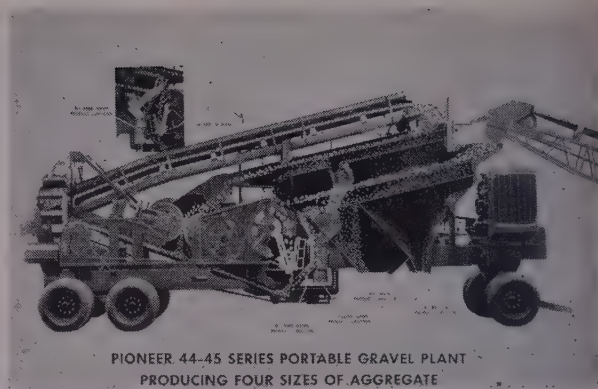
An especially designed carrier is now available as an optional with the Pitman Hydra-Lift, a truck-mounted crane with maximum lifting capacity of 6,500 lb. In announcing the new carrier, **Pitman Manufacturing Co.** also announced availability of three other new optionals to increase the Hydra-Lift's usefulness. One of these is a new type of boom that makes it possible to haul much higher capacity loads on any truck the Hydra-Lift is mounted on. The Hydra-Lift also is available now with a



hydraulically-driven loadline winch, plus a basket which can be attached to the boom tip for lifting a man into the air. The new cab-beside engine carrier has a wheelbase of only 144 in., permitting operation in extremely close quarters, yet there is also 144 in. of free space between the crane and the end of the frame. One of the unique features of the new carrier is that the operator can drive the truck and operate the crane from the same seat. For full details on Hydra-Lift and its new optionals, write Pitman Manufacturing Co., 300 West 79th Terrace, Kansas City, Mo.

Pioneer gravel plants feature four-deck screen

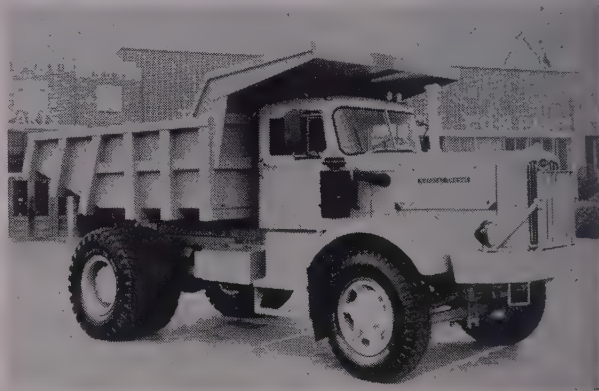
An entirely new series of portable duplex type gravel plants is now being manufactured by **Pioneer Engineering Works, Inc.**, 3200 Como Ave., Minneapolis 14, Minn. Designated the 44 and 45 series, the new line consists of four plants which are built around two basic models, the essential difference between them being in roll crusher size. The 44V is equipped with a 3024 twin roll crusher and the 45V with a 4022 twin roll crusher. Both use a 1036 overhead eccentric jaw crusher, a bucket elevator for intra-plant material transfer and a new four-deck four-bearing vibrating screen, complete with secondary spring suspension mounting. Through its flexible screen-



ing and spouting arrangement, plus availability of a full deck of scalping area ahead of the primary crusher and availability of a full deck of screening area, the new screen allows high total production of one, two, three, or four sizes of closely graded product. Both the 44 and 45 plants are available with electric drives, if desired. On electrified models, only the jaw and the roll crushers are mechanically driven, all other units being driven by individual electric motors. Descriptive literature is available on the new plants. Ask for Form No. 661.

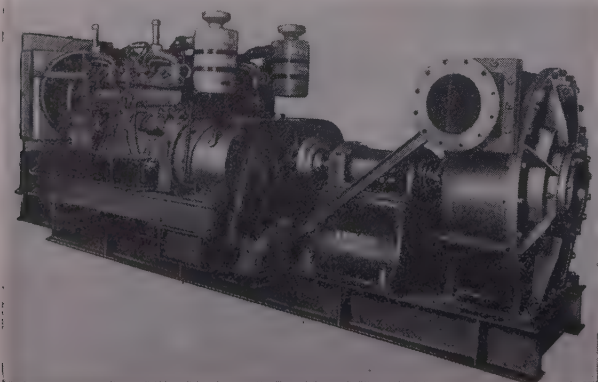
Off-highway 25-ton dumper, planetary gear

A rugged, off-highway rear dump truck, equipped with a planetary gear drive rear axle and rated at 25-ton payload capacity has been developed by **Autocar Division, The White Motor Co.**, 842 E. 79th St., Cleveland 1, Ohio.



The AP-15 is available with either a 335- or a 375-hp. turbo-diesel engine and is designed for work in construction, quarrying and mining. Weight-to-horsepower ratios

SPECIAL DREDGE PUMP FOR HEAVY SERVICE



A 12-in. dredge pump complete with twin diesel power unit was shipped recently to **Bullard & Finwall Dredging Co.**, Lakeport, Calif., for use in a specially designed hydraulic suction dredge that will be used on Clear Lake for flood control, construction of boat harbors and land reclamation. The pump which was manufactured by **Krogh Pump & Equipment Co., Inc.**, 515 Harrison St., San Francisco, Calif., is the only full lined dredge pump on the West Coast and the largest dredge of its kind manufactured in San Francisco. It is designed to handle more than 5,000 gal. per min. of sand, mud, gravel and water and will pass rocks up to 6 in. and larger. It will pump to a distance of over half a mile or more under special operating conditions. Built upon an integral base, the pump is powered with Twin International Harvester Diesel Engines, Model UD-1091, mounted on an Alamo Compound series 450 reduction unit, equipped with a Twin Disc over center clutches. This twin engine combination is rated at 380 hp. naturally aspirated and 500 hp. Turbo-charged. The engines, designed to run at 1,400 rpm., are connected through the Alamo reduction compound for an output shaft and pump speed of 700 rpm.



This roller, hardfaced with Victor alloy, shows practically no wear after crushing 40 tons of rock hourly, 8 hours daily for 30 days.

HOW TO SAVE ON ROLLERS AND RODUse VICTOR Hardfacing

• FREE •

Victor Hardfacing Manual
shows you right rod to use
and how to apply it.

Write us NOW for your copy.

Profitable dealerships open; inquire now!

VICTOR

for hardfacing

Tracy Rock & Gravel Co., Tracy, Calif., crushes 40 tons of rock hourly, prolongs roller life on this rough work by rebuilding with $\frac{1}{4}$ " VICTORALLOY #1 Bare Electric rod, 28" length. Says plant superintendent Albert Parker:

"Victoralloy's ease of application and fast buildup mean a lot to us. There is no lost time as we use 28" length rod; when it burns down, we touch a new rod to the old one, and keep on welding without even lifting the helmet."

You, too, can save rod and increase working life of crusher rolls, screens, shovel teeth, tractor rollers and idlers, dredge pumps and many other parts subjected to abrasion and severe impact. Simply hardface with VICTORALLOY. It welds to manganese, steel or cast iron. You get all position hardfacing, exceptional arc stability, deposits free of porosity, fast application without slag interference. Try it. Order a supply from your VICTOR dealer TODAY.

VICTOR EQUIPMENT COMPANY

ALLOY ROD AND METAL DIVISION

13808 E. Imperial Highway, Norwalk, Calif. • Wakita, Oklahoma

of up to 270-to-1 are provided in the Autocar AP-25 powered by Cummins turbo-diesels of 743-cu. in. piston displacement. The second in a line of planetary gear off-highway trucks, it is equipped with a new adjustable steering wheel to fit any size driver, an all welded box section frame reinforced internally with corrugated steel plate and many other new features. Descriptive literature is available.

Athey announces new hydraulic ejection trailer

A completely new, hydraulically controlled ejection trailer with an ejection force of up to 200,000 lb., is announced by **Athey Products Corp.**, 5631 W. 65th St., Chicago 38, Ill. Called the PE21, the new 31-ton capacity rear ejecting trailer was developed primarily to economically

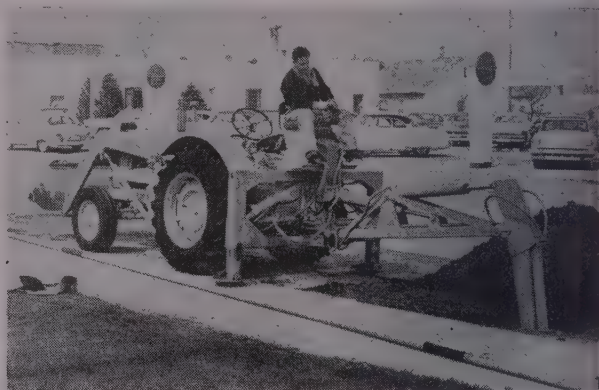


handle three applications—clean dumping of sticky-hard-to-discharge materials, complete ejection control for spreading the load, and "partial load" ejection into less-than-trailer capacity sized hoppers or crushers. The PE21

is powered by the Caterpillar DW21 tractor. A tractor-mounted hydraulic pump, operated from the rear power take-off, furnishes power to two hydraulic rams mounted on the sides of the trailer. The rams move the ejector plate to the rear, ejecting the complete load. The rams are also double acting to insure the return of the ejector into carry position. In addition to its great ejection force and strength, the PE21 features 90-deg. turning ability, low center of gravity, clean straight body lines, component interchangeability and simplified frameless design.

Heavy duty backhoe for M-H-F wheel tractors

The M-H-F Work Bulls, recently introduced by **Massey-Harris-Ferguson, Inc.**, can now be equipped with a large capacity backhoe. The 185 backhoe is available with a wide choice of buckets and can dig as deep as 13½ ft. and at right angles to the Work Bull. On a seat that



revolves as the boom swings, the operator always has a direct view of the bucket. With a 180-deg. turning radius,



at your service in Washington

If you're interested in bidding on government projects, you'll be glad to know that the Washington Service Bureau of National Surety Corporation issues regular bulletins on just such projects.

They tell you *who* is issuing the invitations, *where* and *when* bids will be received and opened.

These bulletins are available to you without obligation. Simply write to either of the Central Bonding Offices listed below, or to any of our Branch or Services Offices.



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ROCK AND DIRT MOVE AS GREENVILLE RIPPER GOES TO WORK ON BLUE RIDGE PARKWAY



BIG BITE TAKES FULL POWER OF TD-24 TRACTOR

The big Greenville tractor-mounted ripper proved itself on a rough testing ground originally marked for blasting, and shovel and truck loading. Biting to depths of 24 inches, the powerful unit tore out layers of rock and dirt without explosives. Swivel shanks give the points live action that shatters rock and dirt loose for scraper loading.

Roy Cantrew, veteran construction man who operated the unit, used it to rip, bulldoze and push-

load. He found it possible to raise or lower the ripper points as little as an inch at a time . . . a control factor that marks the precision construction put into the new tool.

PUSH-LOADING SCRAPER

The new Greenville ripper does not interfere with push-loading operations or steering of the tractor. On this job all loading was planned to be a truck-shovel operation. The powerful bite of the ripper made



push-loading possible—a big saving in man-hours and equipment operation.

AND BULLDOZE, TOO

Addition of the ripper does not hamper bulldozing operations. Blade and ripper are in place at all times. Many operators rip one way, turn around, then bulldoze their way back. One man with one machine can handle jobs previously done by three or more pieces of equipment.



FOR MORE INFORMATION

You'll want to know more. Your nearby International dealer can give you the facts. He's listed in the Yellow Pages of your phone book. If you can't find him, write to us.

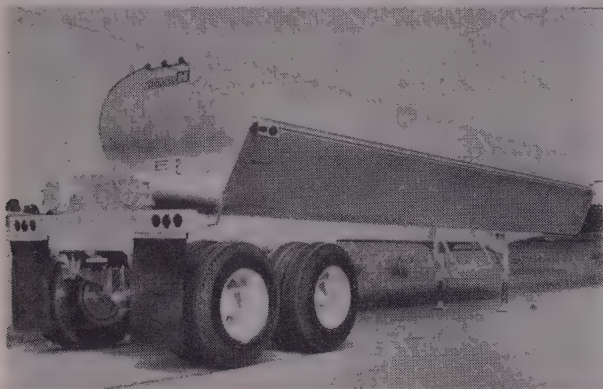


GREENVILLE
STEEL CAR COMPANY
ATECO DIVISION
Greenville, Pennsylvania

trenching jobs from a distance can be done easily with no danger of back-dropping. Rigid, extra wide frame and independently controlled stabilizers provide a safe, solid work platform. The 185 Backhoe attaches or detaches in less than five min. A full line of five Work Bull wheel tractors for use in road building as primary equipment, back-up machines, and utility or clean-up tools is manufactured by Massey-Harris Ferguson, Inc., of Racine, Wis.

Highway Trailer markets new dry-bulk carrier

A new streamlined frameless dry-bulk trailer available in load capacities to meet every operator's requirements for bulk handling of cement and other pulverized materials is being marketed by the Highway Trailer Co. of



Edgerton, Wis., a division of Merritt-Chapman & Scott Corp. An increase in payload capacity is made possible through a lighter weight body of hi-tensile steel. The trailer can be automatically unloaded from any angle or slope by power-driven screw conveyors within the tank. No special ramps, hoists, winches, etc. are required. Dual outlets at the rear of the trailer permit cargo discharge at a maximum rate of seven barrels per min. and are equipped with removable or permanently attached rubber hose. Cargo is completely removed by the screw conveyors. The discharge screws are powered by a four-cylinder, 25-hp., V-type, air-cooled engine with its own electric starter, generator, battery and air filter.

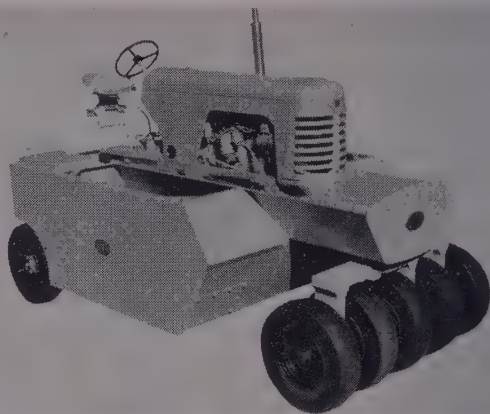
Aggregate handling conveyor system

Triangle Engineering Co. announces the development of an advanced design aggregate handling conveyor system, T.E.C. 5000, popularly known as The Mighty Mole. The Mighty Mole system is made up of a tunnel section, inclined conveyor belt, turn-head chute and electrically

operated control panel. It is adaptable to road construction, operation of material yards, or any material batching operation. Loading gates in each section of the tunnel permit materials to be placed on the conveyor belt and brought to the chute heads in controlled sequence where they are delivered to bins or trucks below. The entire operation of tunnel, inclined conveyor, turn-head chute, etc. is directed from master electrical panel in the control tower. The entire system is of heavy duty construction. The standard unit has a capacity of 450 tph. to 525 tph. Other capacity units are available. For complete specifications, write to the manufacturer, 4655 Southwest Highway, Oak Lawn, Ill.

New Tampo roller ups production 25%

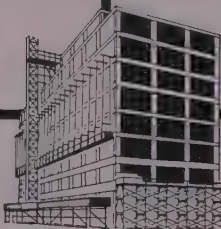
A production increase of over 25% per pass is announced for Tampo Manufacturing Co.'s SP-11S self-propelled roller. The 11-wheel pneumatic tired roller has operating speeds forward and reverse from 3 to 22 mph.



and provides an 88-in. rolling width with a gross ballasted weight of 22,600 lb. Increased width and faster travel are combined with many features including power operated reversing clutches with a torque converter for forward-reverse operation, automotive power steering, single lever control for both travel direction and throttle setting, 12-volt electrical system and a throttle controlled mechanical governor—all standard equipment. The SP-11S 265-cu. in., 65-hp. engine is available for both gasoline and diesel fuels. Complete visibility, maximum stability for safe operation at slopes and curb line steering ease are coupled with simplified controls. Accessories for rolling asphalt, soil-cement and other operations are available. Further information may be obtained by writing Tampo Manufacturing Co., 1146 W. Laurel, San Antonio, Tex.

SCAFFOLDING

SALES-RENTALS



SHORING

SIDEWALK BRIDGES HOIST TOWERS

FOR GREATER SAFETY...EFFICIENCY...ECONOMY



THE PATENT SCAFFOLDING CO., Inc.

Dept. WC 6931 Stanford Avenue, Los Angeles 1, California
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Hansen Lime & Stucco Co. 1574 S.W. Temple St., Salt Lake City, Utah

Allied Industries, Inc. 1028 East First St., Spokane, Wash.

Columbia Concrete Pipe Co., Foot of Ninth St., Wenatchee, Wash.

James A. C. Tait Co. 316 S.E. Madison St., Portland, Ore.



Roebling Royal Blue Wire Rope will bend and bend and bend!

What's more, Roebling Royal Blue is *stronger* than the strongest wire rope previously available. It will do more work and last longer on *your* job. Call your distributor or your nearest Roebling office for full information about Royal Blue, the really better wire rope. John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

ROEBLING 

Distributors, Branches and Warehouses Throughout the Country—Subsidiary of The Colorado Fuel and Iron Corporation

Wisconsin 56-hp. air-cooled engine

Introduced recently was Wisconsin Motor Corp.'s new Model VR4D heavy-duty, industrial type air-cooled engine, rated at 56 hp. at 2,200 rpm. Features of the VR4D include Stellite exhaust valves and valve seat inserts, used in conjunction with positive-type valve rotators for 200 to 500% longer valve life; tapered, self-cleaning, main roller bearings on both ends of the crankshaft; a rotary type, outside magneto; positive lubrication; and efficient air cooling to 140 deg. F. For full details, write for Bulletin S-207, to Wisconsin Motor Corp., Milwaukee 46, Wis.

New Challenge trencher

A new ladder type trencher, designed for universal application, is being produced by Challenger Manu-



facturing Co. It economically digs square or round bottom trenches of any size between 12 and 18 in. wide and to 5 ft. 3 in. deep. Nine travel speeds and eighteen trenching speeds offer a wide range of operating flexibility. The "Challenge" is a gear driven, track-laying trencher with low ground bearing. It will operate over soft terrain, cross open trenches and go where other type trenchers would bog down. Tracks are self cleaning. For full details, write the manufacturer, 7400 E. Bandini Blvd., Los Angeles, Calif.

Hydrauger increases boring speeds

Boring speeds of the latest Hydrauger horizontal earth boring machines have been increased as much as 40% according to the manufacturer, Hydrauger Corp., Ltd., 681 Market St., San Francisco 5, Calif. This is said to be the result of redesigning and incorporation of the latest high-torque Ingersoll-Rand multi-vane air motors. This is a special motor built to bore and cut through the toughest tree roots encountered while boring underground for pipe and conduit installation; and for soil drainage. Hydrauger machines are now available in several new sizes and modifications. The larger machines bore holes of 2 through 24 in. in diameter for distances up to 250 ft. Complete information available.



Heavy duty fork truck

The operator sits above the left front fender for a clear view of the load on a new 35,000-lb. capacity pneumatic tire fork truck announced by the Industrial Truck Division of Clark Equipment Co., Battle Creek, Mich. Named the Clarklift Y-350, the machine was designed for heavy lift-

ing and tiering work. A power-shifted, four-speed transmission coupled with a torque converter and a 404-cu. in. six-cylinder Hercules gas engine provides power for operation through mud and snow and over rough terrain. More information on the Clarklift Y-350 can be obtained by writing the manufacturer.

Two Caterpillar rippers

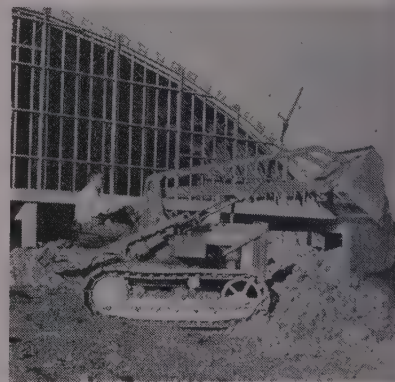
Two new tractor-mounted rippers have been developed by Caterpillar Tractor Co., Peoria, Ill. The largest of the rippers, designated No. 6 Ripper, is designed for use on the Caterpillar D6 Tractor and the No. 977 Traxcavator. The smaller model, known as the No. 4 Ripper, is for use on the No. 955 Traxcavator. Three alloy steel teeth with replaceable tips are standard but provision has been made for the installation of two additional teeth, if desired. An outstanding design feature is the parallel linkage which is used to maintain the same angle of penetration at all depths. In addition this type of linkage protects the hydraulic system by reducing cylinder pressures created while ripping. Points of the new rippers are interchangeable with those used on the Traxcavator buckets.

New turn-up circulating spray bar

An entirely new full circulating turn-up bituminous spray bar is being manufactured by E. D. Etnyre & Co., Oregon, Ill. This lighter weight, air-operated spray bar inverts 90 deg. from spraying position assuring complete drainage and eliminating any chance of drip from nozzle valves. An individual valve for each nozzle permits independent nozzle operation over entire length of bar. Hollow plug-type valves give instant start or cutoff of spray, fit snugly to bar for better heating, yet offer no obstruction to full circulation. When not spraying, material can be circulated full length of bar with extensions in either spraying or folded position. The bar shifts to follow edges of road, adjusts for proper height of spray. Ends fold, raise and lock for traveling.

John Deere announces crawler-loader

A new Crawler-Loader with 30 engine horsepower and $\frac{3}{4}$ -cu. yd. struck or $\frac{7}{8}$ -cu. yd. heaped bucket is announced by John Deere, Industrial Division, Moline, Ill. The rear-mounted, hydraulically controlled, three- or five-tooth scarifier is available as optional equipment. The Crawler-Loader is so constructed that a backhoe may be mounted in



conjunction. The heavy formed-steel loader frame is mounted directly onto the square crossbars of the crawler prime mover making the Crawler-Loader a unit, and placing the load squarely on both tracks. Yoke-type construction, with replaceable hardened steel or bronze bushings, is used at all loader pivot points of great stress. The bucket has a reversible, hardened steel cutting edge and replaceable malleable teeth and is operated by hydraulic cylinders. Bucket break-away lift at ground level is 4,500 lb. The loader lifts 2,700 lb. to dumping height of 10 ft. 6 in.

Over 300 yards per hour with stop set-up



PORTABLE
LARGEST COMPONENT
MEASURES 10' x 10' x 10'

FROM COAST TO COAST

—Supplying 3 pavers on California air base construction. Produced 3500 cubic yards in 10 day period. 36" coarse aggregate conveyor, 24" sand conveyor. Cement silo has facilities for direct loading of cement spreader trucks.

—On New England paving job.

For short stretch paving, come back work, tunnels, bridges, use...

NOBLE-MOBILE Batching Plant on Wheels



Convoir Aircraft taxiways



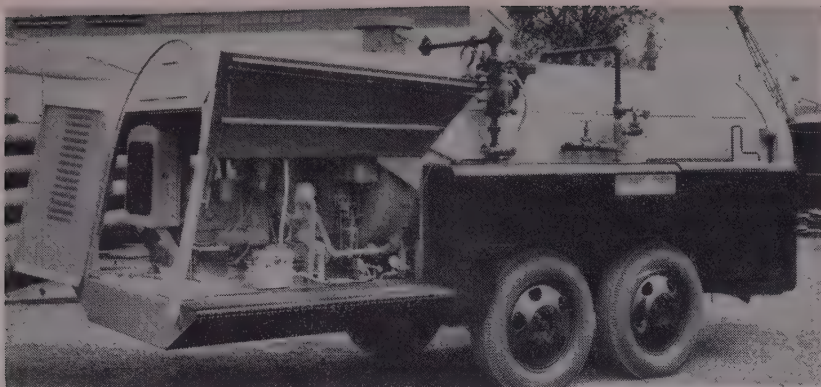
Bureau of Reclamation siphon, Othello, Wash.



Ohio highway paving

Batches at the job site where hauls are shorter and profits longer. 100% complete plant. 65 to 125 yards per hour. Scooploader, crane or conveyor loaded. Supplies transit mix, dry batch or premix.

DEALERS: BIRMINGHAM, ALA., Equipment Service Co., Inc. • PHOENIX, ARIZ., Superior Equipment Co. • DENVER, COLO., Western Machinery Co. • INDIANAPOLIS, IND., Machinery Co., Inc. • CEDAR RAPIDS, IOWA, James W. Bell Co., Inc. • LOUISVILLE, KY., Emmett C. Watson Co. • LOS ANGELES, CALIF., Smith-Booth-Usher Co. • ST. LOUIS, MO., Neff Machinery, Inc. • BOSTON, MASS., Hedge & Mattheis Co. • BALTIMORE, MD., General Supply & Equipment Co. • DETROIT, MICH., R. G. Moeller Co. • ST. PAUL, MINN., George F. Smith Co. • ST. PAUL, MINN., Borchert-Ingersoll, Inc. • DUNELLEN, N. J., Miller Equipment Co. • CHARLOTTE, N. C., Spartan Equipment Co. • CLEVELAND, OHIO, Wepco Equipment Co. • OKLAHOMA CITY, OKLA., Herd Equipment Co. • PORTLAND, ORE., Clyde Equipment Co. • PHILADELPHIA, PA., Furnival Machinery Co. • PITTSBURGH, PA., Equipment & Supplies, Inc. • NASHVILLE, TENN., Peterson Machinery Co. • AMARILLO, TEX., Plains Machinery Co. • DALLAS, TEX., North Texas Equipment Co. • EL PASO, TEX., Border Machinery Co. • HOUSTON, TEX., Boehck Engineering Co., Inc. • SAN ANTONIO, TEX., Contractors Machinery Co. • WACO, TEX., Equipment Co. • SALT LAKE CITY, UTAH, Arnold Machinery Co., Inc. • SEATTLE, WASH., Star Machinery Co. • SPOKANE, WASH., Intermountain Equipment Co. • WYOMING, Studer Tractor & Equipment Co., Inc. • VANCOUVER, B. C., Westcoast Equipment Co., Ltd. • MONTREAL, QUE., Laurentide Equipment Co., Ltd. • WINNIPEG, MAN., Equipment Co., Ltd. • CALGARY, ALB., Precision Machinery & Foundry Co., Ltd. • KANSAS CITY, MO., Funkhouser Machinery Co. • CHICAGO, ILL., Arrow Equipment Co.



New Cleaver-Brooks portable steamer

A new Cleaver-Brooks 125-hp. portable steamer, Model PS-125, offers close control of pile driving operations. One control provides fully modulating control from low fire to high fire for all steam demands. The PS-125 delivers 4,300 lb. of dry steam per hour from cold start in 30 min. According to the manufacturer, this dry steam is the best source of

power for pile driving. It gives single and double acting hammers full rating in maximum number of blows through the pile driving cycle. The engine is rated at 22 hp. continuous duty at 1,800 rpm. Hand throttle controls rpm. speeds below 1,800 rpm. Further information available from Cleaver-Brooks Co., 326 Keefe Ave., Milwaukee 12, Wis.

Asphalt impregnated pans cost less, can be re-used

The only asphalt impregnated corrugated construction pan available to the construction industry has been announced by the Lawrence Paper Co., Construction Division, Lawrence, Kan. Original cost is lower than conventional pans and the cores can be re-used many times. They are quick and easy to install and remove, do not have to be oiled, cleaned or otherwise treated. These Jayhawk pans are available in all standard sizes in lengths up to 12 ft. Straight, tapered and waffle forms are available for use on either solid deck or open centering and on either ribbed or waffle slab. Special designs can be developed to meet specific needs.

Single-stage torque converter for high-speed diesel, gasoline engines

Twin-Disc Clutch Co. has announced a new 1300 Series Single-Stage Torque Converter designed for diesel and gasoline engines producing from 30 hp. at 1,450 rpm. to 212 hp. at 3,200 rpm. Specific torque ratings are 165, 200, 240, 285 and 330 lb. ft. depending on the impeller blading selected by the user. The 1300 Series unit features "unloading" of the engine through an exclusive blade design wherein the turbine develops a counter-head which stops fluid circulation at high speed ratios. Another design feature is that impellers having different bladings are interchangeable. One model of the new series is currently in production, the Model F, which is a spacer-type arrangement with an SAE No. 2 engine flywheel housing size and an SAE No. 2 or 3 output housing. Twin Disc Clutch Co., Hydraulic Division, Rockford, Ill.

Largest steam pile driving hammer

The largest steam Pile Driving Hammer ever manufactured in the world is now in production at the Vulcan Iron Works, Inc., 327 North Bell Ave., Chicago 12, Ill. The new Super-Vulcan Model 400-C has a gross weight of 83,000 lb., a ram weighing 40,000 lb., with a rated striking energy of 113,488 ft.-lb. per blow. With this new equipment, contractors will be able to drive bearing piles to support 1,000 tons. The hammer is designed to drive piling in excess of 80 tons dead weight, and up to 12 ft. in diameter.

New shaft sinker offers varied selection of booms and drills

A new shaft sinker with air motor feeds and air motor controlled booms is now available. With a choice of two, three, four, or six booms and six different drills, selection for specific needs is made easy. The new shaft sinker, the SDR, is marketed by the Le Roi Division, Westinghouse Air Brake Co., Milwaukee, Wis. Available feeds include the DR40 with the standard 10-ft. air motor feed and the DR34 with the standard 6-ft. 8-in. piston feed. Drills which can be ordered are the H10DR, H12DR, and H111DR—all 2 $\frac{3}{8}$ -in. drills; the 3 $\frac{1}{8}$ -in. H23DR; the 3 $\frac{1}{2}$ -in. D25DR; and the 4-in. D14DR. Maximum drilling area diameter is 26 ft., when arms are extended. The sinker closes to 11 ft. 6 in., but drills can be toed-in to drill next to the pedestal, which is 4 ft. in diameter.

Economical batching plant

C. S. Johnson Co. of Champaign, Ill., recently announced availability of its "Econoplant" batching setup. This is a complete plant facility, low cost because it is standardized in many aspects, easily erected and convenient in operation. As a basic plant, it has three aggregate compartments of 45-cu. yd. total heaped capacity and one 70-bbl. cement compartment. It is designed with large top openings to make clamshell charging practicable. All-welded fabrication of the bin structure helps to simplify erection and provides a maximum lift of about 5 tons. A built-in $\frac{3}{4}$ -hp. air compressor supplies air for cement aeration through built-in fittings. Complete information and specifications on the Econoplant may be obtained from the manufacturer.



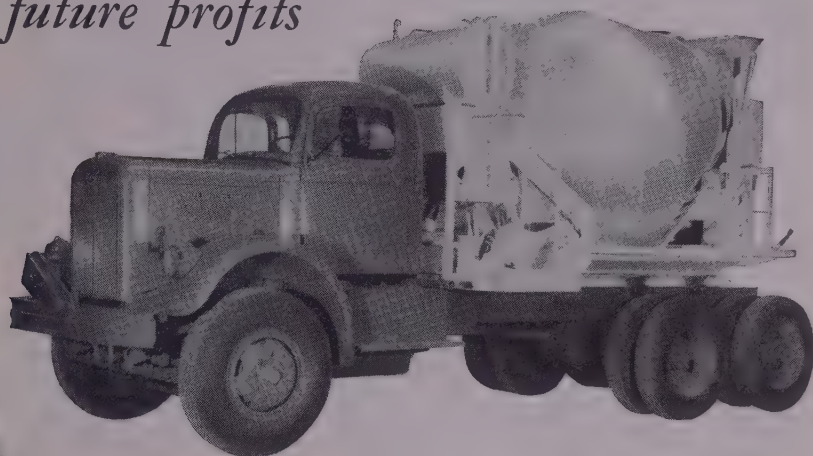
Constant circulation featured on new bituminous distributor

Shown above is the new Seaman-Gunnison Bituminous Distributor incorporating a new system of tank and spray bar circulation. Material can be constantly circulated in the tank for uniform temperature rise, preventing local overheating and thus protecting material quality. Tank circulation

also is maintained while recirculating material through the spray bar. Another innovation is the new Seaman "Duo-Flo" spray bar which feeds material to both lines of the spray bar, creating a parallel flow and assuring uniform pressure at nozzles with bar length up to 24 ft., or longer. A catalog on this new equipment is available from Seaman-Gunnison Corp., Milwaukee 15, Wis.

TOMORROW'S BUSINESS shapes up differently!

*The new SMITH Mixer, available now,
is your answer to future profits*



The shape of business to come is in clover-leaves, super highways, free-ways, expressways, etc. This huge new program means business — for ready-mix operators who can deliver the *right product*.

The new highway jobs specify low slump, "Inspection Type" concrete. To be ready for it, *to assure future profits*, you're going to need the right kind of equipment.

The great new Smith mixers are the answer

The new Smiths are available now — built *especially* for low slump concrete. Featuring the fastest charging and fastest discharging mixer made, they carry up to agitator loads without a door.

Larger discharge opening

New design permits free-flow charging and discharging — even with 0' slump concrete. And, design of the discharge end eliminates any possible constricting of materials.

- ★ *Shorter, big diameter drum* means faster free-flow action. Smith T-shaped blades pull aggregates to big diameter section of drum, where they are lifted out of the mass and turned over.
- ★ *Better weight distribution*, thanks to the shorter unit, means more weight can be shifted to front axle (or a shorter wheel-base truck can be used). You can carry greater legal payloads.

Choice of sizes: 4½, 5½, 6½ yards. Front PTO or separate engine drive.

Since 1900, the pioneer designer and foremost manufacturer of the world's finest mixers.

THE T. L. SMITH COMPANY • Milwaukee 1, Wisconsin • Lufkin, Texas
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because it fits more jobs...



the Cleveland 92 "Baby Digger" digs more trench ... in more places ... at less cost

THAT TREE LAWN is really *narrow* but the compact maneuverable 92 is doing a neat job of digging from driveway to driveway. The operator sets in and lifts out the digging wheel with speed and safety because the 92 gives him full job visibility and fast accurate boom hoist control. Synchronized wheel and conveyor speeds permit precision placement of spoil. No damage to curb, sidewalk or driveways either, thanks to the 92's perfect balance on long, smooth, non-clog crawlers—a real public relations asset.

★ Only 54" wide over crawlers

★ Digs 10" to 20" wide

★ Digs to 5' deep

★ Power-shift conveyor

★ Reversible discharge

★ Digs all soils

★ Digs in any weather

★ Portable, at legal limit speeds

THE CLEVELAND TRENCHER CO.

20100 ST. CLAIR AVENUE • CLEVELAND 17, OHIO



New concrete buggy

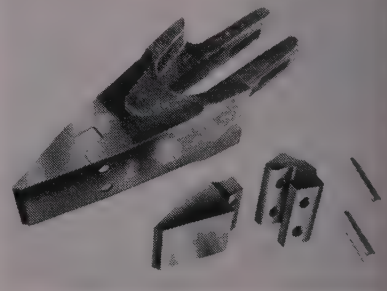
A 1/3- to 1/2-cu. yd. capacity concrete handling truck has been introduced by the **Kalamazoo Manufacturing Co.**, 1827 Reed St., Kalamazoo, Mich. Frame and body of the Little



Kazoo are made of heavy welded steel. The unit has a turning radius of 53 1/2 in. and a 51-in. wheel base, making it very maneuverable in close quarters. Powered by a Wisconsin one-cylinder air-cooled 7.5 bhp. engine, the Little Kazoo climbs 25% grades with its capacity load of 2,000 lb. Travel speeds range from two to 15 mph. Optional equipment includes dual tires and a platform readily interchangeable with the standard hopper body.

Replaceable digger teeth with a universal weld-on adapter

Completely new design principles have been used in the Bulldog Replaceable Digger Teeth for shovel dippers, back hoe buckets, dragline



buckets, clamshell buckets and loader buckets—just announced by **Allied Steel & Tractor Products, Inc.**, 7835 Broadway, Cleveland 5, Ohio. The digger tooth has three parts: a universal weld-on adapter that is easily attached by using the old tooth as a base, an easily changed replaceable tip, and two positive lock pins for securing the tips to the adapter. The manufacturer states that using the old tooth as a base for the universal weld-on adapter eliminates the expense of a conventional adapter or new tooth and saves up to 65% on tooth maintenance costs.

**HIGH-SPEED
COMPACTION
LOW-COST
ROCK CRUSHING
EFFICIENT
BITUMINOUS SALVAGE**

**THE
HYSTER
"GRID"
ROLLER
DOES ALL
THREE!**



Here is the machine road builders all over the world are using on all types of road construction — free-ways, secondary roads, farm-to-market roads, access and logging roads.

Built for long life on any job—rock surfacing haul roads or high-speed compaction on expressways—the "Grid" roller is designed to give you low cost operation and maintenance. Its high capacity tapered roller bearings give long life. Its high-strength cast steel wheels resist wear in rock and abrasive materials. The heavy-duty frame prevents distortion in the toughest going.

"Grid" is the registered trademark for the Hyster open-surfaced roller. Caterpillar is the registered trademark of the Caterpillar Tractor Co.

**For full details,
call your Caterpillar-Hyster Dealer.**

HYSTER COMPANY

**THE "GRID" ROLLER FOR
ALL TYPES OF ROAD BUILDING**



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1 EMBANKMENT COMPACTION—High-speed rolling (up to 15 MPH towed by Caterpillar DW15 Tractor) matches compaction with yardage of high-speed earth movers.



2 ROCK CRUSHING—Pit-run rock quickly and efficiently crushed for base and surface courses on secondary road construction and repair.



3 BITUMINOUS SALVAGE—Quickly breaking down old ripped-up mat, the "Grid" Roller salvages all of the original aggregate and reusable binder for use in new surface.

Portable air utility hoists

Introduction of a complete series of six-cylinder portable air utility hoists designed for better operator control of skidding and hoisting work in construction has been announced by **Atlas Copco Pacific, Inc.** Four models with load capacities of 1,000 to 4,400 lb. at 85 psi. comprise the new series. A single positive adjustment shifts the drum into free-wheeling, permitting substantially faster hook-ups. Special illustrated literature on the new Atlas Copco hoist series is available on request from the company's headquarters at 930 Brittan Ave., San Carlos, Calif.

Funk introduces Revers-O-Matic no-shift reversing clutch

No-shift reversing, featured by the Funk Revers-O-Matic Drive, has been developed in a new torque converter transmission recently introduced by **Funk Aircraft Co.**, Box 577-DF, Coffeyville, Kan. There is no clutch or gear shifting. A single throttle lever instantly changes both direction and speed of travel. Two foot pedals may be substituted for the lever when it is advantageous to leave the operators' hands free. The Revers-O-Matic drive is adaptable to any type of operation involving change in direction of movement,

either forward and reverse, or lift and lower, on equipment with engines up to 250 cu. ft. displacement.

Increased power on new Hydra-Hammer

Larger engine and heavier hammer on the new Model SPHH-1000 Ottawa Hydra-Hammer is reputed to



effect greater production on all pavement breaking, cutting, and backfill tamping jobs. Features of the new model include traverse tower arrangement, hydraulically controlled lay-down, engine cover, rear fenders, adjustable seat, flange type tools, and combined power brake and clutch control. The 7,500-ft. lb. blow developed by this rig is actually controlled so that the maximum blow, or a minimum blow as little as 100 ft. lb., can be used at the operator's will. This makes it possible to compact heavy clay soils in 4 to 6-ft. lifts, and light sandy soils over terra cotta pipe in as little as 18-in. lifts. For illustrated literature, write to Ottawa Steel Division, **L. A. Young Spring & Wire Corp.**, Ottawa, Kan.

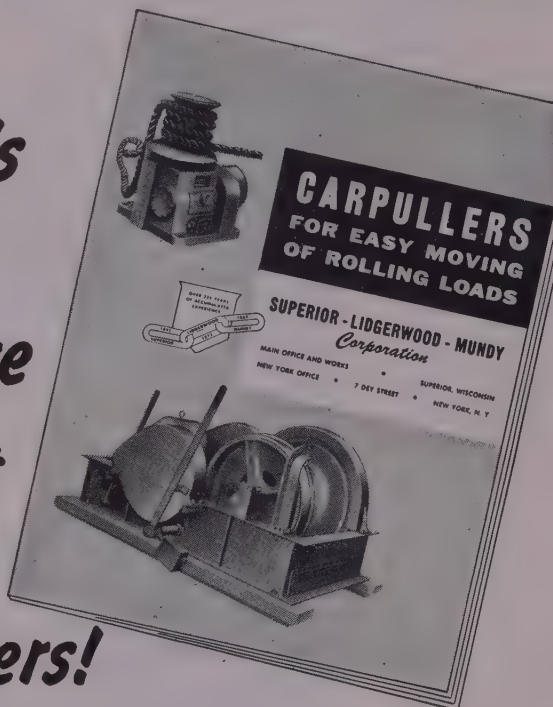
Davis pipe coupling machine

A new, more compact and efficient pipe coupling machine has been designed and built by **Davis Manufac-**



turing Co. Eliminating chains and assembly, the Davis Pipe Coupling Machine is made in various sizes for

Get This NEW 24-Page Booklet on Carpullers!



It shows at a glance, how to compute the cable tension per thousand pounds of load, at level or on various inclines. It tells how much to allow for weight of car, curvature of track, condition of track and low temperature conditions. It suggests the proper type of rope or cable for different jobs, and gives a table showing the working strength of each, according to diameter.

LATEST MODELS—WITH LAYOUTS—Contains over 30 models of regular and special types of carpullers and barge moving winches, including information on dimensions, weight, horsepower, work capacity, rope capacity etc., with diagrams of most efficient layouts for various models.

WRITE ON YOUR LETTERHEAD FOR BULLETIN C-616

Superior—Lidgerwood—Mundy Corporation

MAIN OFFICE AND WORKS—SUPERIOR, WISCONSIN

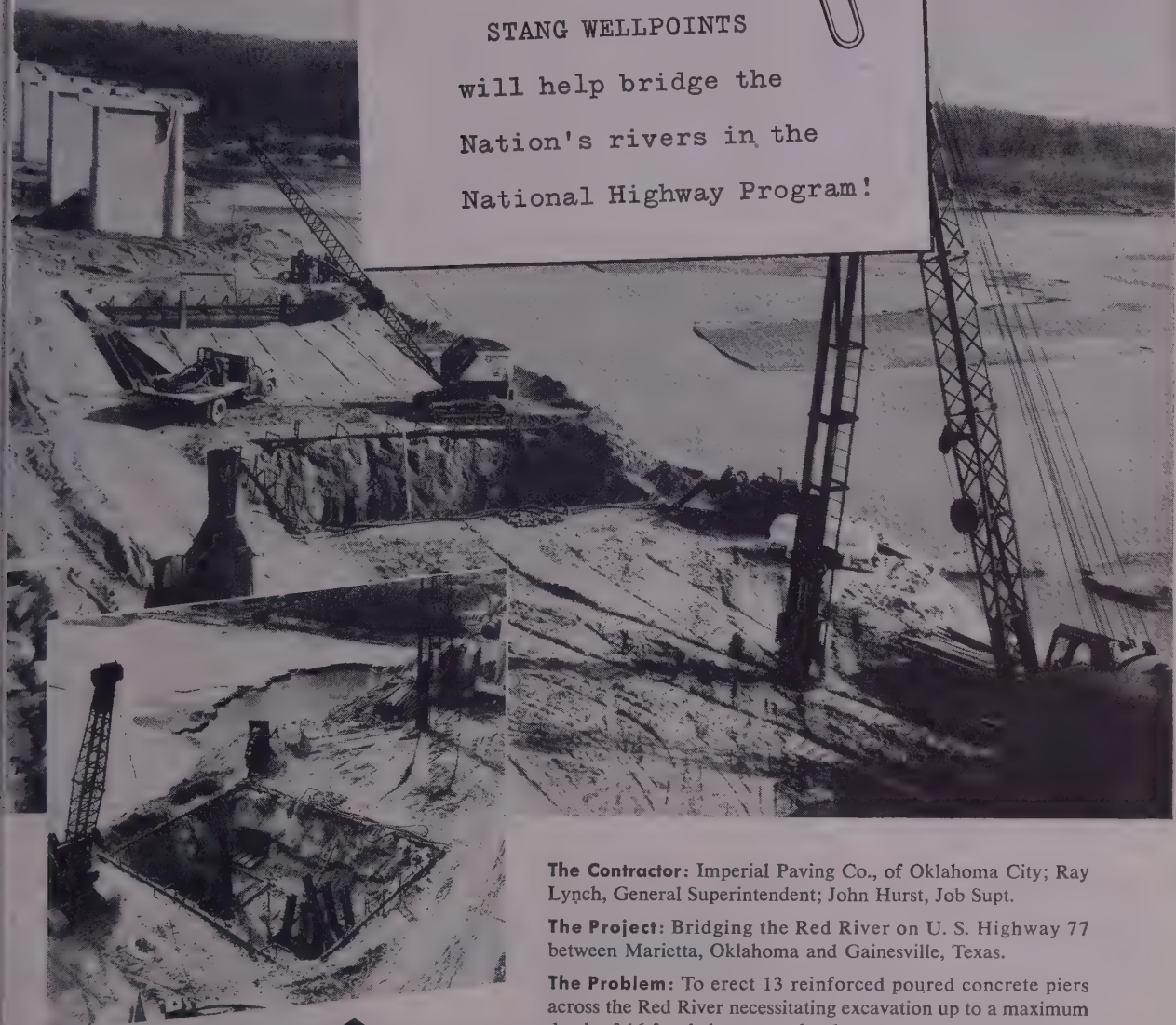
Pacific Coast Representative:

GEORGE E. SWETT & COMPANY

100 Howard Street, San Francisco 5, California

...even as now--

STANG WELLPOINTS
will help bridge the
Nation's rivers in the
National Highway Program!



GENERAL PUMPING

including High Pressure Jet Pumps, Large Capacity Sump Pumps (vertical or horizontal), Hydraulic and Sluicing Systems and Sprinkler Irrigation Equipment.

↑
The Red River bridge is a joint Texas-Oklahoma project under the direction of the Texas Highway Department, Mr. John G. Simpson, resident engineer.

The Contractor: Imperial Paving Co., of Oklahoma City; Ray Lynch, General Superintendent; John Hurst, Job Supt.

The Project: Bridging the Red River on U. S. Highway 77 between Marietta, Oklahoma and Gainesville, Texas.

The Problem: To erect 13 reinforced poured concrete piers across the Red River necessitating excavation up to a maximum depth of 16 feet below water level.

The Solution: Installing a Stang Wellpoint system progressively around each pier location on a previously constructed earthen dyke thus lowering the ground water level to the required depth.

Result: A completely dry working area in a water-saturated riverbed making possible a *time-saving and profitable job!*

Call on STANG engineers for experienced services and special equipment to solve your water handling problems—any size, any type, *anywhere!* STANG engineers are on call in your area for consultation day or night.

Write for bulletin 100

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Engineers and Manufacturers of Dewatering Equipment, Wellpoint and Pumping Systems
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TULSA, OKLAHOMA
4026 South Urbana Street
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Putting water
in its place



571

...anyplace!





"You name the specifications—
**ANY GRADATION OF SAND OR
 AGGREGATES—WE'LL PRODUCE IT
 WITH OUR EAGLE WASHING-
 CLASSIFYING SECTION!"**

ACME SAND & STONE, ORILLIA, ONTARIO.

Acme Sand & Stone, a subsidiary of Uren Construction, Ltd., Orillia, Ontario, is producing material to whatever specification they require for their own construction jobs, and for another subsidiary Champlain Ready-Mixed Concrete Ltd., as well as for other aggregate users in the area.

The versatile EAGLE Complete Washing-Classifying-Dehydrating Section at their plant gives them practically any gradation or blend of material wanted—concrete sand, mason sand, plaster sand or various combinations of aggregates.

The Eagle Section consists of a 16' Water Scalping-Classifying Tank, two 30" dia. x 25' fine material screw washer-classifier-dehydrators and a 36" dia. x 18' coarse material screw unit with trash remover. Each of the fine material screws can produce the same gradation of material or each a different gradation—utmost flexibility that adds up to profits. Eagle engineering and experience can help you.

SEND FOR CATALOG 55

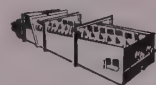
The EAGLE LINE



COARSE MATERIAL WASHERS



FINE MATERIAL WASHERS



LOG WASHERS



WATER SCALPING—
CLASSIFYING TANKS



"SWINTEK"
DREDGE LADDERS



COMPLETE
DREDGES

EXPERIENCE, PROGRESS, SERVICE, SINCE 1872

EAGLE IRON WORKS, 203 HOLCOMB Ave., Des Moines, Iowa

Brown-Bovis Industrial Equip. Co., Los Angeles, Calif.; Coast Equipment Co., San Francisco, Calif.; Balzer Machinery Co., Portland, Oregon; Intermountain Equip. Co., Boise, Pocatello, Ida.; Spokane, Wash.; Kerami Tractor & Equip. Co., Cheyenne, Casper, Wyo.; The Lang Co., Salt Lake City, Utah; H. W. Moore Equip. Co., Denver, Colo.; Jack Seiberg Equip. Co., Seattle, Wash.; Shriver Machinery Co., Phoenix, Ariz.; Sierra Machinery Co., Reno, Nev.; N. C. Ribble Co., Albuquerque, N. Mex.; Western Construction Equip. Co., Billings, Missoula, Great Falls, Bozeman, Mont.

installing all types of pressure-type joints in cement-asbestos, concrete, clay, or cast-iron pipe, 6- through 16-in. diameters. An easy-to-grip handle pushes to uncouple, pulls to couple, without removing or resetting the unit. Inquiries concerning the specifications and costs of the machines may be made to Davis Manufacturing Co., 10th and Gentry, North Kansas City, Mo.

Three speeds on steel wheel rollers

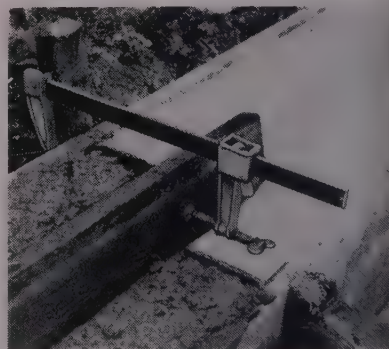
Two new Tandem Steel Rollers, rated at 5 to 8 and 8 to 12 tons respectively, are being marketed by Seaman-Andwall Corp., Milwaukee 1,



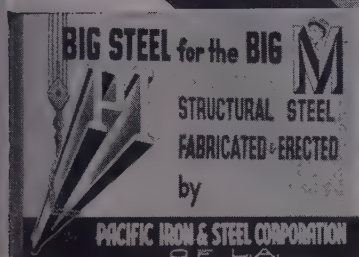
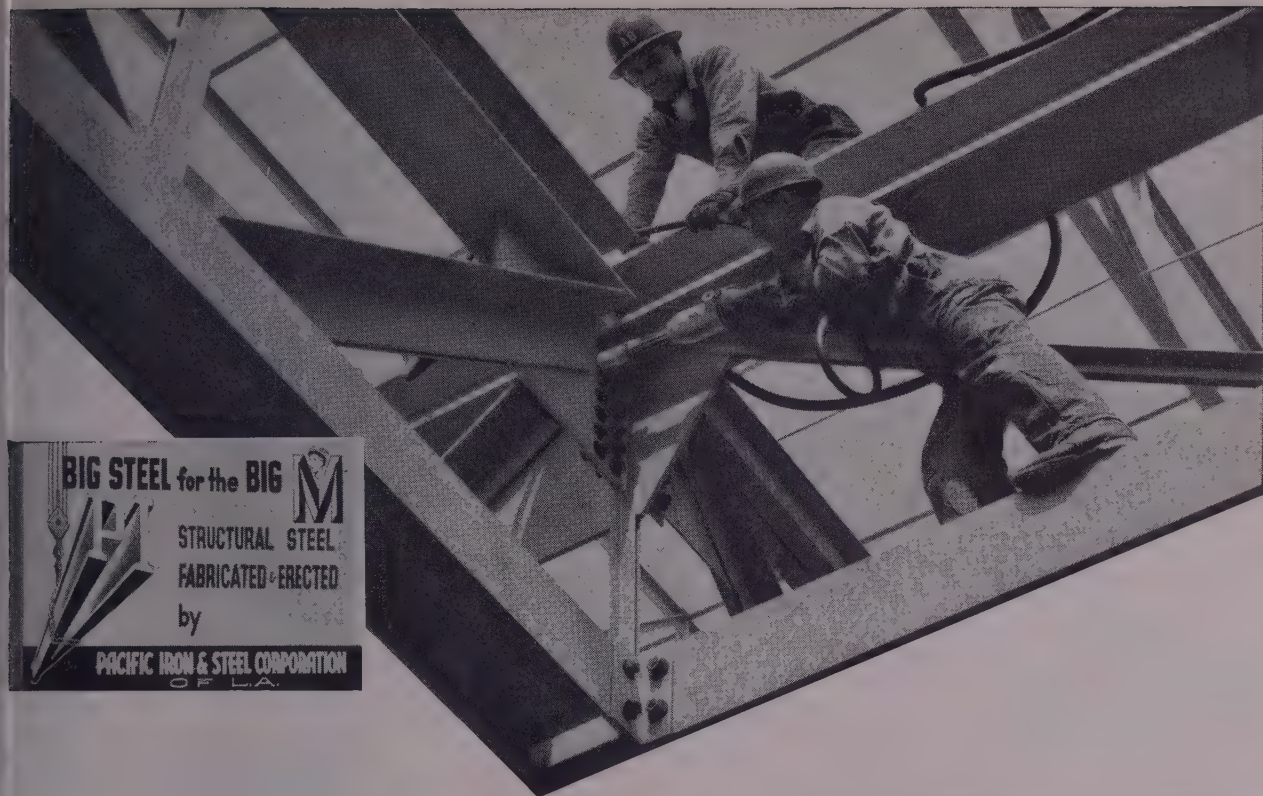
Wis. A single lever controls a specially-designed transmission on each unit which permits three speeds in both forward and reverse. No shifting or clutching are required. Other features include hydraulic power steering and water ballast in both front and rear rollers. Overall design is extremely low for improved visibility and stability. Gasoline engines are standard, rated 65 and 73 hp., with diesel available on special order.

**Clamps speed set-up of
concrete forms**

The use of deep-throated clamps with instantly adjustable multiple-disc-clutch to hold concrete forms in



position speeds up setting-up of forms especially in double step work, such as curb and gutter construction. The clamps take little space and leave ample room for troweling. Complete details can be obtained by writing Adjustable Clamp Co., 417 N. Ashland Ave., Chicago, Ill., for literature regarding "Jorgensen" clamp No. 45.



88,000 BOLTS speed erection of "BIG M" plant

The Pacific Iron and Steel Corporation of Los Angeles used Ingersoll-Rand **Torsion Bar Torque Control Impacttools** exclusively to run 88,000 high tensile steel bolts in the erection of the new Mercury plant in Los Angeles.

Here's Why Bolted Construction is Preferred.

Faster—twice as fast as riveting—one riveting crew can be divided to make two bolting crews.

Safer—no heating and tossing of rivets.

Stronger—high strength bolts provide considerably more clamping force than rivets . . . friction-type joint is superior to shear-type.

Here's Why Torsion Bar Torque Control Impacttools are Preferred.

Positive Torque Control—steel Torsion Bar assures precision control of torque—minimizes inspection.

Cannot "Over Torque" Bolts—tool automatically shuts off when preset torque in Torsion Bar is reached.

Adjustable Torsion Bar—easily changed to meet the requirements falling within its range.

Easy to Operate—no training is necessary.

Easy on the Operator—no buck, kick or twist is transmitted to the operator.

Low Maintenance—periodic lubrication will keep the tool on the job indefinitely—there's no clutch to slip or wear.

Call your Ingersoll-Rand Office for a demonstration of the New Torsion Bar Torque Control Impacttool.



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

18-586

IH truck differential increases traction

A new differential which increases vehicle traction and flotation by preventing wheel spinning in slippery or soft terrain has been made available for the International model S-100 light-duty truck, it has been announced by the Motor Truck Division of **International Harvester Co.**, 180 North Michigan Ave., Chicago 1, Ill. Known as the "Powr-Lok" differential, this device prevents the truck from becoming immobile, when one driving wheel loses traction by transmitting the major driving force to the wheel with the better traction. Suitable for use with either standard or automatic transmissions, this differential is especially valuable to light truck operators who work in all types of cross operation.

New compound for concrete surfaces

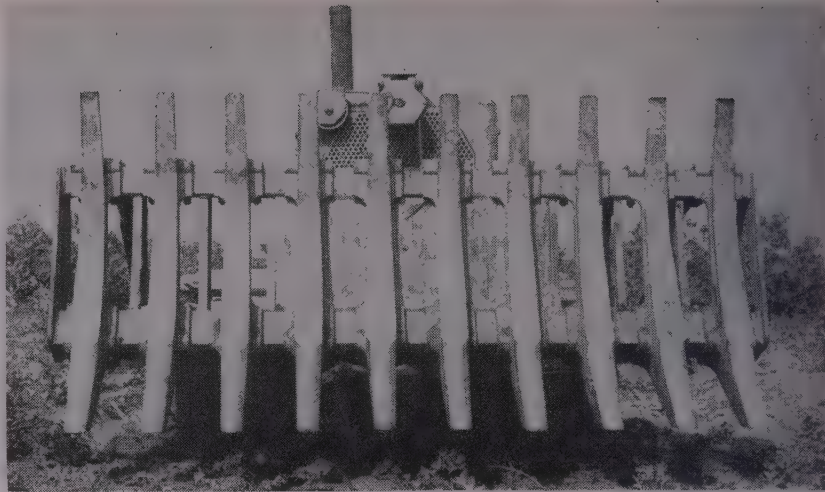
A new compound with a plastic base which offers in one material chemical and mechanical protection, surface texture, color and finish and which is easily applied by either spraygun or hawk or trowel, is being manufactured by **B. M. Heede, Inc.**, 630 Sixth St., San Francisco, Calif. The 30 Compounds lend themselves particularly well for application on smooth concrete surfaces, concrete and gypsum blocks, sheet rock, insulation board, masonite and steel, etc. Using a spraygun, a man after a short training period can apply 10,000 sq. ft. per normal working day. With hawk and trowel, a man can cover about the same area as when applying stucco.

Back-up-alarm for trucks

The manufacture of a new, completely automatic, mechanical safety back-up-alarm for trucks is announced by **E. D. Bullard Co.** This



alarm is operated entirely by gravity. No wires or switches are needed. It attaches directly to the rear wheels of all dual-wheeled vehicles with full floating axles. For literature, giving further information about this new safety back-up-alarm and complete instructions, write **E. D. Bullard Co.**, 275 Eighth St., San Francisco 3, Calif.



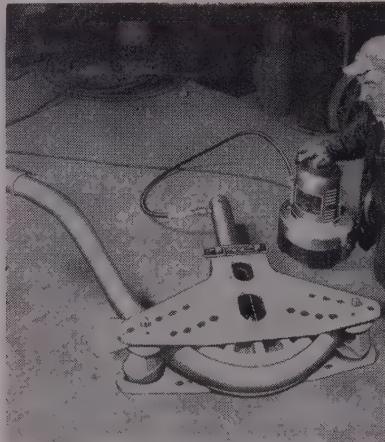
Heavy-duty rake for Cat D9

A new 9,390-lb. rake has been developed by **Fleco Corporation** of Jacksonville, Fla., for use with the Caterpillar D9 tractor. The teeth and frame are designed to give extra strength in heavy clearing, clearing large boulders, spreading rock, rip-rap, piling and other types of construction. The unit uses the same C-frame or push arms as an angle or straight dozer and is easily inter-

changeable with the dozer. Multiple spacing of the teeth permits the number of teeth to be varied from 5 to 10 with equal spacing to match clearing conditions and types of material. The frame includes two heavy boxed angle sections with heavy end gussets and intermediate gussets, behind each tooth, for greater strength and rigidity. Teeth are manganese carbon steel castings, heat-treated for maximum strength and wear. Weight of each tooth is 560 lb.

New line of pipe and conduit benders

Four new models of 3- and 4-in. hydraulic pipe and conduit benders are being marketed by **Blackhawk Manufacturing Co.** The Blackhawk

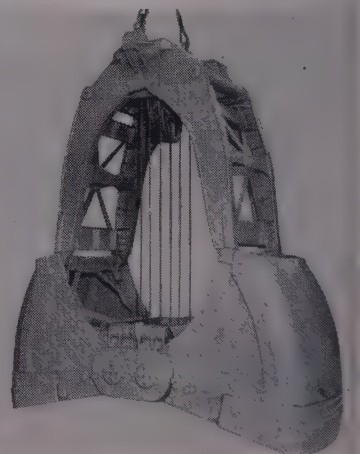


line of benders now includes hydraulic units to bend pipe and rigid conduit from 1/2 through 4 in. in diameter. A 90-deg. bend can be made with just one stroke of the ram in pipe through 3 in. and only three setups in 4-in. pipe, eliminating multi-setups. The new models, S-137, S-138, S-139 and S-40 are styled after Blackhawk's S-130 bender which bends pipe and rigid conduit from 1/2 through 2-inch. All four models come equipped with Blackhawk's patented "Optik-Angle" gage which as-

ures accurate bends. Literature describing these new models is available from the manufacturer, 5352 W. Rogers St., Milwaukee 46, Wis.

Alignment device for grab buckets eliminates jamming and breakage

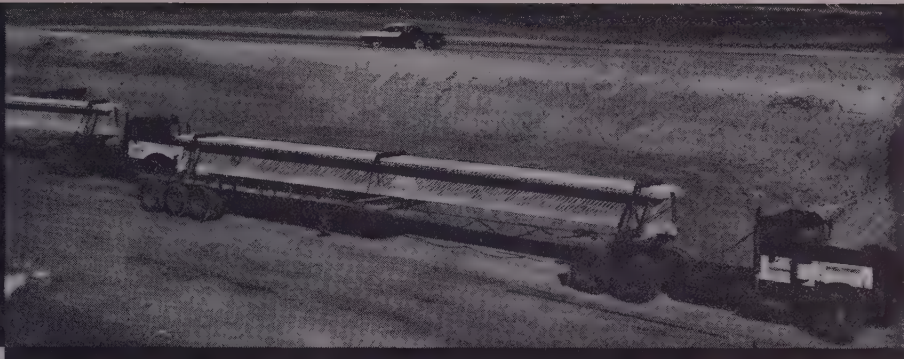
A new link-type hinge alignment device for grab buckets which eliminates jamming and breakage by non-crushable materials has been developed by the **Mead-Morrison Division**



of the **McKiernan-Terry Corp.**, Harrison, N. J. The device has been specially developed for use on buckets handling slag, ore, and other extremely hard materials. In addition, the device has a great deal more bearing surface than an ordinary

ONE

BASALT girders roll to the job quickly, ready to be raised to position. Girders spanned 58 feet and were 3-feet 9-inches high.



TWO

Cranes lower BASALT girders into position on overcrossing with virtually no interruption of highway traffic flow.



THREE

Ready for finishing work, BASALT'S job is complete... all girders delivered on schedule.



and BASALT'S ON THE JOB!

Arno and "C" Street Overcrossings
U. S. Highway 99, near Galt, Calif.
Division of Highways, State of California.

General Contractor: A. Teichert & Sons, Inc., Sacramento, Calif.

BASALT delivered 28 of these precast, prestressed concrete "T" girders right on schedule, for time-saving installation at two Highway 99 overcrossings. BASALT's long experience and ample production facilities assure general contractors of more precise fabrication and definite delivery... by rail, water or truck.

For structural concrete products you can depend on... both for precise specification and dependability... see BASALT!

Basalt
ROCK CO., INC.

WRITE TODAY for detailed information

BASALT ROCK COMPANY, INC.
Structural Concrete Products Division
NAPA, CALIFORNIA • Telephone BALdwin 6-7411

gear-tooth engagement and is entirely enclosed, reducing wear and lubrication problems. The device is fabricated entirely of Carilloy T-1 steel which has a high tensile strength and is unaffected by exposure to the high heats involved in handling hot slag.

New type steel pipe field joint

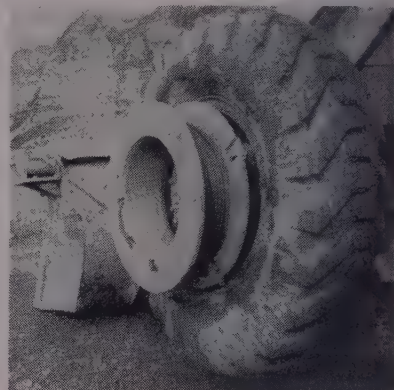
Smith-Scott Co., Inc., of Riverside, Calif., has developed a new type of steel pipe field joint, reported to substantially reduce the cost of laying pipe in the ground. The joint embodies a self-sealing rubber gasket, which locks securely into place in a special key-way. This results in con-

siderable flexibility, while guaranteeing leak-proof joints. Smith-Scott's hi-FLO Steel Pipe equipped with the new joints is sold in diameters of from 4 in. to 20 in. and in lengths up to 40 ft. Complete literature on the Ring-Seal Field Joint is available. Write to Smith-Scott Co., Inc., Box 3033, Riverside, Calif.

Winch for bucket loaders

A new low cost wheel winch developed by Termac is now available for four-wheel drive bucket loaders. Operating from the loader controls, the unit utilizes the ability of this type of loader to raise the front drive wheels and disconnect the rear drive

axle. With the front wheels off the ground and powered, the wheel-mounted winch rolls up the cable pulling the load toward the stationary vehicle. Weight transfer to the bucket



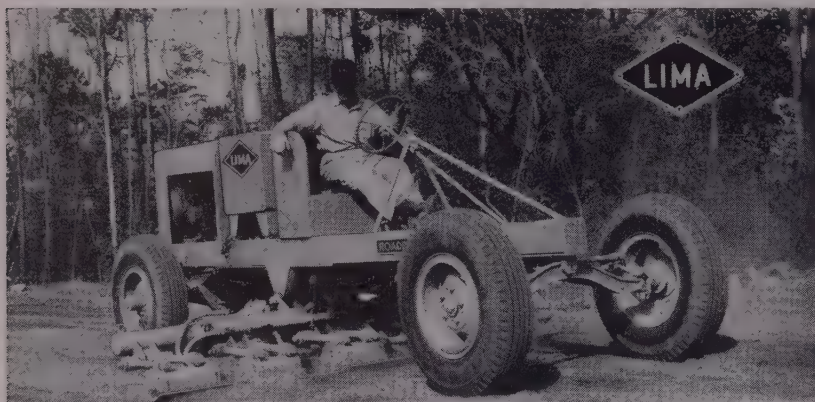
cutting edge gives a positive anchor preventing the vehicle from being drawn to the load in the event the load is larger than the loader. The Termac Outboard Winch Model TOW 1 has a capacity for 165 ft. of 3/4-in., or 350 ft. of 1/2-in. diameter cable. For further information write Termac, Dept. 2660, P. O. Box 556, Libertyville, Ill.

Improved concrete power buggy

A completely new model of the Whiteman Concrete Power Buggy is announced. Principal improvements on the new unit are: a heavier, solid-casting rear frame that adds extra strength and ruggedness; new type wheel-clutches that engage instantaneously; ball bearings in the steering column for easier steering and providing adjustment for wear; new hand-operated parking brake; sturdier seat bracket and larger, stronger steel guards for added protection to the operator. The new DB-60 carries 12 cu. ft. of concrete, travels up to 16 mph., climbs 25% grade, and turns in its own radius. Manufactured by Whiteman Manufacturing Co., 13020 Pierce St., Pacoima, Calif.

New Davis backhoe has 200-deg operating arc

An entirely new engineering development that provides a 200-deg. operating arc on the new 210 Davis Backhoe is announced by Mid-Western Industries, Inc., 1009 South West St., Wichita, Kan. The arc is provided by a rotary hydraulic boom swing cylinder that gives a constant and smooth but cushioned swing. The arc is accomplished without use of cables or without changing any pins. Other 210 exclusives include the interchangeable mounting locations on each end as well as the center of the frame. This makes it possible to switch operating positions from center to side for flush digging alongside buildings, fences and other places where digging formerly had to be done by hand. The Davis Backhoe has 7,000 lb. breakaway power.



LIMA ROADPACKER...

The cost-cutting vibratory compactor—proved on turnpike jobs

This is the hard-hitting, high-capacity machine that penetrates deeper—finishes a 13' width in one to three passes.

On this Ohio Turnpike job near Cleveland, Ohio, the LIMA Roadpacker is compacting a bank run gravel sub-base to an 8" high-density thickness. The LIMA Roadpacker's maneuverability was demonstrated efficiently on this job which required compacting operations in widely scattered sections—the problem of transporting cumbersome equipment and the duplication of units was eliminated.

Course aggregate for macadam bases up to 12" thick can be spread in a single layer, then uniformly compacted to final density

over a 13'-1" width with the LIMA Roadpacker.

Single spread, which is permissible only with the vibratory method, reduces material handling by one-half or more—it eliminates backtracking of spreading equipment and contour shaping is needed only once.

The action of the vibration "runs in" screenings to full depth of macadam with only three operations. Much of the labor formerly required to spread, broom and roll is eliminated. The versatile LIMA Roadpacker performs with equal efficiency on both full-width and widening jobs.

Here's how the LIMA Roadpacker speeds up paving operations.

- Drives to job at 30 MPH.
- Compacts equally well traveling forward or reverse—no deadheading or turning around when two passes are required.
- Covers a 13'-1" width, one-half of a two lane road.
- Operator can easily fold end shoes for

narrower working widths or for highway travel. Shoes are raised and lowered hydraulically.

- Low maintenance—all working parts are completely enclosed, can even operate under water or dirt. Shoes are driven hydraulically and are pressure-lubricated.

Reno Equipment Sales Company, 1510 W. 4th Street, Reno, Nevada; Feenaughty Machinery Co., 112 S.E. Belmont Street, Portland 14, Oregon; Feenaughty Machinery Co., 600 Front Street, Boise, Idaho; Faris-Moritz Equipment Company, 1554 Wazee Street, Denver, Colorado; Evans Engine & Equipment Company, 4300 11th Avenue, N.W., Seattle 7, Washington; Bay Cities Equipment, Inc., 2792 Cypress Street, Oakland 7, California; Bay Cities Equipment, Inc., 1178 West San Carlos Street, San Jose, California; N. C. Ribble Company, 1304 North Fourth Street, Albuquerque, New Mexico; Smith Booth Usher Company, 2001 Santa Fe Avenue, Los Angeles 54, California; Hall-Perry Machinery Company, 902 Central Avenue, Billings, Montana; Hall-Perry Machinery Company, 812 East Iron Street, Butte, Montana; Hall-Perry Machinery Company, 1116 15th Street, North, Great Falls, Montana; Hall-Perry Machinery Company, 127 East Main Street, Missoula, Montana; Shriver Machinery Company, 1756 Grand Avenue, Phoenix, Arizona.

LIMA

SHOVELS • CRANES
DRAGLINES • PULLSHOVELS



BALDWIN-LIMA-HAMILTON
Construction Equipment Division—LIMA WORKS

Asphalt grades reduced in number

The Asphalt Institute cuts paving asphalt grades from 9 to 5 to streamline highway design and construction

IN ANOTHER MOVE to streamline road paving methods, The Asphalt Institute has adopted a reduction in the number of grades of paving asphalts from nine to five. In making the announcement, Pres. J. E. Buchanan said the Institute's action followed a series of exploratory discussions with asphalt users, highway officials and refinery representatives.

Four basic paving grades now officially recognized by the Institute are listed as 60-70, 85-100, 120-150 and 200-300 penetration. A fifth grade of 40-50 penetration asphalt is recommended for special and industrial uses.

"The advantages of the reduction in grades are evident," said Buchanan. "It will simplify the storage and handling problem at the refinery and will certainly make these standard grades more readily available from all asphalt refiners. In turn, the user can reasonably expect better service in delivery and superior distribution of the paving product."

Need for general streamlining of materials specifications has long been recognized by highway officials. The tremendous pressures exerted by the multi-billion dollar Federal road program has made this a matter of immediate concern. This was recognized by A. C. Clark, Assistant Commissioner of Public Roads, who indicated to the Institute he would ask for a determined effort by all materials suppliers for simplification of specifications, without sacrificing quality.

CALENDAR

Apr. 9-11—American Welding Society, Fifth Welding Show, Convention Hall, Philadelphia, Pa.

Apr. 18-19—Western Concrete Pipe Association, annual meeting, Hacienda Motel, Fresno, Calif.

Apr. 28-May 5—International Commission on Irrigation and Drainage, third congress, Sheraton-Palace Hotel, San Francisco, Calif.

Apr. 29-May 3—National Materials Handling Exposition, Convention Hall, Philadelphia, Pa.

May 12-17—American Water Works Association, annual conference, Atlantic City, N. J.

June 11-14—Western Association of State Highway Officials, annual meeting, Houston, Texas

Eliminated from the table of grades by the Institute were those in the intermediate ranges: 50-60, 70-80, 100-120, and 150-200 penetration. The penetration value defines the consistency of the asphaltic cement, ranging upward from extremely hard to very soft. The Institute is satisfied that the skip-grading will not affect the quality of the resulting mix.

The reduction in the number of grades of paving asphalts followed similar action three years ago by the Institute in initiating a reduction in grades of emulsified asphalts from six to four.

A project committee of the Institute is currently working toward a reduction in grades of the rapid-curing, medium-curing and slow-curing groups of liquid asphalts.

PG&E awards contract for hydroelectric plant

PACIFIC GAS and Electric Co. announced the award of a contract to the M & K Corp. of San Francisco for the construction of Caribou No. 2 Powerhouse building on the Feather River North Fork approximately 46 airline mi. northeast of Oroville. The plant is one of two new powerhouses which will be built in a \$32,600,000 hydroelectric development.

The powerhouse will be located adjacent to the existing Caribou Powerhouse. The building will be 100 x 200 ft. in dimension and 32 ft. from foundation below the water to the main generator floor level. The two generators will be outdoors and only their turbines and related equipment will be housed below. A small control building, 66 x 32 ft., will be built alongside the outdoor generators. The plant will generate 106,000 kw. of electricity.

Caribou No. 2 Powerhouse will be supplied with water from Butt Valley Reservoir through a tunnel 1.6 mi. long and 13 ft. in diameter. The second plant will be the Butt Valley Powerhouse, 36,000 kw., which will be located at the upstream end of the reservoir. It will be supplied with water through a 2-mi. tunnel from Lake Almanor. The two tunnels are now under construction.

Another contract was awarded to Wismer and Becker, Sacramento, for the installation of two turbines and their generators and related electrical and mechanical equipment at Poe Powerhouse, which is under construction downstream, approximately 20 airline mi. from Oroville. The \$35,000,000 Poe development will add 106,000 kw. of generating capacity to the PG&E system.

The tunnel of the Poe development, 6½ mi. long and 24 ft. in diameter, was "holed through" Feb. 2. Tunnel

driving began April 4, 1955. Next the work of lining the tunnel with concrete will begin.

Irwin E. Burks dies; concrete authority

Irwin Eugene Burks, 64, died at Fort Belvoir, Va., on Feb. 22. He had retired because of illness after a long and distinguished career as a construction engineer, which included service with the Aluminum Company of America and the Corps of Engineers. He served as an engineer officer in combat in World War I, was an early leader in development of methods of design and control of concrete mixtures in heavy construction, and participated in the construction of numerous major projects in the United States, Canada, and Panama, including Chute-a-Caron Dam, Madden Dam and Bonneville Dam. He was a frequent participant in activities of professional societies.

Thomas Brooks dies; water supply veteran

REPRESENTING the last link to the early days in Los Angeles water development, Thomas Brooks died in February, a few days before his 95th birthday. Tom Brooks retired as engineer in charge of the distribution, construction and operation division in 1939 having served in the water department of the City of Los Angeles for more than 55 years. He was one of five department employees exceeding 50 years of service when he retired. He was given his first job by William Mulholland as a laborer in 1883 and was named assistant superintendent in 1887 when Mulholland was appointed superintendent of the water company. Brooks was an honorary member of the American Water Works Association and the American Society of Civil Engineers.

DEATHS

Toney Romano, head of the Seattle, Wash., contracting firm bearing his name, and a long time member of Mountain Pacific Chapter, Associated General Contractors, died recently.

* * *

Clyde Myers, well known civil engineer of Phoenix, Ariz., died recently. He was head of the engineering department of Phoenix College from 1928 to 1947. From then until his retirement in 1957, he was a civil engineer for the city, county and the state.

* * *

Henry A. Whitley, widely known construction engineer of the Southern Pacific Co., died recently in a San Francisco hospital.



How to get your scrapers ready for heavy schedule of work

44-point check-list for Spring maintenance and "de-mothballing"

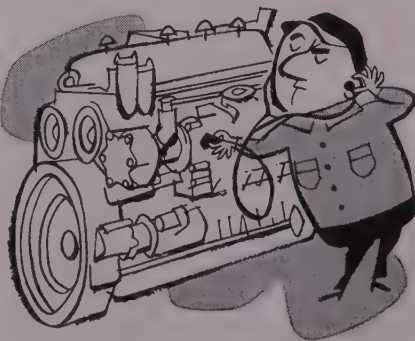
You'll eliminate a lot of maintenance headaches, and get steadier dirtmoving output during the busy season ahead, by carefully preparing your equipment. Remember, a \$5 repair put-off today, may cost you \$500 in lost dirtmoving time later! This check-list will help your crew head-off most equipment-failure troubles before they start.

General

- ☐ 1. Before moving machine, check: closure of all drain-cocks; adequate level of coolant, lube oil, hydraulic fluid; tire pressure.
- ☐ 2. Adjust parking brake for positive holding.
- ☐ 3. Clean and inspect structure and frame-members of scraper and prime-mover; weld or replace broken parts; paint exposed metal.
- ☐ 4. Check axle bearings; adjust or replace; lubricate.
- ☐ 5. Clean and check ball-and-socket joints, hinge pins, tailgate rollers and bearings; adjust or replace as required.
- ☐ 6. Inspect cable sheave wheels and rollers; replace if worn or if not functioning 100% smooth.
- ☐ 7. Replace weak or frayed control cables; lubricate (except for heavy-dust operations).
- ☐ 8. Replace, reverse, or surface-weld worn cutting blades; replace worn ground plates.

Tires and Rims

- ☐ 9. Check rims for bent or damaged flanges; repair or replace, as needed. Tighten wheel bolts.
- ☐ 10. Check tires for cuts and breaks; remove stones or metal fragments; recap or switch worn tires to trailing wheels; repair or replace damaged tires and tubes.
- ☐ 11. Inflate tires in accordance with your operating manual. Post correct tire-pressure schedule in cab.



Engine

- ☐ 12. Perform all periodic maintenance procedures (incl. 1000-hr check), as shown in engine manual.



Cooling System

- ☐ 13. Drain and back-flush radiator, engine block, oil cooler and compressor jackets. Remove scale with sal soda or good radiator cleaner; flush thoroughly. Repair leaks in radiator, water pump, gaskets, hoses and connections. Refill radiator as follows:

Freeze-up zone — use permanent anti-freeze (ethylene glycol) to give year-round protection, adding clean, clear water to fill system.

Warm zone — use clean water free from lime or alkali; add rust inhibitor or 4% soluble oil.

- ☐ 14. Check thermostats for opening temp., and full closure; discard thermostats not operating as stamped.

- ☐ 15. Clean dirt and bugs from radiator core and fins.

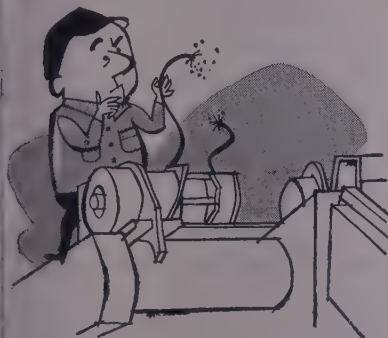
Cooling System (continued)

- ☐ 16. Check water-pump pulleys for slippage or excessive "play"; repair or replace as required.
- ☐ 17. Replace frayed or stretched fan and water pump belts; set tension to $\frac{3}{4}$ " deflection under thumb pressure.
- ☐ 18. Check accuracy of dashboard temperature gauge.



Fuel System

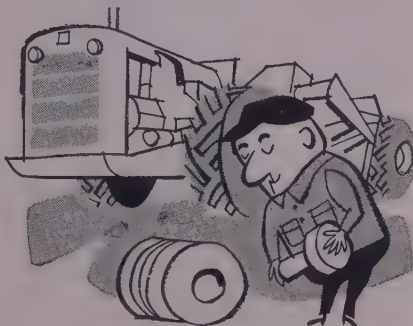
- ☐ 19. Drain water and dirt from fuel tank and filters.
- ☐ 20. Change filter cartridges; clean strainer.
- ☐ 21. Adjust fuel pump to supply recommended pressure.



Electrical System

- ☐ 22. Clean and inspect for loose or broken wires and cables; check solenoid and contactor action; dress or replace burned contactor points; tighten leads.
- ☐ 23. Clean and inspect starting motor and Bendix drive; replace brushes if worn; tighten leads.

- ☐ 24. Clean and inspect generator; replace brushes if worn, tighten leads. Check ammeter; adjust generator to recommended charge rate.
- ☐ 25. Scrape corrosion off battery, box, and cables; wash with bicarbonate of soda solution (1 lb. per gal.); rinse with water. Apply thin coat vaseline to terminals. Check plug vent holes.
- ☐ 26. Check battery for dead cells; add distilled water if plates are exposed; recharge.
- ☐ 27. Check lights and illuminated warning signals; replace burned-out lamps.
- ☐ 28. Clean and inspect electric motor windings, rotor and brake, adjust brake clearance; tighten leads.
- ☐ 29. Check all electric switches for positive, instant action; clean, repair, or replace as required.
- ☐ 30. Clean transformer; check and tighten leads.
- ☐ 31. Blow dust from rectifier; clean pre-cleaner cap.

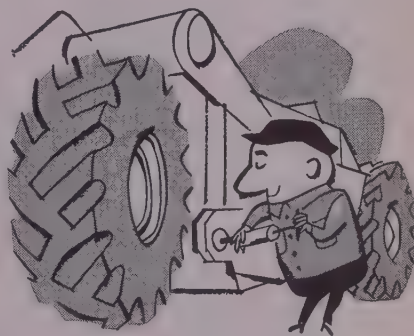


Air System

- ☐ 32. Inspect for damaged air lines and fittings; repair leaks; replace bent or dented tubing.
- ☐ 33. Check diaphragm of multiple-disc brakes. Clean hub splines.
- ☐ 34. Bleed water condensate from air supply tank (add alcohol in freezing weather).
- ☐ 35. Clean compressor air cleaner; refill with oil. Replace frayed or stretched compressor belts; set tension to $\frac{1}{2}$ " deflection under thumb pressure.

Hydraulic System

- ☐ 36. Inspect for damaged hydraulic lines and fittings; repair leaks; replace bent or dented tubing.
- ☐ 37. Check for cylinder leakage, bent rods, seals; repair.
- ☐ 38. Check pumps for leakage; adjust belt tension. Set pressure per manufacturer's recommendation.
- ☐ 39. Check operation of all relief valves.
- ☐ 40. Bleed air from lines; check fluid level.



Lubrication

- ☐ 41. Clean and inspect all lubrication points, replace broken lube fittings; clean screens and strainers; install new filter cartridges.
- ☐ 42. Thoroughly lubricate engine, transmission, prime-mover, and scraper according to *all* periodic lubrication *schedules* suggested by manufacturer (including 1000-hr. or 100th-shift check). Use lubricants specified by manufacturer.

Finally, before operating

- ☐ 43. Be sure all drain-cocks are closed; check for full level of coolant, lube oil, and hydraulic fluid.
- ☐ 44. Check parts stock and build up inventory for quick repair and less down-time.

Write or phone for as many copies of this LeTourneau-Westinghouse check-list as you need.

G-1401-G



LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

WHERE QUALITY IS A HABIT

California state buildings planned at \$112,000,000

DURING the current year, the California State Division of Architecture plans to start construction on nearly \$112,000,000 of state projects. Plans are nearing completion for the majority of these projects and some of them are scheduled for early construction.

About \$68,000,000 of this total is to be spent in Southern California and includes a \$5,000,000 addition to the office building of the Division of Highways in Los Angeles, \$2,200,000 for an engineering building at the State Polytechnic College, \$9,000,000 for a state office building in Los Angeles, \$4,000,000 for buildings at the Patton State Hospital and lesser amounts for other educational and institutional buildings.

The total of \$44,000,000 to be spent in Northern California includes \$6,700,000 for a state office building in San Francisco and \$3,278,000 for a similar building in Oakland, \$3,250,000 for a building to house the headquarters of the State Compensation Insurance Fund and \$3,800,000 for buildings at the Agnews State Hospital.

Piling driven at Swift Dam

ABOUT 63,000 lin. ft. of H-beams and sheet piling weighing 1,200 tons have been driven to serve as a barrier under the world's highest earth-fill dam, the Swift project. The 510-ft. high structure is being built by Jones-Tompkins Construction Company for Pacific Power & Light Company on the Lewis River in Oregon.

After the excavation of 900,000 cu. yd. of material the stream bed was leveled and the piles driven in depths up to 80 ft. The piling sections have sheet steel welded to each flange of the H-beams. Each set is driven to bedrock forming a row of 18-in. cells which are filled with concrete. Material inside each cell is loosened and washed out by a jet of air and water.

The Swift project is expected to cost about \$46,000,000. Power is scheduled for delivery late in 1958.

New sewer system planned for West Phoenix, Arizona

TO COST about \$1,250,000 a system of trunk sewer lines and a disposal plant are now in the planning stage for West Phoenix, Ariz. Plans will be drawn by Yost and Gardner, who will also supervise construction. This entirely new sewerage system has been made possible through a contract signed by a local builder who agreed to connect 2,700 houses he plans to build to the new system. The new system will operate independently of that now serving the City of Phoenix.

Water and power for Seattle

EXPANSION of the water and power development program of Seattle may require the expenditure of more than \$4,000,000 to drain mines in the area of the Pend Oreille River. Possible storage plans on this stream could possibly cause flooding of the mines in the neighborhood and the proposed drainage tunnels would be an answer to this possible objection to the project. Application has already been made by City Light for a dam at the location.

Legal snags continue at Mayfield Dam

LEGAL PROBLEMS continue to plague the dams being built on the Cowlitz River by the City of Tacoma, Wash. For more than a year construction on Mayfield Dam has been on a restricted basis working under a court order. More recently the fisheries and game departments of the State of Washington have charged that rock has been dumped illegally into the river and the court was asked to place the Department of Public Works officials in contempt. Evidence could result in a court decision fining the officials as well as the City of Tacoma \$100 each. The court continues to study the problem as to whether the structures would interfere with public navigation and whether the city has a legal right to purchase land now already in public use.

Little White Salmon Dam

THE FEDERAL POWER COMMISSION has issued a 36-month preliminary permit to Public Utility District No. 1 of Skamania County, Wash., of Stevenson, Wash., for a proposed hydroelectric project on the Little White Salmon River, a tributary of the Columbia River, in Skamania County, Wash.

The proposed project would include an earth-fill dam and storage reservoir, a diversion dam, flume, tunnel, canal, forebay, penstocks, and a powerhouse with an initial installation of two 10,000 kv.-amp. generators, each connected to a 15,800-hp. turbine. Plans call for the future installation of an additional unit.

The District said that it would use part of the power generated at the proposed project while the remaining output may be sold to neighboring public utility districts and might be a possible supply of energy for the Northwest Power Pool.

A preliminary permit does not authorize any construction, but merely gives the holder priority while making the surveys and investigations necessary to prepare an application for an FPC license.

SoCalEd plans steam plant

SOUTHERN California Edison Co. has filed an application with the California Public Utilities Commission for authority to construct a multi-million dollar, 400,000-kw. steam-electric generating station at Mandalay Beach near Oxnard. A contract for engineering and construction of the steam generating station has been awarded to Bechtel Corp. and, if approval to proceed is received, work would be started soon.

As proposed in the PUC application, Mandalay Steam Station's first 200,000-kw. generating unit would be completed in March 1959, and an identical second unit would go on the line in September of that year. The facility would be constructed on a 114-ac. coastal site about 4 mi. west of Oxnard, just south of the mouth of the Santa Clara River.

Edison's investment in the new installation is expected to be approximately \$60,000,000 when completed with two units.

Bonneville construction at \$26,000,000

BONNEVILLE power administration has scheduled a \$26,000,000 construction program for 1957. Contract construction work in Oregon, Washington, northern Idaho, and western Montana is expected to comprise over \$5,000,000 of the total.

Breakdown of the \$26,000,000 construction program includes \$5,000,000 in contract construction, \$13,000,000 material purchases, \$1,000,000 land costs, \$500,000 contract services including surveys and design, and \$6,500,000 for personnel, labor, communications, travel, utilities and miscellaneous charges against construction appropriations.

Right-of-way clearing contracts proposed for issuance during 1957 for 300 miles of line are estimated at \$1,100,000.

San Dieguito Dam

ANOTHER STEP has been taken leading to the construction of a proposed \$20,000,000 dam on the San Dieguito River in San Diego County, Calif. The project has been advanced by a recommendation submitted to the Chief of Engineers, by the South Pacific Division. The recommendation calls for Federal participation in the multi-purpose dam and reservoir project located 23 mi. above the mouth of the river. Approval of the Chief of Engineers must be followed by actual authorizing legislation and appropriation of Federal funds. The structure, which would be of concrete, gravity type, is estimated to provide a 375,000-ac. ft. reservoir for flood control, supplemental water for San Diego and adjoining irrigated areas.

News of DISTRIBUTORS



NEW FACILITIES of Andrews Equipment Service located at East 4620 Trent Ave., Spokane, Wash. From here are distributed through the eastern half of Washington, northern Idaho and western Montana, such major lines as Thew Lorain shovels, Pettibone Mulliken loaders, Chicago Pneumatic compressors and tools, and Challenge truck mixers. The move from Andrews' former headquarters at South 126 Walnut St., where they were for 14 years, was brought about by construction of the new Maple Street Bridge through that site.

N. J. Helmick appointed

Neal J. Helmick recently took over the duties of parts manager and office manager of Feenaughty Machinery Co., Boise, Idaho. The position was left vacant by the death of Edward Villeneuve.

D. Lillebo joins Oregon distributor

Dale Lillebo, well known to Oregon contracting organizations, has joined the sales force of Contractors Equipment Corp., Portland. He will cover the territory of southern Oregon.

Plastic pipe distribution

Republic Supply Co. of California has assumed the distributorship for two trademarked lines of plastic pipe and fittings manufactured by Republic Steel Corp. Roy W. Johnson, executive vice president for the California firm, says it has a full stock of "SRK Kralastic" and "F. E. Polyethylene" pipe. W. J. Anderton, factory representative for the manufacturer, is available at the distributor's offices in Los Angeles for consultation with customers.

New rep for San Diego area

Yale Materials Handling Division, The Yale & Towne Manufacturing Co., has appointed Earthmovers Equipment & Supply, Inc., as industrial lift-truck sales and service representative in the San Diego, Calif., area. Previously San Diego and Imperial counties were covered out of the Yale sales and service branch in Los Angeles. Personnel of the new representative include Jack S. Dea-

derick, president; Harry Booth, vice president; Gene Meek, office manager; Royal Busboom, service manager, and Nelson B. Lee, sales engineer.

ConMac names Bull Moose dealer

ConMac Corporation, Seattle, Wash., exclusive United States distributor for "Bull Moose" mobile construction and industrial equipment, announces the appointment of Andrews Machinery Co. of Seattle as dealer for this equipment in western Washington. Addition of this crane to the lines already represented by Andrews is a further step in rounding out their representation and stocking of construction equipment in the western part of state.

New sales engineer; new account

Wset Coast Engine & Equipment Co., Berkeley, Calif., has appointed a new sales engineer, Bud Capfer. He will cover the three counties of San Mateo, Santa Cruz, and Monterey. Also announced by George McIntosh, sales manager, is the acquisition of the Allis-Chalmers Manufacturing Co. account.

Promotions at Interstate Tractor

A. K. Arnold was elected assistant treasurer of Interstate Tractor & Equipment Co. at the company's annual meeting. Harold Bjorkman was promoted to assistant controller. With headquarters in Portland, Interstate Tractor is Oregon area dealer for Euclid, Lorain and Chicago Pneumatic equipment.

Caterpillar dealer ups sales staff

Elmer C. Mickleit has been added to the sales staff of Halton Tractor Co., Caterpillar dealer in Portland, according to announcement by E. H. Halton, Sr., president. Assigned to



**Elmer C.
Mickleit**

contractor and governmental sales, Mickleit has been in construction equipment and heavy equipment parts sales since 1950. Halton is dealer for Caterpillar Tractor Co. in northwest Oregon and southwest Washington, with offices in Portland, Salem, and Astoria, Ore., and in Longview, Wash.

Clipper distributorship in Arizona

Announcement is made by Bob Stubbs, manager at San Francisco for Clipper Manufacturing Co. of Kansas City, Mo., that Superlite Builders Supply Co., Phoenix, has been appointed to represent Clipper in the Arizona territory.

Lars Prestrud named gen. mgr.

According to announcement by R. D. O'Brien, vice president and general manager of Kenworth Motor Truck Co., Lars O. Prestrud is the new vice president and general manager of Colorado Kenworth Corp. at Denver, Colo. He replaces Don Ward, who resigned to operate a truck line. Prestrud has been engaged in the sale of trucks and diesel engines in Colorado since 1933. For ten years he served as national account salesman for the state with a motor truck manufacturer. He also served as general manager for Cummins Diesel Sales of Colorado, Inc., for a number of years.

Frank Cooper joins AED Board

Frank R. Cooper, president of Howard-Cooper Corp., Portland, Ore., was installed as a member of



**Frank R.
Cooper**

the Board of Directors of Associated Equipment Distributors at its 38th annual meeting in Chicago. He represents AED's Region XII comprising the states of Oregon, Washington, Idaho, and Montana.

MANUFACTURERS

Three sales appointees

Dresser Manufacturing Division, Bradford, Pa., announces appointment of three Western sales representatives. Gerald Melone is named sales representative in the Northern California district, with headquarters in San Francisco; C. R. "Bob" Keiser, in Southern California, with headquarters in Los Angeles; and Fred Frey, in the Pacific Northwest area, headquartering in Portland, Ore.

Northwest expansion

A six million dollar expansion and modernization program has been completed by Oregon Portland Cement Co. The company's plants located at Oswego and Lime, Ore., now have an annual capacity in excess of 3,000,000 bbls. Headquartered in Portland, Oregon's oldest cement

manufacturer has been enlarging facilities for more than a year, and the firm is now probably the largest cement manufacturer in the Pacific Northwest.

Staff changes at Goodyear

Major staff changes in The Goodyear Tire & Rubber Co.'s retread and repair materials section at Akron have been announced. Frank S. Griesinger, former manager of retread and repair materials, has been assigned to special projects in conjunction with the Service Sales and Equipment Division. He is replaced in his former post by Joseph C. Hofmann, Jr.

Bros appoints general sales mgr.

Robert L. Wicker has been appointed general sales manager for the Wm. Bros Boiler & Mfg. Co., Minneapolis, Minn. Wicker will be in charge of promotion, advertising, and personnel in the company's three

sales divisions, Road Machinery, Power, and General Sales. He has long been associated with the road construction equipment business, most recently as sales manager for the Federal Motor Truck division of Napco Industries, Inc.

A-C management promotions

L. C. Daniels is now general manager of the Buda Division, Tractor Group, Allis-Chalmers Manufacturing



Daniels



Higgins

ing Co. succeeding R. K. Mangan who retired Jan. 1. Owen J. Higgins is general manager of the Harvey, Ill., Works, where Buda material handling equipment, and diesel, gasoline, LP gas, and gas engines and generator sets are made.

Jack Davis joins Seaman-Andwall

Appointment of Jack E. Davis as assistant to K. C. Anderson, president of Seaman-Andwall Corp., Milwaukee, Wis. was recently announced. He comes to Seaman-Andwall from the Colson Corporation in Elyria, Ohio.

Kenworth Motor ups Wetta

Appointment of Daniel T. Wetta to the position of sales manager for distributor sales is announced by Lewis G. Gerlach, general sales manager for Kenworth Motor Truck Co., Seattle, Wash. Wetta has been with Kenworth in sales work since November 1945.

Changes in Chain Belt personnel

Chain Belt Co. of Milwaukee, Wis., makes the following announcement. R. V. Krikorian, formerly general manager of Chain Belt (Canada) Ltd., has returned to Milwaukee to become sales manager of the Rex Construction Machinery Division. Henry Valle, formerly assistant general manager and sales manager, has been appointed to the Canadian position vacated by Krikorian's return to the United States. Chain Belt is one of the leading manufacturers of construction equipment. At present its Rex line includes road pacers, general roads machines, steel forms, truck-mounted concrete mixers, building mixers, de-watering pumps, Pumcrete, and Railporter.

Three sales promotions

Three promotions in the sales department of Standard Steel Works



DON'T SEARCH FOR POWER OUTLETS

for tools and lights to perform maintenance work.

DON'T SEND FOR AN ELECTRICIAN

to hook up your welder for repair jobs.

USE A WELDANPOWER!

Weldanpower is a light, but powerful gasoline engine driven combination welder and power plant.

As a power source, Weldanpower furnishes 4 KVA of 115 or 230 volt power for continuous duty.

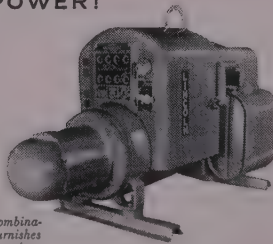
Welds and furnishes power at the same time.

As a welder, Weldanpower supplies 200 amps. of welding current for all maintenance work.

Weldanpower is the heart of a maintenance man's portable repair truck.

Ask your local Lincoln representative or write to us for Bulletin SB-1339.

Weldanpower, Lincoln's combination welder-power unit furnishes both currents at the same time.



THE LINCOLN ELECTRIC COMPANY

Dept. 4314 • Cleveland 17, Ohio

The World's Largest Manufacturer of Arc Welding Equipment

PAVING A TURNPIKE, KANSAS STYLE



Clamshell, Hopper, Conveyor and Portable Plant Keep Backtop on the Move

Marion 43-M, equipped for clamshell
operation, is playing its part in the construction
of the Kansas Turnpike by keeping a couple
hoppers filled.

The picture tells its own story of how
materials flow into the portable asphalt
plant at the extreme right.

This is one of three Marions for this owner,
his second Marion 43-M. The 43-M
is a big one-yard machine with many features
that make it a favorite of contractors. For
example, it converts easily and quickly on the
job. Its air control gets more work done with
less physical effort and less maintenance.
Its self-cleaning crawlers travel and
operate in almost any footing.

For your Marion Distributor for the names
of 43-M owners in your area—talk with
them about their machines. And get detailed
information on the rest of Marion's broad line
of machines for every contractor requirement.

Whatever your job requirement, there is a Marion machine of the right size and
type for greatest efficiency.

Your MARION distributor is the man to see. He can save you money!

EUGENE, OREGON—Western Equipment Co., 1360 W. First Avenue, P. O. Box 3205. Phone: 4-4265. **PORTLAND, OREGON**—Western Equipment Co., 2244 N. W. Savier Street. Phone: CApitol 8-4128. **SAN FRANCISCO 3, CALIFORNIA**—George M. Philpott Co., Inc., 1060 Bryant Street. Phone: HEmlack 1-5475. **FRESNO, CALIFORNIA**—George M. Philpott Co., Inc., 2376 South Railroad Avenue. Phone: Fresno 6-9843. **OAKLAND, CALIFORNIA**—George M. Philpott Co., Inc., 2928 Poplar Street. Phone: Glencourt 2-0458. **PUEBLO, COLORADO**—George M. Philpott Co., Inc., 125 North Vineland. Phone: Edgewood 6-8096. **SACRAMENTO, CALIFORNIA**—George M. Philpott Co., Inc., 6260 Folsom Boulevard. Phone: Gladstone 2-2641. **PHOENIX, ARIZONA**—State Tractor and Equipment Co., 407 South 17th Avenue. Phone: ALpine 2-1731. **TUCSON, ARIZONA**—State Tractor and Equipment Co., 1202 North Main Street. Phone: 4-2335. **ALBUQUERQUE, NEW MEXICO**—M & F Equipment Company, 824 Arno Street, N. E. Phone: 3-3793. **DENVER 4, COLORADO**—Western Machinery Company, 2400 West 7th Avenue. Phone: TAbor 5-7151. **CASPER, WYOMING**—Moss Equipment & Supply Company, 3100 East Yellowstone. Phone: 2-4547. **GRAND JUNCTION, COLORADO**—Western Machinery Co. **SEATTLE, WASHINGTON**—Star Machinery Company, 241 Lander Street. Phone: Elliott 0760. **SPOKANE, WASHINGTON**—Star Machinery Company, E. 415 Sprague Avenue. Phone: Riverside 6121.

MARION POWER SHOVEL CO. MARION, OHIO, U. S. A.

Please send me Bulletin 430 on the Marion 43-M.

Name Title

Company

Address

City State

Inc., North Kansas City, Mo., are announced by H. H. White, vice president. Mason L. Thompson, Jr., formerly manager of the Transport Division, is made assistant general sales manager. J. K. Neubauer has been advanced from manager of the road and street department to sales promotion manager. C. R. Wittig has been promoted from the sales department to manager of the Road Equipment Division, filling Neubauer's prior position.

Thor transfers executive offices

Reversing the trend of industry to move from city to suburb, the Thor Power Tool Co. announces transfer of its executive offices from Aurora, Ill., to the Prudential Building in downtown Chicago. The move affords larger executive headquarters conveniently located in a major business center.

Louis S. Clarke dies

Louis S. Clarke, last of the pioneers of America's automotive industry, died at West Palm Beach, Fla., at the age of 90. A contemporary of Henry Ford and Duryea, Clarke developed the first American spark plug, the direct drive motor car, double reduction gear, circulating oil system, and fathered the left-hand drive. He was founder of The Autocar Company, now a division in Exton, Pa., of The White Motor Co.

T. L. Smith advances Clayton

R. W. Smith, president of The T. L. Smith Co., Milwaukee, Wis., announces the appointment of W. A. Clayton as vice president and direc-

W. A.
Clayton



tor of sales. In his new capacity, Clayton is responsible for over-all company sales policy, and will continue to handle his previous duties as general sales manager. He brings to his position more than 18 years' experience in construction equipment sales, and is a past director of the Associated Equipment Distributors of America.

New pipe products sales manager

The appointment of John R. Broughton as general sales manager of Gladding, McBean & Co., pipe products division, has been announced by R. C. Conover, vice president. A registered civil engineer, Broughton has been associated with the Los Angeles firm for seven years.

His new duties will be in addition to his present responsibilities as area sales manager for Southern California.

Ramset new training program

A training school to teach proper handling of powder-actuated fastening tools is under way by Ramset Fastening System, a part of Olin Mathieson Chemical Corp. The courses are being held at the company's headquarters in Cleveland, Ohio. The school, headed by Ralph H. "Hank" Benedict, has two main purposes, (1) to improve the selling techniques of Ramset salesmen, and (2) to train all salesmen of Ramset's dealer organization numbering more than 400.

Pioneer names district rep

Vern Sieverson has been appointed by Pioneer Engineering Works, Inc., Minneapolis, Minn., to represent Pioneer equipment throughout Montana, Lemhi County in Idaho, and the Canadian provinces of Alberta and Saskatchewan. Sieverson has been with Pioneer, a division of Poor & Co., Inc., since 1951, and has since had wide practical experience in his capacity of field serviceman.

Two in one

To better serve the construction industry Concrete Sawing Equipment, Inc., Arcadia, Calif., has been

New Automatic Front Engine Power Take-Off

The new Willard "Mixomatic," incorporating automatic transmission with front engine power take-off provides more profit by faster operation and greater production per operator.

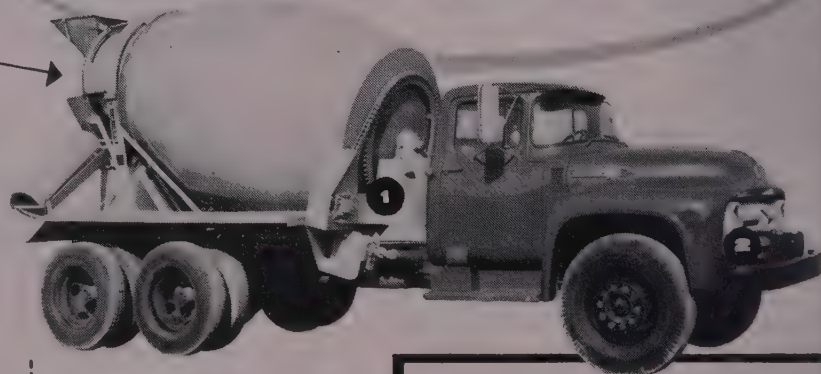
Willard "Mixomatic" does for the transit mixer what the same type of automatic transmission has done for trucks and passenger cars.

It gives close control of concrete flow and ease of operation.

Use of standard automotive parts assures reliability and availability of service everywhere.

Check all the features of these big 5 to 7 C. Y. Willard Truck Mixers. Write for complete information and prices. Dealers everywhere.

Willard "MIXOMATIC"



Features

Standard automotive parts used throughout drive line...service available everywhere.

New hopper design for faster charging.

3-way quick shut-off water valve.

New splash guards protect drum.

New, simplified FEPTO*

1. 2 speed gear box with sprocket and take-up for drive chain are easily accessible.

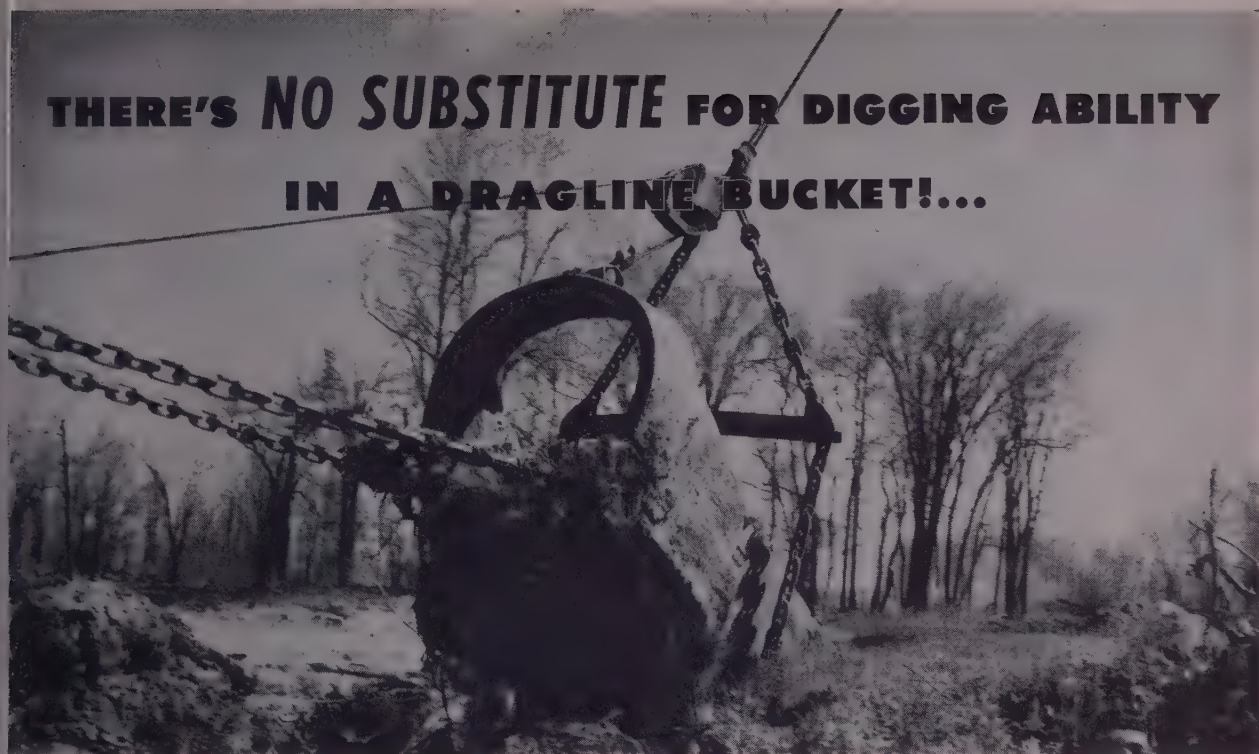
2. Front engine power take-off drives the drum through standard Spicer automotive drive line and automatic transmission. Two mixing speeds and four discharge speeds give maximum flexibility. Two levers, throttle and transmission, simplify control of drum discharge operation.

*Front engine power take-off

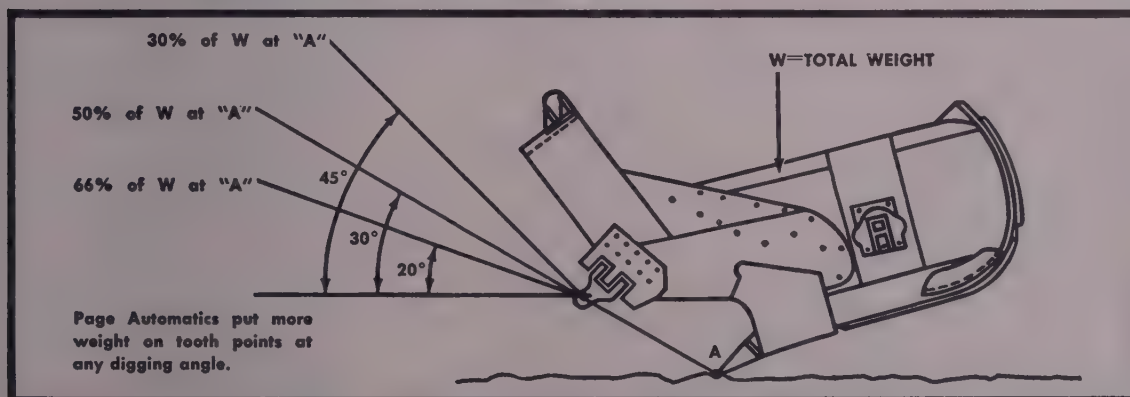
Willard Truck Mixers

Manufactured in Los Angeles and Galion, Ohio • Member: T.M.M.B.
WILLARD CONCRETE MACHINERY CO.
11700 Wright Road, Lynwood, (Los Angeles County) California

THERE'S NO SUBSTITUTE FOR DIGGING ABILITY IN A DRAGLINE BUCKET!...



And it's DISTRIBUTION of WEIGHT That Makes A Bucket Dig



Regardless of all other arguments, the only practical way to judge and buy a dragline bucket is on its *digging ability*. If a bucket won't dig, or digs with difficulty, it is a poor investment in production.

Balance—the distribution of weight—is an important factor in a bucket's digging efficiency. The more weight concentrated on its tooth points ("A" in drawing) at the first pull on the loadline, the better the bucket will dig. Because Page Automatics are designed and built so that a greater percentage of their total weight is concentrated on the tooth points at *any loadline angle*, they are recognized as the best digging bucket on the market.

We can prove that a Page Automatic will out-dig and outperform ordinary old style buckets and increase yardage up to 25% on your own machine. Ask for details on a demonstration today. Write for Bucket Catalog GPB554.

PAGE ENGINEERING COMPANY
CLEARING P.O. — CHICAGO 38, ILLINOIS

Page
Automatic Dragline
Buckets
Walking Draglines

If it's a PAGE... It DIGS

split into two companies. Concut Sales, Inc., is the new company formed to manufacture, distribute and sell diamond and abrasive blades, masonry and sawing equipment. Concrete Sawing Equipment, Inc., will do contract sawing only. Ownership, management, and address (331 N. Santa Anita) remain unchanged.

George Long dies

George E. Long, past president and retired chairman of the board of directors of Koehring Company, died in Milwaukee, Wis., after a brief illness, at the age of 70.

R. G. Kimbell takes Bodine's place

Richard G. Kimbell has been appointed acting executive vice president of the National Lumber Manufacturers Assn. A veteran of 38 years' service with the association, he will act in place of Leo V. Bodine who recently resigned.

Reich appoints Western rep

Harlan Knudsen, Conoga Park, Calif., has been appointed factory representative for Reich Bros. Manufacturing Co., Terre Haute, Ind. Knudsen will provide Western sales and service for the Reich line of rotary drills.

District managers meet

Gardner-Denver Co., Quincy, Ill., recently concluded a week-long district managers conference. Participating in the program were special representatives, sales and engineering personnel from the headquarters office, and district managers. Among district personnel from the West who attended the meeting, which was highlighted by a preview of the 1957 Gardner-Denver models, were R. S. Gibson, Butte, Mont.; H. F. Gerhauser and M. C. Stewart, Denver, Colo.; W. A. Nilsson, Los Angeles; F. B. Matheson, Salt Lake City, Utah; C. H. Dirks, San Francisco; B. D. Elliot, Seattle, Wash., and G. D. Stearns, Vancouver, B. C.

K. J. Worthen promoted by GE

Kent J. Worthen, formerly district sales manager for General Electric mobile communication equipment at Los Angeles, Calif., has been appointed market development manager for the GE Communication Products Department, and will co-ordinate activities in the sale of 2-way radio to the highway construction field. He will be located at the Department headquarters in Syracuse, N. Y.

Yale & Towne buys Trojan line

The Yale & Towne Manufacturing Co., New York City, has entered into an agreement whereby it will acquire Contractors Machinery Co., Inc., Batavia, N. Y., manufacturer of the Trojan line of 4- and 2-wheel drive, self-propelled, front-end bucket load-



A UNIQUE AWARD was presented to members of various Road Show committees for service "above and beyond the call of duty" by the Construction Industry Manufacturers Association. The "Roads Scholar" awards presented by **Kenneth Lindsay**, executive vice president of Iowa Manufacturing Co., president up through the 1957 Road Show, went to **Julien R. Steelman**, The Koehring Company; **Donald O. White**, American Asphalt Paving Co.; **C. J. Haring**, C. J. Haring Co.; **J. T. Callaway**, Goodyear Tire & Rubber Co.; **Boyd S. Oberlink**, Allis-Chalmers Manufacturing Co.; **George C. Williams**, Northwest Engineering Co., and **Harvey A. Scribner**, president of Russell T. Gray, Inc., and 1957 Road Show publicity chairman.

ers, patrol graders, sheepfoot tamping rollers and snow plows. Robert G. Allan, president of Contractors Machinery, will become general manager of this new division.

Standard Steel new regional mgr.

Harry C. Hamilton has joined Standard Steel Corp. of Los Angeles, Calif., as a regional manager, handling sales of road machinery in the Midwest, and making his headquarters at Indianapolis, Ind. He will be working from Standard Steel's recently purchased plant at Decatur, Ill., where manufacture of Road-Master asphalt plants and other road-building equipment has already begun.

Chain Belt broadens its lines

Announcement is made that Chain Belt Co. of Milwaukee, Wis., has purchased the business of Chains, Inc., of Dolton, Ill. The acquisition of this new facility supplements and broadens the present Chain Belt lines, including "Rex" dewatering pumps, building mixers, pavers, Pumpcrete, Moto-Mixers, Railporter, and others.

Turbine division appointment

S. Morgan Smith Co. of York, Pa., announces the appointment of George W. Smith, Jr., to the post of operations manager, Turbine Division. Employed by the firm since 1947, Smith's most recent post was that of assistant to the vice president in charge of sales. His new duties include those performed by the late

Oscar E. Weber, who died recently after nearly twenty-five years with the company.

"Crip" Payne dies; succeeded by Greer

Ralph G. Greer has been named manager of sales, Construction Equipment Division, International Harvester Co., Chicago. He succeeds the late I. P. Payne, who died suddenly of a heart attack. Leslie J. Lange was appointed assistant manager of sales, succeeding Greer.

Work starts on So. Calif. plant

In ground-breaking ceremonies recently, Air Reduction Pacific Co., a division of Air Reduction Co., Inc., launched construction of a \$7,500,000 air separation and liquefaction plant at Bassett, Calif., near Los Angeles. Project is scheduled for completion late this year.

Stiles made Yale Western sales mgr.

Harold M. Stiles, sales executive of Yale Materials Handling Division, The Yale & Towne Manufacturing Co. for the past nine years, has been named Western regional sales manager. He succeeds Frank Boufford who has joined the staff of Yale's San Francisco Sales and Service Branch. Stiles will be in charge of supervision and promotion of Yale lift trucks and hoists throughout the eleven Western states.

Sherman Products expands

To permit rearrangement of production operations and to increase output, Sherman Products, Inc., Royal Oak, Mich., is adding about 30% more floor space to its plant and offices on West Fourteen Mile Road.

Sales and service additions

H. H. Kieckhefer, sales manager of the Wheelco Instruments Division, Barber-Colman Co., Rockford, Ill., announces expansion of sales and service facilities in Los Angeles, Calif., with the addition of Hyman Hacker and Shelton Cashbaugh as sales engineers, and Robert S. Sanquist as a service engineer.

New sales and service manager

Ben E. Teschner has been appointed sales and service manager of the Monolith Portland Cement Co., Los Angeles, Calif., succeeding the late R. B. MacNee. Teschner has been with the company for 29 years, serving as assistant sales manager since 1943.

New name in Seattle production

A new name, "Bull Moose," has joined the list of production items manufactured in Seattle, Wash. Canadian Mobile Co., Ltd., of Vancouver B. C., has contracted with the Todd Shipyard Corp. to manufacture the Bull Moose crane. This crane, long used in construction in 22 countries, for the first time is

UNIVERSAL PRODUCTS

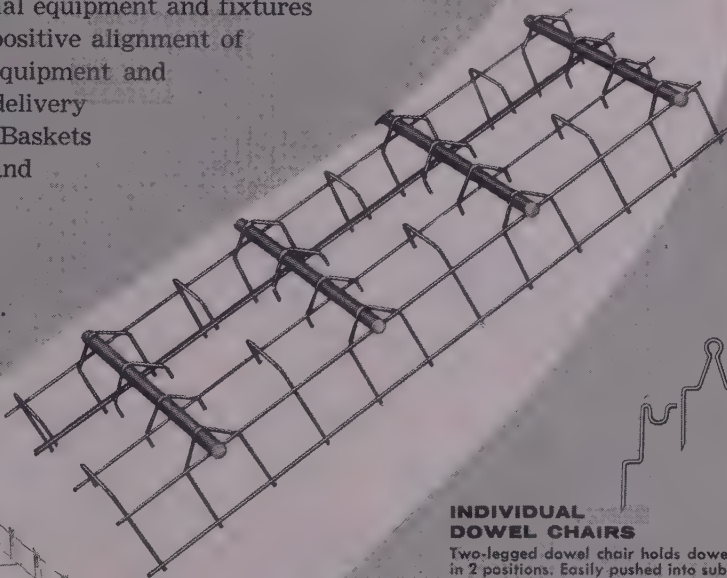
for highway construction

DOWEL BASKET ASSEMBLIES

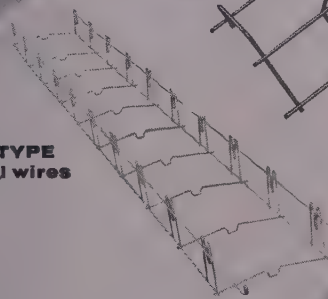
Universal Dowel Basket Assemblies are designed and fabricated to specifications. Special equipment and fixtures guarantee accurate spacing and positive alignment of dowels. High speed production equipment and modern facilities insure prompt delivery of your requirements. Universal Baskets are approved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

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

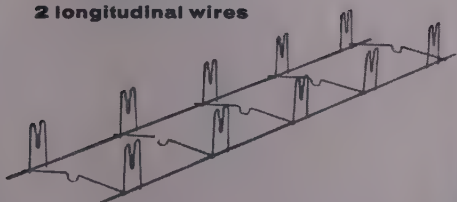
HEAVY DUTY TYPE
Maximum strength
and support



STANDARD TYPE
4 longitudinal wires



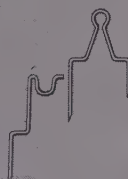
STANDARD TYPE
2 longitudinal wires



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

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CLEVELAND, OHIO, 24901 Lakeland Blvd.

HOUSTON, TEXAS, 2314 Preston Ave.

LOS ANGELES, CALIF., 13210 So. Figueroa Ave.

BALTIMORE, MD., 1020 N. Kresson St.

SAN LEANDRO, CALIF., 2051-9 Williams St.

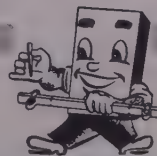
ATLANTA, GA., 1401 Howell Mill Rd.

DISTRIBUTORS IN PRINCIPAL CITIES

Service

Wherever

You Build... Coast to Coast



being made available to United States users. Production has started on a 5-ton model and the complete line up to 10-ton is being readied for early delivery. A nationwide dealer organization is being established through the ConMaC Corporation, 807 Fourth Ave., Seattle, exclusive U. S. distributor.

Linde Air names new v. p.

H. T. Ross has been named vice president—engineering Linde Air Products Co., a division of Union Carbide & Carbon Corp. He has been manager of engineering for the company since 1955.

Two expansions by Clark Equipment

Clark Equipment Co. announces that it is building a 300,000-sq. ft. facility in Chicago and expanding its Construction Machinery Division plant in Benton Harbor, Mich., by 63,000 sq. ft.

Switch at Hercules Powder Co.

Major personnel changes in the explosive department of Hercules Powder Co., Wilmington, Del., are announced. E. St. Pierre Bellinger, former manager of the company's Hercules, Calif., works, is appointed manager of Ketona Chemical Corp., Birmingham, Ala., of which Hercules is a joint owner. Dana F. Sprague, the former plant manager there, takes over Bellinger's former post in California.

D. W. Vernon rejoins Roebling

Douglas W. Vernon has been named product sales manager for wire rope and aircord by John A. Roebling's Sons Corp. He was formerly vice president and general manager of the Leschen Wire Rope Division of H. K. Porter Co., Inc. His office is located at Roebling's main plant, Trenton, N. J. Prior to joining Leschen in 1945, Vernon had been employed by Roebling for more than 23 years.

Cal-Rex sales addition

A new addition to the sales organization of the Cal-Rex Machinery Sales Division of Chain Belt Co. is J. B. Woodward. Woodward formerly was associated with International Harvester Co. as product distribution supervisor of the Emeryville Works, Emeryville, Calif. Cal-Rex Machinery Sales is located at 7601 Telegraph Road, Los Angeles.

E. L. Russell made district mgr.

J. C. Rowold, general manager, Western Division of Mack Trucks, Inc., Los Angeles, Calif., announces the appointment of Eugene L. Russell as district manager at Portland, Ore. Following five years' service with the Army, Russell's time has been spent in the trucking industry, with eight years linked to the sale of Mack products.

A. A. Thornbrough new M-H-F prexy

Appointment of Albert A. Thornbrough as president of Massey-



Albert A. Thornbrough

Harris-Ferguson, Inc., Racine, Wis., is announced. At the same time, the Board of Directors announced the appointment of J. H. Shiner and H. A. Wallace as vice presidents.

Engineering appointment

Appointment of Lt. Gen. Bryant L. Boatner, USAF (ret.) to the position of administrator of engineering for Eaton Manufacturing Co., Cleveland, Ohio, is announced. General Boatner joined Eaton the end of 1955. In announcing the appointment, Martin P. Winther, vice president—engineering, said that "In his new position as administrator of engineering under the office of director of engineering, General Boatner's duties will be corporation-wide, extending to all 17 divisions and two subsidiaries of Eaton."

Spencer Bowman joins Thew

Thew Shovel Co., Lorain, Ohio, manufacturer of power shovels and cranes, has established a new research and development department. Spencer Bowman has joined the company to head up the new department, bringing with him an extensive background in the field of research and development of machinery for excavating and material handling.

Charles E. Bascom dies

Charles E. Bascom, 78, president and chairman of the board of Broderick & Bascom Rope Co., St. Louis, Mo., died recently. Starting in 1902 in the splicing department of the company founded by his father, Joseph D. Bascom and John J. Broderick in 1876, he served in many capacities, becoming president in 1950, and chairman of the board in 1955.

New regional sales manager

Stephen Sanders has been named regional sales manager by Rolled Steel Corp., Skokie, Ill. His territory includes Colorado, Utah, and Nevada, besides the states of Wisconsin, Kentucky and Kansas.

Clipper appoints new field man

Newly appointed field representative for Clipper Manufacturing Co. of Kansas City, Mo., is Bob MacMullan. He will work out of the district office at Los Angeles, Calif.

Bendix opens computer laboratory

Bendix Computer Division recently opened a digital computation laboratory under the direction of Tak Yamashita, for the use of outside organizations. Located at 5630 Arbor Vitae St., Los Angeles, the laboratory is helping industrial clients solve many types of engineering problems.

Ed Brent heads Littleford Division

New sales manager for the Road Maintenance Equipment Division of Littleford Bros., Cincinnati, Ohio, is Edward S. Brent. He succeeds L. W. Glaser who took over a sales director post.

Pacific Southwest appointment

Charles H. Holland has been appointed manager of industrial and transportation sales for the Pacific Southwest district of General Electric Co.'s apparatus sales division with offices in Los Angeles, Calif. Holland joined GE in 1934 following graduation; later worked as a sales engineer in Philadelphia, Pittsburgh, and Los Angeles offices prior to entering the Army in 1940 where he served for five years. In 1947 he was appointed manager of apparatus sales in Riverside. In 1953 he moved to Phoenix as manager of user industry sales for Arizona.

New Whiteman plant

A \$500,000 plant has just been completed by Whiteman Manufacturing Co., maker of concrete truck mixers, power buggies, finishing machines, vibrators, and screeding machines. The new plant is located in Pacoima, Calif.

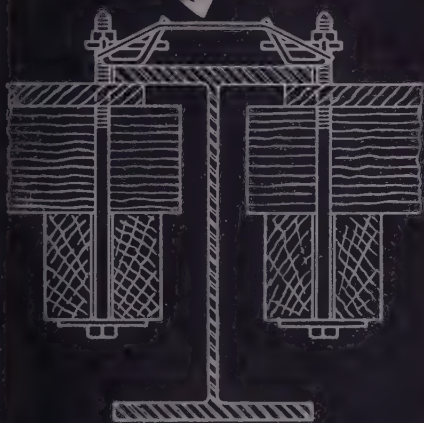
Personnel changes at Fruehauf

L. F. Plummer was recently promoted to the position of branch manager of Fruehauf Trailer Co., Oakland, Calif. He succeeded V. H. Knowles who is no longer with the company. W. R. Pavela has been made district fleet sales manager, while R. O. Mallon received a promotion and assignment to the Los Angeles factory. Coast territory salesman is H. H. Bell. Frank Pigeon is salesman for the Oakland-San Francisco Bay area territory.

Gardner-Denver appointments

G. V. Leece, president of Gardner-Denver Co., Quincy, Ill., announces that J. W. Gardner has been named coordinator of new products development. Gardner joined the company in 1947, in the sales force, operating from the Los Angeles office. He was transferred to the executive office in Quincy, Ill., in 1952 and has since served in various capacities in the engineering and sales departments. At the same time, General Sales Manager Gutekunst announced appointment of O. C. Knapheide, Jr., as

Faster Adjustment from **TOP** of Deck



TOTAL SAFE LOAD ON BOTH COIL BOLTS
IS 10,000 LBS., OR 5,000 LBS. PER BOLT

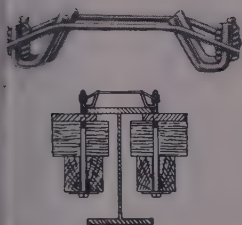
.. WHEN HANGING FORMS WITH **SUPERIOR PLATE HANGER FRAMES**



With Superior Plate Hanger-Frames the installation and necessary adjustment to bring the deck forms tight against the flange are from *above* the deck. Coil Bolts are passed through and secured from above with coil nuts. Bolts are easily removed without binding because, (1) nuts are square and will not turn; (2) embedment of the bolts in the concrete is at a minimum since the plate is only $\frac{1}{2}$ " above the flange.

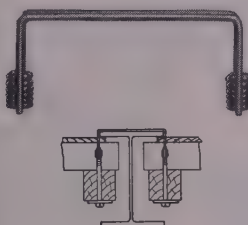
FOUR OTHER SUPERIOR WAYS TO HANG FORMS FROM STEEL BEAMS AND GIRDERS ON BRIDGE SUPERSTRUCTURES

STANDARD COIL HANGER FRAME



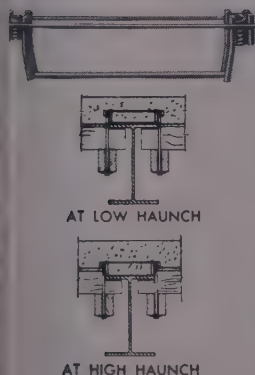
When hanging forms where specifications do not permit any hanger wire to be exposed after stripping, use Superior *Standard* Hanger Frames. Detail at left shows their use with double ledgers, $\frac{1}{2}$ " coil bolts, and flat washers. Total safe load on both bolts for Type 10M is 10,000 lbs., or 5,000 lbs. per bolt. For Type 6M, total safe load on both bolts is 6,000 lbs., or 3,000 lbs. per bolt.

COIL BEAM SADDLE



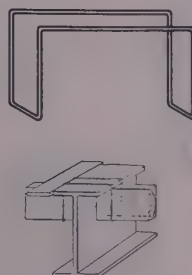
On jobs where hanger wires may be cut after stripping the forms, use Superior Coil Beam Saddles. The Coil Bolts allow for any variation in lumber and flange thickness and tightening the bolts pulls the forms tightly against the flanges. Forms are easily stripped. Safe load is 6,000 lbs. per saddle, or 3,000 lbs. for each $\frac{1}{2}$ " Coil Bolt. Coil Beam Saddles are also furnished for $\frac{3}{4}$ " and 1" bolts.

SPECIAL HANGER FRAME



The design of certain bridge superstructures allows for the permanent deflection of the beams or girders due to the pre-calculated dead load. This deflection is compensated by a concrete haunch of varying depth on the upper flange. Superior *Special* Coil Hanger Frames were developed to meet this field condition, at the same time avoiding any exposed hanger wire. The extent to which the $\frac{1}{2}$ " coil Bolts are threaded into the coils allows for these varying haunch depths from maximum to zero. (See detail). Total safe load per frame is 10,000 lbs., or 5,000 lbs. per $\frac{1}{2}$ " bolt.

WIRE BEAM SADDLE



Wire Beam Saddles are used to hang centering joists from structural steel beams when the beams are not fireproofed with concrete. On non-fireproofed structures the load is determined by the allowable spacing of centering joists rather than the capacity of the hanger. Available in three gauges and sizes as required. Will carry safely, total loads of 2,500 lbs. to 6,000 lbs. Layouts and estimates will be sent upon receipt of plans or quantities. No obligation.

WORKING PARTS (Bolts and washers) are returnable. Layouts and estimates for Superior Hangers are available without obligation.

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.

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.
2131341

LOS ANGELES
STEEL CASTING CO.
6100 So. Bay Avenue, Los Angeles 38, California

assistant to the general sales manager, and that R. J. Marshall has been named sales manager of the oil field division.

New Northwest sales manager

John G. White, assistant manager of Bethlehem Pacific's Seattle sales district since 1952, has been been

John G.
White



named district manager of sales. He succeeds Harold E. Gray who has retired. White will be in charge of all company products in Washington, northern Idaho, western Montana, and Alaska.

Change of address

Announcement is made by Ralph Rodgers, assistant district manager of Baldwin-Lima-Hamilton Corp.'s Construction Equipment Division, of a change of address. Formerly located in South San Francisco, the new address is 1452 Drake Ave., Burlingame, Calif.

Mobile Drilling buys Buda Drill

Announcement is made that Mobile Drilling, Inc., Indianapolis, Ind., drilling equipment manufacturer, has purchased the Buda Earth Drill Division of Allis-Chalmers Manufacturing Co. With this addition, the Indianapolis firm now ranks among the world's largest manufacturers of portable drilling equipment.

Case-American merger completed

Final consolidation of American Tractor Corp. into J. I. Case Co. has been completed, following which John T. Brown, chairman of the Case board, announced the election of Marc B. Rojzman, former American Tractor president, to the newly created position of executive vice president and general manager of the Case company.

New California plant

Ground was broken recently for a new 280,000-sq. ft. plant to be constructed by Standard Pressed Steel Co. at Santa Ana, Calif. The new \$5,500,000 multi-product facility will enable the Jenkintown, Pa., producer of precision fasteners and other equipment to better serve the rapidly growing Western market.

L. B. Worthington elected president

Appointment of Leslie B. Worthington of Chicago as president of Columbia-Geneva Steel Division of



L. B.
Worthington

"FASTER AND CHEAPER DIGGING EVEN IN WET, STICKY SOIL"



**POW-R-DITCHER DIGS 1'-15'
PER MINUTE—
8" to 24" WIDE**

An ideal, low cost, rugged ditcher for contractors, municipalities, utility companies, etc. One-man operation. 2-way side conveyor. Easy to transport. It's the BIG ditcher with the low price. Smaller models also available.

Some excellent sales territory available



Says R. K. Nichols
Los Gatos Construction Co.
Los Gatos, California

"In laying telephone cable for Pacific Tel. & Tel. Co. in Salinas, Calif., we were able to start the job early, even in extremely wet and sticky mud . . . thanks to our 524T Pow-R-Ditcher. It dug very well at 9 feet per minute under tough conditions."

United States Steel Corp., with headquarters in San Francisco, is announced. He succeeds the late Alden G. Roach. For the last eleven years Worthington has been president of the United States Steel Supply Division.

Western representatives named

Clark Equipment Co., Benton Harbor, Mich., announces appointment of two field service representatives for the Construction Machinery Division. Harold H. Cadell will cover the territory including Oregon, Washington, Idaho, Montana, and British Columbia and Calgary, in Canada. The other new Western representatives, Cecil L. Starnier, will cover the territory of Arizona, California, Nevada, Utah, and Hawaii.

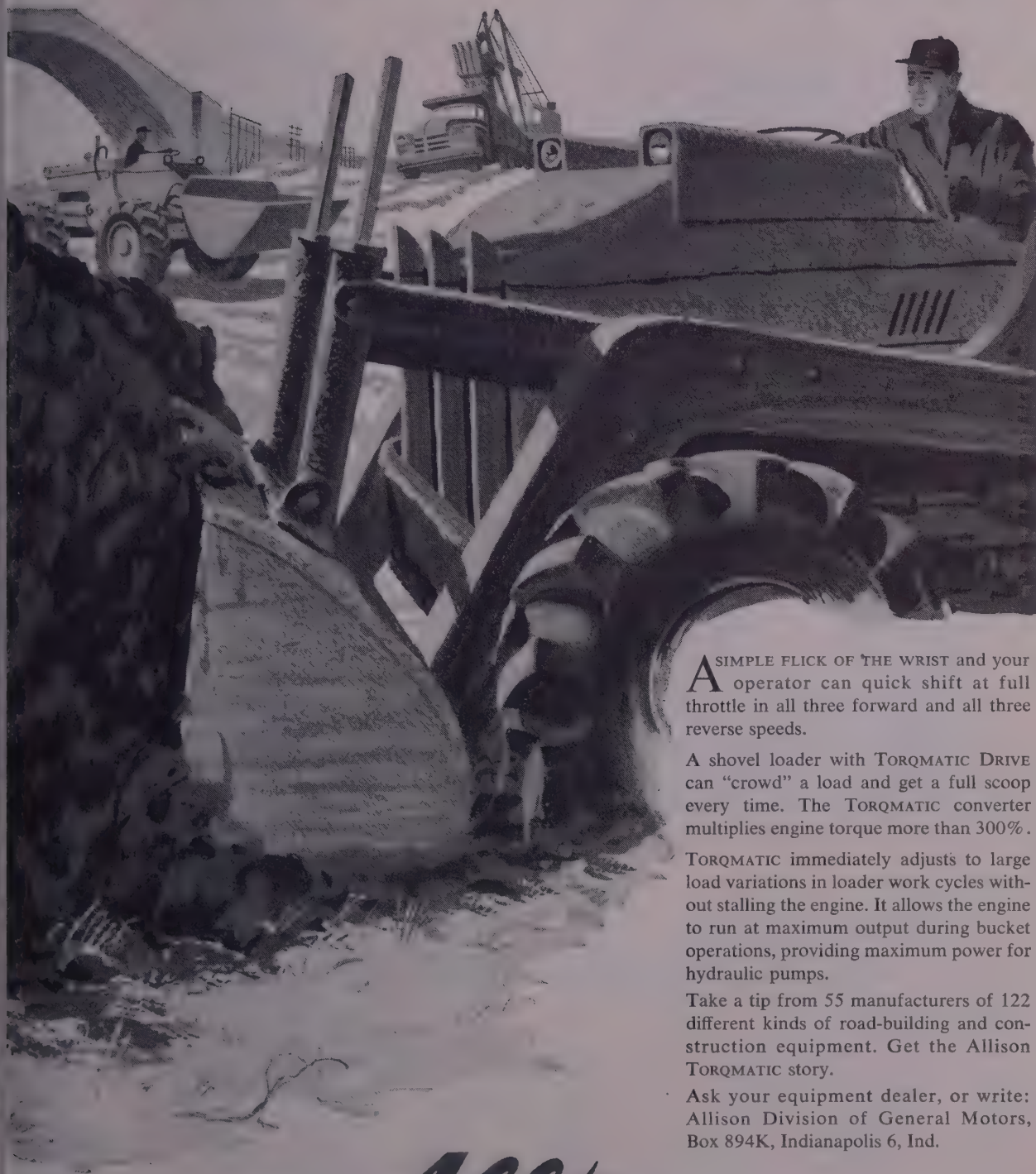
CF&I adds to production facilities

The Colorado Fuel & Iron Corp. has installed production facilities for the manufacture of Cal-Tie wire

(Continued on page 188)

VERMEER MANUFACTURING CO. PELLA, IOWA

TORQMATIC loaders quick shift in all gears



A SIMPLE FLICK OF THE WRIST and your operator can quick shift at full throttle in all three forward and all three reverse speeds.

A shovel loader with TORQMATIC DRIVE can "crowd" a load and get a full scoop every time. The TORQMATIC converter multiplies engine torque more than 300%.

TORQMATIC immediately adjusts to large load variations in loader work cycles without stalling the engine. It allows the engine to run at maximum output during bucket operations, providing maximum power for hydraulic pumps.

Take a tip from 55 manufacturers of 122 different kinds of road-building and construction equipment. Get the Allison TORQMATIC story.

Ask your equipment dealer, or write: Allison Division of General Motors, Box 894K, Indianapolis 6, Ind.

NO. 1 IN A SERIES
ON SPEEDING AMERICA'S
ROAD-BUILDING PROGRAM



Allison

TORQMATIC DRIVES

UNIT PRICES

Selected abstracts for Western projects

TUNNEL—Construction of Vasquez Tunnel and lining of Jones Pass Tunnel in Colorado

Colorado—Denver County—City and County of Denver. Michigan Sewer Construction Co. received a \$3,449,215 contract for construction of the Vasquez Tunnel and for lining Jones Pass Tunnel in Denver, Colo.

(1) Michigan Sewer Construction Co.	\$3,449,215
(2) Gibbons & Reed Co. and Floyd Shofner	3,978,830
Coker Construction Co. and Peter Kiewit Sons' Co.	5,225,000
Blue River Constructors	5,285,000

	(1)	(2)
5 ac. Clearing	\$ 500.00	\$ 2,000.00
30,000 cu. yd. Excavation, unclassified, in open cut	3.00	12.00
44,000 cu. yd. Excav., unclass., in Vasquez Tunnel	40.00	46.60
150 cu. yd. Excav., unclass., for enlargement of Vasquez Tunnel	75.00	70.00
700 cu. yd. Backfill around structures	2.00	1.50
700 cu. yd. Compacting backfill around struct.	3.50	1.50
100 cu. yd. Dumped riprap	6.00	15.00
130 lin. ft. Constructing sewer pipe drains	2.00	3.50
645,500 lb. Steel tunnel supports	.22	.35
123 M bd. ft. Timber tunnel supports	500.00	300.00
1,600 lb. Roof-bolting tunnel supports	.40	1.00
25,000 lb. Removal of steel tunnel supports	.20	.20
5 M bd. ft. Removal of timber tunnel supports	200.00	300.00
1,500 lin. ft. Drill. feeler or grout holes thru rock	2.50	5.00
750 lin. ft. Drill. grout holes thru conc. lining	4.00	1.50
2,300 lb. Pipe for pressure grouting	1.25	1.30
300 ea. Connections for pressure grouting	5.00	15.00
300 cu. yd. Pressure grouting	60.00	150.00
65 cu. yd. Rem. of conc. from exist. outlet struc.	60.00	25.00
40,000 bbl. Furnish. & handling port. cem.	7.00	6.00
91,000 lb. Furnishing and placing reinforcement	.21	.20
17,250 cu. yd. Concrete lining in Vasquez Tunnel	38.00	35.00
7,800 cu. yd. Concrete lining in Jones Pass Tunnel	39.00	35.00
50 cu. yd. Plain concrete in structures	75.00	25.00
500 cu. yd. Reinforced concrete in structures	90.00	80.00
30 cu. yd. Gunite coating and lining	100.00	150.00
Lump sum Furnish. & instal. radial gates & hoists	8,000.00	7,500.00
1,400 lb. Furnish. & install. misc. metal	1.50	1.00
Lump sum Furnish. & install. metering equip.	3,000.00	2,000.00
60 lin. ft. Furn. & install. 18 in. corr. met. pipe	8.00	10.00
430 lin. ft. Furnish. & erecting chain-link fencing	8.00	7.00
Lump sum Furnish. & install. telephone cable	10,000.00	15,000.00

Cont. sum	Class "A" concrete (bridges)		
	(1,450 cu. yd.)	87,000.00	118,000.00
1,322 lin. ft.	Concrete railing	6.00	7.00
2,450 sq. yd.	Air-blown mortar	5.00	7.25
17,000 lb.	Bar reinforcing steel	.12	.14
Cont. sum	Bar reinforcing steel (bridges)		
	(312,000 lb.)	37,440.00	43,000.00
2,450 sq. yd.	Mesh reinforcement	.80	1.00
2,500 lin. ft.	Furnishing concrete piling	3.00	3.60
104 ea.	Driving piles	100.00	120.00
5,200 lb.	Misc. iron and steel	.33	.37
765 cu. yd.	Class "B" conc. (curbs & gutters)	35.00	40.00
48 ea.	Righ.-of-way monuments	7.00	7.70
8 ea.	Survey monuments	15.00	22.00
900 lin. ft.	Metal plate guard railing	4.00	4.60
420 ea.	Culv. mrkrs., clear, mrkrs., horiz. reflect. units & gate posts	6.00	7.20
3.7 mi.	New property fence, Type "A"	2,000.00	2,200.00
0.9 mi.	New property fence, Type "B"	3,000.00	2,440.00
1 ea.	14 ft. property fence gate	40.00	60.00
4,200 lin. ft.	72 in. chain link fence	1.80	1.80
30 lin. ft.	12 in. reinforced concrete pipe	3.00	2.65
330 lin. ft.	15 in. reinforced concrete pipe	3.00	3.30
800 lin. ft.	18 in. reinforced concrete pipe	4.00	4.23
1,455 lin. ft.	24 in. reinforced concrete pipe	6.00	6.27
600 lin. ft.	30 in. reinforced concrete pipe	8.00	7.66
150 lin. ft.	36 in. reinforced concrete pipe	10.00	11.50
858 lin. ft.	42 in. reinforced concrete pipe	13.50	14.75
356 lin. ft.	66 in. reinforced concrete pipe	25.00	28.50
480 lin. ft.	12 in. corr. metal pipe (16 ga.)	3.00	3.44
70 lin. ft.	18 in. corr. metal pipe (16 ga.)	4.00	4.60
12 ea.	Entr. tapers for 8 in. met. pipe	30.00	47.30
310 lin. ft.	8 in. C.M.P. downdrains	2.00	2.18
12 ea.	Downdrain slip joints	25.00	31.00
20 ea.	Downdrain pipe anchors	20.00	23.00
Lump sum	Finishing roadway	1,000.00	4,300.00
140 lin. ft.	Raised traffic bars	2.00	2.97
Lump sum	Highway lighting systems	18,000.00	23,400.00

HIGHWAY—Roadwork in Arizona

Arizona—Yuma County—State. A low bid of \$213,393 was submitted by Royden Construction Co. for 4.4 mi. of roadwork consisting of grading and draining, select material, aggregate base, bituminous road mix and seal coat.

(1) Royden Construction Co.	\$213,393
(2) Yuma Rock & Sand Co.	221,105
W. R. Skousen	226,265
Dale F. Payne	231,184

	(1)	(2)
66,850 cu. yd.	Roadway excavation	\$.32 \$.32
4,400 cu. yd.	Drainage excavation	.24 .30
8,200 lin. ft.	Grade ditches	1.50 1.70
1,720 cu. yd.	Structural excavation	.25 .25
3,300 cu. yd. mi.	Overhaul	.33 .30
63,600 cu. yd.	Borrow (CIP)	500.00 500.00
Lump sum	Provide water supply	1.20 1.50
11,700 M gal.	Apply water	9.00 8.00
1,750 hr.	Rolling	.65 .75
33,800 ton	Select material (CIP)	.75 .90
18,200 ton	Aggregate base (CIP)	5.50 5.00
1,320 ton	Cov. mat. for seal coat (Type "B") (CIP)	
11,500 ton	Bit. mix. (Class I—rd. mix.) (CIP except cost of liquid asphalt)	.96 1.25
390 ton	Liq. asph. for bit. mix. (Grade SC-3) (CIP)	32.50 35.00
155 ton	Emul. asph. for seal coat (Grade B) (CIP)	37.50 42.00
10 ton	Emul. asph. for curing seal (Grade A) (sta. 593 to sta. 612) (CIP)	60.00 68.50
710 cu. yd.	Class "A" concrete (CIP)	46.00 40.00
72,100 lb.	Reinforcing steel (bars) (CIP)	.14 .11
334 lin. ft.	24 in. C.M.P. (CIP except excavation)	7.00 6.25
606 lin. ft.	36 in. C.M.P. (CIP except excavation)	12.00 11.00
74 lin. ft.	42 in. C.M.P. (CIP except excavation)	14.00 13.00
36 lin. ft.	48 in. C.M.P. (CIP except excavation)	16.00 16.00
Lump sum	Rem. of cattle load. ramp (sta. 568±)	200.00 300.00
Lump sum	Rem. of conc. foundations (sta. 643±)	100.00 100.00
48 ea.	Guide posts (std. C-8) (Type B, D or E) (CIP)	7.00 6.00
31 ea.	Righ.-of-way markers (std. C-1) (Type B or C) (CIP)	9.00 10.00
1 ea.	Sur. mon. and cover (std. C-1) (CIP)	60.00 50.00
150 lin. ft.	Bank prot. (std. C-23) (Type B) (CIP)	10.00 10.00
10,345 sq. yd.	Process. and placing cement treated base (sta. 593 to sta. 612)	.12 .3
2,810 sacks	Portland cement for cement treated base (del'd. to job site)	1.30 1.3
Lump sum	Construct cattle loading ramp	1,500.00 850.00

HIGHWAY—Roadwork and bridge construction

California—San Luis Obispo County—State. Madonna Construction Co. received a \$1,116,474 contract for 3.1 mi. of roadwork, the work to consist of grading and paving with portland cement concrete on cement treated subgrade, plant-mixed surfacing on cement treated base and construction of three bridges.

(1) Madonna Construction Co.	\$1,116,474
(2) Frederickson Bros.	1,217,830
Granite Construction Co.	1,235,387
John Delphia and Williams & Burrows Contracting, Inc.	1,287,892
M. J. B. Construction Co., and Ford & Bishop, Inc.	1,333,299

	(1)	(2)
Lump sum	Cleaning and grubbing	\$80,000.00 \$ 50,000.00
Lump sum	Dev. water sup. & furn. water eq.	36,000.00 10,000.00
23,000 M gal.	Apply. water	.10 1.60
30,000 sq. yd.	Compact. original ground	.05 .05
620,000 cu. yd.	Roadway excavation	.35 .36
4,700 cu. yd.	Struct. excavation	2.50 3.00
3,400 cu. yd.	Struct. backfill	3.50 3.50
2,300 cu. yd.	Ditch & channel excavation	.80 1.25
11,200,000 sta. yd.	Overhaul	.003 .004
34,000 sq. yd.	Prep. excav. slopes (erosion con.)	.10 .13
28 ton	Straw	60.00 60.00
74,500 sq. yd.	Mix., spread., & compact. cem. tr. subgr.	.25 .25
26,000 sq. yd.	Mix., spread., & compact. C.T.B.	.25 .26
4,100 bbl.	Portland cement	5.00 5.00
74 ton	Asph. emul. (cur. sl., pnt. bdr. & sl. ct.)	50.00 47.00
78 ton	Liq. asph. MC-2 (curing seal)	50.00 55.00
62 ton	Liq. asph. SC-2 (prime seal)	30.00 37.00
760 ton	Paving asphalt (P.M.S.)	20.00 5.85
13,300 ton	Min. aggr. (Type "B" P.M.S.)	4.00 5.85
485 ton	Min. aggr. (open graded P.M.S.)	5.00 5.85
1,500 sq. yd.	Pl. P.M.S. dit. & spillway dwndr.	1.00 1.25
13,500 lin. ft.	Placing P.M.S. dikes	.20 .15
120 ton	Screenings (seal coat)	6.00 9.00
16,590 cu. yd.	Class "B" conc. (pavement)	17.50 18.50
11,234 ea.	Pavement tie assemblies	.50 .55
100 cu. yd.	Class "A" conc. (structures)	70.00 100.00

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Hauling sewer pipe over the road from Pacific Clay's manufacturing plant in Los Angeles to various points of installation is one of many uses to which their Autocar fleet is put. The Autocar shown above on the job is Model DC-102TL pulling a set of Fruehauf double semi-trailers. The tractor is equipped with Model G Autocar rear axle with double reduction, Spicer 8255 Main Transmission and Spicer 8035-G Auxiliary Transmission.

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HIGHWAY—Grading and surfacing in Montana

Montana—Custer County—State. A \$754,141 contract was awarded to Summit Construction Co. for 17,057 mi. of grading, gravel surfacing, bituminous surface treatment, widening of bridge and drainage. Unit price are as follows:

(1) Summit Construction Co.	\$754,141
(2) Harris Construction Co.	770,792
Husman Bros., Inc.	808,706
Peter Kiewit Sons' Co.	864,604

	(1)	(2)
741,025 cu. yd. Unclassified excav. and borrow.	\$.24	\$.26
6,431 cu. yd. Culvert excavation.	.50	2.00
1,613 cu. yd. Bravel backfill.	3.50	2.00
63,706 mi. yd. Overhaul.	.20	.20
7,331 ton Crushed gravel cover material.	3.00	5.88
185,917 ton Sel. borrow base course.	.82	.88
48,654 ton Type "A" top curv surf.	1.09	1.10
61,577 cu. yd. Sand base material.	.78	.99
102,592 gal. 1st. ap. MC-2 liquid asphalt.	.17	.18
102,592 gal. 2nd. ap. RS-2 emulsion asphalt.	1.65	.18
15,947 M gal. Water surf. course and embankment.	2.00	.10
1,481 unit Rolling embankment.	8.00	8.00
1,271 unit Rolling surf. course.	9.00	2.50
1,162 lin. ft. Corr. metal pipe culv. 18 in. diam.	4.45	4.30
2,476 lin. ft. Corr. metal pipe culv. 24 in. diam.	7.20	7.00
880 lin. ft. Corr. metal pipe culv. 30 in. diam.	8.50	8.80
1,042 lin. ft. Corr. metal pipe culv. 36 in. diam.	13.90	12.80
78 lin. ft. Corr. metal pipe culv. 48 in. diam.	20.85	20.10
98 lin. ft. St. pl. p. el. cul. 72 in. dia. 10 ga. metal	45.15	45.00
300 lin. ft. St. pl. p. el. cul. 84 in. dia. 10 ga. metal	51.25	50.00
252 lin. ft. St. pl. p. el. cul. 90 in. dia. 10 ga. metal	58.75	60.00
128 lin. ft. St. pl. p. el. cul. 108 in. dia. 8 ga. metal	77.50	76.00
70 lin. ft. St. pl. p. el. cul. 120 in. dia. 8 ga. metal	84.75	83.00
162 lin. ft. Cor. metal p. arch culvert 58 in. span x 36 in. rise.	19.85	19.90
214 lin. ft. Cor. metal pipe arch culv. 72 in. span x 44 in. rise.	36.45	35.00
70 lin. ft. St. p. p. arch culv. 6 ft.-4 in. span x 4 ft.-9 in. rise 10 ga. metal.	45.65	47.00
74 lin. ft. St. p. p. arch culv. 7 ft.-3 in. span x 5 ft.-3 in. rise 10 ga. metal.	54.15	54.00
74 lin. ft. St. p. p. arch culv. 8 ft.-7 in. span x 5 ft.-11 in. rise 10 ga. metal.	60.50	62.00
70 lin. ft. St. p. p. arch culv. 9 ft.-4 in. span x 6 ft.-3 in. rise 10 ga. metal.	62.65	65.00
88 lin. ft. St. p. p. arch culv. 11 ft.-5 in. span x 7 ft.-3 in. rise 10 ga. metal.	70.70	72.00
78 lin. ft. St. p. p. arch culv. 11 ft.-10 in. span x 7 ft.-7 in. rise 8 ga. metal.	85.70	85.00
80 lin. ft. St. p. p. arch culv. 14 ft.-10 in. span x 9 ft.-1 in. rise 7 ga. metal.	106.00	104.00
148 lin. ft. St. p. p. stpass. std. 44 10 ga. metal.	58.00	60.00
100 lin. ft. Relay pipe culverts.	4.00	6.00
Lump sum Misc. to be moved.	12,000.00	12,000.00
243 ea. Concrete roadway monuments.	9.00	5.00
3 ea. Concrete project markers.	50.00	25.00
90 ea. Concrete station markers.	9.00	8.00
18,875 MBM Treated timber.	450.00	400.00
1,402 MBM Untreated timber.	350.00	350.00
8 ea. Ea 20.0 ft. treated timber piles.	125.00	80.00
4 ea. Each 25.0 ft. treated timber piles.	150.00	90.00
Lump sum Rev. ex. str. and mtn. tr.	3,000.00	2,000.00

20,415 ton Base course.	.84	.70
1,185 bbl. Bituminous material, Type MC-1.	7.25	6.80
360 bbl. Bituminous material, Type 120-150	7.25	6.80
645 ton Cover material.	5.00	4.25
12,345 ton Plant mix surface course.	3.60	3.90
3,465 bbl. Bit. mat., Type 85-100 (plant mix)	7.00	6.30
301 bbl. Bit. mat., Type 85-100 (tack coat)	7.50	6.80
58.73 cu. yd. Class "A" concrete.	100.00	100.00
5,523 lb. Reinf. for concrete structures.	.20	.16
1,996 lin. ft. Concrete curb and gutter.	2.00	2.00
265 lin. ft. Concrete median curb and gutter.	2.00	1.90
415 lin. ft. Concrete valley gutter (2.5 ft.).	1.85	2.00
360 lin. ft. Concrete valley gutter (3.5 ft.).	2.00	2.20
36 lin. ft. Std. reinf. conc. pipe—18 in. diam.	9.00	6.50
130 lin. ft. Std. reinf. conc. pipe—24 in. diam.	11.00	8.50
32 lin. ft. Std. reinf. conc. pipe—48 in. diam.	30.00	17.00
1,104 lin. ft. Corr. metal culv. pipe—24 in. diam.	8.50	7.20
412 lin. ft. Corr. metal culv. pipe—30 in. diam.	9.00	9.00
460 lin. ft. Corr. metal culv. pipe—36 in. diam.	11.00	15.00
30 lin. ft. Rem. & rel. culv. pipe—24 in. diam.	7.00	7.00
419 lb. Structural steel.	.50	.50

HIGHWAY—Construction of 7 mi. of U. S. Highway 10 in Idaho

Idaho—Kootenai County—State. Fred H. Slate Co. and E. C. Hall Co. submitted a joint venture bid of \$2,731,683 for constructing 7.184 mi. of U. S. Highway 10, the Fourth of July Summit Section, in Kootenai County.

(1) Fred H. Slate Co. and E. C. Hall.	\$2,731,683
(2) Morrison-Knudsen Co.	2,733,369
Green Construction Co.	3,106,971
Max J. Kuney Co.	3,254,424
Peter Kiewit Sons' Co.	3,399,104

	(1)	(2)
135 ac. Clearing.	\$ 500.00	\$ 700.00
52 ac. Grubbing.	300.00	250.00
1 ea. Removal of culvert.	1,000.00	300.00
2,200 lin. ft. Remove guard rail.	1.00	1.00
22 ea. Remove conc. headwalls.	35.00	40.00
1,550,000 cu. yd. Uncl. excav.	.82	.83
110 cu. yd. Excav. for struct. sch. No. 1.	10.00	10.00
4,200 cu. yd. Excav. for struct. sch. No. 2.	4.00	3.00
130,000 y. u. Haul.	.75	.30
30,200 M gal. Water embankments.	1.00	1.00
5,300 M gal. Watering base and surf. courses.	2.50	1.50
1,480 hr. Rolling, power roller.	8.50	6.00
7,500 hr. Rolling, tamping roller.	10.00	6.00
7,500 hr. Rolling, pneu. tire roller.	8.50	7.00
9,080 cu. yd. Mech. tamping.	2.50	2.50
6 sta. Furrow ditches.	50.00	30.00
61,000 ton Cr. rk. base co. 1 in. max. Type "A".	1.75	1.95
83,000 ton Cr. rk. base co. 3/4 in. max. Type "B".	1.85	2.05
30,000 ton Cr. rk. base co. 2 in. max.	1.75	1.95
2 mi. Recond. exist. roadbed Class "A".	750.00	800.00
3,100 ton Cr. rk. in wind. 3/4 in. max.	1.85	1.95
87,500 gal. RC-1 asph. rd. mat. for prime.	.21	.20
1,500 ton Blotter mat. Class "C".	3.25	3.00
2 mi. Mix. finish, and roll. Class "A".	2,000.00	1,000.00
156 ton MC-3 asph. rd. mat. for roadmix.	47.50	48.00
3,050 ton 85-100 pene. asph. rd. mat. for pl. mix.	38.00	44.00
26,800 ton Pl. mix. bit. surf. Class "B".	3.85	3.60
28,500 ton Pl. mix. bit. surf. Class "D".	3.85	3.60
67,600 gal. RC-5 asph. rd. mat. for seal.	.21	.20
3,400 ton Cov. ct. mat. Class 4.	5.00	4.00
339 cu. yd. Conc. Class "A".	75.00	90.00
37,800 lb. Metal reinf.	.15	.17
150 lin. ft. 12 in. pipe culv.	3.00	3.00
4,400 lin. ft. 18 in. pipe culv.	4.00	4.00
2,200 lin. ft. 24 in. pipe culv.	6.00	7.00
500 lin. ft. 24 in. pipe culv. (bit. ct. corr. met. or reinf. conc. ext. str.).	6.00	8.00
240 lin. ft. 24 in. pipe culv. (bit. ct. corr. met. 12 ga.)	7.75	10.00
130 lin. ft. 30 in. pipe culv.	8.00	10.00
280 lin. ft. 30 in. pipe culv. (bit. ct. corr. met. 10 ga.)	12.00	15.00
350 lin. ft. 30 in. pipe culv. (bit. ct. corr. met. 12 ga. or reinf. conc. ext. str.).	9.50	11.00
150 lin. ft. 36 in. pipe culv.	12.50	13.50
210 lin. ft. 48 in. pipe culv. (bit. ct. corr. met. 10 ga. or reinf. conc. ext. str.).	20.00	21.50
74 lin. ft. 60 in. pipe culv.	27.00	28.00
170 lin. ft. 66 in. pipe culv.	31.00	33.00
400 lin. ft. 72 in. pipe culv.	36.00	37.00
441 lin. ft. Salv. 48 in. to 60 in. corr. met. pipe.	15.00	6.00
144 lin. ft. 120 in. corr. pl. pipe culv. (10 ga.).	65.00	71.00
184 lin. ft. 126 in. corr. pl. pipe culv. (8 ga.).	75.00	81.00
210 lin. ft. 7 ft.-11 in. x 5 ft.-7 in. corr. pl. pipe arch (10 ga.).	50.00	57.00
420 lin. ft. 8 ft.-2 in. x 5 ft.-9 in. corr. pl. pipe arch (10 ga.).	51.00	58.00
154 lin. ft. 10 ft.-8 in. x 6 ft.-11 in. corr. pl. pipe arch (8 ga.).	66.00	76.00
220 lin. ft. 10 ft.-11 in. x 7 ft.-1 in. corr. pl. pipe arch (8 ga.).	67.50	79.00
21,500 lin. ft. Steel beam type—guard rail.	3.25	3.50
950 ea. Guide posts Type 4.	3.00	5.00
1,400 lin. ft. Wire fence (Type 1-A).	.40	.30
21,000 lin. ft. Wire fence (Type 1-B).	.45	.30
8 ea. 10 ft. steel gates (Type 2).	150.00	60.00
2 ea. Project markers.	25.00	50.00
100 ea. Right-of-way markers.	12.00	7.50
44 ea. Drop inlet Type 2.	100.00	180.00
35 ea. Drop inlet Type 3.	120.00	200.00
1,200 lin. ft. Lined interceptor ditch.	2.50	5.00
100 ac. Roadside cleanup.	150.00	180.00
110,000 gal. SS-1 emulsified asph. rd. mat.	.22	.20

HIGHWAY—Plant-mix surfacing in New Mexico

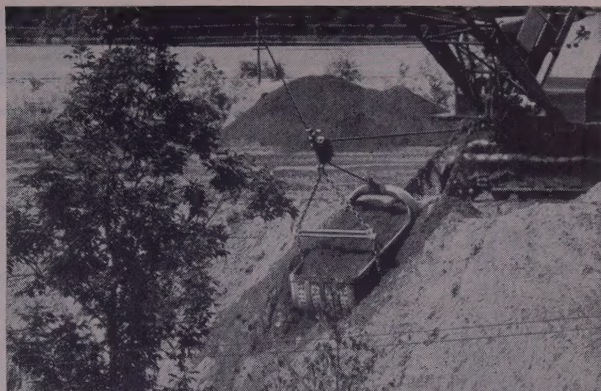
New Mexico—Quay County—State. A low bid of \$324,565 was submitted by Leslie Wheeler Construction Co. for grading and surfacing of 5.157 mi. on U.S. 54 in New Mexico.

(1) Leslie Wheeler Construction Co.	\$324,565
(2) G. I. Martin.	331,450
Allison & Haney and Daniels Construction Co.	334,803
Longenbaugh & Co., Inc.	343,145

	(1)	(2)
Lump sum Removal of old structures.	\$4,500.00	\$8,500.00
Lump sum Removal of obstructions.	6,500.00	5,100.00
41,417 cu. yd. Excavation—unclassified.	.23	.22
103 cu. yd. Excavation for structures.	2.00	3.00
817 cu. yd. Excavation for pipe culverts.	2.00	2.00
99,401 cu. yd. Ordinary borrow.	.23	.21
9,495 M gal. Watering.	.25	.50
225 hr. Rolling (tamping roller).	5.00	10.00
655 hr. Rolling (pneumatic tired).	3.50	4.50
510 hr. Rolling (steel tired).	4.00	6.00
880 hr. Fifty (50) ton roller operation.	13.00	10.00
241 hr. Mechanical tamping.	6.00	4.00
268,481 sta. yd. Station yard overhaul.	.02	.02
177,466 1/4 mi. yd. Quarter mile yard haul.	.04	.05
1,080,955 ton Ton mile haul.	.059	.065
1,000 lin. ft. Contour ditches.	.10	.06
26 cu. yd. Dry riprap Class "A".	20.00	12.00
26 cu. yd. Excavation for riprap.	3.00	5.00
1 ea. Cattle guard—18 ft. roadway.	2,000.00	2,100.00
336 lin. ft. Steel plate guard fence.	10.00	6.00
21,125 lin. ft. Galvanized barbed wire fence.	.30	.25
11 ea. Gates—standard type.	55.00	50.00
37 ea. Bracing.	8.00	10.00
5,430 lin. ft. Galvanized woven wire farm fence.	.40	.28
54 ea. Right-of-way markers.	8.00	8.50
1 ea. Stand. Fed. aid proj. mrkrs., Type I	100.00	50.00
1 ea. Std. Fed. aid proj. mrkrs., Type III	100.00	50.00
57 ea. Treated timber warn. posts, refl. (6 in. diam.).	8.00	7.50
26,625 ton Selected borrow sub-base.	.35	.52
30,305 ton Controlled gradation sub-base.	.65	.60



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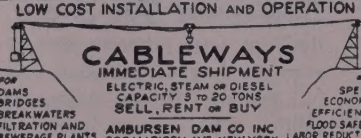
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MANUFACTURERS

(Continued from page 182)

at its Pueblo, Colo., plant, according to announcement by F. S. Jones, vice president in charge of sales. Cal-Tie wire, a special steel wire product for tying reinforcing bars and for other construction tying jobs, was originally developed at CF&I's Pacific Coast Division, and since 1955 has also been manufactured at the company's Wickwire Spencer Division plant in Buffalo, N. Y.

C. W. Leschenko now field engineer
Chester W. Leschenko has been appointed to succeed James T. Conway, resigned, as A. M. Byers Co.'s field service engineer in Southern California and Arizona, with headquarters in the Commercial Exchange Bldg., Los Angeles.

Northwest news from U. S. Rubber
G. W. Oberg has been assigned as truck tire representative at the Portland, Ore., branch of United States Rubber Co. Newly appointed dis-

tributor for U. S. Rubber is Steve Wilson Service of Eagle Point, Ore.

Joe Gunther joins Union Wire Rope
Joseph Gunther has joined the prestressed concrete technical staff of Union Wire Rope Corp. specializing in stress relieved materials and their application. He comes to Union Wire Rope with a background of experience in his own independent consulting firm and with the Midwest Research Institute in Kansas City.

Joseph F. Joy dies
Joseph F. Joy, 73, founder of Joy Manufacturing Co., died at his home in Ft. Pierce, Fla. Joy's name was synonymous with mechanized equipment. He owned hundreds of patents in the United States and abroad, his major inventions including conveyors, blasting devices, drills, locomotives, stoppers, cutters, tractor mechanisms, pumps, hydraulic jacks hoisting mechanisms, tunneling machines and motors. At the time of his death he was a consultant for the Joy Manufacturing Co., Pittsburgh, Pa.