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This month . . .

Big hammer drills in
action at Cherry Dam

•
A new, fast way to lay
concrete roof slabs

•
Report on rubberized
asphalts for roads

•
Pictures of progress
at Pit 4 hydro project

•
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SEPTEMBER 1954

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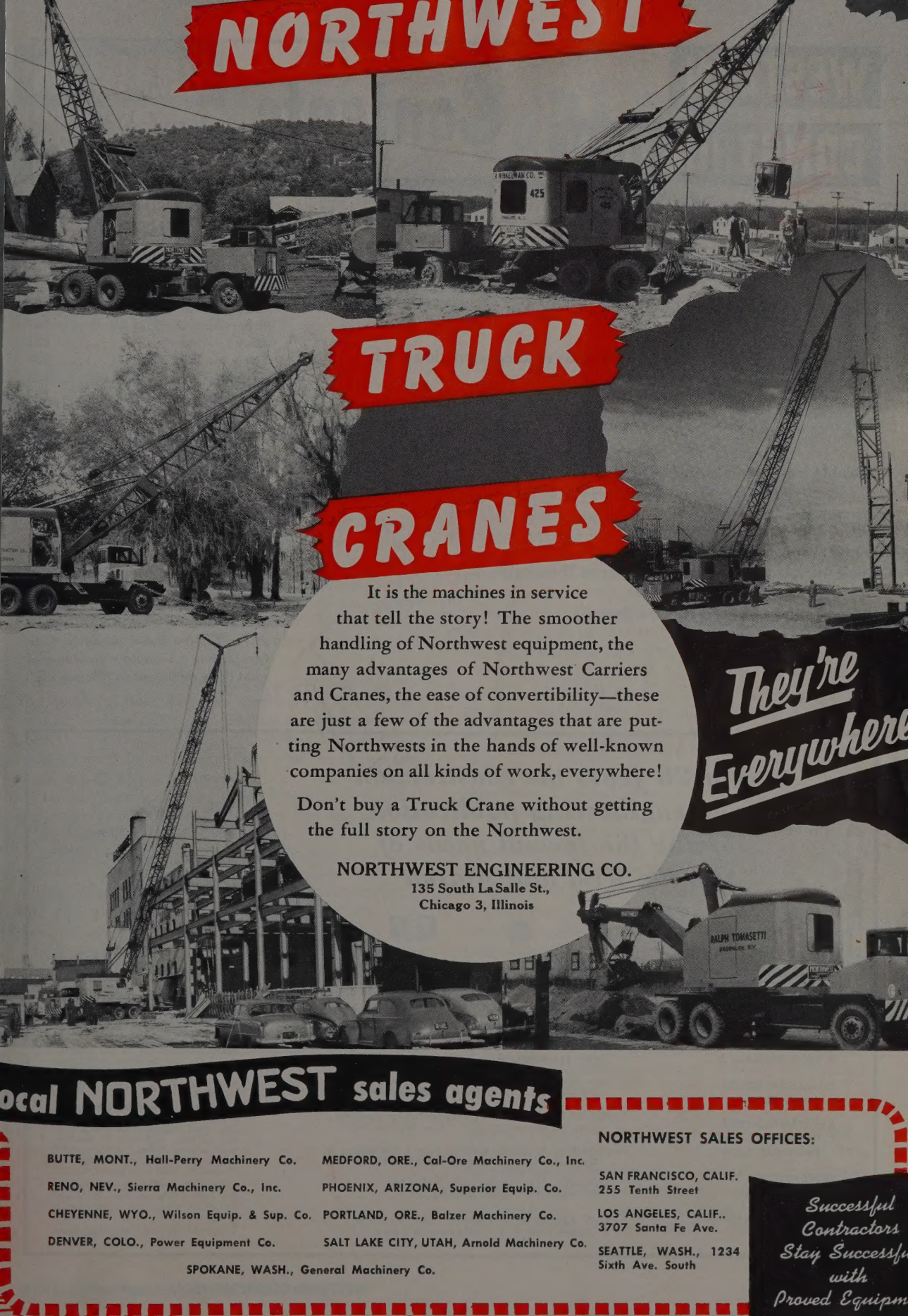
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FRONT COVER

IT ISN'T SMOKE, that's drill dust you see coming from the masts of the large drills working here. Over 3,000,000 cu. yd. of granite is being drilled and shot with these units at the Cherry Valley Dam in California. For a complete rundown of what these drills can do, see page 57.

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Does job safety really pay?

To the casual observer, construction safety simply does not pay. There are too many cases of men riding the hook, of weak scaffolding and thrown-together ladders, of wire rope abuse in rigging, of no hard hats, of neglected "housekeeping."

From these observations, and from a look at the construction industry's accident figures, the casual observer becomes a cynical one. He concludes that safety programs don't pay for themselves, that the old adage is still true in 1954—figure a man's life for every million dollars spent on the job.

Poor safety practices is poor public relations, and it is downright bad business. The record of the safety-conscious contractor proves the point. A good safety record pays on today's job. And it may get you the bid on tomorrow's job.

Safety is more than a phrase and a free poster. It is a continuing practice. The idea may start at the top, but the practice has to start at the bottom. And successful practice of job safety shows as nothing else does just what is meant by the phrase "key men" in contracting operations. It means men with authority—to incur some apparently non-productive expense for extra handrail lumber or for another man to control and flag traffic at a congested spot. It means men with initiative—to set an example of good practice. It means men with courage—who are willing to nag a little when necessary. It means men commanding respect and cooperation—who can conduct effective "tailgate sessions" on safety practice.

In a security-conscious century, the construction industry stands out. Its leaders are men of business daring. And its men, in every craft, are men of physical daring. In fact, some of them are downright careless and reckless. But if the lesson of safety is spelled out, and if the good example is provided, safe working practices result. It isn't likely to be obvious on the job; violations will always be more spectacular. But it will be obvious in the company's books for the job. And it will be glaring in the bid for the next job. . . .

Job decisions — 1954

By JACK K. TUTTLE

Class of 1954
University of Washington

The civil engineering student moves with a close group of his fellows for as many as four academic years. Friendships seem fast, and there is the promise of permanent professional contact. But with commencement day most of his classmates pass from view. The civil engineering class of 1954, University of Washington, is now going its several ways. Where are they going, and why?

The general trend among graduates has been to civil service employment. About 65% of the 1954 class validates this trend. Another separable group includes ROTC students, commissioned at commencement. A few men are soon to be drafted, reducing the number of otherwise available men by about 25%. Most of the remaining men have gone with utility or consulting firms. About 5% of this group has been employed by construction companies.

The main reason for the trend to civil service is the ease with which a student can find a job. To be sure, the era of employer coming to employee is still much in evidence on the Washington campus. But a more attractive range of opportunity is offered by civil service positions.

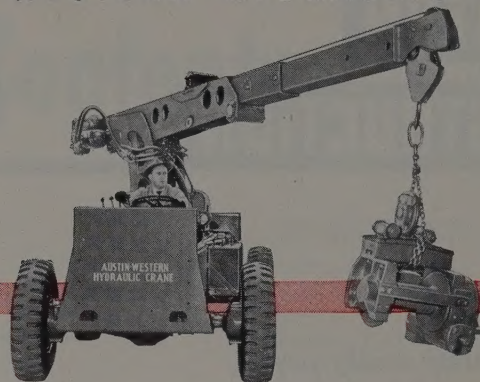
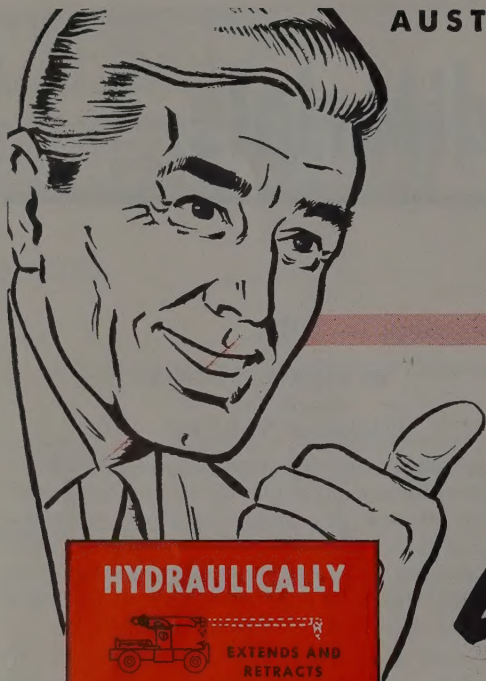
Important in the graduate's choice is his own past work experience. The civil service trend this year was firmed by the many students who had worked in summer engineering aid programs and who elected to return to the agency after graduation. Similarly, most of the men entering private industry had worked for their firms before, either on a summer or part-time basis.

The 1954 graduate placed most emphasis on promotional opportunities, chances for experience, and beginning salary. The worth of experience was not evaluated by the type of work performed by the employer. That is, civil engineering "specialty" was not a factor.

In this connection graduates were questioned on their feelings of capability for the positions offered them. They shared a general agreement that the civil engineering curriculum at Washington supplied sufficient background, with one exception.

Preparation for work in construction was felt to be lacking. There is no construction option at Washington. Particularly desired by the 1954 graduates would have been courses in estimating and in field practices, and more design courses. With additions such as these, they would feel they had a more rounded engineering education and a better basis for commencing their professional careers.

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ROTATES
CONTINUOUSLY
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RAISES AND
LOWERS

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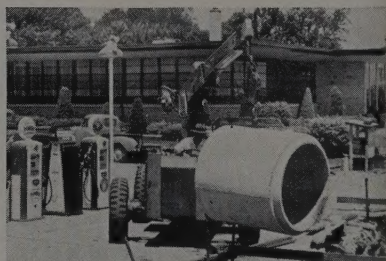
4-wheel steer for maneuvering in close quarters; some have 4-wheel drive for maximum tractive effort. Boom lengths range from 18 to 35 feet. Outriggers may be had, if wanted. Usefulness is increased by such optional equipment as magnet and winch, and either clam-shell or orange peel bucket.



CLOSE QUARTERS. Telescopic boom reaches up and over in an oil refinery.



SEWER EXCAVATION. Six men and one Hydraulic Crane replace 27 men and three slow-moving cranes.



SETTING PIPE. One of many uses found for the Hydraulic Crane by this contractor.

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SEPTEMBER 1954

Largest hammer drills in action at Cherry Valley Dam

What can this new tool for contractors accomplish? Here is what the Guy F. Atkinson Company is doing to find out — in addition to their other interesting work

THERE ARE TWO big things to be seen at the Cherry Valley earth and rockfill dam this summer. One is the contractor's methods for drilling and shooting granite with the largest hammer type drills yet produced. The other is the same contractor's farming operation in opening up and drying out the ground that is to make up the impervious fill section of the dam. These two features make the job an outstanding one to observe.

On this first 500,000 cu. yd. of rock blasting, Atkinson has been experimenting with eight new Joy TWM-2A air-propelled Challenger drills. Several depths of holes and methods of shooting have been employed to bring out the best that the new drills can offer. The remaining 2,500,000 cu. yd. of rock from the high quarry will then be a precise operation of high productivity per pound of powder.

The new Joy drills are the largest hammer-type drill yet designed. They

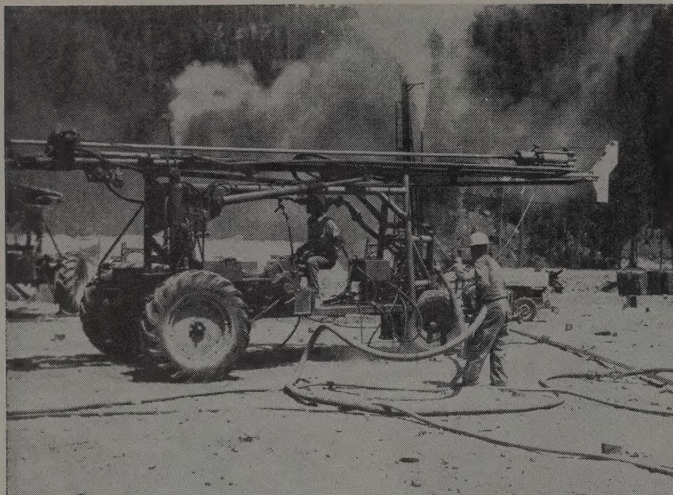


SETTING UP the Joy Challenger drill takes but a few seconds. The 30-ft. long mast is shown here in the process of being raised to a vertical drilling position. Leveling the 9,000-lb. weight of the frame is handled by three hydraulic jacks—located near each wheel.

are capable of drilling holes 50 ft. and greater in depth with hole diameters of $3\frac{1}{2}$ to $4\frac{1}{2}$ in. in the hardest of rocks. They have a feed travel of about 25 ft. to handle 2-in. diameter drill stock lengths of 20 ft. The model in use here is a three-wheeled chassis unit self-propelled by two reversible piston-type air motors and equipped with a hydraulic pump for raising and lowering the mast and three leveling

jacks. It also features simultaneous drilling and blowing and force-feed lubrication. They require about 500 cfm. at 80 to 90 psi. for best performance.

Atkinson has been experimenting with these units in both seamy and solid granite within the following limits: 4 in. diameter holes 20 to 60 ft. deep on 8- to 14-ft. centers. Combined with this, varying amounts of 60%



ON THE MOVE (above) at 1½ mph. Power for tramming is furnished by two reversible Joy Pistonair Motors and is transferred through a spur gear transmission and chain reduction drive. Drill dust in the background is from pipe-stack attachments added by the Atkinson men.

IN PRODUCTION, (right) this rig is now ready to drill a 4-in. diameter hole from 20 to 60 ft. deep with simultaneous drilling and blowing. Drill stock is in 20-ft. lengths and 2 in. in diameter. Atkinson has eight of these units for 3,500,000 cu. yd. of rock excavation.



gelatin sticks and 40% powder have been set off with millisecond delays or the entire round shot all at once. Within this broad range they are finding the right answers for each type of granite encountered and for the size of blasted rock desired. Aside from the higher cost of these units as compared to the ordinary wagon drills, no more men are required to operate them, and the net result is more rock blasted at a lower labor cost. This particular model operates best where the slope is not too great. In establishing a bench for them to operate on, seven Ingersoll-Rand wagon drills are used for the slope shots.

Another important improvement that the Atkinson men have added in this remote job location is the complete handling of their own drill stock, shanks, bits, adapters, and collars. They have a complete machine shop for annealing, threading, and heat treating these items. For example: they use a reverse buttress thread on the drill stock that is completely fabricated by their shop. More details on the process and shop equipment are given under the "Tricks of the Trade" section of this issue.

General features of dam

The planning and design features for this High Sierra dam being built for the City and County of San Francisco were fully described in the March 1952 issue of **Western Construction**. At that time three contracts were under way for the 25 mi. of two-lane paved access road to the site, and another had just been awarded for the 1,280-ft. long, 16-ft.

diameter diversion tunnel. Since completion of these items last year, the damsite has been cleared and grouted under still another contract, and the present \$7,162,800 award held by the Guy F. Atkinson Company is well under way toward the actual dam construction. This portion of the project began in September 1953, and is scheduled for completion December 11, 1955.

Essential features of this dam are that it will rise 320 ft. above Cherry creek to an elevation of 4,715 ft. and have a crest length of 2,600 ft. Of the total 7,000,000 cu. yd. volume of the dam, the inner portion will be impervious rolled fill (3,000,000 cu. yd.) having slopes of 0.75:1 downstream and 0.70 upstream. A cross-section of the dam is shown elsewhere on these pages to aid the reader. Two transitional filter blankets will separate the inner mass from the outer dumped rock. The inner blanket (240,000 cu. yd.), 8 ft. thick, will have 2-in. minus graded rock, and the outer blanket (360,000 cu. yd.), 12 ft. thick, will consist of 6-in. minus graded rock. The outer mass of the dam will be dumped quarry rock (3,400,000 cu. yd.), deposited to achieve an average slope both upstream and downstream of 2:1. The natural angle of repose of this material is estimated at 1.33:1. The series of berms, each 20 ft. wide and 30 ft. high, enables the contractor to place the material with a minimum of difficulty to maintain the 2:1 average slope. For the upstream toe rock in the diversion dam (80,000 cu. yd.) 50% weighed at least 2 tons and 75% at least 1 ton. For the remainder of the outer mass (3,320,-

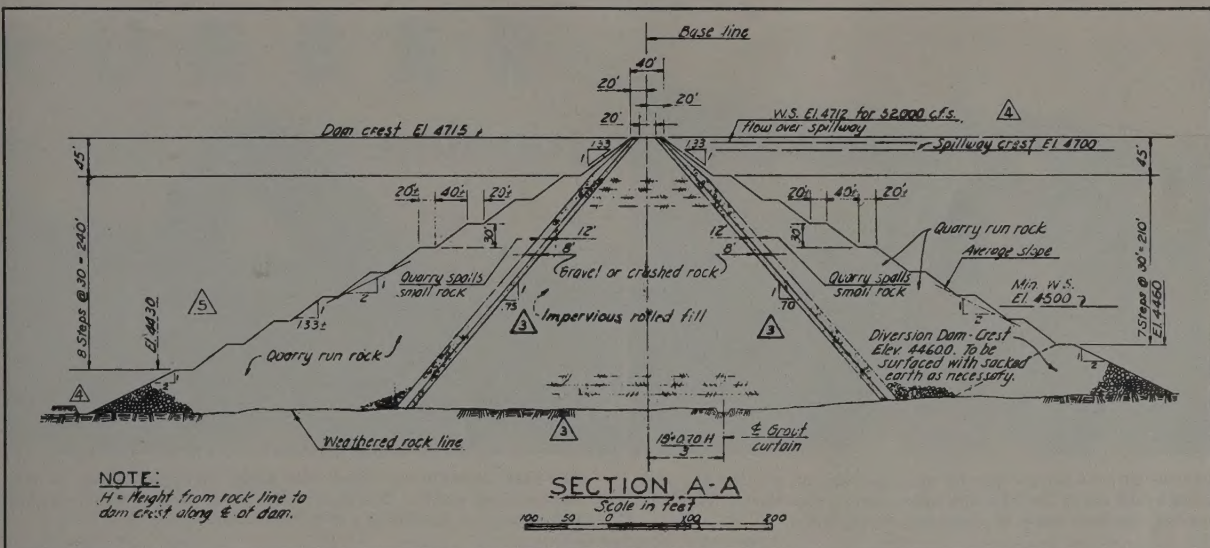
000 cu. yd.) there is no limit on the maximum size, but not greater than 5% of the rock passed a 4-in. screen.

To obtain material for the impervious core, Atkinson has a complex and diversified operation going on at the downstream borrow area, 2 mi. distant from the damsite. This material is granite in various stages of decomposition. Correspondingly, the amount of water required for maximum density at optimum moisture content also varies—and therein lies the main problem. An effort is made to separate material which is more silty sand from that which is sandy silt, the former to be deposited in the core or Zone 1 of the dam. Zone 2 accounts for the remainder of the impervious material. The first case can require only 8% moisture, while the coarser material can require as much as 24%. It all averages out at between 12 to 14% between these extremes.

Impervious fill problems

The deposit as a whole is too wet and has required three operations to solve the problem (a) the borrow pit has been extended in area to expose more material to natural air drying, (b) extensive use is being made of plows, spring harrows, and Ateco rippers to turn over the ground and speed up the drying, and (c) drain ditches 15 to 20 ft. deep are being dug to drain off bedrock springs. Even when the material has been dried down to the allowable moisture content, the contractor still faces the problem of floating oversize boulders in the deposit and the steepness of the terrain.

To handle both the drying opera-



UPPER DRAWING is a section at the highest part of the dam. Note that the upstream cofferdam serves as a part of the finished rock fill. In the lower picture, fill depth is about 50 ft. Visible here are the two Intelligent monitors sluicing down the rock fill. Access road coming in

from the left leads to the impervious fill borrow area, about 2 mi. distant. Core trench, which is the location of the grout curtain, can be seen running up the far abutment. Most of the rock fill will be obtained from area to left of top of dam.

tions and the hauling to the damsite, there is an impressive amount of equipment involved. On the daytime shift there are two basic methods for hauling, one of which is the use of eight 25-cu. yd. Southwest trailers with 20TD Euclid tractors equipped with hydra-tarders for the downhill run. These combined units are loaded by a Euclid elevating loader pulled by an HD20 which takes off 18 in. of the ground surface at one pass. The other basic hauling units are the Cat DW20s of which five are involved in hauling impervious fill material and 11 in enlarging the borrow area by stripping to waste. In the swingshift operation, the bellydump units are retired and all 16 of the DW20s are used for hauling. These units all have extended bodies to give 21-cu. yd. water level capacity and also have hypspeed overdrive that enables them to hit 40 mph. on the downhill run to the damsite.

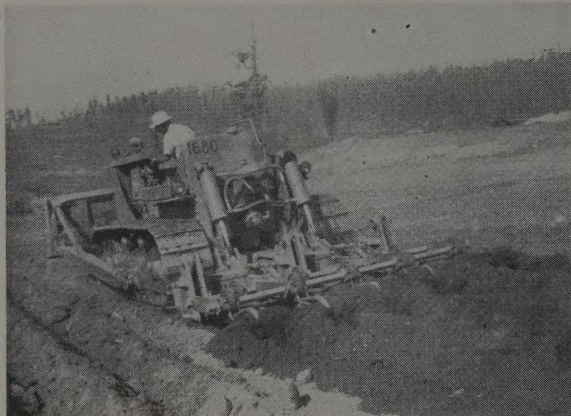
At the damsite, the impervious fill material is deposited in 8-in. layers that are compacted to a 6-in. thickness. (At the time of this writing the dam was about 50 ft. high.) Specifications for compaction are based on the modified AASHO test whereby 57,375 ft. lb. of compactive effort is applied to samples (as against 12,375 ft. lb. for the standard AASHO test). Any series of 10 consecutive tests on the fill must meet these requirements: 100% of the tests shall have a field density greater than 90% of the maximum density, 90% greater than 91%, and 50% greater than 94% (of the same terms). To meet these requirements the contractor has TD24s hooked up to three sheepfoot rollers and one 100-ton Southwest pneumatic roller, while a D8 pulls a 50-ton WISCO pneumatic roller.

In spite of normal precaution at the borrow pit, some oversize ma-

terial is hauled to the damsite. This is very effectively removed however by two D8s equipped with rake teeth on the bulldozer blades that either push the oversize material to the edge or pile it up to be picked up by a DW20 on a return trip. One D8 is also equipped with a harrow to loosen the top 2 in. of a lift compacted by the final pass of the 100-ton roller — this to bond two lifts together. Prior to placing any impervious fill, all cracks and crevices in the rock abutments are gunited or slushed with a 1:3 cement sand slurry. Hand tamping of the fill is required in areas inaccessible to the heavy compaction equipment.

Filter zone envelopes

The two filter zone envelopes of 2-in. and 6-in. minus rock are hauled from two pits about 1½ and 2½ mi. upstream from the dam. For this operation a Bucyrus 54B with a 2½-



DRYING OUT the borrow area for the impervious fill material has been aided by the use of Cat D8's with spring harrow attachments. Extensive use has also been made of plows and Ateco rippers.



DAYTIME OPERATIONS utilize this Euclid elevating loader to load bottom dump wagons. One pass of the loader takes an 18-in. lift. Also being used are Cat DW20's with D8 pushers.

cu. yd. dragline loads Euclid bottom dump trucks that deliver enough of this material to keep up with the rest of the operations on the dam.

This material is deposited by the trucks running out onto the impervious fill area and dumping it as the latter section is brought up in elevation. The specifications require that a 4-ft. strip of the Zone 3 material adjacent to the core be compacted by the same methods. The remainder is compacted by one complete coverage of the treads of a D8.

Quarry operations

Three quarry areas are in use at the present time, two of which are located immediately above and below the damsite and at about the same elevation as the dam's first 100-ft. rise. About 500,000 cu. yd. will be taken from these two areas before operations are shifted to the much larger quarry located on the right downstream abutment that lies above the crest of the dam. The beautiful part of this operation (as well as for the previous impervious core operation) is that none of the loaded earth-moving equipment is required to go uphill to deliver its load. This factor obviously means a great deal in the roundtrip time requirement.

Since there is no limit on the rock size in the outer rock blankets, the quarry operations have not been without their humorous moments. On occasion, single boulders have constituted the entire load for a Euclid enddump truck with the additional requirement that the front end of the truck be tied down with the aid of a D8 to prevent a backflip operation. A payload like this makes up for the extra time it takes to deliver it. In the upstream quarry a 120-B Bucyrus-Erie electric shovel with 5-cu. yd. bucket keeps three trucks busy, while a 150-B electric shovel keeps the same number of trucks busy in the downstream quarry. The material is dumped in 30-ft. high lifts corresponding to the height of the

berms. The rock is settled by washing it down with 2-in. diameter nozzles on 6-in. Intelligent monitors operating at 100 psi. that provide, in accordance with the specifications, enough water to equal three times the volume of rock. The water drains off either upstream or downstream since the impervious fill section is required to be at least 6 ft. higher than the rock fill at all times.

The water for this sluicing opera-

tion is furnished by two Fairbanks Morse 400-hp. vertical turbines that are located at a stilling pond downstream. It is quite possible in the middle of the summer that the stream flow will not be enough to furnish all water requirements—thus the recirculating system worked out above.

Air and power supply

The compressed air supply and the auxiliary electric power has been well planned in advance by the Atkinson firm. For the upstream quarry operation, four stationary Gardner-Denver compressors are used with each rated at 550 cfm. using 150-hp. electric motors. The downstream quarry operation has three stationary Joy Model E compressors putting out 750 cfm. each with 150-hp. electric motors. Here pressure at the receiving tank was held at 110 to 120 psi. to furnish the desired pressure to the large drills over 400 ft. of 6-in. diameter steel pipeline. Above the higher quarry in the right abutment is a semi-permanent structure that will house all of the compressors previously mentioned when the lower quarry operations soon cease. Already installed there is a Sullivan compressor capable of an 1,100-cfm. output. This will bring the total stationary air compressor output to 5,500 cfm. There are three 500-cfm. Gardner-Denver portable compressors in use elsewhere on the job.

The auxiliary power is furnished by two 1,000-kw. GE generators that are powered by five Cat D397's rated at 400 hp. each and one Cat D17,000 rated at 200 hp. Any combination of these diesel units can be obtained to furnish the required power to the generators.

Other interesting features

There are many features about this project that in themselves are not outstanding, but never-the-less contribute greatly in the overall picture

(Continued on page 105)

Equipment List

- 1—Bucyrus-Erie 22-B shovel
- 3—Bucyrus-Erie 54-B shovel
- 1—Bucyrus-Erie 88-B shovel
- 1—Bucyrus-Erie 120-B shovel
- 1—Bucyrus-Erie 150-B shovel
- 4—International TD-24 tractor
- 21—Caterpillar D8 tractor
- 18—Caterpillar DW20 tractor and scraper
- 3—Caterpillar Model 80 scraper
- 3—Ateco ripper
- 3—Gebhart and McCoy sheepfoot roller
- 2—Wisco 50-ton, pneumatic roller
- 1—Southwest 100-ton pneumatic roller
- 2—Caterpillar No. 12 motor grader
- 7—Ingersoll-Rand wagon drill
- 8—Joy TWM-2A 4-in. Challenger drill
- 4—Gardner-Denver 550 stationary air compressor
- 3—Joy 750 stationary air compressor
- 1—Sullivan 1,100 stationary air compressor
- 3—Gardner-Denver 500 portable air compressor
- 2—Ingersoll-Rand 600 portable air compressor
- 2—Fairbanks Morse 400-hp. vertical turbine pump
- 7—Onan 5-kw. light plant
- 1—Master 5-kw. light plant
- 7—Southwest bottom dump with 20TD tractor
- 6—Euclid 43 FDT bottom dump
- 10—Euclid 20TD end dump
- 10—Euclid 36TD end dump
- 2—Peterbilt 3,500-gal. water truck
- 1—Ford 1,500-gal. water truck
- 1—Euclid elevating loader
- 2—Intelligent monitor

RUBBER

in today's bituminous road construction

CONSTANTLY INCREASING wheel loadings and the greater and greater volume of traffic being carried on our highway system today have made the maintenance of existing pavements extremely important, the design of new pavements critical. In turn, increasing emphasis is being placed on the quality and character of all materials entering into highway construction and maintenance.

Among these materials asphalt is no exception. Within certain limitations, the asphaltic materials commonly used in highway construction may be improved to a marked degree by the proper use of certain types and kinds of rubber. Rubber is, therefore, potentially important to today's bituminous roads.

Stimulus from synthetics

Although rubber was first added to asphalt for road building purposes in the year 1898 (in France), few asphalt chemists or engineers recognized its real value for this purpose until recent years, when natural rubber interests began active promotion of their material as an asphalt additive. Even so, many of the basic reactions between asphalt and rubber were still unrecognized.

It was not until the advent of synthetic rubbers, with their high degrees of dispersibility and compatibility, that the real intrinsic value of the physical changes in asphalt obtainable with rubber became apparent. A new appraisal of the value of rubberized asphalts then became possible. It is from this appraisal that our present conclusions as to the types and kinds of rubber which may best be used with asphalt, and the best methods of use of asphalts so rubberized, are derived.

There are many types and kinds of rubber, but not all have pronounced or desirable effects on asphalt. Natural rubber is in a class by itself. Derived from the saps of certain tropical plants such as the Hevea tree or the Guayule plant, natural rubber is essentially one material, except insofar as it may be modified by vulcanization or oxidation.

Synthetic rubbers are made by copolymerizing certain constituents,

FIRST of two installments

By **JEWELL R. BENSON**

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many of which are or may be derived directly or indirectly from petroleum. There are more than 30 distinct types of synthetic elastomers and most of these, in turn, may be modified to various degrees by varying the proportions of the constituents or altering the degree of polymerization, so that in effect an almost infinite variety of synthetic materials exist.

Author's note . . .

THE CONCLUSIONS brought forth in this article are based largely on a series of laboratory tests, using a number of different asphaltic materials from widely scattered sources and a number of rubber materials, both natural and synthetic. While some of the conclusions reached by interpretation of laboratory data have been well substantiated by actual road tests, there must always remain a "twilight ground" between laboratory tests and field performance. The space between can be narrowed only by appreciable periods of time, involving data from the behavior of a large number of actual field constructions, and covering many conditions of exposure and service. However, the behaviors in service of rubberized asphaltic materials observed to date are, in so many cases, so definite and well-defined that it is with a large degree of assurance that these statements, relative to the value of rubber in asphalt, are given.

Suitable rubber materials

It is, therefore, possible to choose and select, from a wide variety, those rubber materials best suited for rubberizing asphalt. While discussion of the effects of a number of rubber materials would be a lengthy article by itself, it can be simply stated here

that of all rubbers investigated and presently commercially available, the most effective has been found to be butadiene-styrene copolymer, which is none other than the familiarly known GRS rubber.

In addition to the various kinds of rubber, rubber is also available in a number of physical forms. These include crumbs, powders, pellets, mineral detackified powders, and the most basic form, latex. Latex, in synthetics, is obtained directly from the copolymerization process and consists of an emulsion suspension of very minute particles of rubber in water. It has been found that any degree of vulcanization or oxidation of rubber seriously decreases its ability to disperse and to produce large changes in asphaltic materials. Therefore, only raw rubbers are considered effective as asphalt rubberizers. Such rubber may be obtained directly from the latex, or from one mineral-detackified rubber powder (Rubarite) currently being produced in this country.

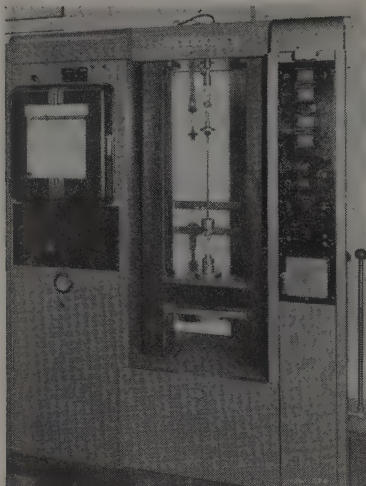
The quantity of rubber required to produce desirable changes in the vacuum refined asphalts commonly used in today's bituminous constructions varies from about 2% to 3% by weight of the asphalt. These amounts appear to give the greatest proportional benefits for all ordinary road-building purposes.

Direct rubberization for testing

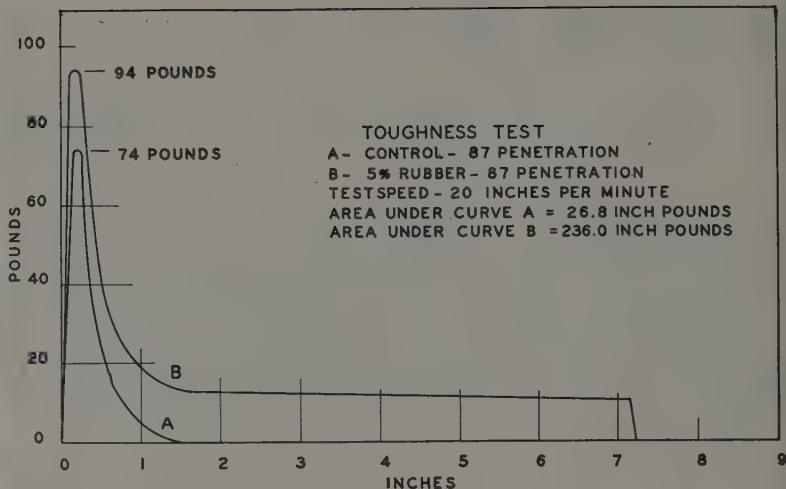
It is possible to rubberize mixtures of asphalt and aggregate by the introduction of the rubberizing material into pugmills or other portions of the mixing equipment. However, accurate analysis to determine the degree of dispersion of the rubber in the asphalt under these conditions is difficult.

All conclusions in these articles are based on the direct rubberization of the asphalt so that tests may be performed on the blended rubber and asphalt as a distinct material. By this means, the specification, analysis, and control of the rubberized asphalt is made possible. Rubberized asphalts will always cost more and this addi-

What are today's rubberizing techniques? What properties of asphalt are affected? . . . to what degree? . . . and are results positive? Are controlled tests possible? . . . and how helpful can they be? With a confident approach to such questions, this discussion provides a new appraisal of the value of rubberized asphalts in today's bituminous road construction.



INSTRON MACHINE used to determine the toughness of rubberized asphalt. The rubberized asphalt is placed in the lower cup. The upper half, to which is attached a steel ball, is lowered into the asphalt and the whole brought to testing (77 deg. F.) temperature. The two halves are then pulled apart at a constant speed (20 in. per min.) and the stresses and distances are automatically registered on the moving chart at the left.



AREAS under the two curves (curves obtained from testing machine shown at left) are representative of the toughness of the two asphalts. Rubberized asphalt (B) is 880% tougher than unrubberized asphalt (A).

tional cost justifies the best and most efficient material control methods available to the highway engineer. Such controls are essential if efficient performance is to be assured.

Although rubber is capable of changing a number of physical characteristics of asphalt, we shall consider in detail here only four principal reactions:

1. Toughness increase
2. Low-temperature ductility increase
3. Temperature susceptibility decrease
4. Durability increase

Greater "toughness" is typical

"Toughness" has heretofore not been given consideration as an important physical property of asphalt. However, it is this property perhaps more than any other that determines the behavior of the actual wearing surface of bituminous pavements, and particularly seal coats or surface

treatments. Toughness is one of the most important physical characteristics endowed on asphalt by rubber.

Toughness involves the forces and distances involved in pulling or stretching a given mass of asphalt. To measure this property, a machine similar to that illustrated may be used. Here, a stress-strain diagram is obtained by pulling essentially a "ductility" test and measuring the forces and distances involved. By this means, the data for the stress-strain curves is obtained.

If we assume that the areas under the two curves are representative of the toughness of the two asphalts, one rubberized — the other unrubberized, we find that the toughness

of the rubberized asphalt in this particular case is roughly some 880% greater than the unrubberized. The long, continued pull of the rubberized asphalt also indicates the property of tenacity, notably lacking in the unrubberized asphalt. These behaviors are typical and of great importance.

Possible material reductions

The toughness factor of rubberized asphalts is strongly reflected when these asphalts are used as cements, cutbacks, or emulsions in surface treatments. In no other use of asphalt is the character so highly stressed as in surface treatments. Subject to the highest physical stress in its effort to hold in place the aggregate particles of the cover stone and subject to high degrees of exposure to the elements, only very tough and durable asphalts yield appreciable periods of service under these conditions.

The increased toughness (and, as will be indicated later, weathering resistance) of rubberized asphalts

APPEARANCE of rubberized and unrubberized seal coat. Roadway on left has had application of 0.30 gal. per sq. yd. of 3% rubberized RC-2 cutback. Section on right has had similar application of unrubberized cutback. The rubberized section has retained about 80% more cover aggregate than unrubberized section. Photograph taken three weeks after application. (Two photos on this page courtesy of Rubarite, Inc.)



About the author . . .

JEWELL R. BENSON, a frequent contributor to **Western Construction**, has had a varied career, beginning with the State Highway Commission of Kansas in 1930. After progression from rodman to Research and Bituminous Engineer with that organization, he joined the Corps of Engineers, Missouri River Division, at Omaha, Nebraska, in 1942. There he was associated with the design and construction of airfield pavements throughout a nine-state area during the war, and participated in pavement evaluation and frost investigations in both the



U. S. and on the Northwest staging route into Yukon Territory, Canada.

After the war, he spent a short time as an instructor with the Technical Training Command, Buckley Field, Denver, leaving there to become head of the Bituminous Laboratory of the Bureau of Reclamation, Denver. After six years at that post, he became Special Projects Engineer for the Asphalt Institute in Denver, in January 1952.

In August 1953, he accepted the position of Chief Engineer of Rubarite, Inc., a position he held until August 1954, when he resigned to set up private practice as a Bituminous Engineer. This article is a result of research and investigation performed during his service with Rubarite, plus his many years of experience in the bituminous field.

promises the most rapid return of benefits in this type of construction. It is indicated that rubberized asphalts immediately retain proportionately more cover stone than unrubberized asphalts of the same grade, and this retention seems "permanent." Test surface treatments confirm this.

It is further indicated that the quantities of asphalt and cover stone, in some cases, might safely be reduced if rubberized asphalt is used. The indicated greater durability of the treatment, leading to deferred retreatment, might well compensate for the small increase in cost of using rubberized asphalt. Since surface treatments in maintenance of existing pavements (and new construction) are frequently an item of major proportions in the average highway department, the indicated ability of rubberized asphalts to improve this type of construction should be seriously considered by every highway engineer.

High-type pavement toughness

It is possible that the effect of increased toughness in the surfaces of certain cold-mixed, cold-laid pavements using rubberized cutbacks and emulsions may be appreciable. Such surfaces will be less tender to curing, and more resistant to abrasion, than unrubberized surfaces.

The effect of increased toughness in high-type asphaltic concrete surfaces may be difficult to observe except over a period of years. If the basic mix design is adequate and good (and most mixes used today meet these qualifications), differences between rubberized and unrubberized surfaces due to abrasion and wear may require many years to develop. Only in the event of certain weaknesses in the basic design or construction, or extremely high traffic stresses, will large differences in

surface behavior be evident. However, more important to the behavior of high-type pavements than abrasion are the improvements obtainable with rubber toward less low-temperature brittleness, less temperature susceptibility, and decreased rates of change toward hardness. The actual "flexibility" of these pavements is also probably increased. These factors will be discussed in turn.

Positive ductility effects

A high, low-temperature ductility has often been proclaimed by many paving engineers as a most desirable property of paving asphalts. One of the most marked effects of rubber (butadiene-styrene) in asphalt is to impart such ductilities.

If small quantities (between 2% and 3% by weight) of raw butadiene-styrene rubber are added to true vacuum or steam refined paving grade asphalts, dispersing the rubber thoroughly and avoiding depolymerization (over 400 deg. F.), the 39.2 deg. F., 5 centimeter per minute ductilities of these asphalts will normally always exceed 150 centimeters. Frequently, less than 1% rubber will give these ductilities, whereas the normal ductilities of the unrubberized asphalts at this temperature will seldom exceed from 0 to 20 centimeters. In general, however, these values are not obtained with asphalts which have been refined by solvent processes, or in which air has been used to assist in the reduction of the asphalt, nor are they obtained in any blends of such materials. The low-temperature ductilities of such materials are increased but only to intermediate values.

High low-temperature ductilities are undoubtedly of value to pavements under low-temperature conditions. To the asphalt technologist, however, the reaction assumes special significance in the indication of

a high degree of peptization of the basic asphalt occurring with this type of rubber dispersion, which tends to substantiate other theories as to the structure, and the relationship between structure and performance of asphaltic materials.

Decreased temperature susceptibility

Rubber decreases the temperature susceptibility of asphalt to appreciable degrees. If we assume that the differences between the 77 deg. F. and the 32 deg. F. penetrations of asphalts are indicative of temperature susceptibility (a common method), then the temperature susceptibilities of typical vacuum refined asphalts of paving grade consistency are decreased by from 18% to 26%, using 3% rubber. Higher percentages of rubber give higher reductions but the proportional effect decreases. A decrease in the temperature susceptibility of an asphalt is generally desirable, in that such changes represent decreased hardness at low temperatures and, perhaps more important, less softness (tendency to deformation, bleeding, etc.) at high temperatures. The change in this particular physical property of asphalt induced by rubber may be reflected beneficially in a number of ways in the completed pavement or surface treatment.

While space does not permit extensive discussion of all the changes made in asphalt by rubber, some other properties of asphalt which are affected by rubber may be mentioned as follows:

1. Abrasion resistance
2. Impact resistance
3. Tackiness
4. Elastic recovery
5. Softening point
6. Cold flow
7. Normal 77 deg. ductilities

The first five of these properties are increased, with some, such as impact resistance and elastic recovery, to frequently several hundred per cent of the original. Cold flows are decreased, as is also the normal 77 deg. ductility. Whereas the ductility of an unrubberized asphalt may normally be in excess of 100 centimeters, rubberizing with from 2% to 3% butadiene-styrene rubber usually decreases this value to about 50 centimeters. However, this decrease is not considered important due to the compensation of the very large increase in ductility obtained at low temperatures. It is significant that, with the possible exception of the normal ductility, nearly every other physical property of asphalt is enhanced or improved by varying degrees.

SECOND PART of this article, to appear in next month's issue, will discuss effects of rubberizing on the durability of bituminous roads, specification change requirements, handling in the field, and costs.

PROGRESS AT PIT 4

— — — A picture report

Current work at Pacific Gas & Electric's Pit 4 project shows that a lot has been done since Western Construction's last visit there in September, 1953. There are contractors, sub-contractors, and sub-subcontractors working on the tunnel, penstocks, and powerhouse. Here is a blow-by-blow description of who these contractors are and what they are accomplishing.

Powerhouse structure

The powerhouse, which measures roughly 84 x 154 ft. in plan, will house two 50,000-kva. turbogenerators. The Walsh Construction Co. has a contract for certain portions of this. Foundation excavation was subbed out by them to W. B. Jones of Redding who completed his work in September of 1953. Walsh went to work on sub-structure concrete and completed it up to the main (generator) floor, except for machinery embedment, in March of this year.

The now completed structural steel frame of the building was handled under a contract (awarded by P.G. & E.) by the Bethlehem Pacific Coast Steel Corp. Bethlehem's contract included both the furnishing and erecting of the steel. The exterior concrete walls covering the steel are 8 in. thick, and are now being formed and poured by Walsh. Design strength of the concrete is 3,000 psi. Statewide Steel Erection Co. of San Jose is installing the reinforcing steel furnished by San Jose Steel Co.

Subsequent work has included putting a laminated wood roof on the powerhouse by Walsh. This roof is composed of 2 x 4's laminated on edge, making it a solid 4 in. thick. It is being topped with roofing felt and ceramic tile. Concrete block interior partitions are being done currently by H. T. Brooks of Chico, a sub of Walsh.

Penstock

The water will fall 382 ft. through twin penstocks 830 ft. long. Here Walsh has another contract to excavate and pour concrete for the penstock piers and anchors, a sluice line, and the valvehouse floor. This work is largely done, except near the top where their other work on the tunnel

interferes. Additional concrete will be required to form saddles for the penstocks when they have been placed. It will require 2,700 cu. yd. of concrete and 1,700 cu. yd. of excavation for this operation.

A contract awarded to Consolidated Western Steel by P.G. & E. included furnishing and installing the penstocks. The latter are 12 ft. in inside diameter, and range in thickness from 1½ in. at the top of the penstocks to 1 in. at the bottom. Consolidated Western's contract also includes a sluice line originating at a sump to be built at the upstream end of the 300-ft. long steel liner of the tunnel. The sluice line begins 36 in. in diameter but is reduced to 24 in. for the major portion of its length down the hill.

Where the penstocks pass under the transformer area adjacent to the powerhouse, they are required to be gunite covered to a 1 in. thickness, reinforced with 4 x 4-in. mesh, before backfilling over the pipes is begun. Walsh subbed it out to the Cement Gun Construction Co. of Sausalito. The specifications also require that underground portions of the penstocks be shop coated with hot coal tar. Interior of the pipes is spun coal tar enamel. Butterfly valves in the valve house at the top of the penstock are being installed by Consolidated but furnished by Westinghouse.

Powerhouse machinery

Installation of all the powerhouse heavy equipment is being handled by Stolte, Inc., the prime contractor. They in turn have a subcontract with Dalzell Rigging Co. for nearly all of this work. Stolte's main problem is that of coordination of their subcontractors.

The parts being installed between the end of a penstock and a turbogenerator unit are as follows: butterfly valve, distance piece, and the spiral case. Branching off from the spiral case is a relief valve or pressure regulator. In the center of the spiral case is the reaction turbine and above it, the generator. Below the reaction

VERTICAL PANORAMA of penstocks as seen from roof of powerhouse. The surge chamber may be seen high on the hill above the penstock and above the tunnel portal (which does not show.) The A-frame is for unloading penstock sections.





LOOKING FROM surge chamber location shows stockpile of timbers for tunnel support and tracks of mine cars (lower). Northwest crane to right of powerhouse is placing concrete in west wall. Natural river bend to the right of the picture will be lowered and straightened by tailrace channel excavation.



GUNITE COVER of 1-in. thickness over the two 12-ft. diameter penstocks is required where they pass under the future transformer area. Penstock is first treated with hot coal tar and then covered with 4x4-in. wire mesh reinforcement for the gunite. Penstocks are 830 ft. long for 382-ft. fall.

turbine is a removable section and the draft tube liners.

Of these parts the distance pieces are arriving on the job in advance of the butterfly valves. Ordinarily these are the last elements installed to complete the length between penstock and turbine—hence the name. However, for the first unit at least, the distance piece is now being permanently installed first, in reliance on a guaranteed dimension from a butterfly valve manufacturer. This involves shaving $3\frac{1}{2}$ in. off one end of the distance piece. This is possible because the flanges of the distance piece are left loose and the pipe undrilled for its riveted connection to the flanges. Draft tube liners, the removable sections above, and the spiral case—all these elements are in place for the first turbine, though bolting and concrete encasement are not yet done except for the liners.

All of the above mentioned parts are being furnished as follows: butterfly valves by S. Morgan Smith; distance pieces by Consolidated Western Steel; draft tubes, spiral cases, reaction turbines, and relief valves by Newport News Shipbuilding and Drydock Co.; generators by General Electric.

Bridge cranes

Two 115-ton capacity bridge cranes were furnished by the Pacific Coast Engineering Co. (PACECO) of Alameda. It was originally hoped that they would be available to be installed by Bethlehem along with their work on the structural steel frame. However, the cranes weren't ready at that time and a separate contract was later awarded to Bigge Crane & Rigging Co. of Oakland for installing them.

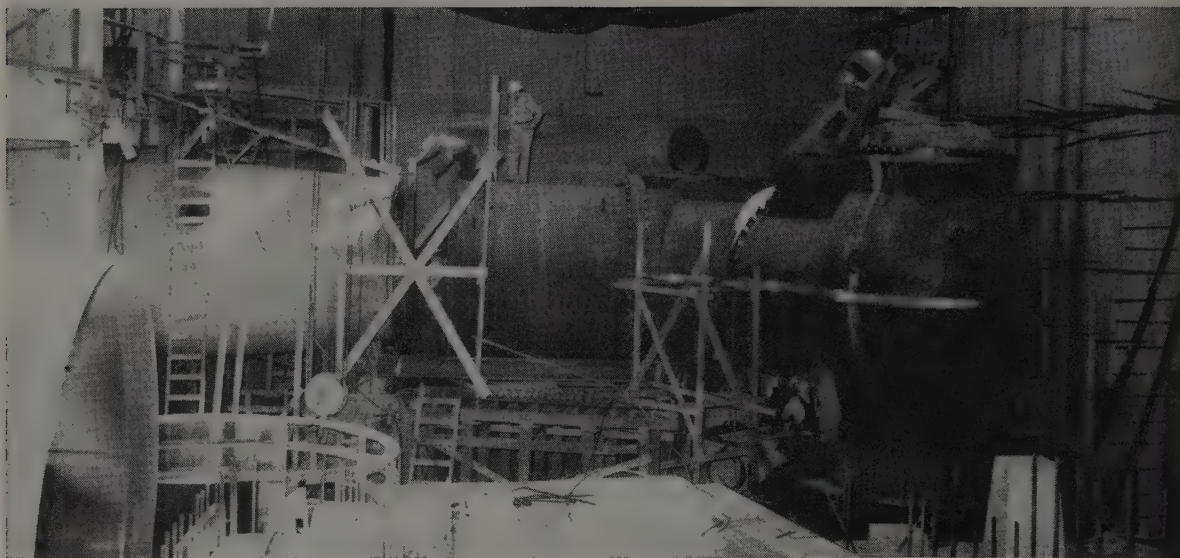
Tunnel

Only 700 ft. of the total of 21,500-ft. length of the hydro tunnel remained to be driven on July 22—and this was finished on Aug. 5, ahead of schedule and right on for line and grade. Walsh Construction Co. began work on this 23-ft. wide horseshoe in October 1952. Since then 380,000 cu. yd. has been excavated plus the solving of some interesting problems. Water has been one of them—there being a total of 16,000 gpm. flowing from the outlet portal, while 4,200 gpm. is being pumped out of the adit heading.

The most difficulty in tunnel driving was encountered early this summer, when the tunnel alignment went through what appeared to be an old stream channel—loose material,



FORM TIES are being installed in concrete formwork for the exterior wall of the west side of the powerhouse. Large window openings on this side will be glass block.



LOOKING SOUTH inside the powerhouse from the main floor. In the left foreground is the end of a distance piece. In the background from left to right, the sequence of parts is: the distance piece of the other penstock (being worked on), the beginning of a spiral case (workman

is standing on top of it), and the pressure regulator or relief valve at the extreme right. All of these units will be encased in concrete when finally installed and aligned. Datzell Rigging Co. is subcontracting installation.



ABOVE THE PIT, two 115-ton capacity cranes are in use for setting heavy parts. Walls to the right are being formed around glass block window openings. Roof is composed of laminated 2x4's on edge.



BOLTS CONNECTING flanges of the spiral case and the relief valve are tensioned to 23,000 lb. Tension is determined by micrometer measurement of bolt elongation, which is only 0.009 in. in this case for full stress.

largely conglomerate, lying above lava. Progress during a one-month period was only 50 ft. in this heading. It was necessary to use breast boards to hold the tunnel face. For a time, the work was advanced by a top heading going 60 ft. ahead of the full face operation. Support in this section is composed of 16x16-in. timbers on 2-to 3-ft. centers.

The water comes in at so many places and in such volume that it is expected that it will be necessary to use "panning" in about 1,500 ft. of the lining work. This means fastening sheet metal pans to the inside faces of the timbers. They are bent around the corners of the timbers and span between adjacent timbers near the outside face. Grout will be

pumped in behind the pans after the other lining is finished, displacing the water allowed to flow there during the main lining operations.

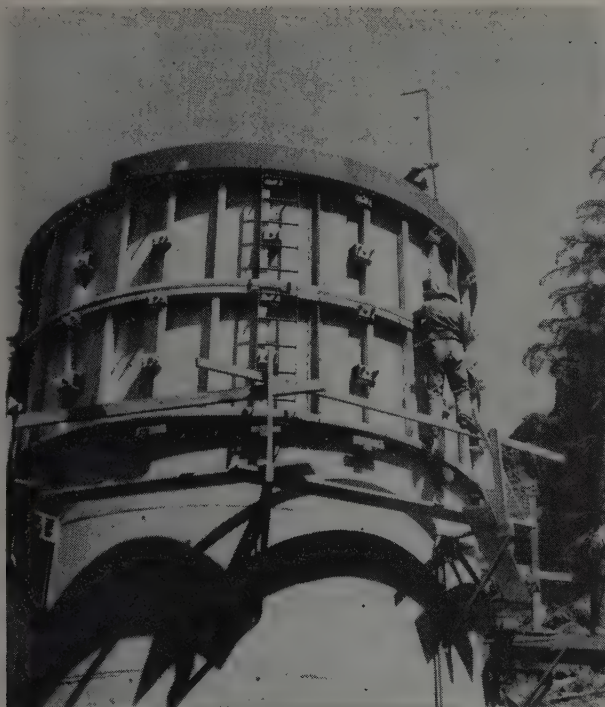
Metal forms will be used for tunnel lining, the operation proceeding from the downstream end toward the adit. Invert and curbs will be poured in entirety first, then a second "trip" for walls and arch. The tunnel forms will be moved in 24-ft. sections, a total of 11 such sections being used leap-frog fashion. Concrete for the job (120,000 cu. yd.) is specified at 2,500 psi. for the invert and 3,000 psi. in the arch.

A Prestweld gun of 1¼-cu. yd. capacity will be used. This method shoots the concrete behind the forms by pneumatic pressure at the top of the tunnel. It is felt by the contractor that this method gives the greatest assurance in filling all voids. The concrete will be mixed outside the tunnel and transported to the site of placing in 4-yd. agitator cars. Cutoff walls will be constructed outside the lining at about 500-ft. intervals.

The tunnel section will be modified where the ground is very wet or relatively unstable. The lining will be circular in those places, horseshoe section elsewhere except where other conditions require circular lining. Approximately half the total length is circular, the other half horseshoe. Seepage water will be pumped through the tunnel in a 24-in. line while curb and invert concrete is being placed. Thereafter, it will probably be allowed to flow along the finished invert while arch concreting is underway.

Surge chamber

Also part of the Walsh contract is construction of the differential surge chamber located directly over the



SETTING STEEL FORMS for next lift of concrete on the inner cylinder of the differential surge chamber. This chamber is located about 300 ft. back from the outlet portal and directly over the tunnel. Water rises in this 16-ft. diameter cylinder to serve as a safety valve for sudden powerhouse valve shutdown.



TUNNELING CONDITIONS can best be described by looking at this 16,000-gpm. discharge coming from the outlet portal. An additional 4,200 gpm. is being pumped from the upstream adit. To concrete line the tunnel, "panning" will be necessary first, this to be followed by grouting behind the walls.

tunnel near its downstream end. The outside barrel is 63 ft. in diameter, 140 ft. deep. Of this depth, 110 ft. is below the surface and was excavated by the shaft and trap method. The top 30 ft. was in hillside cut.

Rising up within this outer barrel is a 16-ft. inside diameter concrete cylinder 155 ft. tall that opens directly to the tunnel below. This arrangement is to take care of an event such as sudden closure of the butterfly valves in the powerhouse. Water surging down the tunnel will then rise to the top of the central cylinder where a head of water is developed to counteract the momentum force of the tunnel water. The outer barrel serves to catch any overflow from this action. Normal water level would be about 54 ft. below the top of the cylinder with no water flowing to the powerhouse, and about 86 ft. below the top with powerhouse at full load.

Between the surge chamber and the butterfly valve house, the tunnel has a 300-ft. long steel liner. The Basalt Rock Co. of Napa is furnishing this liner in quarter-circle segments. It is being installed by the C & D Welding Service of Redding.

Tailrace channel excavation

The contract for this item has just been awarded to W. B. Jones and the work is now under way. Excavating is required here to lower the stream bed next to the powerhouse and on downstream to the backwater of Pit 5 diversion dam. This allowed the



BETWEEN the surge chamber and the outlet portal, 300 ft. of steel liner will be installed. The liner arrives in quarter-circle segments shown here being welded together.

powerhouse design to take advantage of several additional feet of water head similar to the design of Folsom Dam.

Aggregates

All aggregate for the project is being processed by Harms Bros. of Sacramento. That required for the powerhouse, surge chamber, penstocks, and lined section comes from materials left from the construction of Pit 5 Project, completed in 1944. Tunnel lining concrete aggregates come from a bar in the river about 2 mi. downstream from the adit.

Personnel

The names and pictures of most key personnel working for both the P.G. & E. and the various contractors mentioned here can be seen in the "Supervising" section of this issue. The pictures on these pages show how the project looked in July this year with completion due in mid-1955.

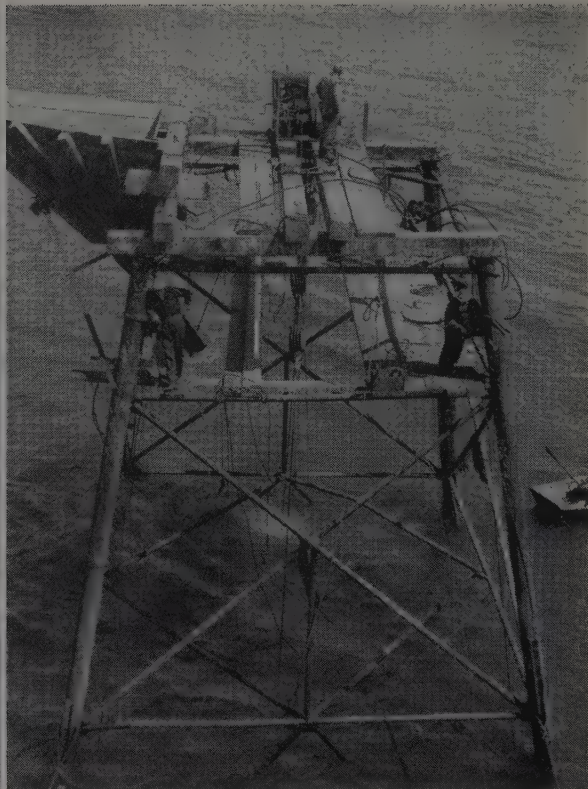
Pit 4 was a wet tunnel

Here is how water was handled in the adit heading of Pit 4 tunnel, for comparison to Tecolote Tunnel techniques, reviewed in *Western Construction* last month.

As of July 22, the adit heading on the Pit had been advanced about 6,500 ft., the last 1,500 ft. in the dry. But water up to 4,200 gpm. was seeping into the tunnel along the first 5,000 ft. and had to be pumped out. The contractor's installation included three 12-in. lines and the following pumps: one 8-in., two 6-in., one 4-in., and one 2-in. On July 22 all pumps were going, handling 3,600 gpm.



LIFTING the 22-ton tower to position over a newly laid section of pipe requires but a few minutes for the derrick. Tower is 60 ft. tall and will handle laying problems out to 40-ft. depth.



TOWER NOW in position, a diver (note bubbles on far side) is sent below to hook various cables to the pipe. Three men on tower handle winches with instructions from superintendent and diver.

Tower plus Prepakt for outfall sewer

By FRED D. BOWLUS

Consulting Civil Engineer
Whittier, California

A THOROUGH SEARCH into the records of the earlier design and installation of the Santa Cruz outfall sewer indicated that adequate anchorage of the new line would be one of the main problems. The gradually sloping bottom offshore, only 18 ft. deep at 800 ft. out and 40 ft. at 2,000 ft., is subject to an extremely severe surge from wave action that resulted in loss of the original line. It was decided that the best solution would be to have a trench excavated to a depth such that the new outfall, when suitably bedded and incased in concrete, would be below the level of the ocean floor. Although this might increase the cost of the project over other possible methods, it was one sure way to provide permanence for the new outfall.

The new design called for a trench to be excavated beginning near the end of the 800-ft. west branch of the existing outfall. This trench would extend 1,200 ft. further offshore to put the end of the outfall out 2,000 ft. The new single outfall line was de-

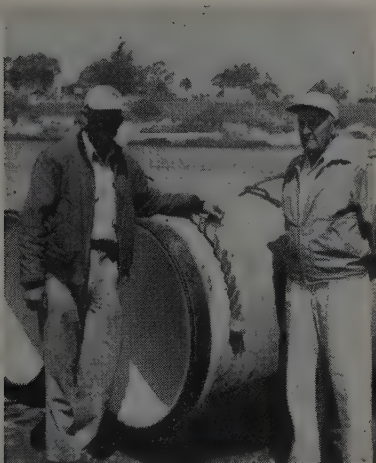
The original Santa Cruz outfall sewer, constructed in 1927, consisted of two diverging 15-in. diameter, gunite-coated steel pipes extending 2,000 ft. offshore. These pipes were anchored every 300 ft. with sacked concrete placed in piles on the relatively smooth bottom, after the lengths of pipe had been winched out to sea the full 2,000 ft. This operation was fully described in the October 10, 1928, issue of *Western Construction*, pages 614-625.

signed to be either 30-in. or 36-in. diameter steel pipe, concrete lined—the larger size to be used if the contractors' bids proved to be within reason. The east branch of the existing sewer would be cut into at a point 500 ft. offshore (where it begins a horseshoe curve), extended 300 ft. to the end of the west branch, and then the two lines joined to the new outfall with suitable steel pipe connections. The increased carrying capacity of the new pipe over the old will allow the expanding city at some fu-

Some time later, possibly two years, a heavy storm tore the twin outfalls loose from the anchorages at the offshore ends. It resulted in the loss of 1,200 ft. from the end of each line, leaving one 800-ft. length approximately on the original line and the other 800-ft. length bent into a horseshoe with the end pointing back toward shore. Over the years, the increasing amount of sewage has constituted a beach pollution problem at this seaside resort town.

ture date to construct a new 800-ft. length from shore to tie into the new outfall. Following the results of recent research on multi-outlet diffusers, six pairs of 6-in. diameter pipes spaced at 12-ft. intervals in the offshore pipe are being installed to give a high dilution factor as the sewage reaches the water surface from a 40-ft. depth. A single 8-in. diameter pipe elbow is being provided in a bulkhead at the end of the outfall.

The successful bidder on this project was the Healy Tibbitts Construc-



EACH SECTION of 36-in. diameter pipe is 32 ft. long, weighs 5 tons. Author at right and Dan Boom, inspector, at left.

tion Co. of San Francisco at a price of \$206,000 for the 36-in. diameter pipe. They began operations on May 27 this year. The major piece of operating equipment is a 35-ton whirley derrick fully equipped for offshore work. In addition, two large barges are employed for handling crushed rock and pipe, and a tug stands by at all times.

The whirley was positioned with the inshore mooring cables running to deadman anchors on the beach and the offshore mooring cables to two heavy stock sea anchors. Heavy surf made inshore mooring operations difficult and hazardous. Material to be excavated consisted of hard sandy shale and hardpan. Although the specifications required a trench only 4½ ft. deep and 5½ ft. wide, the contractor could not hold the trench to such close tolerances, with the result that the excavation exceeds the neat requirement. The trench was excavated under difficulty with the operation frequently brought to a halt because of the heavy dangerous surge occurring at this location. An entire week was lost on one occasion. It goes without saying that such an operation is possible only with the best of equipment and crew.

A diver was sent down after completion of the trench excavation for a walking inspection of the full length of the trench, checking for alignment and unexcavated portions. All was found to be well with the exception that drifting sand occurs in certain areas and portions of the trench had silted heavily. This extra sand will be removed by siphoning or clamming as pipe-laying proceeds.

The steel sewer pipe is in 32-ft. sections, each of which weighs about 5 tons. It is coated inside with a ¾-in. layer of centrifugal spun concrete, and outside with ¾-in. cement mortar over ¼-in. diameter steel wire. Metal joints are of the bell and spigot type with a 3¼-in. effective lap sealed with a rubber gasket. This type of joint allows several inches in align-



IMPORTANT FEATURE of tower is attached hopper. Gravel placed in hopper by derrick is chuted to bottom. Diver directs flow to embed the pipe. Intrusion Prepackt method will be used.

ment to be made either vertically or horizontally in each 32-ft. length without injury to the gasket or the pipe.

The contractor is using a portable tower method for laying this pipe which is well suited to the difficulties of operating in a heavy sea. The tower is 60 ft. high, weighs 22 tons, and is about 36 ft. square at the base and 24 ft. square at the top. The four corner legs are 1-ft. diameter steel pipe filled with concrete. Hanging from the top deck of this tower are two cables operated from a gasoline powered winch. Smaller hand-operated winches are mounted on the lower deck of the tower.

Tower usage

The pipe-laying operation consists of derrick, tower, and diver working in close coordination. The derrick lowers a 32-ft. section of pipe into the trench as close as possible to the previously laid pipe. The derrick then takes the tower up and positions it on line over the newly laid section. The diver hooks the two heavier cables from the gasoline powered winch around the pipe—these serving as slings to suspend the pipe. The smaller cables from the hand winches are used for positioning and to keep the pipe from going wild in the surge. From there on, it is a slow, laborious job of coordination between the diver working on the bottom and a superintendent directing the derrick and tower crews. The diver works entirely by touch and is subjected to a severe physical beating from the surge of the sea.

As each section of pipe is joined, a surveying crew stationed on the shore (and provided by the city of Santa Cruz) takes grade shots on each end of the pipe to make sure that it is level or sloping downward off shore. With the pipe suspended in final position, the derrick clamshells crushed rock from the barge moored alongside, and dumps it into a hopper mounted on the tower. A chute from the hopper is handled by the diver

and he sees to it that the pipe is fully encased up to the top of the trench with crushed rock. A plywood bulkhead is also placed over the end of the newly laid section of pipe to prevent sand from filling the pipe. Many innovations from hour to hour are required to keep the pipe-laying going under the varying sea and bottom conditions. Thus a section of pipe is joined, positioned, and aligned under the tower, and then bedded firmly in crushed rock.

Intrusion Prepackt

The contractor has elected to place the concrete encasement of the pipe by the Intrusion Prepackt method rather than by the conventional tremie method. This phase of the job lies in the future at this writing. The entire grouting operation will be conducted from a barge moored alongside the derrick. Aboard the barge will be all of the grouting materials and equipment consisting of special mixers, agitators, pumps, and batching aids. Grout pipes will be placed in the crushed rock embedment to the bottom of the trench at proper intervals to insure a homogenous and complete encasement of the pipeline. Grout consisting of two parts of cement, one part of Alfesil, six parts of sands, and one per cent of Intrusion Aid will be pumped into the crushed rock. Just what field difficulties will be encountered in the use of this method are unknown at this time.

It is expected that the contract now under construction will be completed this fall and further beach contamination prevented.

Personnel connected with this project for the City of Santa Cruz are R. N. Klein, city manager; Alexander Russell, city engineer; Dan Boom, inspector. For the Healy Tibbitts Construction Co., T. G. Anderson, vice president, is in general charge of the project. Norman Jennings is superintendent, and Andy Collins is engineer. The author is consulting engineer on the project.

How to lay precast roof slabs

All precast concrete reservoir roof system, covering an area the size of two football fields, called for erection skill on the contractor's part. A job-designed hoist is handling 400-lb. roof slabs at double any previous rate. Final in-place cost to the owner will be only \$1.59 per sq. ft.



1 UNLOADING from the trucks delivering the roof slabs is handled in two ways. One method is by use of a truck-mounted Lorain crane that picks up the 2,400-lb. bundles and places them directly on a waiting skip. The other method, used in conjunction with the first, is the use of a Hyster forklift which places remaining bundles nearby.



2 MOVING the bundles down the inclined floor of the reservoir is handled by this skip (left). A pickup (cable attachment) makes forward and backward trips to raise and lower the skip. Another Hyster forklift now takes the bundles from the skip for delivery to the particular location where the track-mounted hoist is working.

AN INGENIOUS new method for the placing of precast concrete roof panels was recently demonstrated by the Payne Construction Co. of Oakland, Calif. The task confronting this firm was the erection of over 7,000 panels, each 2 ft. wide, 9 ft. 4½ in. long, and weighing 390 lb. This large quantity of panels permitted the firm to consider building special apparatus for quick handling. Their hopes have been more than fulfilled by the field operation of their panel handling machine.

General features

The scene for this operation is the 19,000,000-gal. Leland Reservoir being built for the East Bay Municipal Utility District (EBMUD) near Lafayette, Calif. This will be a roofed-over reservoir with a floor that is flat in the central area and sloping upward to meet the roof at the perimeter. Its dimensions are roughly 516 ft. long by 312 ft. wide at one end, and 216 ft. wide at the other. Maximum floor to roof height is about 32 ft.

The column, girder, beam, and roof slab system is made up entirely of precast concrete members. Columns are 11-in. square and vary in length from 13 to 28 ft.—161 of them will be required—spaced at 24-ft. centers both ways. The girders are 11 in. wide, 24 in. deep, and 23 ft. 11½ in. long. They are purposely ½ in. short of the column to column center spacing to allow for erection clearance and for a grout pour to tie girder ends together. There are 222 girders, each of which weighs 6,600 lb. The beams are 9 in. wide, 18 in. deep, and also 23 ft. 11½ in. long for reasons similar to the girder length. These beams weigh 4,000 lb. each. There will be 620 of them, spaced at 9 ft. 7¼ in. centers on top of the girders.

Roof slab units

The roof slabs are shallow pan-type beams, 3½ in. thick at the edges and 1 in. thick in the center. These 2-ft. by 9-ft. 4½-in. slabs weighing 390 lb. each are only designed to hold a live load of 20 lb. per sq. ft. with concrete of 3,000 psi. strength at 28 days. Use of 7,241 of these slabs give a roof area of approximately 140,000 sq. ft., just under the area of two football fields for area comparison. It



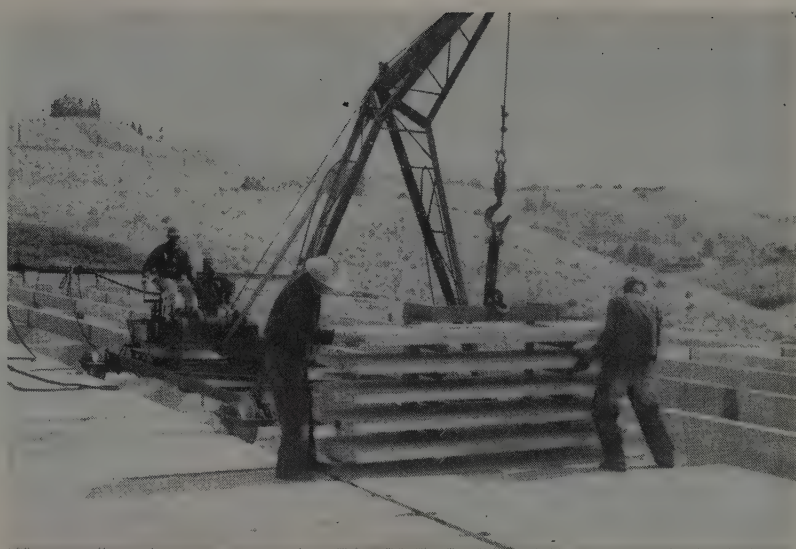
3 LIFTING the slabs on special trees takes place next, one load going up while another is being loaded. This process will not be necessary near reservoir edges; trees will be passed directly from truck-mounted crane to hoist.

was for these units that the greatest erection and handling problem was anticipated.

Separate contracts have been awarded for various construction phases. Upon completion of the reservoir floor excavation and lining, one contract was awarded to the P. Grassi-American Terrazzo Co. for precasting and furnishing to the jobsite the various units of the roof system for Leland and another reservoir. An erection contract of \$72,941 was awarded to the Payne Co. for installation of precast concrete roof members at Leland Reservoir alone. A tabulation of the unit prices is given elsewhere on these pages. Net results to the EBMUD organization will be a roof in-place at a cost of \$1.59 per sq. ft.

Column-girder erection

For erection sequence, two truck mounted cranes, one a Lorain equipped with a 65-ft. boom and the other a 10-ton homemade rig, started column erection operating on the depressed floor of the reservoir. While one crane held a column in place, the other would lift a girder into position. With the first complete line of girders and columns erected and accurately aligned, the spacing of the remainder of the girders was simplified by the use of two light, 3-in. diameter steel conduit pipes. These pipes had flat steel plates projecting at right angles from their axis exactly 24 ft. apart, the required center to center spacing of the girders. Opposite each plate was another projection from the pipe that provided for a threaded



4 PLACING the slabs is easily handled by track-mounted hoist which rides on the beams. First slab has just been seated on beams and is being shoved against previously laid slabs by means of two bars projecting from the front of the hoist. Forward and reverse motion of hoist comes from a geared-down Ingersoll-Rand air tapping wrench.

bolt to be screwed against a concrete girder after the pipe brace had been set in place. With one end of the pipe braces secured to a girder previously erected, it was no problem to hold a newly erected girder accurately in place.

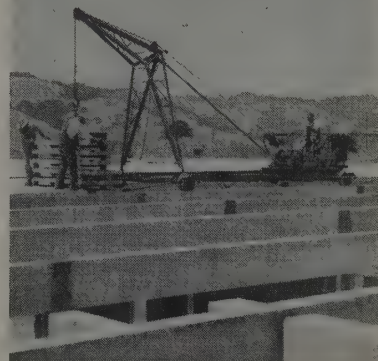
Connections

Each column has a $\frac{1}{4}$ -in. thick steel plate, embedded in its top, that serves as a seat for two girder ends. Each girder end in turn has a $3 \times 3 \times \frac{1}{4}$ -in. angle iron embedded in it. Thus, metal rests on metal and a $\frac{1}{4}$ -in. weld applied to accessible edges provides an excellent column to girder connection. The same principle holds true for the beam to girder connections with metal plates being embedded in top of the girders at the 9 ft. plus beam spacing.

The entire column, girder, beam system becomes permanently tied together as erection proceeds. The pipe clamps are a light erection tool that holds the girders in position while beams are being placed and the necessary welding of girder to column and beam to girder is being accomplished. The EBMUD specifications require Fleetweld #5 rod for these connections. It has been found that even where the metal to be welded is rusty, the rod burns right through to provide a good weld. Payne kept two Lincoln welding machines busy at the height of erection.

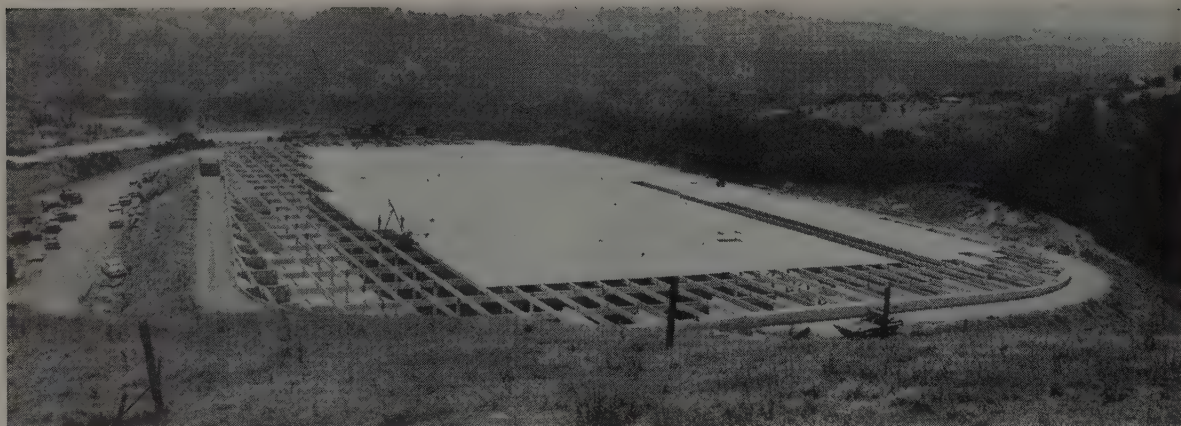
Track-mounted hoist design

The system used for roof panel erection is truly a novel one. Advantage has been taken of the uniform center to center spacing of the beams in the design of a "track-mounted hoist." It consists of a 20-ft.-long angle iron framework, 9 ft. wide, that



A-FRAME on front of hoist is held permanently in position by a pipe brace. Framework is about 20 ft. long to provide counterweight and to spread its 3,000-lb. weight.

rolls on flanged wheels riding on the beams. It has both forward and reverse motion that has as its power source an Ingersoll-Rand air tapping wrench geared down in the ratio of 25:1 with chains and sprockets for travel. About 300 ft. of hose connects it with a Le Roi air compressor. On this framework, a Plymouth car engine has also been mounted. It provides power for the drum hoist. From the drum, $\frac{1}{2}$ -in. cable passes over an A-frame mounted at the opposite end of the framework to complete all that is necessary for fast and efficient hoisting operations. The 20-ft. length of the framework spreads the 3,000-lb. weight of the hoist over a greater length of the beams it rides on and



THIS 19,000,000-gal. reservoir is 516 ft. long, by 312 ft. wide at the near side, and 216 ft. at the far end. Roof area is over 140,000 sq. ft.

with 7,241 roof panels being required that measure 2 ft. x 9 ft. 4½ in. The laying of 700 panels a day made short work of this big area.

decreases the possibility of its slipping off. The operator of this conglomeration of spare parts rides directly on the framework.

From truck to hoist

Placing of roof slabs from truck delivery to an in-place condition is as follows for the central and most inaccessible area of the reservoir. The slabs arrive in bundles of six weighing about 2,400 lb. From here they are picked up by the Lorain crane and placed on a skip that travels about 80 ft. up and down the outer inclined floor of the reservoir. Power for the skip is a cable passing through a sheave and to a pickup truck that makes a monotonous number of forward and backward trips on the floor of the reservoir. The skip having descended with a bundle of slabs, a Hyster forklift takes over and delivers the bundle to a location directly beneath the track-mounted hoist. Here a special lifting frame (called a tree) is used for placing the six slabs in a horizontal position for hoisting. The tree consists of two vertical steel beams, about 3 ft. apart, from which angle irons 2 ft. long project horizontally about every 8 in. vertically. This provides shelves onto which the slabs are loaded directly from the forklift. Two trees are actually used so that while one is being hoisted the other can be loaded.

Roof slab laying

The cable, from the track-mounted hoist overhead, is connected to a loaded tree. The tree is lifted vertically between the roof beams and turned 90 deg. to begin the slab laying process. As the tree is lowered, the lowest slab comes into contact with the two beams on which it is to rest. Not content with having the slabs almost in position, the Payne Co. has mounted two pusher bars onto the front of the track-mounted hoist. They serve to push the just-deposited

slab along the beams with forward motion of the hoist. Recesses in the outer bottom edges of the slab keep it in alignment as it is pushed tightly against earlier laid slabs. The hoist is backed off and the second lowest slab on the tree is deposited on the beams. The handling of this slab, and the remainder of them, is similar to the first.

Other projects

When the track-mounted hoist has worked its way along the length of the reservoir and to one end, it is picked up by the Lorain crane and deposited in the next bay. And there you have a terrific example of ingenuity on the job in solving what could have been otherwise an extremely difficult erecting job. On similar projects, a maximum of 389 units handled by crane and cart have been erected in 8 hr., while Payne has easily handled 700 in 7 hr. For passes of the hoist on beams near the perimeter of the reservoir, the trees are passed directly from the crane to the hoist at roof level without the necessity of lowering all slabs down to the reservoir floor first. The entire operation of roof slab erection requires relatively few men. Four ironworkers and a pusher, four laborers, four equipment operators, and necessary oilers are the total manpower lineup. It is interesting to note that this type of reservoir is the first of its kind in

the area where all the rigging and handling for the slabs is done by ironworkers.

There are several design features about this reservoir that are noteworthy. For one thing, the entire roof supporting system, including the slabs, is essentially rigid. Allowance for expansion and contraction is being taken up entirely where the beams and girders butt against the perimeter of the roof area. Here, vertical thrust walls have been built opposite the ends of beams and girders. Rubber bumpers, 4 in. thick, bolted to the thrust walls will absorb the anticipated expansion of the roofing system.

Another feature is the roof slab connection to the beams. There are embedded metal straps in each corner of each slab. At a point where four slab corners meet, a ¼-in. thick metal bar is welded to the projections. Tie wire, previously embedded in the precast beams at these points, is now tied over the metal bar. The above steps effectively hold the roof to the beams. Recesses in the roof slabs will be grouted to prevent infiltration of rain and dust into the reservoir.

Rod Harrison is job superintendent for Payne Construction Co. Personnel of the EBMUD organization connected with this project are R. C. Kennedy, chief engineer; J. W. Trahern, supervising civil engineer; and W. T. Worden and B. L. Soo, resident engineers on the job.

UNIT COSTS FOR PRECASTING AND ERECTING LELAND RESERVOIR ROOF MEMBERS

Item	Precasting Cost *	Erecting Cost **	Total No.
2x9-ft. slabs	\$ 9.34	\$ 2.00	7,241
Typical 9x18-in. x 24-ft. beams	61.16	22.00	620
Typical 11x24-in. x 24-ft. girders	102.38	23.00	222
Columns 22 ft. 6 in. and minus (l.f.)	2.62	23.00	161 (all col.)
Columns over 22 ft. 6 in. (l.f.)	2.71	23.00	

* P. Grassi-American Terrazzo Company
** Payne Construction Company

Lots of rock work at Monticello Dam

... is the feature this year — Here are pictures of 4,200 yd. shot off the abutment in one operation — Tunneling for spillway and diversion uses the "long hole" method

THE BIG THING this year at Monticello Dam has been rock work—on the right abutment, in the diversion tunnel, and along the relocated highway alignment. The high point was reached on July 19, when Kiewit and Parish set off a single blast that broke up 4,200 cu. yd. of rock overlying the site of the morning glory spillway. Pictures on these pages show what was done with 2,800 lb. of powder after three days of drilling and loading holes. A later shot, involving about 2,000 cu. yd., finished the site preparation so that spillway work could proceed.

With the tunnel work below, the spillway blasting above, and the highway grading alongside, the right abutment of Monticello Dam is a busy place this season. The simultaneous operations there also include removal of loose material by a slack line, abutment keyway excavation, and preparations for blasting out a bench for the contractor's trestle terminal and concreting facilities. Key man in the area for this work is George Keys, rock superintendent, assisted by C. M. "Bob" Grubbs, powder foreman. Following are some facts and figures from those men on the planning, preparation and execution of the big blast on July 19 for the beginning of the morning glory spillway.

Drill pattern

Most of the holes were vertical, set down according to pattern on about 4½-ft. centers. Also included were some slanted holes adjacent to the roadway in a fan pattern, spaced about 30 in. apart. Holes were drilled by two methods, jack hammers and wagon drills. The jack hammer holes were 1½ in. in diameter, averaging 11 ft. deep. Wagon drill holes were 2 in. in diameter, averaging 14 ft. in depth. The reason for the difference in drilling equipment and hole depth was the presence of a slip plane in the rock to be blasted. The area is essentially a rocky point, fairly flat on top. Well defined slip planes are present sloping down and into the abutment. If all the holes were drilled to a fixed bottom elevation, as if to blow off a flat surface, there would have been a good chance that the blast would have caused further unwanted fracture below grade along the slip plane. Therefore, the holes

closest to the roadway were drilled to a point a foot or two short of the desired bottom elevation. However, the gradual sloping of the rock projection in that portion up to the roadway elevation results in the holes averaging 3 ft. deeper.

Loading of the holes was computed at 2/3 lb. of powder per cubic yard of rock. Atlas 30% and 40% gelatin was used primarily. However, some 60% Hercules gelatin was also tried out on this work to determine if it would give better breakage. Fast delays, Nos. 1 through 6, were used, and the shot was judged a success. Look at

Job progress

Monticello Dam is a concrete arch structure on Putah Creek, at the west side of the Sacramento Valley in California. It is being built by a joint venture of Peter Kiewit Sons' Co. and Parish Bros. Construction Co. on a \$7,628,991 contract awarded by the Bureau of Reclamation. Although joint venturers in the work, Kiewit and Parish have split up performance of the work, Kiewit providing personnel and equipment for the dam itself, leaving the road relocation to Parish.

Work began in September 1953, with the new highway as the first order of business. Heavy grading is now virtually complete, and the contractor is spreading base course material and preparing to pave. The work has involved about 320,000 cu. yd. of earth moving, including about 110,000 cu. yd. of rock. In addition, an 8-span prestressed concrete bridge has been built across the creek immediately below the dam, and a temporary timber bridge has been constructed upstream to bring traffic back to the old highway there. (Eventually, all this old highway will be under water. Stolte, Inc., Gallagher & Burke, Inc., and Lee Stephens were low bidders at \$1,663,806 on an additional 10 mi. of new highway connecting the dam contractors work with existing roads outside the reservoir.)

Work on all major phases of the contract this season is aimed at getting both the state highway and the creek out of the dam site by this winter. Next season will see full scale work on the dam itself.





PHOTO PROFILES of rock knob above spillway site on right abutment show results obtained with a computed powder factor of 2/3 lb. per cu. yd. Breakage was good and the Northwest moved right in to clean things up for a final trimming shot.

Tunnel work at Monticello Dam—for getting the creek out of the way—is being handled on a subcontract to Gates & Fox. The spillway tunnel is now being driven from the downstream portal, the work from that end going as far as the vertical axis of the spillway. A temporary diversion tunnel, driven from upstream, connects to this work. It will be sealed off by a 60 ft. concrete plug when the work is finished.

Methods used by the tunnel contractor are worth note, as they involve two departures from conventional tunneling practice. One feature is the use of rock bolts, which this contractor has helped to pioneer in civil engineering tunnel construction. (Gates and Fox subcontracted the diversion tunnel at Keyhole Dam in Wyoming four years ago, using rock bolts there as illustrated and mentioned in **Western Construction's** two recent articles on bolting.)

The other feature of the work is the use of a pilot tunnel driven by conventional methods and then taken

out to full dimension by means of long hole drilling and shooting. In this case, the pilot hole is 14 ft. wide and 15 ft. high, with a roughly circular invert conforming to the final tunnel section. The tunnel stands unsupported for this width. Actually, the size is determined by the equipment used. The Eimco 105 mucker needs 14½ ft. of height to operate. The Koehring Dumpsters need the 14-ft. width for easy operation.

The pilot hole work has gone smoothly, with the following approximate cycle times: setup, 20 min.; drill, 1 hr. 15 min.; load and shoot, 30 min.; smoke, 15 min.; muck, 1 hr. 05 min.

Four drills are carried on a half-track jumbo of the contractor's own design, and about 52 holes are drilled for each round. A modified pyramid cut is used—really two V cuts, one above the other, the V patterns looking up and down at each other, respectively. Holes are drilled 9 ft. deep, and loaded with Atlas 40% gelatin with Nos. 1 through 10 slow delays. Each round pulls about 8 ft.

Rock yardage runs about 8 cu. yd. per ft.—between 65 and 70 yd. per round. The “Dumpy’s” haul about 5¼ yd. (loose measure) on each trip. Three of these units handle the muck hauling to a disposal area about 1,000 ft. away.

Late information, upon completion of the spillway pilot tunnel (510 ft.) reveals the following rate of advance: 18.2 ft. per 7-hr. shift. This reflects time for portal shots at the start.

Similar methods and equipment are being used for the diversion tunnel, which will have a final diameter of 23 ft. The spillway tunnel will be 33-ft. diameter circular section. To get this final section, long hole drilling will be done as follows.

Long hole drilling

At a distance of 70 ft. from the portal, the contractor will excavate a radial slot out to the “B” line, the slot measuring about 8 ft. along the tunnel axis. Then, using diamond drills, holes 1 7/16 in. diameter will be drilled on 5-ft. centers, parallel to the tunnel axis and about 2 in. outside the “A” line. These holes will be drilled successively in both directions—70 ft. back toward the portal, and 70 ft. into the tunnel.

Beyond this first slot, a distance of 140 ft., another slot will be excavated and holes drilled in a similar manner. When this work has been done throughout the length of the tunnel, the holes will be loaded and shot all at once. Experience on other work has convinced Gates & Fox of the worth of this method. It results in a very clean section, characteristically with very little overbreak.

With the tunnel blasted to full section, occasional support will be required. Before mucking begins, the tunnel crews will move in and install bolt support, taking advantage of the muck pile to do the necessary drilling high in the arch. The contractor contemplates using 1-in. bolts in lengths as necessary—they can be cut and welded to measure.

Spillway pilot raise

The work also includes excavation of the vertical portion of the spillway proper. This work will be done in several steps, commencing with the sinking of a 5-in. drill hole with a Hughes rotary bit. This hole will extend from the top of the spillway at el. 420 down about 180 ft.—to the system of raises discussed below and illustrated on these pages. The big blast on July 19 at the top of the spillway was in preparation for this drilling operation. A problem in drilling this long vertical hole will be keeping it on line.

When the 5-in. hole has been completed, a hoist will be erected above it and used to raise and lower the cage from which Gates & Fox will excavate a 7-ft. square raise from the tunnel to the top of the spillway.

Excavation to full section will then proceed from the top down, using jack hammers for drilling and, again, rock bolts as necessary for support. The system for separate manway and muck chute to be excavated just above the tunnel is illustrated in an accompanying drawing. Reasons for doing the major excavation from the top down are twofold: first, it allows the contractor to take advantage of gravity in disposing of the shot material. Secondly, it permits better control of the spillway cross section, which tapers from a 42-ft. diameter at the top to the 33-ft. diameter of the spillway tunnel below.

Rock bolts

Sidelights on the tunneling operation include the use of rock bolts already made by Gates & Fox to hold rock above the portal. Also, bolts were used to hold rock above the relocated highway in the vicinity of the right abutment. For these purposes, bolts were used in 6-, 9-, and 12-ft. lengths. The bolts are 1 in. in diameter, with slot and wedge anchorage. Altogether, about 500 ft. of bolts were used, installed with an Ingersoll-Rand air wrench and subjected to tests by the Bureau of Mines.

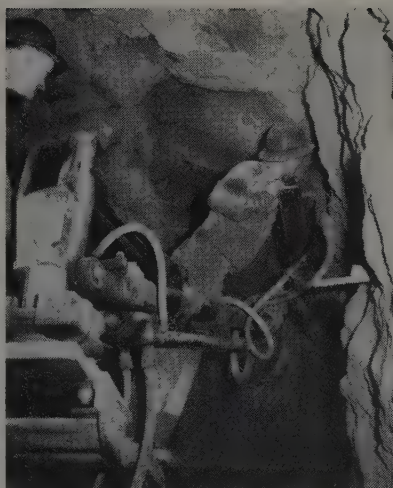
The use of gasoline and diesel engines in the Monticello diversion tunnel required the installation of scrubbers. The Dumpsters carried scrubbers of the contractor's own design — essentially composed of water and limestone. However the jumbo is another story, since it is powered by a gasoline engine. For this a new type of scrubber, especially designed for gasoline engine exhaust, was obtained. It is best defined by its use of a platinum catalyst. To the contractor's knowledge this scrubber has not been used in California before, and its performance is the subject of much interest to state safety authorities.

Personnel

Monticello Dam is a unit of the Solano Project of the Bureau of Reclamation. B. P. Bellport is construction engineer and J. R. Granger is resident engineer. Max R. Johnson is field engineer and H. E. Horton is chief inspector. Inspectors on various phases of the contract include J. M. Wagenet, D. D. Suggs, L. T. Stanley, and O. W. Burrow.

For Kiewit and Parish, the prime contractors, Walden Lowe is project manager, Doug Baker is superintendent on the dam, and Bill Madsen is superintendent on road construction. Other personnel on the job, in each of its two main phases, are drawn primarily from the respective firms of the joint venture.

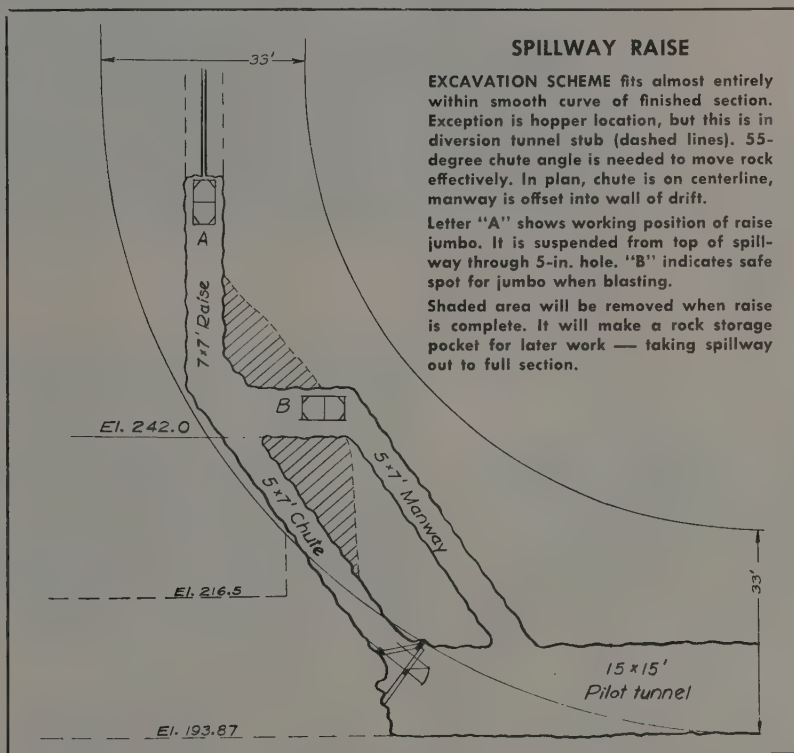
George Keys is rock superintendent, with two principal assistants, Herbert H. Boots on powder, and Roy E. Osborn. Ford Johnson is concrete superintendent, Sherm Watson is erection superintendent, A. C.



COLLARING a hole for the next round, drill crew wastes no time. Jumbo moves in and out on a fast cycle. Small pilot section, standing unsupported, speeds work.



NEW EIMCO makes quick work of muck, but small body size of Dumptor requires mucking in low gear. Otherwise, Eimco could nearly throw muck clear to the portal!



Hestmark is office engineer, and Richard J. Nosky is field engineer. Samuel Aldred is master mechanic. W. G. Lowe is office manager.

Key personnel under Madsen include: Vic Colburn, bridge foreman; Frank Dodd, rock foreman; Tom Stapleton, road foreman. Dave Rigby is office manager.

On temporary duty at Monticello during July and August is a Cedar Rapids Master Tandem portable crusher unit. It was brought in to process base coarse for the relocated highway. Dave Leland is crusher foreman. And this crusher is his

baby! He's been with it, moving from job to job, for two years. He knows it like the back of his hand, can knock it down and have it ready for the road in a little over a day. Likewise, he can set up and be in production in about three days.

The tunnel subcontractor, Gates & Fox, is represented on the job by Kirk Fox. Tunnel work is on a two shift basis under walkers Ed Hill and Chris Kuehn. Shifters are Jess Wilson and Hoyt Gaines. Master mechanic is Roy Shoemaker. Mrs. Hill (Guess who?) runs the job office for Gates & Fox.

Big radial gates for dams in Northwest



***Fabrication and erection of gates on spillways of Big Cliff and Dexter dams take special techniques—Structures are assembled and welded on the job—Then up goes each gate into place—
It's easy when you know how***

By **MARK M. CLAYTON**

Construction Engineer
Portland District
Corps of Engineers

IT WAS NOT until after the end of World War II, when the Corps of Engineers resumed its duties of building multiple purpose dams, that serious consideration was given to the use of large radial gates for spillway control. Fabrication methods and welding techniques, developed during the war, were then successfully applied to record-size radial gates.

The Portland District of the Corps of Engineers has designed five multiple purpose dams that utilize radial gates. The scope of this article will not permit a detailed description of all five designs, but for those readers who may be interested, a table elsewhere in this article lists the pertinent features of the gates for all five dams.

The spillways at Big Cliff and Dexter dams present most of the problems that can be expected in the design, fabrication, and erection of large radial gates. Fabrication and erection of the gates at Dexter Dam

In the old days

THE RADIAL or tainter gate is not exactly a new device. Many of the earlier dams used one arrangement or another of this type of gate for regulation of water flow. If distances between spillway wall or piers were small and water depths over the crest shallow, radial gates could be employed economically to obtain very close to ideal hydraulic conditions. In the earlier days of dam building, radial gates were just not used for spillway control where it was necessary to pass large quantities of water or where discharges were to be made from reservoirs having a large variation of water levels. In such cases, more complicated gates were employed or those with less desirable hydraulic characteristics were used. The techniques of design fabrication and erection of large radial gates had not yet been worked out.

was described briefly in *Western Construction* — August 1954, pp. 74-75.

Big Cliff is a reregulating structure located approximately 3 mi. below Detroit Dam on the North Santiam River in Oregon's Willamette basin. The power plant at Detroit Dam supplies daily peak demands to the Bonneville Power Administration network varying from nothing up to 100,000 kw. This produces water level fluctuations in the pool behind Big Cliff Dam that can amount to as much as 40 ft. To accommodate this variation in water level, and at the same time be able to pass full flow in case of necessity, the spillway is equipped with three radial gates, each having a width of 50 ft. and an effective height of 49 ft.

A contract was awarded by the Corps of Engineers to Gunderson Brothers Engineering Corp. of Portland, Ore., for fabrication and erection of the gates and hoisting equipment. Supplying and placement of the embedded metal seals and trunnion anchors was a part of the general contract for construction of the

(Continued on page 80)

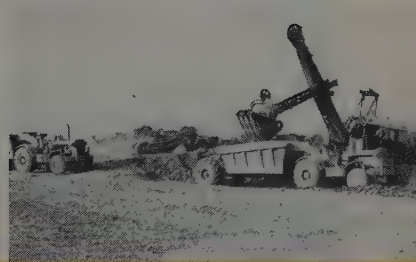
on the Ohio Turnpike Caterpillar



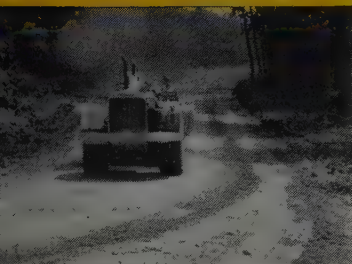
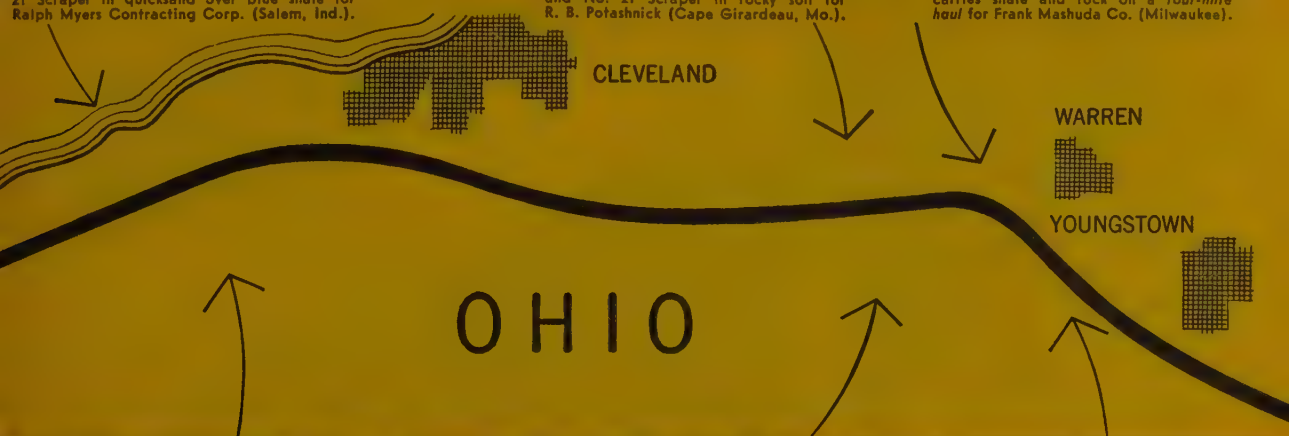
QUICKSAND! D8 push-loads DW21 and No. 21 Scraper in quicksand over blue shale for Ralph Myers Contracting Corp. (Salem, Ind.).



ROCK! D8s in tandem push-load DW21 and No. 21 Scraper in rocky soil for R. B. Potashnick (Cape Girardeau, Mo.).



LONG HAULS! DW20 with W20 Wagon carries shale and rock on a four-mile haul for Frank Mashuda Co. (Milwaukee).



HIGH-SPEED HAULING! The first DW21 ever built still does high-speed hauling for Nick Cenci & Sons (Columbus, Ohio).



CRUSHING! D8 loads portable gravel plant powered by D337 for W. J. Menefee Construction Co. (Sedalia, Mo.).



GUMBO! No. 90 Scraper, pulled and push-loaded by D8s, works in gumbo for Harrison Construction Co. (Pittsburgh).

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**WORLD'S NO. 1
ROAD BUILDER**



WHIRLEY CRANE on a steel trestle erects gate parts at Big Cliff Dam . . .

dam held by Consolidated Builders Inc. For production and installation of the hoisting equipment, Gunderson Brothers entered into a sub-contract with Monarch Forge and Machine Works of Portland. Erection, field welding, and painting of the gate structures was done by North Pacific Steel Erectors of Portland.

Specifications for the Gunderson Brothers contract required completely welded structures. The contractor elected to fabricate the gate leaves in three horizontal sections. To accomplish this, a special fixture or jig was constructed on which formed skin plate sections could be mounted and held in proper contour while the T-section ribs were welded in place. To fabricate the gate arms, another fixture was constructed on which the cast steel hubs were mounted with the bore in a vertical position. The rolled beams that form

the arm struts were fitted and welded to the hub castings at the proper angle.

Due to the large size of the parts and lack of facilities for supporting the structure, no shop assembly was made of the entire gates. The parts were shipped to the dam site by rail.

Before arrival of the gate parts, Consolidated Builders had completed all major work on the dam. This included placing and embedding of the six heavy anchor members that form the only attachment of the unusually large gates to the dam. Installing these 40-ft.-long anchors and holding them in perfect alignment during the embedding process required precision surveying and careful concrete pouring. Placement of the moon-beam-shaped metal side seals in the especially-provided blockouts presented no unusual problems. However, nearly perfect plumbness was

required to assure water tightness between the dam and the movable gates.

Upon arrival at rail head, immediately down stream from the dam, the bottom and intermediate leaf sections were hauled to the dam's roadway deck by truck and trailer. First the bottom and then the intermediate leaf sections were placed in the gate opening and held in approximately correct position by temporary guy lines. A whirley crane on a steel trestle, which had been used for pouring concrete during construction of the dam, was utilized for this operation. Next the trunnions and gate arms were set in place. Finally the top horizontal leaf section was positioned in approximate location and temporarily secured.

Final alignment

With the major component parts of the gate in temporary location, the final alignment was started. In order to assure vertical travel of these large gates without binding in the trunnion or hinge pins, the contract specifications required that a line passing through centers of the trunnion not deviate from the vertical or horizontal by more than 1/32 in. in 40 ft. The radius of the skin plate was required to be accurate within 1/8 in.

When the trunnions, gate, arms, and leaf sections were adjusted to meet the above stated tolerances, molten zinc was poured behind the trunnion castings and the anchoring bolts were tightened. Welders then completed welding the skin plates, T ribs, attachment of the arms to the backing girders, and finally the diagonal braces on the back side of the structure.

How they work

Simultaneously with the gate erection, the hoisting equipment was being installed on the deck of the dam. Each gate is controlled by two multiple-groove drums connected to a line shaft by reduction gears. The line shaft is driven by a motor and reduction gear unit. By means of a hand-operated jaw clutch, the line shaft for one gate can be connected to the drive unit of a neighboring gate, thus providing a greater degree of dependability. A dial indicator is provided for each gate, showing at a glance the extent of the opening below the gate. Limit switches prevent over travel and stop the hoists at predetermined intervals. In addition, revolution counters are permanently installed on the final drive pinion shafts for use in making small adjustments in gate openings.

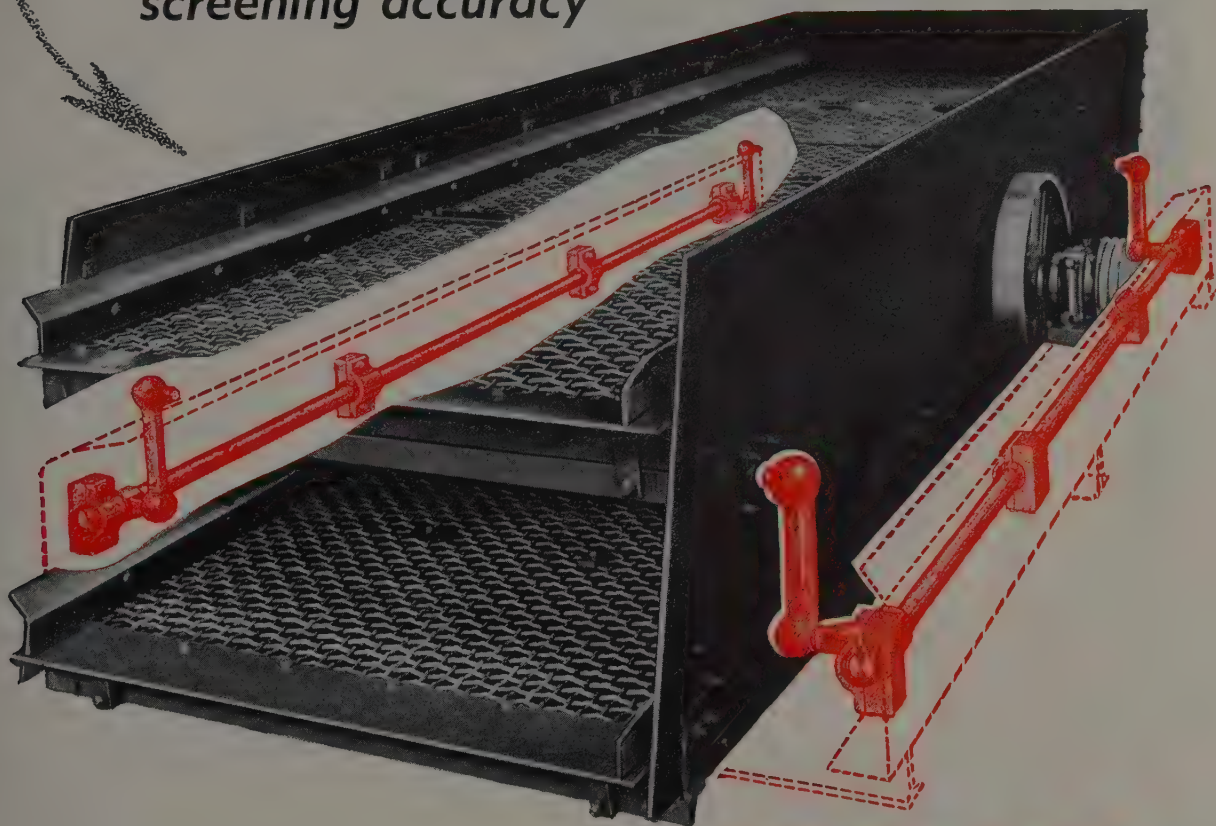
Connection between the hoist drums and the gate consist of four 3/8-in. steel core wire ropes at each end of each gate. Each rope has its own groove on the hoist drum. J-shaped rubber seals, attached by bolts to ends of the gates, press firmly against the embedded metal side



... HERE they are open, with water pouring over spillway in a test operation.

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GATE LEAF at Dexter Dam is hoisted to vertical position. Arms are in place.

seals. These seals provide a water tight joint between the gate and the dam. A flat rubber strip was installed on the bottom of the leaf to provide a seal when the gate is fully closed.

The power supply to one of the hoist units is inter-connected with the control system of Big Cliff powerhouse. This arrangement operates to raise this gate amount sufficient to restore flow in the river below the dam, should there be an emergency shutdown at the powerhouse. Protection of fish life in the river will be assured by this automatic equipment.

First reregulation in 1953

First operation of these gates started in the fall of 1953 to provide reregulation of the flow from Detroit Dam. Since the first week of June 1954, the dam and powerhouse have been in full operation. The gates have operated satisfactorily and have demonstrated that large radial gates of all-welded construction can be used for spillway control.

Dexter Dam is to operate as a reregulating structure in connection with Lookout Point Dam in the same manner as Big Cliff functions with Detroit Dam. This pair of dams is

located on the Middle Fork of the Willamette River, about 20 mi. southeast of Eugene.

Seven radial gates of essentially the same design and approximately the same size as those previously described are being installed at this dam. However, entirely different methods of fabrication and erection are being employed.

Part of general contract

In this case the supplying and installation of the gates was made a part of the general contract for the dam and powerhouse. This contract is being executed as a joint venture by McNutt Brothers of Eugene and C. J. Montag & Sons of Portland. Fabrication of the gates was subcontracted to the Willamette Iron & Steel Co. of Portland.

The contract specifications for these gates required that the leaves be fabricated in four vertical sections and that the entire structure be trial assembled in the fabrication shop. It was believed that the extra time spent in the shop would be more than offset by savings in the field during erection. This theory proved to be well founded.

At the Willamette Iron and Steel plant, a special cradle was constructed upon which to build the gates. The formed skin plates were placed on the cradle with the upstream side down. The T-ribs were then fitted in place and welded to the skin. Next the three horizontal girders were assembled to the ribs and the previously fabricated arms were set in place. This procedure permitted checking all of the specified tolerances before the gates left the shop. Shipment of the parts to the job site was by rail.

Duplicate cradle made

Before the leaf sections arrived at the site, a duplicate of the cradle used in the shop was constructed on the ground immediately upstream from the spillway portion of the dam. As the fabricated sections arrived, they were unloaded and placed on the cradle. When an entire gate leaf, including girders, had been assembled and checked, welding was completed. A second cradle was provided to support the leaf when it was turned over to complete the welding on the upstream face. Turning of the leaf was accomplished by a Model 4500 Manitowoc crawler crane.

Perhaps the most interesting part of the entire operation was the unique method used to set the completed gate leaves in place. First the gate arms and trunnions were assembled in proper location. The upstream ends of the arms were hung on chain blocks, supported by a temporary beam placed across the gate opening at roadway level. When the gate arms were properly adjusted, the assembled leaf was lifted from the cradle and placed on the ground in front of the gate opening with the skin side down. The hoist line from the Manitowoc crane was attached by bridled slings to the top horizontal girder. A line from the auxiliary hoist was run under the gate and attached to the bottom edge of the leaf. When all was ready, it was only a matter of minutes to lift the leaf, roll it to an upright position, and set it in place ready for connection to the arms. Other details, such as seals, hoists, and interlocking controls, are so similar to those at Big Cliff that they need not be mentioned here.

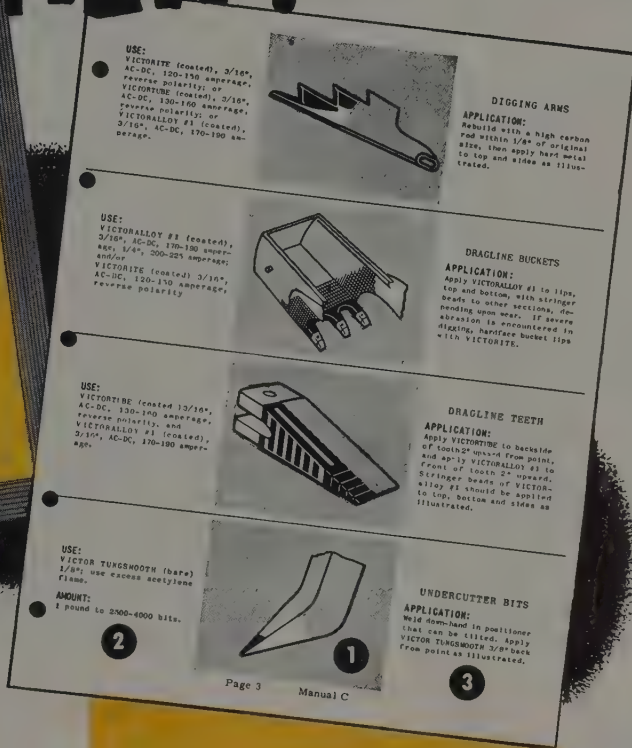
Shop welding advisable

The erection operation at Dexter Dam clearly demonstrated the advisability of complete shop assembly and the practice of completing the field welding of gate leaves before they are set in place. It is now planned to finish all welding of the 23 gate leaves for The Dalles Dam at the shop in Portland and transport them approximately 100 mi. by barge to the dam site. This operation should speed up materially the placing of these gates and eliminate the need for use of erection space in an already congested construction area.

DAM	NO	WIDTH	DEPTH	FABRICATOR
DETROIT	5	42'	32'-6"	WILLAMETTE IRON & STEEL CO.
BIG CLIFF	3	50'	49'-0"	GUNDERSON BROS. ENG. CORP.
LOOKOUT POINT	5	42'	44'-9"	BERKLEY STEEL CONST. CO.
DEXTER	7	50'	40'-6"	WILLAMETTE IRON & STEEL CO.
THE DALLES	23	50'	44'-4"	WILLAMETTE IRON & STEEL CO.

TABLE I. RADIAL GATES AT DAMS UNDER CONSTRUCTION BY THE PORTLAND DISTRICT U.S. CORPS OF ENGINEERS

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REPORTS from the COURTS

By HOWARD S. BURNSIDE, Attorney and Registered Engineer

Effect of posting non-liability notice

AT SILVER CITY, New Mex., an owner, after several starts and stops had been made on a construction job, posted a statutory notice of non-liability and informed the lumber company furnishing lumber that he would not be responsible thereafter for any materials delivered to the contractors. He informed the lumber company that they would have to look to the contractors for payment. The job proceeded, lumber was furnished, the contractors failed to pay for it and the lumber company filed suit seeking to foreclose a lien for materials under the mechanics lien laws of New Mexico. The owner's response in effect was that he had protected himself against the lien by his notices.

The issue then was whether an owner may, by posting a notice of non-liability as provided by statute, escape the provisions of the mechanics lien laws and prevent their application by a materialman. The trial court, answering this in the affirmative, held in favor of the owner. The Supreme Court of New Mexico reversed this decision and ordered judgment entered in favor of the lumber company.¹

A number of the Western states include provisions for posting a notice of non-liability but, with the possible exception of Oregon, these statutes are interpreted to mean that an owner who authorizes construction work directly or indirectly by himself or through an agent cannot use the posting statute to avoid a mechanic's or materialman's lien from attaching. The purpose of the posting statutes generally is to protect the owner's property from such liens if some person like a tenant or lessee contracts for work or materials without the owner's knowledge and authority. Thus it behooves persons furnishing work and materials to determine that they are dealing with the owner of property or an authorized agent if they expect to use the lien laws as to the property.

On the other hand, if one is dealing with a lessee of property and not the owner it is possible to apply the mechanics lien to the leasehold interest as distinguished from the property itself. A lease of property, particularly a commercial property, does

have a value in and of itself. It may seem an abstract proposition, but the right to possess property and pay rent for it may be a very valuable right as in the case of a successful hotel operation. In *Archibald v. Iacopi*,² the paving of an auto court was involved. The California court held that the contractor for work and materials could have his lien attached to the leasehold. The owners were dismissed from this action.

1. *Skidmore v. Eby* 260 P. 2d 370 (New Mex.)
2. *Archibald v. Iacopi* 120 CA. 2d 666 (Calif.)

Damages for wrongful termination of contract

IN *KELLY v. VALLEY* Construction Company,¹ a tunnel subcontractor sued the general contractor for loss of profit on his subcontract to complete a sewer tunnel at Spokane, Wash. He obtained a judgment which was affirmed on appeal.

The general contractor had started the tunnel and had proceeded as far as the first vertical air shaft and station at the base of the shaft when the contract was made. The subcontractor's witnesses testified that the first shaft was off line, that the portal was too small to admit the tunnel shield which was to be jacked forward as the method of "boring," and that the general contractor did not furnish hydraulic jacks and timbers as required by the contract.

The shield was taken down the shaft in four sections and sprung to full width at the head of the tunnel, then bolted together. There was a dispute as to just how complete was the preparation of the shield in place when 14 days after the subcontractor started he was given a notice of termination by the general contractor. A period of 200 days had been set as the time for completion. The reasons given by the general contractor for terminating the contract were that no progress had been made and the job was not being done in a workmanlike manner.

The subcontractor then filed suit and recovered a judgment for \$28,000. The finding of the trial court was that the subcontractor was not afforded a fair opportunity to proceed with the tunnel work and the general contractor acted prematurely in terminating the contract. In so doing, the general

contractor committed a breach of contract for which the subcontractor was entitled to recover his loss of prospective profits.

1. *Kelly v. Valley Constr. Co.* 262 P. 2d 970 (Wash.)

Voluntary support of adjacent building not reimbursable

IF A BUILDING owner is required to protect his own foundation and structure from an excavation next door and fails to do so, one might expect he would be compelled to reimburse the excavator who took steps to shore up the structure. But this is not so.

A California statute¹ states that a person who excavates less than a depth of 12 ft. must notify an adjacent property owner who will then have a reasonable time to protect his building or extend the foundation. In brief, the owner of the building is responsible for supporting his structure. The statute does not say, however, that he is obliged to do so therefore the building owner has the choice of doing nothing.

This is exactly what the owner of an adjacent building did in the case of *Cornet Stores v. Security Trust and Savings Bank*.² The plaintiff gave notice to defendant that he would excavate for a basement and that certain work was necessary to prevent defendant's building from falling and injuring persons and property. Defendant did nothing. The plaintiff then made the excavation and constructed a concrete wall on the property line at a cost of \$4,153. When this sum was demanded from the defendant payment was refused and a trial followed. In the trial court judgment was rendered for the defendant and the plaintiff-excavator appealed, but to no avail.

The opinion of the appellate court followed what is called the majority rule in the United States and quoted from an Illinois case. "If the owner of adjacent improved property does not see fit to protect himself and injury is sustained by him by reason of an excavation which is done with all reasonable care and skill, then he cannot recover, but the other person has no right to compel him to shore his own property. The one making the improvement has a common-law right to go upon the premises of the other for the purpose of shoring such building in order to protect property, when it is necessary, to prevent damage by reason of an excavation, but this is done at his own expense and cost." The judgment for the defendant was affirmed.

1. 337 Calif. Civil Code.
2. *Cornet Stores v. Security Tr. & Sav. Bank* 262 P. 2d 77.



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ARIZONA

\$8,000,000 FOR SCHOOLS—A survey team from the University of Southern California has recommended submission of an \$8,000,000 bond issue to the voters for approval of new high school construction. Included in the 5-yr. building plan is the acquisition of five new 40-ac. sites and expansion of six existing schools to accommodate more students.

PHOENIX SEWERS—The Chamber of Commerce has endorsed a plan to expand sewerage service in the north and east of Phoenix. The plan calls for the city to issue \$4,500,000 in bonds to pay for construction. An additional \$1,500,000 would be raised by assessing residents in sewer districts outside the city limits.

RECENT MAJOR CONTRACT AWARDS and low bids in Arizona include a low bid of \$171,200 submitted by **Copper State Construction Co.** of Mesa for 3 mi. of grading and surfacing in South Grand Canyon National Park. **Fisher Contracting Co.** of Phoenix submitted a low bid of \$155,955 for 3.3 mi. of grading and base course on Rte. 2 in Coconino County. **Morrison-Knudsen Co., Inc.**, of Los Angeles submitted a low bid of \$1,168,977 for earthwork, concrete lining and structures on the Welton-Mohawk Division of the Gila project.

CALIFORNIA

TECOLOTE TUNNEL NEWS—Drilling has again been resumed in the Bureau of Reclamation's Tecolote Tunnel (*Western Construction*—August 1954, pp. 59-62 and 128) after having been halted for a few weeks by a water flow which reached 10,000,000 gal. a day. E. R. Crocker, manager of the Cachuma Project, said that the USBR has not revised the September 1955 completion date. At last report, there was 4,148 ft. left to go before holing through.

SANTA FELICIA DAM—Good progress on excavation for the 200-ft.-wide by 70-80-ft.-deep trench which is to receive the central impervious core of Santa Felicia Dam on Piru Creek in Ventura County has been reported by the contractors, a joint venture composed of D & H

Construction Co., Macco Corp., and M. H. Hasler Construction Co. of Sacramento, who were awarded a \$3,534,826 contract to build the dam. (*Western Construction*—August 1954, p. 90; June 1954, pp. 166-167; May 1954, p. 80; February 1954, p. 67.) The trench was 95% complete when this report was received. The only unexpected condition encountered so far is that the streambed materials are more watertight than anticipated, resulting in a reduced volume of pumping needed to clear the excavation.

STEEL FRAMEWORK of the \$7,000,000, 6-story office building of the State Department of Employment is being erected in Sacramento. It will cover 490,000 sq. ft. of floor space. **George A. Fuller Co.** of Los Angeles has the general contract. Steel fabrication and erection are being done by **Bethlehem Pacific Coast Steel Corp.** under the supervision of

Jack Skei. Completion date for the building has been set in December 1955.

COMPLETION of a 2.3-mi. grading and paving with plant-mix surfacing on untreated rock base road job near Lone has been reported by Jack Corbett, superintendent for C. V. Kenworthy. His major equipment on the job was all Caterpillar. It included two 15-yd. WD10's for hauling dirt; five D8's for ripping, dozing and pulling scrapers; two No. 60 scrapers; and a No. 12 motor grader.

BULGING SCHOOLS in California will have some of the pressure taken off by 1956, according to recent news items. A construction contract for the new \$5,000,000 Gardena High School in Los Angeles was expected to be awarded before this issue of *Western Construction* goes to press. H. L. Gregory, board of education architect, says the building will

Contractors push three big C. of E. jobs

THREE MAJOR PROJECTS in Southern California are being directed by the Los Angeles District, Corps of Engineers. The Upper Los Angeles River Improvement job from Sepulveda Dam to Reseda Blvd. is 18% complete. **McDonald & Kruse** have 102 men on this \$3,085,745 job, scheduled for completion March 1, 1955. The Lower Los Angeles River job (units 2 and 3) from 20th st. to

Ocean in Long Beach is 17% complete. **Guy F. Atkinson Co.** holds a \$1,562,650 contract, scheduled for completion June 30, 1955. The west embankment and outlet works of the Whittier Narrows Project is 8% complete. **A. Teichart & Sons, Inc.**, and **M. J. Bevanda** have 63 men working on this \$3,087,946 contract, which is scheduled for completion on December 15, 1955.



Looking upstream along the Lower Los Angeles River. Channel and levee improvement operations on left bank. Toe trench is being excavated to receive toe rock, shown stockpiled in foreground of picture.

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REINFORCING STEEL FOR FOLSOM DAM STILLING BASIN

Workmen place steel reinforcing bars for one of several sections of the stilling basin retaining wall footing at Folsom Dam across the American River. Area shown is 65 ft. wide, 50 ft. long. Bethlehem Pacific furnished the steel. Merritt-Chapman & Scott Corp. and Savin Construction Corp. hold \$65,000,000 contract.

be erected by the tilt-up method. Meanwhile, trustees of the Lodi Union High School have obtained a 52-ac. site for construction of a \$2,300,000 school building and have instructed Clifford Gatzert, Lodi civil engineer, to survey the tract.

ON JULY 15 this year, the first known erection failure of a lift slab building occurred at San Mateo, Calif. On July 28, the following press release statement was issued by the Vagtborg Lift-Slab Corp.:

"John P. Hall, President of United States Lift-Slab Corp. announced today that Vagtborg Lift-Slab Corp., West Coast Licensee, has been ordered to remove the fallen lift slab at Serra High School. Further work on the lift slab portion of the project will be delayed until the Archdiocese of San Francisco, owners of the project, receive an engineer's report on the adequacy of the structural design. Kaj Theill, San Francisco Structural Engineer, is making the engineering study. Neither United States Lift-Slab Corp. nor the General Contractor has come to a definite conclusion pending the Engineer's final analysis."

The slab being lifted measured 65 x 70 ft. and weighed about 300 tons. It was to be supported on twelve 6-in. diameter pipe columns. Shortly before the slab was raised to the full 16-ft. height, it was found to be out of plumb about 3 in. Efforts to straighten it apparently resulted in its falling in the opposite direction—with eight persons who were atop the slab at the time being injured. For

this project, Vincent G. Raney is architect and Swinerton & Walberg Co., the general contractor.

SEA WATER EVAPORATORS

will be installed at the Morro Bay steam plant of Pacific Gas and Electric Co. to provide fresh water for boiler operations. Two sets of evaporators will be used, each capable of producing 72,000 gal. per day. First of the \$44,000,000 plant's two 150,000-kw. generators will go on the line in 1955. Other PG & E news includes a report that construction will start soon on the Humboldt Bay steam plant, which will go up on a 141-ac. site near Eureka. The plant, to cost \$8,500,000, will have a 50,000-kw. generator.

HIGHEST CONSTRUCTION

PEAK in 15 months was reached in Los Angeles in June, according to G. E. Morris, general manager of the Building and Safety Department. He reported that almost 5,700 permits, totaling more than \$43,169,000, were issued for the month. This total is almost \$9,000,000 more than were issued in 1953.

RECENT MAJOR CONTRACT

AWARDS and low bids in California include a low bid of \$1,321,240 by the Guy F. Atkinson Co. for 2.4 mi. of grading and paving near Fresno. Baker & Pollock of Ventura submitted a low bid of \$298,349 for 2.4 mi. of widening and surfacing in Santa Barbara County. Brown-Ely Co. and W. H. Darrough & Sons of El Cerrito submitted a low bid of \$524,306 for 5.3 mi. of grading and

surfacing near Yuba City. Baun Construction Co. of Fresno submitted a low bid of \$434,464 for 16.6 mi. of widening and surfacing in Colusa and Glenn counties. W. Case Corp. of Newhall received a \$1,502,156 award for water feeder and lateral work in Los Angeles. Cox Bros. Construction Co. of Stanton submitted a low bid of \$231,934 for 2.9 mi. of grading and surfacing on La Habra road in Orange and Los Angeles counties. Einer Bros., Inc., and Marsch Construction Co. of Escondido submitted a low bid of \$288,577 for 1.6 mi. of grading and surfacing in San Diego County.

Fredrickson & Watson Construction Co. of Oakland received a \$1,655,392 award for 6 mi. grading, surfacing, and five bridges in Ventura County. Granite Construction Co. of Watsonville submitted a low bid of \$249,243 for 1.6 mi. grading and surfacing near Gilroy. Griffith Company of Los Angeles submitted three low bids as follows: \$3,338,857 for 3.3 mi. of freeway between Durfee Ave. and east of Puente Ave. in Los Angeles County; \$404,641 for 5.7 mi. of grading and surfacing in Kern County; \$175,682 for construction of a concrete box girder bridge and ramps in San Diego County. Groom-Moyers Co. of Hayward, (owner-builder) will build a \$6,500,000 home subdivision at Richmond. Charles L. Harney, Inc., of San Francisco submitted a low bid of \$197,453 for grading and paving near the Yerba Buena Island Tunnel. George Herz & Co. of Los Angeles submitted a low bid of \$159,571 for 2.3 mi. of grading and surfacing near San Bernardino, and one of \$333,708 for 7.4 mi. of grading and surfacing on SR 19 in Riverside County.

The Lowrie Paving Co., Inc., of San Francisco submitted a low bid of \$265,531 for 0.5 mi. of widening and surfacing on the Golden Gate Bridge approach, San Francisco County. **M. S. Mecham & Sons** of Los Angeles submitted a low bid of \$846,263 for 4.7 mi. of grading and surfacing on the Pacific Coast highway in Los Angeles County. **Oberg Bros. Construction Co.** of Inglewood submitted a low bid of \$1,877,819 for construction of various bridges and undercrossings on the Santa Ana Freeway in Los Angeles. **Pittsburgh-Des Moines Steel Co.** of Pennsylvania received a \$4,000,000 award to design and construct a wind tunnel at the International Airport for North American Aviation Inc. **Gene Richards, Inc.**, of Fresno submitted a low bid of \$561,699 for 5 mi. of grading and paving and two bridges near Los Banos. **Stewart & Nuss, Inc.**, of Fresno submitted a low bid of \$169,026 for 10.2 mi. of surfacing in Madera County.

Stolte, Inc., **Gallagher & Burke, Inc.**, and **Lee Stephens** of San Leandro submitted a low bid of \$1,758,511 for relocation work on SR 6 near the Monticello Dam in Solano County.

Proving its mettle

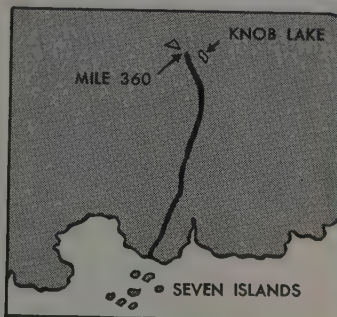
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GM DIESEL
CASE HISTORY No. 53-233

USER: Iron Ore Company of Canada

INSTALLATION: 12 GM Diesel-powered 34-ton Euclid IFFD trucks and 5 Allis-Chalmers HD-20 tractors used to strip and haul at Knob Lake. Part of a fleet of more than 200 GM Diesel engines powering all types of equipment for I.O.C.

PERFORMANCE: "They're doing a wonderful job," said Master Mechanic "Jock" Marshall. "Equipment takes a real licking up here, and GM Diesels stand up under it."



More than 200 GM Diesel Engines on vast Ungava Project

Up at "the Knob," 360 miles above Seven Islands terminal, the Iron Ore Company of Canada relies on General Motors Diesel-powered equipment—just as it has in construction of railroad, dams and facilities all along the line.

The big double-engine "Euc" and HD-20 shown above are benching access road to the rich Ruth Lake #3 deposit, first in the area to be opened for mining. They are part of a GM Diesel-powered fleet that proved its mettle by "walking" to the end of the line under its own power—a 250-mile trek over frozen tundra in blizzards and temperatures that reached 40° below zero.

These quicker-starting, faster-accelerating 2-cycle Diesels have been delivering trouble-free performance on double-shift, 20-hour-a-day schedules ever since they arrived—a tribute to both their rugged stamina and I.O.C.'s excellent preventative maintenance program.

Whatever your need for power—in trucks, tractors, air compressors, cranes, shovels—why not learn firsthand how much more profitably and dependably this versatile GM 2-cycle Diesel can deliver it? There is a GM Diesel distributor near you who will gladly give you all the facts—and you can count on him for prompt, efficient parts supply and service wherever you are.

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A. Teichert & Son, Inc., of Sacramento submitted two low bids as follows: \$1,821,227 for 4.7 mi. of grading, surfacing, and six bridges in San Joaquin County; \$281,865 for 1.3 mi. of widening and surfacing near Sacramento.

Ford J. Twaits Co. of Los Angeles submitted a low bid of \$1,250,000 for construction of a chemistry-biology building at Pasadena for the California Institute of Technology. **Vinnell Company, Inc.**, of Alhambra submitted a low bid of \$3,077,969 for 2.8 mi. of grading, paving and bridges in Los Angeles. **Webb & White** of Los Angeles submitted two low bids of \$1,134,790 and \$687,879 for 0.5 mi. of grading and surfacing and various bridges in Los Angeles. **Western Projects Corp.** of Los Angeles intends to construct a \$1,188,000 subdivision in East Whittier. **Clyde W. Wood & Johnson Western Constructors** of North Hollywood submitted a low bid of \$712,900 for a concrete overlay floor on Dry Dock No. 1 at Long Beach Naval Shipyard. **E. L. Yeager Co.** of Riverside submitted a low bid of \$414,126 for 11 mi. of realignment and surfacing in Riverside County.

COLORADO

\$125,000,000 VILLAGE—Construction has started on an 8,000-home housing project near the Denver Federal Center by Westcraft Homes. It will be a planned community, with churches, stores, schools, playgrounds, and other facilities for a population of 25,000, according to Olle S. Forsberg, head of the firm doing the planning and building.

BOULDER CREEK DAM 22—Concrete pouring has been resumed at Dam 22, the Denver water system's newest project at Boulder Creek, following a month-long strike of construction men. About 205,000 cu. yd. (1/3) of the structure remains to be poured, according to Earl Mosley, secretary-manager of the water board.

COLLEGE EXPANSION—Colorado A and M College has started a \$15,000,000 expansion program to accommodate an expected doubling of the student body by 1970. Plans include construction of two new dormitories and relocation of the stadium and athletic plant.

RECENT MAJOR CONTRACT AWARDS and low bids in Colorado include a low bid of \$324,000 submitted by **Inland Construction Co.** of Cheyenne for 20.7 mi. of grading and surfacing on the Willow Creek Pass road. **Burks and Company** of Denver submitted a low bid of \$174,271 for construction of earthwork and struc-

tures on the Boulder Creek Supply Canal of the Big Thompson Project. **S. Birch & Sons Construction Co.** of Great Falls submitted a low bid of \$266,000 for 4.4 mi. of grading and surfacing in Teton and Lincoln counties. **Reed & Jensen** of Salt Lake City submitted a low bid of \$151,000 for 2.2 mi. of grading and surfacing in Summit and Duchesne counties. **Hinman Bros. Construction Co.** of Denver submitted a low bid of \$292,000 for 3.6 mi. of grading and surfacing in Mesa County.

IDAHO

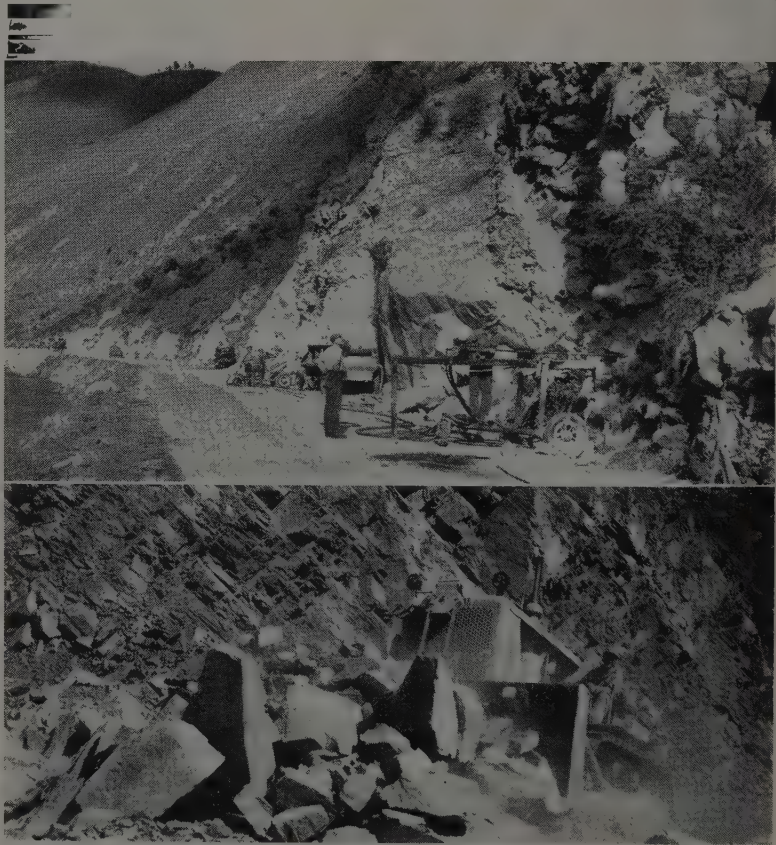
Historic relics found on road revision job

GOLD RUSH RELICS—Relics of gold rush days along the Salmon River in the 80's and 90's are being found by construction crews working on revision of U. S. 95 north of Riggins. They have to be careful not to fall into some of the many mine shafts built during that period. This route is the only highway running north and south through central Idaho. The original road was built in the 20's to replace a wagon road.

The particular part of U. S. 95 being worked on now is a 6.77-mi. section between Riggins and Lucile, which is being widened and relocated under a \$620,000 contract held by Frank G. Baulne of Spokane, Wash. The actual job is being done by Goetz & Brennan of Seattle, however, under the supervision of J. A. Brennan. The job involves moving 466,000 cu. yd. of unclassified material to provide a finished roadway width of 34 ft. Construction of 34 culverts is included.

Goetz & Brennan personnel include W. M. Wilson, grading superintendent; A. W. Sparks, Carl LeMay, and Frank Stevens, foreman; and Paul Poncie, mechanic. Surveyors for the State of Idaho include Don Aldrich, party chief, and Ben Wilcox, assistant party chief. Harding Blasting Co. of Portland, Ore., has the drilling and blasting sub-contract.

SNAG ON CLEARWATER—The Corps of Engineers' plan for getting authorization from Congress to build Bruce Eddy and Penny Cliffs dams on the Clearwater River (**Western Construction**—June 1954, pp. 108-110; March 1954, p. 76) has run into opposition from Holland Huston, power advisor to the governor of Washington, according to Brig. Gen. E. C. Itschner, assistant chief of the Corps of Engineers. This makes it



Wagon drill used to prepare rock for blasting (upper picture) on U. S. 95. After the shot (lower picture) Cat D8 dozes blasted rock out of the way.

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EUGENE, Oregon.....Loggers & Contractors Machinery Co., 540 Filmore Street
PORTLAND 14, Oregon.....Loggers & Contractors Mach. Co., 240 S.E. Clay Street
SALT LAKE CITY, Utah.....Western Machinery Company, 2300 South Main Street
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SEATTLE 4, Washington.....Glenn Carrington & Co., 91 Columbia Street
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unlikely that Congress will be asked to act on the project this year.

RECENT MAJOR CONTRACT AWARDS and low bids in Idaho include a \$196,085 award to **Peter Kiewit Sons' Co.** of Idaho Falls for 5.8 mi. of grading and surfacing on US 191 in Fremont County. **Richard Beshey** of Parma received a \$226,051 award for 11.9 mi. of grading and surfacing in Owyhee County. **Jack B. Parson Construction Co.** of Smithfield submitted a low bid of \$431,881 for 4.9 mi. of grading and surfacing on US 26 in Bingham County. **Intermountain Co.** of Boise submitted a low bid of \$154,675 for earthwork and reservoir structures for the Avondale Irrigation Project. **Pickett & Nelson** of Idaho Falls submitted a low bid of \$468,952 for 9.6 mi. of grading and surfacing in Bonneville County. **Gem Construction Co.** of Wendall received a \$226,432 award for 8.1 mi. of roadway construction in Camas County.

Hansen & Parr Construction Co. of Spokane received a \$325,732 award for 1 mi. of grading and surfacing on US 30 from Burley to Heyburn. **Marion J. Hess** of Malad City received a \$611,710 award for 7.2 mi. of roadway construction on US 191 in Oneida County. **Morrison-Knudsen Co., Inc.**, of Boise received a \$280,031 award for 6.6 mi. of surfacing in Valley County. **Reed & Jensen** of Salt Lake City submitted a low bid of \$190,000 for 4.3 mi. of grading and surfacing in Uintah County. **Thorn & Marble** of Seattle received a \$986,203 award for construction of bulk storage facilities and hydrant refueling system at Mountain Home AFB.

MONTANA

MISSOULA OIL TERMINAL—A \$250,000 Carter Oil Co. terminal at Missoula along the Billings to Spokane Yellowstone oil pipe line was scheduled to be finished and placed in operation by the time this appears in print. The terminal contains five storage tanks with a combined capacity of 95,000 bbl.

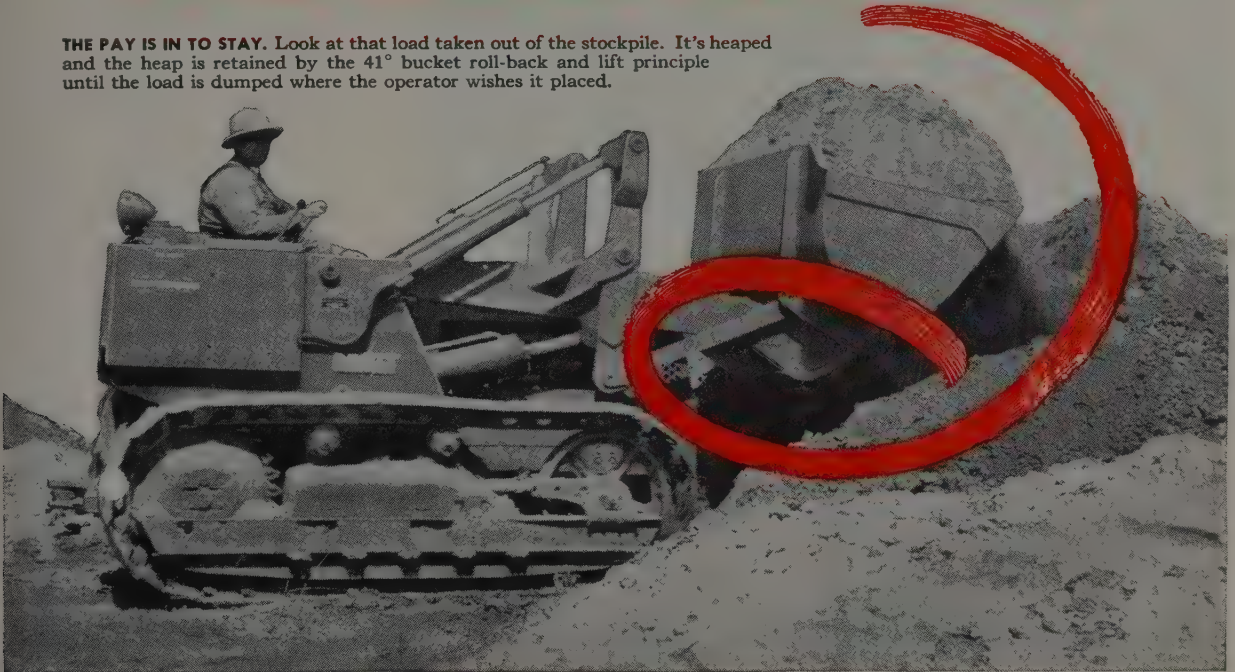
PUBLIC ROADS MONEY—Montana stands to get almost \$13,532,000 in federal aid highway funds six months ahead of the Congressional time limit in the Federal Highway Act of 1954, according to Karl Chamberlain, district engineer for the Bureau of Public Roads. These funds will amount to 57% of the cost of primary, secondary, and urban roads. For the interstate system, which amounts to about 1,200 mi. in Montana, federal aid funds will add up 67% of the cost. The other third will come from state, county, or local matching funds.

RECENT MAJOR CONTRACT AWARDS and low bids in Montana

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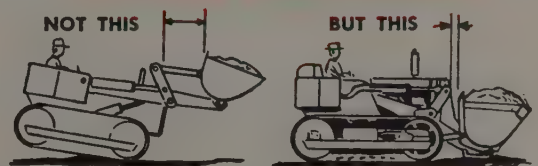
Skid Shovels come in four sizes— $\frac{7}{8}$, $1\frac{1}{4}$, 2 and 3 cu. yd. buckets for the INTERNATIONAL TD-6, TD-9, TD-14A and TD-18A. You can get an eye-opening demonstration of the model suited to your needs by simply calling your INTERNATIONAL Industrial Power Distributor today.

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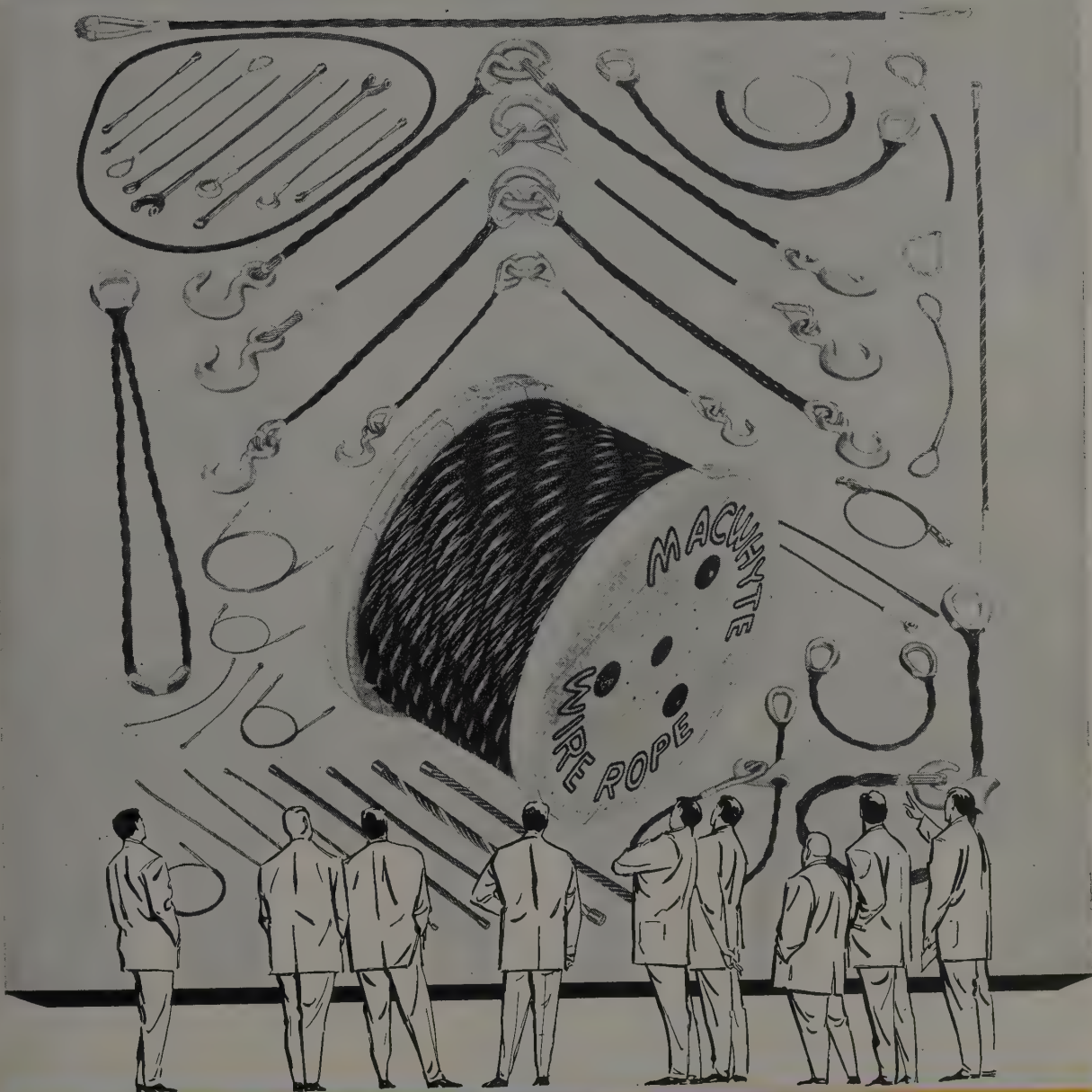
include a \$352,079 award to the **Hilde Construction Co., Inc.**, of Great Falls for 12 mi. of grading and surfacing on the Townsend-Canyon Ferry road. **Norgaard & Hilling** of Williston, North Dakota, received a \$160,044 award for 6.6 mi. of grading and surfacing in Sheridan County. **Robertson & Cave, Inc.**, of Great Falls received a \$161,396 award for 1.7 mi. of grading and surfacing in Cascade County. **Sundling Construction Co.** of Livingston received a \$196,159 award for 7.3 mi. of grading and surfacing in Sweet Grass County.

NEVADA

WASHOE PROJECT—The Senate Public Works Committee has approved a bill authorizing \$960,000 in flood control construction on Lake Tahoe and the Truckee River, but the rest of the Washoe Project, sponsored by Senator Pat McCarran, has been left out of the omnibus flood control bill, recently passed by the House of Representatives, because of jurisdictional objections raised by a Congressman. The Senator hopes to add the \$43,230,000 project to the bill when it reaches the Senate. The project would include Stampede Reservoir, a 126,000 acre-foot reservoir on the Little Truckee River, a 5½-mi. tunnel to the 20,000-kw. Cal-Vada power plant on the Truckee River, and a re-regulating reservoir below the plant. In the Carson River basin would be Watasheamu Reservoir, forming a 115,000 acre-foot pool in the river's east fork, an 8,000-kw. power plant, and Dressler re-regulating dam.

NEW HOT-MIX RECORD—Silver State Construction Co. mixed and spread 32,000 tons of hot-mix asphaltic concrete in 15 days, working one 10-hr. shift per day, according to A. D. Drumm, Jr., of Silver State. This, he believes, is a new record in working with a single plant. The usual bottleneck in turning out material is the limited heating and drying capacity of the plant, he explained. This problem was licked by doubling the normal size of the plant's blower and mixer. "We... believe it is the highest portable producer in the country," Drumm said. The job is a 10-mi. stretch of U. S. 95 south from Fallon. The \$722,000 contract includes subgrade, surfacing, structures, and moving irrigation ditches and drainage canals. The job was due for completion by August 1, two months ahead of schedule.

RECENT MAJOR CONTRACT AWARDS and low bids in Nevada include a \$497,565 award to **W. W. Clyde & Co.** for 12 mi. of grading and surfacing near Robinson's Summit in White Pine County. **Dinwiddie Con-**



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struction Co. of San Francisco submitted a low bid of \$1,091,323 for construction of a hangar and warehouse for Hubbard AFB in Reno. **Hoops Construction Co.** of Twin Falls received a \$215,917 award for 10 mi. of roadway construction in Eureka County. **Silver State Construction Co.** of Fallon received a \$183,408 award for 12.4 mi. of grading and surfacing in Churchill County, and a \$155,871 award for 8.8 mi. of grading and surfacing near Salt Wells.

NEW MEXICO

MORE ALBUQUERQUE HOMES
—The housing boom in Albuquerque

received added impetus with the news that Horizon Homes, Inc., a new firm formed by Gary Grisham and George Walters, both former employees of E. J. Mankin, would build 1,000 homes in a \$6,000,000 project on the east side of the city. Grisham was a construction superintendent and Walters was sales manager for Mankin.

ALGODONES POWER PLANT—A \$5,800,000 power plant, built at Algodones with Rural Electrification Administration funds was scheduled to be in operation by September 1. The plant is part of a \$10,000,000 project to provide power on a pool basis to 12 cooperatives throughout New Mexico. It was built by Plains Electric Generation Cooperative.

RECENT MAJOR CONTRACT AWARDS and low bids in New Mexico include a \$461,181 award to **Armstrong & Armstrong** of Roswell for 5.9 mi. of grading and surfacing on US 70 in Lincoln and Chaves counties. **Brown Contracting Co.** of Albuquerque received a \$395,000 award for 7.5 mi. of grading and surfacing in Apache National Forest Park. **G. I. Martin** of Albuquerque received a \$168,413 award for 8.9 mi. of grading and surfacing in Valencia County. **Skousen-Hise Contracting** of Albuquerque received two awards as follows: \$306,508 for 4.4 mi. of grading and surfacing in Grant County; \$323,487 for 2.3 mi. of grading and surfacing on US 70-80 in Dona Ana County.

OREGON

Steel arch bridge replaced near Logan

OLD AND NEW—These pictures show the contrast between old and new bridge design in New Mexico. The site is U. S. 54 over the Canadian River just south of Logan. Top is the old bridge, which consists of one 420-ft. spandrel braced, 3-hinged steel arch and three 80-ft. and one 70-ft. steel deck truss spans. Completed in August 1922, it was designed to support a 15-ton roller and provide a roadway width of 15 ft. Built by Midland Bridge Co. of Kansas City at a cost of \$154,370, it has been inadequate as a traffic facility for the last 15 yr., according to W. E. Strohm, state bridge engineer. Because of the remote chance of finding another site where the 420-ft. steel arch span would fit and afford sufficient roadway width and live load capacity, no attempt was made to salvage it. Instead, it was scheduled to be removed and sold for junk.

Below is the new bridge. It was built as part of a federal aid project at a cost of \$360,110. Total cost of the

project, which included 3.7 mi. of highway, was \$593,750. The new bridge is 735 ft. 10 in. long. It consists of three 192-ft. steel deck truss spans over the river channel and three 50-ft. steel beam spans in the approaches. The spans carry a conventional reinforced concrete deck, 28-ft. roadway with 2-ft. wide curbs to accommodate occasional pedestrians. Design live load is H20-S16. The substructure includes two 49-ft.-high reinforced concrete river piers founded on steel bearing piles driven to refusal in hard sandstone 56 ft. below the river bottom. Other piers are reinforced concrete founded in the sandstone banks. Abutments are open spill-through founded in the sandstone banks. Height from roadway to streambed is 67 ft. Contractor was J. H. & N. M. Monaghan & Associated Companies of Derby, Colo. State personnel included N. R. Sack, assistant construction engineer, in charge of all field work on bridges; Ben M. Long, resident engineer; and W. E. Strohm.

TWO MORE FOR TOKETEE—The Federal Power Commission approved a request of the California Oregon Power Co. of Medford to amend its license for the Toketee Project on the North Umpqua River to include two new power developments, Lemolo No. 1 and No. 2, to be built at an estimated cost of \$19,916,700 in Douglas County. Lemolo No. 1 will include a 120-ft.-high by 910-ft.-long diversion dam 1 mi. downstream from Lake Creek on the North Umpqua River and a 29,000-kw. powerhouse. Lemolo No. 2 will include a low diversion dam downstream from Lemolo No. 1 powerhouse, a small diversion dam on Deer Creek, and a 33,000-kw. powerhouse.

SECOND COLUMBIA BRIDGE—The Corps of Engineers has approved, with minor revisions, plans submitted by the Oregon and Washington highway departments to build a bridge across the Columbia River between Portland and Vancouver, 83 ft. downstream from and parallel to the present bridge on U.S. 99, according to Col. John A. Graf, acting district engineer for the Portland District. Plans submitted by the departments showed two wide fixed spans south of the lift span to provide vertical clearance from 46.3 to 77.5 ft. above low water and horizontal clearance of 511 ft. each. The plans approved by the Chief of Engineers, however, eliminate one of the two proposed 511-ft. spans in each bridge and provide for two 265-ft. spans with vertical clearances of 77 ft. at low water in place of one long span for each bridge. The approved plans also provide for the lift span in the present bridge to be retained and for a similar span to be built into the new bridge. To help provide safer navigation through the lift span, the upper 120 ft. of the Port of Vancouver dock would be cut away. R. H. Baldock, State Highway Department chief engineer, said, "If all goes according to



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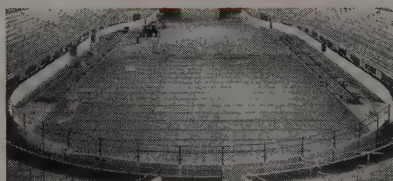
HEATING LINES



PLUMBING LINES



UNDERGROUND LINES



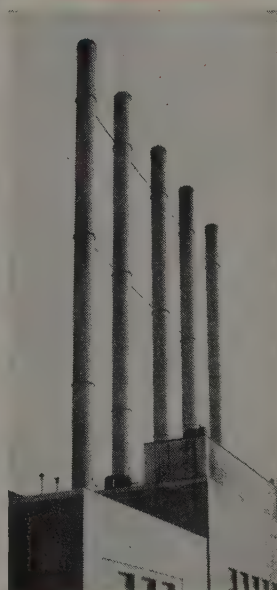
ICE RINKS



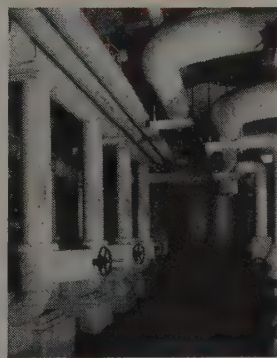
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TUBULAR AND HOT ROLLED PRODUCTS
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schedule and the revenue bonds are sold, we should be in a position to let a contract next spring."

FEDERAL AID for Oregon's highways amounts to almost \$13,000,000 for the 1956 fiscal year, according to the U. S. Department of Commerce. This is a third more than similar funds allocated for the previous year and they are available for contracting immediately, R. H. Baldock, state highway engineer, said. Before, they can be used, however, state and county funds in the ratio of 40% local to 60% federal must be furnished. Of the federal funds, \$2,300,000 must be used on interstate highways, \$1,390,000 for primary urban highways, \$5,400,000 for primary rural highways, and \$3,750,000 for secondary highways.

MAJOR SAVINGS in project cost estimates on The Dalles and Chief Joseph dams were announced by Col. L. H. Foote, North Pacific Division Engineer for the Corps of Engineers. The savings, totaling \$63,252,000, resulted from design economies and favorable construction bids under engineering estimates on contracts thus far awarded. New cost of The Dalles Dam is \$303,000,000, as compared with the old estimate of \$348,372,000. Chief Joseph will run \$169,000,000 instead of the previously estimated \$186,880,000. Foote said that design economies will not impair the multiple-purpose functions of either project.

EXPANDED TRANSMISSION LINE construction has resulted from the recent merger of Pacific Power & Light Co. with Mountain States Power Co. The new construction will provide interconnection of facilities and give loop service to North Lincoln, Tillamook, and Clatsop county coastal areas. It will cost \$6,000,000 to build 110 mi. of 115-kv. transmission lines into the interior. Future plans include a \$1,000,000 program to build 13 mi. of 115-kv. line from Grand Ronde to Otis and 20 mi. of 115-kv. line from Tillamook to Wheeler.

RECENT MAJOR CONTRACT AWARDS and low bids in Oregon include a low bid of \$1,276,525 submitted by **American Pipe & Construction Co.** of Portland for construction of eight steel tanks at Terminal 4 in Portland. **Stratton Construction Co.** of Hermiston submitted a low bid of \$161,600 for construction of telephone lines for the Oregon Telephone Corp. at Mount Vernon. **Nat McDougal Co.** of Portland received a \$459,110 award for highway construction on 21-C3, D5 in Lane County. **Halvorson Construction Co.** of Burley, Idaho, received a \$269,951 award for road construction of Forest Road 51-A in Lane County. **L. H. Hoffman** sub-

mitted a low bid of \$3,210,000 for construction of a high school in Portland.

UTAH

HILL AIR FORCE BASE will be the scene of a \$10,500,000 expansion program if Congress approves a pending appropriation request. Plans include construction of a new runway system capable of accommodating jet-type aircraft and a 560,000 sq. ft. warehouse to cost \$3,350,000.

SALT LAKE CITY 5-YR. PLAN—A 5-yr. plan for major improvements in Salt Lake City has been presented to the City Commission by Roy W. McLeese, city engineer. It lists 34 projects, including \$5,000,000 for the sanitary sewer system, \$5,250,000 for water storage and treatment; \$1,170,000 for storm sewers, \$1,250,000 for opening, widening, and improving streets, \$7,250,000 for buildings, \$375,000 for parks, and \$500,000 for bridges and conduits.

Some projects, planned for the near future, include \$9,000,000 for sewers and a disposal plant for Salt Lake City Suburban Sanitary District; \$725,000 in bonds authorized and partly sold for Salt Lake County Water Conservancy District; \$800,000 in bonds proposed for sewers and water systems in Chesterfield Improvement Association; and \$850,000 in bonds proposed for water system and sewers for Salt Lake City Sanitary District.

RECENT MAJOR CONTRACT AWARDS and low bids in Utah include a low bid of \$469,499 submitted by **W. W. Clyde & Co.** for construction of an overpass in Salt Lake County.

WASHINGTON

PRIEST RAPIDS DAM—Out of the thousands of words printed about the proposed Priest Rapids Dam, to be built on the Columbia River east of Yakima, a few indisputable facts emerge. First, there is a law authorizing construction of the project. President Eisenhower signed a bill on July 27 which would enable local and federal agencies to join in a "partnership" to build the \$300,000,000 structure. An ambiguity in the wording would seem to promise a lot of argument before it is decided who will get the job of erecting the dam. The bill states that the Grant County Public Utility District, a group of public utility districts, or the Washington State Power Commission are authorized to seek approval of the Federal Power Commission for permission to do the job. Both Grant PUD and the

State Commission have already asked the FPC for permission to go ahead. Grant PUD has engaged Harza Engineering Co. of Chicago to prepare plans. Latest word from the area indicates that the State Commission and Grant PUD officials are planning to get together and discuss the problem in an effort to arrive at a solution.

FORT LEWIS HOUSING—The House of Representatives has approved plans to spend \$5,400,000 for building permanent barracks and \$700,000 for a sewage treatment plant at Fort Lewis.

COWLITZ RIVER DAMS—Preliminary estimates for construction of the Cowlitz River Projects, as revised by Tacoma City Light engineers, reveal that the two dams, with accompanying powerhouses, could be built for \$145,630,000. Combined output of the powerhouses would be 474,000 hp. with provision made for future installation of an additional 158,000 hp. This would provide Tacoma with an additional average annual energy output of 1,400,000,000 kw-hr.

\$5,000,000 RAILROAD YARD—A contract for grading and leveling the site of the new \$5,000,000, electrically-controlled yard of Northern Pacific Railroad at Pasco has been awarded to J. A. Terteling & Son, Inc., of Boise, Idaho. Work was scheduled to begin in August.

BOX CANYON IN COURTS—The recent disagreement between the Pacific-General-Shea joint venture, which had a \$7,720,000 contract to build Box Canyon Dam on the Pend Oreille River, and Pend Oreille County Public Utility District No. 1 (**Western Construction**—June 1954, pp. 123-124) has resulted in a \$4,113,000 damage suit against the contractors filed by the utility. Pacific-General-Shea had previously filed a suit against the utility in which \$3,000,000 is being sought. Morrison-Knudsen Company, Inc., has taken over the project and is proceeding with the work.

BATTERY STREET SUBWAY in Seattle has been opened to traffic after recent dedication ceremonies. It was built by a joint venture of Morrison-Knudsen Co., Inc., and Rumsey Co. on a \$2,384,061 contract (**Western Construction**—July 1953, pp. 76-78.).

GORGE HIGH DAM DELAY—Writing of specifications for Gorge High Dam by Seattle's Department of Lighting has been delayed, so that the contract has not yet been advertised for bid.

PASCO-KENNEWICK BRIDGE—The new \$5,000,000 bridge between Pasco and Kennewick in eastern Washington has been opened to traf-

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SPOKANE COLISEUM NEARS COMPLETION

Spokane's \$2,500,000, 8,500-seat-capacity civic auditorium, the Coliseum, is almost finished. Completion is scheduled for December 1 by Henry George & Sons, the contractor. H. Jack Reeves of Spokane was the consulting engineer.

fic. It includes a main continuous tied arch span of 1,170 ft. with a center span of 520 ft. The south approach girder span is 802 ft. long and the north approach girder span is 482 ft. long. It was fabricated and erected by American Bridge Division of U. S. Steel Corp.

SUPER SHOPPING CENTER—

A \$10,000,000 super shopping center on a 22-ac. site in Seattle will be built by E. C. Swanson.

TACOMA COUNTY-CITY BUILDING—

The proposed county-city building at Tacoma will cost almost \$6,000,000, according to A. Gordon Lumm, an architect who is drawing up the plans. It will contain 156,000 sq. ft. of office space at \$15 per sq. ft., 15,600 sq. ft. of basement at \$7.50 per sq. ft., 47,800 sq. ft. of courtrooms at \$15 per sq. ft., and 8,000 sq. ft. of lobby at \$15 per sq. ft. Other sections include a law enforcement unit and a garage.

ICE HARBOR DAM?—A proposed \$130,000,000 dam at Ice Harbor on the Snake River may be built by the Franklin County Public Utility District on a partnership basis if utility districts on the Columbia and Snake rivers join in the plans and if the Corps of Engineers considers the project feasible.

RECENT MAJOR CONTRACT AWARDS

and low bids in Washington include a \$176,087 award to **Anderson Bridge Construction Co.** of Tacoma for construction of two bridges in King County. **Associated Sand & Gravel Co.** of Everett received a \$224,319 award for 1.4 mi. of grading and surfacing on SR 1 in Snohomish County. **Tauf Charneski and H. C. Werner, Inc.**, of Eugene submitted a low bid of \$888,888 for earthwork, pipelines, and structures

on the Columbia Basin Project. **Dahlgren Construction Co.** of Seattle received a \$434,574 award for construction of an overcrossing on SR 1 in Skagit County. **Erickson Paving Co.** of Bellevue received a \$1,029,714 award for grading and paving 1.2 mi. in Lewis County. **Peter Kiewit Sons' Co.** of Longview received a \$276,696 award for 3.4 mi. of grading and surfacing SR 12 in Cowlitz County.

Manson Construction & Engineering Co. of Seattle received a \$1,283,265 award for construction of bridge approaches at the Chehalis River Bridge in Grays Harbor County. **Murphy Bros.** of Spokane received a \$378,935 award for 13 mi. of grading and surfacing on SR 7 in Grant and Adams counties. **Northwest Construction Co.** of Seattle received a \$339,338 award for 2.3 mi. of grading and paving SR 1 in Snohomish County, and another \$839,004 award for 6.2 mi. of grading and surfacing on SR 1 in Clark and Cowlitz counties. **Parker Schram Co.** of Portland submitted a low bid of \$1,085,197 for 85 mi. of transmission line construction for the Bonneville Power Administration. **Charles A. Power** of Spokane received a \$231,938 award for 4.1 mi. of grading and surfacing SR 3-H in Spokane County. **L. D. Shilling Company, Inc.**, of Moses Lake received a \$418,173 award for 15.2 mi. of grading and surfacing SR 11-G in Adams and Grant counties.

WYOMING

GLENDO DAM—An appropriation of \$2,000,000 to start construction of Glendo Dam on the North Platte River has been approved by the Senate Appropriations Committee, according to Senator Bowring of Ne-

braska. If the money is awarded, the Bureau of Reclamation is expected to start work on project plans immediately.

RECENT MAJOR CONTRACT AWARDS

and low bids in Wyoming include a \$437,406 award to **Big Horn Construction Co.** of Sheridan for 4.6 mi. of grading and surfacing on the Salt Creek Canyon road in Lincoln County. **Platte Valley Construction Co.** of Grand Island, Nebraska, received a \$189,888 award for 6.4 mi. of grading and surfacing on the Smith's Fork road in Lincoln County.

ALASKA

ELMENDORF DORMITORY—

Einar M. Peterson Construction Co. of Spenard is working on a \$539,944 airman's dormitory at Elmendorf Air Force Base in Anchorage. **Bernie Tolenan** has replaced **George Morrison** as general superintendent on the job. Major equipment being used includes a Cat D8 for backfilling and grading of utilities, a 22B backhoe for utility excavation, an American portable material elevator with concrete bucket for pouring, and a Chicago Pneumatic 105 compressor. At last reports, the second-floor slab was being poured.

RECENT MAJOR CONTRACT AWARDS

and low bids in Alaska include a low bid of \$2,739,390 submitted by **B. E. C. K. Constructors and McLaughlin, Inc.**, of Seattle for grading and construction of bridges on the Copper River Highway. **Copenhagen & Co.** of Portland submitted a low bid of \$244,641 for construction of water mains and sewers at Kodiak Island. **Stock & Grove, Inc.**, of Anchorage received a \$419,032 award for storm sewer construction in Anchorage. **Olday and Craig** of Anchorage received a \$465,654 award for highway and bridge construction on the Kenai peninsula.

Here and There

ALCAN TUNNEL—Water has started flowing through the 10-mi. tunnel on the Alcan Project (**Western Construction**—December 1953, pp. 64-67 and 81), according to H. E. Echols, administrative manager for Morrison-Knudsen Company of Canada, Ltd. First, a flushing charge of water was passed through the tunnel and discharged through a drain at the 2,600-ft. level, just ahead of the butterfly valves at the top of the underground penstocks. Penstock No. 1 was then filled and tests made to the 200-ft. level. After various inspections and tests, the tunnel and penstock were filled.

Longer Overhaul Periods with G.P. on the Job

On the rugged U.S. Highway 30 relocation project, Morrison-Knudsen Co., Inc., at Pendleton, Ore., has found its equipment operates longer for less with General Petroleum products and lube engineering on the job.

Four miles of highway and railroad track at the mouth of the Deshutes River are being moved to clear the way for raised water level when The Dalles Dam is completed. The job calls for almost continual use of heavy-duty earth movers, scrapers, wagon drills and power shovels, thus placing a real premium on proper lubrication.

According to M-K project engineer E. B. Potter, "We've been able to chart an appreciable savings in reduced down-time and longer overhaul periods on this and other jobs since G.P. began working with us in the Pendleton district ten years ago."

Chances are your nearby G.P. representative can help you save real money in the operation of your expensive construction equipment, too. His proven line of Mobil products, coupled with a lube engineering program that's tailor-made to fit your individual operating conditions, is bound to result in longer life and smoother operation for *all* your equipment. Call him in today for the tops in products and service!

G.P. representative Lee Shannon, right, discusses lubrication problems on the job with Morrison-Knudsen project manager E. B. Potter.



Heavy-duty equipment is put through its paces on rugged highway relocation job.

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ENGINEERS on the move

George L. Beard was recently appointed assistant vice president and project development engineer for Pacific Power & Light Co., Portland, Ore., in charge of the company's long range planning and development program to provide future power supply. He was formerly chief of the planning and development branch, Office of Chief Engineers, U. S. Army, Washington, D. C.

* * *

H. E. Bovay, Jr., Consulting Engineers, Houston, Tex., recently established a Northwest office. Located in the Spokane and Eastern Bldg., Spokane, Wash., this office will provide professional services in the branches of civil, structural, industrial, mechanical, and electrical engineering for Washington, Oregon, Idaho, Montana, Wyoming, Utah, Northern California, and for British Columbia and Alberta, Canada. **William N. Pauley**, registered professional engineer, is in charge of this new Northwest branch.

* * *

Stanley E. Sporseen, civil engineer with the Portland District, Corps of Engineers, has been named



Stanley
E.
Sporseen

a member of the U. S. Committee on Large Dams. Sporseen has been with the Engineers for the past 20 years, first with the old Bonneville District and then with the Portland District where he is chief of the project planning section.

* * *

M. L. Hoffstot, former construction inspector for the Bureau of Reclamation at Coachella, Calif., recently retired from government service and will make his home in Eugene, Ore. Hoffstot's service with USBR, although not continuous dates back to the Lower Yellowstone Project in Montana in 1906.

Later, he was associated with irrigation development of the Flathead Project, Montana; the construction of Grand Coulee; Friant and Shasta dams and, more recently, with construction of the Coachella branch of the All-American Canal.

* * *

Karl Chamberlain, district engineer for the U. S. Bureau of Public Roads, Missoula, Mont., was transferred August 1 to act as division engineer of the Bureau at Denver, Colo. **Morton M. Flint** from the San Francisco office replaces Chamberlain at Missoula.

In connection with the Fifth International Congress on Large Dams to be held in Paris in 1955, followed by study tours in France and North Africa, the United States Committee on Large Dams makes this announcement: "Attendance at the congresses of the International Commission on Large Dams, usually held every three years, is limited to members of the national committees which themselves form the International Commission. American engineers who wish to attend the Congress, and who are not now members of the U. S. Committee on Large Dams, are urged, in regard to membership, to contact either Secretary-Treasurer, USCOLD, P. O. Box A-A, Boulder City, Nev., or **L. N. McClellan**, Chairman, Membership Committee, USCOLD, Room 10, Building 53, Denver Federal Center, Denver, Colo."

Horace Johnson is the newly appointed chief of the construction-operations branch of the Corps of Engineers at Sacramento, Calif. Johnson has an intimate knowledge of dam design and construction of Western projects. Prior to joining the Sacramento district ten years ago, he was with the design section in Los Angeles. During World War II he was resident engineer for military construction at Palm Springs, Camp Haan and March Air Force Base. **H. A. Dettmer** succeeds to

Johnson's former post as head of the design branch at Sacramento.

* * *

George E. Zorger as construction engineer (general) for Alaska District, Corps of Engineers, Anchorage, functions as a construction engineer specialist responsible for insuring adequate inspection of contractor operations throughout the District by rendering technical counsel to field inspectors, resident engineers, and project engineers. He was formerly with the C. of E. North Pacific Division in Portland.

* * *

Robert R. Murdock (left), subcontractor on structures on the Lee J. Immel Co. road construction job between Antioch and Oakley, California, and his dad, **R. N.**, lean into



the wind. Or maybe it's our photographer doing the leaning. **R. N.** is one of the oldest, if not the oldest, operating engineers active in California today, our man says. The road job amounts to about \$81,000.

* * *

Walter E. Fisher is project manager on several \$100,000 jobs in California being done by Fisher Bros. of Rio Vista. One, for P.G. & E., is at Live Oak. Another, at Martinez, is for California Dredging Co. A third is for a State Game Refuge at Grizzly Island. **Sol Fisher** is general superintendent and master mechanic.

* * *

Richard H. Gifford recently moved to Red Bluff, Calif., where he is office engineer for the Bureau of Reclamation.

* * *

Ralph E. Gruenberg recently became associated with the consulting engineering firm of Howard, Needles, Tammen & Bergendoff, Kansas City, Mo., where he will engage in highway engineering design. Before this recent move, Gruenberg was with the USBR as a construction engineer on the Columbia Basin Project, Othello Construction Division.

* * *

Gerry Melone is now employed by H. K. Ferguson as field engineer on construction of a refinery project at Richmond, Calif. Until recently he

Do you recognize this TORTURE CHAMBER?

It's somewhere in your operation. Its victim is choked with bone-dry dust . . . doused in slimy muck and . . . hammered and squeezed between hot, metal plates.



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DUST Ordinary lubricants are quickly contaminated in dust. Tough Shell Tracrol Lubricant seals out dust, dirt, sand and mud—protects against wear long after ordinary lubricants have become harmfully abrasive

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SIDEHILL LOADING Ordinary lubricants are squeezed away from vital bearing surfaces under these severe pressures. Adhesive, squeeze-proof Shell Tracrol Lubricant sticks and stays and protects even under the most extreme pressures

**SHELL TRACROL LUBRICANT protects track roller
bearings under all conditions**



was concrete superintendent on the Alcan Project for Morrison-Knudsen Company of Canada, Ltd.

* * *

Joseph A. McNeil, prominent Los Angeles general contractor, was recently elected chairman of California Contractors' State License Board. **E. L. Buttner**, electrical contractor, Oakland, was elected vice-chairman.

* * *

Ralph A. Tudor's resignation as Under Secretary of the Interior has been accepted by **President Eisenhower**. On accepting the office in March 1953 it was with the understanding Tudor would serve for one year. He is president of the Tudor Engineering Co. in San Francisco. **Clarence A. Davis**, Lincoln, Neb. has been nominated to succeed Tudor.

* * *

Wally M. Hector resigned as county engineer of Douglas County, Ore., as of July 1, 1954. **Floyd Frear**, bridge engineer, was chosen to assume Hector's duties. Hector wrote an article, "Maintaining Oregon's County Roads," which appeared in *Western Construction*, June 1953, pp. 69-70.

* * *

George L. Sullivan, dean of the College of Engineering, University of Santa Clara, California, has been elected to honorary membership in

The American Society of Mechanical Engineers. The rank, awarded for "acknowledged eminence in the engineering field," is the highest honor conferred by ASME. Since the Society's founding in 1880, only 150-odd honorary members have been elected. Sullivan has been dean at Sant Clara since 1918.

* * *

Ben L. Peterson, chief of the engineering division of the Portland District, Corps of Engineers, was recently commended by **Col. John A. Graf**, acting Portland district engineer, and received a monetary advancement in recognition of superior accomplishment in his department.



Peterson



Carroll

Lt. Col. Charles A. (Bill) Carroll was assigned to the staff of the Los Angeles District, Corps of Engineers, in June 1954. Before coming to his present assignment in Los

Angeles he spent one year with the Aviation Engineers in Korea.

* * *

Frank M. Lewis, Bonneville Dam project engineer for the past eight years, has been transferred from the Portland District, Corps of Engineers, to the operations and maintenance branch of the North Pacific division.

* * *

A. J. Newman retired recently after 18 years of continuous federal civil service as production and inspection officer for the Army Corps of Engineers, Los Angeles District. In 1936 he started work for the Engineers as an inspector of structural steel. He is considered an expert on the fabrication and assembly of hydraulic slide gates and his advice was often requested by other districts and by private fabricating companies.

* * *

John S. Cotton, Consulting Engineer, has moved to a new location at 24 Evergreen Dr., Kentfield, Calif.

* * *

Frank J. Barrett, district manager of the Seattle office, Portland Cement Association, has retired. **Robert H. Lochow**, a member of the staff since 1949, has been selected to take his place. Lochow's experience includes 14 yr. as an engineer.

(Continued on page 119)

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Turn NOW to pages 151 & 152

CHERRY VALLEY DAM

... continued from page 60

to the smooth running of the job. Considered at random, some of these are as follows. Pickup trucks in use by superintendents and key foremen are equipped with two-way radio communication. Distress calls on equipment breakdown are most effectively handled this way with the distances involved. A day's operations (six working days per week) uses two shifts, the day shift working 6:30 to 10:30 AM and 11 AM to 3 PM; the swing shift working 4 to 8 PM and 8:30 PM to 12:30 AM. The ½ hr. and 1 hr. breaks in here enable the maintenance men to get at the equipment for lubrication and fueling at regular hours.

All access roads are well graded and watered to keep the equipment highballing. For night operations, lighting is furnished in part by portable light units composed of 30-ft. windmill towers mounted on pipe skids. Each tower has four floodlights with 5-kw. Onan or Master generating units.

This project is many miles from the nearest civilized town. For the 380 men working here, much has been done by the contractor to make the living conditions tolerable. About 200 men live in the man-camp which offers excellent food (and beer). About 5 mi. from the damsite, trailer courts have been established that house an additional 150 men and their families. A modern commissary makes available all that a country general store could offer. A surprising number of trailers are equipped with TV sets at this hilltop location.

Personnel

Key personnel connected with this project for the Guy F. Atkinson Company are A. H. Steiner, vice president and project manager; R. N. Atkinson, assistant project manager; H. F. Quade, project engineer; E. B. Platt, business manager; Burt Louis, master mechanic. For the Hetch Hetchy Water Supply, Power and Utilities Engineering Bureau, Harry E. Lloyd is manager and chief engineer. Oral L. Moore is construction engineer, and Wesley F. Getts is design engineer.

DEATHS

Edward Hyatt, 65, who retired in 1950 after 22 years as state engineer of California, died in a Sacramento hospital recently. During his career of upwards of 35 years in state service, Hyatt was considered as a leader in the development of California water resources, especially the vast Central Valley Project.

* * *

Fritz M. Lundgren, 66, a civil engineer, died in Los Angeles recently.

(Continued on page 120)

Just Off The Press!



Your Guide to LOWER MAINTENANCE COSTS on ANY dragline bucket!

This new 28-page booklet is jammed with detailed, easy-to-understand specification tables, drawings and helpful hints on how to make your equipment last longer and serve you better. Vital subjects such as Drag and Hoist Chain, Repair Links, Dump Blocks, Spreader Bars, Shackles, Rope Sockets and Drag Hitch Assemblies are clearly covered in this book. Scarifier Shanks, Weld-On Grouser Tips, Sheepfoot Caps and Pedestals are also included.

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THE No. 12

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This No. 12 Motor Grader, owned by Daley Corp., is bank-sloping for a canal along the new Wabash Freeway, San Diego, Cal.

When the engineers ask for a clean 40-degree bank, put a Cat* No. 12 Motor Grader on the job. You'll get it, right down to fractions of an inch. And the best of it is that any good operator can work accurately with this machine. Here are some of the features that make the No. 12 outstanding:

- Caterpillar-built throughout, with balanced power, weight and speed.
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- Operates on low-cost No. 2 furnace oil without fouling.
- Full range of blade positions without changing links.
- Powerful control brakes prevent creeping under loads or vibration.
- Rugged construction—heaviest box-section drawbar circle on any grader.

Don Daley, of Daley Corp., San Diego, with ten big yellow units working on the Wabash Freeway, says: "Every year

our faith in Caterpillar's engineering features, economy, long life, trade-in value and good dealer service is strengthened. The machine that stands up longest and does the job is the one to make money with."

Call your Caterpillar Dealer today for an on-the-job demonstration of the equipment that can make money for you.

Caterpillar Tractor Co., San Leandro, Cal.; Peoria, Illinois, U.S.A.

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SUPERVISING the jobs

Kenneth C. Balis, and J. E. Hughes is construction superintendent.

* * *

Max Eiden, president of Inter-mountain Co., has in his charge a \$213,705 contract for rehabilitation of Dalton Gardens Irrigation System in Kootenai County, Idaho. Project manager for job, which is expected to run 230 days, is E. C. Connell, and Mel Williams is superintendent.

* * *

R. A. (Bob) Kerfoot is superintendent for Cox Bros. Construction Co. which recently received a \$231,933 contract for 2.8 mi. of grading and surfacing on La Habra road between Grant Ave. and south of Imperial Highway in Orange and Los Angeles counties, Calif. Job is expected to take 130 days for completion.

* * *

Charles Prose, project superintendent for Fisher Contracting Co., is supervising the 3.2 mi. grading and drainage job on Pine-Winslow highway, Route 10, Coconino National Forest, Ariz., a \$248,974 contract recently awarded to Fisher.

* * *

Ed Stearman, general superintendent; Dan J. Moats, job superintendent, and his assistant Dick Anderson, comprise the top supervisory personnel working for Bentson Contracting

N. H. Latimer is project manager and John J. Devlin is job superintendent on the \$1,251,920 contract recently awarded S. S. Mullen, Inc., for construction of multipurpose hangars for big bombers at Eielson AFB, Alaska. E. E. Harris is foreman for the job.

* * *

C. F. Briggs is superintending construction of 0.4 mi. of Vancouver Freeway at Burnt Bridge Creek, Wash., for Natt McDougall Co. which recently got the job at a cost of \$329,383. Briggs is assisted by foremen Perry McDowell, grade; Earl Bradley, equipment, and F. E. Lockyear, structures.

* * *

N. V. Raney, utility superintendent, and Ernest Kisse, building superintendent, are directing construction of hardstands and parking aprons and family housing at Fort Richardson, Alaska, for L. & L. Contracting Co., Inc., and M-B Contracting Co., Inc. Also on this \$1,250,135 job are D. J. Dougherty, George Heinsen, and J. M. Reilly, engineers; and W. H. Bookwalter, master mechanic. H. A. Leader is office manager.

* * *

L. C. Kenworthy is at the head of the crew working on a 2.8-mi. grading and surfacing job between Stevens Bar bridge and Slate gulch, including constructing a steel girder bridge, in Tuolumne County, Calif. Superintendent Kenworthy has the assistance of Edwin Lowry, grade foreman; Bert Calvetti, general foreman, and Louis Kenworthy, master mechanic. R. W. Bissett is office manager. Kenworthy & Patterson, the prime contractor, recently received the award at \$442,867. The bridge construction is subcontracted to Thomas Construction Co., for which George Borovitch is acting as superintendent.

* * *

T. A. Moore is superintending the construction of 5.9 mi. of grading and surfacing on Highway U.S. 70, in Lincoln and Chaves counties, New Mex. Foremen assisting Moore are R. L. Dever, grading; T. C. Carr, bridge, and Paul Taylor, crusher. Armstrong & Armstrong is doing the work at a cost of \$461,181.

* * *

Robert Phillips, general superintendent for Jack B. Parson Constructing Co., heads the construction

crew working on 4.9 mi. of grading and surfacing on U.S. Highway 26 from Peoples Canal to Snake River in Bingham County, Idaho. Assisting Phillips on this \$431,881 job are the following foremen: Grant Collect, grade; LaMar Jones, fence; Lee Murry, pipe, and Jack Parson, Jr., crusher. Work involves the moving of 300,000 cu. yd. borrow with 8 DW20's, with TD24 pushing the scrapers. Three gravel plants are handling 200,000 tons of gravel, with 6 D8 Cat feeding plants.

* * *

Max L. Burdick as president and general manager of Statewide Plumbing & Heating Co. is directing his company's \$1,093,259 construction contract for trunk and collection lines in group area A, Salt Lake County, Utah. General superintendent for this 2-year project is



CONSTRUCTION at Monticello Dam on Putah Creek in California's Sacramento Valley is being handled by a joint venture of Peter Kiewit Sons' Co. and Parish Bros. Construction on a \$7,628,991 contract. For the complete story of how it's coming along, see pp. 73-75 of this issue. Here are some of the men on the job: (Upper left) are Ed Hill, day walker in the tunnel (left), and J. M. Wagenet, USBR tunnel inspector. (Upper right) Sam Aldred, master mechanic, talks to George Smith, shift foreman (left) and M. Cannedy, mechanic's helper (in truck). (Lower left) are Norm Green, labor foreman (driving) and Charles Roberts, laborer. Day shift tunnel crew (center) includes (back row from left) O. L. Brooks, left lifter; Bill Siese, chuck tender; (middle from left) Jess Wilson, shifter; John Sweeney, chuck tender; Paul Bryant, chuck tender; Lewis Lanning, left top; and J. McNally, "handy man." (Bottom from left) Corkey Wood, right lifter; Bud Goodson, right top; and Bob Williams, mucking machine operator. (Lower right), Paul Holton, heavy equipment foreman, (left) and George Keys, rock superintendent, look down.



Aspen Tunnel Union Pacific Railroad Company

You should erect "COMMERCIAL" Steel Timbers to speed completion of your tunnel construction and reduce cost . .

Several years ago a tunnel in the West was being driven through shifting ground. 12 by 12 wooden timbers placed skin tight were found inadequate to support the tremendous loads which developed. As one tunnel foreman so aptly said, "They are cracking like matches."

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sidered. Steel tunnel supports can be designed to meet the load requirement. They are tailored to fit the job and completely shop fabricated. Erection by unskilled men can be made much faster. Fire hazards are vastly reduced and all workmen are given greater protection.

Notice in the above illustration the conformity of the curved steel timbers and how closely the excavation has been held to the neat concrete line. Savings due to reduced excavation yardage is very substantial.

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they have the experience and know how.

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"PRODUCTS PREFERRED
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LA-10



FISHER BROS. of Rio Vista, Calif., have several \$100,000 contracts under way for P.G.&E. at Martinez, California Dredging Co., and State Game Refuge at Grizzly Island under **Walter E. Fisher**, project manager, and **Sol Fisher** (above), master mechanic.

Co. on its \$170,107 award for 5.4 mi. of grading, draining, concrete curb and gutter, widening two bridges, new alignment of U.S. 80, Maricopa County, Ariz.

* * *

Jack Daugherty, superintendent, under the over-all direction of **James Reed** and **R. M. Jensen**, partners in joint firm of Reed Trucking & Construction and R. M. Jensen, is directing the work of grading and road-mix surfacing of 4.1 mi. of S.R. 10, Salina Canyon, Sevier County, Utah. **Bud Nye** is assisting as grade foreman.

* * *

John Paul, hot plant foreman; **Bill Radovich**, labor foreman, and **Norman Noe**, crusher foreman, are top personnel working for Nilson-Smith Construction Co., which recently received a contract on a bid of \$149,629 for the surfacing of Montana and Lyndale avenues in Helena, Mont.

* * *

Ken DeWitt, superintendent, with the assistance of **Doyal Thornton**, foreman, is supervising a \$132,278 project for Dale F. Payne, contractor doing 14.5 mi. of grading and sub-grade preparation, south of Winslow on Clear Creek Road, Ariz.

* * *

Russel Peterson is superintendent for American Pile Driving Co., Inc., which recently received an award at a cost of \$109,146 for grading, surfacing, and bridges on Tolt to Duval, State Highway 15-B, King County, Wash.

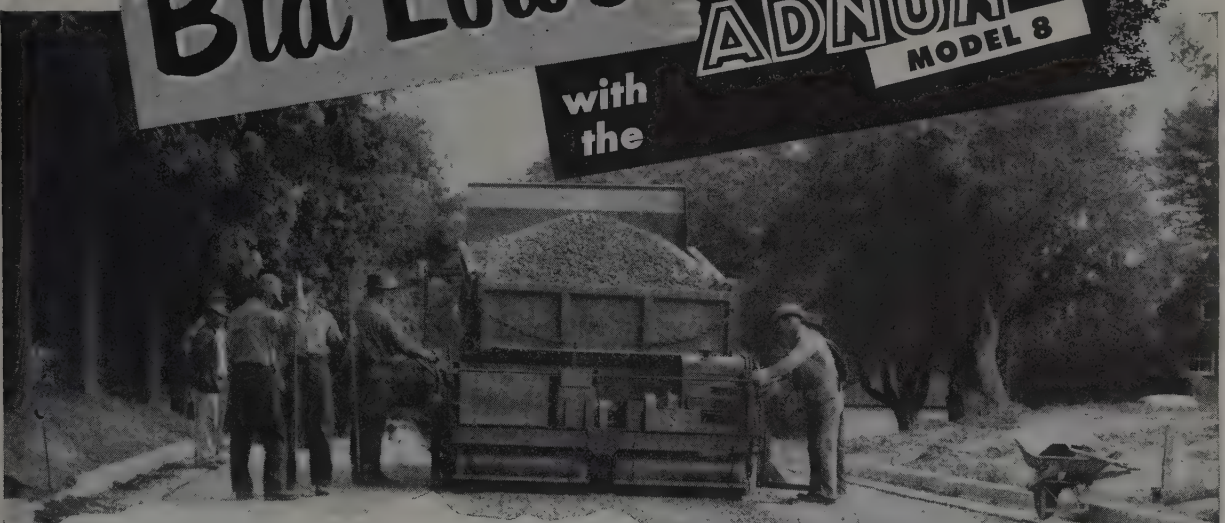
* * *

J. L. Pierson, superintendent; **D. K. Rodgers**, engineer, **G. C. Carlson**, office manager; **Owen Barstow**, piledriver foreman, and **H. C. Good-**

Bid Lower

with
the

ADNUN JR MODEL 8

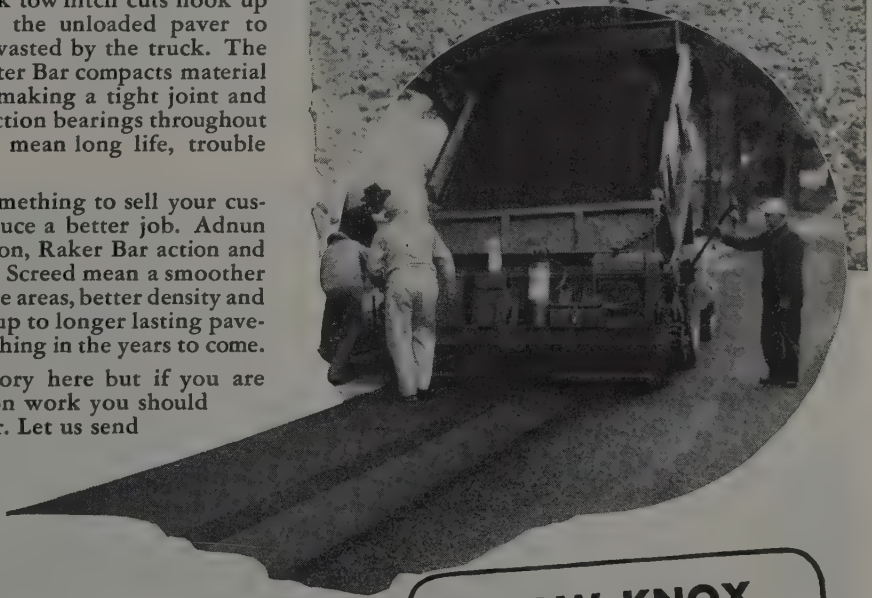


THE ADNUN JR. has advantages that permit closer bidding. Its design and construction (far superior to that of any other tow type rig) assures service with the minimum of "down time" and freedom from adjustment.

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The Adnun Jr. gives you something to sell your customers in its ability to produce a better job. Adnun Continuous Course Correction, Raker Bar action and the overlapping Oscillating Screed mean a smoother surface, fewer hollows in large areas, better density and tighter joints. This all sums up to longer lasting pavement and freedom from patching in the years to come.

We can't tell the whole story here but if you are bidding on non-specification work you should find out about the Adnun Jr. Let us send you the latest bulletin.



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COMPANY**

FOOTE CONSTRUCTION
EQUIPMENT DIVISION
1940 State Street
Nunda, New York





PERSONALITIES on Pit 4 Project

See pp. 64-67 of this issue for current job progress report. **Charles Joslin** (left), P.G.&E. resident; (center, from left) **A. C. Grunert**, P.G.&E. field en-

gineer; **Roy Friedrichs**, P.G.&E. powerhouse engineer; **Al Boddy**, P.G.&E. inspector, and **Bob Smith**, Walsh engineer. **Jess Hoopes**, Walsh super (right).



(Left, from left) **Roland Nystrom**, P.G.&E. superintendent of machinery installation; **Bill Flint**, P.G.&E. in-



spector, and **Ray Barbano**, P.G.&E. electrical engineer. (Center, left) **George Bowman**, Walsh general fore-



man, and **Jim Story**, Walsh carpenter superintendent. **Nebb Bedross** (right), master mechanic for Walsh.



Charles Gardella, Consolidated Western Steel superintendent (left). (Top center, from left) **Morris Vitale**, Stolte

superintendent, and **Frank Millet**, Del Monte Electric foreman. (Bottom center, from left) **Leroy Mow**, P.G.&E.

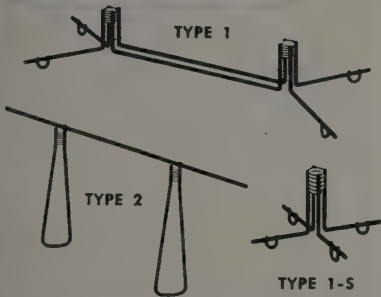
engineer, and **F. K. Massie**, Newport News Shipbuilding Co. consultant. **Jack Burgman** (right), Dalzell foreman.

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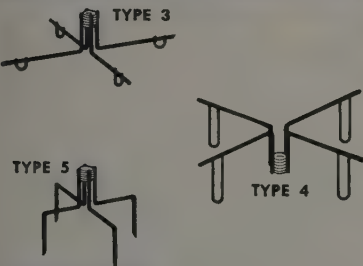
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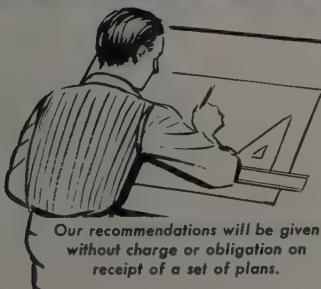
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Our recommendations will be given without charge or obligation on receipt of a set of plans.



42,000 LB. PANEL being raised into position at United Grocers Warehouse, Fresno, Calif. Concrete panels are 8-inches thick with 12-ft. legs. SUPERIOR Pick-Up Inserts, Brace Anchors, and Braces were used. The exclusive pivoting action of the adjustable Braces permitted quick positioning and alignment of the panels. Contractor: Precast Erection Company, Niles, California.

Tilt—Lift—Position!—The proper type of Pick-Up Inserts and Brace Anchors and their location in the slab or precast structural member is of prime importance in order to withstand the stresses occurring when *tilting*, *lifting*, and *positioning*.

As pioneers in this field, SUPERIOR has developed various types of accessories and correct procedures and techniques resulting from the experience of thousands of job applications.

The many types of SUPERIOR Inserts, Anchors, and Braces for every job condition together with complete engineering service provide a combination which offers safe and efficient handling of any precast panel or structural member.

For details request a copy of Bulletin TU-2.

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Here's how much more you get when you buy— ONAN Electric Plants

HIGHER CAPACITY per pound of weight. A 10KW Onan weighs only half as much as other comparable units.

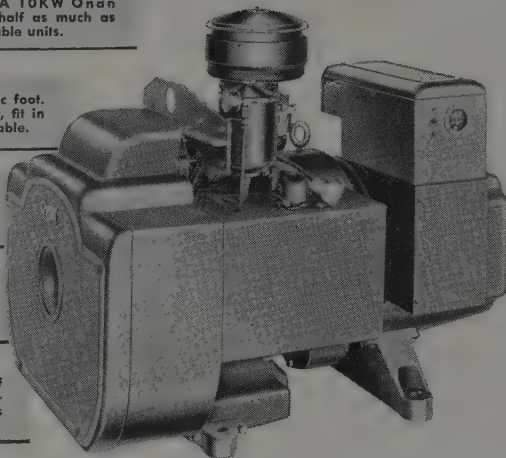
MORE OUTPUT per cubic foot. Onan units are compact, fit in small space, easily movable.

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MODEL 5CW—5,000 watts A.C., two-cylinder, air-cooled, gas, oil powered.

... yet kilowatt for kilowatt, an ONAN costs you less than any other electric plant!

ONAN gives you many advances in electric plant design, plus proved dependability on the job! You pay no premium for these Onan features . . . in fact all the electric plants shown here are priced lower than other plants of similar capacity.

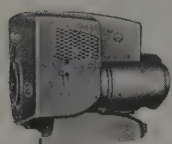
The Onan line is complete, with scores of different sizes and a great variety of optional equipment, making it easy to pick just the right electric plant for particular jobs *with savings in weight, space and operating expense.*

For any job requiring an independent source of electric power, Onan gives you greater all-around service and unequalled value too . . . measured either by first cost or in the long run.

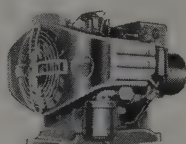
... Gasoline or Diesel-powered Air or water-cooled

GASOLINE: Air-cooled—400 to 10,000 watts, Water-cooled—10,000 to 50,000 watts.

DIESEL: Air-cooled—3,000 and 5,000 watts, Water-cooled—15,000 to 55,000 watts.



MODEL 305CK—3½KW A.C., 2-cyl. air-cooled, gasoline engine.



MODEL 5DRP—5KW A.C. Diesel two-cylinder air-cooled.



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SPARKS-WILLS COMPANY

1624 S.E. Grand Ave., Portland, Ore.

win, Jr., erection foreman, are key men for Peter Kiewit Sons' Co. and LeBoeuf Dougherty on the \$1,135,332 construction of a 5,897-ft. concrete bridge and south approach on 1.7 mi. of U.S. 95 south of Sandpoint, Idaho.

* * *

Jack H. Coons is superintendent; Jack Tomlinson, engineer; and T. E. Dooley, office manager, for Morrison-Knudsen Co., Inc., on construction of Timothy Meadows Dam on the Oak Grove fork of Clackamas River, Oregon. This is a \$1,446,736 contract which will probably end September 1955.

* * *

S. R. (Spot) Denton is superintendent and Roy McDuffy is hot-mix superintendent for Northwestern Engineering Co. which is carrying out a \$154,651 contract for 12.1 mi. of gravel surface on Crow Agency-Broadus Highway, Rosebud County, Mont.

* * *

Chuck Loser is superintendent on the construction of 4.4 mi. of grading and surfacing of Star Valley route, Yellowstone, Targhee National Forest, Teton and Lincoln counties, Colo. Others among the key personnel are Austin Tayer, master mechanic; W. F. Johnson and J. C. White, foremen, and Tex Battenfield, powder foreman.

* * *

R. E. Kasler, project manager, and W. O. Loy, superintendent, are handling the construction of air strips at George AFB, Victorville, Calif., for Fredericksen & Kasler, contractor. Others in key positions on this contract are George Shaffer, chief engineer; George Bell, plant superintendent; Jack Martin, paving superintendent; "Slim" Ramsdell, master mechanic. Dick Brown is office engineer. Morris Burke is office manager. This job, costing over \$1,000,000, is scheduled for completion in December.

* * *

Arthur Kinnamon is superintendent on a highway job on Cajon Pass from north of San Bernardino to Victorville, Calif., a \$1,550,000 contract of Griffith Co., just about complete. Walt Cody is associate superintendent on the work. Other key men are C. E. McCracken, bridge superintendent; G. Weir, field office manager; M. Flint, general foreman; L. Cody, Frank Senteno and Bob Bolden, grade foremen. Al Inouye is timekeeper.

* * *

Herbert A. Neudahl, project superintendent, heads the construction crew for Hagstrom Construction Co. which is erecting a steel frame hangar for Air National Guard at Gore Field, Great Falls, Mont. Assisting Neudahl on this \$647,100 project are Harold Snippen, carpenter foreman; Del Leatherwood, steel foreman, and William Dyer, labor



foreman. Job is expected to be completed April 1, 1955.

* * *

F. A. Einer, Jr., project manager; Edward H. Einer, general superintendent; Roy Neujahr, bridge superintendent; Richard R. Einer, truck superintendent, and C. B. Gering, office manager, comprise the top personnel handling the \$288,577 contract of Einer Bros., Inc., and Marsch Construction Co. for 1.6 mi. to be graded and surfaced at Lake Hodge, San Diego County, Calif.

* * *

M. S. Mecham, project manager; Earl Mecham, superintendent; Al Mecham, purchasing agent, and George Cerveney, mechanic, are key men on M. S. Mecham & Son's contract for 4.7 mi. of grading and surfacing between Pacific Coast Highway and 174th St., Los Angeles County, Calif., a \$846,264 job which is expected to run for 275 days.

* * *

Fred Weiss and Elof Gustafson, top project managers for Stolte, Inc., have been directing the construction of office, shop, and warehouse facilities for the Pacific Gas & Electric Co. at Richmond, Calif. Dean Lowther is general superintendent. Engineer is Jim Grant. Bob Simmons, Cliff Edmon, and Vince Decosla are foremen on this large project, which embraces block and frame construction, with yard for gas and electric service for that area. George Grubb is supervi-



D. E. Waters

E. R. Farrell

H. A. Bohne

R. A. Johnson

H. A. Bohne, project manager, E. R. Farrell, superintendent, and D. E. Waters, J. R. Patton, and R. A. Johnson, engineers, comprise the top supervisory personnel for Robert E. McKee, General Contractor, Inc., on the construction of the State vocational school for boys at Vacaville, Calif. H. H. Perkins is in charge of the office details for this job which approximates \$3,000,000. Working as foremen on the job are: J. R. Bailey, W. L. Roberson, H. W. Watson, L. E. Davis, Ray Bailey and Harvey Cates, carpenter; L. V. Mashburn,

R. D. Meeks and F. B. Andreason, labor; J. M. Kelley, cement. E. L. Beaudikofer and Dan Hahn are supervising the electrical work subcontracted to Rosendin Electric, Inc.

* * *

H. Earl Parker, Inc., of Marysville, Calif., has a \$644,340 contract for West Levee construction on the Feather River in Butte County, California. J. Perry Parker is project manager. Other key men include Albert C. Parker, general superintendent; Lincoln F. Moffitt, master mechanic.



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INDEMNITY INSURANCE COMPANY OF NORTH AMERICA

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ing engineer and **R. I. Meyerholz** is architect for PG&E.

* * *

Barney Hedburg, superintendent, **Richard Baxter**, assistant superintendent, and **Hugh M. O'Neil**, structural engineer, are supervising the construction of a warehouse for the Delta Lines at 6th & Eastshore Freeway, Oakland, Calif. **Stolte, Inc.**, is doing the work at a cost of approximately \$100,000.

* * *

L. W. Arnold, superintendent, and his assistant, **V. E. Kemp**, head the construction crew at work on the bridge approaches to the San Francisco-Oakland Bay Bridge, an award

from the State to MacDonald, Young & Nelson, Inc., and Morrison-Knudsen Co., Inc. Others among the key personnel are **J. A. Crowl**, engineer; **J. A. Burke**, resident engineer, assisted by **W. C. Nomes** and **B. Housden**; **Raymond Boyd**, in charge of the office; and the following foremen: **E. T. Kemp** and **Emil Kallio**, carpenter; and **Hal Farley**, labor.

On the foundation work being handled by P & Z Company, **Bob Cook** is in the superintendent spot. **Bill Hamilton** is job superintendent and **Harry Groshong** is pile-driver foreman for LeBouef Daugherty and Martin Construction Co., another contractor working at the site.

Glenn Fredrickson is project manager and **Art Burch** is general superintendent for Fredrickson Bros., con-



Nobles

Stimbridge

tractor now finishing up an access road construction job from Vacaville to Travis AFB, California. Others who have been on this job are **Jack Tribolet**, in charge of the office; **Robert Nobles**, plant engineer; **Red Daniels** and **Ed Robinson**, foremen; **Glenn Owens**, labor foreman, and **M. W. Stimbridge**, plant mechanic.

* * *

Eldon Osborn is supervising a contract recently awarded to his company involving 1¼ mi. of highway improvement on Washington Blvd., Pasadena, Calif. Working for Osborn Co. as assistant superintendent is **Don Barkley**, formerly with Had-dock Engineers.

* * *

H. W. Brickman is superintending the erection of 38 units being built at Bell Air Square, a residential subdivision in Riverside, Calif.

* * *

Paul Houpt in the superintendent spot; **Jack Cain**, engineer, and **Paul Sines**, carpenter foreman, are key men on an over-\$200,000 tilt-up construction contract held by George W. Carter Co., covering erection of a manufacturing plant for Cold Metal Products Co. of California at Los Angeles.

* * *

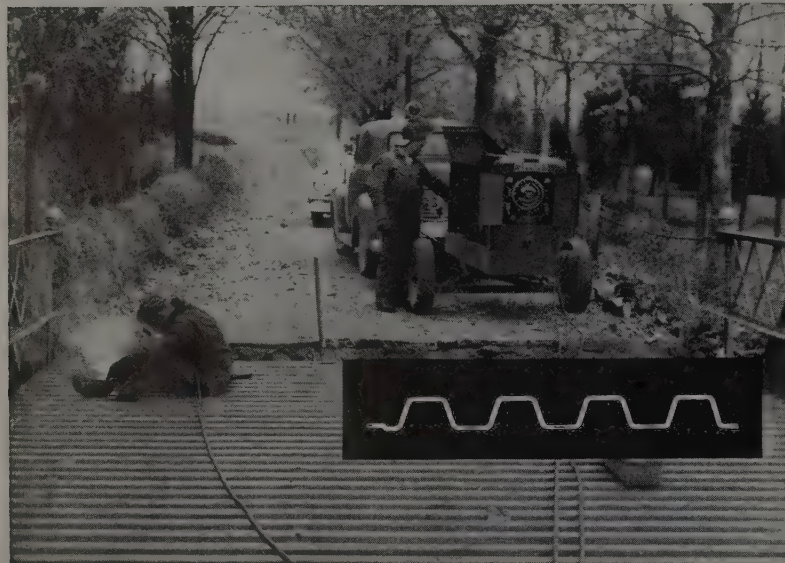
Vernon Evans is superintendent for Ben K. Tanner & Sons Co. on the erection of St. Joseph's parish church at Pomona, Calif.

* * *

Fred Kuehn is superintendent for Berke Bros. & C. R. O'Neil doing 1.9 mi. of grading on Highway 99 in Douglas County, Ore., contract for which was awarded on a low bid of \$165,015. Working the machine operating part of the job are **Johnny Wright**, **Jim O'Kinis**, **Robert Browning**, **Clyde Jensen**, **Arthur Lucas**, and **Billy Bower**. Also working at the site are **C. C. Staggs**, **H. C. Shafer**, **Wil-Padgett**, **Lloyd Landcaster**, **Walter Harvey**, and **E. S. Lamb**.

* * *

Henry B. Isbell is superintending a \$1,263,723 expansion job at Reno Municipal Airport for Isbell Construction Co. of Reno. **Ed Dempsey** and **Arnold Blair** are assistant superintendents; **Larry Callahan** is engineer; **Harry Varaschetti** is office en-



118-Foot Bridge Gets New Floor in 5 Days

Good planning and Armco Corrugated Metal Bridge Plank made short work of replacing the floor on this 44-year-old bridge.

The 24-inch wide Armco Planks were delivered in 16-foot lengths—to fit the width of the bridge. Corrugated metal design provided ample strength without excess bulk. Welding them to the bridge stringers helped stiffen the entire bridge. The job moved smoothly and quickly. An asphaltic concrete pavement completed the new floor. Total out-of-service time—just 5 days.

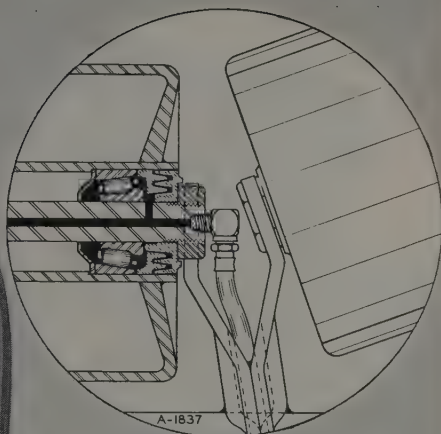
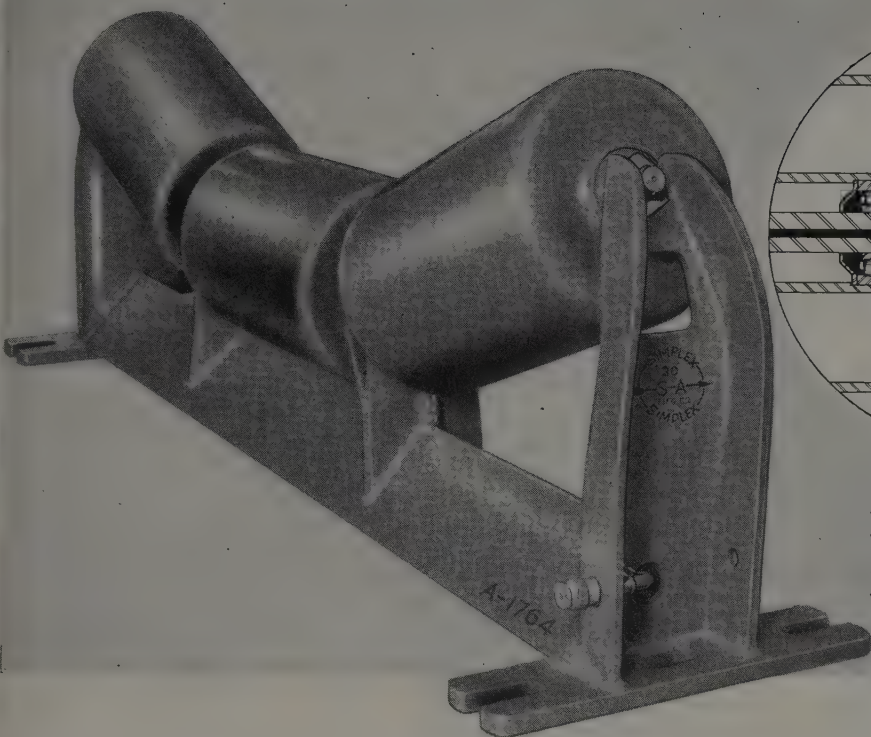
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One shot lubrication for each roller from one or both sides of conveyor. No necessity for reaching under moving belt for center-roll lubrication.

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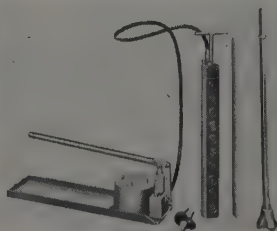
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gineer; A. J. Fernandes, George Conley, Clarence Wibel, Jim Blair, and Clarence (Bill) Boegle are foremen.

* * *

Nicholas M. Veinmiller, Bonneville Dam power plant operator foreman, was recently appointed Lookout Point Project powerhouse superintendent. Veinmiller first went to work for the Corps of Engineers in December, 1936. During World War II he served with the Seabees, and was a construction and maintenance electrician at Naval air bases in the Hawaiian Islands and at Guam.

Two other employees of the Corps of Engineers at the power plant are also in the news. They are Charles H. Ostergren, operator foreman, and Willie Inkinen, second mate aboard the Dredge "Rossell." Both men are retiring. Ostergren after 19 years of service, and Inkinen with 18 years'.

* * *

Les McDonald, assisted by Robert Gedes, is pushing through a highway job for the County of San Joaquin, Calif., awarded to Clements Construction Co. at a cost of about \$131,000. "Bud" Blair is another key man (mechanic) on this job.

* * *

B. C. Henry is acting as project manager for the firm of Johnson, Drake & Piper, Inc., of which he is vice president and area manager, on a job at the new vocational school for boys at Vacaville, Calif. H. A. Sturney is general superintendent, assisted by G. F. Krenkel. Foremen are: Pete Philips and Gordon Lundeg, general carpenter; Bill Peach, concrete; and C. Bond, cement finisher.

* * *

L. D. Ormsby is project manager and E. Schrock is general superintendent for W. J. Kubon, who was recently awarded a contract at about \$100,000 to erect a Bank of America building at Vacaville, Calif. Assistant to Schrock is E. Berntsen.

* * *

G. V. Hollinshead is supervising the erection of a warehouse building in Oakland, Calif., for A. S. Hormes & Sons, contractor doing the work for T. W. Corodar.

* * *

Tony Caputo, assisted by Jim Andrade, is superintending the \$1,200,000 contract of Dan Caputo Co. on Antioch Bridge in Contra Costa County, Calif. Others among the construction crew working there are L. Woods, road foreman, and Joe Williamson, steel foreman.

* * *

Howard Mead is general superintendent and Milton O. Ried assistant superintendent for Nomellini Construction Co. on erection of McKinley Elementary School, Tracy, Calif., a \$250,000 contract just about completed.

* * *

B. L. Gustafson is superintending for his own company on a \$338,301 contract for 7.2 mi. of grading and

plant-mix surfacing on new alignment of U.S. 66 northeast of Holbrook, Ariz.; a job which is expected to finish October 1, 1954. Gustafson is being assisted by his foremen, Nick Blackman (plant) and Cliff Sansom (truck). L. Greer is project engineer representing the Arizona Highway Department.

* * *

Warren L. Mooers is job superintendent on the \$852,517 installation of three 55,000-kw. turbines and switchyard at Folsom Dam, a contract recently started by Stolte, Inc., and expected to run till late 1955. Charlie Ballard is carpenter superintendent and William Kearney is millwright superintendent on the same job.

* * *

Norman G. Vadnais, assistant general manager, Northern Division of Kevry Construcion, Inc., is in overall charge, and Milton J. (Mike) Doyle is general superintendent of Kevry's \$228,609 contract for construction of sanitary sewers in Orchard Annex Districts, San Jose, Calif. J. Corbett and Nolan Ince are foremen and William (Bill) Nilson is equipment engineer.

* * *

C. S. Muir, general superintendent, and L. R. Reiter, superintendent, head the construction force of McLaughlin, Inc., on 8.5 mi. of grade and gravel surface on highway from Fairfield west in Teton County, Mont. Work on this \$203,395 contract was temporarily halted in July after completion of 2 mi. of grading, and resumed after the irrigation season. Completion is scheduled for July 31, 1955.

* * *

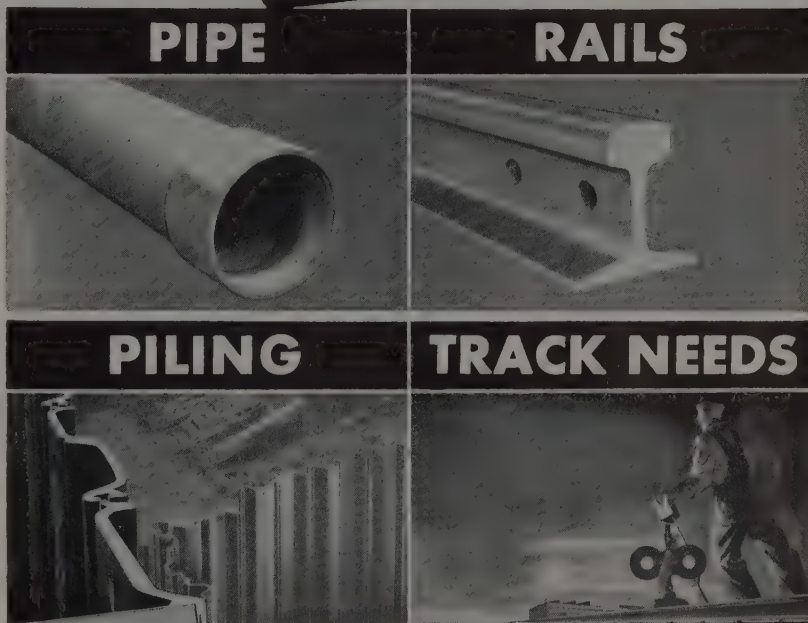
William E. Cowan, superintendent, assisted by Jimmie Darrough and Jack Darrough, grading foremen, and Daryl Doyle, paving foreman, is supervising a \$524,306 contract held by Brown-Ely Co. and W. H. Darrough & Sons consisting of 5.3 mi. of grading and surfacing on U.S. 40 Alternate between Oswald Road and Route 15, Sutter County, Calif.

* * *

Ivon Milligan, carpenter foreman, is working for C. L. Miller Construction Co., which is building a 140-ft. reinforced concrete fishway and trap section on the Klickitat River near White Salmon. Purpose of the construction is to by-pass river falls. Job will probably run till the middle of November.

* * *

Wayne Dirst is superintendent on a \$1,616,000 contract held by M. M. Sundt Construction Co. for building an assembly and test facility for the Air Force at Tucson, Ariz. Other key men on the job include Ed Rhodes and W. D. Covey, general carpenter foremen; Leonard Austin, general labor foreman; and Frank Schmeeder, office manager. San Xavier Construction Co. is sub-contractor for roads, paving, and site



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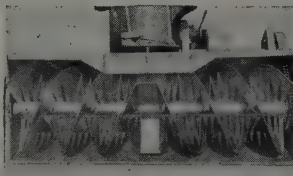
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* * *

Gibbons & Reed holds a \$1,209,074 contract for construction of roads and lanes on Dugway Proving Ground at Tooele, Utah. Lee Bryner is superintendent; Howard Woods is engineer, and William J. Reagen is office manager.

* * *

L. G. Kenworthy is acting as project manager on Kenworthy & Patterson's contract for grading and surfacing on Highway 120 for the California Division of Highways. This \$440,000 job will probably end in mid-June, 1955. It includes a 2-span steel girder bridge with concrete deck subcontracted to Thomas Construction Co. Supervising for Thomas are George Borovich, superintendent; William Fox, resident engineer, and Fred Hunsacker, foreman.

* * *

Chris R. Reid has entered the general engineering construction business for himself and is currently doing work for the State in the vicinity of Concord, Calif. Reid, whose headquarters are at 1134 Edan Ave., Stockton, Calif., was formerly with Stockton Construction Co., Nomellini Construction Co., and Cannon Construction Co.

* * *

Bernard V. Fredrickson is superintendent on a \$1,655,392 contract held by Fredrickson & Watson Construction Co. for 6 mi. of grading and surfacing and building 5 bridges in Ventura County, California. M. A. Bailey is general foreman; Fred Dohle is clearing foreman, and J. Gahan is office manager.

* * *

L & L Contracting Co., Inc., and M-B Contracting Co., Inc., of Seattle hold a \$1,250,135 contract for building hardstands, parking aprons, and lead-in sidewalks at Anchorage, Alaska. Key men on the job include N. V. Raney, utility superintendent; Ernest Kisse, building superintendent; D. Dougherty, James Reilly, and George Heinsen, engineering; H. A. Leader, office manager; W. H. Bookwalter, master mechanic; and Bill Neve, timekeeper. Completion date is September 1, 1955.

* * *

A. E. Huett is superintendent for Gordon Fields on a lift-slab addition to Helms Bakery plant in San Bernardino, Calif.

* * *

Otis Burrows is superintending a \$135,000 precast, one-story building job at Terrace Union School near Colton, Calif., for J. P. Henck of San Bernardino.

* * *

John S. Leavitt and Benson Chandler are co-adventurers on a \$319,500 contract held by Leavitt, Chandler & Co. to build military control and launching areas at Winslow, Wash. Charles E. Merrell is general superintendent.

ENGINEERS
ON THE MOVE

... Continued from page 105

Edward R. Lee, Jr., mechanical and consulting engineer with Kissick Co., power plant equipment specialists, for the last 3 yr., has been named power engineer for Kaiser Engineers.

* * *

Albert M. Capps, Bonneville Dam chief of operations, has been named Bonneville Dam project engineer in place of Frank M. Lewis, transferred from the Portland District to the North Pacific Division, Corps of Engineers. Lewis will coordinate operation and maintenance of C. of E. multiple-purpose projects in the Pacific Northwest as part of his new job.

* * *

Anson S. Blake has retired as president of Blake Brothers Co., general contractors of Richmond, Calif., a position he held for 50 yr. Henry C. Steinbach moves up from vice president to fill the vacancy. Other new officers are John N. Asmussen, vice president; Gustav Kuppe, secretary and treasurer; and Will H. Hall, assistant secretary and engineer.

* * *

Col. William F. Cassiday has been assigned assistant division engineer of the South Pacific Division, Corps of Engineers.

* * *

S. Carl Smithwick, president of Smithwick Concrete Products of Portland and Eugene, Ore., has been elected president of the National Concrete Masonry Association. The group includes about 600 block manufacturing companies in the United States, Canada, Alaska, and Hawaiian Islands.

* * *

James Robertson, supervising senior city engineer for the City of Seattle, Wash., has been selected for the Samuel A. Greeley Service Award for 1954 by the American Public Works Association. He will get the award at the group's annual congress in Atlantic City, N. J., September 22.

* * *

Rex L. Eberline, field engineer with the Zia Co. at Los Alamos, New Mex., has been appointed assistant city engineer and head of the engineering division of the Albuquerque Public Works Department.

* * *

Kenneth E. Mauck has been named executive vice president of the Seattle Builders' and Contractors' Association.

* * *

Frank H. Prouty, a partner in the Denver firm of Prouty Bros. Engineering Co., has been employed by the International Claims Commission to go to Yugoslavia and appraise 25 industrial plants which formerly belonged to American citizens but which were nationalized. He will help establish a financial basis which will

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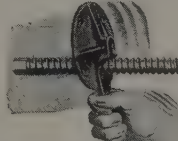
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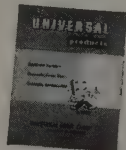


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* * *

Robert F. Woessner has been named vice president and superintendent of operations of Mutual Construction Co. of Portland.

* * *

Lt. Col. A. P. Rollins, Jr., has been named executive officer of the Albuquerque District, Corps of Engineers, in place of **Col. V. A. Shurm**, who is going to Army War College at Carlyle Barracks, Pa.

* * *

Harvey F. McPhail, who retired from the Bureau of Reclamation recently, was named head of the Hydroelectric Division of Kuljian Corp. with headquarters in Philadelphia.

* * *

Col. Paul C. Brown has been appointed chief of the Construction Division, for the assistant chief of staff, installations at headquarters, U. S. Air Force. He is living in Arlington, Va.

* * *

Herbert M. Leppich has been appointed director of the Division of Engineering and Construction at the Idaho Operations Office of the Atomic Energy Commission, Idaho Falls, Idaho.

* * *

Washington Highway Department reports that **Jack Smythe** and **Glen Guy** have been promoted to resident engineer status. Smythe is doing lo-

cation work near Bellingham while Guy has been assigned to construction near Auburn.

* * *

Col. Alexander H. Miller, Walla Walla District, Corps of Engineers, executive officer since February 1953, has been named District Engineer in place of **Col. F. S. Tandy**, who retired to civilian life after 30 years service on July 31.



Miller



Seeman

Brig. Gen. Herbert D. Vogel, Division engineer of the Southwestern Division, Corps of Engineers, has been nominated by President Eisenhower to be a member of the board of directors of the Tennessee Valley Authority in place of **Gordon R. Clapp**. **Col. Lyle E. Seeman** will take over as division engineer with headquarters in Dallas, Tex. New Mexico and Colorado fall within the Division boundaries.

* * *

Col. C. D. McDaniel has been

named executive officer of the North Pacific Division, Corps of Engineers, to replace **Col. J. U. Moorhead**, assigned as district engineer, Portland District.

* * *

G. T. Bath, secondary roads engineer for the Wyoming State Highway Department, has been assigned the duty of getting right-of-way for all secondary road projects so **Jess Graham**, right-of-way engineer, can devote his time to setting up primary and interstate projects.

* * *

Project engineer assignments have been listed by the Los Angeles District, Corps of Engineers, to include the following: **Leonard G. Hogue** is assigned to Los Angeles Defense Area Site 96; **Harry F. Althaus** is assigned to Navajo Ordnance Depot; **Vernet A. Fisher** is assigned to Mt. Laguna; and **James W. Hamilton** is assigned to Norton Air Force Base Project in place of **Bill Smiddy**.

* * *

Horatio G. Stoner, chief of the survey and drafting branch, Portland District, Corps of Engineers, retired in August after 26 years' service.

* * *

David O. Van Strien, professor at Michigan State College since 1947, has been named professor of civil engineering and chairman of the civil engineering department at the University of Denver. He succeeds **Martin P. Capp**, who resigned in 1953.

DEATHS

CONTINUED FROM PAGE 105

Frank A. Johnson, 65, widely known structural engineer, died recently at Sacramento, Calif. Because of illness, he retired in April as principal structural engineer for the California State Division of Architecture.

* * *

Ralph H. Hill, 58, died unexpectedly July 8. He was a maintenance foreman for the California Division of Highways, working in Shasta County, Calif.

* * *

Ralph G. Griffin, 68, died recently in a Sacramento hospital. He was well known for his work as an engineering aide for the U. S. Engineers in the Sacramento Valley before his retirement in 1952.

* * *

Leon A. Paddock, 75, internationally known engineer, died July 27 after a long illness. It was under his direction that American Bridge Co. built the San Francisco-Oakland Bay Bridge and numerous other notable structures.

* * *

A. R. McGinnes, 70, retired regional engineer for the Central Valley Project in California, died re-

cently at his home in Sacramento after an extended illness.

* * *

R. D. Canfield, recently appointed to the position of chief engineer of the Arizona Highway Department,

R. D.
Canfield



was killed in an automobile accident on August 9. He had been deputy state engineer for a number of years, being promoted to the top job after the death of **R. G. Perkins**.

* * *

Cleves H. Howell, 74, chief engineer for the Bureau of Reclamation at Longmont, Colo., in the '30's, died July 22 at Longmont. He had retired several years before his death.

* * *

Blaine Riley, 60, project engineer for the New Mexico Highway De-

partment for 15 yr., died July 26 in Albuquerque.

* * *

George Rex Ross, chief engineer of the Sacramento, Calif., water department in 1913 and 1914, died July 25 in Long Beach.

* * *

Paul De Huff, construction-production analyst and consultant of South Pasadena, Calif. died recently.

* * *

Guy H. Bailey, 67, died in a Boise, Idaho, hospital recently. He was a retired railroad construction superintendent for Morrison-Knudsen Co., Inc., and manager of M-K's Southwest railroad division at Los Angeles.

* * *

Harry H. Murphy, 78, died at his home in Los Angeles recently. He came to California from Salt Lake City 30 years ago and was active in the heavy construction industry.

* * *

Edward Rugler, 38, San Leandro, Calif., foreman of a crew painting a bridge over the San Joaquin River near Stockton, Calif., died July 7 as a result of injuries sustained when he was thrown from a girder. A truck carrying farm equipment passed under Rugler, and as it did so, a piece of equipment snagged the hose to the spray gun Rugler was using, throwing him to the bridge deck below.

ALASKA Newsletter

By CLIFFORD S. CERNICK, Anchorage

BIGGEST NORTHERN PROJECT—The imagination of northern construction men has been fired by announcement recently of the huge British Columbia and Yukon power developments and metallurgical projects. According to the announcement, issued by the Quebec Metallurgical Industries, Ltd., and Frobisher, Ltd., the project will "rank among the major engineering developments of the modern world."

TO DIVERT YUKON — It is planned to begin work next year on the project, providing necessary licenses are obtained from the governments of Canada and British Columbia before the end of this year. As now envisioned, waters of the 2,000-mi.-long Yukon river, which flows across Alaska and into the Bering Sea lying between Siberia and Alaska, would be forced to flow south to generate power at plants in the Sloko, Nakonake, and Taku valleys of Canada.

HUGE PROJECT COST-WISE—The immediate major objective of the project, planned for completion by 1962, will require capital outlay of \$269,950,000. Of this amount \$212,750,000 will be spent on developing 880,000 hp. of electrical energy. The remaining \$57,200,000 will be required to construct the necessary smelters and refineries to treat ores and concentrates. Hydro power consultants say the project makes the most effective use of the waters of the Upper Yukon of all the schemes proposed for harnessing these waters.

PROJECT'S EFFECT—A project of the scope outlined cannot help but have a highly stimulating effect on the construction industry in the north. If you are a contractor, you will no doubt have a chance to place bids on some phase of the giant undertaking. Sub-contractors, too, will be in great demand once the green light is given. If you are a construction worker, there is no question that the new project will offer you opportunities. As in the past on projects of such scope, hiring probably will be through the contractor's office, with the big inducement on a job of this kind being several years of uninterrupted work. Vast quantities of construction equipment and supplies and the services of a small corps of engineers and draftsmen will be required, once the project gets going full steam ahead.

BETTER COMMUNICATIONS—Contractors with field offices and crews in Alaska can be assured of

better, faster communications after 1956 when the new 370-mi. underwater cable to Alaska is completed. The projected cable construction project will link Skagway, Ketchikan, and other Alaskan points. When completed, the cable will tie-in to an 800-mi., \$14,000,000 cable which links Ketchikan with Port Angeles, Wash.

JET DRILLING—Alaska contractors may find that jet-type, waterwell drilling may slash their construction costs. A jet drill especially built for Geological Survey test wells was demonstrated recently near Fairbanks. The jet method of drilling utilizes the force of a circulating water stream "shot" through drill rods extending from the surface to the bottom of the excavation. This is in addition to cutting action of a bit on the lower ends of the rods. The drill rig consists of a gasoline-powered pump to circulate the water, a gasoline engine with a suitable eccentric by which drill rods are raised and dropped to provide cutting action, and a 25-ft. wood frame derrick for handling drill rods and casing.

RECAPITULATION—Col. Carl Y. Farrell, Alaska district engineer, reports that construction work accomplished in Alaska during the 1954 fiscal year which ended June 30 amounted to about \$120,000,000. He added that the program of military construction in Alaska has averaged over \$100,000,000 annually since 1949. During 1954 fiscal year, a total of 76 separate projects amounting to over \$85,000,000 were awarded to contractors. As of July 1, there were 128 military projects under contract in the territory. These contracts total \$235,000,000. Eighty-one of these will be turned over to the Army and Air Force by the end of this December.

NEXT YEAR'S OUTLOOK—A promising picture is indicated for Alaska's construction industry next year. The District Engineer reports that the 1955 fiscal year may become "a new high year for military construction in the territory." Col. Farrell stated that according to present estimates, a construction year of approximately \$145,000,000 total is possible. He said this was based on the scheduled accomplishments for the year on projects presently under contract plus work on additional projects the Engineers plan to place under contract next year.

BILLION - DOLLAR BOOM—\$1,000,000,000 in new Alaskan investments is predicted for the next 10 yr. by the Alaska Development Board,

\$130,000,000 of which is forecast for 1955 alone. Listed among the items planned, some of them tentatively, for the 10-yr. period is the Aluminum Company of America's Taiya project near Skagway with a proposed investment of from \$400,000,000 to \$700,000,000. However, this may be canceled out if the huge Canadian power plan is constructed. Other large projects indicated are the Georgia Pacific Plywood Co.'s Wrangell project, \$56,000,000; Alaska Pulp Company, Ltd., \$30,000,000; Pacific Northern Timber Co., \$15,000,000; Gubik-Fairbanks gas line \$25,000,000; and expansion of the coal industry, \$6,000,000.

LABOR PICKETS LABOR—A union found what it was like to be picketed recently, in Fairbanks. A large group of construction workers picketed their own union hall in protest of what they called "unfair and dishonest dispatching practices." The pickets said they were protesting the alleged practice of the union of "allowing employers to come to the union hall and pick men for their physical appearance and not on the order of the hiring list." The president of the local issued a curt statement declaring that most of the pickets had received jobs during the construction season, but for one reason or another had been fired.

CONSTRUCTION NEWS CAPSULES—Contractors who pass up a chance to buy federal surplus property won't get a second chance at it; a bill has been approved authorizing Uncle Sam to turn over the surplus to the territory of Alaska if it cannot be sold to the public... One of Alaska's smallest power projects is planned near Wrangell; it includes a 20-ft. dam, a penstock about 2,000 ft. long and a short power transmission line. Wrangell now is seeking a preliminary power permit for the project... Alaska's over-all employment situation will show improvement after September 1, employment officials say, when large numbers of college students leave Alaska jobs to return to school... All bids for extension of the electrical distribution system at Ladd Air Force Base have been rejected by the district engineer as excessive... A new method of cleaning sewers—use of a "Wayne Ball" which is made to float down the sewer and controlled by cable or rope—is getting good results in Fairbanks. As the ball floats down the sewer, the turbulence created by water flowing past dislodges dirt and debris for the ball to push to the manhole where it is removed... Twelve major dams on the Susitna River are envisioned if present power development studies are adopted and work authorized. The ultimate plan for Alaska's Susitna River calls for a power output of 1,249,000 kw. Most of the land involved is now government-owned.

TRICKS of the TRADES



FRED STULLER (left) and his shop for heat treating and machining drill parts.

Keep the drills going

WHEN YOU ARE a long way from civilization, it pays to have on hand the tools and equipment necessary to keep the job rolling. This is certainly true on the Cherry Valley Dam being built by the Guy F. Atkinson Co., which is about 100 rugged miles from the nearest large city. To keep the large Joy Challenger drills in top production, (see page 57, this issue) they have established a fine heat treating and machine shop to take care of the drill steel, shanks, bits, adapters, and collars.

The Joy drill is designed to handle 20-ft. lengths of 2-in. diameter drill steel with bits of $3\frac{1}{2}$ - to $4\frac{1}{2}$ -in. diameter. Atkinson has chosen to fabricate from basic bar stock the drill steel, shanks, and collars. For the first, high alloy drill steel is furnished by the Crucible Steel Co. of America. For the shanks and collars, Max-El $3\frac{1}{2}$ Alloy machinery steel is used. Basic equipment required for the fabrication process is a furnace and a good lathe. Atkinson has an American Electric Furnace that is thermostatically controlled for a temperature range up to 3,000 deg. F. and a 25-in. Standard Lodge & Shipley

modern, double-chuck, oil-field type lathe.

To process the 20-ft. drill stock, each end is treated in the following manner. It is first normalized or annealed at 1,600 deg. F for $\frac{1}{2}$ hr. When cool, the end is machined to a reverse buttress thread, reheated to 1,600 deg. F., and quenched in Houghton's No. 2 quench oil. The temper is drawn next by reheating it in the furnace for $1\frac{1}{2}$ to 2 hr. and again allowed to cool. No drill steel in operation has been known to break near the collar (as other types have) after this process.

The shanks and collars are similarly fabricated from basic bar stock—with two exceptions in the heat treating process. It is not necessary to first normalize these parts before machining them, and the final step of drawing the temper is done at 750 deg. F. rather than at 500 deg. F. The bits and adapters also follow the same process as that employed for the shanks and collars for heat treatment after machining.

Fred Stuller, shop foreman, is largely responsible for the work accomplished above. His vast experi-

ence is such that "... you ask his opinion. You'll never have to tell him how to do it." For example, the bits used are of various makes and have Carboloy insert tips. Fred has designed jigs for the grinders that handle both the cross and square type of bit pattern.

Welders' mobile clinic

"IF THE MOUNTAIN won't come to Mohammed, then Mohammed will go to the mountain," might be the theme song of this field demonstration truck as it rolls along throughout the country conducting welding clinics.

Welders invited by local dealers and distributors are brought up to date on many of the industry's newest Automatic Submerged-Arc welding and hard-facing techniques, and are introduced to a number of the latest products marketed by the truck's sponsors.

Sponsored jointly by Mir-O-Col Alloy Co., Inc., and Pacific Welding Alloys Manufacturing Co. of Los Angeles, the mobile unit is under the tutelage of Sid Jordan, well known welding consultant. Currently the clinics are being conducted throughout the Midwest.

A question and answer period during each session, as well as mutual exchange of "How I solved it" or "It worked best this way for me" situations, usually highlight each clinic.

The truck itself is equipped with the latest Mir-O-Col Automatic Submerged-Arc Rebuilding Equipment, along with full lines of both Mir-O-Col Hard-Facing Rods and Pacific's Stainless and Alloy Welding electrodes.

Operators' eight-page magazine by Gradall

PUBLICATION OF "The Gradall Man," a new magazine devoted to "the guys who run the Gradall," the company's earth-moving machine, has been announced by The Warner & Swasey Company, Cleveland.

To be issued quarterly, this service publication will go to owners and operators of Gradalls. As stated on the editorial page of its opening issue, "It will bring you news about Gradall operations, stories telling how other operators are using their machines, and information to help you do a better job of operating and maintaining your own machine."

Liberal illustrated, each issue of the eight-page magazine will contain a feature story on a construction project involving earth-moving problems, and examples of the use of Gradall for a variety of purposes.

A special page will be devoted to questions and answers about Gradall maintenance and operation. Operators and owners are invited to send queries and suggestions to the editor.

NYLON in the U. S. Royal Con-Trak-Tor helps you through the heavy going—*keeps you on schedule!*

ALL-NYLON STRENGTH

The Con-Trak-Tor's Nylon cord body withstands murderous impact . . . means that you get every hour of tire life built into this great U. S. Royal tire.

TRIPLE IMPACT PROTECTION

The Con-Trak-Tor's built with extra rubber between cord-ply—double shock-pads beneath the tread—tough rock-resisting construction at the crown.

FULL LUG TRACTION

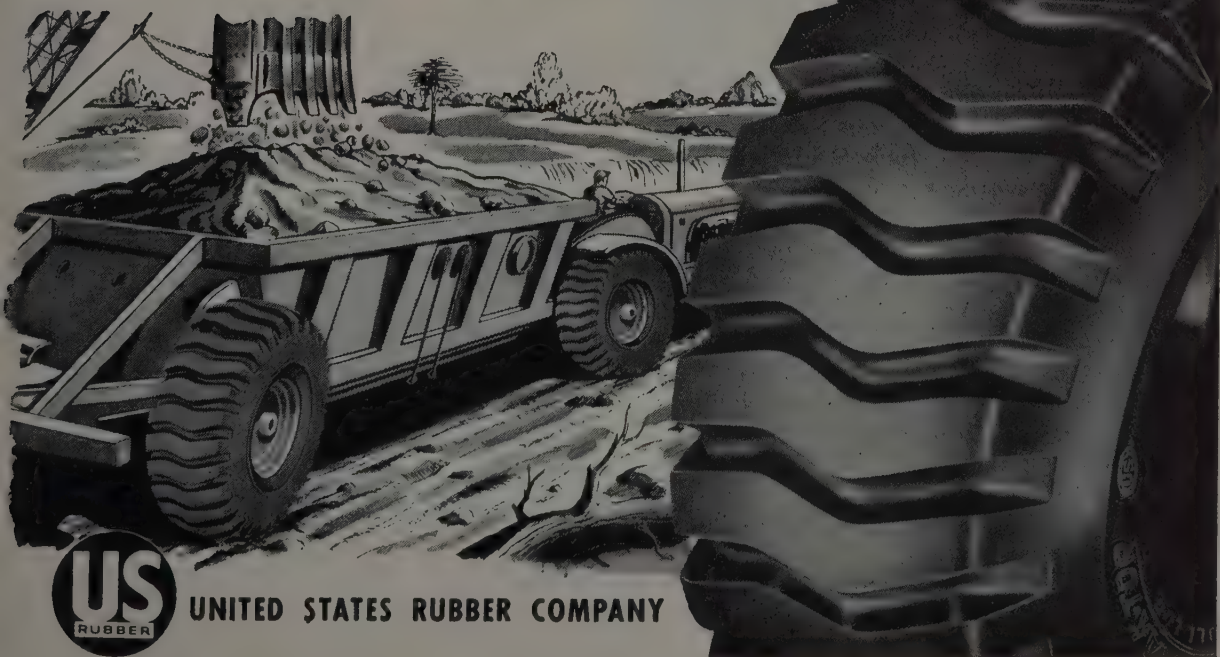
The Con-Trak-Tor's full-width lug design digs deeper, pulls harder in forward or reverse—actually works where other tires stall.

Prove it. Put the Nylon U. S. Royal Con-Trak-Tor to work—watch your pay loads stay on the move. Your U. S. Royal Dealer has it in your size, for your job.

NYLON...Keeps Pay Loads Moving!

U.S. ROYAL

CON-TRAK-TOR
FULL LUG



They are also invited to submit photos of Gradall in action which will be paid for, if acceptable for publication.

Gradall owners and operators may be put on the mailing list for this publication by writing to Edward L. Murray, editor, The Gradall Man, The Warner & Swasey Company, Cleveland, Ohio.

Double-life for Cat D8 treads working on rock

CRAWLER TRACTOR OWNERS using their machines on rock and other hard surfaces may now purchase double grouser track shoes for Caterpillar D8 Tractors. In areas where the tractor is working in blasted rock, track shoes may suffer from extreme wear due to track slippage and from bending. The double grouser shoe is designed first for a considerably greater resistance to bending.

Resistance to bending is achieved by having two parallel grousers lower in height than the single grouser shoe



POINTING OUT the advantages of using double grouser shoes is G. E. Burks, director of engineering, Caterpillar Tractor Co.

but wider. Likewise the body of the shoe is made thicker, all at the expense of added weight but designed for the best usage of material to gain the greatest possible resistance to bending. The second grouser at the mid-section of the shoe provides protection to the track shoe bolt heads. The grouser tips are wide and extremely hard, which increases the wearing area over the single grouser more than three times.

The design of shoe is not comparable to the single grouser shoe under normal soil conditions where the most important factor in the track shoe design is good soil penetration for maximum traction or drawbar pull. Too, the double grouser shoe is not designed for steep side-hill work in rock or frozen ground.

TOOLS of the TRADES

Use the coupon on page 131 for free information on any of these items

1

ENGINEERS' RULE—A new rule especially designed for civil engineers, surveyors, and general contractors has been announced by **Stanley Tools**. On one side, markings are graduated in 100ths and 10ths of a foot. The tape marking is called "mistake-proof" because foot and decimal markings appear at each 10th and each foot is marked in red. The other side of the rule is graduated in feet, inches, and 16ths of an inch. Here each foot number is marked in red and repeated in red at each inch, and every inch is identified. Called Engineers' Rule No. 116, it has big numbers and graduations embedded into the wood. The rule is 6 ft. long. Cost is \$1.85 each.

2

CONCRETE POUR CHECK LIST—The Atlas Concrete Checker, a check list of 10 important items to consider just before you begin a concrete pour, is available from **Irrington Form and Tank Corp.** Printed on heavy cardboard, it reminds foremen to check such items as grade nails, accessories, boxes, sleeves, pilaster chamfer strips, center-to-center measurements on column bolts, and other items.

3

WIRE ROPE GREASE—Howard Drullard Co. has published a 4-page folder describing **Lead-Cote**, which is an open gear and wire rope grease for use of hoists, shovels, cables, dredges, and the like. Folder describes makeup, characteristics, operating suggestions, and price list of this product. Also contains testimonials from satisfied users.

4

MASK FOR TRACTOR DRIVERS—A new air-conditioning dust mask for tractor operators has been announced by **General Scientific Equipment Co.** Called **Filtercool**, the mask can be worn all day while remaining cool and dry inside. The wearer's exhaled air is drawn away to the tractor's air cleaner by the tractor's vacuum system, to which the mask is connected by a rubber hose. If the tractor engine stops or the exhaust hose becomes clogged or disconnected, the mask becomes a conventional respirator mask. A valve adjustment regulates the amount of engine vacuum supplied through the mask's hose. All necessary parts for installation to the engine are provided with the kit. It costs \$19.95.

5

A NEW ELECTRODE for welding manganese steel, called **Wear-Arc Super WH**, is described in Bulletin AR-5, published by **Alloy Rods Co.** This 4-page folder describes the electrodes, gives typical applications and welding procedures, and contains tables of welding specifications as well as pictures of welded specimens.

6

TWO SPECIFICATION SHEETS describing **Flexco** speed tools and containing recommendations as to which would be most satisfactory when used with various brands of impact tools have been published by **Flexible Steel Lacing Co.** Bulletin No. F-110 contains specifications and descriptions of various types of **Flexco** tools. Bulletin No. F-111 contains recommendations on the use of various impact tools with **Flexco** speed tools.

7

A HIGH-SPEED chamfering electrode, called the **All-State High-Speed Chamfer Rod**, has been announced by **All-State Welding Alloys Co., Inc.** Reported to be the fastest electrode yet announced for chamfering, gouging, beveling, routing, and channeling, it uses A.C. or D.C. current. It is used without oxygen or compressed air. Now available in 1/4, 5/32, and 3/16-in. core sizes.

8

SAFETY SAW BLADE—**Construction Machinery Sales Co.** announces its new **Orange Break-Proof Safety Blade**. Internally reinforced with fiber glass which helps give the blade flexibility and strength and increases the bonding of abrasive materials, it comes in three types. They are S-1, for wet cut of any hard or dense material; S-2, for general purpose wet cutting; and S-3, the all-purpose dry cutting blade. S-3 is also recommended for wet cutting such soft materials as cinder block, light aggregate block, or porous fire brick.

9

BOSTON HOSE CATALOGUE—A color catalogue describing its line of water and water suction hose has been announced by **Boston Woven Hose & Rubber Co.** It lists specifications for each type of water hose as to size, weight, construction, recommended use, and working pressures.

10

GRADER OPERATING INSTRUCTIONS—"How to Operate a Galion Motor Grader" is the title of a 20-page, illustrated booklet published by **The Galion Iron Works & Manufacturing Co.** Printed in four colors which makes the various parts stand out, the booklet takes up in detail steering, blade positions, moldboard positioning, gear speeds, turning, ditching, and snow removal.

11

A SERVICE MANUAL illustrating and describing factory-approved service tools for **Allis-Chalmers** tractors has been issued by **Owatonna Tool Co.** Its 12 pages are crammed with illustrations and descriptions showing shop and field service operations, giving approved procedures to follow, and listing the proper tools to use for each case. A must for the man who services **Allis-Chalmers** tractors. Ask for Manual No. AC-54.

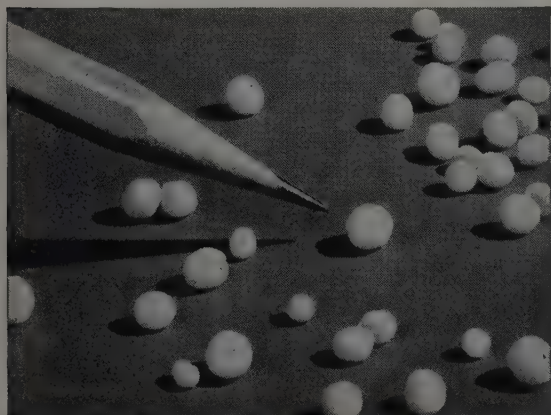
PELADOW GIVES CONCRETE 40% GREATER WORKABILITY

New high-test Dow calcium chloride added to the mix makes concrete flow rapidly through the chute, fills forms completely, for smooth, uniform surfaces



Above: Even flow and complete fill in forms is assured by Peladow added to the mix in concrete. By eliminating many troublesome voids in corners and pockets normally caused by surface adhesion, you gain smoother, better appearing surfaces that require minimum pointing up.

Right: Concrete with Peladow flows easier, more rapidly through chutes with little hand labor, even at turns and blockades. Mixer and chutes require less cleaning after the job is complete, too.



NOW DOW OFFERS AN ECONOMICAL NEW TYPE OF CALCIUM CHLORIDE (94-97%)—Peladow®, in buckshot-size pellets. It's economical to use—4 pounds does the work of 5 pounds of conventional flake calcium chloride. You'll save money, too, in shipping, handling and storage when you order Peladow in bulk, shipped to you in closed hopper cars. Peladow is also available in convenient, sturdy 100-pound bags. Write today for more information about this money-saving new type of calcium chloride. THE DOW CHEMICAL COMPANY, San Francisco, Los Angeles, Seattle.

you can depend on DOW CHEMICALS



Common sense plus knowing your materials equals a job well done



VERY LITTLE ASSISTANCE was required from a come-along to move five sections of pipe down the 30-deg. slope. The pipe rested on a concrete cradle in the pilot tunnel. Excess dirt is cleared away in front. (Photo courtesy of United Concrete Pipe Corp.)

A 65 FT. BLUFF was an obstacle which had to be overcome on the Los Angeles County Flood Control Project No. 264, 26th St.-Georgina Avenue Drain, in Santa Monica, Calif. Alternates called for either jacking or tunneling to lay the 51-in. diameter, 8-ft. long sections of tongue-and-groove reinforced concrete pipe on a 30 deg. slope down into Santa Monica Canyon at the end of 17th St. The discharge end of the drain is about 175 ft. from the base of the bluff.



Charles Burch & Sons, contractor on the project, successfully used an unusual approach. The first step was to dig a 24-ft.-deep shaft at the top of the bluff. Then a pilot tunnel 3 to 4 ft. in diameter was hand dug from both ends. A concrete cradle 24 to 30 in. wide and 6 in. deep, was poured the length of the pilot tunnel, establishing line and grade.

Pipe installation

After setting in several sections of beveled pipe to form part of the vertical curve at the bottom, the balance of the pipe was inserted from the top of the bluff. When a section had been lowered into the shaft and lined up, the weight of the pipe and assistance of a come-along were sufficient to move the last section and those ahead of it down the tunnel. Excess earth was cleared away ahead of the front section and easily removed down the tunnel and out through the pipe at the bottom.

Grout was poured down the tunnel around the outside of the pipe and the joints were plastered within. The vertical curve at the top was laid in open ditch.

Paul Rappe was superintendent on this portion of the project and H. Berkowitz was the Los Angeles County Flood Control inspector under the direction of Harold Ball, senior inspector, United Concrete Pipe Corp. furnished the concrete pipe which again demonstrated the rugged strength and utility of concrete pipe of modern design.

Tunnel insulation

TO PROTECT giant electric power lines carrying 1,250,000 kw. against temperature changes, engineers of the Aluminum Company of Canada turned to vermiculite to do the job.

The lines involved pass from a powerhouse at Kemano, B. C., through a short tunnel and then 12 mi. across the Rocky Mountains to the world's largest aluminum plant at Kitimat.

Because of the varying load on the cables, engineers were particularly concerned about consequent temperature changes where the lines pass through the tunnel. To stabilize the temperature at a constant 70 deg., some 1,200 bags of Vermiculite loose-fill were poured around the cables.

...For PEAK PERFORMANCE

On Every Job

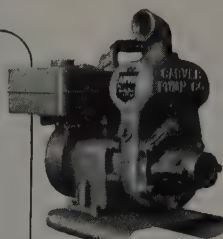
CARVER PUMPS

If you want peak performance on every dewatering job depend on CARVER!

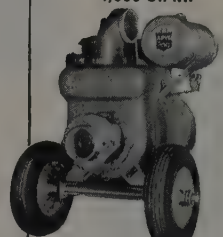
CARVER manufactures the complete line of self-priming pumps from 4000 G.P.H. to 250,000 G.P.H. Every one of these pumps has the same simple design, sturdy construction and rugged durability that mean outstanding performance where jobs are really tough.

Your CARVER DISTRIBUTOR can also supply you with Diaphragm Pumps and a full line of high pressure Jetting Pumps. See him today.

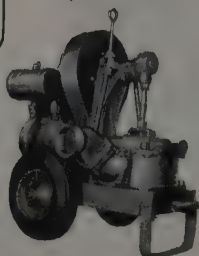
CARVER PUMP CO. 1416 Hershey Ave.
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1 1/2" SELF-PRIMING
4,000 G.P.H.



3" SELF-PRIMING
20,000 G.P.H.



4" DIAPHRAGM PUMP
6,000 G.P.H.



CARVER

the quality name in pumps

Work progresses with chain link retaining shield



WORKMEN CLIMB down 150 ft. over a now safe rocky slope lying above tunnel intake. About 20,000 sq. ft. of shielding was laid.

IN A NEW application, conventional chain link fencing, used as a retaining mat, is anchored on slopes of the new Palisades Dam project on the Snake River near here to prevent landslides which threaten to clog intake tunnels. U. S. Steel's Cyclone Fence Division teamed up with engineers from the Palisades Contractors, a joint venture of J. A. Jones Construction Co., the Chas. H. Tompkins Co., and the U. S. Bureau of Reclamation, to lick one of the toughest problems confronting the dam engineers. Discharge tunnels from the dam, the largest earth-filled dam yet to be constructed by the Bureau of Reclamation, had to be cut through a rugged mountain.

Dangerous situation

During excavation for tunnel intake structures, despite repeated sealing operations by the contractor, rocks were continually falling to lower levels. This dangerous situation continued even after completion of excavation in these areas. Dam officials decided to try to install steel mats to hold the rocks in place. Not only during remaining construction of the tunnels, but in the future, intake structures will nest on top of the tunnels, and a free flow of water through them must be assured. Cyclone Fence Division of U. S. Steel's American Steel and Wire Division won the contract for the project—the first time in dam construction that

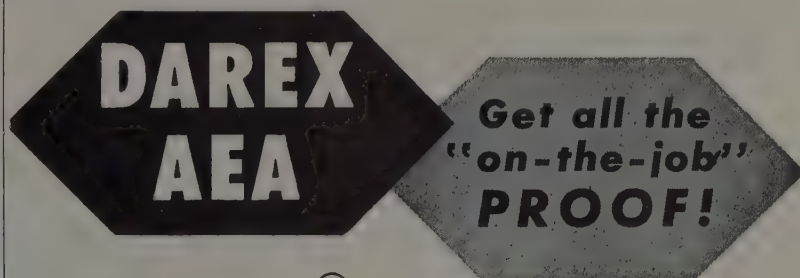
fencing has been used as retaining shields.

Work has just been completed on the project by a fencing crew which has been on the job since spring. Holes 8 ft. deep and 5 in. in diameter were drilled on the top of the mountain to hold steel anchor rods, which were then cemented in place. A heavy steel cable was strung through each of 15 rods. With specially made pickets, the wire mesh mats were laced in place at the top of the mountain.

Distances from the top to the bottom vary from 50 to 150 ft. At the bottom of the installation, anchor

rods similar to those used at the top hold another cable to which the matting is secured. Cyclone chain link fencing, because of its high tensile strength of 80,000 psi., made the project possible.

"We're mighty proud of this job, which is built to last a long time," said Fred Miller, Cyclone's sales engineer at Salt Lake City, Utah, who supervised the project. "We believe the successful application of chain link matting on the Palisades Dam job will open up an entirely new field for its use, not only on dam projects, but on highway construction and on railroad cuts as well.



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MORE DURABLE
CONCRETE

MORE UNIFORM
MORE WORKABLE

— at mixer

— at point of
placement

Get all the
"on-the-job"
PROOF!

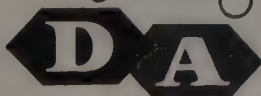
*The only catalyzed
air entraining
agent specifically
formulated for
your concrete job!*

Proof plenty. Look at big concrete jobs with multiple, intricate forms, heavily reinforced. Contractors used low slump concrete and needed workability. Answer — DAREX AEA because of low cost and outstanding uniformity, not only at mixer but at point of placement.

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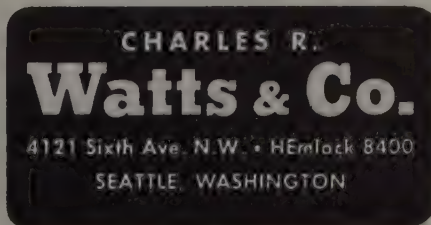
Darex AEA Distributors for Dewey & Almy Chemical Co. in 11 Western States, Alaska and Hawaiian Islands.



Darex is another Dewey & Almy product doing a better job for less

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ABOUT DAREX:

Pacific Coast Aggregates, San Francisco; Blue Diamond Corporation, Los Angeles; C. E. Mitcham, Salt Lake City; Baker-Thomas Lime & Cement Co., Phoenix; Ray Corson Machinery Co., Denver; Mason's Supply Co., Portland; Miller - Richardson, Helena; Hawaii Builders Supply Co., Honolulu.



NEW LITERATURE

Free copies of any of the items in this section may be obtained by using coupon on page 131.

12

Cat DW15 tractor folder

Caterpillar Tractor Co. has published a folder (Form 31041) which describes the new 15-hp., DW15 tractor. It contains photographs and cutaways of the engine, transmission, and clutch as well as a detailed specification sheet and brief suggestions for matching the tractor with the proper scraper or wagon.

13

Air-gas torches

A 36-page booklet entitled "Air-gas Torches by National of California" has been published by National Welding Equipment Co. It begins with pictures and descriptions based on the theories behind flame burners, needle valve control, adjustment tips, and torches. Contains tip selector charts, specification tables, colored pictures, and black and white photographs illustrating the various types of torches in detail. A basic brochure for the welder or anyone else concerned with operation of torches.

14

Dual purpose drill

Ingersoll-Rand has published a 16-page color booklet, Form 4153, describing its new QM-2 Quarrymaster, a dual purpose blast hole drill for either rotary or percussion drilling. The booklet contains many large pictures of the machine in action, lots of description of how and where to use it, a descriptive picture outlining its important features, scale drawings showing the machine's dimensions, and a full page of specifications. Accessories are also described and pictured.

15

Air control system brochure

A 12-page, illustrated brochure describing the air control system on the Michigan line of excavator-cranes has been published by the Construction Machinery Division of Clark Equipment Co. It contains pictures and drawings explaining the theory and practical application of the air-controlled clutches on Michigan excavator-cranes. A series of cross-sectional sequence drawings illus-

trates operation of the air control valve used in the system. Graphs and tables give comparative figures on actual time tests between machines equipped with air and mechanical controls. Also contains eight case histories of actual operating experiences with air-controlled excavator-cranes on construction, steel erection, and other projects.

16

Complete International Harvester catalog

International Harvester Co. has published a 48-page, 2-color catalog describing its complete line of industrial power products. Each piece of equipment in the line has been described in the 8 sections of the booklet. These sections describe, in turn, 7 crawler tractors; rubber-tired tractors with scrapers and bottom dump wagons; 2 push-loaded and 2 self-loaded, four-wheeled scrapers; hydraulic and cable-controlled bulldozers, bullgraders, and angle bulldozers; allied equipment or attachments to International crawler tractors; cable control units; wheel tractors; and 18 models of diesel, gasoline, and gas power units.

17

Adams 660 motor grader

An 8-page, color folder entitled "Adams 660, World's Most Powerful Motor Grader," has been published by J. D. Adams Manufacturing Co. It contains specification tables, cutaway drawings of transmission and axle units, photographs of the machine in various operating positions, engine speed chart, a large color photo of the unit plus various accessories, and photographs of the grader in operation on the job.

18

Delta saw booklet

Delta Power Tool Division of Rockwell Manufacturing Co. has published Catalog M-54, which describes the company's line of radial arm saws. It contains specification tables, photographs, and descriptions of each model saw, and contains other photographs and descriptions

of how to use a specific saw in certain situations. Also lists blades and other accessories.

19

About timber connectors

Where and how to install five types of timber connectors, used to increase the strength of joints in various heavy and light timber structures, is described in a new edition of "Installing TECO Timber Connectors," a 12-page booklet issued by Timber Engineering Co.

20

Bituminous distributor folder

A 6-page folder, Bulletin 54-3, has been published by Rosco Manufacturing Co. to illustrate its line of bituminous distributors. Photographs and descriptions give the uses and specifications of each unit.

21

Roebbling wire rope

A 56-page, color catalog entitled "Wire Rope Recommendations and Catalog" has been published by John A. Roebbling's Sons Corp. It is divided into 16 tab-indexed sections to cover each of the major industries which use wire rope. Each section gives detailed information on specific wire rope requirements, the size range available, weight and strength specifications, construction classification, and a code number for easier ordering. Orders may be made by giving the code number and length of rope required. If the end-use is also mentioned, it will insure proper lubrication for given applications. Catalog comes in spiral binder form.

22

Hard-facing booklet

Mir-O-Col Alloy Co. has published a 72-page, pocket-size booklet which is reported to be an analytical study of hard-facing, its application, and its wear-resisting qualities wherever impact and abrasive conditions exist. The application index recommends specific hard-facing rods for more than 1,000 pieces of equipment subject to impact and abrasion. The technical data section reports such

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information as: What metals can be hard-faced, effect of heat on metals, depositing single narrow heads, hard-facing with moderate build-up, and other technical information.

23

Lorain "42" catalog

A 12-page, 2-color catalog containing pictures and descriptions of the Lorain 42 Series has been released by Thew Shovel Co. It describes the turntable, the carrier, the shovel, the hoe, the clamshell, the dragline, and the crane boom and self propelled crane, all in the 42 line. Most of the pictures were taken on the job.

24

Handling construction materials

"Construction Materials Handling Job Studies" is a series of job reports which illustrate cost cutting and profit making ideas for contractors. This 10-page booklet shows how Prime-Movers have been used on specific jobs, giving the names of projects, contractors, superintendents, and facts and figures on savings made. Published by The Prime-Mover Co.

25

Steel construction booklet

A 4-page booklet entitled "Steel Construction" has been published by Pittsburgh-Des Moines Steel Co. It outlines the service offered by the company in steel construction, including design, fabrication, erection, and rebuilding. A number of on-the-job photographs shows buildings in various stages of construction throughout the country.

26

Mesabi vibrating screen

A 16-page, color bulletin entitled "Mesabi Screens for Rugged Jobs!" has been published by Pioneer Engineering Works, Inc. It takes up screen capacity, size selection, and installation. Installation drawings, data, and specifications, accompanied by text material and tables, help to insure proper selection of the correct screen for the job. Illustrated with cut-a-way drawings to show mechanical details and design features. Ask for Form 651.

27

Handbook on lightweight concrete roof deck construction

A 218-page handbook, "Permalite Concrete Roof Deck Specification Manual," has been published by the Perlite Division of Great Lakes Carbon Corp. for the use of structural engineers and architects. Contained in a 22-ring, locking, loose-leaf permanent binder, it is divided into structural and non-structural sections, each section color-coded and triple-indexed for instant reference.

It covers six basic types of roof structural forms, has 17 drawings with construction details, and contains complete tables on all basic types, different joist spacings, and six different types of ceilings. Every effort has been made, the company says, to insure that the information given is sufficiently accurate to meet the needs and merit the confidence of the engineering and architectural fields.

28

Single pass, portable crushing plant

Bulletin SPP-3 is a 4-page pamphlet describing the Cedarapids Single-Pass, Portable Crushing Plant which has been published by Iowa Manufacturing Co. It explains the principle of operation, and tells what advantages this plant has for producing aggregate for county and township road maintenance, city streets and alleys, small state contracts, jobs in isolated locations, base or blanket course jobs, and other work where portability and fast set-up are important.

29

Kalman concrete floors

Kalman Floor Co. has published a 28-page, illustrated booklet describing its absorption process method of installation in a step-by-step pictorial sequence. Included in the booklet is a description of the company's methods of material selection, a listing of the advantages of a heavy-duty concrete floor, and drawings and descriptions of various types of buildings in which these floors have been used.

30

Profitable drainage jobs

A 4-page, color folder describing how bids tell the story on drainage structures has been published by Armco Drainage & Metal Products, Inc. Contains average unit bid tables, descriptions and specifications of various types of pipe, and field photographs of actual installation. Charts and tables include a list of available products, size and gauge ranges, and advantages in using this type of material.

31

Bolt and nut folder

A 4-page color folder, "Steel Specialty Products," has been published by Bethlehem Pacific Coast Steel Corp. It contains numerous photographs and drawings of steel products forged, upset, punched, headed, or threaded to the purchaser's specifications. Also contains specification drawings of tie rods, timber bolts, U-bolts, and hook, eye, and J-bolts.

32

Cement paint booklet

A 6-page, color booklet describing the properties and application methods of L & S Portland Cement Paint

has been published by General Paint Corp. It contains pictures of typical Western applications, a color chip chart showing the 10 standard colors available, a page of application specifications, and suggested usage in various situations. Ask for Technical Bulletin No. 5402.

33

"Piping for Permanence"

A 32-page bulletin has been published by A. M. Byers Co. for the benefit of engineers and others who specify for piping services. This illustrated bulletin contains helpful technical data based on analysis of many piping systems in which wrought iron is specified to help solve corrosion problems. Other sections are devoted to a round-up of wrought iron pipe installations, a review of piping properties essential to long and economical service life, descriptions of individual service in building-piping systems, and recommendations to help reduce corrosion. Also included is an 11-page chapter on water analysis and treatment.

34

Allis-Chalmers tractor story

"Facts on a New Breed of Tractors" is the title of a 16-page, color brochure published by Allis-Chalmers Manufacturing Co. It follows the format of Time Magazine to present description on operational methods and specific advantages of the four crawler tractors in the Allis-Chalmers line. Action photographs, explained by brief captions, show these tractors at work on various types of jobs. The booklet also contains a review of crawler tractor progress during the last 100 years. A specification sheet lists figures on each of the four tractors presented.

35

Waco Speedlock folder

Waco Manufacturing Co. has published a pocket-size folder describing the operation of the speedlock, said to be the fastest scaffold assembly lock known, according to the manufacturer. Also contains drawings of various types of scaffolding accessories, towers, and jacks. Ask for Form KPA-354.

36

Loaders for Cat tractors

Ulrich Products Corp. has published a 4-page descriptive folder on its Domor loaders for Caterpillar D2 and D4 tractors. Descriptions and specifications, including such features as track oscillation, high lift, detachability, and bucket range, are illustrated.

37

Hyster field facts

A series of job description sheets containing photographs and descriptions of actual construction field

problems have been gathered together in fact sheets submitted by field representatives of **Hyster Co.** They take up various problems encountered by users of Hyster equipment and how they were solved. Included are sewer projects, highway relocation, pipeline laying, dam construction, towing, and road base construction.

38

Masterplate concrete floor furnace

A 12-page booklet, Bulletin No. 38, has been published by **The Master Builders Co.** to describe its DPS Masterplate for producing static-disseminating, spark-resistant, non-combustible, heavy-duty, abrasion-resistant, concrete floor surface. The booklet takes up the problem of why this type of flooring is needed, what this particular product is, what it does, and its other features. Also includes a page of specifications and descriptions of related products.

39

Hensley catalog and price list

Hensley Equipment Co. has published a 12-page booklet, catalog and price list HC-54-A, which contains photographs, drawings, and specification tables on its line of tractor accessories for Caterpillar tractors.

40

Birdsell arc and resistance welders

A 12-page, color booklet describing its line of arc and resistance welders has been published by **Birdsell Manufacturing Co.** Contains photographs, descriptions, and operating hints.

Literature briefs . . .

41

CUMMINS PT FUEL SYSTEM is described in a folder of the same name published by **Cummins Engine Company, Inc.**

42

MODEL 240 is described in Bulletin S-119, published by **The Cleveland Trencher Co.**

43

DETAILS OF L. B. Foster Co.'s high-strength, lightweight piling may be found in Bulletin EP-7.

44

SLACKLINE CABLEWAYS are described in Catalog C, published by **Sauerman Bros., Inc.**

45

RATCHET-LEVER HOISTS—The complete line of Ratchet-Lever hoists handled by **Coffing Hoist Co.** is described in Catalog WC8SP.

46

HOWELL-BUNGER VALVES are described in Bulletin No. 156, published by **S. Morgan Smith Co.**

47

DETAILS of tilt-up accessories offered by **Superior Concrete Accessories, Inc.,** may be found in Bulletin TU-2.

48

TWO BARBER-GREENE bucket loader models are described in separate catalogs. Model 543 is a self-propelled loader on pneumatic tires. Model 82A is crawler-mounted.

49

SIMPLEX CARRIERS are described in Catalog 2-C, published by **Stephens-Adamson Manufacturing Co.**

50

SLUICE GATES and hoists are described in a 232-page catalog published by **Rodney Hunt Machine Co.**

51

PORTABLE CONVEYORS are described in Bulletin Nos. 109 and 112, published by **Kolman Manufacturing Co.**

52

ELECTRODES made by **Air Reduction Pacific Co.** are discussed in Catalog 10.

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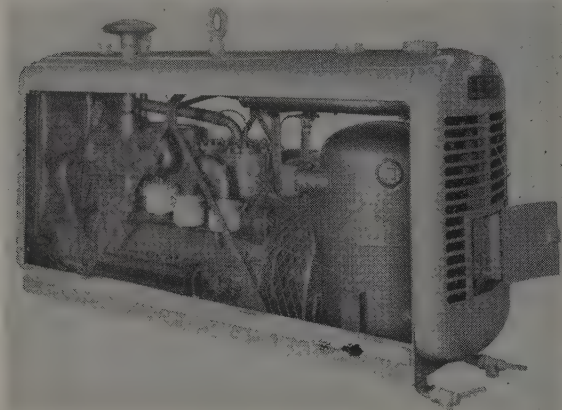
NEW EQUIPMENT

More information on any of the items in this section may be obtained by using coupon on page 131.

53

Improved Le Roi utility compressor again part of Airmaster line

Le Roi Co. has returned an improved model of its 105 cfm utility compressor to its Airmaster line. Improvements include better air cleaning and cooling by means



of oil bath air cleaners and a pressurized cooling system. It uses the same basic engine as the portable Le Roi 105, but it is built up under one housing, including an upright air receiver.

Thus the unit may be mounted crosswise behind a truck cab and still allow extra room for other equipment and materials. Overall width is 25 in. and overall length is 82 in., which does not exceed maximum truck width regulations for any state. All controls on the instrument panel are located on the "curb side." Water, gasoline, and oil filler necks protrude from the hood top for easy access without removing the hood sides.

54

New Koehring excavator can handle 20-ton lifts

Koehring Co. has announced its new Model 405 excavator, which has been designed with only two major shafts in the upper machinery to be used for all applica-



tions. This crawler-mounted unit is available with five attachments. The shovel and hoe are designed for buckets of 1-cu. yd. capacity, digging depth of the hole is 22½ ft., and width of the hoe dipper is 3 ft. 7 in. over the side cutters. As a lift crane, the unit handles up to 20 tons. Clamshell and dragline bucket size depends on weight of material to be lifted.

Swing speed is 3.62 rpm. Travel speed is .80 mph. Designed for use with gasoline, diesel, or electric power, the 405 travels easily on grades up to 30%. Equipped with quick-acting automatic traction brakes, it can be lightened for road travel by taking off crawlers and counter weights, which are easily removed.

55

Two new sizes of truck mixers added to Hi-Up line

Concrete machinery division of Worthington Corp. has added two new sizes to its line of Hi-Up truck mixers. Model LO of the new 3½-cu. yd. mixer has a 5-cu. yd. capacity as an agitator and weighs 6,360 lb. Model LC of the same size weighs 6,850 lb., has a 4½-cu. yd. capacity as an agitator, and produces 3-in. slump on level ground.

Model LO of the 6½-cu. yd. mixer weighs 8,510 lb. and has an 8-cu. yd. capacity as an agitator. Model LC of this



size weighs 9,000 lb. and has a 9-cu. yd. capacity as an agitator.

All of these units can be equipped with a Chrysler engine and fluid coupling or with Hercules power. All above-mentioned capacities are guaranteed and certified with the Truck Mixer Manufacturers Bureau.

56

New Model 240 Cleveland trencher digs down to 6 ft. 3 in.

The Cleveland Trencher Co. has announced a new heavy-duty trencher machine for pipelines and other heavy construction jobs, Model 240. It is a full-crawler-mounted, wheel-type trencher which digs out to 36 in. wide and down to 6 ft. 3 in. deep.

Specifications include a weight of 20,500 lb., ground bearing pressure of 6.35 psi., over-all length of 24½ ft., and road width of 8 ft. It is powered by a 65-hp., 460-cu. in. diesel engine operating at 1,200 rpm.

Fifteen buckets mounted on the digging wheel come

DIAMOND

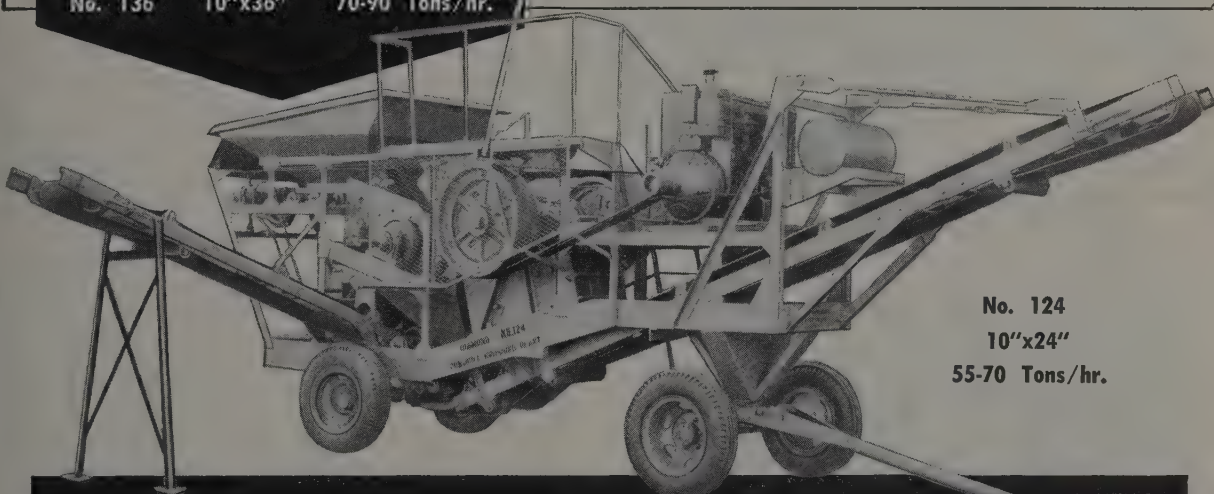
Single pass PORTABLE CRUSHING PLANTS

MADE IN FOUR MODELS

No. 116	10"x16"	30-40 Tons/hr.
No. 120	10"x20"	40-55 Tons/hr.
No. 124	10"x24"	55-70 Tons/hr.
No. 136	10"x36"	70-90 Tons/hr.

USE IT HERE, THERE — anywhere

Your next job is — where? Well, it makes little difference whether it's a mile or two down the road, or way on the other side of the county, if you have a Diamond Single Pass *Portable* Crushing Plant at your command. It's light in weight, designed for frequent moving and quick setup; but above all, this Diamond Crushing Plant is the ultimate for efficient, economical production.



No. 124
10"x24"
55-70 Tons/hr.

THESE FEATURES HELP YOU INCREASE PRODUCTION

- Short wheel base and wheel bar tongue location provide excellent maneuverability in road or pit.
- Hinged delivery conveyor eliminates dismantling for towing.
- Low hopper height permits easy loading, with $\frac{1}{2}$ or $\frac{3}{8}$ cu. yd. shovel. Low over-all height promotes ease of travel.
- Heavy duty grizzly with proper size openings give higher crusher production with minimum scalping.
- Adjustable single eccentric plate feeder provides a constant, even flow of pit run material.
- Vibrating screen is oversize.
- Feeder is clutch operated.
- Power unit (gasoline or diesel) is plant mounted.
- Controls are centrally located.
- Good braking effort (mechanical or air) and fully guarded drives promote safety.

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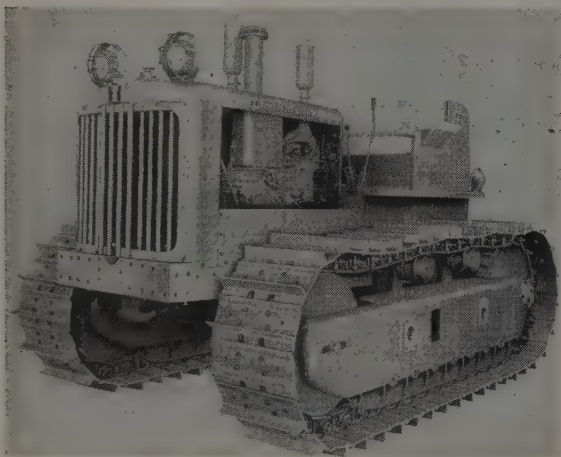


in three different sizes which give a trench width range of from 20 to 36 in. A new crawler "kick-out" clutch permits stopping the crawlers without halting the digging wheel. The conveyor belt is 30 in. wide, 10 ft. 9 in. long and operates at 600 fpm. Descriptive literature is available on request. Ask for Bulletin S-119.

57

International TD-24 torque converter crawler tractor driven by 200-hp. engine

International Harvester Co. has announced that its TD-24 torque converter crawler tractor is now in full



production. Described as the world's most modern and powerful torque converter crawler tractor, it automatically provides needed pushing power at the required speed without shifting gears. Speed and power are increased by advancing the throttle. Push contacts with haul units are smooth, fast, and greatly diminish wear and tear on the haul unit and its operator, the manufacturer says.

While designed primarily as a push-loading tractor, this 200-hp. model is easily adaptable to land clearing, mining, or pipe line work. It has the same dimensions as the standard TD-24. All attachments are interchangeable. The engine operates at 1,500 rpm., 100 rpm. more than the standard TD engine. The hydraulic torque converter drive operates through a heavy-duty universal joint to the transmission. The new 2-speed transmission is full reversing and each speed is doubled by the high and low range in the drive, providing four speeds forward and four reverse. Top forward speed is 6.9 mph.; top reverse is 6.6 mph. Weight of the fully equipped model with torque converter and 7-roller track frame is 43,250 lb.

58

Bucyrus-Erie designs 15-ton transit crane for smaller jobs

A mobile crane-excavator with a 15-ton rated lifting capacity, Model 15-B transit crane, has been announced by Bucyrus-Erie Co. It was designed to handle many types of work now considered too small or restricted for profitable large machine operation.

The wheel mounting is powered by a 138-hp. White gasoline engine equipped with single wheels in front and tandem duals in the rear with 170-in. wheel base. A 5-speed transmission is mounted in the unit with the engine and a 2-speed auxiliary unit is mounted in the truck frame to provide 10 forward speeds, to a maximum of 31 mph., and two reverse speeds. Standard crane boom is 30 ft. long, extendible to 70 ft. with removable inserts. Boom suspension is of pendant type. Booms 60 ft. and longer, with either 8- or 16-part suspension, can be equipped with special folding equipment for job-to-job moves.

Power-controlled hoisting and lowering of the boom is operated by a single hand lever, independent of all other functions. The friction swing brake, an outside band brake fitting a left rear swing clutch housing, is controlled from the operator's station by a hand lever equipped with ratchet squeeze lock to permit more accurate spotting and holding of boom point over desired position. This crane is readily convertible to 1/2-cu. yd. shovel, drag shovel, clamshell, and dragline front ends. Standard boom for clamshell and dragline work is 30 ft., extendible to 45 ft. with insert sections.

GOVERNMENT OF IRAQ MINISTRY OF DEVELOPMENT BAGHDAD - IRAQ Construction of the Dam and Appurtenant Works Derbendi Khan Project INFORMAL ANNOUNCEMENT

The Development Board of the Government of Iraq intends to issue a formal call for tenders this coming November for the construction of the dam and appurtenant works for the Derbendi Khan Project located on the Diyala-Sirwan River about 35 kilometers southwest of Halabja and some 230 kilometers northeast of Baghdad. The dam, a concrete gravity structure will have an estimated concrete volume of from 1,500,000 to 1,800,000 cubic meters and will involve some 650,000 to 800,000 cubic meters of all classes of excavation. Prospective tenderers may obtain more detailed information regarding the work upon application to the following:

- (a) Directorate General of Contracts
Development Board, Baghdad, Iraq.
- (b) Harza Engineering Company
400 West Madison Street, Chicago, Illinois, USA.

The Development Board does not bind itself to issue the formal call for tenders mentioned herein and any response to this informal announcement must be undertaken without expense or obligation to the Board.

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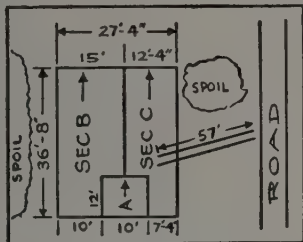
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4 Basements Dug in 9 Hours and 25 Minutes

Young and Dietrich, new, aggressive excavating contractors in Painesville, Ohio, were awarded a contract recently to dig 10 basements and sewer trenches in a new small-home development. A time study was made of the first 4 basements—they were all dug in 9 hours and 25 minutes with a Lorain TL25-J Hoe using a 36" wide, $\frac{3}{4}$ -yd. bucket. The excavations varied slightly in size, but here are figures on one basement.



Dimensions . . . 36'8" x 27'4" x 5' deep
Sewer

Sewer Line 57' long x 3' wide x 8' deep.
Start Sewer Line 11:56 A.M.
Delays 55 mins.
Finish Sewer Line 1:50 P.M.

Total 114 mins.

Basement
Start Section A 1:55 P.M.
Finish Section A 2:15 P.M.

Total 20 mins.
Start Section B 2:35 P.M.
Delays
(backfill sewer trench) . . 10 mins.
Finish Section B 3:55 P.M.

Total 80 mins.
Start Section C 3:57 P.M.
Finish Section C 5:05 P.M.

Total 68 mins.

Total for Basement No. 4—282 mins.

4 HRS., 42 MINS. { Sewer actual digging time . . 59 mins.
Basement actual
digging time 2 hrs. 38 mins.
Time to backfill sewer . . . 10 mins.
Delays—Lunch 30 mins.
Searching for outlet 25 mins.

Basement No. 1 was dug in 2 hours and 11 minutes plus 35 minutes delay for checking grade and installing water line.

Basement No. 2 took 2 hours and 15 minutes plus 37 minutes delay for checking grade and cleaning up cave-ins on basement No. 1.

Basement No. 3 consumed 2 hours and 21 minutes plus 27 minutes delay for discussion between operator and contractor.



As basement No. 2 is finished at 3:42 P.M. the concrete footers are already being poured for basement No. 1 which was finished just 3 hours and 43 minutes earlier.

The above figures were secured on actual on-the-job operations. Nothing was planned. Nothing was staged. Production figures like these make basement digging profitable. Lorain TL25 Hoes match them all over the world.



HERE'S HOW TO

"KEEP OUT OF THE HOLE"

WHEN YOU DIG BASEMENTS

You won't get in the hole on costs if you use a TL-25 Hoe for basement digging, because you can work from the top to cut straight sidewalls, trim square corners and grade level floors to reduce hand finishing. You can spoil pile in any direction, dig utility trenches, and forget the problems of building ramps and the high maintenance of constant travel that is necessary with some types of equipment. TL-25's consistently dig an average residence basement in 3 hours or less. And when you get other types of jobs, it is easy to change to a dragline, clamshell, shovel or crane front end to handle them profitably. Many contractors started their careers with this versatile machine that is so adaptable to their growing needs.

There are many reasons why a TL-25 will throw more dirt per day—at less cost. Call your Thew-Lorain Distributor today for the full story.



WILL KEEP YOU "ON TOP" OF PROFITS

Here's why! High-speed, balanced operating cycle, easy-to-service, hydraulic tread-travel lock, anti-friction bearings, 4 crawler sizes to choose from. Inexpensive to own. These are but a few!

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P. L. CROOKS & CO., INC.
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GENERAL EQUIPMENT CO.
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SOUTHERN IDAHO EQUIPMENT CO.
Idaho Falls, Boise and Twin Falls, Idaho

TRACTOR & EQUIPMENT CO.
Sidney, Mont. Branches: Miles City, Glasgow, Mont.

WESTERN EQUIPMENT CO.
Casper, Wyoming

YUKON EQUIPMENT CO. (for Alaska)
Seattle, Wash. Branches at Fairbanks and
Anchorage, Alaska

SAVES STEEL, CUTS COSTS WITH WELDED DESIGN

AN estimated 120 tons of steel has been saved through welded design in the construction of this 14 story framework. This building, 140 feet across the front and 90 feet on the sides, is considered to be the largest all-welded multi-story structure in Florida.

Designed to withstand 50 pounds per square foot of hurricane winds, beams have semi-rigid end connections with top plates field welded to columns and welded to the top flanges of the beams.

The welding crew of nine men worked just behind the steel erectors. Both shop prefabrication and field erection were welded with Lincoln "Fleetweld 5" for quality, high strength connections in flat and vertical positions. Only ten weeks were required to complete the framework.

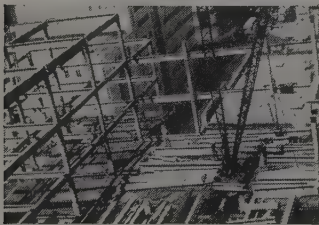


Figure 1. 1178-ton steel framework for new Ainsley Building, Miami, Florida.

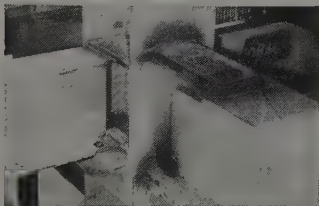


Figure 2. Close-up of connections between beams and column reveals how continuity of section is achieved through web stiffeners on column. Shop welded seat angles take shear loads.

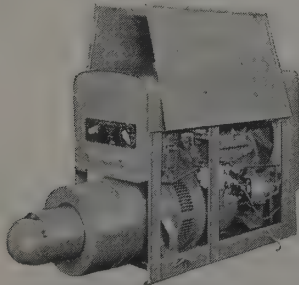


Figure 3. "Shield-Arc" SA-200 welder handles on-the-job repairs and construction in less time ... with less cost. Broad current range from 40 to 250 amps.

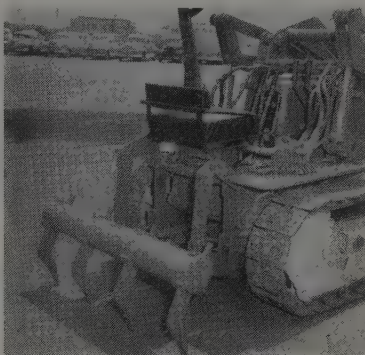
Write for facts. Complete descriptions and specifications of Lincoln "Shield-Arc" welders are in Bulletin 1337. Write on your letterhead.

THE LINCOLN ELECTRIC COMPANY
Dept. 4304, Cleveland 17, Ohio
**THE WORLD'S LARGEST MANUFACTURER
OF ARC WELDING EQUIPMENT**

59

Loader and scarifier for John Deere crawler tractor

Shepherd Tractor & Equipment Co. offers a new loader and scarifier combination mounted on the John Deere Model 40, 5-roller, crawler



tractor. The loader has a standard bucket capacity of $\frac{1}{2}$ yd. The complete loader assembly mounts on the tractor main frame members. Both dual lift and bucket tilt cylinders are double-acting for rapid and accurate control. The bottom of the bucket has a ground clearance of 9 ft. 5 in. in top loaded position and a cutting edge clearance of 7 ft. 11 in. in top dumping position. The bucket tilt is to a maximum of 45 deg.

The S40H Hydro-Rip Scarifier is rear-mounted on the tractor drawbar mounting plates. Double action control is produced by a single 3 x 10-in. hydraulic ram, utilizing a welded cross shaft and heavy connecting drag links. A cross-over valve transfers bucket tilt control to the scarifier. Bucket height can still be adjusted while using the scarifier. The scarifier beam is $\frac{1}{2}$ x 5-in. steel tubing 48 in. wide, utilizing regular Caterpillar motor grader shanks. Point clearance in raised position is 17 in. and full penetration of the teeth can be achieved in down position.

60

Dart 20-ton, off-highway truck

Dart Truck Co. has added a 20-ton, extremely maneuverable truck to its line of off-highway end dump trucks. Maneuverability is due to its short wheel base, (120 in.) and high horse power. It is powered by a diesel engine, 225 or 275 hp. (optional). Available with either conventional transmission or torque converter. Hy-



draulic steering can turn the truck around a circle with a 21-ft. radius.

61

Solvent-resisting asphalt coating

Colfix Jet Seal, a solvent-resisting coating for asphalt pavements, has been announced by American Bitumuls & Asphalt Co. A coal-tar based product, it was developed to protect airport refueling areas, parking ramps, and taxiways from the solvent effects of jet fuels and other petroleum products. It is equally adaptable to other asphalt pavements where possibilities of gasoline spillage or oil dripping exists. It is said to afford maximum protection against heat, wear, and weathering action. Descriptive literature available on request.

62

New P&H $\frac{1}{2}$ -yd. shovel

Harnischfeger Corp. has added Model 155, an entirely new $\frac{1}{2}$ -cu. yd. crawler unit, to its line of excavation machinery. It features a power box built of 1-in.-thick steel plate welded



into a rigid unit which forms the machine frame and supports all shafts, drums, engine, counterweight, and attachments. Designed as an all-purpose machine, it is convertible to shovel, hoe, clamshell, dragline, crane, or magnet. All attachments were designed for fast, simple, change-overs. Power may be either gasoline or diesel. A 4-speed transmission and universal joint to the worm drive pinion and gear in the power box provide the driving mechanism. Further details and complete specifications are given in Bulletin X-149.

63

International diesel power unit

Model UD-1091 diesel power unit is being produced by International Harvester Co. to replace the UD-24 power unit. The engine produces 162.4 hp. at 1,400 rpm. Net maximum torque is 793 lb. at 1,000 rpm. It has a 1,091-cu. in. piston displacement. The unit is skid-mounted and is available with or without radiators, air or

BLAW-KNOX STEEL FORMS

CUT FORMING COSTS ON THE WORLD'S BIGGEST POWERHOUSE AT CHIEF JOSEPH DAM



32 FOOT HIGH
PREFABBED PANELS PERMIT
LARGE UNIT POURS

● Efficient forming methods on the Chief Joseph powerhouse are stepping up the concrete pouring pace from the scheduled 30,000-cu. yds. placed a month to 50,000-cu. yds. in that time to put the job 7% ahead of schedule! Pouring costs have been reduced by improved forming methods, including the use of Blaw-Knox steel panels 32 feet high which permit pours up to 70-ft. long in some of the massive solid walls. By re-using these forms, 80% of the concrete will be formed against the prefabbed panels.

Mass pours in the intake structure are made with Blaw-Knox Cantilever Steel Forms which permit 5-ft. lifts. Many of the big single and double-story galleries are formed with Blaw-Knox Traveling Steel Forms.

Get your forming into
High Gear with the
**BLAW-KNOX STEEL FORMS
CONSULTATION SERVICE**

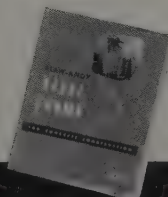
Contractors visiting the Chief Joseph project are impressed with the dramatic improvement of the Blaw-Knox prefabbed Steel Forms over older methods in such intricate places as draft tubes. This is another reason why it will pay you to call in Blaw-Knox engineers in the preliminary planning stages . . . to lick such difficult forming problems *before* they're on the drafting board! Whatever your job . . . dams, tunnels, bridges, sewers . . . take advantage of the Blaw-Knox Steel Forms Consultation Service. There's no obligation, so write, wire or phone Blaw-Knox today.

BLAW-KNOX COMPANY
BLAW-KNOX EQUIPMENT DIVISION
PITTSBURGH 38, PA.
Offices in Principal Cities

**STEEL
FORMS**

WRITE FOR BULLETIN 2430

It contains special design suggestions and complete details about Blaw-Knox Steel Forms and the consultation service that is available to any contractor without obligation.



CONSULTATION SERVICE BY BLAW-KNOX

BLAW-KNOX PACIFIC COAST BRANCH: 818 Monadnock Bldg., 681 Market St., San Francisco 5, Calif.

PREVENT DELAYS

ON-
THE-
JOB

with
fast, sure

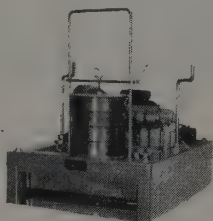
GILSON Screen Testing

Failure to meet sizing specifications costs time and money.

The GILSON Mechanical Testing Screen cuts out error and guesswork in meeting sizing specifications for crushed stone, gravel, slag, coal, ores, and similar materials.

A GILSON Test Report is the standard of industry. It is your guarantee that every carload, every truck-load is as-ordered. And GILSON does the job *fast*—five minutes or less per complete test.

A Sand Attachment for handling 8-inch sieves is optional equipment.



Here's Why You Want GILSON —

No more guesswork on sizing
No more tedious screening by hand

1. Makes tests quickly and accurately
2. Two to seven separations simultaneously
3. Screen trays independently removable
4. Trays balanced to same tare weight
5. Visible separation to refusal
6. Few moving parts
7. Sturdy construction
8. Size range 4" to 200-mesh

Write now for additional information.

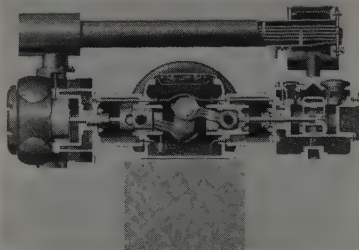
GILSON SCREEN CO.
MALINTA, OHIO

mechanical throttle and clutch controls, and various gear ratios for power take-off speeds. It is interchangeable with the U-1091 natural gas burning engine.

64

Air compressor in 75-100-hp. range

Ingersoll-Rand Co. has announced a packaged air compressor in the 75-



100-hp. range. Known as the PHE, it has an opposed-cylinder, balanced design driven by a direct connected, induction motor. Basic design is a 2-stage unit for 80-125 psi. Additional information available on request. Ask for Form 3155.

65

Combination welder, auxiliary power unit

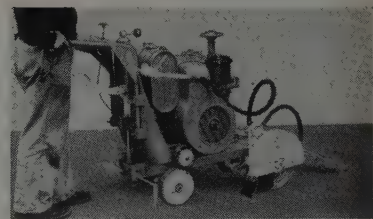
Weldanpower, rated as a 200-amp. welder and a 4 kva continuous duty power unit, has been announced by The Lincoln Electric Co. It was de-

signed as a combination welder and auxiliary or standby power unit for maintenance work in construction and building operations. The AC alternator is powered by a 12-hp. air-cooled gasoline engine. Contractors can use it for power tool operation, emergency lighting, and general maintenance welding. The operating panel provides taps which supply AC current for use with electrodes ranging from 5/64 to 3/16-in. diameter.

66

Felker Model 200 concrete cutter

Felker Manufacturing Co. has announced production of its new Model 200 concrete cutter. It weighs 482 lb. and is balanced so it can be tilted back on the rear wheels or lifted on the front wheels for rapid maneuvering in tight quarters. Designed to use

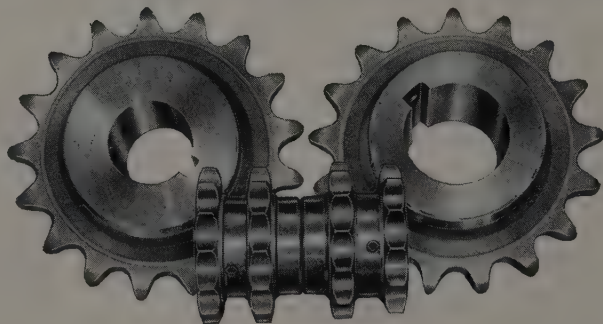


10- and 12-in. diamond blades, it is sufficiently powered to accommodate larger wheels with special guards. Cutting depth is 2 3/4 or 3 3/4 in. It is

**NEED
SPROCKETS?**

call **YUBA**

Sprockets for Mill and Roller Chain



YUBA-Schrock sprockets are flame cut from steel plate. Patented cam-generated action produces sprocket teeth guaranteed to fit standard mill or roller chain with wearing qualities equal to sprockets made by other manufacturing methods. "Special" sprockets with "non-standard" number of teeth readily cut to order without penalty charges. Most emergency orders filled in 24 hours.

Phone, write or wire, nearest office
NOW for quotations and deliveries.



YUBA MANUFACTURING CO.

Pulley and Sprocket Dept.

Benicia, Calif. Phone 628

Stockton Iron Works - Stockton 7-7091

47

available with or without a power drive to the rear wheels. The spindle is double end for right or left hand cutting. Powered by a 13.5-hp. Wisconsin gasoline engine. Descriptive literature available.

67

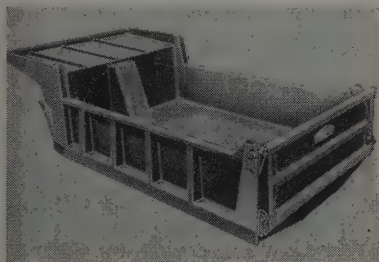
Paper elements for Winslow filters

Winslow Engineering Co. has added a new line of laminated paper elements to supplement its standard filters. Called the WECO-micro Free-Flo, they will be available for both industrial and automotive engines. Heavy felt pads are cemented between the metal end plates and filter paper to prevent channeling of oil inside the element. Special self-adjusting end seals prevent external bypassing.

68

Hercules adds to body line

Hercules Steel Products Corp. has added a new line of contractor's bodies. It includes Series LD and WD rugged duty bodies (standard lengths



12 to 17 ft.), Series CD all-purpose bodies (standard lengths 10, 11, and 12 ft.), Series D standard bodies (standard lengths 8, 9, and 10 ft.), and Series PL solid steel platform bodies for 60, 72, 84, and 102-in. cab to axle trucks. Load-carrier cab shields are available on Series LD, WD, and CD.

69

50-ton hydraulic jack

Templeton, Kenly & Co. has announced a new 50-ton, remote-controlled hydraulic jack. It consists of a hydraulic ram, a high-pressure connecting hose, and a pump. The ram has a minimum height of 10½-in. and a 5½-in. lift. A safety by-pass valve prevents over-loading. Especially recommended for lifting and lowering heavy machinery, lifting and aligning beams, and straightening equipment.

70

Compound secures anchor bolts in concrete

Ankor-Set, a powdered compound which fast-cures when mixed with water to form a hard, high-compressive strength material, has been designed to secure anchor bolts in concrete permanently. This non-shrinking compound sets hard in ½ hr. Recommended for permanent anchoring of machinery, engines, conveyors, rails, bedplates, and the like. Also

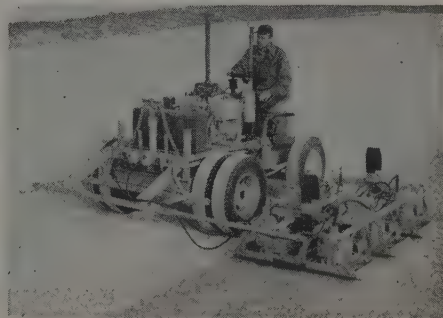


The JACKSON VIBRATORY COMPACTOR FAST • EFFICIENT • VERSATILE

ON MACADAM CONSTRUCTION . . . only one pass or two usually required to compact 12" of rock to final density. And when sufficient fines are spread, one pass suffices to fill all voids. In GRAVEL SUB-BASES (blanket course) 7" thick, this machine has achieved 98% Standard Proctor in one pass. It is equally efficient in granular soil-cement paving or base course construction. Standard width is 13', 3". Working speeds: 0-60 F.P.M. Reverse travel speed: 5½ MPH.

COMPACTS WIDENING STRIPS IN ONE PASS . . .

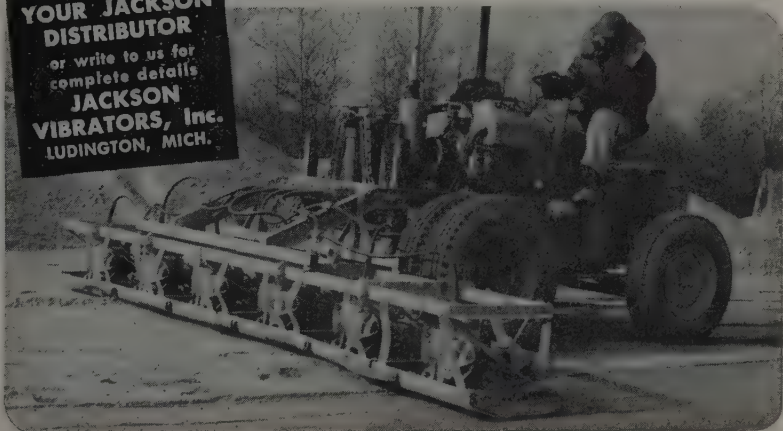
IN ANY GRANULAR MATERIAL used in flexible base-course widening. For this purpose compacting units are assembled in tandem, (3 deep, single or double row) and towed at side of tractor. Compactor bases of 12" and up may be substituted for standard 26" bases to suit requirements.



SAND FILLS, SUCH AS BRIDGE APPROACHES . . .

another spot in which this machine shines. It's rapid and gets into places inaccessible to larger equipment. For the really tight spots one or more of the compacting units may be fitted with operating handles and used as self-propelling, manually guided compactors.

See
YOUR JACKSON
DISTRIBUTOR
or write to us for
complete details
JACKSON
VIBRATORS, Inc.
LUDINGTON, MICH.



used for fast-patching of holes and cracks in concrete floors and walls. Packaged in 50-, 125-, and 300-lb. fibre drums. Manufactured by **Rock-Tred Corp.** Further information contained in Bulletin AS99, a free specification sheet.

71

Gar Wood adds to hoist, body line

Gar Wood Industries, Wayne Division, has recently added hoists and bodies to its Strong-Arm line. The new A-50 medium and A-60 heavy-duty hoists incorporate more lifting capacity, longer hoist life, and easy maintenance. The new medium GB and heavy-duty GC series bodies include models for the general contractor and combination dump and platform units.

72

Cat engines get higher rpm. ratings

Caterpillar Tractor Co., announces new higher rpm. (1,800) continuous ratings for D337 and D326 engines and electric sets in both self- and externally-regulated types.

73

New Bullard face shields

Eye and face protection for wearers of safety hard hats and caps is available with the new Lumerith Acetate Clip-On and Swing-Back



type face shields developed by E. D. Bullard Co. Both types are heat-formed to hold their shape of .030 clear or green-tinted Lumerith. Swing-Back type standard depth is 10-in., Clip-On type is 6 in. deep for the hat and 6 $\frac{3}{4}$ in. deep for the cap. Varying lengths are available.

74

New $\frac{3}{4}$ -cu. yd. loader

Model LO-75 Trojan Loadster, a new $\frac{3}{4}$ -cu. yd. struck measure loader, has been announced by **Contractors Machinery Company, Inc.** It embodies a new idea in loader design, the elimination of all clutches. It has a direct drive from the engine, through a torque converter coupling to the transmission. There are four working speeds and a high-speed range for traveling. This new model loads over the drive wheels and uses the load weight to provide extra trac-

tion. Descriptive literature available on request.

75

Master midget power trowel

The new 24-in. Master Midget power trowel is said to give a sweeping action and finish concrete much faster than by hand. It is manufactured by **Master Vibrator Co.** Weighing less than 70 lb., it was designed to be carried and operated by one man. Powered by a 1.6 hp. Briggs and Stratton engine. It has three steel blades for floating, sweat, smooth, hard trowel finishes. A stationary guard ring lets the trowel work right up to pipes, walls, and other obstructions. The handle adjusts to fit the user.

76

Nails come in 5-lb. box

Columbia-Geneva Steel Division U. S. Steel Corp. announces its new Nail-Pak, a 5-lb. box of nails which come either all in one kind or sorted

77

Land clearing rake

Rockland Allied Equipment Corp. announces its Model RF-2 land clearing rake for mounting on Mod HM Hough Payloader. The rake, which can be ordered with any number of teeth, is recommended for pavement ripping, rock removal, dis-

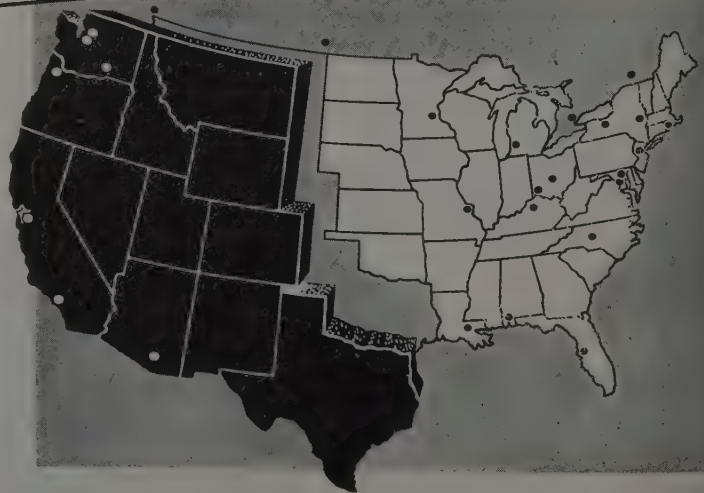
BITUMULS® wins added acceptance in the WEST!

Throughout the West, an ever-increasing number of Roadbuilders are specifying Bitumuls for all types of paving work. These men specify Bitumuls because they know they can get material when and where they need it and in the quantity and grade required.

Back of the ready availability of Bitumuls is a system of distribution that is without parallel in the industry.

Pin-point distribution is, of course, only one of the reasons why more paving is being done with Bitumuls. Cold-applied emulsified asphalt in this modern, convenient form offers important savings in time, labor, and equipment.

Distribution is the Reason



Contact our nearest office for full information

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Inglewood, California • Tucson, Arizona

**AMERICAN
Bitumuls & Asphalt
COMPANY**

200 BUSH STREET, SAN FRANCISCO 4, CALIFORNIA

bris-piling, stump removal, pushing of brush and riprap in gravel pits, and operations where soil should not be removed.

78

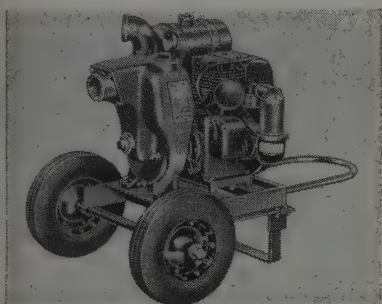
All-purpose welding electrodes

Pacific Welding Alloys Co. announces All-Weld, a new all-purpose, all-position line of welding electrodes. Its current range runs from 20 to 250 amp., depending on size of rod. It uses AC-DC, reverse or straight polarity. Recommended for welding mild steels, low alloy steels, high tensile steels, high or medium carbon steels, cast and malleable iron, and many other difficult-to-weld steels.

79

Contractor's pump handles 166 gpm.

The Gorman-Rupp Co. announces its new Model 32F-AKN 10M contractor's pump. At a total head fric-



tion of 25 ft., it will pump 166 gpm. with a 10-ft. lift. It measures 30x25x35 in. and has a net weight of 160 lb. It is fast priming to 30 ft. static lift. On 12-in. diameter, semi-pneumatic tires, it weighs 200 lb. It is driven by a Wisconsin AKN engine delivering 6.1 hp. at 3,200 rpm.

80

Strip-type waterstop

Water Seals, Inc., has announced development of a strip-type waterstop designed for use between closely-spaced horizontal slab and vertical wall concrete joints and where reinforcing steel or other obstructions prevent the use of other type stops. It is 6 in. wide, 5/16 in. thick at the sides, and tapers to 3/16 in. in the middle. It can be easily spliced by heat sealing with a hot knife. Available for shipment in lengths up to 100 ft. Longer lengths available on special order.

81

New Coffing hoists have 500-4,000-lb. range

Coffing Hoist Co. announces its Quik-Lift electric hoists which range in capacity from 500 to 4,000 lb. and have a choice of lifting speeds and types of suspension. They are designed for heavy work. Special features include push-button control,

WELLMAN-WILLIAMS PERFORATED DRAGLINE BUCKETS

*More profits on
the wet jobs!*



THE Wellman-Williams Perforated Dragline Buckets have welded stiffeners the full length of the bucket for maximum strength and rigidity. Alloy steel construction gives maximum strength with minimum dead weight. Teeth are made of manganese steel and are reversible.

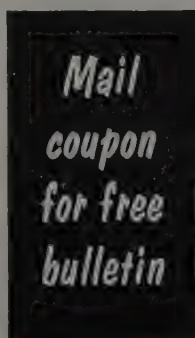
Hitch connections can be easily adjusted to any desired digging depth. Gives the operator a wide digging range for faster work.

Solid plate type dragline buckets also available.

It's a **WELLMAN** — built to dig and last while digging.

THE WELLMAN ENGINEERING CO.

CLEVELAND 4, OHIO



The Wellman Engineering Company
7026 Central Avenue, Cleveland 4, Ohio

Please send me a free copy of bulletin on:

- | | |
|--|--------------------------------------|
| ☐ Clamshell Buckets | ☐ Stone Grabs |
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NOW!
LABYRINTH
WATERSTOPS
 ...the standard
 water seal on
 outstanding
 construction jobs

● Quickly accepted by the nation's leading engineers and contractors, Labyrinth Waterstops—the first really satisfactory water seals—are now being used on all types of jobs...hydro electric plants, atomic energy plants, industrial plants, water and sewage plants, water reservoirs, underground and surface parking lots, swimming pools plus a host of lesser projects. (Names, and details furnished on request.) Why not get additional information on this time and money saving water seal? Just mail coupon below.



*Eliminates seepage
 problems.
 Simplifies
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Made in Canada for J. E. Goodman Sales Ltd.
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WATER SEALS, INC.

9 South Clinton Street Dept. (6)
 Chicago 6, Illinois

Please send complete information on Labyrinth Waterstops.

Name _____

Company _____

Address _____

City _____ Zone _____ State _____

separate load and motor brakes, fool-proof limit switch, and new safety hooks. Descriptive literature available on request.

82

Automatic Arrow hammer tacker

Arrow Fastener Company, Inc., has announced its HT-50 automatic hammer tacker. It weighs 2½ lb., is 11¼



in. long, and uses wedge-pointed T-50 staples made of .050 steel wire. The staples comes in ¼-, ⅜-, and ½-in. lengths.

83

Fiberglas expansion joints

Owens-Corning Fiberglas Corp. has announced a fiberglas expansion joint in widths ranging from 2 through 12 in. in ½-in. increments. Expansion joint slabs in 24- and 36-in. widths are also available.

84

Heavy-duty track roller frames

Caterpillar Tractor Co. has an-

nounced new heavy-duty track roller frames and special large front idlers for the 44-in. gauge Cat D4 track-type tractor.

85

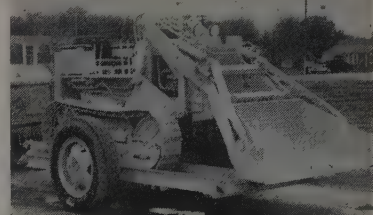
Anchor kit for Masonite panels

Masonite Corp. has announced an anchor kit for attaching Masonite Peg-Board panels to concrete, brick, or other smooth wall surface. Each kit contains material sufficient for attaching a panel up to 4 x 4-ft. in size. No special tools are needed.

86

Low bed, tilt trailer for Terratracs

American Tractor Corp. has announced its new drop-axle, low bed,



tilt trailer which can be handled by a ½-ton pick-up truck. This makes it possible for contractors to provide one-man operation on a tractor job. The operator can load a tractor on a trailer, drive it to the job in a pick-up,

AIR
Delivers
Double-Duty
Service
 with



WISCONSIN-POWERED COMPRESSOR

Supplying dependable AIR-COOLED power for this P244 GH Ingersoll-Rand Air Compressor for operating a J-10 Jackhammer, engaged here in drilling light standard hole in a bridge pier, is a typical assignment for Wisconsin Engines.

Wisconsin heavy-duty engineered design and construction, plus dependable AIR-COOLING and ready adaptability to installation on practically any type of equipment requiring power components from 3 to 36 hp., are factors that make Wisconsin Engines the preferred power among both original equipment manufacturers and purchase-for-use customers.

You can't do better than to specify "Wisconsin Power" for your equipment. Descriptive and engineering data gladly supplied.



WISCONSIN MOTOR CORPORATION

World's Largest Builders of Heavy-Duty Air-Cooled Engines

MILWAUKEE 46, WISCONSIN

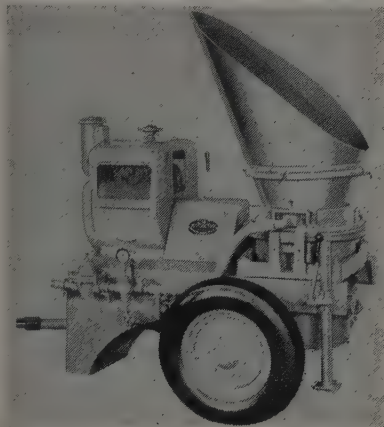
A 7993-1/4

complete the job, and reload the tractor without any help. The trailer rides 14 in. from the ground. It comes equipped with electric brakes, a drop-axle, safety chains, and a ball-type hitch. Price f.o.b. the factory, exclusive of taxes, is \$495. It will be sold only with the purchase of a Terratractor.

87

Jetcreter offers engine choice

Construction Machinery Sales Co. announces that its new Model 240 Jetcreter comes with air- or water-



cooled engine or with explosion-proof electric motor. It was designed for operation with an independent source of air to make possible continuous feeding. Any of the new alternates can be factory-modified to increase output to a capacity of 35 to 40 bags of 4 to 1 concrete mix per hr. The water-cooled model is powered by a 134-cu. in., valve-in-head Ford engine. It has an electric starting motor. The air-cooled model, which is manual starting, is powered by a Wisconsin engine.

88

Carbide-inserted Whirli-Bit

Brunner & Lay, Inc., have announced their carbide-inserted Whirli-Bit, designed to drill plug holes in stone quarries, roof bolt holes in mines, pin holes in construction stone work, and expansion bolt holes for setting machinery in plants. It comes in 3/4- and 7/8-in. bit size in both 4- and 6-in. drilling depth.

89

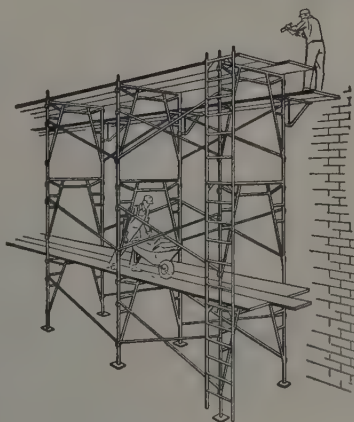
New spreader is self-feeding

Century Engineering Co. has announced its new 1954 Century hydraulic spreader, called Posi-Feed. An auger and agitator operating inside the truck body provides positive feed, prevents channeling, and breaks up and crushes frozen lumps of coagulated material to spreading size. The spreader, adjustable to any height, drops in the truck body and is held securely by the chained tailgate. It will cover any width in any direction from a few feet to a 4-lane highway.

Watch Every Buck . . . Carefully!

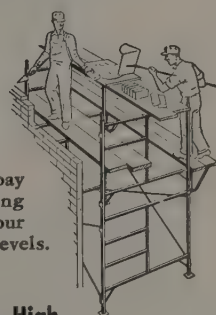
Actually it's not how many bucks you shell out on original costs that count—it's *how much do you save* in erection time and in on-the-job performance. Here are the kind of *savings that count*: can you scaffold higher with fewer panels and parts? can you position plank-bearing brackets at intermediate levels? can you place material at hip-level where your mason can work easier and faster? There's one answer . . . you *can* with Universal Ezebilt Mason Panels, and we don't just make the claim—we show you how in the diagrams below. You'll have a time-saver, a buck-saver and a life-saver with

UNIVERSAL Ezebilt SCAFFOLDING



SU PANELS

Provide open bay for easy handling of planks and four plank bearing levels.



SH PANELS—6½ ft. High

Provide through passage-way at every lift, and rests for plank-bearing brackets at 3' 3", 4' 6" or 6' heights.

Call for Free Planning Service—FAST DELIVERIES from Sales & Rental Stocks

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EZEBILT SCAFFOLDING COMPANY

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California—LOS ANGELES

AMERICAN-UNIVERSAL OF CALIFORNIA, INC.

3146 RIVERSIDE DRIVE

PHONE: NOrmandy 4-6425

Colorado—DENVER 8

THE UNIVERSAL COMPANY

1426 ULSTER STREET

PHONE: DUDley 8-1624

Utah—SALT LAKE CITY

CONTRACTORS EQUIPMENT & SUPPLY CO.

251 RIO GRANDE STREET

PHONE: 22-0501

Washington—SEATTLE 2

UNIVERSAL EQUIPMENT COMPANY

1549 EASTLAKE AVENUE

PHONE: CApitol 2136

UNIT PRICES

Selected abstracts for Western projects

MISCELLANEOUS—Floor finishes and handrailings at Grand Coulee Dam in Washington

Washington—Columbia Basin Project—Bureau of Reclamation. L. D. Shilling Co., Inc., of Moses Lake submitted a combined low bid of \$127,620 for Schedules 1 and 2 for furnishing various floor finishes, hand-railing, and miscellaneous metal work for Grand Coulee pumping plant, power plants and dam on the Columbia Basin Project in Washington. Unit prices were as follows:

	Schedule 1	Schedule 2	Total
(1) L. D. Shilling Co., Inc.	\$ 42,270	\$ 85,350	\$127,620
(2) Rund Construction Co.	87,877	88,040	175,917
West Coast Steel Works	97,766	107,620	205,386
P. Grassi-American Terrazzo Co.	117,406	No Bid	
Arrow Iron and Machine Works	No Bid	74,800	
Acme Iron Works	No Bid	91,730	
C. E. Toland and Son	No Bid	119,943	

SCHEDULE NO. 1

	(1)	(2)
2,340 sq. yd. Bonded—concrete finish on floors	\$ 6.00	\$13.00
25 sq. yd. Bonded—concrete finish on stair landings	10.00	24.00
310 lin. ft. Three-inch bonded-concrete wall bases	1.00	3.00
1,680 lin. ft. Eight-inch bonded-concrete wall bases	2.00	3.80
105 lin. ft. Bonded-concrete stair bases	2.00	6.00
645 lin. ft. Bonded-concrete finish on curbs, except stair, motor-air-housing & motor-generator-set curbs	2.00	6.00
135 lin. ft. Bonded-concrete finish on stair curbs	4.00	9.00
785 lin. ft. Bonded-concrete finish on curbs for motor-air-housing and generator sets	3.00	7.00
785 lin. ft. Bonded-concrete finish on stairs	4.00	4.60
3,540 sq. ft. Terrazzo finish on floors	2.00	4.00
85 sq. ft. Terrazzo finish on stair landings	4.00	7.00
450 lin. ft. Three-inch terrazzo wall bases	4.00	5.30
170 lin. ft. Eight-inch terrazzo wall bases	5.00	7.30
75 lin. ft. Terrazzo stair bases	7.00	7.20
90 lin. ft. Terrazzo finish on curbs, including stair curbs	6.00	19.00
315 lin. ft. Terrazzo finish on stairs	8.00	19.40
1,500 sq. ft. Excavation of concrete floor slabs for floor finishes	2.00	5.00
60 lin. ft. Excavation of 3/4-inch deep recesses in walls for terrazzo bases	2.00	8.00

SCHEDULE NO. 2

4,000 lb. Installing aluminum handrailings	\$1.00	\$1.64
9,000 lb. Furnishing and installing aluminum handrailings	4.75	5.55
34,000 lb. Furnishing and installing steel handrailings	1.00	.78
200 sq. ft. Excavation of concrete stairs for handrailing stringers	3.00	5.50
Lump Sum Furnishing and installing steel gratings and ceiling hatch	4,000.00	3,910.00

HIGHWAY—Construction of an undercrossing, and miscellaneous widening, grading, and surfacing on the Santa Ana Freeway

California—Los Angeles County—State. Oberg Brothers Construction Co. submitted a low bid of \$1,877,819 for miscellaneous highway work including construction of an undercrossing, widening of a bridge, two railroad overheads, and a viaduct, and grading and surfacing 0.6 mi. of approaches on the Santa Ana Freeway in Southern California. Unit prices were as follows:

(1) Oberg Brothers Construction Co.	\$1,877,819
(2) Vinnell Company, Inc. and subsidiaries	1,948,432
Vinnell Constructors	
Guy F. Atkinson Co.	2,014,359
Webb and White	2,209,178
Charles MacClosky Co.	2,844,131

	(1)	(2)
7,735 cu. yd. Removing concrete	\$ 27.00	\$ 35.00
Lump Sum Clearing and grubbing	10,000.00	12,500.00
42,000 cu. yd. Roadway excavation	1.25	1.10
7,500 cu. yd. Structure excavation	5.00	3.30
6,000 cu. yd. Structure backfill	3.00	6.00
10,660 cu. yd. Structure excavation (bridge)	11.00	3.30
4,050 cu. yd. Structure backfill (bridge)	4.00	8.00
30,000 sq. yd. Compacting original ground	.10	.07
16,000 ton Imported subbase material	2.00	1.90
Lump Sum Dev. wat. supp. & furn. wat. equip.	5,000.00	3,000.00
2,000 gal. Applying water	2.00	1.75
Lump Sum Finishing roadway	1,000.00	1,500.00
15,000 ton Untreated rock base	2.50	2.50
40 ton Liq. asph. SC-2 (pr. ct.)	50.00	35.00
40 ton Asph. emuls. (pt. bndr. & Cl. "D" sl. ct.)	50.00	40.00
600 ton Mineral aggregate (P.M.S.)	7.00	5.00
32 ton Paving asphalt (P.M.S.)	7.00	5.00
6,500 lin. ft. Placing P.M.S. (curbs)	.40	.40
15,000 ton Asphalt concrete	7.00	5.00
7,100 cu. yd. Class "B" P.C.C. (pavement)	22.00	25.00
170 cu. yd. P.C.C. (arch abutments)	25.00	47.00
8,370 cu. yd. Class "A" P.C.C. (structures)	52.00	47.00
Lump Sum Cl. "A" P.C.C. (arch ribs) (707 C.Y.)	60,095.00	33,229.00
294 cu. yd. Cl. "E" P.C.C. (prestressed girders)	70.00	47.00
448 lin. ft. Rubber waterstops	2.00	2.00
63,330 lb. Misc. iron and steel	.30	.35

230 lin. ft. Metal stair treads	3.00	3.00
4,094 lin. ft. Steel railing	9.00	10.00
47 lin. ft. Stairway wall railing	7.00	6.00
56 lin. ft. Stairway exterior railing	15.00	18.00
556 lin. ft. Skid rail	7.00	7.00
2,410 lin. ft. Temporary timber guard railing	3.00	3.00
75 ea. Portable timber barricades	40.00	60.00
5,630 lin. ft. Furnishing concrete piling	3.00	3.30
3,150 lin. ft. Furnishing steel piling	3.00	3.50
8 ea. Steel pile splices	25.00	25.00
412 ea. Driving piles	50.00	45.00
23 sq. yd. Membrane waterproofing	3.00	6.00
1,700 cu. yd. Cl. "B" P.C.C. (curbs, gutters and sidewalks)	30.00	32.00
900 ea. Curb dowels	.75	.75
650 lin. ft. Metal plate guard railing	3.00	3.60
4,700 lin. ft. 72" chain link fence	1.00	2.10
80 lin. ft. 12" R.C.P. (std. str.)	5.00	3.00
380 lin. ft. 15" R.C.P. (std. str.)	8.00	4.00
820 lin. ft. 18" R.C.P. (std. str.)	8.50	5.00
134 lin. ft. 21" R.C.P. (std. str.)	9.00	5.50
230 lin. ft. 24" R.C.P. (std. str.)	9.00	6.00
56 lin. ft. 30" R.C.P. (std. str.)	12.00	7.50
290 lin. ft. 33" R.C.P. (std. str.)	12.00	8.50
580 lin. ft. 36" R.C.P. (std. str.)	13.00	10.00
320 lin. ft. 39" R.C.P. (std. str.)	14.00	12.00
566 lin. ft. 45" R.C.P. (std. str.)	16.00	15.00
54 lin. ft. 4" Cast iron pipe	2.00	2.00
295 lin. ft. 6" Drain tile	1.00	2.00
11 cu. yd. Filter material	8.00	12.00
420 lin. ft. 8" Clay sewer pipe (ext. str.)	21.00	16.00
10 lin. ft. 10" Clay sewer pipe (ext. str.)	21.00	16.00
260 lin. ft. 15" Clay sewer pipe (ext. str.)	22.00	18.00
90 lin. ft. 16" Clay sewer pipe (ext. str.)	22.00	20.00
85 cu. yd. Cl. "C" P.C.C. (pipe reinforcement)	30.00	30.00
40 lin. ft. 4" Asbestos cement pipe	2.00	2.00
1,848,000 lb. Bar reinforcing steel	.10	.11
4 ea. Manholes (sanitary sewers)	400.00	420.00
1 ea. Drop manhole (sanitary sewers)	500.00	480.00
12 lin. ft. 10" shaft manhole (storm drain)	15.00	30.00
4 ea. Adjust. man'h's to grade (sanit. sew.)	40.00	60.00
3 ea. Remodeling manholes (sanit. sew.)	100.00	180.00
4 ea. Abandoning manholes (sanit. sew.)	50.00	70.00
Lump Sum Hwy. light & illum. sign sys.	75,000.00	80,000.00
Lump Sum Prestressing steel & prestressing	20,000.00	21,000.00

BRIDGE—A concrete and steel bridge across the American River in California

California—Sacramento County—State. Brighton Sand and Gravel Co. of Perkins submitted a low bid of \$289,165 for construction of a reinforced concrete and steel bridge across the American River at Fair Oaks. Unit prices were as follows:

(1) Brighton Sand and Gravel Co.	\$289,165
(2) George Pollock Co.	298,646
C. B. Tuttle	307,871
James B. Allen	310,447
Lew Jones Construction Co.	315,447
Granite Construction Co.	318,605
B. J. Ukropina, T. P. Polich, Steve Kral, and John R. Ukropina	323,548
Dan Caputo	325,482
C. K. Moseman	333,695
Lord and Bishop	333,914
John C. Gist Co.	334,407
R. G. Clifford & C. O. Bodenhamer	340,906
Bishop, Younger, Bradley Co.	349,067
Baldwin Contracting Co., Inc.	351,381
Stolte, Inc. & Cantor and Coull	373,998
The Duncan-Harrelson Co.	386,157

	(1)	(2)
930 cu. yd. Structure excavation (type "A")	\$ 30.00	\$ 18.50
770 cu. yd. Structure excavation (type "B")	3.00	3.50
20 cu. yd. Structure backfill	1.25	6.00
360 cu. yd. Class "A" P.C.C. (foot. blocks)	19.00	25.00
2,150 cu. yd. Class "A" P.C.C. (struct.)	42.60	47.00
591,000 lb. Structural steel	.13	.125
Lump Sum Clean & paint struct. steel	8,615.00	10,000.00
5,270 lin. ft. Furnish steel piling	2.91	3.25
191 ea. Driving piles	45.00	55.00
24 ea. Steel pile splices	22.00	25.00
415,000 lb. Bar reinforcing steel	.08	.09
600 lin. ft. Catwalk	1.35	2.00
2,000 lin. ft. Steel railing	7.50	8.25
4,400 lb. Misc. steel	.16	.21

SEWERAGE—Sanitary and storm sewers in and about three sanitation districts in San Jose, California

California—San Jose—City. Kevry Construction, Inc., of San Leandro submitted a low bid of \$228,609 for construction of sanitary and storm sewers in and about Orchard Annexation Districts Nos. 2, 5, and 8. Unit prices were as follows:

(1) Kevry Construction, Inc.	\$228,609
(2) P. & E., Inc.	235,369
A. J. Peters & Son	242,769
Nick Bebek Sr.	247,962
McGuire-Hester	248,291
Pisano Bros.	324,244

	(1)	(2)
5,017 lin. ft. 12" V.C.P. stand. strength	\$ 3.90	\$ 4.01
362 lin. ft. 10" V.C.P. stand. strength	3.60	3.59
5,893 lin. ft. 8" V.C.P. stand. strength	3.10	3.04
14,650 lin. ft. 6" V.C.P. stand. strength	2.70	2.78

20 lin. ft. 18" C.M.P. complete with sand backfill.....	25.00	20.61
76 lin. ft. 15" C.M.P. complete with sand backfill.....	24.00	16.46
1 Clay brick & rein. con. manhole & structure.....	350.00	420.00
1,590 lin. ft. 8" plain C.P. stand. strength, inlet laterals....	3.10	3.20
275 lin. ft. 8" plain C.P. stand. strength.....	2.90	3.20
1,841 lin. ft. 10" plain C.P. stand. strength.....	3.00	3.20
289 lin. ft. 12" plain C.P. stand. strength.....	3.15	3.40
1,897 lin. ft. 15" R.C.P. stand. strength.....	3.97	5.21
561 lin. ft. 18" R.C.P. stand. strength.....	5.05	6.02
1,686 lin. ft. 21" R.C.P. stand. strength.....	6.83	7.45
1,134 lin. ft. 24" R.C.P. stand. strength.....	6.75	8.14
838 lin. ft. 27" R.C.P. stand. & extra strength.....	8.49	10.55
458 lin. ft. 30" R.C.P. stand. strength.....	11.34	11.04
831 lin. ft. 33" R.C.P. stand. & extra strength.....	14.20	12.22
1,488 lin. ft. 36" R.C.P. stand. strength.....	11.60	13.54
648 lin. ft. 42" R.C.P. stand. & extra strength.....	15.50	16.18
38 Stand. clay brick manholes.....	185.00	221.00
3 Type "A" clay brick manholes comp. with cov. & rings.....	200.00	350.00
2 Type "B" brick manholes comp. with 3'-7" cov. & rings.....	350.00	450.00
44 Stand. conc. inlet structures comp. w/frames, grates & hoods.....	133.00	105.00
46 lin. ft. 36" C.M.P. No. 10 gauge.....	58.00	40.00
77 lin. ft. 42" C.M.P. No. 10 gauge.....	50.00	42.00
17 lin. ft. 54" C.M.P. No. 8 gauge.....	92.00	85.00

MISCELLANEOUS—Bank protection on the Sacramento River in California

California—Sacramento River—C. of E. H. Earl Parker, Inc., of Marysville submitted a low bid of \$657,557 for normal bank protection on 25.7 mi. of the Sacramento River. Unit Prices were as follows:

- (1) H. Earl Parker, Inc. \$657,557
- (2) Basalt Rock Co. 682,790

	(1)	(2)
Lump Sum Clearing and grubbing.....	\$22,500.00	\$25,000.00
216,600 cu. yd. Common excavation.....	.40	.45
209,500 cu. yd. Levee embankment.....	.42	.45
8,500 M gal. Wat. for embank. compact. & dust cont	1.00	1.00
720 sq. yd. Shaping existing levee crown.....	.40	.25
19 cu. yd. Concrete.....	105.00	105.00
29 bbl. Portland cement.....	4.75	5.00
1,500 lb. Steel reinforcement.....	.16	.20
51 lin. ft. 10 in. soilproof. stl. pipe No. 10 ga.....	3.60	6.00
102 lin. ft. 12 in. soilproof. stl. pipe No. 10 ga.....	6.10	8.00
166 lin. ft. 14 in. soilproof. stl. pipe No. 7 ga.....	12.00	8.00
52 lin. ft. 24 in. soilproof. stl. pipe, ½ in. thick.....	12.60	10.00
25 lin. ft. ¾ inch galvanized steel pipe.....	.80	1.00
32 lin. ft. 2 inch galvanized steel pipe.....	1.60	1.35
36 lin. ft. 24 inch reinforced concrete pipe.....	8.50	50.00
9 lin. ft. 42 inch reinforced concrete pipe.....	25.00	50.00
9 lin. ft. 48 inch reinforced concrete pipe.....	40.00	50.00

12 lin. ft. 60 inch reinforced concrete pipe.....	40.00	65.00
524 lin. ft. 24 inch non-reinforced concrete pipe.....	6.35	30.00
233 lin. ft. 24 in. corr. met. pipe, No. 12 ga.....	18.00	20.00
54 lin. ft. 24 in. corr. met. pipe, No. 14 ga.....	14.00	20.00
6 ea. Corr. met. cut-off wall for 24 in. corr. metal pipe.....	110.00	60.00
2 ea. 36 inch gate riser unit.....	1,050.00	1,200.00
1 ea. 42 inch gate riser unit.....	1,250.00	1,200.00
7 ea. 24 inch slide headgate.....	140.00	200.00
1 ea. 10 in. Butterfly Valve & 90° flanged steel ell, No. 10 gage.....	500.00	600.00
1 ea. Steel concentric red. No. 7 ga. 14 inch to 12 inch 2'-10" long.....	80.00	200.00
1 ea. Steel concentric red. No. 7 ga. 18 inch to 14 inch, 2'-10" long.....	100.00	200.00
1 ea. 12 inch mechanical coupling.....	40.00	60.00
1 ea. 14 inch mechanical coupling.....	50.00	60.00
1 ea. Hoist assembly.....	215.00	150.00
168 lin. ft. 8 in. steel pipe pile, concrete filled.....	22.50	10.00
88 lin. ft. 10 in. steel pipe pile, concrete filled.....	23.00	14.00
28 lin. ft. 8 in. steel pipe pile cut-off.....	22.50	6.00
8 lin. ft. 10 in. steel pipe pile cut-off.....	23.00	10.00
224 lin. ft. 12 inch treated timber pile.....	8.00	8.00
38 lin. ft. 12 in. treated timber pile cut-off.....	6.00	4.00
38,700 ton Quarry rock below mean low water.....	5.00	4.70
41,800 ton Quarry rock above mean low water.....	4.90	4.70
90 cu. yd. Rem. & repl. exist. stone protection.....	2.00	10.00
3,400 ton Crushed min. agg. road surfacing.....	4.30	4.65
18 ton Liquid asphalt, Type SC-2 or SC-3.....	35.00	50.00
2,350 lin. ft. Remove fence.....	.15	.15
2,115 lin. ft. Reconstruct fence.....	.30	.30
38 lin. ft. 1½ inch rigid steel conduit.....	1.30	2.00
15 lin. ft. 2 inch flexible steel conduit.....	3.00	2.00
550 F.R.M. Lumber, Douglas fir, treated.....	.40	.50
1,100 F.B.M. Lumber, Douglas fir, untreated.....	.50	.40
3,300 lb. Structural steel.....	.40	.30
300 lb. Miscellaneous metal.....	.65	.60
Install Only: Pump, pump column, Motor and appurtenances, furnish & install: Service pole		
Lump Sum Sta. 451/00, Site No. 2.....	265.00	1,500.00
Lump Sum Plug 6 in. cased well with concrete Sta. 438/85, Site No. 2.....	65.00	75.00
Lump Sum Remove & waste: Timber walkway, Sta. 445/00, Site No. 2.....	35.00	100.00
Remove & waste: Concrete retaining wall Sta. 437/35 to 438/80		
Lump Sum Site No. 2.....	500.00	2,500.00
Remove & salvage: 1-18" slide headgate 1 24" slide headgate, 6"x18" corr. metal pipe, 60"x16" steel pipe, pump, motor priming pump, tank & appurtenances 1-16" gate valve & frame pump house. Remove & waste: Concrete discharge box, concrete surge box, concrete pump pit, concrete saddle & 95'x1'-8"x1'-8" concrete box		

(Continued on page 146)

SPECIFICATIONS SHOULD REQUIRE

CONSTRUCTION BONDS

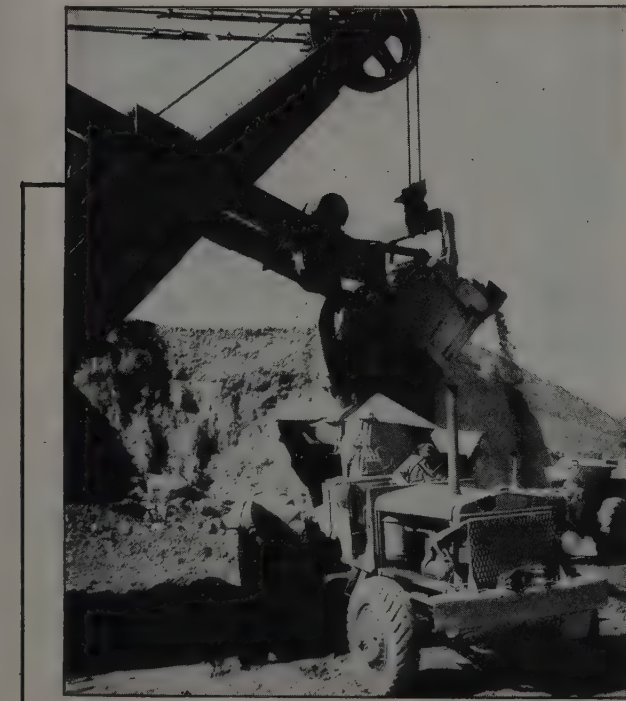
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UNIT PRICES . . . CONTINUED

67	Stand. clay brick manholes comp. with covers & rings.....	185.00	180.00
12	Stand. flushing inlets comp. with cov. & rings..	50.00	46.00
52 lin. ft.	4" V.C.P. house sewer lats.....	2.50	2.37
307 lin. ft.	4" cast iron soil pipe house sewer laterals.....	3.41	2.99
188 lin. ft.	21" C.M.P. complete with sand backfill.....	25.00	17.32
Lump Sum	Culvert Sta. 457/25.8, Site No. 2.....	1,600.00	2,500.00
	Remove & salvage: 2-12" slide headgates & 1-18" slide headgate. Remove & waste: 18" & 42" concrete stand pipes 202"x16" concrete pipe & 39"x18" con. pipe Sta. 457/29 to 459/24. Site No. 2.	400.00	2,500.00
Lump Sum	Remove & reinstall: Pump, trash clean out, check valve, 2-14" to 12" reducers, 18"x15" steel pipe & appurtenances, primer line, tank & appurtenances. Remove & salvage: 40"x15" steel pipe & 1-24" slide headgate. Remove & waste: 2 concrete head walls, 75"x3"x2" concrete box culvert & concrete spillbox Sta. 1263/49, Site No. 3.....	1,000.00	3,000.00
Lump Sum	Remove & reinstall: 12"x18" corrugated metal pipe inl ateral ditch Sta. 1270/50, Site No. 3.....	50.00	1,000.00
Lump Sum	Remove & waste: 5 wooden shacks Riverside Sta. -0/65 to Sta. 0/70, Site No. 5.....	150.00	500.00
Lump Sum	Remove & reinstall: at Sta. 13/00 pump & motor assembly, 1-12" gate valve, corrugated metal pump house, primer pump, motor, starter & appurtenances, 30"x3/4" galvanized steel pipe & 35"x2" flexible metallic conduit. Remove & salvage: 47"x12" steel pipe & 97"x18" steel pipe. Remove & waste: 2 concrete spillboxes. Sta. 14/27.60 Site No. 6	900.00	2,600.00

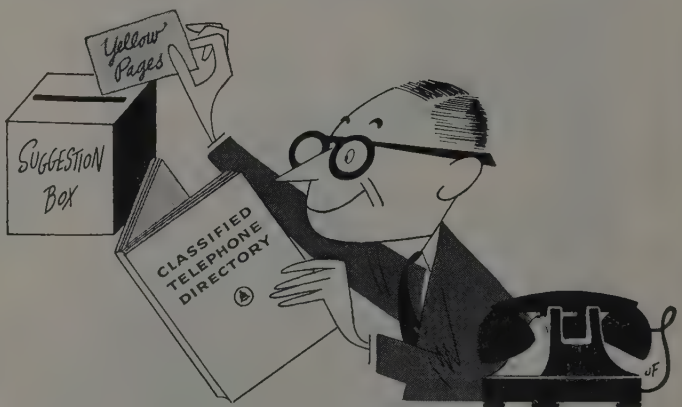
BRIDGE—A prestressed concrete bridge and highway embankment in California

California—Marin County—State. The Duncanson-Harrelson Co. & Pacific Bridge Co. of Richmond submitted a low bid of \$3,017,427 for construction of a prestressed concrete girder and reinforced concrete box girder bridge and highway embankment to be constructed at Richardson Bay, about 5 mi. north of San Francisco. Detour to be graded and surfaced with plant-mix surfacing on cement-treated base. Unit prices were as follows:

(1)	The Duncanson-Harrelson Co. & Pacific Bridge Co....	\$3,017,427
(2)	Healy-Tibbitts Construction Co.....	3,067,094
	Ben C. Gerwick, Inc. & Peter Kiewit Sons' Co.....	3,127,983
	Judson-Pacific-Murphy & Stolte, Inc.....	3,211,606
	Walsh-Pomeroi.....	3,222,271
	MacDonald, Young, and Nelson, Inc. & Morrison-Knudsen Co., Inc.....	3,389,483
	Chas. L. Harney, Inc.....	3,752,751
	Guy F. Atkinson Co.....	4,045,068
		(1) (2)
800 sq. ft.	Removing traffic stripes.....	\$.40 .50
Lump Sum	Clearing and grubbing.....	10,000. 8,000.00
58,400 cu. yd.	Roadway excavation.....	.80 .90
4,250 cu. yd.	Structure excav. (Type "A").....	13 9
720 cu. yd.	Structure excav. (Type "B").....	10 9
1,825 cu. yd.	Structure backfill.....	2 4
1,080 cu. yd.	Ditch & channel excavation.....	2 2
Lump Sum	Dev. wat. sup. & furn. wat. equip.....	1,000 1,000
1,340 M gal.	Applying water.....	3.50 3.50
Lump Sum	Finishing roadway.....	1,000 2,500
240 bbl.	Portland cement (C.T.B.).....	5.30 5
2,800 sq. yd.	Mix. spread & com't (C.T.B.).....	.40 .40
910 ton	Mineral aggregate (C.T.B.).....	2.60 3
38 ton	Asphaltic emulsion (cur. sl. ct. and pt. binder).....	40 45
17 ton	Screenings (sl. ct.).....	10 12
4,940 ton	Plant mixed surfacing.....	6.50 7
2 M F.B.M	Treated Douglas fir timber.....	600 500
2,925 cu. yd.	Class "A" P.C.C. (foot. block).....	15 22
17,750 cu. yd.	Class "A" P.C.C. (structure).....	60 65
5,205 cu. yd.	Class "E" P.C.C. (prestressed girders).....	41 46
1,650 lin. ft.	Class "A" P.C.C. (col. bells).....	40 40
6,195 lin. ft.	Concrete railing.....	5 6
130,000 lb.	Misc. iron and steel.....	.40 .40
2,520 lin. ft.	Furn. treat. Douglas fir piling.....	1.65 2
56 ea.	Driving timber piles.....	60 40
39,380 lin. ft.	Furn. 10" steel piling.....	3 3.25
478 ea.	Driving 10" steel pile.....	150 140
525 ea.	10" steel pile splices.....	30 15
21 064 lin. ft.	Furn. 225 ton bearing piling.....	14 15
238 ea.	Driving 225 ton bearing piles.....	1,000 325
Lump Sum	Load test (225 ton bear. pile).....	10,000 6,000
65 lin. ft.	Metal plate guard railing.....	5 5
200 lin. ft.	Salv. & reconstruct. met. plate guard rail.....	3 3
80 lin. ft.	12" C.M.P. (16 ga.).....	3 3
20 lin. ft.	18" C.M.P. (16 ga.).....	5 5
5,125 000 lb.	Bar reinforcing steel.....	.085 .095
Lump Sum	Removing existing bridge.....	16,530 25,000
Lump Sum	Prestress.stl. & prestress oper.....	150,000 150,000
Lump Sum	Hi-way light. & illum. sign sys.....	15,000 16,000



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You'll find it fast in the YELLOW PAGES!



News of DISTRIBUTORS

New Diamond Chain rep.

William Kenton has taken over the Hudson-Tucker Co. and changed its name to Hudson Equipment Co., with offices at 629 First Ave., San Diego 12, Calif., and in El Centro. He will distribute Diamond Chain Co. products.

Cummins Engine increases staff

Cummins Engine Co. of Seattle, Wash., has added A. C. Burrill, assistant regional service manager, and H. R. Ginther, assistant regional sales manager, to its staff.

Chain Belt appoints service engr.

Chain Belt Co. has appointed LeRoy Gratz service engineer for eight Western states, British Columbia, and Alberta. He will be available to service Rex Moto-Mixers, pumps, pumpcretes, pavers, and building mixers from his headquarters at the new Los Angeles plant.

Chicago Pneumatic address change

Chicago Pneumatic Tool Co. has moved its Denver, Colo., office from 1382 Broadway to 465 Acoma St.

Arnold Machinery changes

William E. Thomas, service manager at Arnold Machinery Co.'s Salt Lake City office, has moved to Idaho Falls, Idaho, to take over all service in the state. He has a completely equipped service truck. His former position will be filled by W. D. Hoffman. The company has taken on distribution of Baker Lull shovel loaders in its territory.

Baldwin-Lima-Hamilton L.A. office

Our information was incomplete last month as to the assignment of Paul LaFrance as manager of the Los Angeles office of Baldwin-Lima-Hamilton Corp. It should be noted that in his new assignment LaFrance will be responsible for the activities of the transportation and industrial division of the company in the Los Angeles territory. T. A. Griffin remains as district manager for the construction equipment division of B-L-H.

Gutekunst promoted to general sales mgr.

George W. Gutekunst, Gardner-Denver Co. Los Angeles district manager, has been promoted to general sales manager with offices at

Quincy, Ill. He will fill the spot left vacant by the election of G. V. Leece as president of the firm.

New Buda distributor

Anderson-BeVier Company, Inc., has been formed by two former employees of Buda Engine and Equipment Company, Inc. The new firm will distribute Buda engines, parts, and service from its main office in Los Angeles and branches in Bakersfield and Long Beach, California. Anderson was formerly Buda's West Coast regional manager and BeVier was manager of the California stores and assistant general manager of the California branches.

Casey-Metcalf takes on new lines

Casey-Metcalf Machinery Co. of Los Angeles, Calif., have been named exclusive distributors in Southern California for Manitowic cranes, shovels, draglines, and clamshells; Vermeer ditchers; and Schield Bantam cranes, shovels, clamshells, and the like. The Schield territory excludes San Diego and Imperial counties. Anthony Gentile, an experienced salesman, has been added to the staff.

Howard-Cooper replaces Tony Gosselin

Tony Gosselin has sold his International Harvester dealership in Eureka, Calif., to Howard Cooper Corp., which will operate out of Tony's old address with a new staff. This includes Wilkie Slavens, service manager; Orville Janssen, office; Jim W. Bugbee, parts; and Floyd Crawford, general services.

Gosselin will take a long-awaited vacation. His crew of highly-trained

men are all available for other positions.

Remington Arms adds distributor

The Warden Tool Co. has been named distributor of all industrial items made by Remington Arms Company, Inc. Warden has offices in San Francisco, Sacramento, Los Angeles, and San Diego, California.

New distributor at Wenatchee

Midstate Equipment Co., a new equipment distributing firm, has been formed at Wenatchee, Wash., with E. W. Elliott as manager. Midstate will distribute Allis-Chalmers heavy road equipment, Ingersoll-Rand, and Northwest Shovel products in the middle section of Washington. Representatives may be found at Hanford, Moses Lake, and Yakima.

Western Machinery opens new office

Western Machinery Co. of Denver, Colo., has opened a new office and warehouse near Grand Junction, address P.O. Box 1084, Grand Junction. The entire staff consists of graduate engineers. George Setter will direct engineering sales activities. Bob Jordan will handle office inquiries. Jack Quist will cover the Western Slope and Paul Fillo will take care of eastern Utah and southwestern Colorado.

Star Machinery handles Blaw-Knox

Star Machinery Co. of Seattle, Wash., has been named exclusive distributors for the state of Washington of Blaw-Knox construction equipment. B. J. McNae is manager of the construction equipment department.

Warnock-Bancroft to handle Warco graders

Warnock-Bancroft Equipment of El Monte, Calif., will distribute Warco motor graders in Southern California.

Rosenblatt joins Olympius Agency

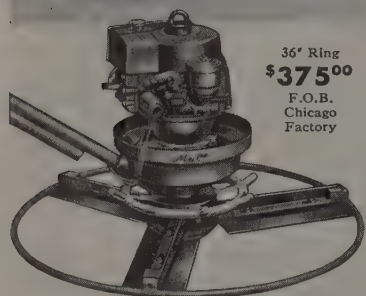
Ned K. Rosenblatt, former advertising manager for Shepherd Tractor



LINK-BELT CO. has completed a 3-story addition (above) to its San Francisco plant to allow for increased manufacturing, engineering, and warehousing facilities and a factory branch store. The company has also started work on a new district sales office and warehouse building in Portland.

NEW! Mall POW'R TROW'L

Exclusive
Features New to
Power Troweling



36" Ring
\$375.00
F.O.B.
Chicago
Factory

MALL—the first power trowel that delivers 97% of engine power to the trowel blades. New direct "in-line" transmission does it...no belts or pulleys to steal valuable power.

MALL—the first power trowel with interchangeable ring sizes...36" or 45" rings, with corresponding floating shoes, finishing blades and a 24" disc for dry tamp floors, can be used with one power unit.

MALL—the first power trowel that employs a new, extra sturdy trowel ring and arm design that will not sag. These, plus many other new, exclusive features, make the new MALL POW'R TROW'L the finest performing, easiest to handle gasoline driven troweling machine you have ever experienced. GET DETAILS NOW.

MALL Nation-Wide Factory-Owned Service
Warehouses Assure Fast, Dependable Service.

MALL TOOL COMPANY 7708 S. Chicago Ave.
Chicago 19, Illinois

Send me full details and prices on the NEW
MALL POW'R TROW'L.

Name _____

Firm _____

Address _____

CU-112



FIRST International 2T55 tractor-scraper unit sold in California went to Fresno County. Max Orendorff, sales manager of Allied Equipment Co., makes delivery (above).

& Equipment Co. in Southern California, has joined S. K. Olympus and Staff, Stockton advertising agency, as a principal and vice president. The agency has opened an office at 5420 Jillson St. in Los Angeles.

Nelson to handle Warco graders

Nelson Equipment Co. of Portland, Ore., has been appointed a distributor for Warco motor graders. The firm has a branch office at Seattle, Wash.

New P & H Pacific Division mgr.

Thomas J. Jeanneret, manager of the P & H Denver office, has been appointed general manager of the Pacific Division in place of Ralph D. Holcomb, who died recently. He will be responsible for all sales activities in the 11 Western states. Paul Diefenderfer has been appointed manager of all plant, service, and repair parts operations in the Pacific Division.

Remington field rep. moves

George Eiser, industrial field representative for Remington Arms Company, Inc., has moved his offices to 10930 Gerald Ave., Granada Hills, Calif. Phone Empire 3-2411.

MANUFACTURERS

Permanente opens Pasco plant

Permanente Cement Co. has opened its East Pasco (Washington) plant for business. The plant, situated at the Tidewater-Shaver docks on the Snake River waterfront, has a bulk storage capacity of 7,000 bbl. It is equipped to make delivery by either truck or rail to customers in its sales territory.

Kaiser names two veeps

E. T. Larsen and Dr. W. C. Rueckel have been named vice presidents of Henry J. Kaiser Co., parent company of the Kaiser group of in-

dustries. Larsen, who joined Kaiser in 1941, will be responsible for all engineering activities of Kaiser Engineers with the title, manager of engineering. He is a member of A.S.C.E. and other professional groups. Rueckel, formerly a division manager for Kaiser Engineers, has been made manager of development and sales. He will be responsible for general development work. He holds degrees in ceramics, metallurgy, and chemistry.

Hyster ups two

Lewis W. Krumbein, market research director, has been named coordinator of lift truck promotion by Hyster Co. Richard M. Taylor has been moved up to fill the vacancy.

Chicago Bridge & Iron names ad mgr.

The Chicago Bridge & Iron Co. has appointed E. N. Zimmerman advertising manager. A company employee since 1937, he had been assistant advertising manager since 1945.

TerraTrac adds working capital

American Tractor Corp. has secured \$500,000 in additional working capital, with the promise of more if needed from its Wall St. backers. The funds will help finance rapidly expanding domestic and export market sales, according to M. B. Rojzman, president. The firm is currently engaged in setting up a nationwide network of distributors and dealers under the direction of David A. Milligan, vice president.

New Blaw-Knox div. sales mgr.

John Pendergast has been appointed domestic sales manager of the Foote Construction Equipment Division, Blaw-Knox Co. His previous connection was with Contractors Machinery Co.

Iowa names new officers

Iowa Manufacturing Co. has named a new slate of officers. They include Howard Hall, president; Kenneth Lindsay, executive vice president and director of sales and advertising; James F. Plumb, vice president and treasurer; B. T. Perrine, secretary; A. C. Gossard, vice president, domestic sales manager; C. O. Norberg, vice president, parts and service; H. C. Pollitz, vice president, engineering; and J. W. Riley, vice president, production.

Ralph D. Holcomb dies

Ralph D. Holcomb, 48, general manager of Harnischfeger Corp., Pacific Division, died of a heart attack in Los Angeles recently. He joined the firm in 1929, serving as general sales manager from 1947 to 1951, when he took over the Pacific Division.

U.S. Rubber ups Slate

R. H. Slate, district sales manager of the Los Angeles branch, U.S. Rub-

ber Co., has been appointed Pacific Coast sales manager of the general products division. Jack L. Bruce, assistant district sales manager in the Los Angeles branch, moves up to fill the vacancy.

1957 ARBA convention to meet in Chicago

The 1957 American Road Builders' Association Convention and Road Show will be held in Chicago from January 28 through February 2, according to a joint announcement by Robert M. Reindollar, president of ARBA, and Frederick Salditt, vice president of Harnischfeger Corp. and president of the Construction Industry Manufacturers Association, an ARBA affiliate.

The affair, to be held in the International Amphitheater, will cover 300,000 sq. ft. of exhibit space, making it the largest indoor spectacle of its kind ever held. Preliminary plans were worked out at a recent joint meeting of ARBA and CIMA under the chairmanship, respectively, of Donald O. White, president of the American Asphalt Paving Co., and Julien R. Steelman, president of The Koehring Co.

board of Quick-Way Truck Shovel Co. His appointment was part of a financial deal whereby Penn-Texas Corp. acquired both Quick-Way and Industrial Brownhoist Corp. Other personnel changes include the election of Louis T. M. Ralston, president of Brownhoist, as president of Quick-Way and the appointment of Wilson H. Madden, formerly with Gardner Board and Carton Co., as vice president and general manager. Luke E. Smith, founder and former president of Quick-Way, will act as a consultant.

Concrete pipe plant ups capacity

United Concrete Pipe Corp. has tripled the capacity of its centrifugal reinforced concrete pipe making plant at Baldwin Park, Calif.

Gar Wood sales reorganization

Domestic and export sales of Gar Wood and Buckeye equipment are being directed from executive offices in Wayne, Mich. The move of sales functions from the plant in Findlay, Ohio, is part of a reorganization program intended to centralize sales and marketing functions of all divisions. To direct this centralization, E. B. Hill, vice president, has been named director of sales, advertising, and export for all products.

Calaveras sales reorganization

Calaveras Cement Co. has reorganized its sales department into two di-

BUY

these cost-reducing forms for concrete:

1. EFCO "Lifetime" Steel Forms

BUY these forms for your: (a) Minimum form requirements. (b) Larger form requirements where reuse of the form equipment and simplicity of the form work seem to make purchase more practical.

2. SPECIAL ECONOMY Forms

These are designed and manufactured to your specifications and are supplied with or without supervisory service for your special form requirements.

RENT

3. ECONOMY Steel Forms

RENT these forms for your: (a) Larger unusual form requirements. (b) More difficult form requirements. These forms are supplied with supervisory service.

For details and estimates, call or write:

ECONOMY FORMS CORPORATION

HOME OFFICE: DES MOINES, IOWA

DISTRICT SALES OFFICES: St. Louis, Mo. • Kansas City, Mo. Lincoln, Nebr. • Minneapolis, Minn. • Ft. Wayne, Ind. • Cincinnati, Ohio • Cleveland, Ohio • Metuchen, N. J. • Springfield, Mass. • Washington, D.C. • Decatur, Ga. • Dallas, Texas • Los Angeles, Calif. • Oakland, Calif. • Denver, Colo.

Pilj joins Superior Scaffold

Larry Pilj, president of C. P. Concrete Equipment Co. of Inglewood, Calif., for 9 yr., has joined Superior Scaffold Co. of Culver City as field sales manager.

Marion takes over Osgood-General

Marion Power Shovel Co. has acquired controlling interest in The Osgood Co. and its subsidiaries. Osgood will continue to function with its own separate personnel and will continue to design, build, and sell machines under the Osgood-General name, according to John P. Courtright, who is directing both companies as president and general manager. He advises the owners of Marion and Osgood-General machines to regard the companies as completely separate and look to them separately for sales or service needs.

New Marlow sales mgr.

A. F. Woods, district engineer, has replaced A. S. Rubin as sales manager for the Marlow Pumps Division of Bell & Gossett Co. Rubin has gone into business for himself as a distributor.

Oscar Chapman joins Quick-Way

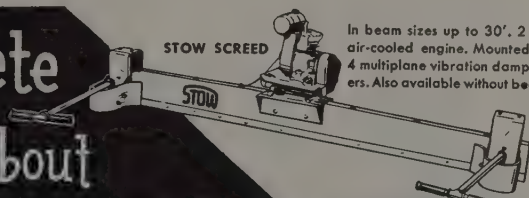
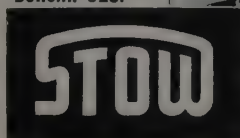
Oscar L. Chapman of Denver, Secretary of the Interior from 1949 to 1953, has been named chairman of the

Concrete facts about Concrete Vibrators and Screeds

Model BU
2 HP at 9000 VPM
115 V. AC or DC

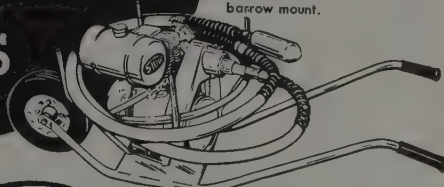


See your STOW distributor about STOW vibrators and screeds today. Send for free Bulletin 526.



In beam sizes up to 30'. 2 HP air-cooled engine. Mounted on 4 multiplane vibration dampers. Also available without beam.

Model AGW
4 1/2 HP 4 cycle air-cooled engine, automatic centrifugal ball bearing clutch, delivers 6000 to 9300 VPM, with wheel barrow mount.



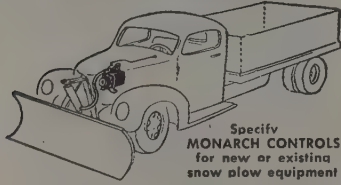
STOW is the name you want!

The high operating speeds of the new STOW line of Concrete Vibrators make possible the use of heavy duty, light weight flexible shafting and lighter, more efficient vibrator heads—which speed operations, cut costs. And, STOW design provides convenient, practical speed control so attachments may be used directly on the vibrator shafts.

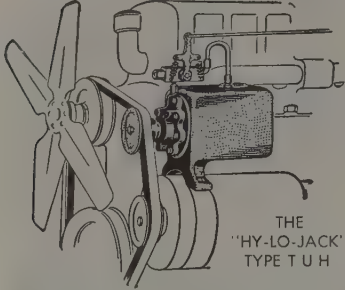
STOW SCREEDS—permit placing more than 300 cu. yds. in less than 8 hours; strike off and impact in one operation; leave surfaces true to grade; work up to and around manhole covers and obstructions.

STOW MANUFACTURING COMPANY
55 Sear Street Binghamton, New York

POWER HYDRAULICS for Snow Plows



Specify
MONARCH CONTROLS
for new or existing
snow plow equipment



THE
"HY-LO-JACK"
TYPE T U H

- Clutch operated models
- Thousands in use—
- 1000's Pressure. 1 gal. per minute
- Fit all trucks
- Fan belt or electrically driven
- Electric Models (6 or 12 Volt) also available

• Write Hydraulic Division
MONARCH ROAD MACH. CO.

324 North Front Ave.
GRAND RAPIDS 4, MICHIGAN

visions, dealer and contractor sales. Dealer sales will be headed by William Jeffrey, formerly manager of Stockton Building Materials Co. in Stockton, Calif. He will supervise dealer sales personnel in San Francisco, Fresno, Modesto, Stockton, Sacramento, Chico, Oakland, and Santa Rosa. Tom Love, Jr., assistant chemist in the San Andreas, Calif., plant, will be dealer sales representative in Stockton.

Contractor sales will be under Mel J. London, vice president in charge of marketing for the company. His staff, to work in coordination with James R. Casey, sales engineer in San Francisco, will include Jack Gordon, Alameda and Contra Costa County representative; Lowell Garrett, Sacramento north to the Oregon border; Merle Segale, Lodi south to Bakersfield; and Al Maier, Oakland area.

Atlas names pipe line rep.

George T. Errickson has been appointed special representative, explosives department, covering all pipe line construction work in the country, by Atlas Powder Co. His collateral duties will include working with the contractor's division in the heavy construction field. He was formerly sales agent for an eastern district.

International Harvester changes

James R. Allan, manager of the Industrial Engineering and Construction Department of International Harvester Co., has retired after 44 yr.

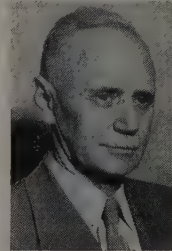
with the firm. He has been replaced by Otto A. Krueger, assistant manager of the department. Krueger's old spot will be filled by Harold W. Parthemer, construction engineering consultant.

New Le Roi sales dept.

Le Roi Co. has organized a Municipal Sales Department under the direction of Guy Scrivner, a company sales engineer in the Midwest, to sell engines for standby generator sets and centrifugal pumps to municipalities, state, and federal governments, the military, and industry.

Bethlehem retires three

Three Bethlehem Pacific Coast Steel Corp. department heads have retired from their positions in the company's Seattle operations recently. They are P. H. Guldberg, the plant's chief engineer; W. A. Roth, in charge of district reinforcing steel sales; and R. P. Herr, superintendent of rolling mills.



Guldberg



Irrgang

Irrgang named Lincoln prexy

William Irrgang, executive vice president of The Lincoln Electric Co. since 1951, has been named president and general manager. Other new officers include John S. Roscoe, executive vice president; A. F. Davis, vice president and secretary; and George Landis, vice president.

Mack gets military contract

Mack Trucks, Inc., has been awarded a \$2,000,000 contract to furnish 121 off-highway trucks, each with a 30,000-lb. capacity, to the Bureau of Yards and Docks, U.S. Navy, by the Corps of Engineers. Delivery is to be completed in October 1955.

Gardner-Denver ups three

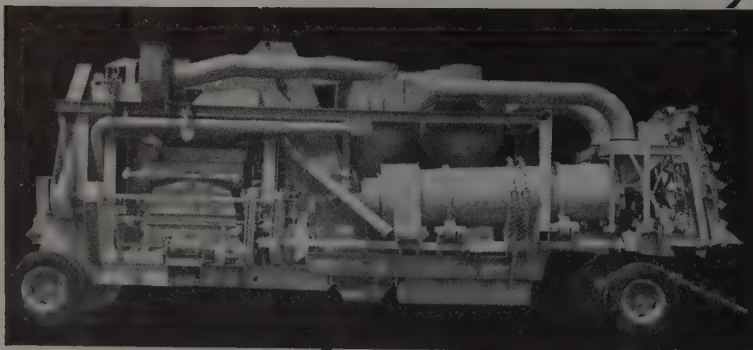
Charles M. George, sales administrator, has been named assistant to the president of Gardner-Denver Co. J. W. (Jack) Gardner has become administrative assistant. B. P. (Doc) Spann has been elected vice president.

American Chain in Portland

American Chain & Cable Company, Inc., has opened a warehouse and office with a complete stock of

SMALL
IN
SIZE

BIG IN PRODUCTION



THE LITTLE MONSTER®

...a complete asphalt mixing
plant on wheels

Handles 40 tons per hour
on a 45-second mixing cycle

Here's a rugged, portable asphalt plant that you can move where you want it ... set it up in short order, and turn out close specification mixes at a high, money-making rate of production... MADSEN'S superior engineering is evident throughout The LITTLE MONSTER. It occupies a small amount of space and the component parts are arranged for simplicity of operation and maintenance, maximum efficiency, high output and low operating costs. For complete engineering data, write for Bulletin LM-1.



Equipment that Serves®

MADSEN IRON WORKS, INC.
14100 E. ROSECRANS AVE., P. O. BOX 38
LA MIRADA, CALIFORNIA

wire rope and slings in Portland, Ore. I. L. Schobert will be in charge of sales.

Staudt to head ad men

George L. Staudt, advertising manager of Harnischfeger Corp., has been chosen chairman of the board of the National Industrial Advertisers Association at the 32nd annual conference in Montreal. He will serve in the post for a year.

Tournapull Model D Number 2,000

The 2,000th Model D Tournapull has come off the assembly line of LeTourneau - Westinghouse at Peoria, Ill.

Kaiser Steel appointments

C. Lee Emerson has been named general sales manager for the Kaiser Steel Corp. Prior to his new appointment, Emerson was southern district sales manager, with headquarters in Los Angeles. In his new capacity he will be located in the general sales office in Oakland. Emerson replaces Jack J. Carlson who has been appointed assistant to the vice president and general manager.

New construction materials firm

A complete line of concrete curing compounds, separating membranes, fiber expansion joints and protective coatings is now being produced by Edoco Technical Products, Inc., of Long Beach, Calif., for use in highway and canal construction, and in all types of building. Edoco is the newest subsidiary of Edgington Oil Refineries, Inc., of which Ralph Edgington is president. The new company brings to the Pacific Coast many specialized products used in construction and manufacturing which heretofore were only available from the East.

Executive promotions at Basalt Rock

Harold A. Price has been named manager and Jack A. Streblow sales manager of the newly formed structural concrete products division of the Basalt Rock Co., Inc. Ross Rudolph is appointed technical representative of the new division, with headquarters at Napa, Calif.

N. B. Obbard made president

As of July 1, Norman B. Obbard was appointed president of the American Bridge Division of U. S. Steel Corp., succeeding Frank K. McDanel, retired. Until his new appointment, he was vice president and general contracting manager of the division.

Bay City elects president

Donald E. Hawkins was recently elected to the presidency of Bay City Shovels, Inc., succeeding Morgan

More Classifieds

NEW PLYMOUTH HARBOUR BOARD NEW ZEALAND

Bid: October 26, 1954

Tenders will be received until 5 p.m. on 26th October, 1954, for the construction of Moturoa Jetty in reinforced concrete approximately 1,100 feet by 90 feet. Drawings and contract documents may be inspected at the New Zealand Government Trade Commissioner's Office, Dupont Circle Building, 1346 Connecticut Avenue, N.W., Washington 6, D.C., and may be obtained from the Consulting Engineer, Mr. W. G. Morrison, 28 Buller St., Wellington, New Zealand.

FOR HIRE!

Experienced Transmission and Telephone Line Engineer and Commercial Pilot desires position with reliable general construction firm. Bachelors' Degree in Mechanical Engineering, ex-Army pilot 2000 hours single and multi-engine.

Box 8A

WESTERN CONSTRUCTION

609 Mission St., San Francisco

Civil Engineer

Registered, BSCE 8 years varied experience US & Foreign in heavy equipment, construction, contracts, office engineer, technical training, costs & budget. Desires position with a future in construction. Box 9A, Western Construction, 609 Mission, San Francisco.

EXPORT SALES TRAINEES

Excellent opportunities now exist in our Export Sales Department for recent college graduates with training in Civil, Agricultural, or Mechanical Engineering; or related fields. Foreign assignments are made upon completion of training.

Men interested in these openings are invited to call or write to:

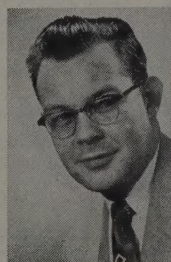
EMPLOYMENT DIVISION
CATERPILLAR TRACTOR CO.
PEORIA, ILLINOIS

AVAILABLE: Concrete Construction Supt., young, aggressive, cost conscious. Experienced on Dam, Powerhouse, Pumping Plant, Aqueduct and Spillways. Ten years with one large contractor. Have experienced following. Other positions considered. Reply Western Construction, Box 9B, 609 Mission St., San Francisco, Calif.

Ramsay who retired because of ill health. The new president joined the company in 1928 and was named a director in 1943. He was made secretary and treasurer in 1947. This new appointment covers the dual post of president and treasurer. Ramsay continues on the board of directors and will serve in an official advisory capacity.

CF & I appoints Smolenske

J. R. Smolenske has been appointed advertising manager for the Western



J. R.
Smolenske

Division of The Colorado Fuel and Iron Corp. He has been engaged in various advertising assignments for the company for the last 8 years.

Ken Williamson new sales mgr. of Osgood General

Kenneth O. Williamson was recently appointed sales manager for the Osgood-General line of excavators and materials handling equipment. Williamson, formerly assistant sales manager, succeeds James S.

Fortiner, who resigned to enter a new field of endeavor in Florida.

New tank-lining company

Merlin H. Anderson has been named president of Tank Linings, Inc., a newly organized company in Ames, Iowa.

Sales, publicity mgr. for Sylvania

William R. Sears has been named Pacific Coast manager of sales promotion and publicity by Sylvania Electric Products, Inc.

By-Chemical changes name

By-Chemical Products Co. of San Francisco and King City, Calif., has been incorporated as E. A. Thompson, Inc., according to Edward A. Thompson, president.

Texaco publicity man

James T. Maher has been named general staff assistant in public relations for the Texas Co. with headquarters in New York.

Bronze bearings for Cat tractors

Bronze replacement bearings manufactured by Magnolia Metal Co. will be offered to Caterpillar tractor owners by distributors throughout the country.

Hyster personnel mgr.

Donald G. Longer has replaced Victor Vandevor as personnel manager of Hyster Co.

Space is sold as advertisers' inches. All advertisements in this section are 1/2 in. short of contracted space to allow for borders and composition.

CLASSIFIED

Rates are 8.50 a column incn. Copy should be sent in by the 20th of preceding month if proofs are required; by the 23rd if no proofs are required.

For Sale



Trade in
Your Old Cores

FLASH! ! DO YOU KNOW

We Manufacture New
ROTARY SWEEPER CORES

Most Any Popular Make To Fit
**MEILI — BLUMBERG — GRACE — HOUGH — LULL
ROSCO — LITTLEFORD — DETROIT HARVESTER —
SPEARSWELL and Others — Send Your Specs**

REFILLS — SPECIALISTS

WITH SPRING STEEL
WIRES AND FIBRES

REPAIRS—ANY MAKE SIZE OR TYPE—24 HR. SERVICE

PECKERWOOD STEEL WIRE DRAGS

LARGE

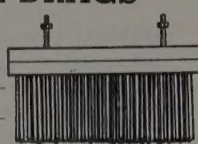
6" Wide—Any Length
to 12 Feet

Draggs Not Staple
Set

**SMALL
PECKERWOOD**

Fits Your Frame

3" wide—15" Long
Now **\$2.50 ea.**



Prices Subject to
Change Without Notice

1928

**ONLY
\$3.50 Fool**

Buy in Lengths
Assemble Your Own
In Any Shape Desired.

SINCE

NAME YOURS
No frame required

VAN BRUSH MFG. CO., INC.

327 SOUTHWEST BLVD., KANSAS CITY, MO.

SAVE \$40,000.00

On a slightly used NEW Barber-Greene 848 Black Top Plant Complete, All Pipes, Tank, Hot Oil Heater and Finishing Machine.

If interested, contact:

Allied Construction Equipment

4015 Forest Park Avenue

St. Louis 8, Missouri

Telephone: Franklin 1-1818

BARGAINS

9 — 22 ton Euclids
Model 47 TD, 46 TD, 29 TD.

1949, '50 & '51 models.

All in excellent condition.

**NO REASONABLE OFFER
REFUSED!**

JOE BRETTO

Hibbing, Minnesota
Phone 2-2581

FOR SALE

Bucyrus-Erie 120-B electric dragline, mounted on caterpillars; 100 foot boom; 4 1/4 cubic yard bucket. Has recently been reconditioned and in excellent condition, has been used mostly for rehandle. Reason for Sale: Less rehandle in new coal pits and have two other machines. Specifications and photographs sent on request.

Northwestern Improvement Company
Colstrip, Montana

FOR SALE STEEL SHEET PILING

NEAR BREWSTER, WASHINGTON

Shipped New — Used Only One Job

Carnegie Length	MP-101 Pcs.	MP-102 Pcs.	Tees Pcs.
72-65 ft.	105	100	2
65-60 ft.	210	50	9
60-50 ft.	210	5	18
50-45 ft.	290	2	7
45-40 ft.	120	1	13

Also quantity 35 ft. and shorter—Quick Shipments Regardless of job, location. Write, Wire or Phone.

**MISSISSIPPI VALLEY
EQUIPMENT CO.**

511 Locust St., St. Louis 1, Mo., Chestnut 4474

FOR SALE

1—Koehring Model 34E, Twin Batch Paver purchased April 1946, Powered by G. M. Diesel. F.O.B. Utica, N. Y. \$5,000.00.

1—Ransome 34E. Dual Drum Paver. Powered by Cummins Diesel. F.O.B. Chelsea, Michigan. \$12,000.00.

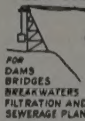
1—1/2 yd. Insley dragline, in good shape.

All in good condition and reasonably priced.

**RUFFRIDGE-JOHNSON
EQUIPMENT CO., INC.**

3024 S.E. 4th St. Minneapolis 14, Minn.
Lincoln 7648 — PRIOR 7147

LOW COST INSTALLATION AND OPERATION



CABLEWAYS

IMMEDIATE SHIPMENT

ELECTRIC, STEAM OR DIESEL

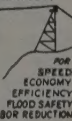
CAPACITY 5 TO 20 TONS

SELL, RENT OR BUY

AMBURSEN DAM CO. INC.

295 MADISON AVE. NEW YORK

LABOR REDUCTION



FOR SALE

Barber-Greene 830-840 Mixer and Dryer Hot-Mix Plant, complete with electric shakers, tunnel, boiler, steam-heated tanks, and all necessary equipment; 1/2-yard Quickway truck-crane; TD 18 International Tractor with carry-all; 2 International dump-trucks; AC blade; Motor roller; Howe truck-scales; Various other pieces of small equipment. **MUST BE SOLD IMMEDIATELY, AND AT A SACRIFICE.** Mid-Valley Corporation, 414 E. Mill St., Porterville, California. Phone 1440.

FOR SALE:

Caterpillar D7, Model 3T, just completely overhauled. Excellent condition. Athey Tracks—8 complete tracks—Good as new. Never been used. Model 7D7.

Call or write Ralph Getter
GETTER TRUCKING, INC.
CUT BANK, MONTANA
170J or 193

STOP that WATER

With FORMULA No. 640, a clear liquid which penetrates 1" plus in concrete, brick, stucco, plaster, etc. Seals out water, dirt holds 20' head. Use outside and in. Preserves all absorbent materials. Sold 14 years. Quick, economical, sure. \$3 in 55's. Free sample. See Sweet's.

HAYNES PRODUCTS CO., OMAHA 3, NEBR.

FOR RENT

RENT STEEL SHEET PILING

Get the exact lengths and sections you need from Foster—all standard makes, delivered on time—and at Foster's standard low rental rates. Also Rental Pile Hammers & Extractors.

L.B. FOSTER Co.

PITTSBURGH 30 • NEW YORK 7 • CHICAGO 4
HOUSTON 2 • LOS ANGELES 5

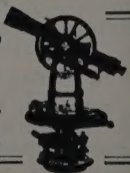
SOLD RENTED REPAIRED

Transits • Levels
Steel Tapes • Compasses

Portland Instrument Co.

334 S.W. 5th nr. Stark

PORTLAND 4, ORE., AT 3598



Engineers—Foremen—Office Men

Learn latest methods to organize and run work. Prepare for the top jobs. Send post card for details.

Geo. E. Deatherage & Son

CONSTRUCTION CONSULTANTS

411 So. 5th Ave. Lake Worth, Florida

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BACKFILL, uncompacted

Short-wave station break

There's no privacy anywhere anymore. Not even on hydro project surveys in the high brush country. It's a curse that comes with the streamlined techniques of modern communication.

A utility company party was out checking line a few months ago. They were 40 miles from town. And they were using 1-watt walkie-talkies to extend their shots and speed their work. Just a routine application for today's portable short-wave equipment.

But when they got back to camp, a not-so-routine complaint was waiting for them. Apparently their working conversations had come through loud and clear on the company's wave length at a permanent station in town. And the women in the office were quite confused by surveying terminology. The complaint was worded in a nice way, but the gist was obvious: Watch your language, boys!

With hazards like this to put up with, who will ever buy a two-way wrist radio?

Contracting apprenticeship

We're glad to see contractors continue to make room in their operations for summer work by engineering students. It beats interviews just before graduation, when neither employer nor prospective employee knows quite what the other has in mind.

Ed Foreman and Al Mitchell are getting a good break this season. They're doing surveys for Kiewit and Parish at Monticello Dam. Ed is from New Mexico A&M, and he is giving serious consideration to going with Kiewit after graduation. Al Mitchell is a student at Hartnell J. C. in Salinas, California. Both boys are having a chance to watch progress on a big job, and to do layout on some of the important plant structures being built by the contractor. It's the best way to learn the problems of field operations and it is profitable experience—for the classroom and for the future.

Highway flagmen make us see red!

We have just returned from a 3,000-mi. swing through some of the Western states. (And let's face it: 3,000 mi. in this region covers only three states!). We visited several jobs and passed by many more. Which brings us to the subject of flagmen on highway work.

Summertime is tourist time in the West, just as it is the time of highest construction activity. Put the two together, without a good flagman, and

Twenty-five years ago in *Western Construction*

"The directors of the Los Angeles Metropolitan Water District have announced the appointment of an engineering Board of Review which will select the route of the Colorado River aqueduct. This board consists of three internationally known engineers: **Andrew J. Wiley**, consulting engineer, Boise, Idaho; **Richard R. Lyman**, consulting engineer, Salt Lake City; and **Thaddeus Merriam**, chief engineer of the board of water supply of New York City."

* * *

"The **Smith Engineering Works**, of Milwaukee, has received an order from the Russian soviet government for complete equipment for the first large foreign-made gravel washing plant in that country. The order includes 10 carloads of machinery and represents a cost of nearly \$50,000. It will give two complete and identical units, each with a capacity of 3,000 cu. yd. of gravel per hour."

* * *

"**Pardee Dam**—The Atkinson Construction Co., contractors, have about finished 'cleaning up' around the dam, and installation of the machinery in the powerhouse at the base of the dam was begun August 6."

* * *

"Contracts on the **St. Johns Bridge** over the Willamette River near Portland have been awarded by Multnomah County as follows: Division A (substructure) to Gilpin Construction Co., Portland, for \$1,026,897; Division B (superstructure) to Wallace Bridge & Structural Steel Co., Seattle, for \$986,445; Division C (cables) to MacRae Bros., Seattle, for \$472,200 on the Roebling alternate; Division E (viaduct steel) to the United States Steel Products Co., Portland, for \$290,000; Division F (concrete deck) to Lindstrom & Feigenson, Portland, for \$146,060; and Division G (electrical work) to National Electric Co., Portland, for \$33,000."

you have a lot of confusion. The out-of-state driver is already troubled by problems of following unfamiliar routes, of wondering if he'll find a motel that night, of keeping his kids (and his trailer) in line. Detours, dump trucks, and one-way controlled traffic are added burdens. And they are not lessened by the flagman who turns his back to traffic. This breed seems to think that motorists will pass him (and the blade working in plain sight a few yards ahead) with complete confidence so long as not directed otherwise.

Then there is the fellow who waves his flag up and down to stop traffic, down and up to pass cars by! This may be an exaggeration, but we've been mystified by some of the wig-wagging we've run across. Swinging a red flag in a downhand arc while facing traffic may be effective in stopping cars. But merely turning sideways and repeating the same slow motion parallel to the road is not clearly or distinctly a way to motion traffic ahead.

A flagman in Oregon cut it a bit fine in passing cars through a rock cut where a shovel was working. He timed his work to wave cars by (both ways) when the shovel was crowding the bank, keeping traffic out when the shovel swung to dump into a truck beside the roadway. But the roadway was rough, one driver was extra cautious, and the shovel dipper was over the truck when the car passed by. A 10-lb. chunk tipped off the full dipper load, glanced from the truck body, and just missed the passing car. It's just as well the driver never knew it. But the flagman could have played safe, working traffic in on a one-way basis only, in order to give the shovel a wider berth.

Flagging cars means more than stopping them. It means directing them—all the way through a job. To do his job effectively the flagman must be trained. He must be alert, and he must leave no doubt about his hand signals.

NEXT MONTH

BOX CANYON DAM . . . We were up there in July and saw the Pend Oreille River turned aside in an authoritative way. Woody Williams and Si Piedmont headed up the Morrison-Knudsen crew on what turned out to be a remarkably smooth operation. The October issue of **Western Construction** will tell all about it—200,000 yards of select placed rock and dumped fill in a downstream cofferdam that was built first.

. . . The Editors