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goes up in Sacramento

Equipment garage built,
1954 style, in Arizona

Payne "gizmo" eases
timber pier construction

Agitators for concreting
Tecolote Tunnel invert

APRIL 1954

COVER see page 4

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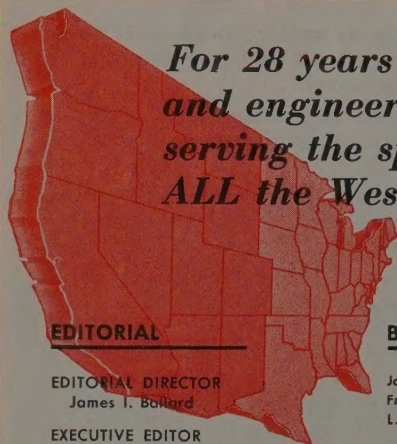
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FRONT COVER

THE TALLEST lift-slab building in the U. S. A. is on its way up. Portion of structure shown here is to be four stories high. Second floor is in process of being jacked to its permanent position. Columns will be extended to roof height and jacking repeated to get the roof and fourth floor to final position.



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A strong Western voice

Commissioner Dexheimer's remarks before the final session of the 35th annual convention of the Associated General Contractors are fully reviewed in the convention report in this issue. In discussing reclamation activities his principal allusion was to the Echo Park Dam controversy, and he dispassionately explained the views of the Bureau of Reclamation.

These are the views of engineers, and especially of engineers versed in reclamation. Experienced in determination of the tangible benefits to accrue from a given capital outlay for project construction, these men conclude that the Echo Park site is the best to be had, one that is entirely feasible and the development of which would be in the public interest.

These men are also versed in the evaluation of intangible benefits. And in this respect has Echo Park been the biggest problem. For its benefits, tangible and intangible, must be equated not only to a construction cost but also to an intangible cost representing the value of the particular and peculiar area in which the site is located. This is the Dinosaur National Monument, and the cost of establishing precedent for "violation" of such a recreational preserve with dam construction has been placed at a very high figure.

The matter is not one for Commissioner Dexheimer and his staff alone to decide. It is one for the entire West. And it was in that realization that Dexheimer called upon the members and guests of AGC in his Los Angeles speech: "You may be interested in talking to the local people or to your Congressmen if you feel it is in the best interests of the country to go ahead with a development of that type."

Western engineers have evaluated Echo Park—and other features of the Upper Colorado River Storage Project—in a favorable light. It follows that Western contractors and others associated with the construction West must lend their voices to carry the work through. They must speak loudly, clearly, and decisively through their elected representatives in Congress. Only in this way can reclamation continue to build the West.

The road to better roads

The value of exchanging information on technical problems and developments has been an editorial cornerstone of *Western Construction* for over 28 years. Contractors and engineers have profited by such exchange, not only in the Western region but throughout the entire United States.

But technical interests have not been served just by business publications. Many technical societies and business associations have been founded on similar concepts. In their actual meetings and in their published proceedings they draw heavily upon the specialized knowledge of their members. Among the most active civil engineering organizations today are those that are concerned with highways—AASHO, WASHO, the Institute of Traffic Engineers, the Highway Research Board, and the Association of Asphalt Paving Technologists. Whenever these groups convene, they seek the participation of Western highway engineers, for this region has paced others in its studies of and answers to the problem of highway needs.

It is disheartening, therefore, to find that abuses of travel allowances to attend technical meetings have forced some state highway departments to limit the attendance of their engineers. An especial target has been travel outside the given state. Careful attention must be given to this situation. It may be that limitations on travel for highway engineers will come to cost more than would abuses of greater freedom. It is not good to know that one Western highway department "okayed" but a single delegate for attendance at the annual convention of AASHO, and only one for the annual meeting of the Highway Research Board. Advances in highway engineering depend on participation of engineers in technical society activities. Positive benefits can be cheaply bought with liberal allowances for out-of-state travel.

A matter of jurisdiction

Professors of civil engineering at the University of Washington have encountered problems in academic jurisdiction. But they have avoided "disputes" by careful study and comparison of course content. For instance, it was found that instruction in soil mechanics had crept into a course in reinforced concrete design. The reason was simple: How else could students handle an assignment for retaining wall design? By give and take, however, the problem has been resolved, and professors and students alike now profit from more efficient use of classroom time.

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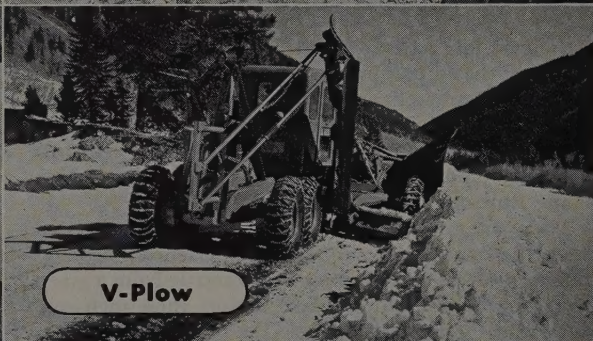
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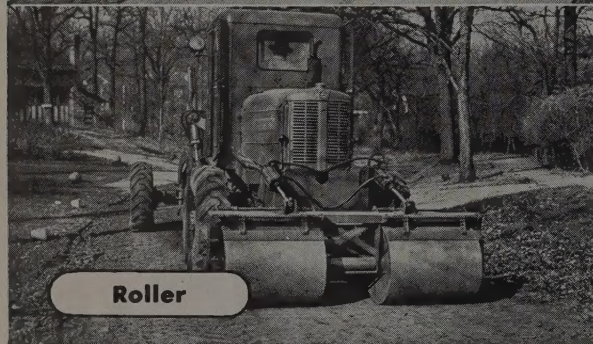
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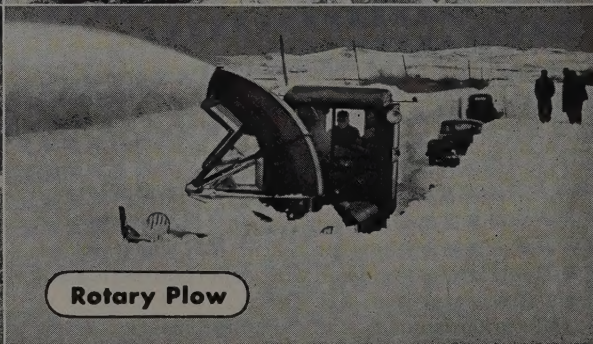
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APRIL 1954

Special equipment beats a unique problem for —

Invert paving in Tecolote Tunnel

With arch concrete already in place, the squeeze was on Halvorson Constructors to move concrete in for paving 3 mi. of 52-in. invert — The answer was agitator cars that hook together as one unit for discharge

INVERT CONCRETE lining of the first 3 mi. of the inlet leg of Tecolote Tunnel, recently completed, led to the development of a unique type of agitator for transporting mixed concrete into small bore tunnels.

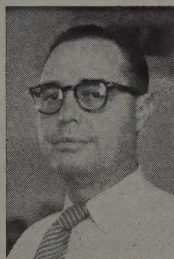
The prime contractor, Halvorson Constructors of Portland, Ore., and Spokane, Wash., elected to place the arch lining first. This left them with 3 mi. of partially lined tunnel, a single-track railroad, and with invert to be placed beginning 3 mi. from the portal.

Conveyor belt first

The plan for placing concrete had been well considered in advance so that all that needed to be done was to procure the necessary equipment especially suited for the invert work.

The first item to be taken into the tunnel was a 230-ft.-long conveyor.

By
**MAX T.
HEDGES**
Field Engineer
Cachuma Project,
USBR



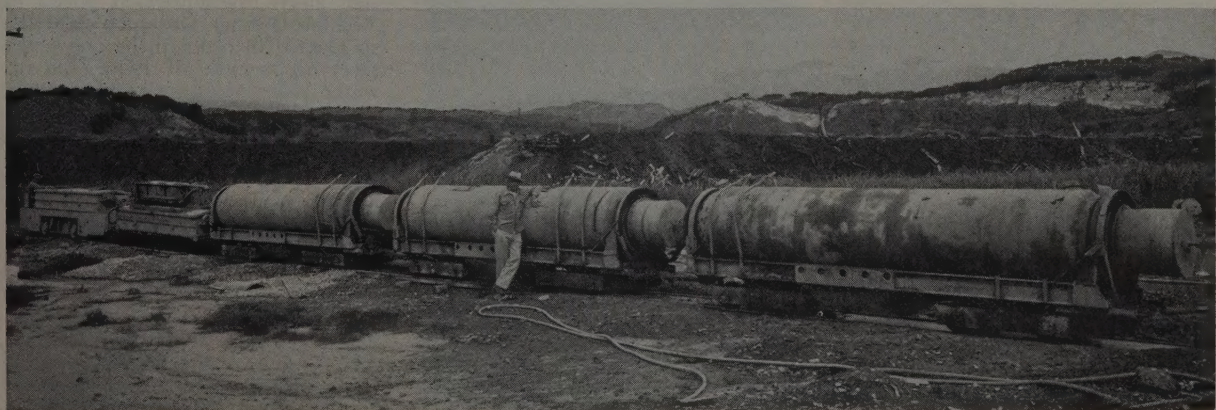
This belt was built onto a gantry-type frame which carried the belt high in the arch. A train of muck cars could be placed under the belt, enabling the cleanup crew to shovel muck onto the belt at the forward end. The belt carried the muck back and dropped it in muck cars as they were slowly pulled back from their position under the conveyor. The entire conveyor was

moved back and forth in the tunnel by means of cables and an air tugger attached to the gantry frame. The gantry was equipped with hard-rubber-tired wheels to ride on the curved bottom of the arch walls, thus not occupying part of the track. Another feature of the conveyor belt was its hinged end sections, which could be lowered to a point about 3 ft. above the tunnel bottom. This made it convenient to shovel muck on one end or to receive concrete on the other end for transporting to the pour. The origin of the idea is credited to George Blehm, then concrete superintendent for Halvorson.

Outside advice

The concrete agitators and the conveyor, designed for use in pouring the invert, were manufactured by the Moran Engineering Co. of South

THE COMPACT NATURE of the Moran agitator cars is indicated in this picture of the complete train used for invert concrete paving at Tecolote Tunnel. Chet Purdy, principal inspector on the U. S. Bureau of Reclamation job, gives an idea of the size of the cars.



WHY IT WAS USED

THE "WHY" of the unusual tunnel lining scheme and equipment described in the accompanying article is a story in itself. Tecolote Tunnel was originally designed as a concrete lined bore with a horseshoe section and inside diameter of 7 ft. However, the contractor later requested and was granted a change order for a circular section. The reason for the change was to permit permanent placement by the contractor of a 14-in. fan line in the bottom of the tunnel and against one wall. Flattened to an elliptical cross section, this fan line would be completely covered by concrete, greatly simplifying the concrete lining procedure itself; and plans were made for grouting the fan line at the completion of the work.

At the time of the change, however, tunnel lining forms had already been ordered by the contractor. When they arrived, it was necessary to cut them at spring line and fit them with new skirts to match the circular section. Arch concrete was placed by conventional methods by the use of these modified forms, but it was necessary to leave a 52-in. invert width for paving in a later operation.

The presence of concrete lining in the arch greatly reduced the working area for the contractor. When means were considered for paving the invert it was with the knowledge that no arrangement for car passing could be made. The result was the unusual design of agitator cars and their use as described in the article by Max Hedges.

Gate, Calif. Ray Moran was called in by the contractor for advice and suggestions during the planning stage of the job. His advice was followed and his idea for the agitators was accepted and subsequently built.

Each agitator was built as a 38-in. cylinder 14 ft. long mounted on a long frame with 4-wheel trucks at each end. An electric motor to rotate the cylinder in either direction was mounted on the frame under the cylinder because of limited tunnel head room. The usual type spiral blade was welded inside the drum to agitate or discharge the concrete.

Train made up

In operation, the agitator was charged with $3\frac{1}{2}$ cu. yd. of mixed concrete through two portholes in the cylinder. A train was made up of three agitators, a battery car with controls for the three agitators, and a battery locomotive. It moved into the tunnel to a position at the outer end of the conveyor belt. There the end doors were removed and the three drums telescoped together by shortening the special drawbars. This, in effect, made one long cylinder of the three agitators. The concrete was dumped on the lowered end of the belt, transported, and dropped directly into the invert. Final shaping of the concrete was by a slip-form and hand floating.

Good for tunnelmen

The excellent operation of the agitators for invert placement was the answer to one of the problems that plague tunnelmen. They could be used without a conveyor by those people who prefer to use the least amount of machinery possible. They are capable of handling a concrete of higher slump than that designed for

slabs. Adaptation to other methods and problems of concrete placement is certainly possible.

REAR DOOR of each agitator car can be removed for close coupling with the discharge end of the adjacent car (above). Pictured here is Jerry Remick, assistant concrete superintendent and master mechanic for Halvorson. Discharge end of agitator (below), with door removed, shows the special discharge blade arrangement. Chain drive, located at this end only, is connected to motor beneath cylinder at middle of car.



Job experience proved the agitators capable of the performance as explained in the following list:

1. Loading time, each agitator: 5 min. for slumps over 3 in., 15 min. for slumps of 2 in. or less.
2. Transportation time for entire train was 6 mph.
3. Unloading time, each agitator: 10-20 min., depending on placing problems.
4. Slump loss, with or without agitating enroute, was $\frac{1}{4}$ in. in 30 min., no further slump loss occurred after 1 hr.
5. Lined invert required 0.17 cu. yd. per lin. ft. Average pouring rate at 3 mi. of haul was 6.7 yd. per hr., or 37 lin. ft. of invert per hr.

250 ft. a day

This progress was dictated by the policy of the contractor. The length of pour for each day was set at 250 ft. A cleanup crew was organized on the graveyard shift to clean up and prepare that length of tunnel. The day shift then completed the preparation by removing the track and spreading a 2-in. blanket of gravel to stabilize the muddy subgrade. All pouring was done by the swing shift.

An accelerated program could have been accomplished had there been a passing track and if the use of a California switch had been possible. Then, by operating three trains, the production rate could have been trebled. Such an arrangement was not in the cards for this job.

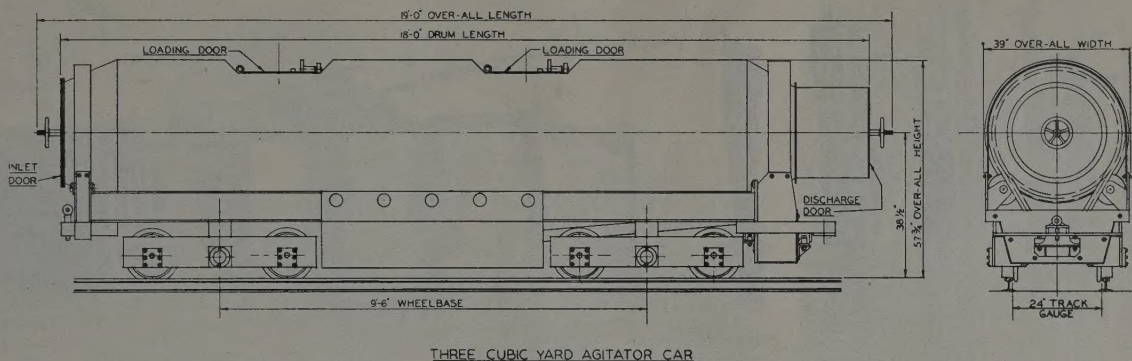
Double duty

It is interesting to note the double duty performed by both the conveyor and the agitator train. On cleanup, the conveyor was used to move muck out, as described. In addition, it was used to move in crushed rock for stabilizing the invert. Also, the crushed rock was hauled in the agitator cars and discharged from them in the same manner as concrete. Finally, the agitators and the conveyor were used for concrete placement.

Batch plant on hill

Concrete for the work was batched at the contractor's plant on the hillside above the upstream portal of Tecolote Tunnel. The batch plant was so located in order to be above the reservoir level at all times. Had the water risen behind Cachuma Dam, the tunnel intake structure was complete and could have been closed. In such an event, access to the tunnel work would have been by a vertical shaft.

As things finally worked out, the batched concrete was loaded into transit-mix trucks and was mixed while being trucked to the tunnel portal. Here the concrete was discharged into a 7-yd. remix hopper. The contents of this hopper, plus one loaded transit-mixer, exactly matched the capacity of the three agitator cars



MEASUREMENTS of agitator cars show a nice fit for Tecolote Tunnel work. The design has been scaled up for 5- and 7-yd. capacity units now. Here are side and end views of a typical car in the train, which was made up specifically for paving the invert.

each time they returned to the portal for concrete.

Pouring of invert concrete began in August of 1953 and was completed late in January 1954. Final cleanup was completed at the end of February.

Personnel

E. R. Crocker is project manager for the Bureau of Reclamation on the Cachuma Project and R. E. Burnett is construction engineer. General superintendent for Halvorson Constructors was Carl Nelson. Oscar Peterson succeeded George Blehm as concrete superintendent. Jerry Remick was assistant concrete superintendent and master mechanic.

Army Board approves San Francisco Bay survey

A COMPREHENSIVE 5-yr. study of all plans to remake San Francisco Bay was unanimously approved by a seven-man Army Corps of Engineers Board meeting held in San Francisco for the first time in its 52-yr. history. It must be approved by the Chief of Engineers and funds appropriated by Congress before it can be carried out.

Estimated cost is \$2,900,000, including money from State of California. About \$730,000 of this sum will be used for a scale model of the Bay Region on which such schemes as solid-fill barriers across the Bay can be tested accurately. When concluded,

the survey will provide "an integrated comprehensive plan of improvement to afford optimum use of the natural resources" of the Bay Area.

Before the board's public action, a division of responsibility was worked out at a conference with the California Water Projects Authority and other state officials. A joint announcement said:

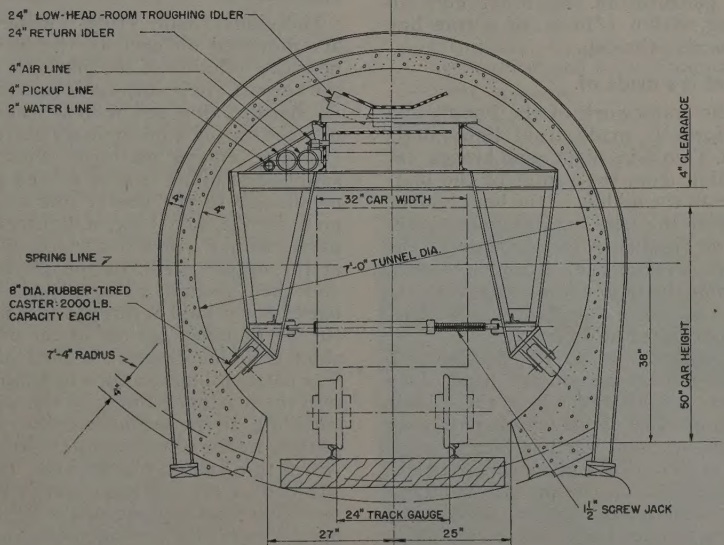
"It is recognized by the Corps of Engineers and Water Projects Authority that the survey by California will make the principal analyses and proposals related to barrier dams, reclamation of land, water supplies for domestic and industrial uses, transportation other than navigation, and other matters that are usually of local concern.

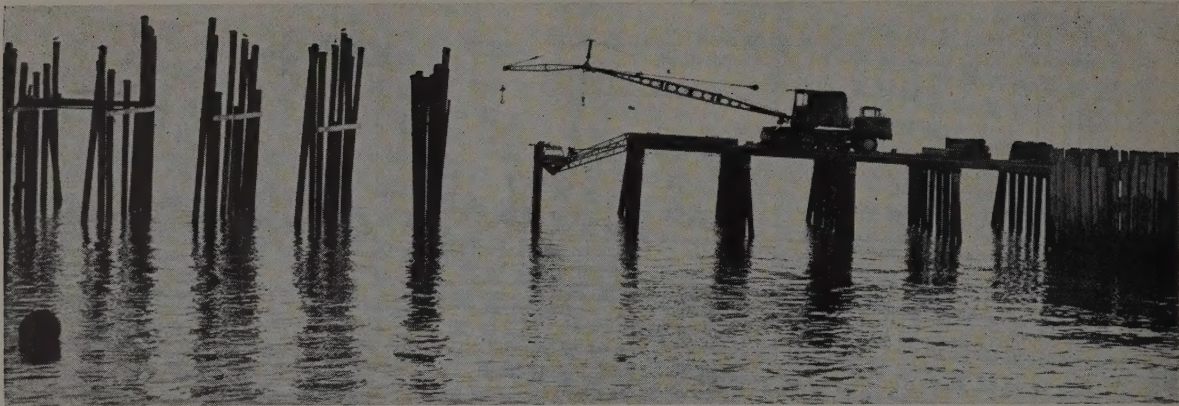
"The survey of the Corps of Engineers will analyze the needs and desires of the San Francisco Bay Area with regard to navigation, national defense, flood control, and other matters of Federal interest, including an analysis of plans."

Both agencies agreed to exchange complete information and technical facilities. The scale model, which will cover several acres, will be set up somewhere in the Bay Area. One suggested site is the University of California's Berkeley campus. The model will be a working instrument instead of a dressed-up public exhibit. A similar model for a permanent public exhibit in the future was discussed.

The survey was recommended by Col. Henry Walsh, former district engineer in San Francisco, and Col. Paul D. Berrigan, present district engineer. Reuben Johnson, of the district engineer's office, told the board that the population of the Bay Area was now nearly 3,000,000. "The continuing economic stability of this area," he said, "is dependent upon an optimum development of its resources."

AUXILIARY EQUIPMENT for placing crushed rock and concrete in the invert was a 250-ft. conveyor. This section of the frame shows how it rode the lining, and carried water and air lines.





Timber pier construction made easy

Time cut in half for accurate aligning and cutting of piling with structural device designed by contractor for his own work on the Richmond-San Rafael Bridge

ANOTHER "Western construction first," this time for alignment and cut-off of timber pier bents, can be seen in operation on the San Rafael end of the current Richmond-San Rafael bridge project. Through the use of its "Gizmo," the Payne Construction Co. is cutting in half the time normally required for these operations. Once the piling have been driven, there is no further use for barges; all work proceeds from the high and dry pier itself.

Eugene Payne, owner of the company, and Rod Harrison, general superintendent for the same firm, are responsible for this innovation. Their combined experience in waterfront construction enabled them to invent, design, and to have fabricated in the company's own yard this structural steel device which they choose to call the "Gizmo."

Proper use important

Once timber piling have been driven, the entire operation of pile alignment and cut-off plus cap and stringer placement depends upon proper use of the device. It consists essentially of the following major components:

(1) Two rigid, bent booms are located about 30 ft. apart and parallel to the direction of the pier. Considering a single boom, one end rests beneath the cap of a completed bent, the middle portion rides over the cap of the next completed bent, and the other end of the boom supports a work platform.

(2) The work platform (4 ft. wide

x 41 ft. long) is supported on the ends of the two bent booms. The length of the booms plus the platform is such that the next row of piling to be worked on touches exactly the front of the platform. The bend in the booms places the platform approximately 2 ft. below the cut-off elevation of piling.

(3) Two parallel guide rails of the platform support a sliding frame to which is attached an air-operated chain saw. With the saw in operation, sliding the frame from one end of the platform to the other cuts all piling within 1/16 in. of a true line to receive the cap.

What it's made of

The framework of the booms and platform is made from light angle iron. Two 3-in. diam. pipe braces, extending from the center of the platform to the middle of the bent booms, provide the necessary diagonal bracing for rigidity. A section through the boom is rectangular in shape while a section through the platform framework is triangular. The whole "Gizmo" weighs but 3 tons.

To move this framework forward, three pickup points are used. Two points are located where the middle portion of the bent booms pass over a cap, and one point is located near the center of the platform. A truck-mounted Lorain crane, with outrigger attachment; easily moves the "Gizmo" ahead one entire bay.

There are items mounted on the framework described above that are important to its efficient use. Mounted

on the ends of the bent booms—at the ends passing beneath caps—are screw jacks. Adjustment of this end of the booms up or down by use of the jack causes the other end (at the platform) to go in the opposite direction. It is quite similar to a teeter-totter in this respect. Setting one end of the platform higher than the other makes it possible to provide a super-elevation cut across the piling.

The side of the platform parallel and adjacent to a row of piling has bevelled slots formed by angle irons projecting outward from the platform. The slots are spaced at the required center-to-center distance of the piles. A pile is snubbed in tight to a slot by use of a rope secured to the platform, passed around the pile, and tightened on a small dogged drum also attached to the platform.

Hand crabs

Individual hand crabs (winches) are mounted on each of the booms near the junction of the platform and the booms. Their purpose is two-fold: (a) batter piling can be held securely in place during a preliminary cut-off; (b) the entire platform with its snubbed-in piling can be moved perpendicular to the center line of the pier. In the first case, a light cable passes from a winch to a snatch block at the opposite end of the platform and then around a batter pile. The batter pile is held in this position until the preliminary cut-off of all piling about 6 in. above grade has been made. The batter piling can then be snubbed into the platform similar to the vertical piling. In the second case the cable passes, in the same manner, from a winch to a snatch block at the opposite end of the platform, but is then passed around a piling of the nearest bent. Under this arrangement, tightening the cable of a winch located on the right side of the platform (viewer standing on completed portion of



KEY FEATURE of the "gizmo" (above) is an air-operated chain saw mounted on a sliding frame. The frame rests on guide rails which run full length of the platform. This arrangement cuts piles to within 1/16 in. of grade. Piling (top right) are snubbed securely into position against platform by rope. Dogged drum is being tightened. Angle iron projections provide slot giving accurate center-to-center spacing of piling. Hand-turned screw jack (center right) raises or lowers this end of one of the two bent booms. Platform at far end of boom goes up or down in opposite direction. Boom rests beneath cap in lower foreground, then passes over cap of next bent. Cantilevered platform (below) is shown shortly after "gizmo" had moved to new location. Vertical piling has been snubbed into place. Note cable holding batter pile in position until preliminary cut-off has been made. Cable is from winch at other end of platform, similar to one shown here.



pier) would cause the entire platform and its snubbed piling to shift to the right also. It is in this way that bents can be accurately brought into alignment with the planned center line of the pier.

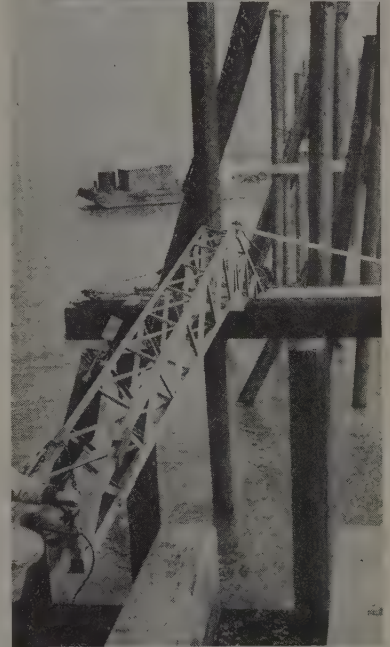
The fact that the platform serves so many useful purposes should be stressed. Here is a wide, stable, work area that eliminates scaffolding. Here is a framework rigid enough to hold and align the piling in their proper position. Here is a properly elevated table down which to slide the chain saw and its frame. It is truly a "Gizmo" and "construction first."

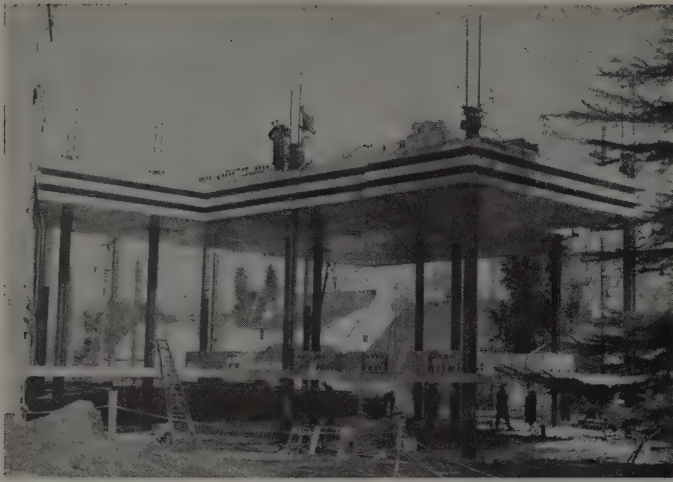
An additional point of interest is the method used to space the bents center-to-center. After the cap has been placed on a new bent, two 2-in. diam. adjustable pipe jacks are placed between the cap of the bent just completed and the cap of the nearest secured bent. Spreading action is exerted by these pipe jacks while come-along jacks are used to pull the bents together. Precise center-to-center distances are thus obtained for setting stringers.

The Payne Construction Co. contract is for 1,000 lin. ft. of timber pier, bents spaced about 19 ft. on centers. Each bent contains seven vertical piling at 6 ft., 0 in. on centers and two batter piling. The 700-ft. distance of pier in which the "Gizmo" will be used for construction is both curved and super-elevated. That the framework devised can handle this condition speaks well for its designers.

Normal or "old time" construction would produce one bent every two days, but use of the "Gizmo" cuts that time in half. The field superintendent, Dalton Highfill, is to be credited for maintaining this smooth working operation. Here is the complete manpower lineup for production of one bent per day.

- 1—field superintendent.
- 3—carpenters—adjustments on "Gizmo," cut-off of piling, placing cap.
- 2—carpenters—lay stringers, put in herringbone and solid blocking.
- 1—crane operator.
- 1—oiler.
- 1—fork-lift operator—stacking of materials behind the crane.





THE SECOND FLOOR of this four-story part of the hospital is in the process of being lifted to its final position. The 10 x 10-in. columns will then be extended to roof height by butt welding additional lengths. Lifting jacks will then be repositioned on the columns and the roof and fourth floor jacked to their permanent positions. Note use of the slab as an elevator to handle the exterior wall concrete block. Various trades are already working beneath the second floor.

THE HIGHEST lift-slab structure in the U. S. A. is now under construction in Sacramento, Calif. A contract for \$2,333,000 has been awarded for major alterations in the existing Mercy Hospital and for the new five-story, lift-slab addition. At least 50% of the contract amount is for the new building.

Successful bidder was the Heller-Campbell-Erickson-Lawrence Construction Co., a joint venture of Sacramento contractors, with the Heller Construction Co. in charge of field construction. It is interesting to note that, although bids were taken on both the conventional pour-in-place method and the lift-slab method, the latter has again proved to be the most economical. The architect was Harry J. Devine and Ernest D. Francis was structural engineer.

Maximum lift of 12 columns

When finished, the new addition will be about 48 ft. wide and 292 ft. long at the ground level, the longitudinal dimension running in a north-south direction. This structure is located adjacent to the old hospital and will be connected to two of the four radial wings of the old building. Certain portions of the old Mercy Hospital wings were removed to provide for this new connection.

The lifting device used on lift-slab buildings has been designed to work on a maximum of 12 columns at a time. For this reason the building was divided into four areas for construction purposes, each area having from 9 to 12 columns within it. The south portion will be about 58 ft. long, and four stories high. The center section, in its final form, will be 165 ft. long but is divided into two lengths of 92 and 73 ft., each five stories high. The

north portion of the building will be 69 ft. long and only one story high.

Floor-to-floor heights are 12 ft., 0 in. from first to second, 10 ft., 6 in. from second to fifth inclusive, and 14 ft., 2 in. from fifth to roof. This makes the total lift for the roof in the center section about 58 ft., highest yet in the country.

Same outside dimensions

The columns in this addition are 10 x 10 in. square. They are shop fabricated of plate steel, varying in thickness from $\frac{3}{4}$ to $\frac{1}{4}$ in. Columns using the greater thickness plate steel are used on the lower floors where the loads are greater. It is important to note that all the columns are of the same outside dimensions from the first floor to the roof, a necessity for this method of erection. Longitudinally in the building, columns are spaced at about 24-ft. intervals. The first columns erected are long enough to extend about 4 ft. above the third-floor level. Further increases in height are made by butt welding on additional lengths. Transversely, there are three rows of columns, the center-to-center distance varying from $9\frac{1}{2}$ to $25\frac{1}{2}$ ft. because of the addition's internal room arrangement.

The construction methods used in a building of this type logically break down into two considerations, (a) the concrete pouring of the lift-slabs and (b) the actual process of lifting the slabs. Intensive work was absolutely necessary on scheduling the various operations involved in each of these two phases. The results to date have been satisfactory and each will be discussed.

The floor areas, described earlier, into which the building has been divided for construction purposes vary

TALLEST LIFT-SLAB STRUCTURE

Cost saving and functional features, quietness of construction make lift-slab technique ideal for hospital

from 2,900 to 4,400 sq. ft. in size. All floors and the roof are 9 in. thick, giving concrete quantities of 80 to 120 cu. yd. per pour.

The first step after the foundation walls and footings had been poured was the erection of steel columns. Around these, a tent-type structure was erected over the entire floor area. Because it normally rained at the time of year when the floor pours were scheduled, no chances were being taken on a lengthy interruption in this schedule. The concrete floor pours made were very similar to any slab poured at grade. Both concrete buggies and direct pours from the ready-mix trucks were used. There is one important exception to the normal situation. Here, one pour is made directly on top of the one below, the total number of pours being equal to the number of floors in the building. A five-working-day cycle was arrived at for each of the slabs in the final "pancake." The first day was for pouring and finishing, second day for application of a curing and separating compound and parting sand, and the remaining three days for placement of reinforcing steel, electrical conduit, pipe sleeves, and setting screeds. The only formwork required was a bulkhead around the perimeter of the pour.

3-ft. section omitted

A 3-ft. slab section is omitted between each of the four basic slab areas. These sections will have to be formed and poured at a later stage of the lift-slab operation. The normal slab steel is doweled out in this 3-ft. section from each of the adjacent pours.

Much is at stake from the contractor's viewpoint in making sure that the slabs will separate properly when lifting is begun. There are recorded cases where the bond developed be-



THIS TEMPORARY tent-type enclosure protected pouring of lift-slabs from the weather. After the pour was completed, the tent was removed.

tween slabs was great, resulting in much trouble for the contractor. A new product, called Horn's Parting Compound, was used on this project for several reasons. It serves as a membrane for concrete curing and also as a distinct separating agent between the slabs. It has a synthetic resin base that deteriorates in about 45 days. This leaves a concrete surface to which floor hardeners or paints may later be applied. A thin coat of foundry sand to protect the floor against abrasion by workmen was sprinkled on the finished floor after application of the parting compound.

Dual purpose, heavy "collars" of cast steel are imbedded in the slabs at each column. These collars are similar to the angle iron framework imbedded for any framed opening in concrete buildings. The 10 x 10-in. columns rise through the 10 $\frac{3}{8}$ x 10 $\frac{3}{8}$ -in. opening in these collars. The two threaded rods of the hydraulic lifting jack can be attached to these collars. Also, when a slab has been lifted to final elevation, four 3 $\frac{1}{4}$ x 9-in. square plates are each welded just beneath the slabs to the columns and the collars.

How they work

A description of the mechanics of the hydraulic lifting jacks has been discussed in a previous issue (*Western Construction*—March 1953, p. 72). Readers can refer to this issue or write to the Vagtborg Lift-Slab Corporation, 11973 San Vicente Blvd., Los Angeles 49, Calif., for full details. Essentially each jack operates hydraulically with a 3-in. stroke. Lock nuts attached to the lifting rods and to the jack framework provide a positive hold at all times during the lifting. Each jack is controlled by a central "console" that can record increments of lift as small as .083 in.

The general plan for lifting the slabs of the highest five-story portion

of the addition will go according to the following plan. All columns have been erected and all slabs have been poured. The columns extend to a height about 4 ft. above the third-floor level. Hydraulic lifting jacks are mounted on top of the columns and the lifting rods connected to the roof slab. At a rate of 4 ft. per hr., this slab is lifted to a position above the third-floor level. It is temporarily held there by bolting four 3 $\frac{1}{4}$ -in.-thick plates to the column just below each of the collars. The lifting rods are lowered for the fifth-floor slab, connections made, and it is lifted to a position just beneath the roof. A similar procedure is followed for the fourth floor.

The third and second floors can now be lifted to their permanent positions and the anchor plates welded to

the columns and collars as described earlier. At this time, the joining concrete pours are made at the second-floor level in the 3-ft.-wide sections that separated the four lift-slab areas.

The next operation is to remove the jacks and extend the columns to a height about 2 ft. above the fifth-floor level. The jacks are remounted on top of the extended columns and the previous procedure is repeated. The roof is lifted this second time to a position just above the fifth-floor level and temporarily secured. The fifth and then the fourth floors are lifted to their permanent positions and anchor plates are welded beneath them. Joining concrete pours can now be made at the third and fourth-floor levels in the 3-ft.-wide omitted areas. Again the jacks are removed, the columns extended to a small height above the roof, and the jacks remounted. Up comes the roof slab to its final position, anchor plates are welded, and the lift-slab operation is complete. Columns extending above the roof level will be burned off and grouted over.

As in most buildings, there is the need for providing rigidity to the structure. It has been capably handled in this building by the nature of the exterior masonry block walls. Each cell of the block wall is to be filled with mortar with 1 $\frac{1}{2}$ -in. dia. bars to be placed vertically at 2-ft. centers. Provision has been made for the vertical reinforcing bars to pass through the floors by incorporating 4-in.-dia. sleeves in the original slab pours. Temporary cable bracing for steel erection is required until the exterior walls are complete.

The plans and specifications as submitted by the architect for this

Concluded on page 57

THIS VIEW includes three of the four lift-slab areas. One-story north section has been already lifted. Note columns lying on roof slabs which will be butt welded to standing columns for upper stories. There are four 9-in.-thick lift-slabs "pancaked" in the foreground with the smaller fifth slab further back. Lightweight concrete was added to the fourth and fifth slabs for roof drainage. Use of 4-in.-dia. sleeves at edge of slabs is for vertical reinforcing in exterior block walls.



Who should know about lift-slab?

WHAT DOES the new lift-slab technique mean to various interested parties such as owners, architects, engineers, general contractors, and subcontractors? Since 1950, tremendous strides have been made in its working-knowledge usage by architects and structural engineers. Once a contractor has started or finished a lift-slab building, there remains no doubt in his mind that he will gladly put in a bid on another such project.

The lift-slab equipment was invented by two men, Youtz and Slick, and developed in Texas by the Institute of Inventive Research just 4 years ago. At the present time, a subsidiary organization, U. S. Lift-Slab Corp., of Austin, Tex., owns and leases all equipment. About ten franchises have been let in the U. S. and Canada to date. An unusual feature of this arrangement is that none of the franchise owners are limited in area of operation.

Two men run it

Consider the Vagtborg Lift-Slab Corp., one of the franchise owners, located in Los Angeles. Two men make this a smooth-running promotion. C. H. Vagtborg handles the public relations end while C. T. Fornstrom takes care of the estimating and on-the-job problems. Vagtborg has traveled extensively through the West attending meetings of architects, engineers, and civic groups. He has ably demonstrated, with pictures and cost presentations, what can be accomplished with this method. Fornstrom, on the other hand, submits bids in the same manner that any other subcontractor would for a proposed project. He also gets to the jobs to handle erection procedure.

Reduces cost

Let us consider in detail the various interested parties mentioned earlier.

The adaptability of this lift-slab technique to nearly any type of building from warehouses to schools means many interested owners. Even now a 15-story building is being planned.

Fornstrom will tell you without reservation that it is possible to reduce the cost of a building, one that can be built by lift-slab methods, by 50¢ to \$3 per sq. ft. of floor area. To the owner, this amount can very well mean the difference in whether he builds or not.

Here are sample cost comparisons for projects bid two ways, conventional pour in place meth-

ods and the lift-slab way. (1) Corpus Christi, housing project, 200 units, about 210,000 sq. ft. Bid: conventional, \$7.26 per sq. ft.—lift-slab, \$6.85 per sq. ft. (2) Corpus Christi, Chamber of Commerce building, about 7,000 sq. ft. Bid: conventional, \$13.41 per sq. ft.—lift-slab, \$12.38 per sq. ft. (3) Walker Air Force Base, New Mexico, two dormitories. Bid: conventional, \$538,949—lift-slab, \$483,043. (4) Trinity University classroom building, Texas, about 45,000 sq. ft. Bid: conventional, \$6.82 per sq. ft.—lift-slab, \$6.31 per sq. ft. (5) Phoenix High School, Arizona, about 82,000 sq. ft. Bid: conventional for wood floors and roofs, \$11.28 per sq. ft.—lift-slab, \$11.48 per sq. ft. Here the cost is only 2% more to get a fireproof building.

West catches on

There were more than 67 lift-slab projects lifted or under way in 1953. Hospitals, schools, warehouses, apartment houses, and housing units are only a few of the varied applications of this method. The Western states are catching on; 12 of the above projects were West of the Rockies.

So many different types of buildings are adaptable to this technique, architects as a group are definitely affected. *The Architectural Forum* has devoted considerable space and enthusiasm to its development.

The ideal building, from the architect's standpoint, would be a roof supported by toothpicks. This would allow him the greatest freedom of space in which to arrange for the desired functions of the building. Flat slab design using small columns, keymark of lift-slab construction, approaches this ideal.

Cantilever slabs and long smooth lines, characteristic of much modern architecture, can be attained in lift-slab buildings. Let the situation be summarized by saying here is a new tool for the ever progressing field of architecture.

Flat slabs used before

Perhaps least affected by the lift-slab method is the structural engineer. Flat slab design has been common for the last 30 yr., usually in conjunction with reinforced concrete columns topped by drop-heads or column caps. It is now necessary to transfer the slab loads to steel collars when using the lift-slab method. These collars are in turn fastened to the columns by plates placed beneath the collar and welded to the column.

Variations in the flat slab design are being accomplished. So-called "waffle slabs" have been tried with success. On one job, 2-in.-thick acoustical board was laid down as the parting medium between slabs. Over this, cardboard boxes 8 to 14 in. in depth and 24 to 36 in. square were laid in a symmetrical pattern. The space between the boxes served as beams in the completed concrete pour. When the slab was lifted, the tile remained attached and there was the finished ceiling in place.

Form and pour beams in slab

For one-story lifts, it is possible to form and pour beams in the slab. This is accomplished by forming trenches in the first floor of the desired beam shape. After the roof has been poured and jacked into position, additional concrete is poured to fill in the impressions on the first floor.

Column design is usually limited by two considerations. The lifting rods of the hydraulic jack are only 15 in. apart. Any column section 10 in. or less out-to-out measurement helps greatly. The other factor directly related to this is the l/r or slenderness ratio. If each jack is utilized to its full design load of 120,000 lb., a limiting column height will be reached for the column section being studied. For any building over this height, multiple-lift arrangements must be made. Such was the case in the Mercy Hospital five-story addition.

Column sections in use include the following: standard pipe 6 to 10-in. dia., 10-in. dia. prestressed concrete, two angle irons formed into a square, a standard wide flanged beam, and squares of welded standard steel plates.

Unusual case

One unusual case was that of a building using 24-in. square reinforced concrete columns. Lifting the slabs here was accomplished by setting horizontal steel beams on top of the columns. The jacks were then set on the beams for hoisting the slab. Steel plates were imbedded in the concrete columns so that the slab collars were welded to them in the conventional manner.

Columns are designed to carry only vertical loads in the lift-slab building. Since rigidity is necessary in a multi-story building horizontal loads must be transmitted to the foundation by properly designed interior or end walls.

It appears that slab and column design to provide maximum utilization of the lift-slab technique is

limited only by the ingenuity of the architect and structural engineer.

The basic simplicity and cost-saving features of the lift-slab type of building should be readily apparent to everyone. The Vagtborg Corp. lists these features as being outstanding: (1) All rough work is done at grade. (2) All rough work is done in flat slab. (3) Layout is simplified at grade. (4) Sleeves in upper slabs are always in perfect alignment. (5) Prefabrication is possible because of the accuracy in layout and perfect alignment. (6) There are no shores, forms, or bracing to hinder or interfere. (7) The slabs may be used as elevators by loading materials prior to being raised. (8) Work may proceed to completion on all floors at the same time without shores, braces, or debris to interfere. (9) Men and materials are protected by a roof as soon as the first slab is lifted.

The Trinity University Classroom and Administration Building in Texas was started in June 1950 and finished in August 1951. *The Architectural Forum* (September 1951) makes available these facts. Prevailing figure for this type and size structure (45,000 sq. ft.) was \$10 per sq. ft. It was bid at \$6.31 per sq. ft. Placing the concrete at grade over the pour-in-place method is estimated to have saved \$21,900. Saving No. 1—only five carpenters were required; No. 2—\$2,200 was saved by not having to hoist concrete; No. 3—\$1,000 was saved by placing and tying steel at grade. Other estimated savings by subcontractors: heating—\$1,400, electrical—\$1,200, plumbing—\$1,500. Total saving was estimated at \$28,500, 10% of the contract price.

On another two-story building, 73 x 356 ft., it took one operator and three helpers 36 hr. to lift the slabs. At \$10 per hr. for the four

men, total lifting cost was only \$360. The cost breakdown for the 7½-in.-thick second floor of this building shows the following:

	per sq. ft.
Columns in place.....	\$.10
Collars in place in slab....	.07
Separating material for slabs.....	.02
Weld collars to columns	.02
Reinforcing steel in place	.40
Concrete at \$14 per cu. yd.....	.32
Placing concrete	.02
Finishing concrete	.06
Lifting slab	.24
Total	\$1.25

An analysis of the above cost considerations indicates why lift-slab buildings can be constructed for much less money than the pour-in-place type construction.

Continued from page 55

project were made with the lift-slab technique generally in mind. An alternative in the bids allowed for standard pour-in-place type construction. A compromise between the two is seen in the use of three longitudinal rows of columns instead of two. A building designed solely for lift-slab methods utilizes the cantilever possibilities of slab design to a greater extent. For bidding purposes, the fact that the plans were for lift-slab only made no difference.

Had the successful bid gone to a contractor who intended to use the pour-in-place methods, the plans and specifications would have been modified. Concerning plans, the major change would have been in columns, changing them from structural steel to reinforced concrete.

One of the most notable features in favor of the lift-slab method near the existing hospital is the elimination of noise. Carpenters erecting and stripping forms, power equipment to handle materials, a concrete hoist; all these noise-making sources have been eliminated.

The schedule of operations for this type of construction moves rapidly. Pouring concrete for footings was started October 28, 1953, and finished six weeks later. Slab pouring started December 21 and finished six weeks later on February 5, 1954. Lift-slab work began February 10 and will be finished in about five weeks. From footings to final positioning of all slabs—a total of 4½ months. This is a schedule-busting operation for any five-story building.

Key personnel associated with this project are M. J. Heller, project manager and co-venturer; Bud Gilbert, general superintendent; and Dick Guhse, project engineer.

Complex transmission tower lift handled by four truck cranes

ONE OF THE BIGGEST and most complex lifting jobs on record in Southern California was carried out February 2 when a Southern California Edison Co. multi-circuit steel bridge-type transmission tower in Eagle Rock, carrying 33 half-in. copper conductors, was raised 7 ft. to provide greater clearance for the Colorado Freeway now under construction.

The unit, weighing 77,000 lb., actually is a bridge 98 ft. long supported by two towers, one 130 ft. high and the other, being on a hillside, 116 ft. high. It was hoisted while the 66,000-volt transmission lines were "hot." The high-voltage circuits carried by the tower were not de-energized, avoiding interruption of electric service to Edison customers served by the lines. The site of the big job is just north of Colorado Boulevard, on the company's Eagle Rock right-of-way paralleling Figueroa St.

Four 35-ton truck cranes, owned by the Owl Truck & Construction Co., two on each tower, were used to raise the two towers of the bridge unit simultaneously. Each tower was "broken" in the middle and raised sufficiently to enable Edison workers to bolt on the 7-ft. extension legs.

Over fifty men were used during the operation, which was accomplished perfectly and without incident. Engineers and estimators agree that the job was both economical and expedient.

C. W. Sanders, Edison Company Superintendent of Transmission; Jordan Lummis, Transmission Engineer and G. L. Matteucci, superin-

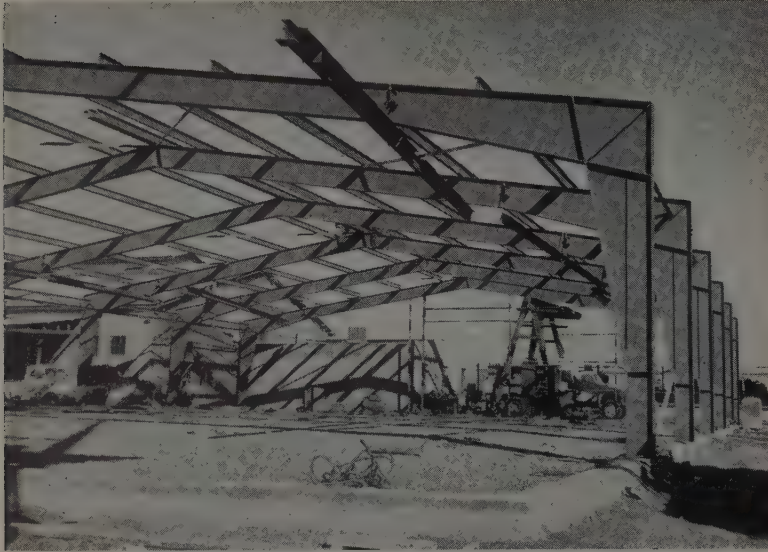
tendent of the company's central transmission division, directed the day-long operation for Edison. W. G. Hopcraft of The Owl Truck & Construction Co., contractor for the big moving job, was in charge of riggers and the four 2-man crane crews.

Owl Truck also contracted to make the site ready by moving the dirt, on the hillside, with bulldozers and doing considerable other tree clearing and placing of anchors in preparation for the "Big Lift."

FOUR TRUCK CRANES cooperate to raise this bridge-type steel transmission tower.



EQUIPMENT GARAGE—1954 STYLE



Rigid frame construction gives head room and clear floor space for servicing Salt River Project's rolling stock — Radiant heating, exhaust disposal system, three-way ventilation, and built-in safety make it a repair man's dream

A NEW GARAGE with up-to-date facilities for the servicing of 500 vehicles and pieces of construction equipment has been completed by the Salt River Project at its 16th Street Yard in Phoenix, Arizona, at a cost of \$90,700. The garage will be used to service all rolling stock of both the Salt River Power District and the Salt River Valley Water Users' Association.

The Project's existing equipment service facilities, a garage constructed in 1929, became entirely inadequate for the Project's greatly increased number of vehicles and construction equipment.

Design specifications

Designed by the Civil Engineering Division of the Salt River Power District, the main portion of the 11,800-sq. ft. new garage is 80 ft. wide, 120 ft. long and 16 ft. high, with a wing 28 ft. wide, 81 ft. long and 16 ft. high. Framing for the main garage consists of single-span rigid frames with 8-in. WF purlins. Rigid frames were selected to provide a maximum of head room clearance with a minimum of side wall height, and to provide garage personnel with clear working area for the entire 80-ft. width. The rigid frames are braced in the plane of the roof with diagonal angles for both tension and compression, and welded to the underside of the purlins.

The rigid frame was designed for a 20-psf. live load, 5,000-lb. load at the ridge and a 2-ton hoist load about 11 ft. from each haunch (based on moment coefficients outlined in the AISC booklet, "Single Span Rigid Frames in Steel"). Design was then checked

by the dummy-unit lead method. The haunches were stiffened laterally by a truss placed in a diagonal plane between frames. Since it was not practical to provide intermediate lateral support for the compression flange of the column leg of the frame, this inside flange was made thicker than the outside flange to permit utilization of higher allowable stresses. This involved no problem, since the frame was constructed by welding flange plates to the web in the shop.

Steel rods take thrust

The thrust at the bottom of the column legs is taken by steel rods which are attached to plates at the bottom of the columns and extend across the building under the floor slab. This thrust could have been taken by designing the foundations to resist overturning, but this was not possible due to proximity of a sewer line serving the yard on one side of the building, and a storm drain immediately adjacent on the opposite side. The tie rods are protected by coal tar enamel and wrapping with saturated felt.

Rigid frames were delivered to the job in three sections, with the field weld of the roof girder being made about 12 ft. from the back of the column. Twelve-inch pumice block walls fit into the space between the flanges, and are separated from the web of the columns with expansion joint material. Slope on the inside column flange starts about 4 ft. up from the floor to permit installation of work tables against the walls at any point along their length. Pumice block was used for the walls for good

appearance, structural stability, and good insulating and acoustical properties.

Foundations for the garage are concrete spread footings under the columns, with grade beams between the footings.

The floor consists of 6-in. concrete slab reinforced with welded wire fabric. This is now probably the only large garage in the Phoenix area that incorporates a radiant heating system embedded in the floor slab. The system consists of a 600,000-Btu. input boiler which circulates hot water through 6,000 lin. ft. of 1¼-in. embedded wrought iron pipe. The system was laid out so that pipes could be extended in the event of an enlargement of the building. Thermostats are provided to control temperatures in the main building and in the wing separately.

Outside expansion joints

Because provisions of heating pipes in the slab precluded the use of expansion joints inside the building area, expansion joints were carried only around the perimeter of the wall.

Steel decking welded to the 8-in. WF purlins on the main garage and to bar joists on the wing makes up a sturdy roof. Insulation consists of one-inch Fiberglas, and roofing is of the built-up type with asphalt-asbestos sheets. The entire roof was given a coat of asphalt aluminum paint.

The north end of the garage was constructed to facilitate extension in the event of future need for additional space. This consists of asbestos-cement insulation board panels attached to the steel frame. The panels

used for this purpose are 1½ in. thick.

Access to the garage interior is by means of 14 x 14-ft. roll-up steel doors at each end of the building with push-button electrical control at mid-length of the building on each side and at each door. Doors for the paint shop and body repair shop are 10 x 14-ft. overhead steel doors manually operated.

Cooling and ventilation facilities are provided to create comfortable and safe working conditions in both summer and winter. For safety, one of the first exhaust systems of its type installed in the Phoenix area is provided in the garage to eliminate the possibility of asphyxiation. This system consists of an 8-in. tile line buried in the floor, floor inlet connections to this pipe, receding flexible tubing to connect to vehicle exhaust pipes, and an exhaust ventilator to pull the gas through the line and discharge them to outside atmosphere. So that other fumes and odors are cleared from the building, two 48-in. diameter vents are in position on the roof.

Ventilation facilities

Windows are steel industrial type with heat absorbent glass, which is expected to reduce solar radiation by about 43%. The skylights are constructed of tinted plastic sheets.

Cooling and ventilating facilities (in addition to the special exhaust system) are also provided to create comfortable working conditions during summer months. The main building is cooled by six 10,000-cfm. evaporative coolers. About 600 sq. ft. of skylights were installed to reduce requirements for electric lighting of the interior. Normal ventilation is pro-

vided by vents in the windows and two 48-in. gravity ventilators at the ridge of the roof.

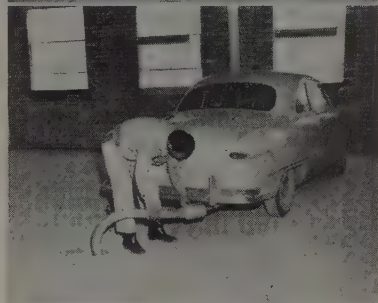
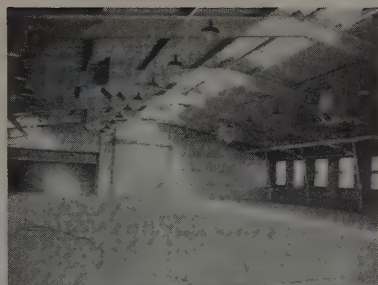
At the west end of the main building are housed the tire repair, wash stall, body shop and body paint shop. As an added protection for the concrete floors in the wash stall, railroad rails were installed to permit track-type tractors to be driven into the stall for steam cleaning and other service.

The paint shop is enclosed entirely with fire-proof materials. Explosion-proof switches, lights and motors are an added safety feature. The room is ventilated with two exhaust fans. Air is brought into the paint room through filtered louvers installed in the overhead steel door.

Lighting and drains

Lighting (supplementing that available from the skylights) consists of fluorescent lights down each side of the main building near the walls to serve workbench areas. Lighting in the interior of the building is by incandescent lights. Complete lighting was installed because a full night shift operates to provide adequate vehicle maintenance. Frequent outlets are provided throughout the building for servicing, including outlets for welding equipment.

Drains are provided down the center line of the main building to permit flushing and adequate cleaning of the floor. The floor slopes slightly toward the drains. Drains were also provided in the paint room, auto repair room and wash stalls. Water and compressed air outlets were provided at intervals around the perimeter of the building on the in-



INTERIOR of the main garage (top) shows the overhead door at one end. Mike Sienert, Power District civil engineer (center), shows how gas fumes will be eliminated for more safety and convenience. A closeup (bottom) of the exhaust gas vent, taken before the concrete slab was poured.

RADIANT HEATING system comprising about 6,000 lin. ft. of 1¼-in. pipe is being laid in the floor of the new 80 x 120-ft. equipment garage built by the Salt River Project.



side face of the walls.

The new garage can accommodate 14 vehicles at one time in the main section and operates on a two-shift basis.

In order to expedite completion of the work the foundations were constructed by the Salt River Power District's Construction and Maintenance Division, superintended by Calvin Kirk. The structural steel in the roof deck was fabricated and installed by Allison Steel Mfg. Co., Phoenix. The general contract was awarded to Farmer and Godfrey Construction Co.

The building was designed and engineering supervision provided by the Engineering Department of the Salt River Power District. T. M. Morong is the chief engineer. Directly in charge of the work was C. H. Whalin, civil engineer. Mechanical work was done under the direction of Art Tesmer, mechanical engineer, and electrical work under the direction of W. J. Grasmoe, electrical engineer. S. A. Ward is General Manager of the Salt River Power District.

SEAL COATS—economical usage

A practical method for determining the quantity of screenings and binder required per square yard of road surface for adequate coverage — Also: when to use a screening seal coat as compared to a plant-mixed, open-graded seal coat

THE TERM "seal coat" covers many types of light surface applications that are sometimes used as a pavement seal. Generally, it applies to a class of surface treatments that range all the way from a very light application of liquid asphalt or emulsion placed without cover to the more substantial two-shot screening seal or even a surface dressing of open-graded, plant-mixed surfacing. The plant-mixed seal is entirely different from normal seal coat and will be discussed separately in this article.

Seal coats are used for other purposes too

It is common knowledge among engineers that seal coats are used for many purposes other than to seal the surface of the pavement. The proper uses of seal coats have been very well covered by C. V. Kiefer in a paper titled, "Use and Abuse of Seal Coats," presented to the Second Nevada Asphalt Forum in Carson City (1948). His list is worth repeating here. A seal coat is needed only "if it is necessary to accomplish one or more of the following:

1. To seal moisture and air from entering the pavement.
2. To non-skid the surface of slippery pavements.
3. To rejuvenate or enliven a dry or weathered surface.
4. To improve luminosity or night visibility.
5. To reinforce or build up pavement structure.
6. Traffic lane demarcation (rumble)."

Although there should be general agreement on the purpose of a seal coat, there will doubtless be wide disagreement as to which is the most important or most common use.

What the maintenance engineer selects

The maintenance engineer would probably select skid proofing, rejuvenation of pavement surface, and reinforcing pavement structure. Of these, rejuvenation of the pavement surface is probably more important in the desert regions where bituminous pavements have a tendency to become dry and cracked with age. Reinforcement of a pavement structure would



By
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probably be considered most important in the wetter northern areas where large mileages of structurally weak pavement are preserved principally by maintaining a relatively rich flexible surface skin through the use of seal coats.

Seal coat limitations and advantages

Let us examine each of the purposes listed and consider briefly the limitations and advantages of the seal coat.

If a seal coat is being used to seal against moisture or air entering the pavements, we should weigh very carefully the benefits and liabilities involved.

Moisture entering the pavement from the surface may percolate to the subgrade or basement soil and soften the soil sufficiently to cause failure if

an adequate structural section has not been provided. On the other hand, moisture collecting in the soil or rising in the soil may be escaping through a slightly pervious pavement. It is frequently the case in semi-arid regions that moisture which percolates downward through the pavement is of relatively little significance as compared with moisture vapor escaping through the pavement in summer months. We should consider very carefully then whether we are sealing out more moisture than we are sealing in.

As a non-skid treatment of a slippery pavement, seal coats are very effective if a good retention of screenings is obtained. It is, of course, obvious that if the screenings whip off the treatment has served only to make a bad situation intolerable. It might also be noted here that it is generally difficult to obtain an entirely satisfactory seal coat on rich or bleeding pavements. We should also distinguish between skid proofing an old pavement and providing skid resistant surface on new construction. These considerations will be discussed later.

To rejuvenate or enliven a dry weathered surface, the application of liquid asphalt is the primary consideration. An application of screenings is made only if an improvement of skid resistance is desired.

Dangers in trying to improve luminosity

The use of a seal coat to improve luminosity or night visibility should not be attempted unless past experience in the area has indicated a high probability of obtaining good screening retention. Loss of screenings will result in real harm to the pavement and visibility will be worsened.

If reinforcement of a weak or structurally inadequate pavement is desired, the condition of the pavement should be given careful consideration. The seal coat does not add a sufficient thickness of metal to be of much value as reinforcement. It is, however, effective to a degree on pavements which have a tendency to ravel because of flexing under wheel loads as it provides a flexible, relatively tough surface skin which resists disintegration of the pavement.

A seal coat should not be expected to correct or even improve an un-

Why this article?

A MOST COMMON and controversial subject in bituminous road construction and maintenance is the problem of adequate seal coating. It is the responsibility of *Western Construction* to report new ideas and developments on this subject to the engineers of the entire West, who are responsible for highway design, construction, and maintenance.

This important chapter in our reporting on seal coats was originally presented by the author at the Eleventh Northwest Asphalt Forum.—Editor.

stable bituminous pavement that is rutting under traffic.

Seal coats are also frequently used to delineate traffic lanes, and they are no doubt of some value for this purpose. The same reservation must be made, however, as that discussed for improvement of visibility. A seal coat should be used for delineation of traffic lanes only if an entirely satisfactory seal coat is assured.

The first fundamental study of seal coats

The first systematic and detailed study of seal coats was made by F. M. Hansen of New Zealand. Although some of the problems studied are peculiar to that area, the fundamental principles established by him cannot be successfully contested. Working with closely sized screenings, he established a correlation between the average least diameter of the stone and the quantity of screenings required per square yard for complete coverage. He determined that the quantity of binder required was related to the void content of the compacted screenings. The surface of the pavement was primed to a standard condition before placing the seal coat so absorption of the asphalt by the pavement could be neglected in determining the required spread.

In California, the use of closely sized screenings proved too costly, and grading tolerances have been established which permit a small amount of both undersized and oversized rock in each of the different screening specifications. This requires an adjustment in the rate of spread and a different method of calculation, because the use of the average least diameter by direct measurement is not feasible with the smaller particle sizes.

Satisfactory correlation has been obtained, in the laboratory, between the mean particle diameter and the loose volume of screenings required to produce a layer one stone thick. The mean particle diameter has been calculated as the weighted average of the mean size of the largest 20%, the middle 60%, and the smallest 20%.

Spread modulus correlated with laboratory spreads

The mean particle diameter, calculated in this manner, has been termed the "spread modulus." Correlation of the spread modulus with laboratory spreads was obtained. This correlation is shown in the accompanying chart. The laboratory spreads were made by placing the screenings on papers coated with a heavy grade of asphalt in an amount similar to that used in construction. The asphalt was heated and then allowed to cool while in contact with the screenings. After cooling, the excess screenings were



SPREADING screenings presents problems in obtaining a uniform spread quickly without spillage. Note spreading crew riding the spreader box.

shaken off and the quantity retained was determined by weight.

Although the screenings in the laboratory tests were pressed down with a sponge rubber block, the density of the cover coat did not equal that normally obtained on construction work. Hansen observed in his work that the loose screenings compact approximately 37½%. Since the cover is only one stone thick, this compaction must represent a lateral densification of the screenings. It appears, therefore, that the use of a constant to cover compaction of the screenings is in order.

Hansen also concluded that it was necessary to make an allowance of

about 10% extra screenings because of the normal fluctuations in the operation of the spreading equipment. The amount of this allowance should be determined for each locality and will be dictated by the price of extra screenings as compared to the cost of hand "spotting" over thin areas, bearing in mind that too great an excess may cause movement of the stones under traffic and result in complete loss of screenings.

Observations and data available indicate that a factor of 0.85 to 0.95 times the spread modulus will provide the proper quantity of screenings in cubic feet per square yard with a reasonable allowance for both compaction and whip-off. It must be remembered, however, that this determination is based largely on laboratory data and needs further verification under actual field conditions.

DIFFERENCE in surface texture between a screening seal coat (top) and a plant-mixed, open-graded seal coat (bottom) affects skidding and whip-off.

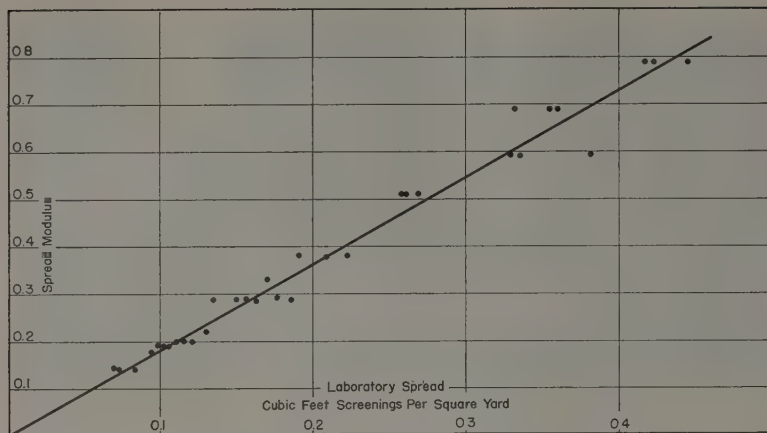


Absorption allowance must be included

The calculation of the quantity of bituminous binder required to hold the screenings is quite simple except that an allowance must be included for absorption by the pavement and screenings. The allowance for absorption by the pavement cannot yet be calculated or determined by tests except by trial spreads.

The calculation of the quantity of binder required is based on the principles developed by Hansen. Briefly, he determined that the thickness of the cover was controlled by the average least diameter of the stones and that sufficient binder should be used to fill from 50% to 70% of the void spaces in the cover. He also determined that the loose screenings contained approximately 50% voids and that the compacted screenings contained approximately 20% voids.

A calculation from these values will show that the 50 to 70% submersion of the screenings will require 0.062 to 0.087 cu. ft. of binder for each cubic foot of loose screenings.



CORRELATION of "spread modulus" or mean particle diameter with laboratory spreads of screenings. Listed in cubic feet screenings per square yard.

The average value of 0.075 cu. ft. of binder for each cubic foot of loose screenings, *exclusive of the allowance made for whip-off*, should be satisfactory. This figure can then be converted into gallons per square yard or for simplification, these calculations may be combined into one constant and the expression for the calculation of the quantity of binder required could be written:

$$\text{Gal./sq. yd. required} = 0.56 \times \text{cu. ft. screenings per sq. yd.}$$

To this quantity must be added the allowance for absorption by the pavement. Approximately 1/10 gal. per sq. yd. should be added for the average pavement, but no allowance need be made for rich or fat surfaces.

How to calculate screening spread

This expression may be further simplified by basing the calculation for binder requirement as well as screening spread on the spread modulus. These calculations could then be written:

Quantity of screenings:

$$0.9 M = S$$

Quantity of asphalt:

$$0.4 M + V = A$$

in which

M = spread modulus

S = cu. ft. of screenings per sq. yd.

A = gal. of asphalt per sq. yd.

V = variable to cover absorption by pavement

The pounds per square yard may then be obtained by multiplying the above spread by the loose weight per cubic foot of the screenings.

Example

The following sizes are determined from the plotted grading curve:

100% size = 0.375 in.

80% size = 0.300 in.

20% size = 0.200 in.

0% size = 0.065 in.

The spread modulus then equals:

$$0.20 \times \frac{0.30 + 0.375}{2} = 0.0675$$

$$0.60 \times \frac{0.20 + 0.30}{2} = 0.1500$$

$$0.20 \times \frac{0.065 + 0.20}{2} = 0.0265$$

$$\text{Spread Modulus} = 0.244$$

Screening Spread:

$$0.9 \times 0.244 \times 93 = 20 \text{ lb. per sq. yd.}$$

Application of oil:

$$0.4 \times 0.244 + 0.10 = .19 \text{ gal. per sq. yd. (assuming 0.10 gal. per sq. yd. for absorption by pavement.)}$$

Selection of screenings

In choosing the size of screenings for a particular project, the individual experience and preference of the engineer will generally be the most important determining factor. In spite of preference, however, certain factors should be carefully weighed in light of the purpose of the seal coat and the condition of the pavement surface.

It is well known that the larger the screening size or the greater the variation between the sizes of the individual stones, the greater the tire noise or rumble. It is also probable that the larger screenings are more easily dislodged from the pavement.

Finer screenings, on the other hand, are more critical with regard to the oil application because a higher proportion of the total binder is included for absorption by the pavement. Fine screenings also have a tendency to form "pads" of finer particles and are more subject to corrugation under traffic.

The bituminous binder used for a seal coat may be any bituminous product that is sufficiently fluid, at the

temperature of the pavement when it is applied, to adhere to both the screenings and the pavement surface; and yet develop, within a relatively short time, a sufficient viscosity to hold the screenings at any subsequent temperature of the pavement. The bitumen, the road surface, and the screenings should have a mutual affinity in order to resist the action of the water. Further, the binder should not become too brittle to withstand impacts of traffic.

There are other qualities that are important, but an asphalt that meets the above requirements will generally have the other desirable properties.

A particular grade of asphalt will not be suggested here because the grade should be selected to fit the individual conditions of each particular area. It may be that it is not possible to select a single grade of oil that will satisfy all the requirements of a project. This may be the case if there are patches of shade and sun or if there are wide variations in the temperature from day to day.

Failure of screening seals

In considering the probability of success of a screening seal coat, all the factors which could cause failure must be evaluated. These factors may be listed as follows:

1. An insufficient quantity of bituminous material will result in a partial or complete loss of cover.
2. An excess of bituminous material will cause bleeding of the binder through the cover, resulting in a slippery and unsightly road surface.
3. An inadequate spread of screenings will result in a thin seal coat with bleeding similar to that caused by an excess of binder.
4. A surplus of screenings may cause excess movement of the screenings and result in whip off.
5. A binder that is too fluid or does not harden quickly enough will not hold the screenings.
6. A binder that is of too high a viscosity will not adhere to the screenings.

Varying conditions cause complications

These represent the factors which the engineer must evaluate and adjust in order to obtain a satisfactory seal coat. That in itself would not be too difficult if it were not for the fact that these six are multiplied and compounded by variations in porosity of the pavement surface, variations in temperature of air and pavement, porosity of the screenings, the need to open the road to traffic before a sufficient curing period, and if this is not enough, a rain the day after completion may wash out the whole works.

The effect of air and pavement

temperature on the bituminous binder is particularly troublesome. A seal coat placed in an area where temperatures are not normally high using a bituminous binder properly selected for the prevailing conditions may be completely lost because of an unusually hot day occurring before the binder has had time to harden through normal curing. The binder must have an optimum viscosity at the time the screenings are placed in contact and must remain at or below that viscosity if the screenings are to be retained.

Seal coats— good and bad

The results of an unsuccessful seal coat are well known and have been viewed with bitterness by most highway engineers. It is a common observation that only the screenings are lost. The asphaltic binder always sticks to cause a skid hazard and make the application of a second seal coat even more uncertain of success.

The satisfactory seal coat, on the other hand, provides a uniform and pleasing driving surface that has good night visibility and skid resistance. Unfortunately, under severe conditions of traffic, alignment, and climate, it has a service life much shorter than a properly designed and supported plant-mixed pavement.

We have all observed the gradual loss of screenings under heavy traffic, on steep grades, or on curves. First, the seal coat begins to appear thin, then bare spots develop and soon a new seal coat is required.

With each seal coat another increment of binder is added. If the project is in an arid or semiarid climate, applications of liquid asphalt may be necessary and beneficial in rejuvenating a pavement which has become dry and weathered. In the northern areas, particularly along the coast, pavement temperatures are normally lower and oxidation progresses at a much slower rate. Under these conditions, frequent sealing causes an accumulation of asphalt on the surface which may become a serious skid hazard.

It is not intended to imply that it is impossible to obtain a satisfactory screening seal or that all seals are short lived. Many miles of excellent seal coats have been constructed with a service life that has justified their use. In general, these will be found, however, in areas where conditions are favorable.

The plant-mixed, open-graded seal coat

It appears, therefore, that if a screening seal coat is being considered, the probability of success is of paramount importance. If there is not reasonable certainty of securing a uniform and lasting cover of screen-



WIDE VARIATIONS in temperature and frequent rain during the construction season may require use of a plant-mixed, open-graded seal coat, such as is shown here.

ings, some other type of construction is indicated.

A screening seal coat is not recommended under the following conditions:

1. If wide variations in temperature from day to day are common.
2. If the prevailing climate is cold.
3. If the area to be covered varies within short sections between shade and sun.
4. If there is the possibility of rain on the newly constructed seal.

The plant-mixed open graded seal coat is strongly recommended under these conditions. Approximately 32 mi. of this type of seal coat have been placed in northwestern California in the last six years without a failure. Although it is too soon to determine the ultimate service life, all indications so far are encouraging.

Briefly, the mix consists of a crushed river gravel produced to meet the following grading tolerances:

Passing $\frac{3}{8}$ -in. sieve.....	100%
Passing No. 3 sieve.....	85%-100%
Passing No. 8 sieve.....	15%- 32%
Passing No. 30 sieve.....	0%- 15%
Passing No. 200 sieve.....	0%- 3%

How it is mixed and paved

The aggregate is mixed in a paving plant with approximately 5% of paving asphalt and spread on the road surface to $\frac{1}{2}$ -in. depth with a paving machine. Paving asphalt of 85-100 or 120-150 penetration is used. On a part of the projects a tack coat was used but on the others there was no special treatment of the newly placed dense graded plant-mixed surfacing.

This plant-mixed open graded seal coat gives a smooth, uniform, relatively skid proof riding surface. Tire noise is reduced and, as the surface

is porous, there is a reduction in the splash from tires during rainy weather.

The mix is not critical with regard to asphalt content, but plant temperatures must be carefully controlled or the asphalt will drain from the rock and collect in the bottom of the truck. A temperature of not over 225 deg. F. is desirable.

Needed—equipment for uniform application

Some mention should be made of improvements needed in seal coat technique. Most important are improvements in equipment. An asphalt distributor that will give a uniform application for the full width and length of spread at the rate selected by the engineer is desperately needed. Screenings spreaders should be improved so that a uniform spread can be obtained quickly without spillage. The engineer should insist on equipment that will do the job properly.

The development of a simple test to determine the amount of binder that will be absorbed by the pavement is necessary before the rate of application of binder required can be calculated with any certainty.

Above all, do not place a screening seal coat unless there is a high probability of success.

Missouri pact seen

A BILL has been introduced into the Senate which would authorize Colorado, Montana, and Wyoming to join with seven other states to make a compact to cover the disposition, allocation, diversion, and apportionment of the waters of the Missouri River and its tributaries without any reservation.

County cuts small bridge costs

*... to \$5 and \$6 average cost per sq. ft., using Army surplus "prefab" steel deck and beam sections —
Latex-asphalt surfacing used with good results on
steel hatch covers utilized as deck units*

AFTER World War II vital construction materials were still scarce. Monterey County found itself in a position where it was necessary to replace and repair many small structures which had become inadequate due to old age and to failures caused by increased loads and speeds of trucks.

Fortunately, there became available considerable Army surplus material and the county was able to purchase 6,000 lin. ft. of 10 x 26-ft. LSD decks which, with a small amount of reinforcing, could be made into 52-ft. spans, and by precasting a 4-ft. concrete center strip a 24-ft. roadway was obtained for most of the structures constructed. On some of the structures, lightweight concrete was poured into steel grill flooring to overcome the objection of ranchers who found it necessary to drive cattle over the bridges.

Abutment and deck construction

For the piers and abutments steel piling was used. This consisted of two 6 x 6 angles (Army surplus) which were welded together to form a "Z" pile and which developed the same bearing characteristics as an "H" pile.

Abutments for most of these structures were constructed of steel piling (60-lb. rails or angles) backed with steel (Army surplus) landing mat.



By
**H. F.
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Civil Engineer
(Retired January 1
from position of
County Road
Commissioner
Monterey County,
California)

Approximately 2,000 lin. ft. of this type of bridge, with 24-ft. roadway, has been built by the county during the last 6 yr. The average cost per square foot is from \$5 to \$6; the per cent saving resulting from use of Army surplus material.

In addition to the LSD decks, the county obtained a large number of steel hatch covers which have been used for constructing many small bridges (illustrated). These hatch covers average 5 ft. wide and 18 to 22 ft. long, and are approximately 8 in. deep and made of 7/32-in. plate. They are so constructed that they will carry standard highway loadings, although there is some deflection of the steel plate between supporting members.

When the hatch covers were first obtained at a very low cost it was proposed that they would be put in place and covered with a concrete

floor for a wearing surface. It was assumed that deflection of the steel plate would not permit the satisfactory use of plant-mix surfacing.

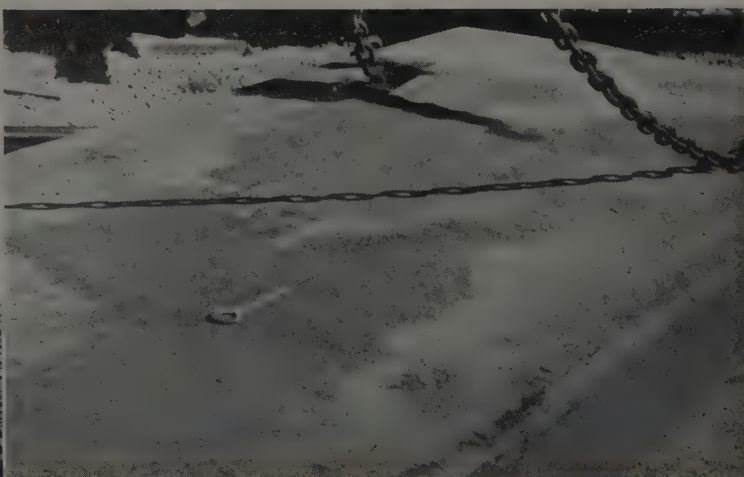
After investigation, it was decided to try a surfacing using latex-asphalt and fine rock screenings; the county had prior satisfactory experience in using this material in sealing joints in wooden bridge floors after caulking. This material consists of rubber and asphalt and was developed by J. F. McSwain, owner of the Industrial Asphalt Co. of Berkeley.

Field experience

On the ten bridges constructed using the hatch covers, the latex-asphalt has been used with fairly good results. Failures which have occurred are the peeling off of sections of the surfacing, which may be attributed to improper cleaning of the hatch cover and improper aggregates used with the latex. It is the opinion of the engineering department that, with careful cleaning and proper heating of the steel before application, the material would adhere to the surface and protect it from abrasion and at the same time develop some non-skid qualities.

After this field experience with the hatch covers, the county engineering department has concluded that they, or other units of similar dimensions which may be constructed, are among

SURPLUS steel hatch covers stocked at Monterey County yard . . . are paved with asphalt-latex mixture and 1/4-in. screenings. A cover is added to the stockpile (left). Right is a closeup of a hatch cover. The chains lead up to the hoisting crane.



A quick history of Monterey County's bridge experience

THE MONTEREY County highway system is comprised of 1,402 mi. of county roads, of which 216 mi. are in the Federal Aid system. A total of 311 mi. is classed as being in the county primary system and 1,091 mi. in the county secondary system.

There are 140 bridges over 20 ft. in length in the system with a total length of approximately 12,000 ft., or 2.3 mi. In addition to the bridges, there are numerous other structures and cattle passes varying in length from 8 to 20 ft.

Before 1928, the majority of the smaller structures were constructed generally of wood with some concrete abutments. Wooden piles, mostly untreated, were used where piles were required.

In 1928 the county constructed two bridges approximately 100 ft. long, using steel "H" piles with steel stringers and concrete decks. These bridges were constructed in the southern part of the county in streams in which the water is very alkali, and at the time of construction serious consideration was given as to what the effect of the alkali condition would have on the life of the steel piles. In 1953, after a period of 23 yr., excavations were made around several of the piles and no deterioration was found.

In addition to constructing these two bridges, the county also started replacing many small bridges on secondary roads with structures consisting of steel rails used as piles for trestle bents and abutments. In many cases the abutments were backed with heavy galvanized wire mesh which was backfilled with gravel and rock to form the abutment and protect it during flood periods. Many of these mesh and rock-filled abutments have been in service over 20 yr. and are in excellent condition today.

Also, some of the structures were constructed with the steel rail piles backed with precast concrete slabs to form the abutments and precast decks were used. During World War II, because reinforcing steel was difficult to obtain, several structures were built in which second-hand cable was used for reinforcing, and these structures have proven satisfactory and economical. (See "War surplus steel used for suspension bridge in Monterey County," by Chester B. Dudley—*Western Construction*—April 1950, pp. 92 and 93.)

the most economical, convenient, and practicable type of bridge sections available for use on rural highway systems in repair of existing structures and use on secondary roads.

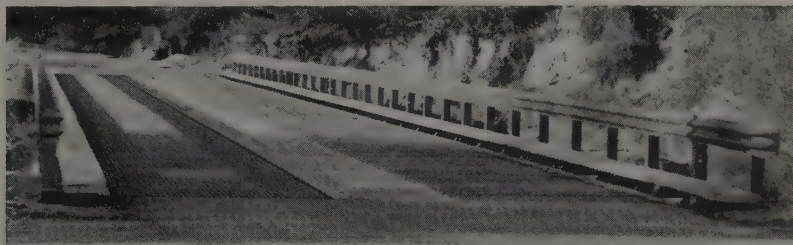
At the present time, use of the



GABILAN CREEK BRIDGE—Hatch-cover span of 22 ft. The piles are made of 6-in. driven pipe, filled with concrete and backed with steel landing mat (Army surplus) for abutment.



COREY BRIDGE—This is a hatch-cover span of 20 ft. These piles are made of 60-lb. rail, backed with Army surplus corrugated sheeting for abutments.



ROBLES BRIDGE—Four 56-ft. spans with LSD (Army surplus) decks make up this bridge. The center divider is a 4-ft., precast reinforced concrete slab.

covers is not restricted to permanent structures. The county uses them also as temporary bridges on summer river crossings where they must be removed each winter on account of high water conditions.

Future plans

The photos accompanying this article show typical Armco guard rail installations used on most of the county structures as well as steel piling and abutments made from surplus materials. Plans are being made to use standard steel material for de-

velopment of abutments in future works. Also, preliminary designs are being worked out for constructing new units similar to the hatch covers, when they are no longer available, for deck sections. It is our opinion that these steel sections will prove very helpful and economical to rural county highway departments.

The Monterey County Engineering Department consists of Chester Dudley, Road Commissioner; Sam Black, Assistant Road Commissioner and Surveyor, and W. J. Carlson, Office Engineer.

Contractor uses 'safety car' to cut job accidents



THE IDEA of an accident prevention service car came largely as the result of two things: first, the practical necessity of having on the job some of the tools of safety work such as films, projectors, screens, and cameras; and secondly, the fact that it is difficult and costly to transport such equipment by the ordinary means of public transportation to and from our various construction jobs, which are scattered from northern Washington to Southern California.

So now we travel by "service car" on most of our visits and, by digging into its compartments, can come up with anything from a tube of burn ointment to a 20-min. sound movie on construction safety. We are very proud of this piece of Atkinson equipment, and in 20 yr. of safety work I have never seen anything quite like it.

Extra electricity

The car itself is a 1953 Ford Courier V8 with overdrive. The power plant is as it came from the factory except for the replacement of the standard generator with a Leese-Neville alternator to give us the extra electrical capacity needed for a two-way radio and other equipment.

While on the subject of the electrical system, the car also has a Carter rotary converter which operates on the 6-volt system and produces 115-volt AC for small loads up to 85-90 watts. Thus we can run some of our lighter 110-volt equipment directly from the car's electrical system. However, it is possible in 90% of our jobs to place the car within 100 ft. of a source of 110-volt power, so the car is fitted with a switch panel from which we go out with heavy extension cords to light plants or other sources of this power. This energizes our car's 110-volt circuit to which we can plug in and operate any of the 110-volt AC equipment we carry.

By **ROBERT M. EVENDEN**

Safety Manager
Guy F. Atkinson Company

The service car carries a complete line of visual aid equipment. At the head of the list is a Bell & Howell 16-mm. sound moving picture projector. This has both the optical and the magnetic sound heads and permits the relatively simple recording of our own narration and sound on 16-mm. moving picture film. This model has a self-contained speaker and packs in half the space of many other models.

"Hot" projector

Next is a TDC "500" slide projector with a semi-automatic slide changer. This is a "hot" projector and does a good job of projection under tough conditions. This is an important point in our work, for, while we black out windows as much as we can, occasionally our daytime slide showings are not made under optimum conditions. The slide-changing device permits the easy arrangement of slide series.

Our Dukane sound-slide projector is one of the latest of its kind and operates either manually from record bell tones or automatically from the inaudible high-frequency tones which have come into recent use on strip film transcriptions.

With these projectors we have the necessary screens, tables, and supplies. We have a small rear projection screen which we use in cramped quarters and for small groups. It works very well but has a comparatively narrow viewing-angle or zone.

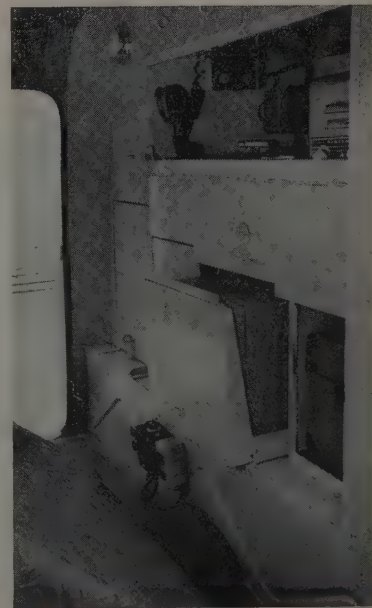
As both Russell Jones and myself, who jointly operate this car, are camera hobbyists of some years experience, our own cameras go along with us when we use the car. Both of us own 35-mm. cameras, a Kine Exakta

and a Leica, and with these we make color transparencies that we use in our meetings. The Exakta has three lenses, a normal, a wide-angle, and a telephoto, and the Leica has a normal and a wide-angle. As a note to camera-conscious safety men, we find that a wide-angle lens is an extremely important part of any 35-mm. outfit.

The car camera equipment consists of a Graflex Crown Graphic $2\frac{3}{4} \times 3\frac{3}{4}$ in., complete with accessories, and we now have a 68-mm. wide-angle lens for it which we have found extremely useful. For moving pictures, the car carries a 16-mm. Bolex motion picture camera. This is complete with normal, wide-angle, and 3-in. telephoto lenses. Here again, we find ourselves taking a very large proportion of our film footage through the wide-angle lens. The Bolex has a lot of advantages for our work.

We found a good tripod with pan head for these cameras and cannot over-emphasize the importance of this item. Lately, we have been considering the addition of a gear- or worm-driven panning head to smooth up some of our panoramic views.

FRONT SEAT of service car is folded forward out of the way, showing radio, cabinet work, public address system, electrical switches and outlets, a projector in its drawer, and a camera case.



A stock of flash bulbs goes along with us and some floodlights. We must, of course, carry a supply of film and we have standardized on Eastman Kodak Kodachrome for color and Plus-X and Super-XX in black and white. The Plus-X is 35 mm., and the Super-XX comes in the large size.

Audio equipment

We carry two items of audio equipment, a small public address system and a tape recorder.

The public address system has 10-watt output and we can operate two loudspeakers from it. We can use it as an amplifier for the sound from the projectors or use it directly with a mike for speech, and we have both a lapel microphone and a small dynamic one. Using this unit, we have carried on meetings in competition with gas pumps and diesel motors in operation and have made ourselves heard. The amplifier operates on either 6-volt DC or 110-volt AC, but is for the most part run on the car's 6-volt system.

The tape recorder is a small Ampro which we can operate off the rotary converter mentioned previously. Our plans for its use involve the recording of job sounds, narration by job personnel, and the like for use on the sound movies and slide series, which we hope some day to find time to make.

Two-way radio

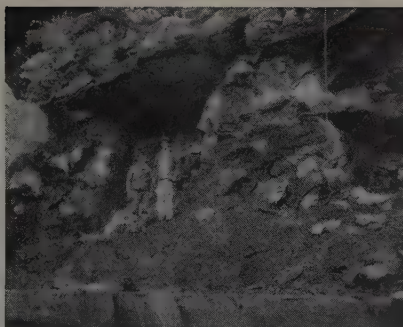
Many of our construction jobs are equipped with 2-way radio communication systems. Our service car has a Motorola 2-way set tuned to our company's assigned frequency, which puts us into their communication system whenever we come in range of these jobs. This has been very useful at times and occasionally we can help with the production problems with our unit.

Miscellaneous

Space does not permit a detailed account of the miscellaneous items we carry in the service car. We have first aid supplies, posters, films, safety codes, a carbon monoxide tester, an explosive gas tester, extra hard hats, samples of goggles, extension cords, chains, flares, fire extinguishers, and dozens of spare parts and supplies for equipment described above.

All of this equipment fits into metal cabinet work in the car body, which was fitted to each major item. The cabinet work was made of steel by a truck bodymaker, and after some 24,000 mi. of operation is holding up well and keeping the equipment in good shape. We have a clothes locker in the truck, where hang our rain and work clothes, because we have to be equipped in that manner as well.

The GFACO accident prevention service car has been in use about a year at this time and we have put it to good use. We are, as I have said, very proud of it.



SKEWBACK rock excavations at the site of the Dunsmuir Bridge as shown by Martin Cornelius (left) and Reuben Sells, assistant superintendents. Right is the skewback after concrete was placed. Note steel I-beams for falsework trusses.

Concrete arch bridge is pushed across the Sacramento River

CONSTRUCTION of a reinforced concrete arch bridge over the Sacramento River on Highway 99 at Dunsmuir, Calif., is now under way. The contract for this work was let last summer to Charles MacClosky Co. on a bid of \$651,648, and calls for widening a bridge and $\frac{1}{2}$ mi. of plant-mix surfaced approaches.

For excavation of the river piers and skewbacks the men were faced with lava rock formations overlain with boulders, together with the Sacramento River and Southern Pacific railroad tracks. Reuben Sell, foreman, handled the excavation problem expertly by the use of slant holes, a combination of black powder and dynamite, and smoke analyses. Blasting mats of $\frac{7}{8}$ -in. steel cable tied together with cable clips successfully controlled pieces of flying rock.

Moving the Sacramento River to the north was accomplished by the use of a 2-cu. yd. crawler dragline, and

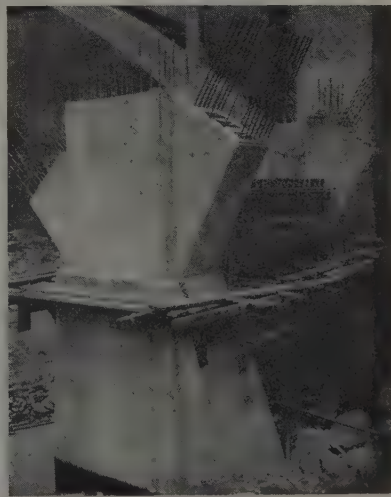
the excavated gravel and boulders served as a cofferdam for Pier 2 adjacent to the Southern Pacific tracks. This cofferdam was unwatered about 8 ft. below the river bed.

A steel cofferdam was driven by Macco Corporation for the construction of Pier 3, about 20 ft. below the river bed.

All footings and piers were completed above ground before winter, thereby permitting construction to continue on the concrete arch ribs and columns, which rise about 90 ft. above the river bed. A 50-ton Northwest crawler crane with a 120-ft. boom was used for the erection operations.

Vern Leiding is general superintendent for Charles MacClosky Co. and his assistants are Martin Cornelius and Reuben Sell. Denny Bagley is job engineer. For the California Division of Highways Ralph Sherick is supervising engineer, with F. C. Marshall as resident engineer.

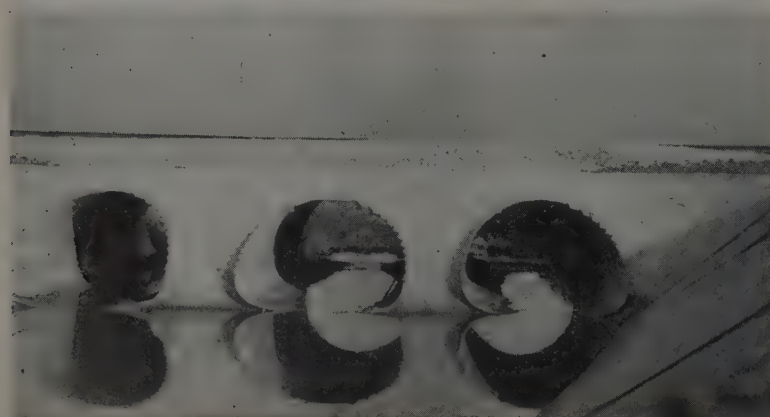
PIER 3 of the new bridge is in the foreground (left) looking toward the south abutment. Right is a closeup of Pier 2. Note steel I-beams through the pier which will support the bowstring trusses as falsework.





Quick drainage job done at Ford Milpitas plant

FOUR BARRELS (top of page) were tunneled under the highway to increase drainage outlet for the project. After machine tamping of foundation (center), the middle barrel is pulled into position for pipe arch culvert under branch railroad. Completed structure (bottom). Service was restored after only 14 hr. Canal invert and slopes were concrete-lined on all curves after culvert was completed.



CONSTRUCTION of the new Ford Motor Co. plant at Milpitas near San Francisco has required many different types of jobs, including improvement, enlargement and realignment of existing drainage facilities.

Natural drainage was seen to be insufficient because greater run-off was anticipated from the developed areas covered by the project. The land, once used for farming, was purchased by the Western Pacific railway and a large tract of it later sold to Ford.

Record time

An early drainage job required cutting a railway line and installing a triple 98 x 69-in. x 38-ft.-long Armco Multi-Plate pipe arch culvert. The work was done and service restored in the record time of 14 hours. The three large-diameter culverts carry the flow of Arroyo De Coches and Berryessa Creek under the San Jose branch of the Western Pacific, the line on which the project is located.

Other small drainage culverts as well as yard drainage will also be installed. The existing outlet under State Highway 17, now a 12 x 5-ft. concrete box, will be enlarged by four barrels of 68-in. round Armco Liner Plate culvert, each 38 ft. long. These are being tunneled under the highway because of extremely heavy traffic on that road. Being the principal link between San Jose and Oakland, detours or slow orders could not be tolerated.

Cover less than 3 ft.

It was thought that the exceptionally light cover of less than 3 ft. with a high water table would make tunneling difficult. The heavy adobe soil prevented that. This job was typical of the advantages offered by tunneling—no detours, no interference with traffic, and no costly temporary structure to build and later dismantle.

While not a part of the required drainage improvement, a 268-ft.-long, 102-in. diameter round Multi-Plate conduit was placed paralleling a 72-in.

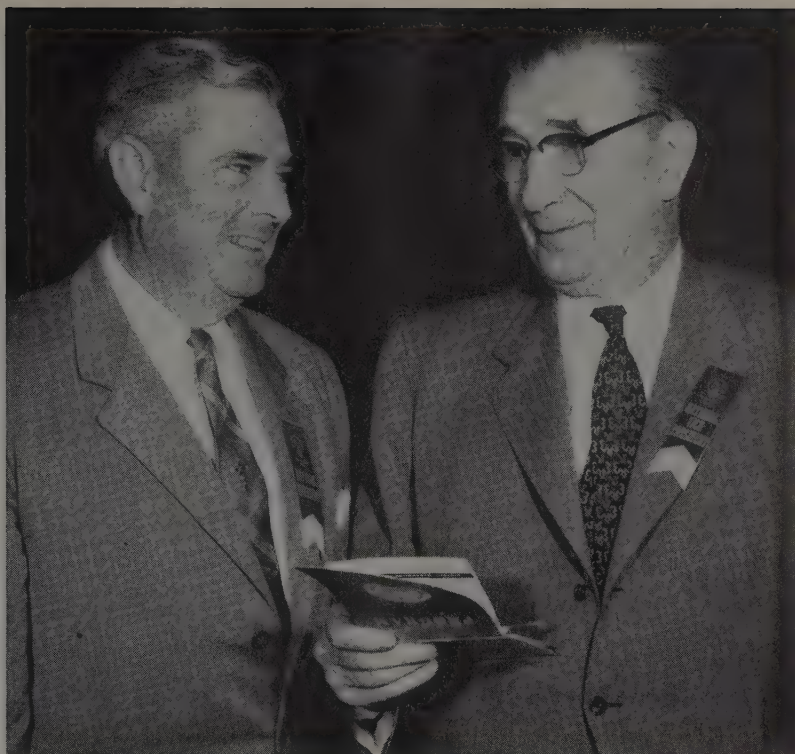
Concluded on page 76

AGC:

the

35th annual convention at Los Angeles

Competition up, and number of failures may go up —But in the long run the construction industry of the West has a very busy future



TAKING OVER from C. P. Street (left), John MacLeod of Macco Corp. is AGC's head man for 1954. Another Westerner, A. S. Horner of Denver, was AGC president just 2 yr. ago.

“WE LIKE your attitude!” With these words, outgoing President C. P. Street of the Associated General Contractors acknowledged a welcome extended by Mayor Morris Poulson of Los Angeles. Poulson had just addressed the opening session of AGC's 35th annual convention and in his own remarks had drawn heavily on knowledge and experience he had gained as a former member of the Southern California Chapter staff.

For Westerners the significance of the California convention was the installation of AGC's 35th national president, John MacLeod, president of Macco Corporation. Founder of his own firm in 1929, MacLeod has since extended his activities to include three affiliated firms and a \$400,000,000 work record that has covered the Western states and South America. He has been an AGC booster for a long time, serving a term as president of the Southern California Chapter 13 years ago and one as chairman of AGC's Heavy and Railroad Contractors' Division in 1950.

Convention principals

Taking office with MacLeod was George C. Koss, president of Koss Construction Co., Des Moines. Koss is vice-president of AGC for 1954, having served the association in various committee positions and as national director. He was chairman of the Highway Contractors' Division in 1948.

A parade of authoritative speakers from various points in government

and industry appeared at both general sessions and meetings of individual divisions of AGC. Among them were Clifford E. Hood, president of U. S. Steel; Brig. Gen. C. H. Chorpene, Assistant Chief of Engineers for civil works; and Rear Adm. J. R. Perry, chief of the Bureau of Yards and Docks—all speaking at the opening session. Subsequent sessions and meetings heard Hon. James P. Mitchell, Secretary of Labor; A. E. Johnson, chief engineer of the Arkansas State Highway Commission and president of AASHO; Carl F. Oechsle, Deputy Assistant Secretary of Commerce; Robert L. Gordon, vice president, Bank of America; and Richard J. Gray, president of the Building and Construction Trades Dept., A.F. of L.

No collapse, but . . .

Among the most pointed remarks were those of Robert Gordon of Bank of America. His general opinion of business conditions today was stated flatly: “I do not feel that we are headed for a collapse.” But he also added that “business and industry, for most of the last 12 years, have been burning the candle at both ends and I sincerely believe that now is as good a time as any to stop that.” The adjustment process will bring with it business failures, and “there is a feeling that in the contracting field there could be a substantially increasing number of failures during 1954. This

could be good for the industry even though someone would get hurt in the process. It would serve to separate the men from the boys and could result in stabilization within the industry through the elimination of foolish and unsound competition as a result of eliminating those who encourage it.”

Elaborating on this view, Gordon went on: “In the contracting industry today there is the appearance of much foolishness. At least that is the feeling of many of us who lend money to the industry . . .

Examples of foolishness

“The contracting business is a hazardous business at best but there are those among you who carelessly expose themselves unduly to hazards. Some of you assume major obligations in connection with work with which you are only vaguely familiar and to perform which you are completely unprepared. Some of you obligate yourselves to perform work valued far and away beyond your ability to finance. I know one of your number, successful and considered smart, who, in order to obtain a sub-contract, engaged himself to guarantee the performance of a weak prime contractor—in other words went on his bond—only to wind up almost losing his shirt when the prime failed.

“Some of you, in connection with contracts with the Army, Navy, Air Force, the Department of the Interior and other governmental agencies, repeatedly proceed, on the verbal re-



BIG GUNS of AGC are these (from left): H. E. "Doc" Foreman, managing director; C. P. Street, 1953 president; John MacLeod, 1954 presi-

dent; George Koss, 1954 vice president; and Jim Marshall, executive director. They direct activities of more than 50 staff members.

quest of the job site supervising engineer, to perform work not covered by the contract, even though in the past you have had to spend as much as two or three years trying to get a change order which would result in your being paid for the extra work."

Resolution

(A resolution of the convention addressed this situation, noting that contractors must make protests, etc., within a very limited time, but that action by the contracting officer is not comparably bound by either law or custom. The resolution: "In order that federal projects may be completed promptly and economically, the 35th convention of The Associated General Contractors of America in Los Angeles, March 1-4, 1954, recommends that government agencies and general contractors cooperate fully in handling expeditiously any change orders or disputes that may arise in connection with their contracts.")

Heavy overhead

Gordon's observations went further in delineating instances of apparently faulty management which may contribute to contracting failures in a time of tighter competition: "I have known you to have fired construction superintendents for cause and then hire them back again to superintend jobs carrying even greater responsibility, only to have to fire them again after further costly loss. Some of you are guilty of maintaining excessive overhead, particularly in engineering staffs, for many months while waiting for jobs to break and then wind up taking work on bids so low as to allow no margin for error just to provide work for dead-head personnel. A frequent situation is where you become "equipment happy" and have to undertake unprofitable work in order to earn depreciation—or, as some of you call it, "rentals"—on the equipment you have no business owning in the first place.

"I could spend all afternoon multiplying these instances of what in the light of experience has been called "foolishness." These are among the things that make your financing difficult to obtain and that will result in your contribution to whatever business adjustments might develop."

Reclamation voice

A surprise addition to the list of convention speakers was W. A. Dexheimer, Commissioner of Reclamation, who addressed the closing general session. Dexheimer's principal theme was one of education, introduced with the statement that "I think many of you do not understand the laws under which we are required to operate." Thereafter, he did much to explain the apparent slowness with which reclamation projects characteristically move from their first inception to the bidding stage years later. Woven into this discourse were figures that speak for themselves in describing the contribution of the Bureau of Reclamation to the construction West:

Spent \$2,100,000,000

"In our 52 years of existence, we have spent a little over \$2,100,000,000. A large percentage of that has been spent in the last 8 or 9 years, so these projects are not yet returning their full share to the Treasury. In spite of that fact, we have collected and put back into the Treasury \$510,000,000, or over 25% of the total money we have spent in the last 50 years."

Western growth

In connection with planning, and particularly as a general prediction of things to come for the West, Dexheimer noted: "We expect an increase in population to something over 200,000,000, by 1975. At the rate the western part of the United States—and particularly the Pacific Coast area—has been growing, that population will largely be in the Western 17

states of the United States. That part of the country is entirely dependent on its water supply for further economic expansion . . .

"There has actually been a decrease in the amount of irrigated acreage in the United States over the past decade. Marginal land has been taken out of production. Industry and cities have grown up and taken good farming land in their expansion. Development of irrigated land in the West has actually not been fast enough to keep up with the amount of land taken out of production in other parts of the country."

Bureau engineering

Dexheimer also emphasized the "caution" that is built into Bureau operations by law. Various entirely justified legal requirements do cause some engineering costs to be high but comparison of them to estimated costs of private consultants is not warranted: "A private consulting firm, if they were to take on a job of work, would make a study, make one set of plans and specifications, would supervise construction. They could make the claim that they could do work much cheaper than any governmental body could do it. Yes, they could if they neglect to include in their prices the things that we must include. The studies that we must make, the fact we must submit all of these to all the states and local people interested, work out repayment contracts, go in and get the right-of-way. We must process our reports through the Department of the Interior, the Bureau of the Budget, all other governmental agencies interested, and eventually to the Congress and present it in hearings before both the House and the Senate before we know whether we have a project or not. Once we get it authorized, we go through pretty much the same procedure to get money appropriated to build it. These things, of course, are not included in a private consulting

Two Good Ideas:

1

A movable steel form to take the place of trench piling.

2

A MARION 362 for dependable cost-cutting excavation work.



Haddad Construction Company of Columbus puts two good ideas to work on its sewer projects.

One is a movable steel form which prevents cave-ins while pipe is laid. Its variable width makes it adaptable to various sewer jobs. The backhoe pulls it forward like a sled as pipe is laid.

Its other good idea is the selection of a MARION 362 Backhoe to handle the excavating. Dependability, accurate and easy-operated air control, reserve power and maneuverability are some of the 362 features that please Said S. Haddad, president. The 1-3/4 cu. yd. bucket moves plenty of dirt and the 362's range handles deepest trenches with ease.

Let your nearest MARION representative show you what a versatile 362 can do on your jobs.

The need for protective piling is eliminated by the fabricated steel form shown in the foreground. Width of form can be varied as needed. The form is pulled along in the trench like a sled by the MARION 362, providing positive protection while pipe is lowered and fitted.

MARION POWER SHOVEL COMPANY — MARION, OHIO

REPRESENTED BY:

Marion Power Shovel Company.....571 Howard Street, San Francisco 5, California
 Star Machinery Company.....241 Lander St., Seattle, Washington
 M & F Equipment Company.....824 North Arno St., Albuquerque, New Mexico
 Marion Power Shovel Company.....3133 N.E. 87th Place, Portland, Oregon
 Haupert Tractor Co.....Medford, Oregon

C. H. Grant Company...P. O. Box 74, Bay Shore Station, Oakland 23, California
 Star Machinery Company.....E. 415 Sprague Avenue, Spokane 8, Washington
 Marion Power Shovel Company.....1017 N. 22nd Avenue, Phoenix, Arizona
 Rasmussen Equipment & Supply Co.....1960 So. Second W., Salt Lake City, Utah

engineer's bid. I think we can compete with the best of them if we are talking about the same amount of work."

A current example of Reclamation planning has been much in the news this year; the fact that the news is being made well in advance of any construction contractual commitments attests to the scrupulous manner of USBR operations. Echo Park Dam, proposed for construction in the Dinosaur National Monument, is part of the Upper Colorado River Storage Project. (Eventual adoption of this or some similar project, incidentally, was implied by the 1922 Colorado River Compact. Now, 32 years later, it remains only in the planning stage.)

Evaporation loss

Speaking of Echo Park Dam, Dexheimer stated, "We have chosen the Echo Park site for a storage dam after study of hundreds of sites, and comparison of the costs and other things. The difference is simply that Echo Park is in a canyon 1,500 to 2,000 feet deep . . . The reason we chose that deep canyon, shaded and protected from the wind at a reasonably high altitude, over alternative sites, is a saving of about 300,000 acre feet of water in evaporation each year . . .

Call for support

"You might be interested in the development of the West and particularly in the construction. The Upper Colorado Storage Project which we propose to Congress will cost a little over \$1,000,000,000. The first jobs that we would like to get started are Glen Canyon and Echo Park dams, plus 11 participating irrigation projects for utilizing the water that is stored."

Strongest plea

At this point Dexheimer made his strongest plea, which in itself is treated on page 47 of this issue. Echo Park is largely in the hands of Congress, Dexheimer pointed out, saying "You might be interested in talking to the local people or to your congressmen if you feel that it is in the best interests of the country to go ahead with a development of that type." Noting the devastation of resources and of peoples that has occurred in other parts of the world by adherence to a resources policy of conservation by neglect, Dexheimer concluded "We must think in terms of preserving our resources in the best possible way so that they will be available for future generations. I think it is good business from a financial standpoint. As citizens interested in your country, I believe you should give some thought to proper use of our resources."

Predictions for construction activity were released by AGC at the convention after review of a survey conducted among chapters and directors.



NEW CHAIRMAN of the AGC secretaries' and managers' Council is A. H. Harding (right) of the Portland Chapter, taking the gavel from Robert Patten, 1953 chairman.

Competition for contracts is the subject of most universal interest, even though the construction year will only slightly miss the 1953 mark. Among types of construction, highway work is at record levels, building construction continues to rise slightly, and heavy engineering projects have dropped off.

Highway work best

Contractor capacity is at a new high, adding to competition as contractors cross state and regional lines and explore new fields of work. In the West heavy construction volume will remain stable only in the mountain states, and will bring about more competition there. Building work may decline some in the southwestern states, remaining approximately unchanged or advancing a little in other parts of the Western region. Highways are a point for special emphasis in the West, where the biggest year in history is getting under way.

New directors

Elections of AGC national directors, also announced at the convention, included the names of the following Westerners for Districts 1, 2 and 3: Fred Birch, S. Birch & Sons Construction Co., Great Falls, Mont.; James W. Cawdrey, Cawdrey & Vemo, Seattle, Wash.; D. L. Cheney, S. Birch & Sons Construction Co., Seattle; W. Ray Rogers, Rogers Construction Co., and Fred H. Slate, Fred H. Slate Co., both of Portland, Ore.; J. A. Thompson, J. A. Thompson & Son, Inglewood, Calif.; E. J. Maupin,

Jr., Dodge Construction Co., Fallon, Nevada; Marshall J. Wylie, Wylie Bros. Contracting Co., Cheyenne, Wyo.

The 6-day convention included 4 days marked by general and division sessions, with a preceding week-end devoted to meetings of committees and of the secretaries' and managers' council. The non-business side of things included a complete schedule of ladies' activities, plus "a day at the races" at Santa Anita, a golf tournament, and a dinner dance that took over the Hollywood Palladium on the final evening, March 4.

The social side

Gestures of companies working closely with the construction industry included a "Welcome Night" cocktail party preceding the first day of general sessions. This was sponsored by 36 underwriting companies and 15 brokers of the surety industry. During the convention itself, evening open houses were maintained by Caterpillar Tractor Co., International Harvester Co., and others.

Behind the scenes

Convention sponsors included the San Diego, Southern California, Central California, and Northern California chapters, with R. A. Smith and Spencer Webb as co-chairmen of the general convention committee. The Southern California Chapter was the official host, represented on the general committee by Donald E. Reed and W. D. Shaw, in addition to Webb. Officers of the chapter include W. E. Irish, president; Harvey W. Kruse, J. V. Quinn, and Carl H. Wittenberg, vice presidents; Spencer Webb, treasurer; and W. D. Shaw, manager.

FORD PLANT DRAINAGE

... Continued from page 68

pressure steel water line of the San Francisco Hetch-Hetchy water system. This line crosses under the new classification yard. The conduit will provide for future duplication of the present water line with no interference to yard operations. The conduit was installed by open trenching before building the yard over it and the water line.

The work is being pushed to the limit, and the railway yard will be ready for use well before the Ford plant goes into operation. The entire project is another significant step in the expanding industrial development taking place along Western Pacific lines. E. P. Peterson, Assistant Chief Engineer of the railroad, was in general charge of the work. C. A. Gerstner was Field Engineer. The contractor was McGuire & Hester of Oakland. The Construction Department of Armo Drainage & Metal Products, Inc., erected the Multi-Plate structures.

ARIZONA

SAN MANUEL HOMES — More than 500 of the first 1,000 houses at San Manuel have been completed and the village will have 16 business quarters occupied by April 1, according to the Del E. Webb Co., which has the contract for building up the mining town in the desert. Webb has about 750 workmen on the job, which consists of building a complete town, including 2,000 homes and many business buildings.

THE ARIZONA SENATE is considering a state construction program totaling almost \$6,000,000. Projects involved include \$1,862,650 to the University of Arizona for construction and remodeling of buildings, \$2,200,000 for Arizona State College at

Tempe for construction of new buildings and other improvements, \$958,850 for construction of new buildings and remodeling at Arizona State College at Flagstaff, \$340,000 to build new structures at the Children's Colony, and \$475,000 to raise new buildings and renovate old buildings at the state hospital.

AN 80-ACRE TRACT has been acquired by John C. Hall for some \$3,000,000. He intends to erect 360 houses, in the \$8,000 to \$9,000 price bracket, on the Phoenix tract.

PRELIMINARY PLANS for a proposed \$400,000 fine arts and museum building to be erected in Phoenix's civic center are being prepared by Alden Dow, the architect who designed the public library building erected in 1952. A scale model of the proposed civic center is on display in

the library building. Bulk of the money for the proposed building must come from private sources but civic leaders are hoping that the city will help supply construction funds.

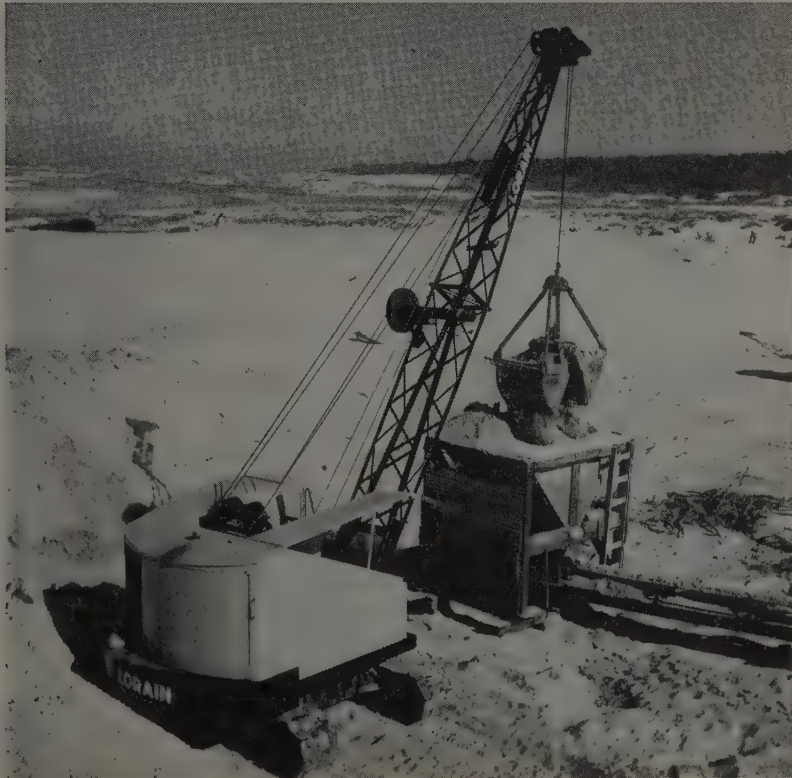
NATIONAL GUARD ARMORIES in Tempe, Glendale, and Globe-Miami are scheduled to be built shortly at an estimated cost of \$225,000 for the three buildings. Each will be of brick masonry construction with concrete floors and roofs carried on steel trusses, and each will measure 71 x 91 ft.

PHOENIX SUBDIVISION—Ralph Staggs Construction Co. has taken out permits to build 80 houses in a subdivision northeast of Phoenix at a cost of approximately \$720,000.

RECENT MAJOR CONTRACT AWARDS and low bids in Arizona include a low bid of \$517,610 for 9.6 mi. of roadway widening near Globe on U. S. 60 submitted by Arizona Sand & Rock Co. of Phoenix. Completion date is October 31, 1954. R. W. Evans of Winslow submitted a \$118,300 low bid for 6.4 mi. of grading and paving on the Superior-Winkelman Highway near Big Wash. United Contractors, Inc., of Phoenix was low with \$245,715 for 4.2 mi. of grading and draining near Prescott. Completion date is August 15, 1954. J. R. Porter Construction Co. of Phoenix received a \$813,820 award for construction of high school buildings in Phoenix. Lyle Price of Flagstaff submitted a \$355,340 low bid for 3.4 mi. of highway grading and draining north of Phoenix. James Stewart Co. of Dallas, Tex., submitted a low bid of \$2,740,000 for construction of a 10-story bank building in Phoenix.

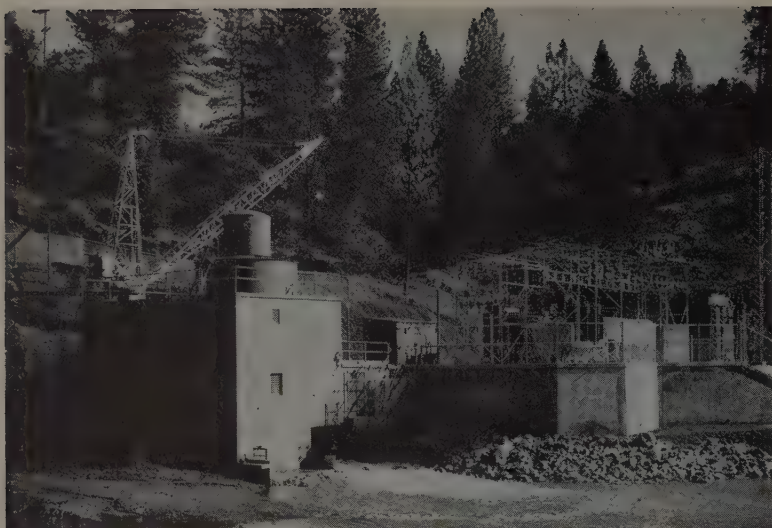
LOADING SAND AT MONTEREY

It takes a lot of lifting to load out 3,000,000 cu. yd. of sand for the Pacific Grove Sand Division of Del Monte properties on California's Monterey Peninsula. Doing the work is a ¾-yd. Lorain crane with Owens clamshell bucket.



CALIFORNIA

FEATHER RIVER STUDY—The state legislature is considering appropriating an additional \$677,000 for continuing studies of the proposed Feather River Project. This includes a plan to build a dam on the Feather River in Butte County and a series of canals and a tunnel through the Tehachapi Mountains to move water from the river as far south as San Diego. Estimated cost of the entire project is \$1,270,387,000. Up to now, the state has spent about \$1,500,000



NEW MURPHYS POWERHOUSE REPLACES OLD PLANT

THIS IS Pacific Gas & Electric Co.'s new Murphys Powerhouse, built at a cost of \$1,335,000 to replace the old plant which had churned out power since 1899. (*Western Construction*—March 1954, p. 52.)

on planning the project. T. B. Waddell, assistant state engineer, described the plans to an assembly subcommittee and reported that the additional funds would be enough to complete the study.

A NEW FREEWAY, 17½ mi. long, between the industrial section of downtown Los Angeles and eastern Los Angeles County is being considered by the California Highway Commission. The proposed freeway, which would be built with six lanes, will lie several miles south of the Ramona Freeway.

STOCKTON CHANNEL—The sum of \$1,000,000 is being sought by California congressmen for construction of a Sacramento River deep-water channel which would cut 6 mi. from the 88-mi. route between Stockton and San Francisco Bay.

U. S. 80 RELOCATION—The State Highway Commission has voted to relocate U. S. 80 in two areas of San Diego County and one in Imperial Valley. A 6.9-mi. section will bypass northeastern San Diego. Cost of this project is estimated at \$7,814,000. The Imperial Valley relocation involves carrying the highway around the Holtville business district.

FLOOD CONTROL PROJECTS are scheduled to be constructed at the rate of \$1,000,000 per year for the next 5 years in the Calleguas watershed in the Santa Susana Mountains by engineers of the Soil Conservation Service. A federal survey revealed that this watershed was being damaged at the rate of \$580,000 a year on the average. Soil conservation projects include re-

channeling of creeks and building of bridges, check dams, diversion ditches, culverts, and dikes.

SAN DIEGO PROJECT—Del E. Webb and Aldon Construction companies are engaged in building a subdivision in the suburbs of San Diego. The work will involve \$30,000,000 in home building and a \$5,000,000 shopping center. In addition, a junior high school and two churches are under construction and six more churches are being planned for the area. Construction of 2,500 homes in the subdivision is expected to start by May 1.

PARALLEL PIPELINE—The Pacific Gas & Electric Co. has started work on a 107-mi. section of a 34-in. natural gas pipeline paralleling its "Super Inch" line to Milpitas. This section will go for 80 mi. across the desert from Newberry to Danby and then move into the hills near Hollister for the final 27 mi.

WATER STORAGE PLANS—Bureau of Reclamation engineers John Hamilton and John Morgan have submitted a four-part preliminary plan for water storage in the Ventura River watershed to local water authorities. The plan includes construction of Casitas Dam for \$17,000,000, a \$1,500,000 diversion dam, a \$9,000,000 conduit system, and a \$4,000,000 distribution system. The new system would be tied in with the existing Matilija Dam and reservoir.

SANTA MARIA FREEWAY—A \$7,000,000 freeway which will go around Santa Maria to the east has been recommended to the State Division of Highways, according to dis-



Neil B. McGinnis Company, Inc.
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Casa Grande, Arizona

San Joaquin Tractor Company
Bakersfield, California

Shaw Sales & Service Company
Los Angeles 22, California
San Diego, California

Buran Equipment Company
Oakland, California
Santa Clara, California

Moore Equipment Company, Inc.
North Sacramento, California
Redding, California
Reno, Nevada
Stockton, California
Fresno, California

Aikins Tractor Co.
56 West Fifth Street
Eureka, California
Willits, California

A-D Machinery Company
Elko, Nevada

Power Equipment Company
Denver, Colorado

Southern Idaho Equipment Company
Idaho Falls, Idaho
Boise, Idaho
Twin Falls, Idaho

Seitz Machinery Company, Inc.
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Gate Equipment Company, Inc.
Salt Lake City, Utah

A. H. Cox & Company
Seattle, Washington
Wenatchee, Washington

Yukon Equipment, Inc.
Seattle, Washington
Fairbanks, Alaska
Anchorage, Alaska

American Machine Co.
Spokane, Washington

Studer Tractor & Equipment Co.
Casper, Wyoming

trict engineer E. J. L. Peterson. The new construction would include four lanes of traffic over a distance of 9.4 mi., as well as two new bridges across the Santa Maria River.

CENTRAL VALLEY PROJECT—There's been a lot of talk recently about the possibility of the State of California buying the Central Valley Project from the federal government. So far, nothing concrete on the purchase has resulted, and a lot of opposition has developed. Among the varied groups and individuals opposing the purchase are Richard Graves, Democratic candidate for governor; Lt. Governor Harold J. Powers; the Stanislaus County Ponoma Grange, and a Redding Chamber of Commerce committee.

Other recent developments include approval by the Sacramento Municipal Utility District directors of a contract calling for the purchase of SMUD power requirements from the project, beginning July 1. The contract had previously been approved by Douglas McKay, Secretary of the Interior.

Congress, meanwhile, has been asked for planning funds for the construction of flood control and water

conservation projects in the central valleys watershed at a cost of almost \$100,000,000. The group has also requested additional funds for Corps of Engineers projects already under construction, including \$18,000,000 for Folsom Dam, \$2,000,000 for Cherry Valley Dam, \$5,000,000 for the Sacramento River, and \$320,000 for the Merced County Stream Group.

Still other Central Valley Project news includes a report from Irvin M. Ingerson, principal hydraulic engineer of the California Water Project Authority, of the start of a trial distribution operation on the Sacramento River which will reveal how much project water is being diverted along the river. Clyde H. Spencer, Sacramento regional director of the Bureau of Reclamation, reported that the 1953 operation of the project has returned \$5,500,000 to the U. S. Treasury from the sale of 1,000,000 acre feet of water and 2,245,000,000 kw. of electrical energy.

HIGHWAY COSTS CONSTANT—The California Highway Construction Cost Index had a maximum spread of only 1.6 points during the year of 1953, according to a report prepared by Richard H. Wilson, as-

sistant state highway engineer; H. C. McCarty, office engineer, and John D. Gallagher, assistant office engineer. This cost index has been tabulated every year since 1940. The overall figures indicate that the average unit prices of roadway excavation, untreated rock base, plant-mix surfacing, and asphalt concrete have declined slightly and the unit prices of portland cement concrete pavement, structural concrete, bar reinforcing steel, and structural steel have increased slightly. However, the writers said, the predominating factor at this time in holding overall construction costs to a level and preventing increases is the factor of strong competition among bidders.

ARCADIA'S WATER WORKS—Arcadia's Municipal Water Department is considering improvements in its water-handling facilities to cost more than \$1,000,000 over the next several years. The most expensive part of the program, estimated to cost about \$760,000, involves replacement and addition of steel water mains and cement lining, as well as an allowance for drilling and equipping two additional wells.

MCCLOUD RIVER PROJECTS—Pacific Gas & Electric Co. has announced plans to develop power generation capacity of 233,000 kw. at McCloud Powerhouse and the McCloud-Pit Powerhouse in Siskiyou and Shasta counties at a cost of \$89,000,000. The comprehensive plan, applied for from the Federal Power Commission, includes construction of 8 dams, 5 tunnels totaling 17½ mi. in length, and 2 powerhouses. Details of the plan, to be carried out in two stages, include construction of a 225-ft.-high concrete gravity diversion dam, a 40,500-ft.-long pressure tunnel, and a small timber crib dam, and a 175-ft.-high earthfill dam across Iron Canyon Creek, and a 17,200-ft. pressure tunnel during the first stage.

NEXT YEAR'S WORK has been started by the State Highway Department already. Bids were opened recently on the first eight projects from the 1954-1955 state highway budget. Although the fiscal year will not begin until July 1, state law provides that contracts can be awarded as early as April 1 so that full advantage may be taken of favorable construction weather. The budget, set at \$145,387,000, provides \$1,350,000 for grading and paving on 6.6 mi. of U. S. 101 between Paso Robles and San Miguel. The other seven projects include 2.3 mi. of grading and surfacing on Route 88 near Ione, surfacing 12.8 mi. of Route 33 near Taft, widening and surfacing 2.3 mi. of Route 37 in Marin County, surfacing 0.6 mi. of U. S. 101 in Pismo Beach, surfacing 5.6 mi. of U. S. 101 near Redwood City, building a reinforced concrete girder bridge

Cahill builds new brewery

NEW CONSTRUCTION by Hamm's Brewing Co., on the old site of the Rainier Brewing Co. in San Francisco, started in October 1953. The new brewery will cover 3½ city blocks.

Cahill Brothers are doing the construction as general contractors. This job is unusual in its physical layout because new construction and alterations are going on at the same time.

In charge of this project is William K. Ingram, superintendent. His staff includes George B. Durham, office manager; Art Carson, general foreman of the Borsari Cellars; John S. McMillen, general foreman in charge of the Main Brew House; Louis Kirk, general foreman in the Main Brew House; Nick Rudometkin, general foreman of the new Bottle House; L. T. Ayers, millwright foreman; and Andy Biffico, surveyor.

Subcontractors are Buzzell Electric, J. A. Nelson, G. W. Thomas Drayage and Rigging Co., Herrick Iron Works, Bethlehem Pacific Coast Steel Co., Judson Pacific-Murphy Steel Co., Kern & Sons Iron Works, Clementina Co., Ltd., Fred Meiswinkle (plastering), Harry Drake (brick and tile), Rigney Tile Co., Rainey & Sons (tile and masonry), Western Fibrous Glass (insulation), Armstrong Cork Co., Dutton Asbestos Co., Duffy Tile Co., Fair Manufacturing Co., Raphael Co. (painting) and Devencenzi Bros. (excavating).

TOWERING 200 ft. above San Francisco is this hoist tower with 2,000-lb. capacity boom which raises concrete to working levels. In addition, 28,500 lin. ft. of Tubelox steel scaffolding rises 160 ft. from ground level to support the workmen on the job. The scaffolding around the smokestack rises another 160 ft. above the structure of the main building.



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A truly “balanced” oil, Shell Rotella also has highly effective detergent-dispersant and anti-oxidant properties. These enable Shell Rotella Oil to provide unsurpassed engine cleanliness.

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across Clover Creek on Route 44 near Millville, and surfacing 5.6 mi. of U. S. 101 near Cloverdale in Sonoma County.

TUNNEL TRANSPOSITION — It would cost \$1,179,600 to make a public highway out of the mile-long railroad tunnel extending from Glendale Blvd. to the subway terminal in Los Angeles, according to the City Public Utilities and Transportation Commission. It would cost \$3,815,000 to rehabilitate the terminal and tunnel for rail operations and \$1,823,900 to convert it for trolley-bus use. The Metropolitan Coach Lines has proposed complete abandonment of the terminal if it can substitute buses for the streetcar lines which use the terminal now.

STONE CANYON RESERVOIRS — At the same time water was turned into the new \$2,600,000 Upper Stone Canyon Reservoir in the Santa Monica Mountains by the Los Angeles Dept. of Water & Power, announcement was made that a \$4,000,000 project to improve and enlarge Lower Stone Canyon Reservoir has been authorized by the Board of Water & Power Commissioners upon the recommendation of Samuel B. Morris, general manager and chief engineer. The work, which will be advertised for bid around October 1, includes increasing the present 120-ft. depth by 18 ft. and raising the capacity by 2,000 acre feet to a new total of 10,000 acre feet.

POE PROJECT ACCESS — Construction has begun on access roads to the proposed site of the Pacific Gas & Electric Company's \$40,500,000 Poe hydroelectric project on the Feather River in Butte County. The actual start of the project itself, however, must wait until the company receives the go-ahead signal from the Federal Power Commission.

VAQUERO DAM — The House of Representatives has passed a bill authorizing construction of Vaquero Dam on the Cuyama River near Santa Maria at a cost of \$16,982,000. This Bureau of Reclamation project would involve construction of a 184-ft.-high earthfill dam as part of an overall plan for water conservation and flood control in the Santa Maria Basin.

A MODERN, \$2,500,000 power plant, built to operate by push-button controls 10 mi. away, is in full operation on the All-American Canal about 35 mi. east of El Centro. The plant, part of a \$12,500,000 power development program, has two generators capable of producing about 60,000,000 kw-hr a year.

HIGHWAY GARAGE FIRE — A fire which swept through a State Division of Highways garage and



LOADING OUT LAVA

A Cat shovel is used by V. V. Coleman to load out red lava rock as well as other rock, sand, and gravel in this Lower Lake, Calif., rock pit.

workshop in Sacramento early in March was estimated to have caused between \$200,000 and \$400,000 worth of damage. The building contained an equipment garage, workshops, and the testing and materials laboratory.

GROUND HAS BEEN BROKEN in Long Beach for a \$3,000,000 plant to be built for the Robertshaw-Fulton Controls Co. The contractors are Lindgren & Swinerton, Inc., of Los Angeles.

WALDO TUNNEL — The first bore on the new Waldo tunnel was "holed through" 35 work days after the job started. The preliminary construction story of this job was described in *Western Construction*—February 1954, pp. 49-51.

WORLD'S LARGEST Mormon Temple is being erected in Los Angeles at a cost of \$4,000,000. The tower will rise 244 ft. into the sky, making it second only to the City Hall as the tallest structure in the city. Construction on the building, designed by Edward O. Anderson, started in September 1951. Completion is scheduled for July 1955.

RECENT MAJOR CONTRACT AWARDS and low bids in California include a low bid of \$982,965 from Gordon H. Ball and San Ramon Valley Land Co. of Berkeley for 6.6 mi. of grading and paving near Paso Robles. Connolly-Pacific Co. of Long Beach was awarded a \$1,769,350 contract for jetty construction at Alamitos Bay small yacht harbor. Griffith Co. of Los Angeles submitted a \$160,540 low bid for 12.8 mi. of surfacing on State 33 near Taft. C. V. Kenworthy of Stockton was low with \$154,810 for 2.3 mi. of grading and paving near Ione.

MacDonald, Young & Nelson, Inc., and Morrison-Knudsen Co., Inc., of San Francisco were awarded a \$4,-

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Great Falls — Hall-Perry Machinery Co.

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Austin — Central Texas Equipment Co.
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Spokane — Andrews Equipment Service of Washington, Inc.

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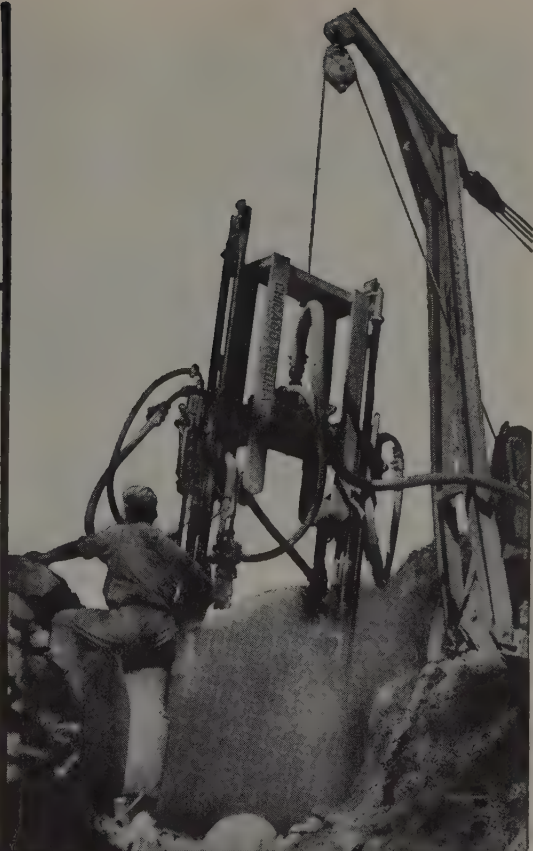
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EARTHMOVING RIGS IN ACTION ON THE SAN GABRIEL RIVER

Pushers stand by waiting for single-engine rigs while double-engine machines, each powered by two GM diesel engines, scoop up dirt on a flood control project along the San Gabriel River in Southern California. Contractor Bert C. Altfillisch of Los Angeles had almost 1,500,000 cu. yd. of dirt to move. The double-engine rigs moved up to 23 cu. yd. per trip.

194,460 contract for revision of the Oakland Approach to the San Francisco-Oakland Bay Bridge (*Western Construction*—March 1954, p. 66). Arthur B. Siri, Inc., of Santa Rosa submitted a low bid of \$155,290 for 5.6 mi. of rock base and surfacing near Cloverdale. Vinnell Company, Inc., of Alhambra received a \$2,632,700 award for construction of pipelines for the Metropolitan Water District. Baun Construction Co. of Fresno was awarded a \$212,860 contract for 4.9 mi. of grading and surfacing near Watsonville. S. A. Cummings of Compton received a \$464,500 award for 3 mi. of grading and surfacing in Orange County.

R. R. Hensler of Sun Valley received a \$654,415 contract award for 2.4 mi. of grading and surfacing and erection of two bridges in Fillmore. Peter Kiewit Sons' Co. of Arcadia and Fred J. Early, Jr., Co., Inc., submitted a \$317,750 low bid for construction of a settling basin near Mariposa. Lindgren & Swinerton, Inc., of Los Angeles hold a \$3,000,000 contract for erection of an industrial plant in Long Beach. Lord & Bishop of Sacramento submitted a \$292,770 low bid for construction of a structural steel swing-span bridge across the Mokelumne River at Miller's Ferry.

North H. Plunkett & Co. of Long Beach submitted a low bid of \$664,585 for a reinforced concrete conduit in Aliso Creek. Selby Drilling Corp. of Los Angeles submitted a \$294,600 low bid for drilling and grouting the foundation through the embankment at Folsom Reservoir. Winston Bros. Co. of Monrovia submitted a low bid of \$3,385,435 for construction of a 3,850-ft.-long by 160-ft.-high earth embankment and outlet at San Antonio Dam.

COLORADO

DENVER DAM—The final pouring season at Denver's Dam 22 in South Boulder Creek Canyon will start around April 15. The \$12,000,000 structure, which will rise 390 ft. from bedrock, will be the biggest concrete structure in Colorado. It will take another 355,000 cu. yd., making a total of 600,000 yd. of concrete, to complete the dam, according to Fred D. Hudkins, the job superintendent. Hudkins said that the job payroll will reach a maximum of 425 men at the height of the summer pouring season. He added that the dam would be ready to catch the entire spring runoff in 1955.

THE AMERICAN CONCRETE INSTITUTE celebrated its 50th anniversary with a meeting late in February in Denver. W. A. Dexheimer, Commissioner of Reclamation; Rear Admiral Joseph F. Jelley, Director of Construction for the Department of Defense; Norman P. Mason, Chairman of the Construction and Civic Development Department Committee of the U. S. Chamber of Commerce, and Major General Samuel D. Sturgis, Jr., U. S. Army Chief of Engineers, were scheduled speakers at the Institute.

TOLL TUNNEL—A bill authorizing a \$16,000,000 toll tunnel under the Continental Divide has been passed by both houses of the Colorado legislature and signed by Governor Dan Thornton. This bill permits the State Highway Commission to issue bonds for building a tunnel under the Rocky

Mountains for winter highway travel. Possible sites were discussed in *Western Construction*—March 1954, p. 74.

EXPANSION PLANS for Colorado A&M College demand the expenditure of \$16,000,000 by 1970 if the college is to meet its fast growing needs, according to W. E. Morgan, president. Construction program would include various new academic buildings, and an auditorium, an amphitheater, additional dormitories, new road construction on the campus, and improved facilities for eight branch stations of the college's experiment stations scattered over the state.

ARVADA SUBDIVISION—A new \$4,000,000 housing development on a 70-ac. tract of land in Arvada has been started by Hoskinson Brothers Co. The subdivision will contain 274 brick homes with two, three, and four bedrooms, ranging in price from \$13,000 to \$15,000.

PINON CANYON DAM — Construction has started on Pinon Canyon flood control dam near Trinidad.

REPLACEMENT of the 25-year-old Stapleton Airfield Administration Building has begun. Demolition of the old structure and erection of the new one will cost \$530,000. The F. R. Orr Construction Co. is doing the work, which is scheduled for completion in February 1955.

DENVER will spend \$1,425,000 on street improvements during 1954, according to Charles B. Berry, director of public works. Program includes paving and sealcoating 60 mi. of city streets, resurfacing and repairing via-

ducts, repairing curbs, culverts, alleys and gutters, and clearing channels of the South Platte and Cherry rivers.

FLATIRON NO. 3—Flatiron No. 3, final unit of the Flatiron Power and Pumping Plant near Loveland, is one of the last units of the Colorado-Big Thompson diversion project to be dedicated to use. The entire project, which cost \$160,000,000, provides irrigation, power, and recreational facilities for part of northern Colorado. Main feature of the project is the Alva B. Adams tunnel, which carries Western Slope water from Grand Lake 13 mi. through the Continental Divide to Estes Park.

RECENT MAJOR CONTRACT AWARDS and low bids in Colorado include a \$4,000,000 housing development on a 70-ac. tract in Arvada being built by Hoskinson Bros. Construction Co. of Denver.

IDAHO

A HIGHWAY NEEDS STUDY of all roads in the state is being planned by Idaho highway officials, according to Joseph C. Parker, Latah County highway commissioner. A plan is needed to develop a sound appraisal of highway transport needs as well as an estimate of the cost of improving these roads to adequate standards, he said.

THE ATOMIC ENERGY COMMISSION has called for bids for construction of \$2,500,000 worth of buildings and service facilities in the initial engine test area of the National Reactor Testing Station. Utah Construction Co. is already at work on a previous \$4,600,000 contract for construction of an assembly, maintenance, and administrative area.

ARRIVAL OF SPRING is being awaited before work can start on a 7½-mi. section of the Mohler-Nezperce road, cost \$595,000, and a 2½-mi. section of the Fenn East road, cost \$270,000. A Goff Bridge-Lucile road section of 7.8 mi., cost \$621,000, is scheduled for completion on September 15.

DITCH PUMPING PLAN—Residents of South Boise are considering a proposal to form an irrigation district for piping the Mill ditch to eliminate open-ditch hazards. Project would cost approximately \$250,000, according to John L. Hoffman, consulting engineer.

MOUNTAIN HOME AIR BASE—A \$25,000,000 construction program, including new barracks, longer and stronger runways, permanent warehouses, and a \$5,000,000 housing proj-

ect, is under way at Mountain Home Air Base. Plans include construction of a swimming pool, golf course, and grade school.

SALMON RIVER BRIDGE—The new \$32,000 bridge over the Salmon River at Pine Creek has been opened to traffic.

RECENT MAJOR CONTRACT AWARDS and low bids in Idaho include an award of a \$439,555 contract to Jack B. Parson Construction Co. of Smithfield for 21 mi. of grading and paving in Cassia County. Completion date is October 1, 1954. Neilson & Smith of Twin Falls received a \$498,800 award for building 1½ mi. of roadway and four concrete structures and surfacing U. S. 20 in Canyon County. Completion date is October 1, 1954. Sather & Sons of Yardley, Wash., received a \$411,925 award for 1.8 mi. of roadway and plant-mix surfacing in Latah County. Goodfellow Bros., Inc., of Wenatchee, Wash., received a \$445,550 award for 3.2 mi. of grading and surfacing in Shoshone County. Completion date is 200 working days after February 15, 1954.

MONTANA

YELLOWTAIL DAM—The multipurpose, \$100,000,000 Yellowtail Dam on the Big Horn River in Montana is fully authorized and construction may proceed when money is available, according to a ruling by a Department of Interior lawyer. The pro-

posed dam is part of the integrated Missouri River Basin Project, authorized by Congress in 1944. It is intended to provide irrigation, flood control, power generation, silt retention, improvement of fish and wildlife resources, recreation, and water supplies. Opposition had developed previously because some of the reservoir area would lie within the Crow Indian Reservation and it was felt that the construction work would affect the Indians' irrigation district.

MONTANA BRIDGES—Two interesting bridge projects are now under way in Montana (*Western Construction*—March 1954, p. 80). One is a 689.6-ft. bridge over the Missouri River near Toston. Work started February 1 on the \$375,749 project, which consists of the construction of a new, built-up, steel girder bridge to replace the present narrow steel through truss. It is made up of two 3-span continuous units with 19-ft. tower span and bents. The piers are T-type with a cylindrical section 8 ft., 6 in. in diameter. The roadway width is 28 ft. clear. Plans were prepared under the supervision of Albert W. Jones, bridge engineer, and Jack R. Beckert, assistant bridge engineer. Claude A. Martin, assistant bridge engineer, is supervising construction and Max H. Anderson is project engineer. W. P. Roscoe Co. of Billings is the contractor. It is interesting to note that the Roscoe Co. also built the present Toston bridge in 1920.

Also under construction near Toston is a 385½-ft. bridge over the Northern Pacific Railway. This job, which has not yet started, was

SKULLCRACKER KNOCKS DOWN OLD DENVER BUILDING

Clearing the way for a new \$3,000,000 public library building in Denver is a Lorain Moto-Crane, Model MC-254, with a 2,040-lb. skullcracker on the 60-ft. crane boom. The Barnett Co. of Denver is doing the wrecking job.





STRUCTURE OF WORLD'S FIRST ATOM-BOMB PROOF BUILDING

Construction is under way in Denver on the \$2,000,000 National Farmers Union headquarters, a 13-story structure.

awarded to F. L. Flynn & Co. of Billings for \$149,941. Work to be done includes construction of a 7-span structure. Two approach spans on the south end and three on the north end are concrete T-beams ranging in length from 40 ft., 9 in., to 51 ft., 6 in. The two main spans over the tracks are steel-plate girder spans, each 77 ft., 3 in. long. The structure is to be built on a 4-deg. horizontal curve and a 1,000-ft. vertical curve. Bents are set on radial lines with the exception of the straddle bent over the railroad tracks, which is set on a line 14 deg., 22 min. off from the radial line. Roadway width is 28 ft. The same state highway personnel are in charge as were listed on the previous bridge project above.

LIBBY DAM NEWS—A representative of the Corps of Engineers has reported to a senatorial committee that a new site, about 15 mi. upstream from Libby, has been virtually settled on for the proposed Libby Dam. Meanwhile British Columbia officials are seeking a quick settlement of international problems now delaying construction of the dam, which would back water into British Columbia.

POWER AND TELEPHONE lines are being constructed in both directions from Superior by the Montana Power Co.

HUNGRY HORSE DAM is now virtually complete. The last major contract, a \$1,860,000 job to erect the switchyard, install the turbines, and finish features in the powerhouse and dam, is done. Prime contract on the dam, a \$47,850,000 award to General-Shea-Morrison, was finished last July 18. First power was generated October 1, 1952. Heavy snow in the Flathead River's south fork drainage area indicates that the reservoir will fill to its capacity of 3,500,000 acre-feet this summer.

RECENT MAJOR CONTRACT AWARDS and low bids in Montana include a \$1,430,427 award to Hagstrom Construction Co. of St. Paul for construction of a 76-bed hospital at Great Falls air force base. Riedesel Construcion Co. of Billings received a \$1,473,930 award for the new Helena High School. This building will be a five-wing, two-story concrete and masonry structure with glue laminated joists, posts and beams specified.

NEVADA

LOTS OF EXCITEMENT was generated recently on the Nevada-California state line when U. S. 40 was blocked by rock and dirt slides. A big mass of granite slabs hung over the side of the road and all efforts of the state engineers and men and heavy equipment of the Isbell Construction Co., hired to clear the slide, were unavailing. Each time it appeared that a lane would be cleared, rain or snow would loosen more rocks and bury the road deeper. Finally the Nevada National Guard was called out to shoot the rocks down. Hundreds of rounds of .50 caliber machine gun ammunition were fired but proved ineffectual. Then armor-piercing bazooka ammunition was tried with the same result. The Army would not let the Guardsmen use high-explosive warheads, however, because it was reported to be too dangerous. So 11-lb. practice rockets, armed only with a hollow steel warhead, were used. They made a lot of noise, but only bounced off the granite boulders and the noise of the firing dislodged more rocks than the rockets did. Then Nevada highway engineers set off three boxes of dynamite, but it didn't do any good either. So the construction men went back to power shovels, dump trucks, bulldozers, crowbars,

picks and shovels. After more than 35,000 tons of debris had been carted away and a deflector wall of boulders had been built to keep falling rock from bouncing into passing cars and trucks, the road was opened to limited traffic.

NEW UNIVERSITY BUILDING—Architects have begun work on preparation of plans for a new \$400,000 student union building at the University of Nevada.

TRUCKEE RIVER DEVELOPMENT—Bureau of Reclamation engineers have reported on a proposed \$42,000,000 development of the Truckee and Carson rivers. Plans include the construction of a dam and reservoir at Stampede on the Little Truckee River with a tunnel from there to a point near the California-Nevada border on the Truckee River. This 5½-mi.-long tunnel would deliver water to a proposed power plant capable of producing 20,000 kw. annually. Other structures proposed by the plan include the Watasheamu Dam and Power Plant on the Carson River and drainage of the Truckee Meadows area and Carson Valley.

SNOW SURVEY—Snow survey officials have reported that above normal snowfall is needed during the late spring if Nevada water supplies are to reach a normal level this year.

SPARKS SEWERS—Construction has begun on the \$500,000 Sparks sewage disposal system.

RECENT MAJOR CONTRACT AWARDS and low bids in Nevada include an award of \$1,191,335 to Morrison-Knudsen Co., Inc., of Boise, Idaho, for 6.4 mi. of grading and paving of Highway 40 located 3 mi. east of Sparks.

NEW MEXICO

DIABLO DAM—Preliminary work on a second major dam on the Rio Grande will begin as soon as Congress provides the necessary \$500,000, according to Representative Lloyd M. Bensten, Jr. Like Falcon Dam (*Western Construction*—March 1953, p. 81; November 1953, p. 99), Diablo Dam was authorized by the U. S.-Mexico water treaty of 1945 and would be constructed under supervision of the International Boundary and Water Commission. Estimated cost of Diablo, which would store about 4,085,000 acre-feet, is about \$70,000,000.

CONCRETE FIRM COMBINATION—The Albuquerque Gravel Products Co. has purchased the Albuquerque equipment and property of the Dunham Concrete Co. This combines the two largest ready-mixed

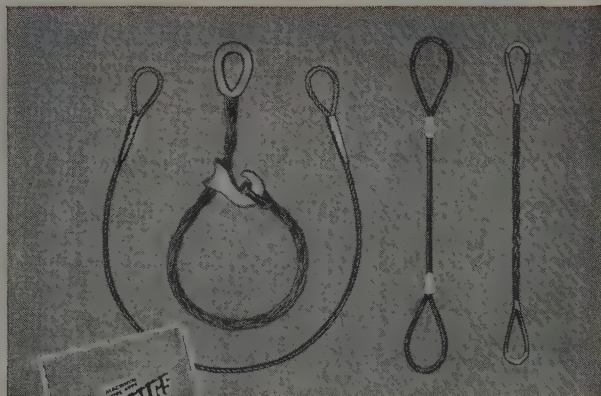
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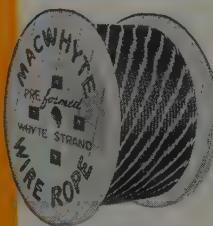
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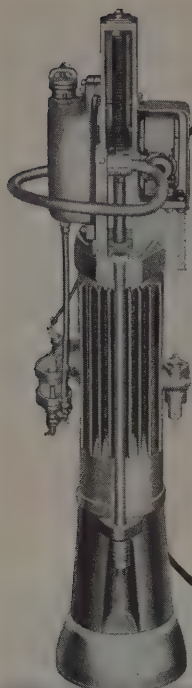
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- Ideal for work in restricted areas: inside buildings, close to walls, culverts, and abutments—in trenches, ditches.
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CRANE AIDS "FLAMINGO'S" FLIGHT

This "Flamingo's" flight is being aided by the largest rubber-tire mounted crane in Nevada, a Lorain Moto-Crane, Model MC-424, owned by the Lincoln Welding Works of Las Vegas. The "bird" is a 5,800-lb., 22-ft.-dia. circular sign.

concrete firms in the state. Most of the Dunham employees are being absorbed by the new firm.

SOUTHEASTERN NEW MEXICO has asked the State Highway Commission to pave four roads to give access to oil and potash development in the area.

TWO FLOOD CONTROL DAMS in the Bernalillo watershed are being sought by members of the Santa Fe-Sandoval Soil Conservation District. The Soil Conservation Service hopes that a start on the first dam can be made before July 1. It would be on Piedra Lisa Arroya and would cost about \$100,000. The other, Canon del Agua Dam, would cost about \$50,000.

NEW MEXICO will receipt for some \$3,000,000 for water control in the coming fiscal year if current Bureau of Reclamation plans are carried out. One proposal is to spend \$300,000 to enlarge the spillway of the Alamogordo Dam of the Carlsbad project. Other projects for which funds are sought include the Middle Rio Grande, the Vermejo, and the Rio Grande, New Mexico-Texas.

ALBUQUERQUE will get about \$8,045,000 worth of water and sewer improvements if a bond issue, to be put on the April city election ballot, is approved by the voters.

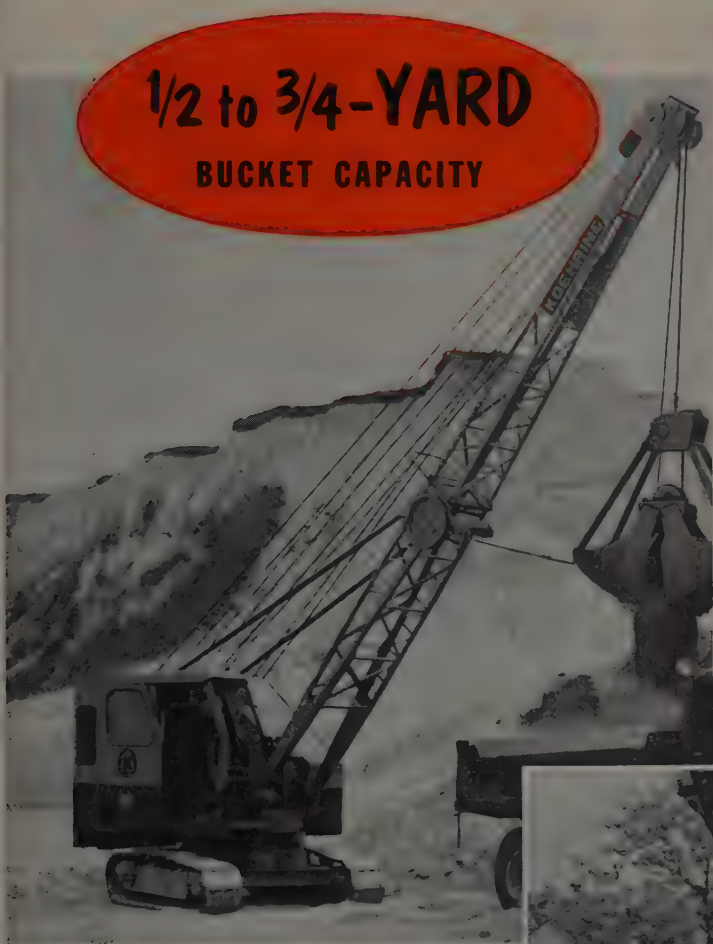
RECENT MAJOR CONTRACT AWARDS and low bids in New Mexico include a low bid of \$109,510 submitted by D. W. Falls Construction Co. of Tulsa, Okla., for earthwork, clearing, and structures for rehabilitation of drains on the Middle Rio Grande Project.

1/2 to 3/4-YARD BUCKET CAPACITY

NEW Koehring 205 with 10 tons of lift capacity on crawlers (15 tons on rubber) has plenty of power, strength and stability to handle 1/2 to 3/4-yard clamshell and dragline buckets on a wide work radius. Boom lengths range from 30 to 50 feet on the 205 crawler crane (25 to 55 feet on truck crane).

Crawler-mounted 205 with either standard or extra-long crawler frames, takes 16, 20 or 24-inch shoes . . . gives you ground-bearing pressure as low as 7.4 pounds per square inch. Crawlers are self-cleaning, have double-faced steel rollers, and high-carbon cast-steel shoes.

If mobility is needed the 205 is available on rubber . . . gives you the *plus* advantage of 15-ton lift capacity and 32 1/2 m.p.h. travel speeds for clamshell, dragline and lift crane work. Converts to 1/2-yard shovel or hoe. Better look into this rugged new machine today.



With **HEAVY-DUTY 205** you also get:

- Full-rotating fairlead on dragline.
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PROVED by 2 years of thorough field tests, Koehring 205 brings you this 10-to-15-ton capacity at only "1/2-yd." price. Call us.

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The Harry Cornelius Co., Albuquerque, New Mexico
San Joaquin Tractor Co., Bakersfield, California
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McKelvy Machinery Co., Denver, Colorado



OREGON

PORTLAND VOTERS will decide on May 21 whether or not to spend \$8,000,000 for construction and operation of an exposition-recreation, multi-purpose coliseum, stadium, play field, exposition, exposition center, and war memorial.

A PROPOSED flood control and irrigation dam on Catherine Creek in Union County was supported at a public hearing of the Upper Columbia River Basin Commission.

WILLAMETTE RIVER BRIDGE—Officials in Portland are considering construction of a new bridge to replace the present Morrison Street Bridge across the Willamette River and building two eastside approaches to the Hawthorne Bridge. Cost of the new bridge is estimated at \$7,500,000 with an additional \$4,500,000 to be spent for rights-of-way for overhead approaches on the east side. The new Hawthorne Bridge approaches would

cost \$1,700,000, plus \$900,000 more for rights-of-way.

AN ADDITIONAL APPROPRIATION of \$11,000,000 to carry on construction of The Dalles Dam on the Columbia River during the year beginning July 1 is needed to prevent a delay in completion, according to Representative Sam Coon of Oregon. The Budget Bureau has recommended \$34,000,000 for the work. Army engineers, meanwhile, estimated that the government will lose \$11,000,000 in power revenues unless they can get sufficient appropriations to keep construction at the dam on schedule.

SETBACK FOR PELTON—The United States Ninth Court of Appeals has invalidated a Federal Power Commission order which would have permitted the Portland General Electric Co. to build the Pelton hydroelectric plant project on the Deschutes River. The order has been appealed by the State of Oregon and the state fish and game commission which reported that proposed dams would

seriously curtail the fish population and damage the state's fish hatchery on the Metolius River above the sites.

RAILROAD EXPANSION—Construction of a major railroad project, including a new bridge across the Clackamas River, was forecast when the Southern Pacific Railroad Co. filed deeds to property at Oregon City.

CHIEF JOSEPH DAM is now 91% complete as compared with a scheduled completion rate of 88%. Contractors on the powerhouse and intake structures are currently 63% complete as compared with scheduled completion rate of 46%.

COUGAR DAM—Senator Guy Cordon and Representative Harry Ellsworth of Oregon have introduced companion bills which would provide a partnership of the federal government and the City of Eugene in construction of the proposed Cougar Dam on McKenzie River. Provisions of the bill call for the city to build \$10,000,000 in power facilities and contribute \$1,500,000 toward the estimated \$25,500,000 cost of the already authorized flood-control project. The proposal would heighten the dam by 45 ft. and increase the power output by 10,000 kw. The city would own and operate the power facilities at the dam. Total cost of the project would be \$34,000,000.

EARTH SLIDES in Astoria, which occurred in January, affected an area about 600 ft. long by 300 ft. wide. It lies on a 23% slope and has an earth layer of from 10 to 30 ft. deep resting on an impervious hard blue shale. Upon becoming wet, this shale acts as a lubricant and the saturated layer of earth upon it begins to flow and slide. The maximum rate of flow occurring this year was 5 ft. per day with a total movement of 35 ft. occurring this winter. The area does not and could not support an elaborate drainage system. Borings were taken during 1950 and a drainage system was installed at a cost of \$25,000 to intercept all known sources of underground water. Because of the number of buildings and improvements in the area, very little could be done toward surface drainage in the way of open ditches or flumes.

"In my opinion, the movement was caused by excessive rainfall which, due to the topography of the area, did not have ample opportunity to run off. The porous ground absorbed this rainfall and became a heavy, water-soaked mass. The frictional resistance of the ground had been lowered by previous movements, thus the added weight, along with lubricating action of the water upon the sub-surface shale, resulted in the earth flow or slide," said H. M. Olsvick, city engineer of Astoria.

The 25 houses in this area, with the

Flood takes out bridge pier



CANTILEVER action kept deck intact after failure, but end of unsupported section deflected about 6 in. Timber support was installed as a temporary measure, without raising deck to original grade. Normal river channel makes angle of about 65 deg. with bridge axis; in flood, angle reduces to about 30 deg.

DURING November 1953, a record flood on the North Umpqua River resulted in an unusual pier failure of the Lone Rock Bridge project, the main piers and the three-span continuous concrete approaches of which had been completed at each end earlier that fall. Erection of the 200-ft. steel through truss had been deferred until the construction season of 1954.

The North Umpqua River drains an area where logging operations have been under way and the flood brought down a tremendous amount of drift and debris from these logging operations. Apparently a large drift jam collected on the south pier with the result that the upstream pier shaft

broke at a point 27½ ft. below the top, which is approximately 16 ft. above the footing. The downstream shaft broke at the top of the footing. The concrete approach span rested on rockers on the pier, so that the pier in falling did not carry the approach span with it. This last span now acts as a cantilever from the intermediate column. The pier failed primarily because of tension in the vertical steel bars, which pulled in two at the break in the pier shaft.

As soon as river conditions are suitable, the foundation will be re-excavated and the pier rebuilt, according to G. S. Paxson, assistant state highway engineer of Oregon.

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exception of those whose value does not warrant the expense of moving, are being moved to new locations. The city intends to acquire the property by trading other property out of the slide area for it and then condemn it for use as a residential area.

Pacific Power & Light Co. crews, under Charlie Anderson, line superintendent, managed to keep the area lighted most of the time while the slides were occurring despite the hazards caused by trees and other obstructions sliding into the electric power lines. Many poles were left askew after the slide has subsided.

UMATILLA COUNTY RESIDENTS will have plenty of water this year, according to M. J. Belton, district watermaster. Belton found that generally there was more water and snow content in the mountains than existed at the same time a year ago.

GREEN PETER DAM—Construction of the proposed Green Peter Dam on the Quartzville Fork of the South Santiam River in Linn County is being backed by a number of residents of the area. The main benefit of this dam, they feel, will be its influence in minimizing floods which overflow the river banks each year.

RECENT MAJOR CONTRACT AWARDS and low bids in Oregon include an award to J. C. Compton Co. of McMinnville for 12.2 mi. of grading and 13.3 mi. of paving on the Sage Hen Hill-Hines section of the Central Oregon Highway. The D & H Construcion Co. and M. H. Hasler Construction Co. of Sacramento, Calif., were awarded a \$1,359,784 contract for 6.7 mi. of grading of the Pacific Highway about 7 mi. south of Roseburg.

Donald M. Drake Co. of Portland was awarded a \$475,365 contract for construction of a 714-ft. steel deck truss and reinforced concrete bridge at the north city limits of Roseburg. A low bid of \$4,888,600 was submitted by the S. A. Healy Co. of The Dalles for cofferdam construction and powerhouse excavation for the first work on the new dam at The Dalles. Lee Hoffman of Beaverton submitted a low bid of \$259,103 for grading, paving, and bridge construction on the Tualatin River Bridge Unit, Washington County.

P. S. Lord of Portland submitted a low bid of \$351,970 for construction of 22,775 lin. ft. of 24- to 30-in. trunk sewer in Gresham. Puget Sound Bridge & Dredging Co. of Seattle received a \$765,155 award for deepening three sections of the reserve fleet mooring basin in Cathlamet Bay near Astoria. W. H. Shields Construction Co. of Eugene submitted a low bid of \$818,654 for a 300-man dormitory addition to Straub Memorial Hall, University of Oregon, Eugene.

Warren Northwest, Inc., of Portland received a \$514,192 award for



FIRST TIME IN NORTHWEST

Light-weight prestressed concrete beams and slabs for this Eugene job were hauled 120 mi. from the plant of Empire Prestressed Concrete, a subsidiary of Empire Building Materials Co. in Portland. Such operations should become familiar as other materials firms get into "factory prestressing" picture.

12.2 mi. of grading and paving of the Vale-Cairo section of the Central Oregon Highway. Young & Smith of Grants Pass submitted a low bid of \$110,852 for three bridges on the Goshen-Coast Fork of the Willamette River Unit, Lane County.

UTAH

SALT LAKE CITY'S new \$596,000 sewage pumping plant has about 87% of its concrete now in place, according to M. N. McKendrick, assistant city engineer who is acting as resident engineer on the project. The "in place" concrete, together with 30% of the excavation backfill which has been completed, represents about 42% of the entire cost of the project, he said.

LEGAL SNARL SIDESTEPED—The Board of Regents of the University of Utah believes that it has found a way to get around legal entanglements which have long delayed financing the new \$2,000,000 student union building. The delay was caused by a pending lawsuit in the Supreme Court, which made it necessary for bond authorities and the state attorney general to get together to remove the legal obstacles to the bond issue.

TUNNELING 78 ft. in 24 hr., construction crews of Utah Construction Co. set a new record at the Gateway Tunnel of the Weber Basin Project, according to Ross Billings, Bureau of Reclamation construction engineer. Average daily progress of the crews

has been more than 60 ft. Because of this, it is possible that the 3½-mi. tunnel will be completed almost a year ahead of schedule.

SALT LAKE CITY'S suburban sewer district project is also tangled up in legal difficulties. It seems that certain taxpayers have brought suit questioning the constitutionality of the statutes setting up the sewer district. This has delayed the sale of bonds to finance the \$8,000,000 project.

LATE WINTER storms have improved the irrigation water outlook for most of Utah. The pattern of precipitation throughout the state was somewhat erratic, but generally water content of snow cover was almost normal and most of the watersheds checked revealed above-average precipitation.

RECENT MAJOR CONTRACT AWARDS and low bids in Utah include a low bid of \$274,912 submitted by Thorn Construction Co. of Springville for 4.4 mi. of grading and surfacing of U. S. 89 and 91, Utah County. Whiting & Haymond of Springville submitted a low bid of \$174,048 for 4.4 mi. of graded roadway and one 172-ft. span concrete bridge in the Escalante-Henrieville area, Garfield County. W. W. Clyde & Co. of Springville submitted a low bid of \$480,255 for 29.4 mi. of grading and paving on the Zion-Bryce Canyon National Parks Approach Road and Cedar-Long Valley Forest Highway. Young & Smith Construction Co. of Salt Lake City received a \$642,336 award for 7.9 mi. of grading at Emory Castle Rock.

WASHINGTON

AIR FORCE BASES in Washington will be the scene of much construction activity during 1954. At Fairchild AFB, construction will include a \$2,300,000 hospital, 9 hangars to total \$3,600,000, a \$150,000 crash-fire station, and ammunition storage facilities totaling \$40,000. Geiger AFB is due to receive a \$57,000 power generating plant, a \$95,000 crash-fire station, and other structures to cost around \$52,000.

EMERGENCY SCHOOL CONSTRUCTION FUNDS totaling \$2,068,975 has been authorized by the State School Emergency Construction Commission for construction in nine districts.

PASCO-KENNEWICK BRIDGE—The new \$5,000,000, four-lane bridge between Pasco and Kennewick over the Columbia River has been joined in the middle, climaxing more than 3 yr. work on the 2,520-ft. span, ac-

cording to Frank Henagar, highway department resident engineer. The roadway is about 62 ft. above the permanent surface of the river and the top of the span extends another 75 ft. About 80% of the superstructure was erected by the American Bridge Division of the U. S. Steel Corp., under the direction of C. E. Edmonds, division superintendent. American Bridge Division project engineer was D. H. Englehorn. The bridge will be dedicated sometime this summer.

BAKER RIVER DAM—Puget Sound Power & Light Co. of Seattle has applied to the Federal Power Commission for a preliminary permit for a power project on the Baker River which would include a dam at the Engletrout site, a reservoir about 9 mi. long, a tunnel about $\frac{1}{4}$ mi. long and penstocks, and a 60,000-kw. powerhouse.

CASTLE ROCK SEWER—Bids will be called about May 1 for a \$210,000 sewer project at Castle Rock. The project calls for construction of a primary sewage treatment plant, sewer trunks, and laterals.

KENNEWICK HOUSING PLANS—Construction of \$3,000,000 worth of two- and three-bedroom homes near Kennewick will begin this spring by the Guthrie Construction Co. of Spokane.

PIERCE COUNTY ROAD PLANS—The sum of \$5,305,600 will be spent by the state, county, and city on road construction and improvement in Pierce County this year, according to William A. Stancer, county engineer. The largest contract in the group, for \$1,278,000, is to build 4 mi. of new road near Fort Lewis. It is held by Woodworth & Co. of Tacoma.

SPLIT-ROADWAY BRIDGE—Seattle's Engineering Department is considering a split-roadway design for a bridge across Lake Washington Ship Canal and Union Bay, according to W. E. Parker, city engineer. Design of the bridge, to cost \$8,500,000, includes two six-lane roadways about 750 ft. apart at the canal. A small-boat passage would permit an uninterrupted flow of small vessels under the bridge.

COWLITZ DAM PROJECT—Tacoma still plans to build the proposed \$146,000,000 Cowlitz River Dam Project, according to C. A. Erdahl, Tacoma utilities director. He said that although the city had received approval for the construction project from several court actions, almost 3 yr. had gone by and that engineering and cost estimates for the project are not up to date. He anticipated that a complete review of the project, which includes construction of two dams near Mossyrock and Mayfield to produce a combined total of 350,000



DOUBLE-DUTY DUMPTORS DON'T DALLY AT THE DALLES

Three Dumptors were used by Dalles Powerhouse Constructors for moving excavated material from batch plant site. Now that the plant is in production, the machines are bulk haulers for cement and aggregates, from stockpile to batcher.

kw., will be made before construction actually starts. (*Western Construction*—January 1954, p. 81.)

DREDGING of the Maritime Administration's reserve fleet mooring basin near Astoria to depths of 24 to 30 ft. for the storage of ships loaded with surplus grain is expected to be completed by July 8, according to Col. Thomas H. Lipscomb, Portland district engineer of the Corps of Engineers. Specifications for the job, estimated to cost between \$750,000 and \$1,000,000, include excavation of 4,000,000 cu. yd. of material.

CONFLICT FOR WELLS SITE—Public Utility District No. 1 of Douglas County has applied to the Federal Power Commission for a preliminary permit for a power project at the Wells site on the Columbia River. This application conflicts with one filed by Puget Sound Power & Light Co. of Seattle (*Western Construction*—February 1954, p. 83) and is essentially the same as the previous application. The project would include a concrete dam near Azwell, a 29-mi.-long reservoir upstream to the tail water of Chief Joseph Dam, and a powerhouse with an ultimate capacity of 588,000 kw.

MILLIONS FOR BRIDGES—A second bridge across Lake Washington, terminating at Sand Point, and an arterial highway from Sand Point into Seattle would cost about \$40,860,000, according to Charles Andrew, Toll Bridge Authority engineer. A bridge from Evergreen Point into Seattle would cost \$18,000,000, he said. Earlier, the Washington Toll Bridge Authority had voted to have W. C. Gilman & Co. make an engineering, revenue, and traffic survey for the proposed Hood Canal Bridge. The state has already obtained Army ap-

proval of a floating, two-lane bridge, connecting Lofall and South Point on Hood Canal. Cost of this project is \$19,000,000.

SPOKANE COUNTY spent \$77,500 on snow removal during the month of January, according to C. J. Chaffins, county engineer. This was more than triple the amount spent during the entire year of 1953 for the same purpose.

END OF THE LINE for the Seattle-Skagit River Railway came in the middle of February when the Seattle City Council authorized \$148,000 to replace the railroad with a temporary highway. This highway would be used only until a 300-ft.-high dam across the gorge, which would bury the road under 100 ft. of water, is erected. Then, of course, a higher road must be built. The 31-mi.-long line was built in 1919. From 1928 to 1941, the railroad hauled as many as 1,800 tourists per week. In recent years, the railroad has been used mainly for heavy hauling.

RECENT MAJOR CONTRACT AWARDS and low bids in Washington include an award of \$175,847 to Carbon Bros. of Spokane for 3.6 mi. of grading and paving on State Highway 18 west of St. John, Whitman County. Lige Dickson Co. of Tacoma received a \$411,164 award for stockpiling aggregates on State Highway 1 from Frost Road to E. B. Hamilton Road, Lewis County. Jentoft & Forbes of Seattle submitted a low bid of \$613,311 for the 50,400 sq. ft. Ballard Shopping Center in Seattle.

Lewis Construction Co. of Great Falls, Mont., has received a \$839,000 award for construction of the new Samaritan 50-bed hospital in Moses Lake. Nelson Construction Co. of Tacoma has submitted a low bid of \$438,578 for the Mary Bridge chil-

dren's hospital in Tacoma. Northwest Construction Co. of Seattle has received a \$260,739 award for grading and surfacing 0.4 mi. of State Route 21-A from Winston to Rolling Bay, Kisap County. Pettijohn Engineering Co. of Portland has received a \$118,302 award for construction of a 400-ft. reinforced concrete fishway in the Deschutes River at Tumwater.

Poston Construction Co. of Seattle has submitted a low bid of \$434,000 for restoration of service buildings at the Washington State Reformatory at Monroe. John H. Sellen Construction Co. of Seattle has submitted a low bid of \$131,595 for construction of a steel blast fence at Boeing Field for the local B-52 test facilities. Waale-Camplan Co. of Portland has received a \$676,500 award for construction of a freestanding, two-story addition to the Columbia High School at Richland.

Howard S. Wright & Co. of Seattle has received a \$10,000,000 award for construction of a paper plant addition for the Scott Paper Co. at Everett. J. N. & M. J. Conley of Portland received a \$959,139 award for widening to four lanes a 7.1-mi. stretch of U. S. 99 between Salmon Creek and Ridgefield junction. Grading and paving are involved. Strand & Sons of Seattle have received a \$1,440,623 award for construction of the Catholic Blanchet High School in Seattle.

WYOMING

A PIPELINE from the Clareton oil field to Glenrock and Casper, a distance of 108 mi., has been proposed by the N. N. C. W. Pipeline Co., a new Wyoming corporation, which has applied to the Wyoming Public Service Commission for permission to build the line. Construction, which would involve a network of lines 4, 6, 8, and 10 in. in diameter, would amount to \$3,505,000. Construction would start within 60 days after a certificate is granted by the Commission and completion date would be 90 days thereafter.

THE FEDERAL BUDGET requested by President Eisenhower contains four projects in Wyoming. Included is \$1,399,000 for canals and laterals on the Riverton Project, \$780,000 for canal lining, laterals, and drains on the Kendrick Project, \$625,000 for Eden Canal and laterals and Little Sandy Canal on the Eden Project, and \$519,200 for construction of canals, lateral linings, and channel and bank protection on the Shoshone Project.

SNOW DEPTH on the Cheyenne watershed in the Pole Mountain district of the Medicine Bow National

Forest is at its lowest point in 8 yr., according to W. K. Kelso, district forest ranger. The Pole Mountain watershed has been subject to three very dry winters in succession, coupled with drouth conditions during the summer of 1952. This year the average water content of the snow is 75% less than a year ago and only 62% of the cumulative average.

TWO STEEL BRIDGES across Grey's River in the Bridger National Forest will be built this year.

EXPANSION of Cheyenne's water supply will start immediately, according to W. J. Dinneen, water board president. The expansion, expected to cost between \$300,000 and \$350,000, includes the construction of additional pipeline connections, experimental drilling, and the drilling and equipping of one or two other wells.

RECENT MAJOR CONTRACT AWARDS and low bids in Wyoming include a \$201,215 award for grading and surfacing of 3.5 mi. of road east of Lyman, Uinta County, and a \$168,765 award for grading and surfacing 5.9 mi. of the Lovell-Emblem road in Big Horn County. Both contracts were awarded to Stanley H. Arkwright, Inc., of Billings, Montana. Etlin E. Peterson of Casper received a \$87,495 award for a bridge.

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LIGHTWEIGHT, HEAVY DUTY RIPPER. Fits all small, medium and large dozers. Penetration 8" to 18". Excellent tool where grade has been lost and for corner cuts.



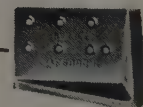
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ALASKA Newsletter

By CLIFFORD S. CERNICK, Anchorage

UNEMPLOYMENT APEX—One of the usual signs of spring sadly lacking so far is a reduction in northern unemployment. No such reduction seems in progress at this time. In other years, noticeable drops in unemployment totals became evident by early March and before the end of April. This year, union officials, business leaders—to say nothing of the unemployed construction workers themselves—are wondering when things will “open up.”

CONSTRUCTION WORKERS' DILEMMA—Hardest hit in the ranks of Alaska's unemployed are the construction workers. Right now, for example, 475 carpenters and 425 laborers are looking for work in Anchorage alone. Other job categories are hardly better off. Latest employment reports show that 135 heavy duty operators and 94 mechanics are seeking work. Also jobless in Anchorage are 160 plumbers, 195 truck drivers, and 24 janitors. The unemployment situation is substantially the same in all of Alaska's cities and towns—with many more construction job applicants available than could conceivably be employed at this time of the year when all construction activity is at a low ebb.

JOB PREFERENCE CONCEPT—Union officials and workers in Alaska are taking a strong stand in favor of job preference for Alaskan residents on Alaskan construction projects. This is hardly a new concept on the Alaskan labor scene, since most Alaskan workers have felt that way all along. However, no fuss has ever been kicked up by unions or workers on the matter as long as employment conditions were in the “boom” stage. Now that the pendulum is swinging the other way, Alaskans want to be the first to be hired by contractors when jobs open up.

SETBACK FOR UNIONS—Unions with visions of enforcing job preference clauses in contracts with Alaska contractors suffered a setback recently when the National Labor Relations Board examiner ruled that the unions had no right to enforce such provisions. The trial examiner, in his ruling handed down in San Francisco, found the preference procedure to be an unfair and illegal practice under the national labor law. The case was brought by two Anchorage carpenters who charged that the union singled them out for discharge on grounds they were not Alaska residents. The contractor wanted to keep

them on the job. In light of this ruling, Alaska unions will have to think twice before they hand a pink slip to a worker who doesn't happen to be a resident Alaskan.

EVERY CONTRACT AFFECTED

—Virtually every union contract in Alaska is affected by the job preference ruling. Union leaders have served notice they will appeal the decision to Washington, D. C. They are making a concerted effort to convince the NLRB in Washington that the preference clause should be kept in the contracts because of the security it gives Alaska residents, who can remain in the territory and help develop it only if they are given a reasonable guarantee of employment. No final decision on the matter has yet been handed down from Washington, however.

WHAT IT MEANS TO YOU—The job preference squabble has profound implications for construction workers and for contractors doing business in Alaska. If you are a contractor with an Alaska project, you probably will be given more latitude to hire the kind and quantity of workers you need, without regard to their residence or union affiliation. Unless the NLRB decision is reversed, you can refuse to discharge workers who are non-Alaskans in order that they may be replaced by Alaskan residents. From a standpoint of basic cost economy and time-saving, however, the hiring of workers at the jobsite has obvious advantages. A large labor pool now exists in Alaska. The ruling may make it easier for stateside workers to secure employment in the territory. In the past, many such workers who came to Alaska seeking jobs were discriminated against on the grounds that available jobs had to go to Alaskans first.

ADVANCE IN WAGE LEVELS

Construction workers in Alaska can look forward, in most cases, to a larger hourly wage rate but a smaller total paycheck during the 1954 construction season. A 12½-cent hourly wage increase, benefiting about 20,000 workers, has been agreed upon by committees for management and craft unions which met recently to discuss the new contracts. Crafts involved include operating engineers, laborers, teamsters, cement masons, plasterers, bricklayers, ironworkers, and lathers. A check with contractors and union officials in Anchorage shows that although the hourly rate will be higher, the weekly pay total will be smaller

because of less overtime than was granted in previous years. Contractors are slashing overtime pay to an absolute minimum in an effort to pare away job costs. The higher hourly rate will give them additional incentive to cut corners elsewhere to make up the difference.

FAIRBANKS JOB PICTURE

—Employment in the Fairbanks area has remained almost level during the past 60 days despite abnormally prolonged frigid weather. Charles C. Pugh, manager of the Fairbanks territorial employment office, says steadily rising employment can be expected until the peak is reached in the fall. Listed as unemployed are 400 carpenters, 270 laborers, 209 plumbers, 167 heavy equipment operators, 127 truck drivers, 36 electricians, 31 painters, 31 sheet metal and iron workers, and 17 welders.

BIG BALL AND CHAIN—A mammoth steel ball is being used at the south end of the Haines-Fairbanks pipeline for clearing underbrush and timber on the right-of-way for the 621-mi. line. The ball weighs from 4 to 12 tons, depending upon the quantity of water that is poured into its hollow interior. The huge sphere is linked to heavy cables which are attached to bulldozers. As the 'dozers advance, the ball crashes forward along the right-of-way, crushing everything in its path and providing sufficient tension for the chains to assist in the clearing task.

IT'S DIFFERENT IN KETCHIKAN

—Totally unlike the housing situation in Anchorage is that prevailing in Ketchikan. There, the completion of a huge new pulp mill has brought in hundreds of new workers and placed housing at a premium. Construction hasn't kept up anywhere near the demand and an acute housing shortage became apparent when a proposed project of about 400 family units failed to materialize last year. The Alaska Housing Authority is considering the necessity for sponsoring a project there, since the money market for housing loans is at present considered to be fairly “tight.”

CONSTRUCTION NEWS CAPSULES

—Congressional action is being awaited on a budget request of \$9,940,000 for Alaska road work . . . A big increase in cadastral survey work in Alaska during the latter part of 1954 and all of 1955 is forecast by territorial officials . . . The defense department is reported to be considering establishment of “seatrains” from the U. S. to Alaska. The seatrains would carry as many as 75 to 100 loaded freight cars in their hatches . . . Alaska's delegate E. L. (Bob) Bartlett has asked Congress for slightly more than \$6,000,000 for fishing boat harbors in Alaska.



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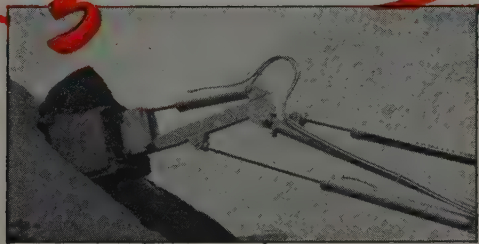
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There is no longer any need to just wish for a mobile crane, a fast cycling power shovel, with a capacity of 40 cubic yards per hour, a portable digger that can do 'straight-down' digging to a depth of 11' !!! You get them all in the low-cost truck HOPTO. Just mount this completely hydraulic unit on any 1½ ton or larger truck that still runs but which may have been already completely charged off on your equipment inventory! Now you have a mobile Digger-Shovel-Crane with world-famous work capacity and at the lowest possible equipment investment!

The simple handling of HOPTO is quickly mastered by any handy man or utility man. Four hydraulic controls are conveniently banked in front of the operator who has unrestricted visibility of work at hand. Hydraulic stabilizers assure a firm loading platform, take weight of heavy lifting off the truck springs.

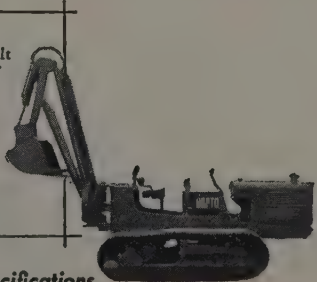
Crane boom is optional equipment, may be equipped with hydraulic control grapple. Backhoe and shovel buckets are available in a wide variety of sizes and designs for material handling and for digging, trenching and excavating in all types of soils.

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All the outstanding features of the truck-mounted HOPTO are also available in other models to best fit your needs at lowest possible equipment investment. Self-powered trailer models, power take-off trailer type models and HOPTO units for rear mounting on track type tractors are available in addition to the two models shown.

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Model SPC HOPTO is a complete Badger-built unit powered by an MM 206-4A. Other power units can be furnished on request. Unit has a bearing pressure of only three pounds per square inch to permit uninterrupted operation in swampy or muddy soils. Comfortable seat for operator swivels for easy access to operating and driving controls. Extremely long reach permits all HOPTO models to work all of a thirty-two foot semi-circle without moving unit.



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ENGINEERS on the move

Lawrence P. Sowles, who was project manager on construction of Canyon Ferry Dam in Montana, is now with the American Pipe & Construction Co., Portland, Ore. He is in charge of company field operations, involving penstock installation, tanks, etc., at Palisades Dam, Chief Joseph Powerhouse, Lookout Point Dam, as well as installations for the City of The Dalles.

Paul Dunckhorst, assistant bridge engineer, Bridge Department of California Division of Highways, retired Feb. 1 after thirty years continuous service with the department. One of the department's oldest employees in point of service, he was one of its original dozen employees in 1923 (there are now more than 600). With the exception of three years with the State Reclamation Board in 1916-1918 and a short period with the U. S. Army in 1918, his career with the Division of Highways was continuous.

Among recent changes in personnel of the North Pacific Division of the Corps of Engineers are the following: **Loren A. Shoemaker**, Engineering Division of the Walla Walla District, was reassigned April 1 to the Power Studies Section of the Water Control Branch in the Engineering Division of the North Pacific Division office in Portland, Ore. **Miss Meredith E. Thoms**, hydrological engineer in the Engineering Division of the Seattle District, was reassigned March 1 to the Hydrology-Hydraulics Section of the Engineering Division, in the North Pacific Division headquarters, Portland. **Bernhardt E. Torpen**, special assistant to the Division Engineer in the North Pacific Division office recently returned from Pakistan where he conducted flood control studies for the Punjab Province while on three months' loan to the State Department. In going to Pakistan, Torpen traveled by the European route. He returned by way of the Orient, making a complete circuit of the globe.

Robert P. Walter has been appointed acting manager of the Walla Walla, Wash., area office of Bonneville Power Administration. He has been area engineer for the past two years, and succeeds **H. R. Richmond**,

Jr., who resigned as area manager to enter private employment in Los Angeles.

Levant R. Brown, assistant division engineer for Division 7 of the Bureau of Public Roads, San Francisco, Calif., was presented with the Department of Commerce Meritorious Service Award on March 8. It was awarded to him in recognition of his exceptionally competent leadership and



Herman F. Bahmeier (left) and **William Hudson**, Commissioner of the Snowy Mountains Hydroelectric Authority, look over a map of the Australian Snowy Mountains Project. The two met in the Denver design offices of the Bureau of Reclamation shortly before Bahmeier left for Australia as head of a group of six Bureau engineers who are to assist the Authority during the next two years in the initial construction phase of the tremendous project (which will involve water use structures in a 20-year plan to cost more than one billion dollars).

Bahmeier, a 40-year veteran in water engineering, goes to Australia from the American River development in California, where he has been in charge of construction of Folsom power plant, Nimbus Dam and power plant and Sly Park Dam. Bureau men on his staff will be **Elmo C. Higginson**, **Harold R. Orr**, **Richard B. Ward**, **Clifford L. Mutch** and **Jean R. Walton**. Orr will head an engineering design division, and Higginson will counsel on lab investigations and techniques. Ward, Mutch and Walton will be construction advisers for the four major features of the project now getting started.

service as a highway engineer with the BPR for the past forty years. Division Engineer **Raymond Archibald** made the presentation.

Recent changes among the engineering personnel of the New Mexico State Highway Department involve the following men: **T. B. White**, construction engineer, is now chief technical engineer in charge of the entire technical division. **L. E. Wheeler** is engineer of secondary highways, having moved up from assistant; **R. E. Miller**, former assistant construction engineer, has been promoted to construction engineer, and **J. J. Plese** becomes assistant construction engineer. **C. W. Johnson**, formerly assistant construction engineer, is now materials engineer. **H. F. Leslie** has moved from Las Vegas, where he was district engineer, to Deming where he holds a corresponding position, and **J. A. Fairly, Jr.**, is now district engineer at Las Vegas. **A. G. DeLong**, formerly a project engineer, now is an assistant construction engineer. **G. C. Lasseter**, who was former engineer of secondary highways, is district engineer at Santa Fe.

Holding a key position with the highway department is the Director of the Division of Information **C. B. Mayshark**.

Two civil engineers in the employ of the City of Seattle have recently moved up to more important positions. **E. H. Lindstrom**, supervising senior engineer, is now assistant city engineer in charge of plans and operations. **D. A. Andersen**, senior engineer, is now assistant city engineer in charge of maintenance and operations.

Among recent changes in Corps of Engineers personnel in the Northwest are the transfer of **George Schoch** from the Walla Walla District to The Dalles Dam, where he is in charge of relocations. **Roy Cami** has transferred from the Little Rock District also to The Dalles Dam, in charge of the engineering division. **Tom Kelly** has left the Corps of Engineers at the dam to join Master Builders in Cleveland, Ohio.

Heading the newly incorporated Mart Construction Co., Salt Lake City, are **Soren N. Jacobsen**, president; **T. C. Jacobsen**, vice president, and **Leo M. Jacobsen**, secretary-treasurer.

R. W. Beaty, resident engineer at Yakima for the Washington State Highway Department, has been assigned to the Walla Walla area, where he will work with **John Leeper**, resident engineer in charge of construction. According to **T. P. Doyle**, district engineer in Yakima, the move

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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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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.

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was made necessary because of the heavy work load expected at Walla Walla for the next few years.

Brig. Gen. Herbert D. Vogel, Division Engineer of the Corps of Engineers Southwestern Division at Dallas, Tex., was promoted (from Colonel) to his present grade in January. General Vogel is currently chairman of the Arkansas-White-Red Basins Interagency Committee, member of the Board of Engineers for Rivers and Harbors, and member of the Mississippi River Commission. He became Southwestern Division Engineer in June 1952, immediately following his assignment as Lieutenant Governor of the Panama Canal Zone.

David E. Morris, public works director of Tacoma, Wash., has resigned to enter private business. He had been head of public works for the past eight months and prior to that had been city engineer for five years.

Robert Lee, Colorado River Association executive, was recently named assistant to **Samuel B. Morris**, general manager and chief engineer of the Los Angeles Department of Water & Power.

Lester Marx is acting chief of the Alaska Public Works Agency at Juneau, Alaska, following the resignation of **Donald C. Wilson**, who had held the position since the Interior Department agency was established 5 yrs. ago.

Dale Bean has become county engineer of Benton County, Wash., a post vacated when **C. D. Kinder** resigned. **William T. Cavanaugh** had accepted the appointment, but later found he was unable to take the position.

James R. Carney, Jr., has resigned as assistant engineer of Redding, Calif., desiring to get into a more specialized field of civil engineering.

Haddock-Engineers, Ltd. has opened offices in Seattle, with **F. J. Cribbins** as district manager of this Pacific Northwest headquarters office. Main offices of the contracting firm are in Montebello, Calif.

Cecil C. Badgley, employee of the Seattle city engineering department, retired the end of February. Badgley, a civil engineer, joined the department in 1911.

Gerald D. Bletcher, assistant resident engineer at Fairchild AFB, Washington, was appointed to succeed **Samuel C. Guess**, resident engi-



Colonel Lynn C. Barnes, District Engineer of the Albuquerque District, Corps of Engineers, is shown receiving the Southwestern Division safety award. The plaque was awarded to the Albuquerque District for placing first in safety in 1953 among the five Districts which compose the Southwestern Division with headquarters in Dallas. With a 5% increase in manhours, the Albuquerque District reduced its accident frequency rate by 26%, the accident severity rate by 50%, and the motor vehicle accident rate by 33%. The Albuquerque District previously won the award in 1951. By placing first in safety another year in the Southwestern Division the Albuquerque District will retain permanent possession of the safety award.

neer for the Corps of Engineers at Fairchild for the past two years, who resigned to become secretary-manager of the Spokane Chapter, Associated General Contractors.

J. Robert Roll has been named temporary chief engineer of the Santa Clara County Valley Water Conservation District, San Jose, Calif., replacing **G. Walter Hunt**, retired.

Fred N. Finn has joined The Asphalt Institute, Sacramento, Calif., as district engineer.

M. M. Flint, formerly assistant Alaska division engineer for the Bureau of Public Roads has been transferred to the BPR office in San Francisco, the Alaska division office having been abolished. The territory is now handled as a district under the Portland office, with **C. F. Wyller** acting district engineer at Juneau. **Franklin L. Davis** is another transfer from Alaska to the Portland office as assistant design engineer. Also announced is the retirement of **W. G. Peters** after more than thirty-five years with the BPR. He was attached

to the Olympia district office, and is being replaced there by **James R. Hortenstine**, formerly highway engineer for the Bureau in Alaska.

Lieut. William L. Durham, Corps of Engineers, heads a 12-man team of Army and Air Force personnel in Spain working with the Spanish in making soil surveys at four proposed American airfield sites under terms of the aid-for-bases agreement with the Government of Spain. The survey findings will be used by the Bureau of Yards and Docks and contractors engaged in the construction program.

George Grove was recently appointed director of public works for the City of Tucson, Ariz. He had been Pima County engineer and city engineer of Tucson and most recently was associated with Headman, Ferguson & Carollo at Tucson.

The Associated General Contractors of America, Washington, D. C., recently announced that first-place awards for nationwide safety went to two Seattle construction firms. **John H. Sellen Construction Co.** received first award in the AGC building division, Group B, for its 1953 safety record. **J. B. Warrack Co.** got first place for the same division and group for the period 1948-1953.

Newly established in Seattle is the consulting firm of **Shannon and Wilson** specializing in soils mechanics and foundations. The principals of the firm are **William L. Shannon**, formerly of **William D. Shannon & Associates**, and **Stanley D. Wilson**. **Wilson** comes to the new firm from Harvard University, where he was for seven years an assistant professor of civil engineering. Offices of the new firm are in the Stuart Building.

Ed W. Ford, Registrar of Contractors for the State of California, announces the promotion of **Henry Gray Clark** to the position of assistant registrar of contractors, with headquarters at Sacramento. He has been deputy registrar at San Francisco for the past year, and just prior to that time he spent over eight years as deputy registrar at Los Angeles.

Henry L. Kennedy, president of the American Concrete Institute, recently announced the election to ACI honorary membership of **Raymond E. Davis**, director emeritus, engineering materials laboratory, and former professor of civil engineering at the University of California, Berkeley. Professor Davis is a past president of the Institute. He has been active in the concrete field in many capacities over twenty-five years as a teacher and

consulting engineer and as a member on numerous boards and committees concerned with concrete problems. He is the author of several text books on civil engineering subjects as well as numerous technical articles.

Francis R. McCabe, materials engineer for the Corps of Engineers, has been located at The Dalles Dam in Oregon for the past few months,



Francis R. McCabe
now at
The Dalles
Dam for the
C. of E.

where he is head of the concrete testing laboratory. Formerly, he was in charge of the concrete testing lab at Lookout Point Dam, transferring to the Engineering Division, C. of E., Portland, in February 1952, then to his present position at The Dalles.

L. F. Wylie, construction engineer with the Bureau of Reclamation, has replaced **Byron Felkner** as construction engineer on the 30,000-kw. hydroelectric plant at the Eklutna Project in Alaska. Wylie's prior assignment was on the Canadian River Project in Amarillo, Texas, where he was project engineer. Felkner has gone with Morrison-Knudsen Co., Inc., on a job in Turkey.

Art Bright, engineer with the Bureau of Reclamation, is working for the Bureau at Sacramento, Calif., in the design and construction department. Until recently he was located at Santa Barbara in connection with Tecolote Tunnel work.

Joseph O. Elwell has left the Bureau of Reclamation and taken a position in the engineering design department of the California Division of Highways at San Luis Obispo.

Glenn W. Bradow of the Salt River Power District of Phoenix, Ariz., has moved up from manager of operations and construction to the newly created position of assistant general manager in charge of engineering, supply, construction and operations.

William Morton, city engineer of Kelso, Wash., has been selected as the new engineer-supervisor of Consolidated Diking Improvement District No. 1, to replace **E. V. Berg**, scheduled for retirement. If approved by the county commission, he will be

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Here is a great new production saw with the power and accuracy you need for high-speed work — yet low price! In the new UTILITY model you get all the quality features that have made the COMET line the first choice of builders everywhere. See the UTILITY demonstrated at your dealer's or on your job. Write for complete catalog information.

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a part-time engineer for the District and will continue his duties as city engineer.

A new firm, with headquarters in Albuquerque, New Mex., has been incorporated to engage in professional engineering, including consulting engineering, design and construction. Members of the new firm, known as Ken Engineering, Inc., include **Erwin J. Klink**, **Wallace C. Eberhart** and **Edgar D. Nunns**.

Establishment of engineering scholarships, open to young men of Southern California, has been announced by **Holmes & Narver, Inc.**, Los Angeles engineer-constructor firm. The scholarship funds provide a grant of \$10,000 for four years at the Massachusetts Institute of Technology and



J. T. Holmes

D. L. Narver

\$8,000 for a similar course at Stanford University. **James T. Holmes**, president of the firm, is an alumnus of MIT, and **D. Lee Narver**, executive vice president, is a graduate of Stanford. Applicants must be residents of Southern California, in financial need, and students of civil, mechanical, electrical, chemical or industrial engineering. Preference will be given to students who intend to work in engineering fields concerned with construction or with commercial or industrial plant design.

Charles E. Haley has been appointed acting traffic engineer of Phoenix, Ariz., taking over the duties of **R. W. Morris**, who died recently.

Daniel Lee of Forest Grove, Ore., is the new city engineer of Baker, Ore., succeeding **Jack Gray**, who resigned the end of the year to become Umatilla County engineer.

E. H. Philip Smith, engineer recently with Macco-M-K at Crescent City, Calif., is now employed as an estimator with the Macco Corporation, Paramount, Calif.

L. E. Hall and **John C. Wiebusch** have been employed by the Washington Power Commission to aid in the study of power problems. Hall was formerly with the Corps of Engineers and Wiebusch was associated with the Bonneville Power Administration.

L. E. Hough, until mid-1953 city engineer of Aberdeen, Wash., has accepted a resident engineering position with the Alaska Road Commission. He expects to spend two months in Juneau before being assigned to engineering duties in the Mount McKinley area.

Robert C. Downer licensed Nevada civil engineer, was recently appointed as county road commissioner for El Dorado County, Calif. He fills the post vacated by **Herbert F. Abell** who is now road commissioner in Placer County, Calif.

Roy A. Klein, highway design engineer for the Fort Worth, Texas, Division Office of the Bureau of Public Roads retired Jan. 22. He had been with the BPR since 1933, serving as division design engineer at Denver for eight years prior to his Fort Worth assignment. At one time, from 1923 to 1932, he was state highway engineer of Oregon. Klein is returning to Oregon and will live in Portland.

J. Walter Barham succeeds to the position of city engineer of Coos Bay, Wash., left vacant by the retirement of **George McGee**.

CALENDAR

April 22-23—Western Concrete Pipe Association, 35th annual meeting at Fresno Hacienda north of Fresno, Calif.

April 23-24—American Society of Civil Engineers Pacific Northwest conference at Davenport Hotel, Spokane, Washington.

Apr. 28-May 1—Pacific Southwest Local Sections, ASCE, conference, at Sacramento, Calif.

April 30-May 1—Northwest Conference, ASCE, annual meeting, at Spokane, Wash.

May 27-29—California Society of Professional Engineers, annual convention and trade show, at Mark Hopkins Hotel, San Francisco.

Sept. 16-18—Western Association of State Highways Officials, 33rd annual conference, at Challenger Inn, Sun Valley, Idaho.

Oct. 14-16—Structural Engineers Association of California, annual convention at Hotel Del Coronado, San Diego.

Oct. 28-29—American Concrete Institute, regional meeting at Statler Hotel, Los Angeles.

DEATHS

H. A. Van Norman, 75, retired general manager and chief engineer of the Los Angeles Department of Water & Power, died recently in a Hollywood hospital of a heart ailment. Van Norman served thirty-seven years with the Department, beginning his career there as a construction superintendent. When he retired as general manager and chief engineer in 1944, he left an unusual record of achievement, projects costing over \$500,000,000 having been built under his supervision.

Carl F. Braun, 69, founder and head of C. F. Braun & Co., Alhambra, Calif., died at Pasadena, Calif., as a result of a heart attack. The firm, of which he was president, was one of the nation's largest companies in its field, having designed and constructed chemical plants valued at \$300,000,000.

Clyde B. Thompson, 68, civil engineer with Los Angeles County for twenty years, died recently at South San Gabriel, Calif.

John J. Silva, 59, Siskiyou County, Calif., county road foreman, died recently of a heart ailment at a Yreka hospital.

Arthur L. Collins, 72, construction engineer, died of a heart attack recently at his Los Angeles home.

Albert E. Chandler, 81, Nevada's first state engineer, died recently in a Berkeley, Calif., hospital after a brief illness.

L. Glenn Hall, 60, planning engineer for the City of Oakland, Calif., died there after a week's illness. Before moving to Oakland last May he had been planning engineer of Sacramento.

Ernest F. Halverson, 59, a general contractor of Elk Grove, Calif., died after an illness of several months.

Walter P. Koetitz, 66, retired construction engineer, and former chief of the California Division of Housing and at one time city manager of Alameda, shot himself at his home in Nevada City, Calif. He had been despondent over failing health.

John A. Clay, 76, former assistant engineer, Utah Power & Light Co., Salt Lake City, died at his residence in Pasadena, Calif., after a lingering illness.

Performance Pays Off in Low Cost Production



Working on a highway relocation job in Arkansas for contractor D. B. Hill, "Euc" Scrapers of 12 cu. yd. struck capacity spread their loads on the run. Time saved in loading, speed on the haul, and fast dumping on the fill cuts down cycle time, steps up production.



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◀ Fast, easy loading with more pounds of payload than other equipment of comparable size on many competitive demonstrations has made Euclid Scrapers the first choice of contractors and an important part of their profit picture.

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with one man
and one machine!**

Western Contracting Corp. found the Twin-Power Scraper a versatile machine for their work on the Ohio Turnpike. On one section, carrying average loads of 23 cu. yds., a complete 4700' cycle was made in only 5.3 minutes. Top extensions increased the struck capacity to 21 cu. yds.

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EUCLID DIVISION

GENERAL MOTORS CORPORATION
Cleveland 17, Ohio

SUPERVISING the jobs

George Boyer is general superintendent and Robert Faris is project engineer on the Continental Can Co.'s new tinning and lithographing plant at Pittsburg, Calif. General contractor is J. H. Pomeroy & Co.

Homer McCallam is superintendent for Foster Construction Co. on the construction of two prestressed concrete reservoirs at Albuquerque, New Mex. Ray Prouhet is general field superintendent and Joe Pino is engineer. Foster won the award on a bid of \$325,130.

Larry Arpin, superintendent, assisted by foreman Gordon Elmore, is in charge of the \$187,800 contract recently awarded Vega Engineering & Grading Co. for earthwork and clearing in connection with the rehabilitation of 24 mi. of drains, Unit BW-1, Middle Rio Grande Project, New Mex. Work started the end of January 1954 and is expected to be finished in a year's time.

"Pinky" Randall, working under the direct supervision of Manager George Savala and Assistant Manager William C. Schoof, is supervising the work of 1.3 mi. of widening and surfacing in Santa Monica, Calif. Roy Camarillo is concrete foreman and Joe Martino is grade foreman. George Savala Paving Co. received the contract on a \$224,383 bid.

John E. Alexander is superintending his company's \$100,124 contract for construction of Northrup Road and N. P. R. R. overcrossing, S. S. H. No. 2-A, King County, Wash. Alexander has the assistance of Sandy Gorsuch, labor foreman, and Lloyd K. Morris, carpenter foreman.

L. F. deStwolinski, superintendent for Goudeseune Construction, Inc., is supervising a \$299,999 storm job contract on Imperial Highway, El Segundo Blvd. and 135th St., in El Segundo, Calif. Work involves 9,500 L. F. reinforced concrete pipe, with cuts varying from 10 to 35 ft.

Herman Brenden is superintendent for Boen-Koon & Egge-Cummins Construction Co., which has a \$467,-

000 contract for the building of an arctic training base shop, paved apron and utilities at Big Delta, Alaska. Work starts May 1 and is expected to run for 210 days.

Floyd Hardenbrook, superintendent for Boen-Koon & Egge-Cummins, will supervise the construction of a \$2,215,500 high school building in Fairbanks, Alaska, work on which is scheduled to start May 1. Pete Wal-maki is carpenter foreman.

Jess Moore, superintendent for Taggart Construction Co., is heading a \$329,259 contract covering 8.6 mi. of grading, gravel surfacing and oiling on the Norris-Bozeman road in Gallatin County, Mont. Don Turly is timekeeper for the job.

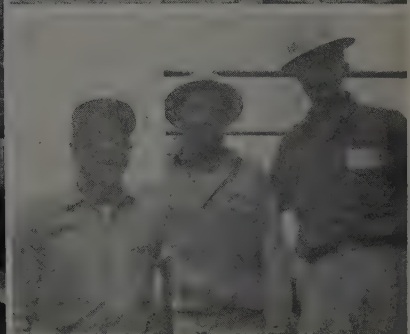
Fred Carlson, with the assistance of Nels Hansen and Paul Lutes, is supervising the erection of a high school in Hayward, Calif., for Williams & Burrows, Inc., who received the contract on a bid of \$1,404,670. William H. Carr is field engineer.

George A. Grant is general superintendent and Paul Spletzer is superintendent on the \$293,255 contract held by Erwen Construction Co. for building two railroad undercrossing siphons for the Chandler Lower Canal near Prosser, Wash. E. D. Campbell is purchasing agent.

Willis Morris, grading superintendent; Fay Ramsey, crushing superintendent, and John Hunter, oiling superintendent, are in charge of 6.7 mi. of grading, gravel surfacing and oiling work on the Cleveland-Chinook road, Blaine County, Mont. This \$133,-205 contract was recently awarded to Hilde Construction Co., Inc.

J. M. (Jack) Bean is Harms Bros.' superintendent on an aggregates-sand contract on Stockton Blvd. in Sacramento, Calif., for the Pacific Gas & Electric Co. Bill Tregambo is general plant operator. Job will probably run through 1955.

KEY MEN ON POWERHOUSE JOB—*Jess W. Hoopes* (upper left), superintendent, heads Walsh Construction Co.'s forces building the P. C. & E. Pit 4 powerhouse at Big Bend, Shasta County, Calif., a \$1,400,000 job. (Upper right) *Bill Flint* is chief inspector for P. C. & E., *George W. Bowman* is general foreman, and *Art Borron* is labor foreman. (Lower left) *James C. (Sparky) Mathis*, tunnel foreman, and *Jack Reed*, surge tunnel superintendent. (Lower right) *Nebb Bedross*, master mechanic, *J. O. Carleton*, mechanic foreman, and *James L. Storey*, carpenter superintendent. Not shown is *Pat Feeny*, job engineer.



R. Y. McCarthy, superintendent; **D. C. Richey**, engineer, and **H. H. Sawyer**, office manager, key men under the supervision of **R. B. Grose**, vice president in charge of construction, are directing the construction of electrical distribution systems and Navaid buildings at Ladd and Eielson AFB, Alaska, for Yukon Electric Corp. Work on the \$746,060 contract started in February and the job is scheduled to be finished the end of 1954.

Earnest Redfern is job superintendent for North H. Plunkett & Co. on its \$664,584 contract for a reinforced concrete conduit in Aliso Creek in Southern California. Other key personnel on the job are **Dan Pardee**, engineer; **Joe Caslillo**, concrete foreman, and **Bob Twadell**, mechanic.

William Hostetter, superintendent, assisted by general foreman **B. W. Stonecipher** and concrete foreman **Dick Job**, is in charge of the erection of 273 stucco dwellings at West Covina, Calif. Work on the tract is under way now, and houses are going up at the rate of eight a day. Hadley-Cherry, Inc., holds the \$1,911,000 contract.

George Trivitt and his assistant **Joe Kubich** are superintending the Ettie St. storm sewer work in the city of Oakland, Calif. (*Western Construction*—Feb. 1954, pp. 65-66) for Stolte, Inc., who is doing the work at a cost of \$372,000. Among other key personnel are: **Leo Durocher**, mining foreman; **Frank Contardi**, labor foreman; **Kenneth Nance**, pipelayer foreman, and **Bob Bowen**, pile driver foreman.

J. H. Nelson heads the supervisory forces constructing the stockhouse and bottling plant of the San Francisco Brewing Corp. (Burgermeister) at San Francisco for Cahill Bros., Inc., contractor. Other key personnel on the job are: **Adrian Nelson**, general foreman; **J. W. Nixon** and **I. S. Davis**, carpenter foremen; **D. Lindauer**, labor foreman; **P. Vollhardt**, cement finisher foreman, and **E. W. Jose**, timekeeper. Among the subcontractors and their foremen are: Brick-glass-tile: **George W. Reed**; **Fred Hooper**, foreman. Acid-proof brick floors and glazed structural tile: **Persson & Wik, Inc.**; **George Boehle**, foreman. Electrical work: **Buzzell Electric Co.**; **Jim Ruble**, foreman. Plumbing-heating-air conditioning: **James A. Nelson Co.**; **Sam Piccoli**, plumbing foreman. Work on this structure is drawing to a close.

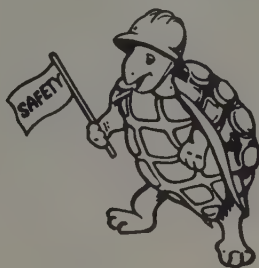
William E. Roche, Jr., superintendent, and **B. F. Lockwood**, project engineer, are key men on a \$4,387,000 job of Peter Kiewit Sons' Co. for Bay-

shore Highway construction at Berkeley, Calif. Others in supervisory positions are: structural superintendent **Homer Olson**; master mechanic **Henry Vogt**, and the following foremen: **Ray McClarrinon**, general; **John Kaufmann**, grade; **Orville Saalfeld**, **Fred Burton** and **Barney Holder**, carpenter; **R. C. Brown**, labor; **Bill Turnbow**, concrete; **Jim Wilson**, pipe, and **Sam Eldridge**, finishing. **Dave Scott** and **Dick Russel** are engineers.

A. H. Ashley is office manager. Job is expected to be completed by October 1955.

John Ford, superintendent, and his assistant **William Goss**, with project manager **Don Weaver**, comprise the supervisory personnel on the substructure of the Richmond-San Rafael bridge for the San Francisco Bay Toll Crossings. Other key personnel on this \$14,200,000 contract held by Ger-

Are you qualified for membership in the "Turtle Club"?



Among those recently qualifying for membership in the distinctive "Turtle Club" are the following Western construction men:

Mark M. Clayton, supervisor-engineer for the Portland, Ore., District, Corps of Engineers, reports, "I am now alive because of a hard hat. Today (Feb. 1, 1954) while making a routine inspection of equipment installation at Lookout Point Powerhouse near Lowell, Ore., for the Engineers, a metal case fell from an overhead crane. The object landed squarely on my hard hat, leaving a rupture (in the hat) about 3 in. long. I was stunned by the blow, but I was not injured. There can be no doubt that even the so-called thick skull of a construction engineer could not have remained intact after stopping the 70-ft. fall of the metal case. Shortly after the accident, Tom Waring, assistant resident engineer at the project, handed me page 117 of Jan. 1954 *Western Construction*, and said, 'You're now qualified for membership in the Turtle Club.' 'If I am,' I said, 'I had to wear a hard hat for 15 years before it happened.'"

Elmer Johnson, employed by the Diamond Match Co. Cedars Operation in Superior, Mont., was bucking up a fallen tree when his partner felled a 60-ft. tree in back of him. The tree,

when it fell, dislodged a dead tree about 9 in. in diameter, which struck the side of the hard hat Johnson was wearing. Though he received two broken vertebrae and lost a week's work, he was spared more serious injury by his hard hat.

Onius Dickey, employed by the Edward Hines Lumber Co. in Seneca, Ore., sustained an injury to his shoulder. A tree which had just been felled, struck the top of another tree. Dickey, after waiting for falling limbs, thought everything was clear. He stooped over to begin work again when a 100-lb. green limb, which evidently had been hung up, fell, striking Dickey. His hard hat deflected the limb so that the full impact was broken by his shoulder. He was unconscious for over 4 hr., but is alive today because he had on his hard hat.

Donald W. Hines, an employee of the Salt River Power District, Phoenix, Ariz., not long ago was assisting in the installation of some rubber protective equipment in preparation for some maintenance work while a power line was being energized. A lineman atop a pole suddenly lost his hold on a 5-ft.-long, 6-lb. rake-stick and as it dropped 25 ft. to the ground it struck Hines' hard hat. Fortunately for him, he had remembered to put on this piece of safety equipment, thus saving himself from serious injury or death.

If you have had a similar experience to those reported above and can substantiate the facts, send in a request for an application blank to Editor, *Western Construction*, 609 Mission St., San Francisco 5, or to E. D. Bullard Co., 275 Eighth St., San Francisco 3. On qualifying as a member of this unique organization, you will receive a scroll of membership, and a pin in the shape of a turtle to be worn on your lapel.

wick-Kiewit are the following: William Talbot, project engineer; Bob Harvey, carpenter superintendent; Harry Larson, equipment superintendent; Hans Feibusch, concrete superintendent; Jack Rosiach, tug-master; John Darby, office engineer; Tom Collins, field engineer; John Hay, office manager, and Jim McClees, purchasing agent. Among the foremen are: William McCrae, carpenter; William Ferraris, Dick Venbrugge and Harry Bridgewater, pile-driver; Harris Edner, C. A. Bond, F. P. Dugan and Alfred Felix, derrick; H. E. Harris and C. J. Ripley, batch plant; W. R. Gibson, weld bridge, and W. B. Hames, dock.



Mike Cremarosa (left) and Ed Curtis head the Transocean Engineering Corp. personnel working on a \$230,000 bridge and road job 5 mi. east of Whitmore, Calif. Also working at the site is Arnold Olson, mechanic. Lynn Parker and Leroy De Martin are county engineers.

Rodney Harrison, project manager, and Dalton Highfill, superintendent, are top men for the Payne Construction Co., which has a \$176,000 contract on construction of the Richmond-San Rafael Bridge in California. Others working on this job are: Walt Goss and Hank Tigri, pile-driver foremen, and Tony Travers, master mechanic. George Purser is inspector for the State, assisted by Bill Blank.

Tony Caputo is general superintendent for the \$1,199,103 job recently awarded his company for erection of a portion of a steel bridge and 2 mi. of approaches in Sacramento County, Calif. He is assisted by Russell Woods, grading superintendent, and Jim Andrade, general foreman.

A. B. Gonzalves is superintending the erection of an office and laboratory designed and being built by The Austin Co. for Underwriters' Laboratories, Inc., Santa Clara, Calif., at a cost of over \$500,000. Others in key spots are: Foremen—B. E. Eather-ton, carpenter; C. L. Jenkins, steel; L. A. Dunham, labor; and Alex Grossi, mason. T. B. Hall is accountant.

Joseph L. Farrell is general superintendent on a \$2,500,000 freeway construction contract held by Granite Construction Co. Work involves 8.3 mi. of San Jose-to-Warm Springs highway in California, including six concrete structures and two railroad bridges. The following men are assisting Farrell: N. E. Montgomery and Tony Bruno, grade foremen; William Jensen, structure foreman; James Gaither, labor foreman, and Curley Toles, master mechanic. Rudy Larson is office manager. Resident engineer is Lee Marks.

Don Shupp, with his assistant Vernon Casey, is supervising the \$3,000,000 outfall cooling water conduit at Redondo Beach, Calif., being built by the Macco Corporation for Southern California Edison Co. Other key personnel are: Superintendent assistant Pete Christensen; job engineer Jack Christensen; master mechanic Ray Jones, and the following foremen: "Slim" Hall and Floyd Capps, pipe-layer; Chet Davis, Ted Smith, Bud Ferris, Norman Swanson and Marvin Green, pile-driver; Jack Hendricks, "Doc" Blum and Chuck Higginson, framing; Carl Lemley, excavating; and Shorty Meyers, welding.

Leo Angers is superintending some general construction work at Duns-muir, Calif., for Earl W. Barnum, contractor who is doing the \$160,000 job for Robert Cornet.



R. K. Plumber is structure superintendent for Fredrickson & Watson who is doing a stretch of highway work at Walnut Creek for the California Division of Highways.

Harold Nielsen, project manager, and Dick Nickles, job engineer, are top men for the Continental-Heller Construction Co. which is erecting the Lassen Junior High School at Sacramento, Calif., a \$1,705,000 project. Foremen are Al Miller and Frank Sanchez, carpenter; and Manuel Menchaca and Clifton Larry, labor. Inspectors for the school district are Sam Dudley and Sid Osborne. Sub-contractors are: Electrical, Collins Electrical Co., foreman Dick Abram-

son; plumbing, M. R. Carpenter Co., foreman Jim Rotz; heating and ventilating, C. B. Hodnett & Son, foreman Bud Clark.

R. J. Dietrich, chief engineer and project manager; F. C. Harp, general superintendent; Gus Klammer, job superintendent; Tony Perrotto, concrete foreman, and John Leigh, job clerk, are key men on the construction of a \$3,000,000 plant for the Grayson Controls Division at Long Beach, Calif., contract for which was won by Lindgren & Swinerton, Inc.



Left to right: Howard Donne, project manager; Robert Busse, superintendent; H. A. Sutton, assistant superintendent; and J. Blatlock, labor foreman are the key men for Stoltz, Inc., contractor on the Anglo-California National Bank being erected at Redding, Calif., at a cost of \$440,000. Work has progressed on schedule and job is about finished.

Martin Bassett is project manager, Don Yates is general superintendent, and Charles Barden is assistant superintendent for Lawrence Construction Co. on the East Yolo High School being erected for the Woodland School District at West Sacramento. Ronald Miller is foreman. A. A. Church is inspector. Collins Electric Co. has the electrical work; Pete Goggia, foreman. Robert Rasmussen is foreman on the plumbing subcontract, and Bill Fleishman on the heating subcontract.

W. T. Spencer and Wayne Kaapala, superintendents, assisted by J. T. Murphy, John Vichrey, W. C. Wentworth and A. Bandiecci, are in charge of highway construction in the vicinity of Davis, Calif., for Gordon Ball & Son-Ramon Valley Land Co. which received the \$100,000 contract from the State. W. H. Carson is office manager. Jay Row is company engineer.

Lee J. Clary and R. G. Castle are superintendents for Raymond Concrete Pile Co. (for Cantor & Coull) which is doing the pile driving in connection with the new State Employment Building covering two city blocks in Sacramento, Calif. Robert

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Clark is pile-driver foreman; **Pete Stefani** is operating engineer, and **Robert Stephenson** is labor foreman.

F. M. Stevenson, superintendent, assisted by carpenter foreman **B. C. Jeffcoat**, is supervising the erection of a \$1,034,333 building in Sacramento for the California Department of Agriculture. **M & K Corp.-Fredrickson & Watson** is executing the contract. **F. A. Lynch** is timekeeper. **Ed Peck** is foreman for **Collins Electric Co.**, subcontractor; **Bob Perryman** for **Luppen & Hawley, Inc.**, plumbing subcontractor; **Stanley Brown** for **Marelich Mfg. Co., Inc.**, heating and ventilating subcontractor.

Bob McChesney, project manager; **Clark Draper**, carpenter superintendent, and **Paul Clifton**, project engineer, are among the top personnel of **Stolte, Inc.**, who is building the Student Memorial Building at Davis for the University of California, a \$860,000 contract. Foremen are: Carpenter—**Jim Stalnaker**, **Chuck Jones** and **Jimmie Lansdon**; labor—**Les Wells**. **Don Mahony** is Sacramento area superintendent. **Al Goodyear**, **Norm Nelson**, **Bob Cook**, **Pete Clay** and **Buck Clay** are key men at the site for various subcontractors.

J. H. Lonsdale is construction supervisor on the \$9,500,000 project started in January at 7th to 9th at Capitol Mall, Sacramento, Calif., for the State. There are two buildings being erected; one a temporary office structure and the other a central office building.

Doug Pyle, project manager, and **Dick Payne**, general superintendent, with construction engineer **Case Rutledge**, head the construction forces of **George A. Fuller Co.**, contractor on the \$3,500,000 addition to the Campbell Soup Co. manufacturing plant at Sacramento, Calif. Others among the key personnel include **George Coates**, expeditor; **John Crispo**, accountant; **George Horton**, field engineer. Carpenter superintendents are **Glen Hartshorn**, **Theirl Harvey** and **John Goggans**. Important personnel for **Mehring & Hanson Co.**, mechanical subcontractor, are **R. F. Boeklen**, project manager; **R. E. Harrington**, superintendent; and **Charles R. McLaren**, mechanical superintendent. **George Curran** and **Charlie Stewart** are two other key men working for subcontractors at the site. **Stan Bate-mann** is engineer for the owner.

Roy Fluggare, superintendent, and **James Plum**, bridge superintendent, are **Francis H. Holland's** key men on this contractor's \$118,290 job of building 4 mi. of forest road, U. S. 191, 30 mi. south of Bozeman, Mont.



Ben Morgan, **Walt Trublood** (above), and **Clyde Trublood** comprise the top supervisory force of the **Morgan Construction Co.**, responsible for ramrodding through the company's general construction work in and around Redding, Calif. **Bill Short** is their master mechanic.

Homer May, job superintendent, and **Al Jensen**, project manager, are at Los Alamos, New Mex., heading up the building of a 4-story reinforced concrete laboratory and administration building, contract for which was recently awarded by AEC to **Farnsworth & Chambers Co., Inc.**, at a cost of \$4,574,625. Job is expected to be completed the middle of next year.

Earl W. Allison is superintendent for **L. P. Stubblefield** who holds the \$205,000 contract for 6 mi. of roadbed widening and paving on Territorial Highway in Lane County, Ore. **Svend Lobek** is crusher foreman and **Jos. O. Chaffin**, quarry foreman.

William A. Ralston is project superintendent and **Thomas B. Easterling** is job superintendent, working for **Morley Building Co.** which is building the additions to the high school at San Marino, Calif., a \$1,174,000 contract.

Lee Stephens, grading-paving supervisor; **Al Canfor**, bridge-piling supervisor, and **Ken Foote**, bridge superintendent, are top men for **Stolte, Inc. & Stephens Trucking Co.**, contractor on a \$243,000 job of 1½ mi. of grading and surfacing and a reinforced concrete bridge in San Joaquin County for the California State Highway Department.

L. J. Curtis, excavating superintendent, and **Keith Hardin**, bridge superintendent, are supervising a

highway job for **Cherf Bros. & Sand-kay, Inc.**, which recently received the \$240,000 award for ½-mi. **Kennewick Interchange**, P. S. H. No. 3, Benton County, Wash.

Walter Kaucher, project manager, and **Chester D. Rhodes**, project superintendent, are directing the work of constructing a 2-mg. reinforced concrete reservoir at **Beverly Hills, Calif.**, contract for which was recently awarded **Kaucher** on a bid of \$151,250.

Louis Richter, general superintendent under the direction of **John L. Connolly**, project manager, is supervising the work of constructing two jetties and raising two jetties for the city of Long Beach, Calif., contract for which was recently awarded to **Connolly-Pacific Co.** on a bid of \$1,769,350. Purchasing agent for the job is **Robert Tudor**. **Joe Barnett** is engineer.

Milo Lubanko, superintendent, with the assistance of **Leslie Basich**, is directing grading and surfacing work on U. S. 80 in Imperial County, Calif., a \$324,500 award recently won by **Basich Bros. Construction Co.** and **R. L. & N. L. Basich**. **John Hasich** is acting as grade foreman on the job.

Peter Van den Haak is project manager for **Fred J. Early, Jr., Co.**, Inc. and **Stolte, Inc.**, contractors who got the \$2,977,000 award to build runways and taxiways, lighting, grading and draining at **Palmdale, Calif.**, for **Lockheed Aircraft Corp. W. (Bill) Miller** is superintending the concrete work, **Lee Stephens** the dirt moving, and **U. N. (Bob) Chandler** the carpenter work.

James H. Beagle (below), superintendent, and **Charles D. Davis**, assistant superintendent, are in charge of the work at the ready-mix sand, gravel and cement products plant of the **Oaks Sand & Gravel** at **Clear Creek**, 5 mi. south of **Redding, Calif.** Dispatcher is **Hubert Vanderwerf**, head mechanic is "**Doc**" **Tinsman**, plant operator is **Traugott (Shonty) Mautz**, and batcher is **Earl Schultz**.



Herman Brenden, building superintendent, and Fred Pankratz, heavy equipment superintendent, are key men for Boen-Koon Construction Co. which is building nine underground ammunition storage magazines and an access road at Big Delta, Wash., for the Corps of Engineers. This is a \$308,000 contract.

C. R. Williamson and W. Vernon in the superintendent spot, and J. K. Sutherland, engineer, comprise the top personnel of S. M. McGraw Co., which is working on a \$151,000 contract installing sanitary sewers at Stockton, Calif., a county job.

Arch Johnson, superintendent, and his assistant Loren Olsen are directing the work of erecting Macy's Department Store in Hillsdale, San Mateo County, Calif., for Haas & Haynie who got the contract on a bid of \$6,318,000.

Bill Loy, superintendent, with the help of J. R. Beadles, underground superintendent; Jack Skaggs, concrete superintendent; and M. Sandwin, grade foreman, is directing Fredericksen & Kasler's \$566,000 contract for 4 mi. of grading and surfacing and a reinforced concrete slab bridge in Ventura County, Calif., for the State.

SAFETY

Job accidents take their toll

THESE were the accidents that resulted in death or serious injury on the West's construction jobs during the last reported month.

Virgil Naugle, 66, in mid-February was assisting in loading a tractor on to a truck near Pentz, Butte County, Calif., when the heavy equipment rolled and slid downhill. He suffered a fractured hand and elbow as he fell to the pavement while endeavoring to escape the rolling tractor.

Doyline Spencer, 46, a city employee of San Diego, Calif., was killed by a run-away 10-ton street grader on Feb. 4. He had tried to jump back to the seat of the grader, which had started moving while he was adjusting a man-hole cover. He missed and slid under the wheels.

Warren Craig, 25, died Feb. 4 as a result of head injuries sustained when he fell 20 ft. to a concrete floor while working on a construction job for the Campbell Soup Co. in Sacramento,

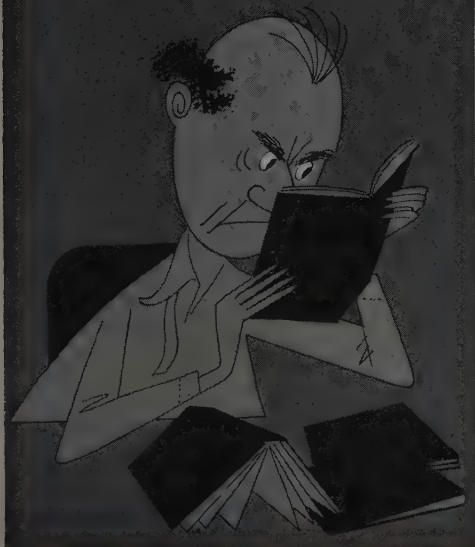
Calif. Craig, a steel worker for Union Steel Co., was hitting a piece of iron with a hammer when he lost his balance and fell backwards.

Roscoe Hulse, Jr., on Feb. 25, escaped serious injury or possible electrocution when he came in contact with a truck which had been energized by a 12,000-volt power line. He was part of a lineman crew removing a power pole which fell against the line and contacted the truck.

James J. Wanke, Donner Lake, Calif., suffered severe injuries when his clothing caught in the whirling drive shaft of a rotary snow plow. He had left the cab of the truck to investigate a mechanical failure under the truck and failed to shut off the motor. As he reached up to see what the trouble was his clothing caught on the shaft, thrashing him against the bottom of the truck. His wife arrived just as the accident occurred and shut off the motor, thus saving him from probable death.

ACCIDENTAL DEATHS and serious injuries on the West's construction jobs are reported each month in the interest of promoting safety-on-the-job.

*In the dark
about wholesalers?*



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The Yellow Pages contain accurate, up-to-date listings of wholesalers, manufacturers and local distributors in your area. Besides their names, the Yellow Pages tell you where they are and how to reach them. So, check the Yellow Pages first. It's the business-like way to reach almost all other business firms and find the product or service you need.

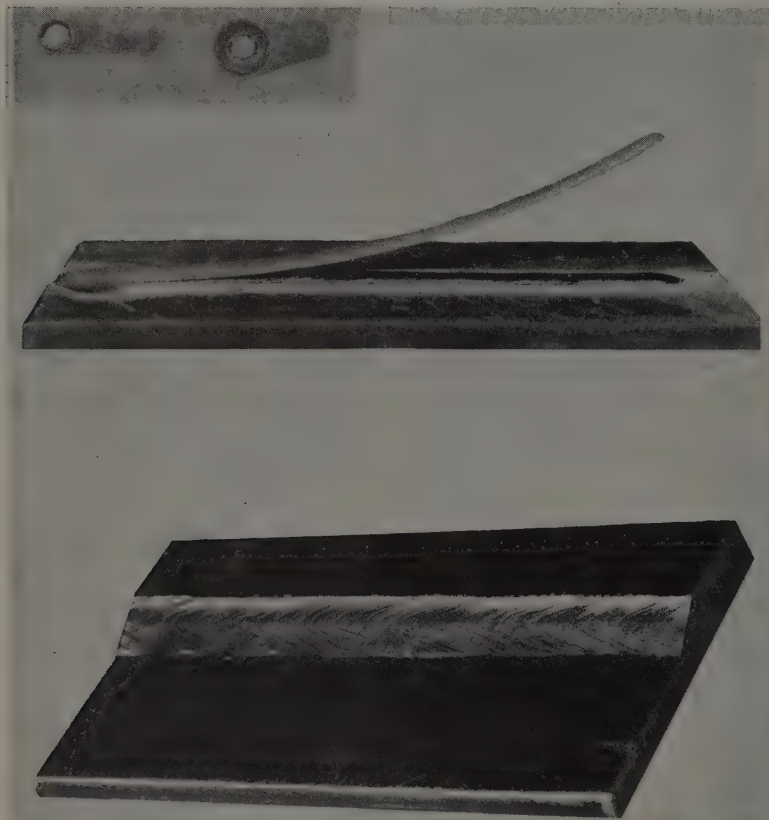
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Pacific Telephone

TRICKS of the TRADES

Electrodes coated with powdered metal increase welding speeds by 50%



PARTIALLY USED conventional electrode (top left) compared with electrode with powdered metal coating (right) shows how crucible forms in end of the powdered coating. Slag formed from powdered metal coating (center) has lifted from the bead as it cooled. Bottom is a horizontal lap weld made in 1/4-in. plate with a 1/4-in. dia. electrode. Arc speed, 18 in. per min.

HEAVILY-COATED electrodes containing large quantities of powdered metal in their coatings obtain increased welding speeds on the order of 50%, with appearance in smoothness and freedom from spatter almost equal to that obtained with automatic welding, according to L. K. Stringham, chief engineer for the Lincoln Electric Co.

The development of electrodes with powdered metal in their coatings is a milestone for construction and metal fabricating industries. Although these

electrodes are still new, (commercially introduced with Jetweld in October of 1953 by The Lincoln Electric Co.), cost reductions already obtained in production welding indicate that welding procedures will shortly be completely revised to new standards. Powdered iron electrodes will obsolete existing electrodes like the jet plane has obsoleted propeller-driven fighter planes.

Calculated conclusion

This is not an opinion but is a calculated engineering conclusion. The basic fundamentals of the arc welding process have led inevitably to the development of powdered metal coatings and, therefore, inevitably secure their position in welding progress.

In general, as welding current increases, the speed of welding increases. The electric arc drawn from the end of a welding electrode performs the three functions of melting the core wire, melting the coating of the electrode, and melting the edges of the parts to be welded together. An increase in welding current increases the speed with which the arc can perform these functions. For any given size electrode, welding speeds can be increased until a maximum usable current is reached. Beyond this maximum current, a further increase causes difficulties which result in unsatisfactory operation. The difficulty may be an overheated electrode causing a breakdown of the coating, it may be too much penetration, gouging of the parent metal, or too much spatter. In any case, the effect is to impose a top limit on welding speed.

Electrodes with powdered metal coatings are designed to raise this top limit on welding speeds by eliminating or reducing the effect of these difficulties.

Excess heat cuts speed

The major cause of operating difficulties that limit welding speeds is the fact that the welding arc normally creates more heat than can be effectively used by conventional electrodes in melting the parent metal, the core wire, and the coating. This excess heat usually is expended in melting an excessive amount of parent metal. The arc force throws this excess and some of the melted core wire out of

Typical welding currents and speeds

Electrode Size	Current Amps	Polarity	Fillet Size	Arc Speed Inches/Minutes
5/32"	225	AC	7/32"	15
5/32"	200	DC (+)	7/32"	12.5
3/16"	275	AC	1/4"	15
3/16"	250	DC (+)	1/4"	12.5
7/32"	300	AC	9/32"	15
7/32"	270	DC (+)	9/32"	12.5
1/4"	350	AC	5/16"	14
1/4"	300	DC (+)	5/16"	12

the molten pool. The result, depending on the application, may be too much penetration, gouging, undercutting, and spatter. The correction for the difficulty with conventional electrodes is, of course, to cut back on the amount of current used and slow up welding speeds until satisfactory operation is obtained.

Electrodes with powdered metal coatings use the excess heat available in the arc to increase welding speeds. The powdered metal in the coating is melted by this heat and becomes an additional source of metal for the weld, thus permitting an increase in welding speeds. The difficulties of excess current, spatter, gouging, and undercutting, are minimized and additional metal is available to make full welds at the higher speeds.

50% faster

If an electrode contains sufficient iron powder in the coating to supply one-third of the deposited metal from the coating and two-thirds from the core wire, that electrode can deposit metal 50% faster than the same size electrode without iron powder in the coating. Proper balance is necessary between coating and core wire, for if too much iron powder is put into the coating, so much of the heat of the arc may be absorbed by melting the coating that there will not be enough to melt the parent metal and core wire.

In addition to reducing spatter, undercutting, and gouging, this more efficient use of arc heat by powdered metal coatings also reduces overheating in electrodes. Overheating is an operating difficulty frequently encountered on welding applications where the rate of metal deposition is the only controlling factor on welding speeds. The temptation is to push welding current up to its maximum, since current controls the rate of metal deposition. The danger is that of overheating the electrode to a red hot condition by forcing it to carry more current than its size warrants. A red hot core wire will break down the electrode coating so that it cannot perform its functions satisfactorily. The limit to welding speed, therefore, becomes the maximum current which can be used without producing a red hot core wire.

More metal available

Powdered metal electrodes effectively raise the limit on welding speeds imposed by the current-carrying capacity of the core wire. More metal is available for deposition and the more efficient use of the arc heat permits increasing welding speeds without increasing currents.

For the electrode consumer, the efficient use of arc heat by powdered metal coatings means:

1. Lower welding costs through higher welding speeds.
2. Lower cleaning costs because of less spatter and undercut.
3. Smoother, more uniform welds.

TOOLS of the TRADES

Use the coupon on page 123 for free information on any of these items

401

FLAME CUTTING CATALOG—National Welding Equipment Co. has released a 36 page, welding and flame cutting apparatus catalog. The catalog lists and illustrates all of the equipment the average user of welding and flame cutting apparatus will require. Price list is included.

402

A FACT-FILLED, liberally-illustrated manual on the maintenance, servicing, and repair of the Gradall has been published by Warner & Swasey Co. This 28-page, quick-reference guide to good maintenance includes service recommendations and suggestions on the company's Model M-2460. The manual discusses simplified maintenance methods with the aid of more than 100 "how-to-do-it" photographs and schematic drawings. Supplementary data include a review of the hydraulic system, engine wiring diagrams, a graphic lubrication chart, and a comprehensive troubleshooting check chart in tabular form covering 25 specific operating problems and giving the probable cause and remedy for each. Fill out the coupon to get your free copy.

403

A REVISED MANUAL illustrating approved methods for doing many of the operations normally encountered in servicing and repairing International Harvester tractors has been issued by the Owatonna Tool Co. It includes in-



structions for removing and installing gears, bearings, pulleys, shafts, pre-combustion cups, cylinder sleeves, and injection nozzles, and in addition includes descriptions of complete tool sets, both manually and hydraulically operated, for special maintenance operations.

404

THREAD REPAIR KIT No. 34CS, designed for use in repair shops in all fields, has been announced by Heli-Coil Corp. This kit contains an assortment of 25 inserts in each of four commonly-used sizes as well as all tools necessary for the wire-insert method of thread repair. A printed direction sheet and photographs illustrating this thread repair method come with the kit. Tests have proved that threads repaired with wire inserts provide a minimum of 25%

greater loading strengths in all materials and are more resistant to wear, vibration, seizing, galling, and corrosion.

405

TWO NEW shear-type tools for cutting steel cable and wire rope have been developed by H. K. Porter, Inc. With passing jaws notched to lock the cable in during the cut, these shears have proved effective for all cable up to Brinell 400 or Rockwell C 42 hardness. The design minimizes crushing or deforming either coarse or fine-stranded cable in the cutting action. The No. 1 TN cutter cuts all cable through $\frac{3}{8}$ in. in diameter and the No. 3 TN cuts all cable through $\frac{3}{8}$ of an in. in diameter.

406

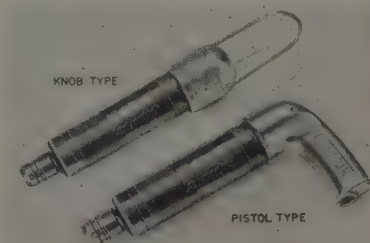
SAFETY GOGGLES for WELDERS—Watchmoke Optical Co. has announced its new Model 492 SV Stac-Vent goggle for welders which incorporates a new principle of ventilation to prevent fogging. The ventilation openings are shielded by a hood, and a heavy, opaque holder has pockets for replaceable 50 mm. round glass filter lenses, protected both inside and outside by hard plastic cover lenses. The goggle frame is large enough to fit over all prescription glasses. Three other models of the goggle are also available.

407

A PULLER for removing the pre-combustion cup on all International diesel engines has been announced by the Owatonna Tool Co. The tool, which is fast operating, provides a more positive grip, and will pull all cups regardless of their condition, consists of three sizes of expanding collets which grip the inside diameter of the cup, an expanding screw, a pulled screw, a sleeve, a forcing nut, and a ram when used hydraulically. This tool can be used manually as well.

408

A NEW CALDWELL HAMMER for drilling, chipping, trimming, scaling, sealing, and all around general application has been announced by the Burgess Thomas Co. This hammer weighs about 5 lb., is $9\frac{3}{4}$ in. long, and has a barrel diameter of $1\frac{1}{2}$ in. It is offered in two handle styles, the pistol and the knob. It is automatic in that it operates when pressed into contact with the work and stops when withdrawn. Tools are readily inserted, held firmly, and removed easily by hand from the push-pull, quick-change chuck of the hammer. It operates on air pressures of from 30 to 100 lb.



Resourceful old-time construction hand shows how to raise a smokestack by using his head

BACK IN THE OLD days, the smokestack of a small steam plant, which furnished power for a sawmill, had been burned out and the plant was shut down until the nearest steel fabricator could make up, deliver, and erect a new stack.

The fabricator's plant was some miles away, and the only way to ship the stack, after it had been made, was by means of a large, horse-drawn dray driven by a resourceful old-timer.

When this man pulled in with his load, he had the understanding that the shop's erecting crew would come out and erect the stack the next day. He found, however, that the mill owner was very anxious to get the stack erected with the shortest possible delay because he had customers waiting for the mill's output who were crowding him severely. He was so insistent on the need for speed that the dray driver felt he should help the project along if he could.

Enough material on hand

After a look around the mill, the driver decided that there was enough material in the way of ropes and blocks on the job to make the erecting job possible, if the right use was made of it by a man with the "know how" and some ingenuity. So, as an accommodation to the mill man he offered to put up the stack at once if the owner would supply a gang to help him in the job. The owner gladly consented to this division of labor, so the driver went to work getting the necessary materials ready for business.

His first step was to take his team and a couple of men with tools out into the nearby woods, there to select a proper gin pole, still standing in the area, and have these men fell it and

By H. B. McDERMID
Retired Construction Engineer

trim it up fit for service and use the team to drag it in to the mill. This pole had to be heavy enough to support the load of the stack safely, and yet not so heavy that the gang could not erect it by hand.

While the pole preparation was in progress, the driver hunted up rope and tackle blocks. When the pole appeared, he attached guy lines to hold the pole erect. These guy lines and the lift-tackle block were put in place on the pole as it lay on the ground, thus doing the work as easily as possible.

Lower end hung heavy

Next the pole, which when erected stood somewhat over half the stack's height, was raised. Then the lower block's hook was attached to the stack in such a location that when it was picked up the lower end would hang a trifle heavy. The permanent stack guys were attached to the stack while it lay on the ground, one of them being used for a tag line to control the sway of the stack as it was being hoisted. Another necessary tag line was attached to the stack near its base. The two tag lines, when manned, could thus keep the load under control so it could not swing where it could interfere with its proper hoisting.

While the crew was attending to this work, the driver, as their foreman, was busy figuring what he could use for hoist power; since his manpower was not sufficient to handle guy lines and still haul hard enough on

the rope falls. His team had power enough but was not dependable enough; the horses might easily ruin the job by their lack of control. His dray stood there idle. As he noted the high hind wheels the solution came to him.

Wheel made emergency winch

He placed the dray in an appropriate position, blocked up one end of the rear axle, anchored the axle so it would stay in place (some rope and solidly-driven stakes took care of that detail) and, with the big wheel turning free, had an emergency winch ready for work. A husky man on each side of the rim (front and back) gave enough power to wind the haul rope of his hoisting blocks around the wheel hub to serve as a winding drum or "nigger head," as the rigger calls it. When his two muscle men were placed, with a third man on the winding drum rope to take up slack and a man on each tag line, he was ready to go.

The rig proved to have ample power and the hoisting went on without incident until the stack was high enough and hanging nearly horizontal at the top of the gin pole. Then, by pulling on the tag line attached to the base of the stack, he was able to up-end the stack and set its base down in its prepared location. Then the permanent guy lines of the stack were attached to their anchorages and the stack was ready for service just as soon as their rigging was removed. Because the lower end of the hoisting falls was the only hitch that was above the center of the stack's height, and it only slightly higher, the dismantling did not present much of a problem.

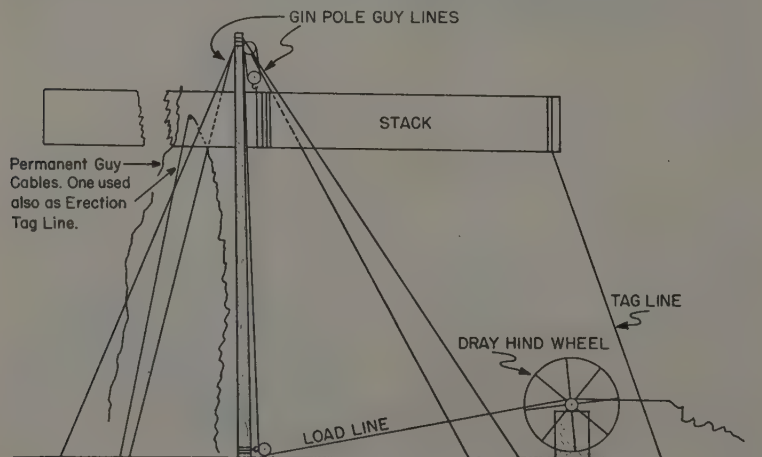
Upon arrival at his home shop later in the day, the driver found his boss picking a crew to go out next day and erect the stack. He said, "Boss, that won't be necessary; it weren't much of a job, and that feller was in such a sweat to get going, I just got some rope and set the stack up for him."

Vanishing clan

That driver was a good member of a fast-vanishing clan, one who could tackle almost any job that was at all possible and, with "make do" rigging such as he could pick up on the job, do a satisfactory piece of work, including speed and cost, that was generally fully justifiable.

The method outlined in the above description and sketch is a very satisfactory one in the handling of stacks and flagpoles, either in erection or dismantling, and is a mighty handy trick to know when the need for its use arises.

DRAWING shows how the old-timer rigged the hind wheel on his dray to raise a heavy smokestack without any effort to speak of. Guy cables were attached before the stack was lifted.



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NEW LITERATURE

Free copies of any of the items in this section may be obtained by using coupon on page 123.

409

Armco Products booklet

Armco Drainage & Metal Products, Inc., has published a 6-page, two-color folder picturing and describing how its various types of pipe installations are used along the nation's highways. Allied products are also described.

410

Thew-Lorain hoes

A new 15-page picture booklet featuring all sizes of Lorain hoes has been published by The Thew Shovel Co. Each size hoe is pictured in action and contains recommendations as to what particular type of job it can best be used on. Some specifications are included.

411

Cat quarry booklet

Caterpillar Tractor Co. has issued an 8-page booklet entitled "Profit Builders in Pit and Quarry," showing various types of Caterpillar equipment in action alone or in combination with other types of machinery. Has suggested types of machinery to use in various types of applications.

412

Soapstone Oct-O-Duct

A new two-color, 8-page manual, "How to Use Soapstone Oct-O-Duct—a manual of field practice," has been issued by Soapstone Duct Co. It illustrates methods of preparing trenches, erecting duct structures and manholes, and encasing. Drawings and description show recommended practices in each situation when laying the duct in a trench.

413

Electric hoist bulletin

A new 6-page, two color bulletin on Coffing Quik-Lift Electric Hoists has been published by the Coffing Hoist Co. Includes pictures of various types of hoists, description of various features, a cut-away drawing showing the inside construction and salient features, drawings showing suggested types of installations, photographs of the hoist in action, and specifications.

414

Cleveland Model 140 trencher

An 8-page bulletin on the Model 140 trencher has been issued by The

Cleveland Trencher Co. It contains many pictures showing the trencher in action in the field, a drawing of the machine with all the main features numbered, and lots of specifications.

415

Protective coatings booklet

The Atlas Mineral Products Co. has published a booklet containing 50 pages of information on protective coatings described on a generic basis.

416

Adams Motor Grader No. 550

The J. D. Adams Mfg. Co. has published an 8-page folder on Motor Grader No. 550 with 100-hp. diesel engine. It contains pictures of operating positions, cut-away views of the engine, a chart of speed ranges, pictures of accessories, specifications, and pictures of the grader in action.

417

Blaw-Knox steel forms

A new 50-page bulletin, No. 2430, has been published by Blaw-Knox Co. The booklet includes more than 50 photographs illustrating a wide variety of form types and uses in different fields of application. Included are practical design suggestions for economical adaptation of steel forms as well as recommended data to be sent in with inquiries. Among the types of forms described are circular conduits; arched and box conduits; vehicular tunnels; railway tunnels and subways; flood, retaining, and sea walls; circular tanks for sewage disposal plants; caissons and shafts; dams; and bridges.

418

Hard hat described

The MSA Shockgard safety work hat is described and pictured in a new bulletin issued by Mine Safety Appliances Co. Arrows point out all of the advantages of this particular type of hat. Also listed are accessories for winter wear.

419

Payloader tractor-shovels

The Frank G. Hough Co. has issued a booklet directed to public officials in charge of construction and maintenance of roads, streets, utilities, and parks. Called "Getting more for the tax dollar with Payloaders," it con-

tains pictures and specifications of the Payloader in action as well as pictures and descriptions of various types of accessories.

420

Road danger lamp

A descriptive circular on the Chalmers Road Danger Lamp has been published by William W. Lee & Son. It pictures the lamp, contains specifications, and recommends where this lamp would be especially effective.

421

Cummins diesel booklet

A 16-page color booklet entitled "Cummins Cuts Contractors' Costs" has been published by the Cummins Engine Co., Inc. It shows all types of contractors' equipment in action in all types of construction situations. It points out how Cummins diesels were used in various situations. It covers the whole country from the New York Thruway to Folsom Dam in California.

422

About the Rhino blade

The Shunk Mfg. Co. has published two bulletins describing and picturing Rhino blades in various types of applications. Eight types of blades are listed.

423

Allis-Chalmers Model D

A new 26-page bulletin about the Model D motor grader has been published by Allis-Chalmers Mfg. Co. It is chock full of job application photographs, cut-away drawings, closeups of attachments and specifications.

424

P & H diesel engines

A new series of 2-color bulletins covering the full line of P & H diesel engines has been announced by Harnischfeger Corp. There is a separate bulletin for each diesel with pictures and specifications of each model or engine and power unit.

425

Harris 4-wheel-drive tractor

The Harris 4-wheel-drive tractor, plus all of the attachments especially designed for it, are described in a series of bulletins in color put out by the Harris Mfg. Co. and the companies which manufacture its allied

equipment. Special color panels illustrate the advantages of the key points of this tractor. The attachment bulletins are loaded with descriptions and specifications.

426

Spokane job study

The Frank G. Hough Co. has published a 4-page folder entitled "Job Study No. 22." It describes, in picture and story, what the officials of Spokane County, Washington, did to solve the problem of procuring a bulk-handling machine which could be applied to great number of jobs including maintaining and repairing county highways throughout the year, do each one quickly and efficiently, and still be capable of operating on or off the road and capable of getting to and from the job quickly and under its own power.

427

The Allis-Chalmers line

The complete line of Allis-Chalmers Mfg. Co. industrial equipment is pictorially described in the newly revised, 36-page general line catalog entitled "Presenting the Allis-Chalmers Line." Each item is pictured in color and includes a complete specification sheet. Equipment illustrated and described includes crawler tractors, wheel tractors, motor graders, motor scrapers, wagons, and pull-type scrapers. A 10-page section in the catalog is devoted to pictures and pertinent data on the selection of allied equipment and attachments engineered for use with Allis-Chalmers equipment.

428

Acker all-purpose digger

The Acker Drill Co., Inc., has published an 8-page, color bulletin on its new, medium size, all-purpose digger. Various applications are pictured in photographs and described. Specifications are included.

429

Jersey spreader

A 4-page, two-color booklet has been published by the Tractor Spreader Co., showing the Jersey spreader in action. Job application photos show the spreader in action and a story with each picture describes how the spreader operated on that job. Specifications are included.

430

Mason's T jacks

A new 2-page, two-color catalog sheet on Waco Mfg. Company's Mason's T Jacks has been published. The jacks, made by a manufacturer of



ATECO HRD8 rippers on Guy F. Atkinson Co.'s Waldo approach job, Marin County, Calif.

RIP ROCK

WHERE YOU NEVER COULD BEFORE
with the ATECO Tractor-mounted Hydraulic Rock Ripper for Caterpillar D8 and D8 Pusher Tractors

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in corners, tight spots; handles faster, easier, gets more done!

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standards are swivel-mounted, pivot to follow tractor like a trailer for effortless steering.

Improves balance and traction...

balances dozer, gives ideal weight distribution on tracks.

7,000 lbs. of rugged strength...

built of high-strength alloy steels, takes full power of the D8 Pusher and either rips rock or stalls the tractor! Drawbar takes the pull, no strain on case.

Makes 3-way tool of your tractor...

with the ATECO ripper and Cat dozer, your D8 Pusher is the complete master of the cut or borrow pit, ready to rip, bulldoze or booster load anytime, anywhere!

21



Step up yardage, cut scraper damage...equip your D8's with ATECO rippers now. Call your Caterpillar distributor for a demonstration, or write:

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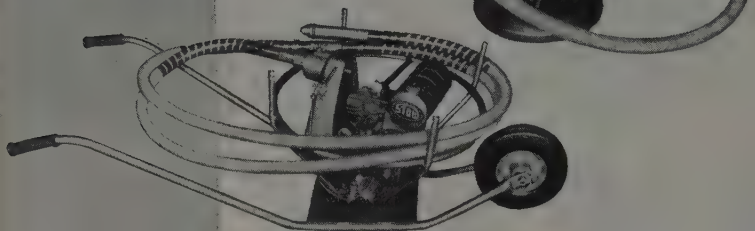
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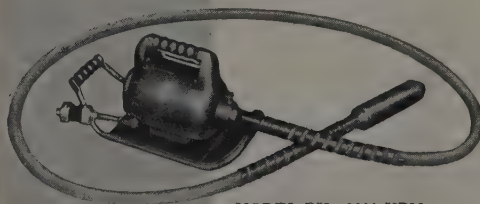
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Contractors like STOW vibrators because the high operating speeds of this new STOW vibrator line make possible the use of heavy duty, light weight flexible shafting, and lighter, more efficient vibrator heads. And STOW design provides convenient speed control so that attachments for rubbing, grinding, cleaning may be used directly on the vibrator shafts, making it unnecessary to purchase extra shafts for this purpose.

The STOW line is complete . . . provides the right vibrator for every job. Complete accessories available. Be sure you see your STOW distributor about the STOW line!



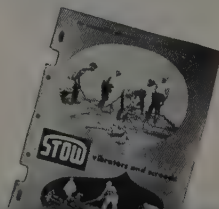
MODEL J-3600 VPM



MODEL BU-9000 VPM

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Industrial Equipment Co.
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Phoenix, Ariz.



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sectional steel scaffolding and shoring equipment, are described in application photographs. Complete specifications are included.

431

P & H chain hoists

A 2-color, 6-page bulletin covering the full line of recently announced P & H chain hoists has been published by the Harnischfeger Corp. Contains cut-away drawings of a chain hoist, pictures of various types of chain hoists and attachments, and lots of specifications.

432

Hydraulic truck crane

A 6-page bulletin describing the Hiab fully-hydraulic truck crane has been published by Hydraulic Industries, Inc. Photographs, drawings, and sketches show the crane in various types of application. A chart reveals the loading and unloading arcs. Lots of specifications are included.

433

Sewer caulking yarn

Sealite, Inc. has released a 38-page illustrated booklet on the use of Sealite caulking yarn in bell and spigot sewer piping. Included are a developmental history of the product, performance graphs, instructions for use, specification and testing suggestions, and 27 pages of detailed test reports.

434

Soulé building catalog

Soulé Steel Co. has published a 24-page, color catalog describing its line of standard steel or aluminum buildings. It contains many photographs and drawings of the buildings in use and has suggestions as to what type of building would be best for a specific need. Also contains specifications and erection photographs.

435

Gilsulate insulation

A 20-page technical data manual on Gilsulate insulation has been published by American Gilsonite Co. It contains trench sections showing pipe insulation, heat loss tables, computational formulas for figuring installation, resistance factor tables, temperature gradient charts, and photographs of the insulation being installed around pipes in place.

436

Trailer brochure

La Crosse Trailer Corp. has a 4-page folder on its Model DF6T flat platform trailer and its Model DF6T drop platform trailer. Gives specifications and details about component parts of these heavy-duty low bed trailers.

437

Catalog on lifting equipment

A 16-page catalog on derricks, hoists, winches and elevating and

hoisting equipment has been made available by **Sasgen Derrick Co.** Gives photographs, drawings, and specifications. Put key number on coupon and mail in for a free copy.

438
Air compressor catalog

A comprehensive catalog on air compressors, listing 27 sizes in 5 types, is being offered by **Binks Manufacturing Co.** Calls attention to the many new features which this line offers and points out the most suitable unit for the job. Catalog No. 810.

Literature briefs . . .

439
CONCRETE FORMS — **Universal Form Clamp Co.** has published a new catalog describing its line of concrete forms.

440
PIPES AND RAILS — **L. B. Foster Co.** has available five catalogs on pipe and pipe fabrication, rails, steel sheet piling, switch material, and track accessories and tools.

441
AUTOMATIC TAGLINE — **Westfall Automatic Tagline** has published a folder on its center-pull automatic tagline and magnet control reels.

442
"BAXCO CHEMONITED FOREST PRODUCTS" is a 2-color, 32-page brochure which tells the story of

pressure treated wood, containing 125 illustrations. The booklet was published by **J. H. Baxter & Co.**

443
PAVING BREAKER ACCESSORIES — **Ingersoll-Rand** has published a 16-page bulletin containing complete data on all tools and accessories for use with the company's paving breakers.

444
MOTOR UNIT — **The Chapman Valve Manufacturing Co.** has published catalog No. 50 which describes the motor units made by the company.

445
HIGH-STRENGTH BOLTS — **Bethlehem Pacific Coast Steel Corp.** has published a 16-page booklet, "High-Strength Bolting for Structural Joints," which describes the bolts and nuts made by the company.

446
VIBRATING SCREENS — **Screen Equipment Co., Inc.,** has published Catalog No. 203, which describes the various types of aggregate screens.

447
WATER PUMPS — **The Gorman-Rupp Co.** has published Contractors' Pump Bulletin No. 4, which describes the line of pumps made by the company.

448
WIRE ROPE CATALOGS — **Macwhyte Co.** has published three catalogs. No. G-15 describes the complete

line of wire rope. Folder 5308 describes the slings made by the company. Catalog 5201 describes the company's wire rope assemblies and accessories.

449
MARLOW PUMPS — **Marlow Pumps** has published Bulletin C-52, which describes the company's line of self-priming and "mud hog" pumps.

450
CONCRETE VIBRATORS — **Stow Manufacturing Co.** has published Bulletin 526, which describes the company's line of concrete vibrators and screeds.

451
TORQUE CONVERTER — **Twin Disc Clutch Co.** has published Bulletin 135-D, describing its overall line of torque converters, and Bulletin 501, which describes truck-type converters made by the company.

452
CONVEYOR BELTS — **The American Rubber Manufacturing Co.** has published a 5-page catalog which describes the company's line of conveyor and elevator belts, and includes factual data on belt capacities, material characteristics, and other specifications.

453
ASBESTOS-CEMENT PIPE — **Keasbey & Mattison Co.** has published a booklet, "Mains Without Maintenance," which is of value to anyone concerned with water main construction.



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▶▶ or for more information
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described in the following
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NEW EQUIPMENT

More information on any of the items in this section may be obtained by using coupon on page 123.

454

Self-contained, portable concrete batching plant designed by contractor

Engineered to make work cheaper, faster, and easier in all phases of concrete construction, a self-contained, portable concrete batching plant is now available from Allison Steel Co. Known as the Auto-Crete, the machine was conceived and designed by engineers of the Fisher Contracting Co. of Arizona.

The new unit requires only a one-man crew instead of the normal five to seven in similar setups, has a high pro-



duction rate, and provides uniform accuracy in concrete batching. One outstanding feature is its mobility. It is 34½ ft. long, 13 ft., 4 in. high, and 8 ft. wide, all within legal highway limits. Thus the plant can be towed anywhere with a 1½-ton tractor unit.

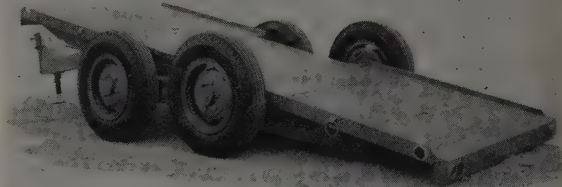
The unit contains three storage bins which hold 13 tons each of sand and gravel and 176 cu. ft. of cement. These materials are fed into the skip loader through electric controls. Sand, gravel, and cement move through a conveyor system. All are weighed electrically. Power for the unit's operation is provided by a gasoline engine driven by an electric generator. Production is 125 to 150 cu. yd. of concrete per day.

455

Walking beam in tandem-axle wheel assembly features new "Tilt-top" trailer

A new tandem-axle tilting platform trailer for loading heavy equipment has just been announced by Miller Research Engineers. The frame uses tapered side channels that are 14½ in. deep at the center. The platform's rear edge, the tongue gooseneck, and the wheel assembly walking beam are all box-section construction on the trailer, known as the Tilt-top.

The walking beam member in the tandem axle wheel assembly is considered to be one of the special features of this new trailer. A heavy box-section beam on each side of the frame pivots independently on 1¼ in. of solid, high-carbon steel which forms a stub shaft projecting through the frame side. The walking beam carries oversized 3¾ in.-diameter stub axles at each end for the wheels. This design was intended to provide rugged support for heavy loads and permit the tandem wheels on each side to rise and fall over uneven terrain independently. Another innovation is a vertical adjusting pintle



on the tongue gooseneck which enables the user to set it for the height of his particular truck hitch.

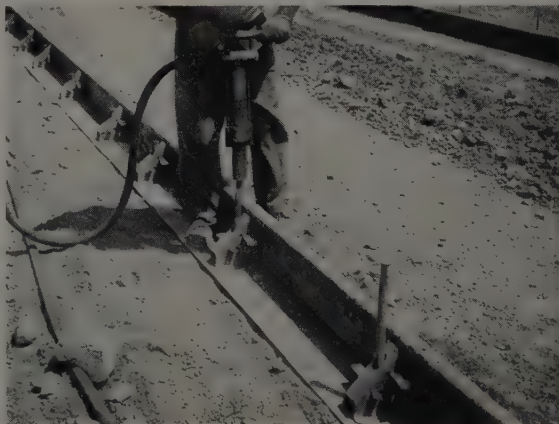
The platform deck, which is planked with 2-in. oak, is 76 in. wide, 16 ft. long, and has a height of 25 in. at level position. This reduces the overall height of load and lowers the center of gravity for safer trailing. In addition, the climb angle of the platform is greatly reduced for loading. This model, known as the BT-10, can handle crawler tractors and rollers up to 10 tons in weight.

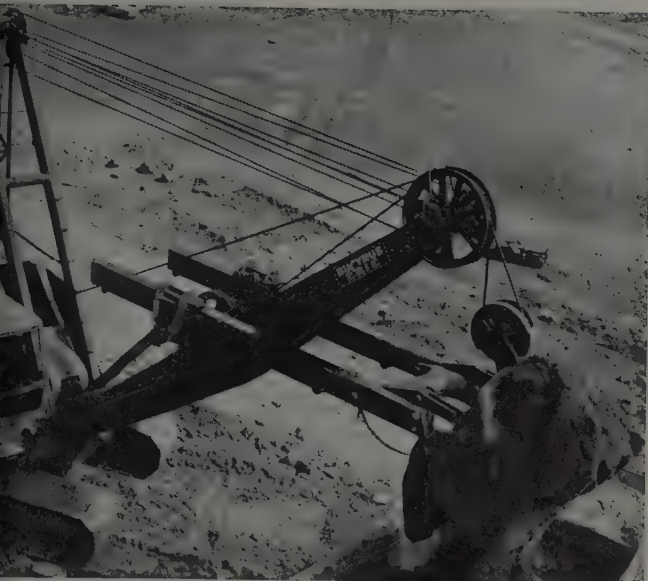
The trailer comes equipped with platform deck, four 8.25 x 20 x 12-ply tires, two sets of 15 x 3 in. Warner electric brakes, lights, reflectors and safety chains. Its overall width is 8 ft., its gross weight unloaded is 3,800 lb.

456

Form pin driver ups production 4 to 1, converts to paving breaker

The PB-59, a new 50-lb. form pin driver, is equipped with a pin-driving fronthead which is reported to speed up form pin driving operations on road building work by at least 4 to 1, in comparison to any other method. One man with a PB-59 can keep up with the pin setters—driving the pins in straight and tight at a rate of from 5 to 10 sec. each. In addition to the advantages this new tool offers in speeding pin driving, it also is convertible to a paving breaker for a wide range of demolition, digging and backfill tamping jobs. Its light weight makes it ideal





EXTRA FLEXIBILITY—Wire rope encounters fast sheave action, reverse bending, constant stop-and-start operation on many jobs. When this same rope must also lift or pull heavy loads, an unusually flexible, strong wire rope is needed.

Rope jobs like paver skip hoists, overhead cranes, large shovel and dragline hoists, and sawmill carriages demand these qualities. That's where the use of 6 x 37 Red-Strand wire rope saves time and money.

Where will 6 x 37 Red-Strand improve your wire rope service?

Look at a cross section of 6 x 37 wire rope. You see three rings of small, uniformly sized wires in each strand. This differs from a rope construction like 6 x 19, which contains fewer and larger wires.

The *smaller size* wires make 6 x 37 more *flexible*. The *larger number* of wires maintains rope *strength*.

Would this combination improve your wire rope service? Would it solve a problem for you? Leschen's higher-than-rated quality is also providing longer-than-expected service to heavy industry everywhere.

Check with your Leschen man. He can help you.

Leschen's 64-page Wire Rope Handbook tells you all about 6 x 37 and other Red-Strand wire rope constructions. Ask or send for your free copy.



6 x 37



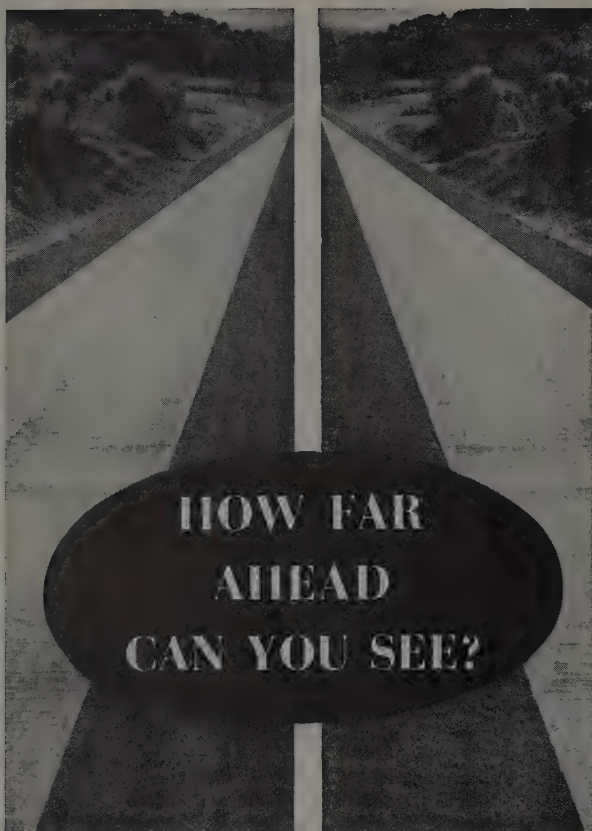
6 x 19

LESCHEN WIRE ROPE DIVISION

The Watson-Stillman Company
(A SUBSIDIARY OF H. K. PORTER COMPANY, INC.)

St. Louis 12, Missouri





With Clinton Welded Wire Fabric

Without Clinton Welded Wire Fabric

What condition will these new highways be in next year? . . . in five more years? . . . or ten? You can't tell by looking at the concrete surfaces, but you can make a good guess when we tell you that only one is reinforced.

Welded wire fabric reinforcement is one of the major factors in determining the strength—and long life—of concrete pavements. It greatly reduces the amount of cracking and holds tightly any cracks that may form . . . thus decreases pavement maintenance and builds years of extra life into streets and highways.

THE COLORADO FUEL AND IRON CORPORATION • Denver and Oakland
WICKWIRE SPENCER STEEL DIVISION • New York



for use on scaffolding or on any job application requiring an easy-to-handle tool. Manufacturer is Ingersoll-Rand Co. For additional information put key number shown above this item on coupon and send in for forms 4126 and 4127A.

457

Cleveland Trencher Co. announces Model 190 heavy-duty backfiller

The Cleveland Model 190, a one-man-operated, big-capacity backfiller for pipelines and heavy construction work has been announced by the Cleveland Trencher Co. It is reported to be especially effective under the more rugged and difficult conditions of sand, mud and rocky soil, swamps, and hilly terrain. The machine, which backfills as it travels, provides continuous operation from its 7-ft. backfill board.

Long, wide crawlers give a ground bearing pressure of 6.2 psi. The crawler unit has double-rimmed sprockets, wheels, and rollers, all anti-friction bearing mounted, which eliminates track packing and effects greater sta-



bility. Over-all width is 8 ft., not including the boom. The machine, which is 15 ft. long and 9 ft., 10 in. high, weighs about 22,500 lb.

The transmission provides 48 crawler speeds from 1 ft. per min. to 4.3 mph. in either direction. It is powered by a 467-cu. in. diesel engine which develops 97 hp. at 1,400 rpm. Hydraulic-actuated clutches with vacuum boosters give added control to the smooth-casting scraper board.

Four separate transmission-controlled line speeds are available for both the pull-in and throw-out cables, ranging from 47 to 450 ft. per min. Both boom hoist and tow winch are hydraulically operated.

The adjustable boom can be telescoped from 19 to 27 ft., or it can be removed easily for 8-ft. hauling width. As a side crane, the machine has a 50,000 ft.-lb. capacity from the edge of the crawler; 10,000 lb. 5 ft. out; and 5,000 lb. 10 ft. out. The winch drum hand brake is spring-cushioned to provide steady control for crane work.

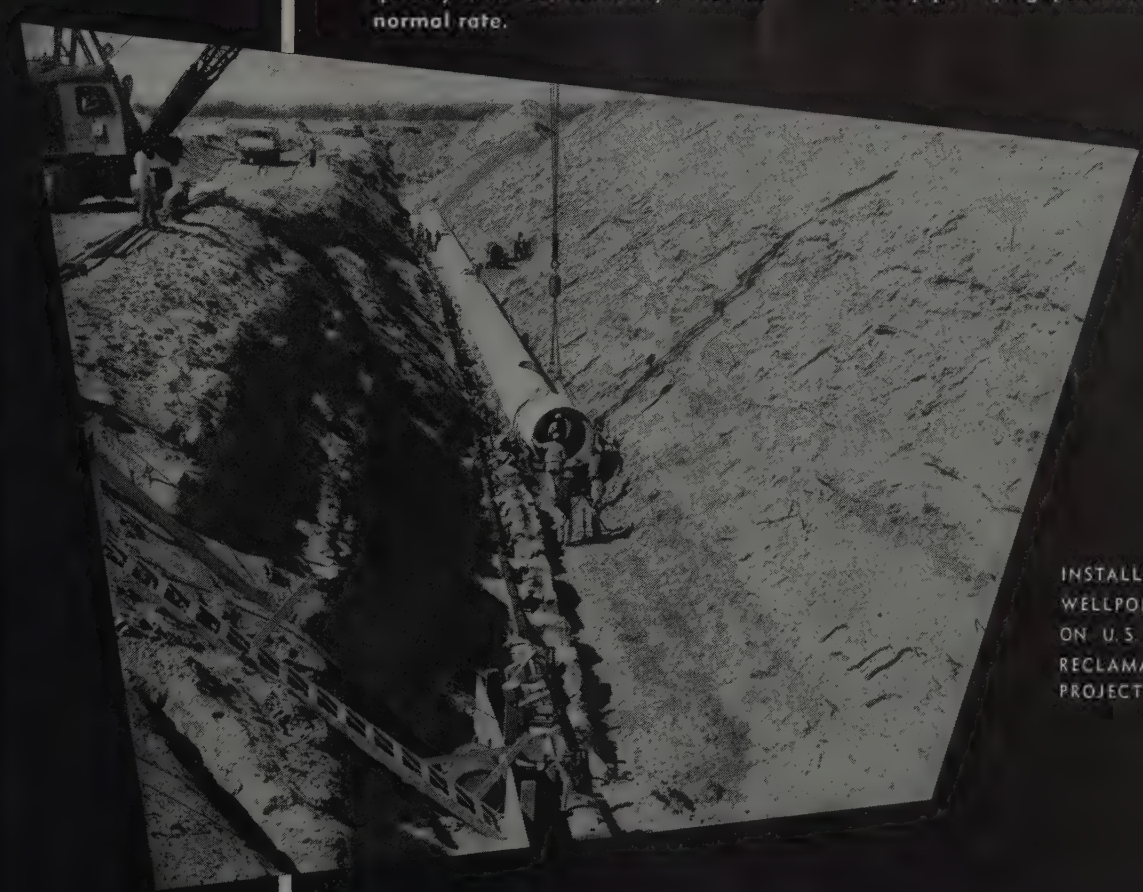
Treacherous soil made **SAFE** in deep cut in fine wet sand

Treacherous soil conditions were encountered in this excavation for the installation of a Pipe Line Siphon under the bed of the Gila River for the U. S. Bureau of Reclamation Gila Project at Wellton, Ariz.

For a quarter of a mile the cut was 25 ft. deep in extremely light and fine sand, with little cohesive quality of the particles.

Ground Water at subgrade, and excavation into the wet material caused continuous sloughing of the dry soil above.

So the contractor installed a Stang Wellpoint System . . . the cut was quickly and economically stabilized . . . and pipe laying proceeded at a normal rate.



INSTALLING STANG
WELLPOINT SYSTEM
ON U.S. BUREAU OF
RECLAMATION GILA
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#58

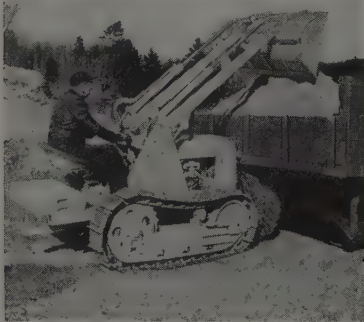
Model 88 Trenchmobile now has bucket width to 16 in.

Parsons Co. has announced various improvements which serve to increase the versatility of the Model 88 Trenchmobile. The machine is now offered with a choice of three bucket widths: 8, 12 and 16 in. The new 16-in. bucket enables the Trenchmobile to trench for larger pipe sizes and to produce trenches large enough to accommodate workers. Among other improvements are included a hydraulic boom hoist with positive down crowd and 3-point suspension of the wheels from the Trenchmobile frame, which permits excavating in roadside ditches of uneven terrain. Other established features of the Model 88, which, because of its small dimension is well suited for work in restricted areas, have been retained.

#59

1/2-cu. yd. loader unit added to Oliver OC-3

Now available for the Oliver OC-3 crawler tractor is the new, versatile, multi-purpose model 3-WI loader unit. The entire unit is called the



OC-3 Tractor-Loader. All-hydraulic in operation, it is perfectly balanced and mounted for efficient operation. Outstanding features include: extreme bucket rotation permitting dumping from ground level to full lift height of 10 ft., 9 in., with bucket level; a 9-ft., 5-in. loading height at bucket hinge point; ability to dig 16 in. below track level. The bucket capacity is 1/2 cu. yd.; its lifting capacity is 2,000 lb. This machine can become a bulldozer, backfiller, lifting boom, lifting fork and snow plow. Manufacturer is Oliver Corp.

#60

Torqmatic brake controls down-hill truck speed

A new braking device, known as the Torqmatic brake, is an added package to the Allison Torqmatic converter now in general use with the Allison Torqmatic transmission in a number of heavy-duty trucks. It is not a friction-type brake; instead it consists of three major parts, a rotor,

stator vanes and a control valve. In operation, control valve admits oil to the brake. Rotor paddles churn the oil against the stator vanes, thus placing a drag on the converter-transmission drive shaft. In this way the oil does all the braking and also absorbs the heat generated by the braking action. Conventional friction brakes are needed only for a complete stop. Manufacturer is Allison Division, General Motors Corp.

#61

Machine piles sand and stone at 40 tons per hr.

The 550-lb. new beltless Speedpiler, described as "a husky little mite," takes sand and stone discharge from belt conveyors and throws the material into bins or piles at a minimum rate of 40 tons per hr. Suspended under the discharge end of a conveyor, mounted on a platform



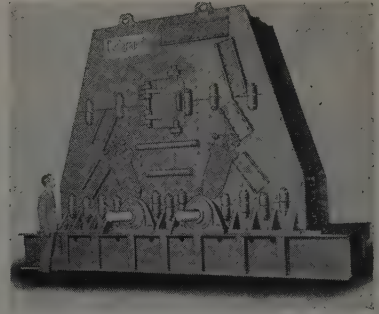
or equipped with tires, the Speedpiler eliminates costly conveyor extensions usually required for comparable piling. The receiving hopper will accommodate the discharge from conveyor belts up to 30 in. wide. Manufacturer is Pettibone-Milliken Corp.

#62

Heavy-duty Double Impeller impact breaker announced

The new Model 5360H, which weighs 168,000 lb., is the largest unit in the Cedarapids line of Double Impeller impact breakers. Capacities of Model 5360H range from 500 to 800 tons per hr. of 4-in. minus product, depending upon the type and characteristics of the material processed. It can be fed with material as large as 53 x 60 in., with reduction to a minimum size of 3 in. minus in one pass. Reduction of the material is accomplished by a high percentage of the material being broken in suspen-

sion, resulting in reduction of wearing action on the manganese steel parts of the breaker. A high ratio of reduction eliminates the need for



much auxiliary equipment such as screens and conveyors. Manufacturer is Iowa Manufacturing Co. Send in for further details.

#63

Attachments and improvements added to Payloader

Frank G. Hough Co. has announced a series of attachments and improvements on the 4-wheel drive TM Payloader tractor. These include pusher and towbar plates; single or dual railway couplers; an air compressor attachment; switchman's platform and catwalk; hydraulically driven, rear-mounted winch with a 30,000-lb. line pull; 4-wheel vacuum-booster brakes, giving twice the braking capacity with less operator effort.

#64

180-deg. boom swing speeds operations of this loader

An exclusive feature of the new Pettibone Speed Swing loader is an 180-deg. boom swing permitting discharge of the load to the left or to the right, as well as to front, without moving the loader out of line. This factor makes it especially efficient



when operating in tight spots. Another main feature is a 30-deg. bucket tilt-up providing shovel action. Available with 2- or 4-wheel drive, optional 4-wheel steer, 3/4- or 1-cu. yd. bucket, and these accessories: fork, crane hook, backfiller blade and 4-cu. yd. snow bucket. Manufacturer is Pettibone-Milliken Corp.

HOW A TOUGH BUILDING PROBLEM BECAME A 30% SAVING

with Coffing Quik-Lift Electric Hoists

The Problem

J. M. Odom, Austin, Texas, building constructor, faced heavy financial loss, when unforeseen setbacks during excavation put the construction of a stone church far behind schedule. Stone laying could not be completed in the remaining time — by conventional methods.

The Solution

Mr. Odom mounted four Coffing Quik-Lift Electric Hoists and trolleys on an I-beam which ran the length of the wall. Limestone blocks, weighing 300 to 500 lb., came from the quarry with Lewis pin holes in their upper edges. Using a simple chain sling and Lewis pins, Odom raised and positioned the blocks with the Coffing Quik-Lifts.

The Results

Quik-Lifts eliminated the need for a material tower and A-frames. Blocks were lifted and positioned on one operation instead of two. Quik-Lifts allowed greater control in positioning since load chain was plumb at all times. Manual handling of stone was virtually eliminated. The need for unskilled labor was reduced about 50 percent. This new method cut two months off the normal stone-laying time, while over-all savings were estimated to be about 30 percent.

Wherever you see durable Coffing Quik-Lift Electric Hoists at work, you can be sure they are saving time, labor and costs. Choice of seventeen sizes with capacities up to 4,000 lb. to fit your requirements. For full information write for Bulletin WC4E.

COFFING HOIST COMPANY
DANVILLE, ILLINOIS

Hoist-Alls • Safety-Pull Ratchet Lever Hoists • Mighty-Midget Pullers • Spur-Gear Hoists • Differential Chain Hoists • Load Binders • I-Beam Trolleys



Coffing Quik-Lift Electric Hoists were used to raise and place 500-lb. blocks of limestone. New system accounted for a 30 percent over-all saving in construction of a stone church.



465

New 1½-yd. rock shovel and 35-ton crane available

American Hoist & Derrick Co. has announced its new Model 750 shovel which can be rigged for crane, clamshell, dragline, shovel or backhoe work. The shovel and backhoe combination are rated at 1½ cu. yd., while its rated capacity as a crane is 35 tons. It will handle a 2-yd. clamshell or dragline.

Among its new design features are the single-purpose shaft assemblies, multiple-tooth involute splines, air control, and self-adjusting clutches of a special contracting band type. Anti-friction bearings in the brake linkage



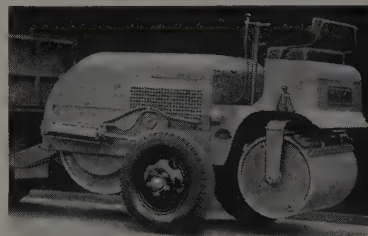
and air-controlled clutches are estimated to reduce operating effort as much as 60%.

The car body, roller path, and bull gear of the new machine are integrated in one heavy steel casting. Steering is accomplished by means of multiple-jaw-type clutches which continue to operate even when the crawler base is submerged in water because there are no bands to soak and slip. The machine was designed for quick preparation for shipment and transportation. Crawler side frames slide in on axles for minimum road and rail clearances or they can be removed along with the counterweight and front end attachments to reduce load weights.

466

Easy portability features retractable wheel tandem roller

The Galion Iron Works & Manufacturing Co. has announced a variable weight (4 to 6 tons) tandem roller which has the advantage of easy portability from job to job. This was accomplished by including a set of hydraulically-retractable, roller bearing, rubber-tire transport wheels which permit towing of the roller behind a truck. A built-in hydraulic jack in the truck hitch raises the compression roll and the retractable transport wheels raise the steering roll to get the roller in condition to transport. The roller was built to fulfill any specification requirements for compressions ranging from 144 up to 206 lb. per in. of roll width. Specifications include a wheel base of 73½ in., overall length with towing tongue of 10 ft., 5½ in., overall height of 72 in., overall width of 89 in., and ground clear-



U. S. Highway Guard Rail and Supporting Post

Illustrated are a few of the many different types of installations for U.S. Metal Plate Highway Guard Rail

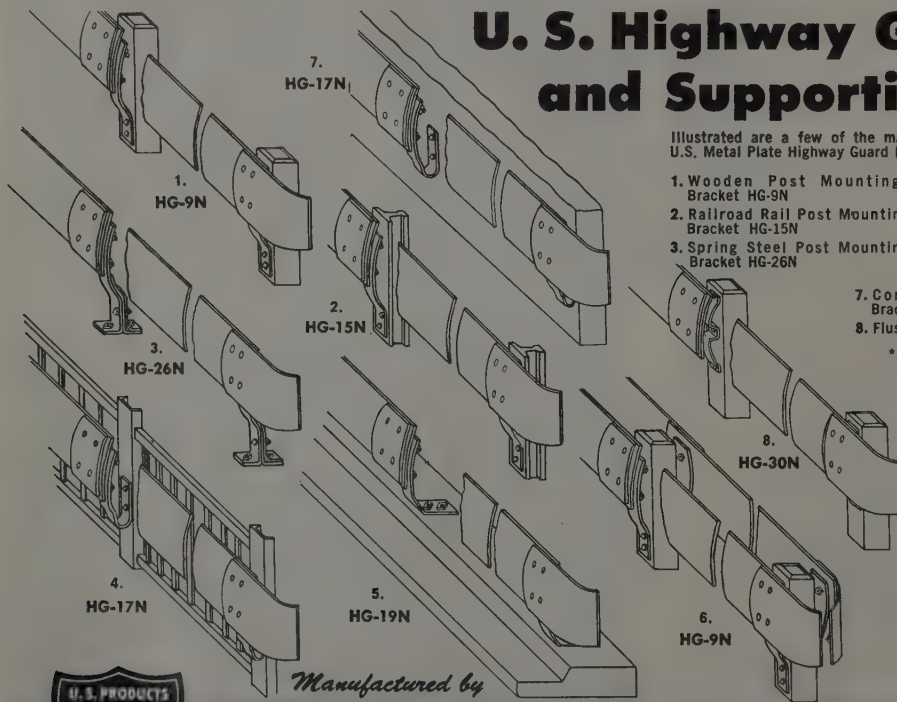
1. Wooden Post Mounting* Bracket HG-9N
2. Railroad Rail Post Mounting Bracket HG-15N
3. Spring Steel Post Mounting Bracket HG-26N
4. Bridge Rail Mounting Bracket HG-17N
5. Curb Rail Mounting Bracket HG-19N (When ordering specify height of curb)
6. Road Center Divided Mounting Bracket HG-9N
7. Concrete Wall Mounting Bracket HG-17N
8. Flush Type Bracket HG-30N

*For Mounting on 8" or 9" round post, specify Bracket HG-29N

Design follows trend of higher speed traffic. Special mounting brackets available for particular locations and conditions.

U.S. Metal Plate Highway Guard Rail assures maximum highway safety at low installation and maintenance cost.

WRITE FOR FOLDER on installations and specifications.



Manufactured by



UNITED STATES SPRING & BUMPER CO.

4951 ALCOA AVENUE, LOS ANGELES 58, CALIFORNIA

ance of 16 in. Total weight when empty is 9,160 lb., and weight on compression roll is 6,060 lb. The machine is operated by a 25-hp. motor at 1,500 rpm. Free literature available.

467

H. K. Porter announces No. 5 cutter

An all-steel tool with heat-treated tubular steel handles built to stand up under heavy usage has been developed



by H. K. Porter, Inc. This new No. 5 cutter was designed for continuous cutting of hard concrete reinforcing rods up to $\frac{1}{2}$ in. in diameter and wire rope and cable up to $\frac{3}{4}$ in. in diameter. Cutters are also available for cutting soft bolts, medium hard rods, and the like. Detailed information is available on request.

468

Adjustable pilaster form announced

Forming pilasters of varying sizes is said to be simplified with the new adjustable pilaster form manufac-

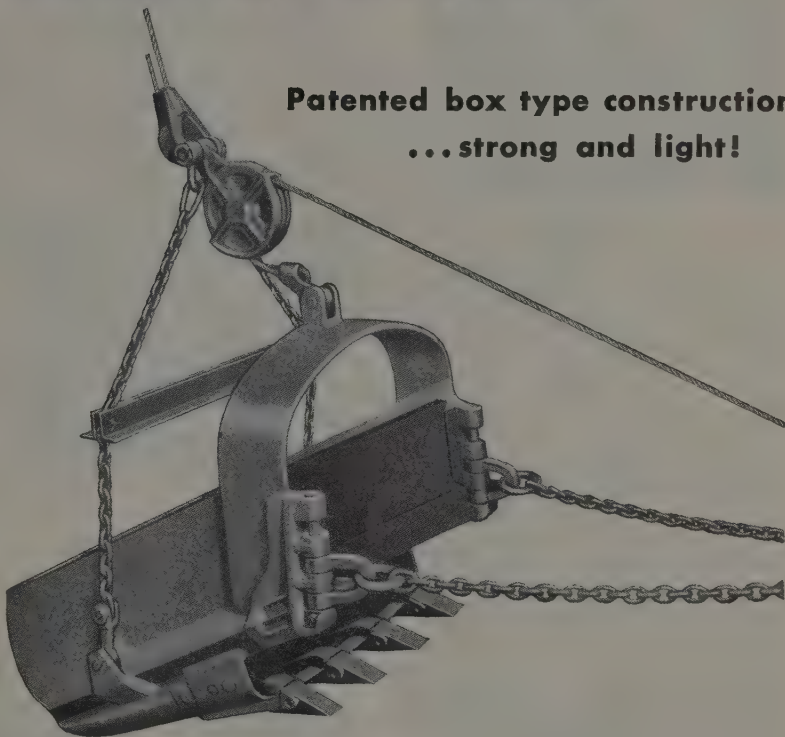


tured by Universal Form Clamp Co. It is adjustable for pilasters from 4 to 14 in. in depth in $\frac{1}{2}$ -in. increments and from 2 to 8 ft. in height. This form provides for positive pilaster sizes and can be used with standard panels. The forms are reusable. Literature and other information is available on request.

Make more profits with

WELLMAN-WILLIAMS DRAGLINE BUCKETS

Patented box type construction
...strong and light!



THE Wellman-Williams Dragline Bucket is perfectly balanced, light in weight, has a wide digging radius and hitch connections for fast adjustment of digging depths. Alloy steels provide maximum strength with minimum dead weight. Teeth are made of manganese steel and are reversible. Perforated type dragline buckets also available.

It's a **WELLMAN**—built to dig and last while digging.

THE WELLMAN ENGINEERING CO.

CLEVELAND 4, OHIO

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☐ Dragline Buckets	☐ Log Grabs

Your Name _____

Address _____

City _____ State _____

Position _____ Company _____

Le Roi Co. announces new model front-end loaders

Front-end loaders ranging in capacity from $\frac{1}{2}$ to $1\frac{1}{2}$ -cu. yd., are now being offered by the Le Roi Co. They feature torque converter, power steering, and reversing planetary transmis-



sion as standard equipment. This new model, the TLF-150, ranges in speed up to 18 mph. Four-wheel drive enables it to traverse treacherous terrain. Heavy cast iron grills give extra protection to the rear end and act as counterweights, thus eliminating poor road clearance. Literature also available.

470

Osgood-General announces new 2-yd. Model 920

Pictured here is Osgood-General's Model 920, a new 2-cu. yd. shovel, hoe, dragline, clamshell, and crane combination machine. Its standard shovel boom is box type and is built of high-strength, low-alloy steel. It is 23 ft. long and has an 18-ft. dipper



handle. The independent chain crowd, with 2-piece chain, is self-adjusting to any boom angle. Conversion from shovel to another service is said to be rapid and easy.

The boom for crane, clamshell, and dragline service is lattice type, all-welded with tubular lacing. Inserts and jibs of varying length are available. Another feature is the demountable side frames to reduce weight when transporting the machine.

Crawlers are 15 ft. long and 12 ft., $1\frac{1}{2}$ in. wide overall with standard 31-in. treads. Treads of 36 in. are also available. Specifications include maximum weight of 111,350 lb., a high

travel speed of 1.38 mph., and a maximum swing speed of 3.38 rpm. Maximum total length of boom plus jib that can be lifted off ground without assistance is 130 ft. Specification booklet available free.

471

New transit-mixer line

A new line of mixer and agitator models for truck or skid mounting, ranging in capacity from 3 to $6\frac{1}{2}$ yd., is being offered by the Transo Division of Le Roi Co. Features of the new line are ease in handling, faster charging, speedy discharging, shock-free starting, and ease of reversal of drum rotation with full load. Other features are spring-loaded clutches running in oil, dual mixing and agitating speeds, direct mixer drive, and



savings in weight from the elimination of exposed chains, ring gears, sprockets, and bevel gears. Also contains a built-in centrifugal water pump. Literature also available.

472

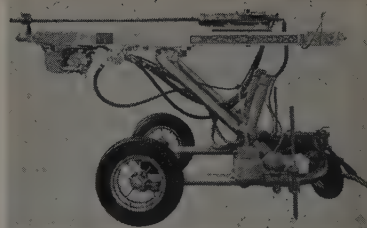
New Cat D2 tractor

A heavier D2 tractor, capable of pushing or pulling nearly 8,000 lb., has been announced by Caterpillar Tractor Co. Drawbar hp. has been increased from 32 to 35, belt hp. is up to 42, total weight of the machine has been increased about 525 lb., overall length has been increased $6\frac{1}{8}$ in. and two more track sections have been added. Other improvements include moving the seat forward for better access to the rear of the steering clutch case, addition of track carrier roller and heavy duty fenders as standard equipment, an under-the-seat tool box, and an increased fuel tank capacity of 26 gal.

473

New wagon drill has dual hydraulic lift

A new wagon drill has been announced by Gardner-Denver Co. The unit, known as Model URM, consists of a drill wagon with dual hydraulic lift, 4-in. drill, and RM chain feed. The hydraulic lifts raise or lower the U-bar while the drilling mast is being maneuvered into position. The drill wagon carries the chain feed and the heavy-duty 4-in. drill which is said to combine fast and powerful hammer action with the ability to keep the steel rotating in bad ground. This



steady rotation, plus hole cleaning at full line pressure and a powerful pull for extracting steel, means that the URM can save deep holes which otherwise might be lost in the broken ground. A single drill control handle operates all drilling, blowing, and hole-cleaning actions. The machine accommodates 8-ft. steel changes as standard.

474

Cal-Hook developed to aid in pouring concrete slabs

The Cal-Hook has been developed to position wire mesh or radiant heating tubing in any slab concrete pour. Experience has shown, the manufacturer says, that when a unit is attached to each shovel that will be used to spread concrete, a savings of 20% to 25% in the amount of placing labor has resulted on a majority of ground-

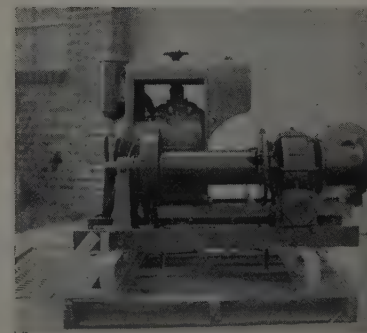


level slab pours. This attachment fits any shovel, attaches or removes easily, and does not interfere with shovel operation. It is made of high-tensile aluminum alloy. A set of five Cal-Hooks costs \$8.95 a set.

475

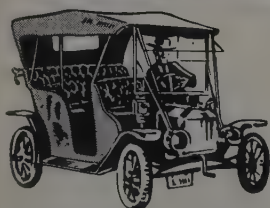
Self-contained winch designed for truck and stationary use

A self-contained winch which was designed for truck and stationary use has been announced by Forsburg & McLaughlin, Inc. Specifications of



KUE-KEN CRUSHER

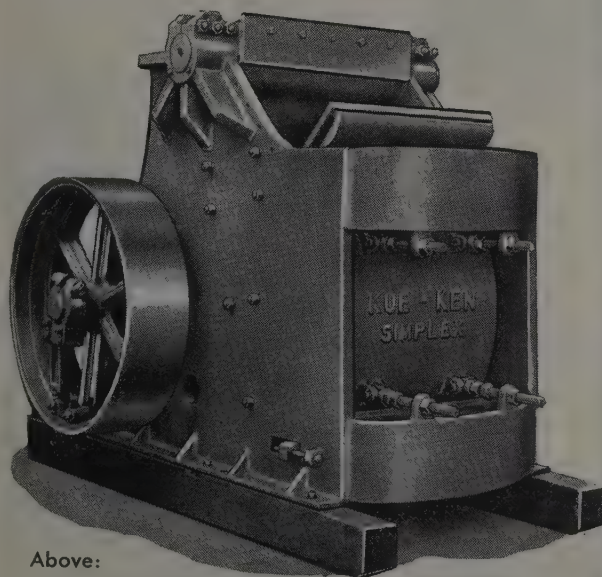
- ✓ LASTS LONGER
- ✓ OPERATES FASTER
- ✓ GREATER CAPACITY
- ✓ LESS MAINTENANCE



You wouldn't drive a car that had to be oiled by a squirt can . . . then why settle for an outdated crusher that is lubricated in this manner or by similar inefficient meth-

ods? The price is worn out bearings, wasted horsepower, slow operating speeds and uneven crush.

Stop this waste . . . switch to a Kue-Ken crusher with the crankcase-type lubrication system.



Above:
36" x 20" crusher.

The only crusher whose moving parts run in a bath of clean cool oil!



Cutaway view showing Kue-Ken hinge pin (above) and "crankcase" (below).

Kue-Ken Crusher is completely sealed so dust cannot enter and oil cannot escape. A direct driven gear type oil pump draws oil from the "crankcase" and pumps it through a strainer and filter to all operating mechanism. An automatic pressure switch protects the crusher from oil failure. All toggles and seats are machined to micrometer tolerances which are maintained indefinitely because of the perfect lubrication system exclusive to Kue-Ken crushers. The hinge pin and overload safety device have separate sealed oil baths.

KUE-KEN CRUSHERS

"LOWEST COST-PER-TON CRUSHING"

Jaw Crushers Gyracone Crushers Overhead Eccentric Crushers Revolving Screens
Classifiers Feeders Rib Cone Ball Mills Concentrating Tables Vibrating Screens

Pennsylvania Crusher Co., Exclusive Licensed Eastern Manufacturer and Distributor. Broad and Arch Streets, Philadelphia, Penn.

Sir W. G. Armstrong Whitworth & Co. (Ironfounders) Ltd., Authorized Licensed Manufacturer and Distributor. Close Works, Gateshead-upon-Tyne, England

Write for brochures

STRAUB MFG. CO. 571 CHESTNUT - OAKLAND, CAL.

DEALERS: LUND MACHINERY CO., Salt Lake City, Utah; CLOSER EQUIPMENT CO., San Antonio, Texas; WASHINGTON MACHINERY CO., Seattle, Wash.; CONSTRUCTION EQUIPMENT CO., Spokane, Wash.; CONTRACTORS EQUIPMENT CO., Portland, Ore.; ANAHUAC MACHINERY CO., Mexico City, Mexico; UNIVERSAL EQUIPMENT CO., Vancouver, B. C.

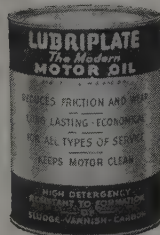


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IMPROVE ITS OPERATION AND
REDUCE MAINTENANCE COSTS.**



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Bart-Sayer Co., El Centro, California

the Porta-Mule, as it is known, include a weight of 1,800 lb., rated line pull of 15,000 lb. at 17 ft. per min. and 2,000 rpm., cable capacity of 770 ft. of ½-in. wire rope and 496 ft. of ¾-in. wire rope, and a 44:1 worm gear ratio. It is powered by a Wisconsin VF-4 enclosed power unit rated at 24 hp. at 2,400 rpm. It can be installed on or demounted from a truck in a matter of a few minutes.

476

New, one-man chain saw announced by Homelite Corp.

A new, one-man chain saw which weighs 22 lb. has been announced by Homelite Corp. Known as Model 17, it features automatic clutch, all-angle



diaphragm carburetion, positive chain lubrication, quick starting, weather-proof ignition, and 3.5 brake horsepower. Straight blades are available in sizes from 15 to 36 in. Plunge-cut bow saw attachments, for one or two-man operation, are available in 14 and 18-in. sizes.

477

Heavy-duty equipment added to crane-excavator line

Special heavy-duty equipment for the Bucyrus-Erie, 22-B, ¾-yd. crane-excavator has been developed to widen safety factor margins and increase machine life. While basically



the same machine as a standard model, the new 22-B has these additional features: a long-frame crawler mounting to provide increased bearing area as well as increased stability and maneuverability and a heavy-duty boom which carries lengths ranging from 35 to 70 ft. The boom suspension is of the pendant type, with eight parts of operating line between bridle and boom point. A 16-part suspension for booms 40 ft. or longer is available as extra equipment.

Power-controlled lowering on the main hoist line as well as independent hoisting and lowering of the boom are other features. New safety devices include a friction-swing brake and boom stops of the telescoping pipe type. When equipped for dragline or clamshell work, the machine carries booms ranging from 35 to 50 ft.

478

Roller is capable of close work

The Andwall Manufacturing Co. has announced a 2-ton roller capable of surfacing within 1¼ in. of curbing, wall or any other vertical obstruction. It was designed especially for patch work where ease of maneuverability and close work is important. A hydraulic lift raises the 36-in., 4,100-lb. roller off the ground to prepare it for trailing. Pneumatic-tired wheels support the roller for transportation purposes. The weight is concentrated on the main roller, which provides a compaction pressure of 110 lb. per lin. in. Capacity of the water drum is 800 lb., and the tank holds 220 lb. There are no gears to shift and no complex



clutch adjustments on the roller, which is powered by a 11.2-hp., 2-cylinder, air-cooled Wisconsin motor.

479

"Load King" truck announced by Cook Bros.

The "Load King" truck, designed and engineered especially for use in the sand and gravel and ready-mixed concrete industries, as well as for dump-truck work, has been an-

nounced by Cook Bros. Equipment Co. It is made in several models for use as either a 2-axle trailer or a 3-axle truck, with various model single or dual drive units. It can be custom built by the manufacturer to meet any requirement. Important features include a forward cab design which permits shorter wheelbase with more even load distribution, a 12,000-lb. front axle as standard equipment, choice of 5 or 8-speed transmission, and choice of Cook Bros. or Cummins diesel engine.

480

New design improvements announced in Lessmann Loadall

New design improvements of all three models of the Lessmann Loadall have been announced by Lessmann Manufacturing Co. Among them are



a cast grill with horizontal louvers which has replaced the perforated grill and fabricated hood; an optional all-steel, all-weather cab; and a hydraulic power crowd which permits easy loading of heavy or compact material by a forward sweep of the bucket. Standard equipment includes drawbar, work lights, rear safety light, and starter. Optional equipment includes a dozer blade, easy-on lift forks, and a crane hook.

481

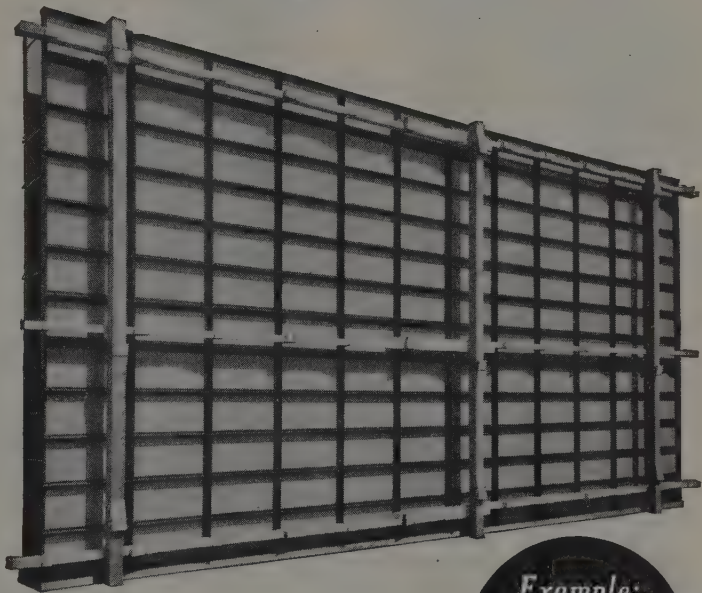
Hydro-Trencher, Swing Loader announced by Oliver

A newly-designed, half-yard Hydro-Trencher and Swing Loader combination has been announced by The



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Oliver Corp. for their Model 88 wheel tractor, known as the Model 88WT Hydro-Trencher. It will dig to a depth of 10 ft. and load to a height of 10 ft., 6 in. An optional boom cylinder increases the digging depth to 12 ft., and an optional loading bucket with hydraulically-controlled trap door permits loading to 12 ft.

The machine features a dual-circuit control system which provides the operator with a choice of three lifts or drop speeds on the boom. A swivel seat swings from tractor to trencher controls in a few seconds. Other features of the machine are bucket rotation that permits clamping rocks or dirt loads against the boom to prevent spillage when loading, 200-deg. boom swing, preset boom relief valve for digging power, and finger-tip controls. Free literature is available. Reference No. 792.

402

Concrete form clamp insures quick make-up, fast stripping

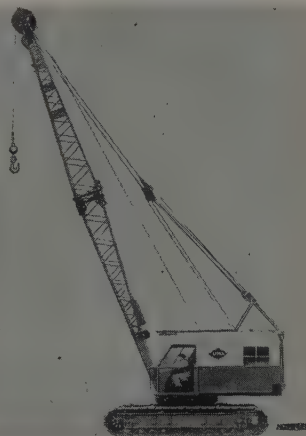
Only a light tap with a single jack hammer makes it possible to drive the new Taper Tie form clamps. Formerly threaded on both ends for attaching washers, these clamps, which feature a tapered rod, utilize a fast-assembling keyplate on the small end instead of a threaded washer. Keyplate construction eliminates make-up, insures fast stripping after the

concrete is poured, and eliminates all re-make-up time. Type A, with washers, is adjustable for 6- to 14-in. concrete and may be used in conjunction with she-bolts for even greater extensions. Type B, employing the new keyplate is adjustable for 6- to 13-in. concrete. Manufacturer is **H. J. Krueper Co.**

484

New Lima lifting crane

A new Lima lifting crane, designated the 703 SC and available on crawler or wheel mount, has been announced by the construction equipment division of **Baldwin-Lima-Ham-**



ilton Corp. On crawlers, the unit has a lifting capacity of 50 tons at 12-ft. radius with a 50-ft. boom and a capacity of 1,195 lb. and 110-ft. radius with a 130-ft. boom. Crawlers are 18 ft., 6 in. long and 14 ft., 2 in. wide. Working weight is about 109,000 lb.

Crawler side frames and counterweight segments can be removed by the machine, acting as its own crane, in preparing to travel over highways. The machine, when wheel mounted, is self-propelled with one engine in the rotating assembly supplying power for all operations.

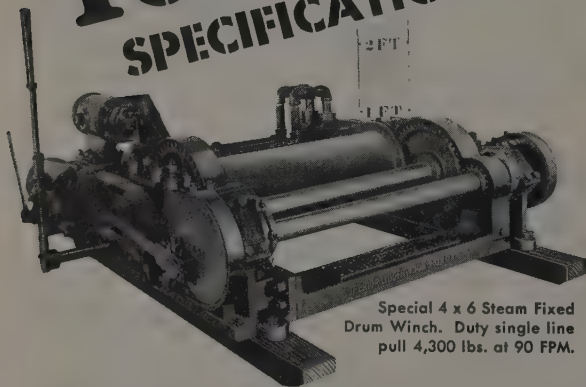
The air-controlled machine has twin, hook-type conical rollers in front, back-hitch gantry, and a low center of gravity with the main machinery placed back of the center of rotation to reduce the need for excess counterweight. Swing is controlled by a three-way compensating valve. Optional equipment includes independent propel, dual drum boom hoist, auxiliary or third drum, torque converter power take-off, and automatic boom stop.

485

Largest crusher of its kind announced by Lippmann

A size 42 x 48 overhead eccentric crusher, largest of its kind in the world, has been added to the Grizzly-King jaw crusher line by **Lippmann Engineering Works**. It has a capacity

You SET THE SPECIFICATIONS



Special 4 x 6 Steam Fixed Drum Winch. Duty single line pull 4,300 lbs. at 90 FPM.

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BARNES PUMPS HELP HANDLE SEEPAGE ON GIANT CANADIAN HYDRO PROJECT!



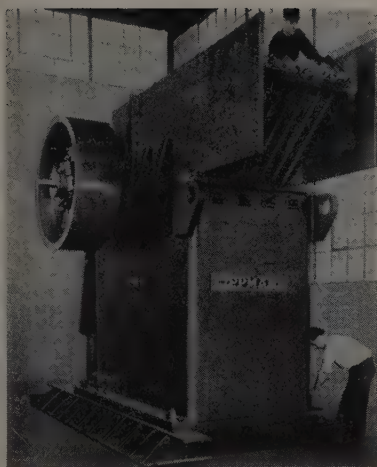
Barnes 90M Self-Priming Centrifugal Pumps operate 24 hours a day in helping to control surface and seepage water in the Canal Section of the vast \$300,000,000 Hydro-Electric Power Commission's "Sir Adam Beck-Niagara" Generating Station No. 2 now under construction at Niagara Falls, Ontario, Canada. . . Barnes could ask for no greater privilege than to put its pumps in action on your own projects. See your distributor today!

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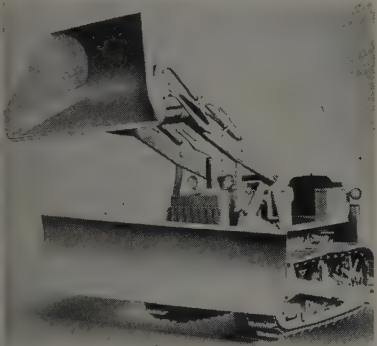
BARNES MANUFACTURING CO., Mansfield, Ohio; Oakland 21, Calif.



of more than 1,200 tons an hr. at its largest setting and will run around 800 tons an hr. at the 5-in. opening. It has control over the product size required and lessens the need for additional secondary processing. Its design results in very little vibration or lost motion. It is fabricated with a special laminated design for extra strength and durability. The hopper and grizzly shown at the top of the crusher in the picture are optional equipment.

486
Two tractors in one

Production of the new Terra-Builder with 3/4-yd. digging bucket and 7 ft., 4 in. heavy-duty angled dozer or 6 ft. bulldozer, has been announced by the American Tractor Corp. The bucket operates as a digging loader,



leveler, materials-handling loader, and backfiller. The ATC special bucket is tapered for self-cleansing. Close-coupled, direct hydraulic linkage permits precision performance when pushing heavy loads, land leveling, or grading. The machine is light enough to be moved on any light dump or stake truck.

487
Adhesive developed for bonding rubber to concrete

A new adhesive to provide more positive anchorage of rubber gaskets to concrete pipe even under extreme climatic conditions has been devel-

MOHAWK STONE PRODUCTS BUILDS *Profits*

WITH
THE
STANDARD
RB
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ERECTION
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MAKE ASPHALT *faster* FOR LESS MONEY

The STANDARD RB Asphalt plant guarantees balanced performance. From raw material state to delivery of finished mix there are no bottle-necks. Every unit is engineered to *speed* the flow, cut man-hours per batch, and reduce lag time between batches. Follow the leaders across the nation ... switch to a STANDARD RB Asphalt plant. Parts warehoused in New York and Los Angeles.

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NO OTHER PUG MILL MIXER GIVES YOU THIS FEATURE



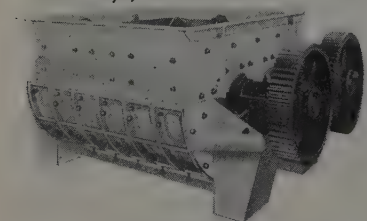
Look at the photo above. It shows how easy it is to replace a worn liner segment in the MADSEN Model 440 Twin-Shaft Pug Mill Mixer. It's a one-man operation, completed in the field in a matter of 20 minutes! The worn liner segment together with the liner frame is removed and a new liner support frame and liner segment is inserted in its place from the outside! No need to remove paddle shanks...and no need for jacks, crowbars or heavy chain hoists. The liner segments in the MADSEN Model 440 Mixer are precision ground to a width tolerance of .003" plus or minus. They fit perfectly without field modification. The sectional, small-piece replacement design permits the user to shift parts to secure the maximum wear factor essential for lowest replacement cost.

★ ★ ★ ★ ★

Based on its performance in all makes of asphalt mixing plants, the MADSEN Twin-Shaft Pug Mill Mixer is considered the outstanding mixer in the industry. Combine this new MADSEN Pug Mill Mixer with the famous MADSEN Asphalt Pressure Injection System (Patented), and you have the right combination for a more profitable asphalt plant operation.



Equipment that Serves®



Externally removable liner segments is only one of the years-ahead MADSEN features incorporated in the MADSEN Model 440 Twin-Shaft Pug Mill Mixer. It will pay you to get the complete story... WRITE FOR BULLETIN NO. 400.

MADSEN

Twin Shaft
PUG MILL MIXER

MADSEN IRON WORKS, INC.

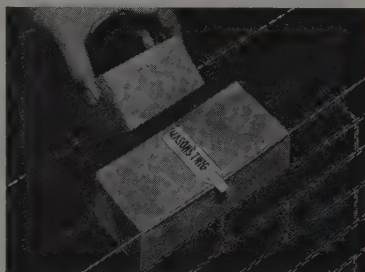
14100 E. ROSECRANS AVE., P. O. BOX 38
LA MIRADA, CALIFORNIA

oped by Rubber & Asbestos Corp. The new product, called "BondMaster 158C," is reported to offer more uniform application characteristics, particularly in overcoming hot weather difficulties ordinarily encountered due to evaporation of solvents. It is also said to permit smoother and faster trowelling in the field. Complete technical data and prices available on request.

488

Mason's Twig said to assure absolute alignment

Assurance of absolute alignment when laying brick, cement, concrete or glass blocks, or other materials is given by Mason's Twig Sales Co., manufacturers of Mason's Twig. It is made of 26-gauge stainless steel in the form of a metal leaf. It is 4 in.



long, 1 in. wide at one end, and tapers at the other end to a clip-like arrangement $\frac{3}{4}$ in. wide. A slot at the clip end is placed over a stretched line so that the line falls into the slot. Then a brickbat is placed on the folded-over metal strip which holds the line firmly and securely. These items cost 25¢ each postpaid, with discount for quantity purchases.

489

Jaeger model 2PN pump is rated at 10,000 gph.

The new model 2PN Jaeger 2-in. pump delivers its rated capacity of 10,000 gal. when operating at the speeds of 2,400 to 2,550 rpm. On 13-in. diameter pneumatic tires, it weighs 190 lbs. and measures 24 x 21 x 26 in. high. Without tires it weight 160 lb. It is powered by a Wisconsin AKN



engine delivering 5.3 hp. at 2,500 rpm. Other features include combined inherent and jet priming, a self-cleaning shell of 20% steel, positively lubricated shaft seal, reversible liner plate, and an impeller that is adjustable for wear. Free literature available on request.

490

All-purpose truck tire

The B. F. Goodrich Co. has developed a new all-purpose truck tire that wears longer on a road and pulls better when off the road. It was designed for truck operators who drive most of their mileage on the highway but who need extra traction for short distances off the highway. Design features include all-purpose cleats, V-shaped tread grooves between lugs which widen toward the shoulders and help stone ejection action, a tread that is 30% deeper, a center wear bar that reduces rate of wear in the center of the tread, sharp edges to give resistance to side slippage, and buttons on the cleats to prevent skids and resist slippage off the road.

A nylon shock shield, plus an extra shock shield directly under the tread to prevent bruise breaks, are built into the tire. These built-in shields add strength to the tire without adding bulk under the tread where heat is most likely to occur. Early failures are prevented and a bigger percentage of the tires can be recapped. This tire is available with a nylon cord body as well as rayon cord construction.

491

Dump-O-Matic hoist converts pickup trucks to dumps

A new model universal mount Dump-O-Matic hoist for use on $\frac{1}{2}$, $\frac{3}{4}$, and 1-ton pickup chassis has been announced by National Lift Co. It is so engineered that a single hoist model can be adapted to any truck chassis with the simplified kit of mounting brackets. The twin cylinders are low slung between the truck chassis frame to permit a lift point well ahead of the dump body hinges, greater leverage, and easier hoist work. Hydraulic power for the hoist is supplied by the fan-belt driven pump. The pump draws 1 hp. to lift a 6,000-lb. capacity load. This pump permits the hoist to be used on any pickup chassis.

493

Portable powerhouse announced

The new Model B-2000 Lynncor Powerhouse, a hand-portable, engine-driven, electric generator plant, has been announced by Lynn Engineering & Supply Co. It will provide both electrical and mechanical power (for belt-driven equipment) simultaneously without removing either the generator or engine from the steel base. The unit has a maximum amount of output of 2,500 watts, and its continuous rating is 2,000 watts, 115 volts single phase, 60 cycles. Overall dimen-

sions are 17 x 23 x 19½ in. high, and weight is approximately 145 lb. complete. Power is supplied by a 5-hp. Briggs & Stratton 4-cycle, air-cooled engine operating at 3,000 rpm. The generator is driven at 3,600 rpm. by steel-cable, cog-type V-belt. This model was designed to list at \$395, but the manufacturer offers an engine trade-in allowance as a service to users. Literature and further information available on request.

494

Elevator attachment for Allis-Chalmers motor graders

A newly-designed elevator attachment with capacity up to 1,200 yd. an hr. for side casting or loading trucks is available for Allis-Chalmers AD-30



and AD-40 motor graders. It was developed by Hancock Manufacturing Co. and is sold through Allis-Chalmers dealers.

The main frame, including the plow beam, is a single unit mounted at three points on the grader. The live power take-off is connected to the engine drive shaft through V-belt sheaves to the clutch. This drives the 42-in. wide conveyor belt. The conveyor is 19 ft. long with a 3-ft. extension available. The hinged conveyor folds at the center to a vertical position for transit.

495

Distometer designed for measuring accurately

A new series of calibrated wheels, tradenamed Distometer, has been announced by Rolatape, Inc., to provide high speed, accurate methods of measurement. The new units are easily operated by one man. Model 200 is 2 ft. in circumference and registers up to 100 ft. before repeating its cycle. It permits measuring wall to wall, around corners, and around curves and contours. Total distance is recorded in ft. and in. on linearity counter and recessed scale on wheel circumference. A click every 2 ft. permits running count, while a bell tone indicates the 100-ft. total. A knob allows operator to reset the wheel at any time. Model 200 weighs 2¾ lb. and has a 34-in. collapsible handle.

"Smoothest Surface ever"
—SAYS RAY W. STRAND
of Strand & Sons



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Architect: Young, Richardson, Carleton and Dettie, Seattle
General Contractors: Strand & Sons, Seattle.

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MASONITE CONCRETE FORM PRESDWOOD

"Concrete Form Presdwood gives us the smoothest surface we have ever been able to produce."

Mr. Strand further states that the extreme surface smoothness also saves money by reducing costs of sacking and grinding. He used these all-wood hard-board panels eight times on this job and felt they were good for the four more times needed to finish the structure.

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PUT THESE ADVANTAGES
TO WORK FOR YOU!

- Two labor-saving sides to choose from: (a) smooth side for painted surfaces, (b) screen side for concrete of uniform color.
- Low first cost—less than ½ that of other smooth-surface methods.
- Can be curved for arches, columns, etc.
- Uniform and complete hydration assured.
- Large 4' x 8' and 4' x 12' panels handle easily, create fewer fins.

Save Two Ways with Masonite Presdply!

Try Presdply on your next job and get both these money-saving advantages: (1) No backing needed, for Presdply has the structural strength of plywood and the smooth, texture-free surface of Presdwood. (2) Smooth concrete will need minimum rubbing, will quickly be ready for painting. Send for your free sample.



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Please send me:

- ☐ Your booklet on Concrete Form Presdwood.
☐ A sample of Concrete Form Presdwood. ☐ A sample of Masonite Presdply.

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"Masonite" signifies that Masonite Corporation is the source of the product



UNIT PRICES

Selected abstracts for Western projects

HIGHWAY—3.8 miles of grading, crushed stone surfacing and asphaltic concrete paving

Washington—Whitman County—State. Carbon Bros., Spokane, won an award from the State Highway Commission on the basis of a low bid of \$327,586 for 3.8 mi. of grading, crushed stone surfacing and asphaltic concrete paving, and construction of a small bridge. Work begins at Colfax and proceeds north on P.S.H. No. 3. Unit prices were as follows:

(1) Carbon Bros.	\$327,586
(2) Goetz & Brennan	343,580
F. R. Hewett Co.	347,163
M. A. Degarstrom Co.	358,839
Clifton & Applegate	381,552
James Crick & Sons	393,203
Sather & Sons	403,596

	(1)	(2)
Lump sum, clearing and grubbing	\$ 3,000.00	\$ 7,500.00
199,110 cu. yd. common excavation, incl. 600-ft. haul	.20	.26
8,100 cu. yd. solid rock excavation, incl. 600 ft. haul	1.20	1.20
465 cu. yd. common trench excavation, incl. haul of 600 ft.	1.00	1.20
12,000 cu. yd. stripping borrow and surfacing pit, incl. haul of 600 ft.	.20	.25
112,920 cu. yd. sta's. overhaul	.01	.01
2,205.7 M. cu. yd. sta's. overhaul	3.00	3.50
1,355 cu. yd. structure excavation	2.00	2.25
53 day smooth wheeled power roller	45.00	40.00
85 day tamping roller	45.00	45.00
56 day pneumatic tired roller	45.00	40.00
51 day mechanical tamper	30.00	42.00
11,540 lin. ft. slope treatment, Class A	.10	.12
205.2 stas. (100 ft.) finishing roadway	10.00	12.00
2,375 M. gal. water	1.50	1.75
4,100 cu. yd. crushed stone filler in place, incl. haul	1.50	1.45
55 cu. yd. gravel backfill for foundations	4.00	4.50
251 ton emulsified asphalt SS-1	45.00	45.00
19,960 ton crushed stone surfacing top course	1.40	1.36
56,530 ton crushed stone surfacing base course	1.36	1.30

Light bituminous surface treatment—Method A

3.9 mi. preparation, construction, finishing	200.00	500.00
101 ton asphalt cement MC-3	46.00	46.00
840 cu. yd. furnishing and placing crushed cover stone	2.80	2.85

Type I-1 asphaltic concrete pavement

2,930 ton Class C wearing course	7.15	7.46
4,410 ton Class L leveling course	7.15	7.35

Other items

220 cu. yd. concrete, Class A	60.00	53.00
33,300 lb. steel reinforcing bars	.12	.12
36 lin. ft. plain conc. culvert pipe 12-in. diam.	2.50	2.00
1,784 lin. ft. std. reinf. conc. culv. pipe 18-in. diam.	4.50	4.00
532 lin. ft. std. reinf. conc. culv. pipe 24-in. diam.	6.50	6.20
128 lin. ft. std. reinf. conc. culv. pipe 30-in. diam.	8.50	8.50
96 lin. ft. std. reinf. conc. culv. pipe 42-in. diam.	15.00	15.50
65 ea. reinf. conc. right-of-way markers	4.00	6.00
14 ea. monument cases and covers	40.00	35.00
39 ea. removing concrete pipe headers	10.00	15.00
Lump sum, removing concrete box culverts (4)	300.00	2,000.00
Lump sum, removing concrete bridge (1)	1,500.00	2,000.00
21,938 sq. yd. removing cement concrete pavement	.60	.45

Bridge

225 cu. yd. structure excavation	3.00	4.00
70 cu. yd. concrete, Class A	70.00	70.00
102 cu. yd. concrete, Class B	55.00	65.00
78 lin. ft. reinf. conc. bridge railing	8.50	8.00
25,400 lb. steel reinforcing bars	.12	.125
2 ea. bridge drains, complete	65.00	100.00

CANAL—Two railroad undercrossing siphons for the Chandler Lower Canal

Washington—Yakima Project—USBR. Erwen Construction Co., Pasco, submitted a total low bid for \$293,254 for two schedules for construction of monolithic reinforced concrete siphons, each with two 11½-ft. inside diameter barrels. Schedule 1, for which Erwen was low with \$172,904, is for the 415-ft. siphon crossing under the Northern Pacific Railroad and Snipes Creek. On Schedule 2, Henly Construction Co. was low with \$106,550 for a 320-ft. crossing under a county road and the Union Pacific Railroad. Unit prices were as follows:

	Schedule 1	Schedule 2
(1) Erwen Construction Co.	\$172,904	\$120,349
(2) Henly Construction Co.	204,922	106,550
Lee Hoffman, General Contractor	188,848	134,784
Morrison-Knudsen Co., Inc.	200,349	138,786
Cherf Bros. & Sand Kay Construction Co.	208,233	131,736
Hall-Atwater, Inc.	197,436	142,665
Young & Smith Construction Co.	220,445	138,860
Long Construction Co., Inc.	229,800	148,215

J. H. Trisdale, Inc.	238,912	139,550
Butler Construction & Engineering Co.	225,833	156,192
Paul Jarvis, Inc.	245,950	170,499
Pacific Bridge Co.	264,345	167,407
Valley Construction Co.	307,159	206,323
Engineer's estimate	234,878	149,585

SCHEDULE 1

	(1)	(2)
2,400 cu. yd. excavation, common, for canal	0.36	1.00
50 cu. yd. excavation, rock, for canal	5.20	2.00
100 cu. yd. excavation, common, for channel change	.50	1.00
1,200 cu. yd. excavation for tunnels	4.65	20.00
350 cu. yd. compacting embankments	0.46	1.00
10,000 cu. yd. excavation, common, for structures	0.50	2.00
500 cu. yd. excavation, rock for structures	5.20	4.00
50 sq. yd. preparing rock foundations for concrete canal lining	2.50	2.00
1,150 sq. yd. trimming earth foundations for concrete canal lining	0.60	1.00
20 cu. yd. fill at top of canal lining	3.00	2.00
8,500 cu. yd. backfill about structures	0.26	0.50
600 cu. yd. compacting backfill about structures	1.30	3.00
1,020 cu. yd. concrete in structures	48.25	50.00
435 cu. yd. concrete in tunnel lining	36.50	40.00
130 cu. yd. concrete in canal lining	17.00	30.00
2,700 bbl. furnishing and handling cement	7.30	5.00
270,000 lb. furnishing and placing reinforcement bars	0.14	0.14
40 sq. ft. furnishing and placing ½-in. elastic filler material in joints	3.30	3.00
1,020 lin. ft. placing 9-in. rubber waterstops in joints	0.70	1.00
2 ea. furnishing materials and constructing cattle guards	360.00	300.00
180 lin. ft. furnish. materials and constructing 6-in. diam. underdrains with uncemented joints	1.90	3.00
270 lin. ft. furnishing and laying 6-in. diam. drain pipe with cemented joints for outlet drains	2.70	2.00
86 lin. ft. furnishing and laying 10-in. diam. corrugated-metal pipe	4.50	2.00
192 lin. ft. furnishing and installing metal tunnel liner plates	139.00	120.00

SCHEDULE 2

	(1)	(2)
7,000 cu. yd. excavation, common, for canal	0.36	0.10
200 cu. yd. excavation, rock, for canal	5.20	0.50
360 cu. yd. compacting embankments	0.46	0.60
13,000 cu. yd. excavation, common, for structures	0.50	1.00
500 cu. yd. excavation, rock, for structures	5.20	1.00
50 sq. yd. preparing rock foundations for concrete canal lining	2.50	0.80
1,400 sq. yd. trimming earth foundation for concrete canal lining	.60	.80
20 cu. yd. fill at top of canal lining	3.00	2.00
10,000 cu. yd. backfill about structures	0.26	0.30
4,400 cu. yd. compacting backfill about structures	1.30	0.80
1,050 cu. yd. concrete in structures	48.25	40.00
160 cu. yd. concrete in canal lining	17.00	20.00
1,900 bbl. furnishing and handling cement	7.30	6.00
200,000 lb. furnishing and placing reinforcement bars	0.14	0.12
40 sq. ft. furnishing and placing ½-in. elastic filler material in joints	3.30	2.00
790 lin. ft. placing 9-in. rubber water stops in joints	0.70	1.00
220 lin. ft. furnishing materials and constructing 6-in. diam. underdrains with uncemented joints	1.90	3.00
90 lin. ft. furnishing and laying 6-in. diam. drain pipe with cemented joints for outlet drains	2.70	2.00
20 lin. ft. furnishing and laying 10-in. diameter corrugated-metal pipe	4.50	3.00

BRIDGE—Railroad overpass and highway overpass at The Dalles Dam

Oregon—Wasco County—C. of E. Erick Enquist, Troutdale, submitted a total low bid of \$7,585 for construction of a reinforced concrete overpass on the relocated Union Pacific Railroad and a reinforced concrete underpass on relocated Highway 30 at The Dalles Dam Project. He was low on Part A with \$24,020 and low on Part B with \$33,565. Unit prices were as follows:

	Part A	Part B
(1) Erick Enquist	\$24,020	\$33,565
(2) Cherf Bros., Inc. and Sandkay Contr., Inc.	26,383	35,112
Marshall Construction Co.	30,320	35,922
Larson Construction Co.	32,490	35,071
John E. Alexander	28,340	39,321
Pettijohn Engineering Co.	32,110	35,607
Schrader Construction Co.	32,810	37,311
Louis Elterich Co.	33,950	36,833
Hannan Bros. Co.	32,230	40,221
Teller Construction Co.	32,630	40,466
Valley Construction Co.	34,370	39,247
M. P. Munter Co.	38,030	38,856
Guy E. Atkinson Co.	34,805	43,391
C. B. Lauch Construction Co.	39,795	44,806
Parker-Johnson Co.	41,000	43,930
C. P. Patterson	No Bid	35,126

PART "A"

	(1)	(2)
Underpass on Relocated Highway No. 30		
240 cu. yd. structural excavation	4.00	7.20
370 cu. yd. concrete	38.00	36.00
580 bbl. cement	5.00	6.24
61,000 lb. steel reinforcement	.18	.126

PART "B"

	(1)	(2)
Overpass on Relocated Union Pacific Railroad		
300 cu. yd. structural excavation	6.00	7.20
345 cu. yd. concrete	55.00	51.60
550 bbl. cement	5.00	6.24
74,300 lb. steel reinforcement	.10	.126
5,800 lb. miscellaneous metal	.45	.40

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UNIVERSAL CONCRETE PIPE, who are said to be the largest producers of Concrete Pipe in America, a subsidiary of the American Marietta Company, have opened a new plant in Los Angeles County, California, at 5555 Irwindale Avenue, near Azusa. The plant is being equipped to make centrifugal spun, vibro-cast and machine tamped concrete pipe for various uses, including pressure water lines. Henry Weigand is Manager. Chris Adzovich is Assistant Manager and Superintendent. Both are men with years of experience.

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UNIT PRICES ... CONTINUED

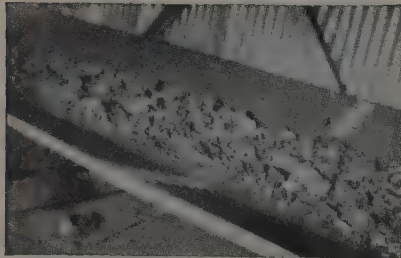
HIGHWAY—Heavy grading on the Old Oregon Trail

Oregon—Umatilla County—State. Berke Bros. and C. R. O'Neil, Portland, were low with \$1,515,560 submitted before the State Highway Department for 15 mi. of grading and draining on the Old Oregon Trail east of Pendleton. Work includes 2,396,000 cu. yd. of general excavation. Unit prices were as follows:

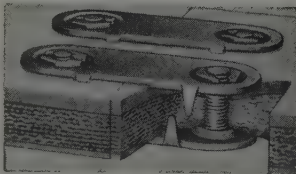
(1) Berke Bros. and C. R. O'Neil.....	\$1,515,560
(2) Rogers Construction Co.....	1,636,091
Goodfellow Bros., Inc.....	1,640,845
Parker-Schram Co.....	1,743,751
D & H Construction Co. and M. H. Hasler Construction Co.....	1,784,887
Roy L. Houck & Son.....	1,809,549
Peter Kiewit Sons' Co.....	1,834,576
Morrison-Knudsen Co., Inc.....	1,884,001
Kuckenberg Construction Co., Inc.....	1,896,729
McCammon-Wunderlich Co.....	1,897,842
Roy L. Bair & Co. and James Crick & Sons.....	1,897,885
Guy F. Atkinson Co., Inc.....	1,933,535
Vernie Jarl.....	1,967,030
J. N. Conley and R. A. Heintz Construction Co.....	1,968,717
Gibbons & Reed Co.....	1,986,880
Natt McDougall Co.....	2,051,195
Fred H. Slate Co., Oregon Ltd., and E. C. Hall Co.....	2,168,372
White Bros. Co.....	2,177,556
F. R. Hewett Co. and Sather & Sons.....	2,395,930
McNutt Bros.....	2,589,777

	(1)	(2)
All spec. clearing and grubbing.....	\$25,000.00	\$25,000.00
3,100 cu. yd. structural excavation, unclassified.....	3.00	3.50
2,396,000 cu. yd. general excavation, unclassified.....	.50	.57
6,830,000 yd. sta. short overhaul.....	.01	.0075
210,000 cu. yd. sta. long overhaul.....	.35	.30
15.04 mi. finishing roadbed and slopes.....	1,000.00	400.00
58,000 lin. ft. rounding cutbacks.....	1.15	.12
2,500 M. gal. sprinkling.....	3.00	2.00
300 lin. ft. 12-in. concrete pipe.....	2.00	1.50
4,000 lin. ft. 18-in. concrete pipe.....	3.50	3.00
580 lin. ft. 18-in. conc. pipe, extra strength.....	3.80	3.50
370 lin. ft. 24-in. concrete pipe.....	5.00	5.00
160 lin. ft. 24-in. conc. pipe, extra strength.....	5.50	5.25
290 lin. ft. 36-in. concrete pipe.....	9.00	8.50
430 lin. ft. 36-in. conc. pipe, extra strength.....	9.70	9.50

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770 lin. ft. 36-in. special corrugated metal pipe, 8 gauge, protected invert.....	19.00	16.00
200 lin. ft. 48-in. corrugated metal pipe.....	15.50	17.00
125 lin. ft. 72-in. struct. plate pipe, 1 gauge.....	55.70	53.00
90 lin. ft. 72-in. struct. plate pipe, 3 gauge.....	51.00	52.00
140 lin. ft. 72-in. struct. plate pipe, 8 gauge.....	42.40	45.00
110 lin. ft. 84-in. struct. plate pipe, 12 gauge.....	42.00	40.00
130 lin. ft. 96-in. struct. plate pipe, 5 gauge.....	59.40	62.00
170 lin. ft. 96-in. struct. plate pipe, 7 gauge.....	56.25	55.00
200 lin. ft. 6-in. perforated metal drain pipe, coated.....	1.90	1.25
50 cu. yd. ¾-in.-0 backfill in drains.....	6.00	4.00
190 cu. yd. Class "A" concrete.....	62.00	50.00
31,000 lb. metal reinforcement.....	.12	.11

HIGHWAY—Heavy grading and bituminous surfacing in Idaho

Idaho—Idaho County—State. Frank G. Baulne, Yardley, Wash., was awarded a contract by the State Department of Highways on the basis of a low bid of \$620,463 for 6.7 mi. of grading and bituminous surfacing on crushed gravel base. Work includes 490,000 cu. yd. of unclassified excavation. Unit prices were as follows:

(1) Frank G. Baulne.....	620,463
(2) Peter Kiewit Sons' Co.....	674,406
James Crick & Sons.....	696,184
Eagle Construction Co.....	697,672
McNutt Bros.....	708,635
Morrison-Knudsen Co., Inc.....	729,222
Sather & Sons.....	775,042
Morgan Construction Co.....	814,365
Duffy Reed.....	834,376
Tony Marrazzo.....	857,064
Triangle Construction Co.....	940,453
Quinn Bros.....	948,754
Clifton & Applegate.....	960,229
Max J. Kuney.....	1,056,938

	(1)	(2)
2 ea. removal of culvert.....	\$100.00	75.00
1 ea. removal of culvert (operstr.).....	200.00	150.00
16 ea. remove concrete headwalls.....	30.00	50.00
490,000 cu. yd. unclassified excavation.....	.77	.88
1,140 cu. yd. excavation for structures.....	3.00	3.75
123,000 yd. mi. haul.....	.24	.20
7,300 M. gal. watering embankments.....	1.25	1.00
2,000 M. gal. water base and surface courses.....	1.25	2.00
2,730 hr. rolling power roller.....	5.00	9.00
1,200 hr. rolling tamping roller.....	5.00	7.00
1,350 cu. yd. mechanical tamping.....	2.50	2.00
600 lin. ft. small ditches.....	.30	.30
41,000 ton cr. gr. base course 2-in. max.....	1.15	1.15
37,800 ton cr. gr. surf. course ¾-in. max.....	1.35	1.33
58,800 gal. RC-2 asph. rd. mat. type C, S.T.....	.25	.18
58,800 gal. MC-4 asph. rd. mat. type C, S.T.....	.25	.18
6,500 ton cov. coat mat. Cl. 5, type C, S.T.....	3.00	2.75
31 cu. yd. concrete Class "A".....	100.00	65.00
4,200 lb. metal reinforcement.....	.18	.16
120 lin. ft. 12-in. pipe culverts.....	2.65	4.00
2,130 lin. ft. 24-in. pipe culverts.....	5.90	7.00
64 lin. ft. 36-in. pipe culverts.....	11.00	14.00
170 lin. ft. 48-in. pipe culverts.....	16.00	17.00
70 lin. ft. 60-in. pipe culverts.....	25.00	30.00
75 lin. ft. steel beam ty. guard rail (rigid).....	4.00	4.50
320 ea. guide posts, type "4".....	6.00	8.00
6,800 lin. ft. move and reconstruct fence.....	.22	.25
432 lin. ft. move and reset guard rail.....	2.00	.60
1,560 lin. ft. salvage cable guard rail and posts.....	.30	.20
50 lin. ft. relay 2-in. galv. iron water pipe.....	1.00	1.25
140 lin. ft. 4-in. galv. iron water pipe.....	3.00	3.00

HIGHWAY—Two small reinforced concrete bridges in Oregon

Oregon—Marion County—State. C. J. Eldon, Portland, was low with \$83,940 submitted before the State Highway Department for construction of two reinforced concrete structures on the North Santiam highway. Unit prices were as follows:

(1) C. J. Eldon.....	\$83,940
(2) F. S. Lord, Mechanical Contractor.....	84,100
Tom Lillebo.....	85,670
Hannan Bros.....	91,12
Lee Hoffman.....	92,69
Schrader Construction Co.....	92,88
Valley Construction Co.....	94,04
Parker-Johnson Co.....	98,06
Young & Smith Construction Co.....	98,35

	(1)	(2)
390 cu. yd. N. Santiam Highway Overcrossing structural excav.....	10.00	3.2
5 cu. yd. excav. below elevations shown.....	15.00	10.0
300 lin. ft. furnish steel piling.....	5.90	5.4
8 only, drive steel piles.....	100.00	100.0
420 cu. yd. Class "A" concrete.....	61.00	65.0
94,000 lb. metal reinforcement.....	.11	.11
80 lin. ft. 8-in. metal drain pipe, coated.....	4.00	2.6
320 sq. yd. concrete slab riprap.....	6.00	5.0
400 cu. yd. structural excavation.....	10.00	8.0
5 cu. yd. excav. below elevations shown.....	15.00	15.0
390 cu. yd. Class "A" concrete.....	61.00	65.0
103,000 lb. metal reinforcement.....	.11	.11

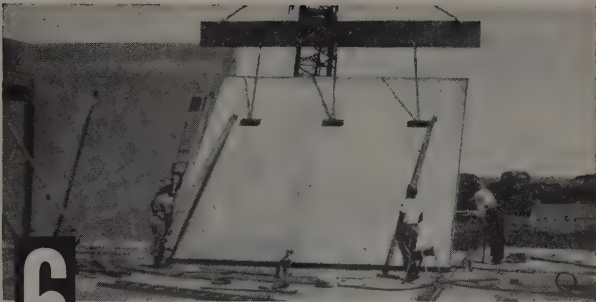
UNIT PRICES . . . CONTINUED

HIGHWAY—Heavy grading and five structures for freeway construction in Placerville, California

California—El Dorado County—State. Piombo Construction Co., San Francisco, was awarded a contract by the Division of Highways on the basis of a low bid of \$809,970 for construction on the Placerville Freeway. Work consists of about 1.3 mi. of grading, involving 214,000 cu. yd. of excavation, for a 4-lane divided highway, construction of two pedestrian overheads, three bridges, and the widening of three bridges. Unit prices were as follows:

(1)	Piombo Construction Co.....	\$ 809,970
(2)	Fredrickson & Watson Construction Co.....	874,719
	Granite Construction Co.....	884,763
	Gordon H. Ball & San Ramon Valley Land Co. and John Delphia.....	895,100
	Eaton & Smith.....	911,377
	H. Earl Parker, Inc.....	920,837
	Lew Jones Construction Co.....	930,815
	B. K. Ukropina, T. P. Polich, Steve Kral & John R. Ukropina.....	969,463
	Nomellini Construction Co.....	1,099,067
	Charles MacClosky Co. and Clyde W. Wood & Son, Inc.....	1,166,262
	A. Teichert & Son, Inc.....	1,218,726

	(1)	(2)
Lump sum, removing portions of exist. bridges.....	\$ 10,000.00	5,000.00
Lump sum, clearing and grubbing.....	30,000.00	25,000.00
214,000 cu. yd. roadway excavation.....	.85	.92
18,700 cu. yd. structure excavation.....	3.00	4.00
6,000 cu. yd. ditch and channel excavation.....	1.50	2.40
8,600 sq. yd. compacting original ground.....	.05	.09
880 cu. yd. selected rock slope protection.....	1.30	3.60
3,900,000 sta. yd. overhaul.....	.003	.009
Lump sum, dev. wat. sup. and furn. water equip.....	6,500.00	19,000.00
12,000 M. gal. applying water.....	1.00	1.00
Lump sum, finishing roadway.....	4,000.00	5,200.00
680 bbl. portland cement (C.T.B.).....	5.20	4.80
7,900 sq. yd. mix, spread and compact C.T.B.....	.32	.60
9 ton asphalt emuls. (cur. sl. ct. and pnt. bndr.).....	45.00	80.00
3,000 ton mineral aggregate (C.T.B.).....	3.30	2.70
2,800 ton untreated rock base.....	3.40	3.00
1,800 ton mineral aggregate (P.M.S.).....	8.00	9.00
95 ton paving asphalt (P.M.S.).....	8.00	9.00
19 ton liquid asphalt, SC-2 (prime coat).....	40.00	46.00
4,310 cu. yd. Class "A" P.C.C. (structures).....	55.00	55.00
270 lin. ft. rubber waterstops.....	3.00	2.80
132,000 lb. structural steel.....	.15	.15
2,130 lb. misc. iron and steel.....	.40	.50
Lump sum, clean and paint, structural steel.....	5,000.00	4,600.00
600 cu. yd. light stone riprap.....	15.00	9.60
75 cu. yd. grouted riprap.....	19.00	46.00
220 cu. yd. Cl. "B" P.C.C. (curbs, gutters and sidewalks).....	36.00	40.00
55 ea. R/W monuments.....	8.00	8.00
323 lin. ft. cor. metal bridge railing.....	9.00	7.50
669 lin. ft. cor. metal rail. (12 ft., 6 in. post spacing).....	5.00	4.60
275 lin. ft. cor. metal rail. (6 ft., 3 in. post spacing).....	6.00	5.70
Lump sum, pedestrian railings.....	12,500.00	14,600.00
7,300 lin. ft. 72-in. chain link fence (rail top).....	2.40	2.30
75 lin. ft. 12-in. R.C.P.....	2.60	3.40
1,050 lin. ft. 15-in. R.C.P.....	3.20	2.80
2,000 lin. ft. 18-in. R.C.P.....	4.10	3.60
1,750 lin. ft. 24-in. R.C.P.....	5.70	5.00
860 lin. ft. 36-in. R.C.P.....	9.70	8.60
130 lin. ft. 48-in. R.C.P.....	16.20	14.40
210 lin. ft. 12-in. C.M.P. (16 ga.).....	2.80	2.70
1,050 lin. ft. 8-in. P.M.P. underdrains.....	2.00	1.90
450 cu. yd. filter material.....	9.00	9.00
5 ea. slip joints.....	45.00	23.00
443,000 lb. bar reinforcing steel.....	.095	.10
250 lin. ft. 1-in. galv. steel pipe.....	.50	1.00
550 lin. ft. 2-in. galv. steel pipe.....	1.00	1.25
500 lin. ft. 4-in. cast iron pipe (water).....	3.50	2.80
1,230 lin. ft. 6-in. cast iron pipe (water).....	4.50	4.00
380 lin. ft. 8-in. cast iron pipe (water).....	6.00	5.50
220 lin. ft. 10-in. cast iron pipe (water).....	8.00	8.00
1 ea. 2-in. gate valves.....	28.00	50.00
1 ea. 4-in. gate valves.....	60.00	140.00
1 ea. 6-in. gate valves.....	115.00	180.00
7 ea. salv. and reset. exist. fire hydrants.....	160.00	200.00
1,950 lin. ft. 4-in. cast iron pipe (san. sewers).....	2.80	3.25
520 lin. ft. 6-in. cast iron pipe (san. sewers).....	5.00	4.60
360 lin. ft. 8-in. cast iron pipe (san. sewers).....	6.00	6.60
700 lin. ft. salv. and relay. exist. 4-in., 6-in., and 8-in. C.I.P. (san. sewers).....	2.60	3.50
270 lin. ft. salv. and relay. exist. 10-in. C.I.P. (san. sewers).....	6.50	6.25
20 ea. sanitary sewer cleanouts.....	64.00	45.00
10 ea. san. sew. cleanout covers and boxes.....	13.00	30.00
6 ea. manholes, type "H".....	320.00	140.00
2 ea. manholes, type "K".....	380.00	220.00
1 ea. manholes, type "L".....	260.00	210.00
1 ea. manholes, type "M".....	380.00	270.00
2 ea. manholes, type "P".....	360.00	190.00
4 ea. manholes, type "S".....	260.00	110.00
14 ea. manhole frames and covers.....	155.00	117.00
25 ea. frames and covers (cast steel).....	110.00	88.00
32 ea. frames and grates (bar steel).....	77.00	64.00
Lump sum, bridge lighting equipment.....	4,500.00	4,100.00



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WESTERN CONSTRUCTION

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Association officers—1954

Michael V. Pregnoff is the newly elected president of the Structural Engineers Association of Northern California, for the year 1954. Others

**Michael
Pregnoff**
new presi-
dent of
SEAONC



chosen to serve with him are Howard A. Schirmer, vice president; James L. Stratta, secretary, and Cecil H. Wells, Jr., assistant secretary; William K. Cloud, treasurer. Robert D. Dewell, W. H. Ellison, Wesley T. Hayes, Jack Y. Long and G. A. Sedgwick, as well as the president and vice president, comprise the board of directors.

King E. Parker has been elected to serve as 1954 president of Central California Chapter, Associated General Contractors. Also elected for the ensuing year are John R. Winblad, vice president, and Melvin F. Gautier, treasurer. Bruce McKenzie is secretary and managing director, located at the Chapter headquarters in San Francisco.

Alfred L. Miller, member of the civil engineering department of the University of Washington, was recently installed as chairman of the Puget Sound Engineering Council, succeeding Gerald O. Freeman. Also installed were: D. M. Saunders, vice president; R. P. Hotelling, treasurer, and R. J. Campbell, secretary.

Kenneth P. Norrie, Spokane, is the new president of the Structural Engineers Association of Washington.

H. W. Tyler was elected president of The Engineers Club of Seattle, Wash., succeeding Bennett M. Saunders. Tyler is senior engineer with the city engineering department.

William E. Irish of E. A. Irish Co. was elected 1954 president of Southern California Chapter, Associated General Contractors, and the following members were elected to serve with him: Harvey A. Kruse of MacDonald & Kruse, vice president; J. V. Quinn of Quinn and Conant, vice president; Carl H. Wittenberg of Ford-J. Twaits Co., vice president, and Spencer Webb of Webb & White, treasurer.

John F. O'Connell, vice president, Bechtel Corporation, San Francisco and New York, was elected president of the National Constructors Association, an organization composed of the leading national firms engaged in the engineering and construction of power and chemical plants, steel mills and petroleum refineries.

W. D. Newbitt was recently installed as 1954 president of Associated Engineers of Spokane. Others chosen to assist him are vice presidents: R. E. Blasen, Kenneth P. Norrie, Harold Halsted, Fred Long, Lee Patchen and Byron Barber. W. L. King was re-elected secretary-treasurer.

Officers elected for 1954 at the annual meeting of the Idaho Branch of the Associated General Contractors at Boise are N. L. Terteling, Boise, president; W. E. Arrington, Idaho Falls, vice president, and William Gramkow, Boise, secretary-treasurer.

Charles H. Scholer, head, Department of Applied Mechanics, Kansas State College, was elected 1954 president of the American Concrete Institute at the fiftieth annual convention of the Institute. After graduating

**Charles
Scholer**
1954 presi-
dent of
ACI



from KSC, Professor Scholer worked for various agencies, including engineering assignments with the U. S. General Land Office in New Mexico; the A. T. & S. F. railroad; Extension Division of KSC; Kansas State Highway Commission; and since 1919 has held his present position at the College, except for a short leave of absence when he performed investigational work for the Portland Cement Association in 1939-1940.

Kenneth N. Phillips of the Portland district of the U. S. Geological Survey, was recently elected president of Oregon Section, American Society of Civil Engineers, for the next year. He succeeds Loren Thompson. Others elected were: first and second vice presidents, Gordon L. Burt and Robert T. Mercer; secretary, Robert M. Bonney; treasurer, Walter J. Bushnell.

J. Robert Mitch is the newly appointed secretary-manager of Northern California Chapter, Associated General Contractors, succeeding Winfield H. Arata. He was formerly director of labor relations for both the Northern and Central California Chapters of AGC. In his new position he will assume this assignment for the Northern California Chapter only.

Bruce McKenzie, as of February 1 took over the position of secretary-manager of Central California Chapter, AGC, and became director of labor relations for this chapter. Since Frank C. Corker left six months ago, Robert Titherington had been acting manager. He has now become field representative for the chapter.

Walter W. Candy, Jr., vice president and secretary of the Colorado River Association, Los Angeles, succeeds Ben P. Griffith as president of the organization. Vice presidents of the organization are M. O. King, El Centro; A. J. McFadden, Santa Ana, and Adm. William H. Standley, U. S. Navy (ret.), San Diego.

C. A. Riedesel is the new president of the Idaho Society of Professional Engineers. Other 1954 officers are C. C. Hallvik, vice president; W. P. Eaton, secretary; C. C. Fiske, treasurer, and M. L. Higgins, national director, all of Boise.

Mons Benson of Boise has been selected to serve as president of the Southern Idaho Section of the American Society of Civil Engineers, succeeding Robert J. Newell. Others elected as officers of the society are: John Hayes, Twin Falls, first vice president; John Walker, Notus, second vice president; David Crandall, Boise, secretary, and Frank Hart, Boise, treasurer.

New officers of the Colorado Contractors Association, Inc., AGC, recently elected are: president, Walter Schmidt; first vice president, Jack Harrison; second vice president, Edward W. Vandervort, and secretary-treasurer, James B. Kenney, Jr.

Thomas E. McCarty, District Engineer for the New Mexico State Highway Department, Albuquerque, has been elected 1954 president of the New Mexico Society of Professional Engineers. Charles G. Caldwell, director of engineering and sanitation for the State of New Mexico, was chosen first vice president; David I. Lloyd, Albuquerque Testing Laboratory, second vice president; Dr. T. T. Castonguay, chairman of the Chemical Engineering Department of the University of New Mexico, secretary-treasurer.

News of DISTRIBUTORS

**Clark Equipment
Co. district
representatives
(from left)
Lewis
Zermer
Pedley**



Clark Equipment Co. appointments

Among seven district representatives of the Construction Machinery Division of Clark Equipment Co. recently appointed in the West are Clarence E. Zermer, Southwest district; Devereux W. Pedley, Western district, and Richard W. Lewis, Northwest district. Before joining Clark in 1953, Zermer had been a district representative for Frank G. Hough Co. His territory includes New Mexico and Colorado, as well as Texas and Oklahoma. Pedley joined Clark last year after several years in the plant engineering division of Northrup Aircraft, Inc. His territory includes California, Arizona and Nevada. Prior to joining the Clark organization, Lewis also had been district representative for the Hough company. His territory embraces Washington, Oregon, Idaho, Montana, Utah, Wyoming and western Canada.

Products of the Construction Machinery Division include power shovels, cranes and draglines formerly manufactured by Michigan Power Shovel Co., acquired by Clark in mid-1953, and a recently introduced line of tractor shovels.

Robert Nicolai named Northwest district rep

Robert L. Nicolai has been named district representative for Gorman-Rupp Co., to serve as a liaison between factory and distributor in the Northwest Division. According to K. H. Cadigan, vice president in charge of sales, Nicolai's appointment is a part of an expanded sales and service program in the distribution of its pumps for the construction field, as well as irrigation and petroleum.

Viber distributor

Viber Company announces appointment of W. J. Burke & Co., San Francisco, as Northern California distrib-

utor for the complete Viber line of electric, gasoline, and pneumatic internal and external vibrators. Arthur P. Denton will continue his long-time association with the Viber concern in the San Francisco Bay Area, handling sales and service on special jobs, and in a consulting and advisory capacity.

C. I. T. news

Construction equipment financing is now the largest segment of the business of C. I. T. Corporation and, according to S. D. Maddock, C. I. T. president, "the volume of loans secured by construction equipment in 1953 ran about 60% ahead of 1952." Personal contact with contractors is maintained by some fifty field men throughout the U. S. Western operations are under the supervision of Vice President E. H. Thrower of the San Francisco division office and assistant vice presidents R. S. Wallace in Los Angeles and C. H. Anderson in Portland. Customer contact in Southern California is handled by W. D. Beezley, L. G. McGraw and C. O. McGruther. Field man Robert

French of Los Angeles also covers Arizona and part of Nevada.

Northern California and the remainder of Nevada is covered by R. Y. Mann, San Francisco. G. R. Foulger, Salt Lake City, covers Utah and part of Idaho. Peter D. Quass, Spokane, has the remainder of Idaho and a portion of Washington. F. L. Conrad, Portland, is responsible for business in Oregon and shares the remainder of Washington with A. D. Keith of Seattle. Donald Douma of Billings is C. I. T. Corporation's field representative for Montana.

Lutz joins Bucyrus-Erie at S. F.

Appointment of Donald E. Lutz as sales representative for Bucyrus-Erie excavators in the Western sales district was recently announced. He has been with the company since 1947, and was formerly a representative in the Dallas territory. His new assignment is with the San Francisco office, which serves California, Arizona, Nevada, Utah and part of Wyoming. The office is headed by J. H. Sackett, Western sales manager. Lutz has an engineering background including service as a Marine Corps engineering officer and employment with the engineering firm of Dames & Moore, Los Angeles.

J. D. Adams appoints Bay Cities Equipment

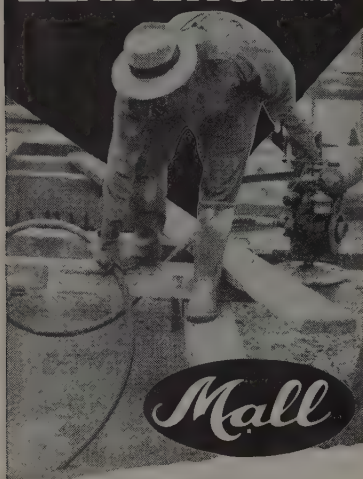
Bay Cities Equipment, Inc., 2606 Cypress St., Oakland, Calif., has been appointed distributor for J. D. Adams Mfg. Co. for the San Francisco Bay area. Many well-known lines are distributed by Bay Cities, such as LeTourneau-Westinghouse Co.; Baldwin-Lima-Hamilton Corp.; Gorman-Rupp Co.; Ingersoll-Rand Co.; Wisconsin Motors, Inc., etc.

Mack's new headquarters

Mack Trucks' Salt Lake City, Utah, sales and service office is functioning in a new and larger building located at 704 South Third West St. According to John C. Rowold, Mack vice president and Western division manager, the new quarters are custom-



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built to the company's plans and specifications as part of its branch modernization and expansion program. S. V. Trent, manager of the Salt Lake branch, described his new quarters as a "modern brick and concrete structure 115 x 180 ft. and totaling 20,700 sq. ft. in area." He feels that the new headquarters' location only 2½ blocks from the heart of Salt Lake City is a great convenience particularly for drivers.

Frank D. Gaus Co. appointed Western agent

Frank D. Gaus Co., 2280 Golden Ave., Long Beach, Calif., sales agent for construction materials, is appointed manufacturer's representative for the eleven Western states by Dewey and Almy Chemical Co., and Serviced Products Corp. The Gaus company will assist established distributors in promotion and sale of Dewey & Almy's Darex AEA air entraining agent, Daracone silicone water repellent for concrete and masonry, and Darakote anti-stripping additive for asphalts and road oils. The same function will be performed for the Serviced complete line of Kork-Pak, asphalt, cork, and sponge rubber expansion joint filler, Para plastic joint sealing compound, rubber water stop, asphalt plank and other concrete specialty items.



Gaus



Kinzley

News from Stang

Joseph A. Kinzley has been appointed sales engineer for the John W. Stang Corp. in the Tacoma, Wash., office. Kinzley first joined the Stang organization in 1945 and since that time has been actively engaged with wellpoints in many parts of the United States and in Central America. The Stang Corporation has offices and a yard in Tacoma.

Hensley appoints new distributors

Hensley Equipment Co., Oakland, Calif., announces the appointment of the following firms to serve as exclusive distributors in their particular areas: Lowry Equipment Co., Redding, Calif.; Oroville Motor Parts, Oroville, Calif.; Harrison Motor Parts, Fresno, Calif.; John A. Batchelor, Los Angeles, Calif.; Cal-Ore Machinery Co., Medford, Ore.; J. T. Holland Co., Salt Lake City, Utah, and Hi-Way Machinery Co., Dallas, Houston and San Antonio, Texas. Hensley Equipment Co. manufac-

tures heavy duty dozer rippers and brush rakes, scraper rippers, dozer end bits, track rollers and allied tractor attachments for use in heavy construction, as well as pipeline, logging, mining and large scale farm operations.

New Western rep for Drott

The appointment of James Blake-more as Western district representative of the Drott Manufacturing Corp. is announced by John W. Drott, vice president. He has been active in the construction and machinery industry for many years, having started with the Martin Wunderlich Co. in 1935, and just prior to joining Drott was Western representative for Bucyrus-Erie. Presently he is headquartered in Spokane, Wash., and will represent Drott in Washington, Oregon, California, Arizona, Utah, Idaho, Nevada and the provinces of British Columbia and Alberta in Canada.



Blakemore



Bechtel

New Gradall sales reps on Pac. Coast

New appointments in the sales organization of the Gradall Division, The Warner & Swasey Co., include the transfer of two salesmen from the East to the West coast. Shelby Coffman and Robert Bechtel have been assigned to new sales duties working out of the Gradall office in Los Angeles. Together they will cover the eight Western states of California, Washington, Oregon, Arizona, Nevada, Utah, Idaho and Montana, as well as the Canadian provinces of British Columbia, Alberta and Saskatchewan.

Timpte made distributor for St. Paul Hydraulic Hoist

Appointment of Timpte Brothers, Inc., Denver, Colo. as a St. Paul Hydraulic Hoist distributor is announced by Leo M. Brown, sales manager of St. Paul Hydraulic. Timpte is granted exclusive sales rights for the entire state of Colorado and for the state of Wyoming, with the exception of eight northern counties. Sales territory of the state of New Mexico, except eight southern counties, is assigned to Timpte's branch office in Albuquerque.

B. F. Goodrich expansion

The new warehouse and office building to serve as Arizona state headquarters for the B. F. Goodrich Tire & Equipment Division, sched-



A PLAQUE which honors Cook Bros. Equipment Co. of California as outstanding P&H dealer for 1953 is accepted by Joseph E. Hall (left) from J. F. Catalane of Harnischfeger Corp. during the recent AED convention in New York.

uled for occupancy March 15, is in line with Arizona's construction and industrial growth and is designed to give better service to dealers and customers throughout the state. In addition to normal warehousing and shipping operations, the new distribution center, located at 1345 N. 22nd Ave., Phoenix, will also be headquarters for tire servicing and adjustment, according to the announcement by L. T. Greiner, Pacific zone manager of replacement tire sales for the division.

McGinnis Co. named Schield distributor

Neil B. McGinnis Co., Phoenix, Ariz., has been appointed as exclusive distributor in the state of Arizona for the Schield BANTAM Company, producer of truck-mounted power cranes and excavators, according to an announcement by G. O. Britton, general sales manager for Schield. McGinnis will sell and service the company's complete line of truck and crawler-mounted $\frac{3}{8}$ -yd. power cranes and excavators, including the BANTAM line of all-new and re-built trucks and crane carriers.

Columbia-Geneva Steel appointment

Appointment of R. H. B. Jones as staff geologist for U. S. Steel's Columbia-Geneva Steel Division was recently announced by W. F. Pruden, chief engineer. A graduate civil engineer and geologist, he was at one time assistant professor of geology at Washington State College and a geologist for the Washington State Survey. He joined U. S. Steel in 1930. Jones will make his headquarters in San Francisco.

Ted Henry Co. named Wooldridge dealer

The Ted Henry Co. of Portland has been appointed exclusive dealer for Wooldridge earthmoving equipment in northwestern Oregon and the five southwestern river counties of Washington, according to an announcement by Wooldridge Manufacturing Co. The Portland firm is headed by Ted Henry, well known throughout the area for his activity in the heavy construction equipment industry over the past twenty-one years. Other official members of the organization include Tom Carr, Kenney Hauser, Jr., and Vern Warren.

Star has complete Blaw-Knox line

Star Machinery Co. was recently appointed distributor for the Blaw-Knox Co.'s extensive line of construction equipment in the state of Washington. The complete Blaw-Knox line now represented by the Seattle distributor includes clamshell buckets, subgraders, paving spreaders and finishing machines, steel road forms, blacktop equipment, and batching plants and cement plants.

Osgood-General appoints new distributor

Osgood-General recently appointed West Coast Engine & Equipment Co., Berkeley, Calif., distributor of its full line of excavating and materials handling machinery for the San Francisco and Northern California area, as well as the southern counties of Oregon. Besides the headquarters office at Berkeley, three affiliated companies are strategically located for

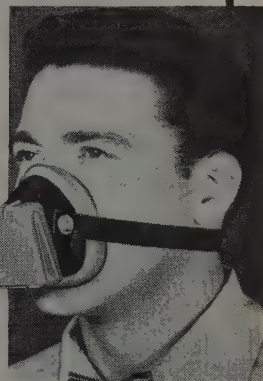
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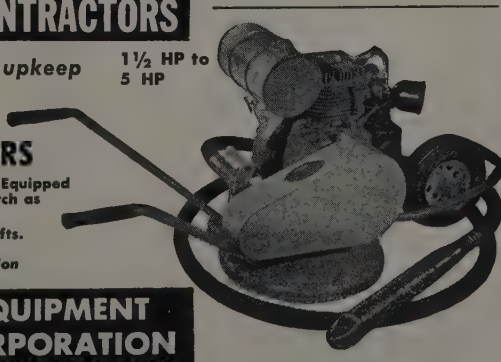
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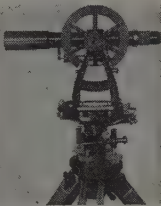
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handling emergency requirements: Rhea Tractor & Engine Co., Sacramento; Hoover Tractor & Engine Co., Woodland, Calif., and Equipment Sales & Service Co., Stockton, Calif. Frank Johnson, formerly Osgood-General division sales manager in California, has joined the staff of the equipment company and will direct sales of Osgood-General machines.

Marlow appoints district engineer

William E. Galland is named Northern California district engineer for Marlow Pumps. He will make his headquarters in the Sacramento area. Galland brings to his new position a background of engineering experience, having been associated with several pump manufacturers before joining Marlow.

Bogle opens branch

Bogle Pipe & Steel Co. has opened an office in Bakersfield, Calif., stocking standard steel pipe and line pipe in addition to light gauge steel pipe. This new office constitutes one of the many branch offices being set up at strategic points in the United States by the Bogle company which maintains headquarters in Houston, Texas.

Changes at U. S. Pipe & Foundry

Two changes in the sales department of United States Pipe & Foundry Co. recently announced involve

the termination of U. S. Pipe's agency agreement with the Water Works Supply Co. at Los Angeles with the establishing of a direct company office at the same address. George J. Bogs of the Chicago office has been made Los Angeles Sales Agent in charge of this office. Foster T. Manock continues as sales representative for U. S. Pipe. And the second change is the establishment of a direct company office at Seattle and the termination of U. S. Pipe's agency agreement with the Hugh Purcell Co. This office has been placed in charge of Robert N. Park, who was made Northwestern sales agent.

New home for Collins

According to a recent announcement by Frederick B. Collins, president of Collins Machinery Co., Pacific Northwest Caterpillar dealer, the company has moved to a new \$250,000 sales and service building at 4233 W. Marginal Way, Seattle, Wash.

Gladstone leaves Bethlehem Pacific

H. V. Gladstone, a salesman in Bethlehem Pacific's San Francisco district sales office, has retired after 29 years of service with the company. He is widely known by the trade in the Bay Area and throughout northern California.

Concrete Sawing appoints Techkote

Techkote Company, Inc., Inglewood, Calif., has been named distributor in the eleven Western states for the complete line of Concut concrete saws and Foothill concrete sawing blades put out by Concrete Sawing Equipment, Inc., Arcadia, Calif. The Techkote Company, with established representatives in the principal cities throughout the West, has served the construction industry for the past twelve years.

Aeroil appoints Klevies Pacific Coast mgr.

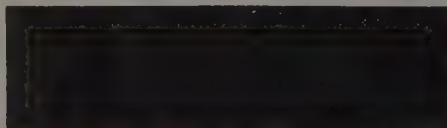
Charles Klevies has been appointed Pacific Coast manager of Aeroil Products Co., Inc. For a number of years he has been manager of Aeroil's Seattle, Wash., branch and will continue to make the Seattle office his headquarters, from which he will supervise the control of West Coast sales activities for the company. Klevies is well known to all general contractors, as well as roofing men and automotive distributors in the Northwest.

Stoody appoints more distributors

New Western distributors recently announced by the Stoody Company for the marketing of Stoody hard-facing alloys are: Arizona—Consolidated Welding Supply Co., Phoenix, and Phoenix Welding Supply Co., Phoenix, California—Laird Welding & Manufacturing Works, Merced, Montana—General Distributing Co., Butte.



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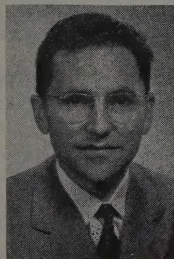
4445 N. E. GLISAN STREET • PORTLAND 13, OREGON



MANUFACTURERS

Executive changes at Soulé

Edward Lee Soulé, Jr. was appointed president and general manager of Soulé Steel Co. at the firm's annual meeting. At the same time, Edward L. Soulé, Sr., founder and head of the company for 43 years, was elevated to chairman of the board. The new president began his service with the firm in 1939, and has worked in all departments, most recently serving as vice president and general manager.



Soulé



Powers

Koehring names genl. mgr.

H. R. Powers has been named general manager of Koehring Company of California, Stockton. Powers was domestic sales manager of the Le-Tourneau-Westinghouse Co., Peoria, prior to accepting the post. He will be in charge of all operations at the West Coast Koehring subsidiary. The Stockton firm services Koehring equipment for users in the Western states and also manufactures some parts.

Four Wheel Drive appointment

Four Wheel Drive Auto Co. announces the appointment of Philip A. Larnino as manager of manufacturing.

Hyster promotes two

Thomas R. Hazel has been promoted to the position of supervisor of the tractor equipment engineering division of Hyster Co. Hyster also announced the appointment of Ronald A. Johnson as supervisor of the engineering standards division.

Jolley heads Ceco sales

Harold D. Jolley, senior vice president of Ceco Steel Products Corp., has been appointed to the newly created position of senior president and manager of sales, according to an announcement by Ned A. Ochiltree, president of the metal building products firm.

Baker assistant sales mgr.

Baker Manufacturing Co. announces the appointment of Bert M. Constant to the position of assistant sales manager, replacing George D. Phares, who it now works manager of

Baker's new Beardstown, Ill., plant, presently nearing completion.

Doug-Lynn move, name change

The Doug-Lynn Co. simultaneously announces its name change to Doug-Lynn Manufacturing Co. and a change of address. This manufacturer of True-Lay paving machines is now located at 339 Fifteenth St., Oakland 12, Calif., and plans to add several new items to its line.

New veep for Caterpillar

Newly-elected vice president of Caterpillar Tractor Co. is Henry H. Howard, whose principal responsibilities will be administration of the firm's recently created engine division. Howard was director of sales for several years prior to becoming manager of the engine division last August, which position preceded his present promotion.

Eutectic names sales head

New vice president in charge of sales for Eutectic Welding Alloys Corp. is Fred F. Roehll, since 1946 national sales manager for the firm, according to the announcement by Eutectic president Rene D. Wasserman.

Timber Engineering Co. adds to staff

J. A. Reidelbach, graduate civil engineer, has joined the staff of Timber Engineering Co. in the capacity of structural engineer to design clear-span timber roof trusses for light and heavy construction and to assist in the planning and building of modern engineered wood structures.

I-H appoints Buzard

Ralph M. Buzard succeeds W. K. Perkins as manager of International Harvester Co.'s motor truck sales department, according to announcement by W. C. Schumacher, vice president. Buzard was associated with I-H sales in the Northwest from 1940 to 1946.

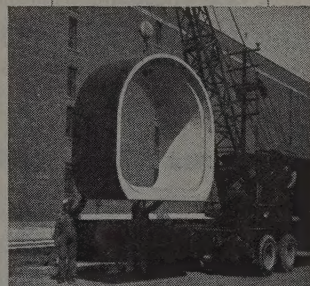
Rauen elected U. S. Spring & Bumper v.p.

United States Spring & Bumper Co. has elected Patrick T. Rauen to the position of vice president.

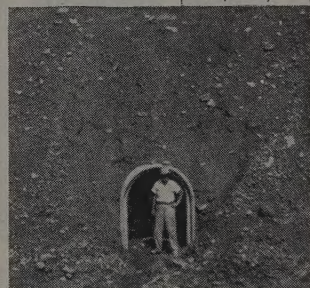
Hercules Powder promotions

J. Joseph Kelleher, formerly assistant director of sales, has been appointed sales manager of the explosives department of Hercules Powder Co. John R. Ryan was appointed manager of explosives operations, while Edward L. Ramer has been named manager of detonator operations. Ryan has held various chemical-engineering posts since joining Hercules in 1940 and has been a technical assistant in the explosives department at the same office in Wilmington since 1951. Ramer has been associated with Hercules since 1935, most recently as an explosives engineer in Wilmington.

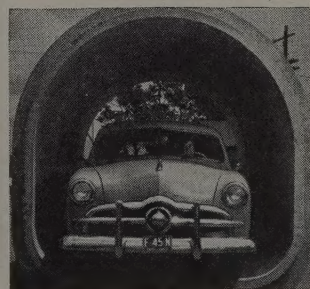
flatten
cost curves
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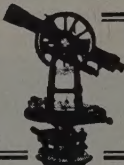
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The spillway bucket of Coulee Dam rates pretty careful maintenance, as reviewed in *Western Construction* some time ago—August 1951. Most recently, though, the routine has called for inspection by divers, at a time of year when there is no spillway flow and the 60 ft. of water above the bucket is calm.

For Mark Youngs, USBR inspector listening to the divers' reports by phone, the work was mighty frustrating. Interrupting reports on erosion of concrete were exclamations by the divers as they discovered a collection of coins in the bucket. One of the divers even found a wristwatch.

For the divers the work was even more frustrating. They were unable to collect the money, and they know that spillway flows this spring will wash out the bucket. Next year will bring more tourists and, presumably, more money.

Maybe it isn't tourists. We all know how valuable water is to the West. Maybe it's like the brewing company says: "It's the water!"

The last word in dams

Free and open discussion has certainly marked the FPC hearing on plans for developing Hells Canyon on the Snake River. According to FPC, as of January 28, 1954, the record in this case comprised 91 volumes of transcript, totaling 11,333 pages! Two hundred eighty-seven exhibits had been submitted for identification. The San Francisco regional office of FPC had spent over 36,000 man-hours on the case. Yes, quite a record!

Born 75 years too soon

Montana Section of the American Society of Civil Engineers got an unusual welcome last year when it held an annual meeting in Helena. Reception of the section included a letter from the Last Chance Prospectors, Inc., a service organization of Helena. Said the letter: "Following is a section of report to the War Department in 1857 by Lt. J. C. Ivers on section of the Colorado River area now covered by Hoover Dam:

"The region last explored is, of course, altogether valueless. It can be approached only from the south and after entering it there is nothing to do but leave. Ours was the first, and doubtless will be the last, party of whites to visit this profitless locality."

"It was recommended that it be

given back to the Indians, and it probably would have been had it not been for the American Society of Civil Engineers!"

The West shows the way

A Western construction man makes this point in comparing our tunneling methods to those of other countries:

"We use lots more machinery, and we cut the man-hours down by about two-thirds. Yes, our labor costs are perhaps six times as much; so we may find that mucking, for instance,

Twenty-five years ago in *Western Construction*

"Samuel Humes, formerly state highway engineer of Washington, has been appointed director of highways by Governor Hartley, in the newly created department of highways."

* * *

"Alan MacDonald, of MacDonald & Kahn, contractors of San Francisco and Los Angeles, . . . on April 10 was appointed general manager of the Golden Gate Bridge and Highway District."

* * *

"L. H. Hoffman, Public Service Bldg., Portland, Ore., \$440,547, awarded contract by City [Tacoma] for Cushman Dam No. 2, concrete arched masonry type, 240 ft."

* * *

"Aerial mapping of Southeastern Alaska is being accomplished by U. S. Geological Survey in conjunction with the Bureau of Aeronautics of the Navy Department."

* * *

"The Gardner loader represents an entirely new idea in the method of grading roads and disposing of the loosened material. It is a combination grader and truck-loader. . . . The grader with the loader installed is drawn by the same size tractor that draws a plain grader. The grader operator blades his material as usual and the material travels to the lower end of the moldboard where the buckets of the elevator pick up the materials and discharge them into the trucks. . . . Two contractors report loading 600 1½-cu. yd. dump trucks in eight hours."

runs us into twice the money, on a per-yard basis.

"But don't forget this: When the job is over, we have done it faster—so really we are able to bid on and complete more work in the same time. Also, where contractors in other countries wind up a job with nothing more than the good will of their miners, we still have some money—whatever salvage value we can get out of our equipment."

That's Western ingenuity at work!

The select few

Overheard at the AGC convention in Los Angeles last month: "You know, we're watching developments on a nice job that's coming along. It'll be a 5-story reinforced concrete building—right up our alley. I hope they have a select list of bidders. Just think—maybe only 16 or so of us will be asked to participate! Not as if it were public work and we were up against everybody!"

Beavers and county roads

We've reported on beavers in this column before. Their most recent engineering efforts have been in the Northwest, and at the expense of their engineering colleagues, the road department of Okanogan County, Washington. According to H. M. Taylor, county engineer, the beavers do their best work at new culvert locations. Modern equipment and materials permit these, and their controlled fills, to be at narrower canyon locations than in the past; so the beavers get bigger and better ponds at less "cost."

The conventional beaver dam in a pipe culvert is a complicated but structurally sound affair shaped like a cone, with the point upstream. It is made of sticks—and occasionally barbed wire—plastered with mud. It is very efficient, and the road becomes a spillway in very little time.

Game department trapping activity is slow and not particularly permanent. Dynamiting the dams is apt to be permanent, says Taylor, but not in the right way. Sometimes a new embankment has to be built! Either way, dynamiting is expensive.

Okanogan County personnel have tried cowbells in the culverts. No good. They have tried lanterns. This only helped the beavers to maintain 3-shift operations! Most recently they have tried threading each new culvert installation with a length of wire rope and a hook. A dam can be built around the cable, but pulling on the cable and hook usually removes it in short order. At least, only once have they had to remove the culvert itself to break up a dam!

... The Editors