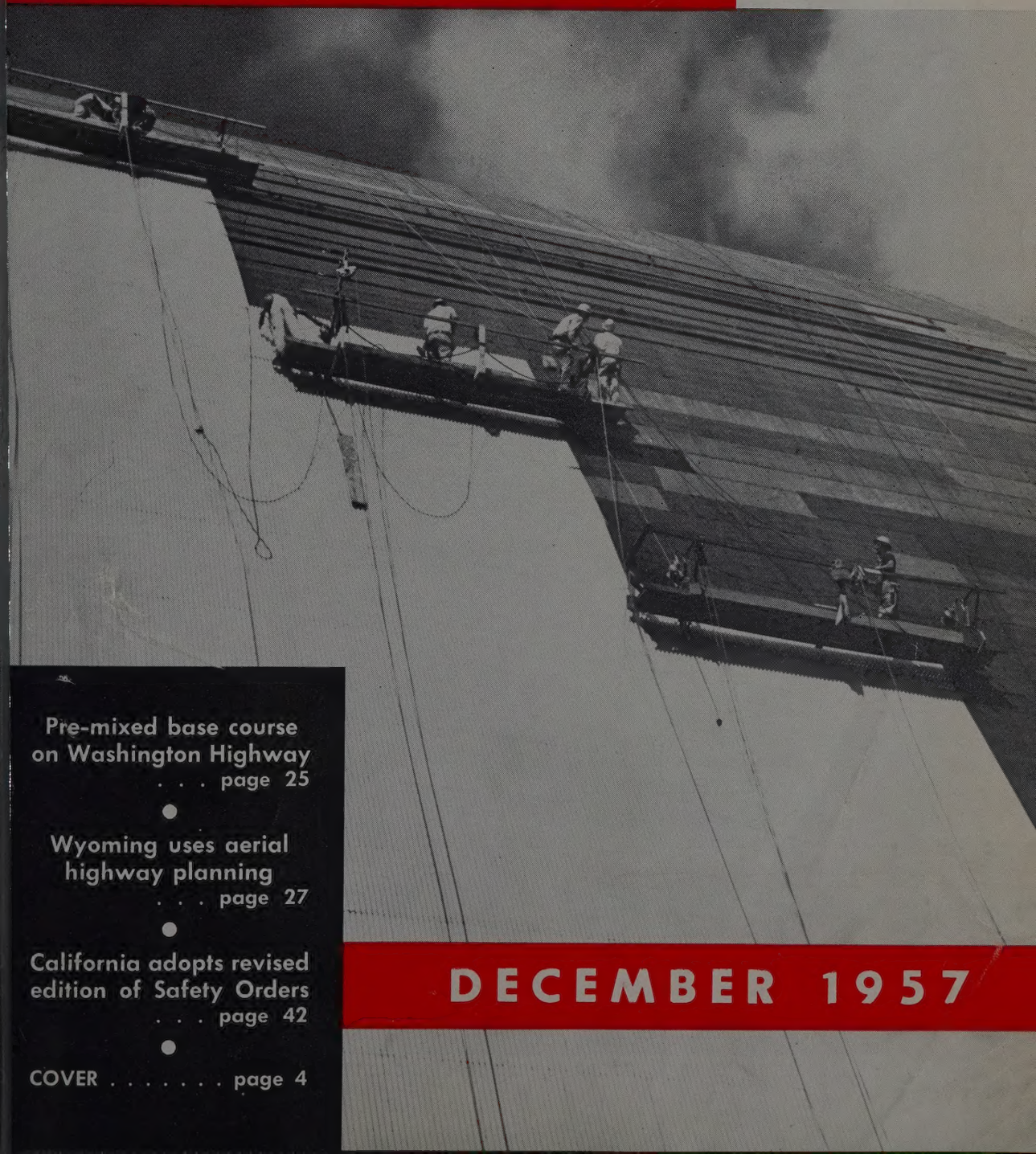


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CONSTRUCTION

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Pre-mixed base course
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... page 42

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DECEMBER 1957

Excavation for powerhouse at Priest Rapids Dam—on Columbia River south of Vantage, Wash.—is over 4,000 feet long and between 40 to 90 feet deep. Texaco lubricants are used exclusively on the job by Merritt-Chapman & Scott



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FRONT COVER

ONE OF the huge hangars at Moffett Field near Palo Alto, Calif., is getting a new roof—Kaiser Aluminum corrugated sheet over asphalt-covered wood sheathing. Dale Benz, Inc., has the job and his 16-man crew, working from hanging scaffolds, applies the sheets at the rate of 400 to 450 per day. More data on page 86.

COMING NEXT MONTH—In addition to all the regular articles and features, the January issue of Western Construction will include the annual Equipment Directory—a 120-page cross-referenced listing of where equipment is manufactured, and where it's sold and serviced in the West.

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Price-tag is not True Equipment Cost

PUBLIC WORKS officials cannot buy quality equipment. Laws force them to buy their equipment based on the price-tag determined by competitive bidding. The reason for such legal restrictions—from federal law to city ordinance—is obvious; public funds must have protection. But this price-tag protection breaks down and can become self-defeating when applied to modern construction equipment.

For materials which have standard specifications, such as cement, steel or chemicals the recognition of the lowest bid may be considered an acceptable process in determining true cost. But the exclusive application of initial cost to a complicated piece of machinery that must be used, serviced, maintained and repaired for several years results in a miscarriage of the legal safeguard. The situation deserves restudy in the light of modern construction equipment and its use by public agencies.

Construction equipment, from truck to air tool, is purchased to perform certain work. Responsibility of the public official goes beyond securing a machine of proper size and must consider the true cost of using this unit to perform its function. Such a cost figure accepts the price tag as the initial item but must include even more important items such as fuel and oil consumption, wages of the operator, servicing, maintenance, repairs and the final trade-in value. Failure to include these charges is hiding the true cost of the machine from the public.

In theory, the specifications prepared for calling bids on equipment by public agencies will include those elements necessary to secure the best machine for the purpose intended. At this point the legal safeguard begins to run into difficulties. The tighter the specifications the closer the official can come toward securing the quality of product he considers adequate, and the more he approaches the troublesome borderline of being too restrictive. This is the nub of the problem.

Accurate and extensive cost keeping and accounting is the key to its solution. Every piece

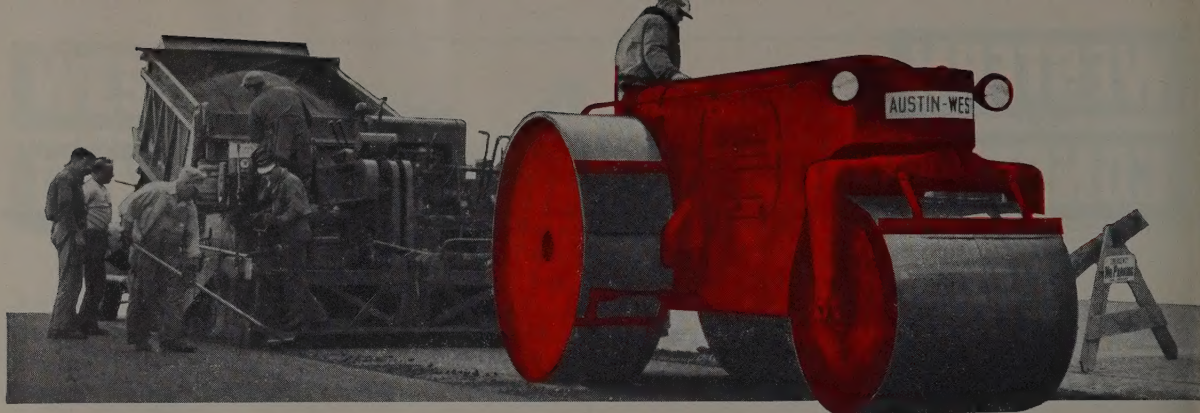
of equipment owned and used by a public agency should have a complete lifetime history of cost from price tag to trade-in value. With this information the officials begin to have facts from which to direct the selection of equipment. It is not a simple matter and at its beginning will not eliminate the arguments over the need for open bids, but over the years it presents the ultimate solution.

As an aside, contractors use exactly this type of system in their purchasing of equipment. Cost figures tell them down to the fraction of a cent per yard or per hour the type and make of equipment which will do the job for the least money. They will buy accordingly regardless of the price tag. Further, the smarter and more successful the contractor, the more he realizes the value of time spent in the accumulation and analysis of such basic information.

Getting back to the public official and his problem, the accumulating of cost data does not in itself remove the straight-jacket of the law. However, it represents an initial step since it provides a foundation of fact on which to build a case for revision. Assume that an agency has accumulated adequate cost data and service records for four different makes of machine and found one far more costly in the final figure than the other three. This information would be a logical step towards specifications that would eliminate bids on the costly machine.

Certainly this is in the interest of saving the public's money. It is more logical than the present theory which insists on taking the low price-tag, when many times this can represent a waste of public funds. Accumulation of accurate and effective cost data is the first step toward correcting this situation.

Jim Ballard



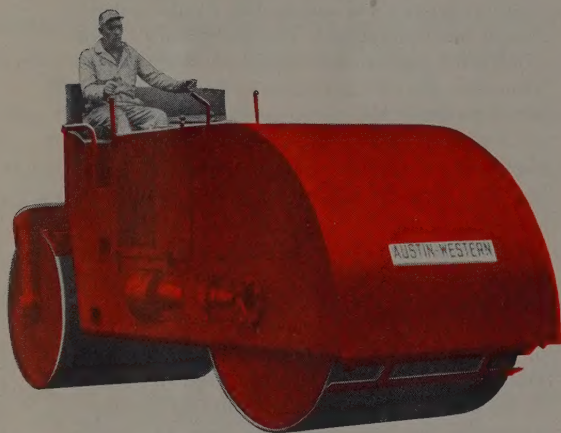
THE A-W 3-WHEEL ROLLER

8-11, 10-12, 12-14 ton models. The left drive roll is keyed to the axle shaft; the right turns on heavy duty bushings independent of the left roll and axle. Torque-proportioning-type differential transfers power automatically . . . giving traction under all conditions.

THE A-W TANDEM ROLLER

5-8, 8-12, 10-14 ton models. Full-width seat and dual controls are standard on all models. Forward and reverse levers are located at each side of the platform, steering lever at center, thus permitting the operator to sit where visibility is best.

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- Oversize axles and antifriction bearings for longer life.

- All transmission gears are machine cut and heat treated
- Entire transmission is equipped with antifriction bearings
- 3-wheel rollers have heat-treated alloy steel bull pinions and high strength steel bull gears
- Tandem rollers have machine-cut, heat treated final drive bevel gears and pinions
- Outside edges of finished rolls are beveled to prevent marks in hot materials

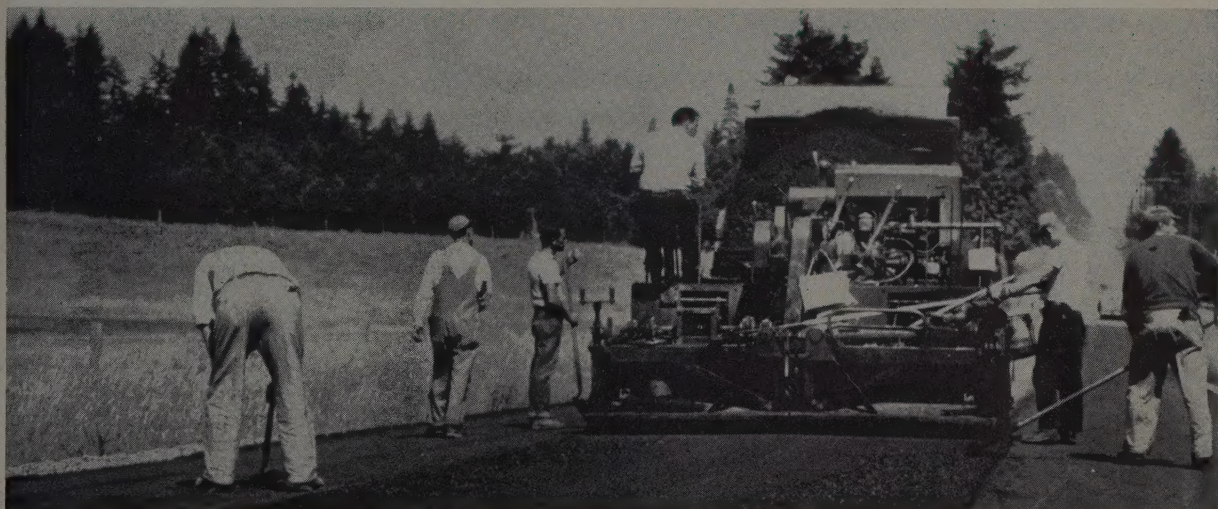
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Pre-mixed emulsified asphalt base

Stabilizing of a 2½-in. base course on a FAS route in Clark County, Wash., has advantages of reducing passage of moisture and increasing strength of roadway section. Mix put through continuous pug mill at rate of 120 tons per hr.

A NEW, CONTROLLED method of constructing pre-mixed base courses with diluted emulsified asphalt was introduced recently on a Federal Aid Secondary road project in Clark County, Washington. Major benefits of the technique include: (1) reduction in the passage of moisture through the base-course surface, which helps prevent distress caused by freeze-thaw cycles and (2) an increase in the strength of the roadway section developed through greater cohesive strength in the mix.

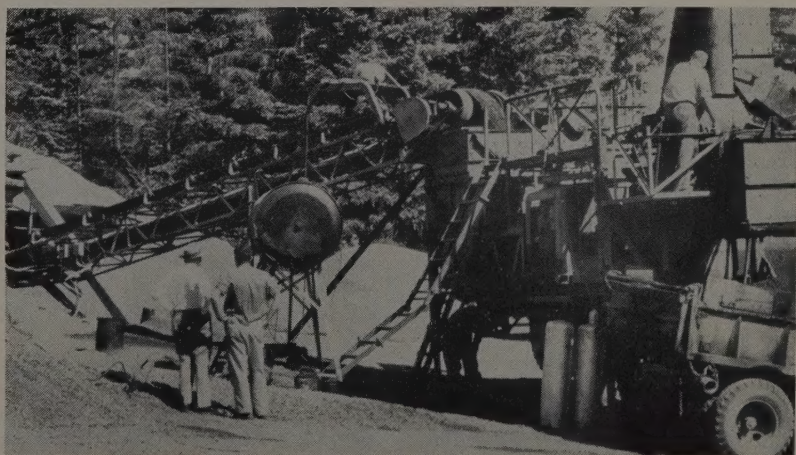
Although the pre-mix technique is new to the area, conventional base treatments with diluted Bitumuls emulsified asphalt have been used

extensively throughout Washington and Oregon for several years with excellent results. Primary purpose of the treatment is to produce a sufficient amount of water resistance in the base course material so that it will not ravel out, pot-hole, or become too slick between the completion of the base and the start of surface course construction. When stage construction is used and traffic must be maintained on the base, this

time elapse may be appreciable. The dilute Bitumuls base courses are designed to stand up under this traffic with a minimum of maintenance.

Previous construction methods called for the application of diluted mixing grade emulsified asphalt by a pressure distributor or water wagon. Motor patrols then mixed the asphalt with the crushed stone for the base course surfacing.

The new pre-mix technique was



FROM THE STOCKPILE at the left the aggregate dumps into bins that feed calibrated gates and into what would normally be the hot-stone elevator. The operator at the platform controls the entire mixing operation. Water was sprayed directly into the pug mill.

developed by American Bitumuls & Asphalt Co. and the D-H Paving Co. of Vancouver, Wash. It involves the use of a continuous-mix pug mill to process the emulsified asphalt, water, and aggregate in a controlled operation. The SS-1 emulsified asphalt is 4% of the weight of the aggregate with the processing water used to set up the aggregate. The 4% of emulsion was decided upon after testing various Pacific Northwest aggregates by the Emeryville, Calif., laboratory of American Bitumuls & Asphalt Co. The aggregate selected for this particular project had a high percentage passing the 1/4-in. sieve and was fairly uniformly graded through the other sieves.

Gradation tests run in the field on the crushed stone surfacing top course were as follows:

Sieve	Percent Passing
3/4 in.	100
1/2 in.	96
1/4 in.	61
10	27
40	10
80	7
200	6

The pre-mix project was set up on a 2.819-mi. stretch of County Road 116. Following final grading in the spring of this year, a pug mill mixing section of a Barber-Greene Model 845 paving plant was transported to a county owned quarry near the job site where the crushed aggregate was stockpiled. A bunker with a reciprocating plate feeder was installed next to the stockpile and fed with a small tractor.

A conveyor belt carried the aggregate from the plate feeder into two bins that fed through calibrated gates in the same manner used in hot plant operation. It then dropped into what is normally the hot stone elevator and fed into the pug mill. The regular volumetric proportioning asphalt pump used on the hot plant was employed to meter the correct amount of Bitumuls emulsion. Use of the pump provided contractors with close control over the amount of emulsion added to the aggregate.

Moisture was controlled through the use of a water meter, converted from a standard fuel oil meter. Water was sprayed directly into the pug mill by a spray-bar attachment. Since the meter registered only gallons pumped, the contractors also used a stop watch to accurately determine the number of gallons per minute metered into the mix.

Field moisture of the aggregate



FROM THE ELEVATOR the aggregate drops into the pug mill for a mixing interval estimated at 14 sec. Emulsified asphalt is 4% of the weight of the aggregate. Output of the plant was 120 tons per hour as compared to its rated capacity of 60 tons of plant mix.

was calculated to be between 7-8% depending upon the construction of the stockpile. It was found that only an additional 1% water had to be added to the mix to achieve the desired results. This was easily done by adjusting the water meter. The additional 1% moisture did not include the water added to the mix through the use of the emulsion.

Although the capacity of the Barber-Greene 845 plant is rated at 60 tons per hr. of plant-mix, contractors were able to increase this to 120 tons per hr. of dilute Bitumuls base treatment. Mixing time in the pug mill was estimated at 14 sec. The mix was dumped into 5-yd. trucks and weighed before hauling to the job.

The mix was layed quickly through a Barber-Greene paving machine, with a 2 1/2-in. compacted mat laid in one lift. Since the finished road was 26 ft. wide, the contractor pulled two 8-ft. passes down the shoulders and then came down the center with a final 10-ft. pass. A screed and oscillating tamping bar were used to provide a smooth finished base course surface. No joint trouble was encountered since the paving machine passes were evened up by the end of the day. Upon completion of a day's run, all working parts of the paving machine (flights, augers, tamper bar, screed, etc.) were hosed off with water. The truck beds and pug mill were also cleaned.

Immediately behind the paving machine, a self-propelled rubber-tired roller was put into operation to provide a flushing action that gives the base course surface a tight texture plus the necessary compaction. Water was not used on the wheels of the

roller. Toward the end of each day, a tandem wheel 8-10 steel wheel roller was used to smooth out the finished base course surface, without the use of water on the wheels.

When the finished section of base course had been down for 24-48 hr., a flush coat of dilute Bitumuls emulsified asphalt was applied. Dilution of one part Bitumuls with one to two parts water was applied at the rate of 0.25-0.30 gal. per sq. yd. of the diluted material through a pressure distributor. No cover was used over this seal and traffic was turned on it immediately. Upon acceptance of the job by state and county personnel, the Clark County oiling crew plan to apply a single shot seal for a wearing surface.

In addition to the basic economy and flexibility of dilute Bitumuls base treatments, the new, controlled pre-mix technique also insured improved quality of the finished job and with additional use promises to help reduce total construction time. Officials point out that the recent Clark County project was experimental; steps are now being taken to further improve production rates at the mixing plant and in the field.

Technical assistance on the Clark County road project was provided by R. G. Congdon, Portland district sales engineer for American Bitumuls & Asphalt Co.

County personnel involved in the project were Cecil Kinder, Clark County Engineer; Harold Riches, maintenance engineer; Rollie Hitchcock, maintenance superintendent; and Tony Klein, inspector. Bob Donkel was superintendent in charge of paving for the D-H Paving Co., and Stan Floyd was paving foreman.

Wyoming locates Interstate by air

Methods described for relocating Interstate from Sundance to Moorcroft and cutting 48 mi. of present highway route to 35 mi. Procedure reviewed for the four stages of highway location from area reconnaissance to final survey.

By D. J. OLINGER

Aerial Engineer
Wyoming State Highway Department
Cheyenne, Wyoming

WYOMING, WITH its large areas of rough mountainous terrain where land use is limited, has found photogrammetry a logical tool of modern highway engineering. It is being used most effectively on selected sections of Interstate highway location. The result has been to shorten existing mileage and reduce construction and travel costs.

The following brief explanation of procedure is based on practices that have been followed on several locations, or are planned on a section of Interstate 90.

Highway locations, especially on large projects, can usually be divided into four distinct stages¹:

- (1) area reconnaissance—the identification of all possible route bands that justify further study,
- (2) route reconnaissance—elimination of all but the best route band,
- (3) preliminary survey—securing the information for horizontal location of centerline, and
- (4) location survey—staking of centerline and obtaining complete design and right-of-way data.

This section traverses part of the Black Hills in northeast Wyoming from Moorcroft to Sundance (see

map), and has an existing length of 48 mi., with both curvature and grades of very low design standards, between terminal points "A" and "B" on present Interstate U. S. 14. Air line distance between the two terminal towns is approximately 30 mi. The current location for this new four-lane divided interstate highway is in the third stage (preliminary survey), and indicates: (a) final route length of about 35 mi. between terminals, (b) maximum curvature of 2 deg., (c) only one short ascending grade in excess of 3%, and (d) an economic balance of excavation, embankment, and haul.

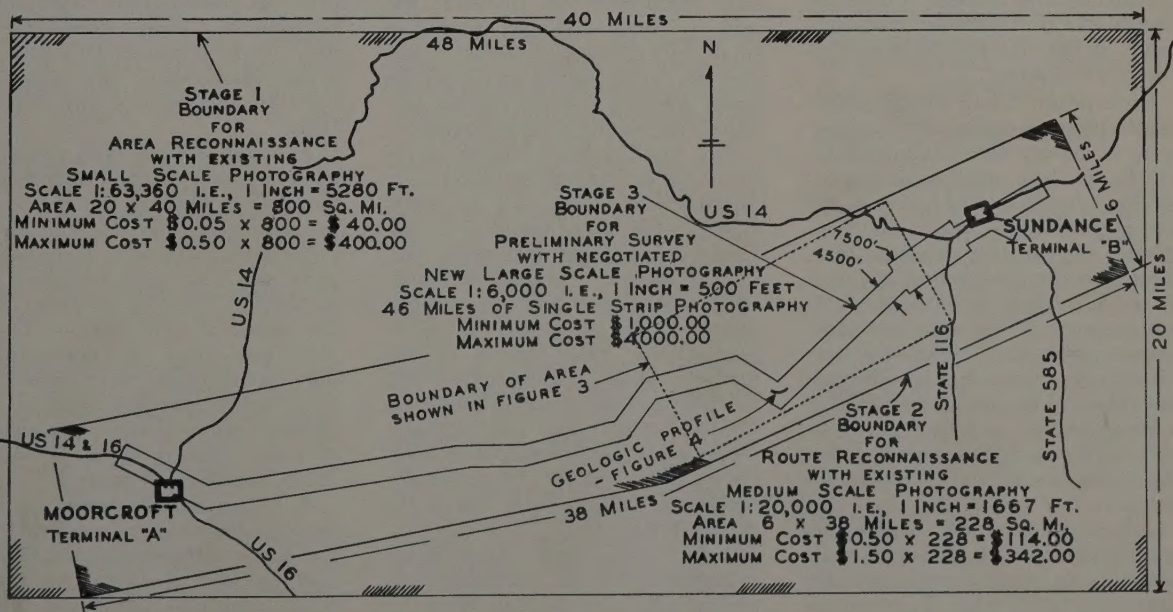
Stage 1—Area Reconnaissance

Small scale existing aerial photography (about 1:63,360, or 1 in. to 5,280 ft.) is purchased. This small scale coverage is generally satisfac-

tory in areas where there is little or limited land use,² and costs about 5c per sq. mi. when purchased from a government agency, but may run to ten times this figure if purchased from a commercial film holding agency.³ Small scale photography has an added advantage in that fewer photos must be studied for a given area. This fact should not be overlooked, for on reconnaissance of a large area one can literally become lost in stacks of medium or large scale photographs.

The width of photographic coverage for area reconnaissance should be from 40 to 60% of the length between terminals, and the length should extend well beyond the proposed terminals, as further study often indicates the desirability of changes. It is imperative that photographic coverage be of a large enough area to consider all possibilities that may arise during the reconnaissance. With the very low price of small scale photography the cost of an additional few hundred square miles of coverage is negligible when compared to the cost due to a faulty decision resulting from insufficient photographic coverage.

FIG. 1. The section of Interstate highway location showing the area and negative scale of aerial vertical photography purchased for each of the first three stages, and ranges in costs based on Wyoming experience.



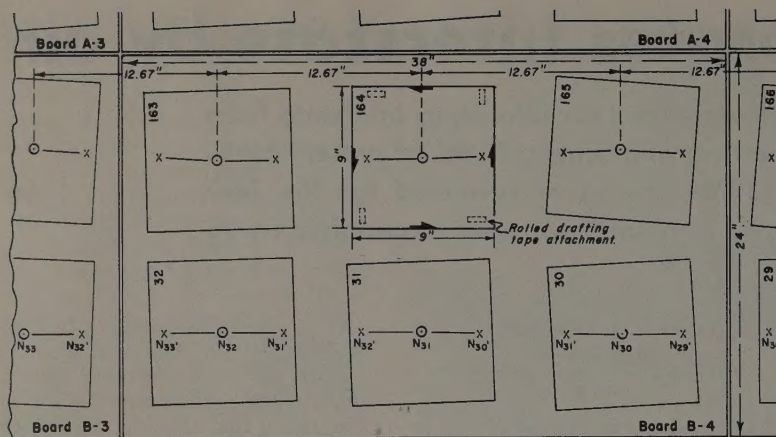


FIG. 2. Sketch showing a portion of an airphoto board laydown.

Board layouts are made from airphotos for the area reconnaissance by locating and marking the principal points (N—) and their conjugate images (N—') on the photographs with red wax pencil (see Fig. 2). The photographs are then mounted, by the use of very small pieces of rolled drafting tape on the back, in parallel flight strips on $\frac{1}{8}$ -in. prestwood boards cut to 24 in. by 38 in. With a Zeiss or Wild mirror stereoscope, and a photo center to center spacing of 12.67 in., this affords most persons satisfactory stereovision.

Care must be exercised to align each four points, between and including the principal points, of each pair of photographs in a flight strip. This both eliminates eye strain when the pairs of photographs are viewed stereoscopically with the mirror stereoscope, and properly orients the photos for the necessary measurements of parallax for the computation of elevations.

Each layout board of six photographs provides complete stereo coverage of an area about 12 in. square, which on these small scale photographs is approximately 150 sq. mi. Once the layout plan has been worked out on the airphoto index sheets and the photographs mounted on the layout boards (takes about 30 min. per board) the area reconnaissance is initiated. This process is to identify one or more relatively narrow bands of terrain within which it appears possible to locate the highway and maintain required design standards. (see Fig. 3). This step involves:

1. Stereoscopic study, with a mirror stereoscope, of the small scale photographs of the entire area for familiarization, using in conjunc-

tion any available planimetric, topographic, geologic, and agricultural soil maps.

2. Location of the obvious intermediate control points, as passes, stream crossings, etc.

3. Location of alternate route bands between the main control points after giving consideration to alignment, grade, construction costs, etc.

4. Consideration of land use and rights-of-way costs.

5. Field reconnaissance as a check for points in question.

Stage 2—Route Reconnaissance

Medium scale existing aerial photography (about 1:20,000, or 1 in. to 1,667 ft.) is purchased for an area encompassing the alternate route bands located during area reconnaissance. This area is usually only one-fourth to one-half the area originally covered with the small scale photography. Cost of this photography again varies from under 50c up to \$1.50 per sq. mi., depending on the holding agency.

For small urban areas enlargements of existing photography are purchased at a scale of 1 in. to 400 ft. while for larger urban areas negotiations are sometimes made with photogrammetric firms for new large scale photography and uncontrolled mosaics.⁴ Board layout is again planned on index sheets of the medium scale photography, and the photographs properly mounted. Control points and the alternate route bands are transferred to these photographs and route reconnaissance is initiated for selection of the best route band by:

1. Stereoscopic study, with a mirror stereoscope, of the medium scale photographs for gaining more in-

formation within the route bands. Continued use is made of other maps.

2. Refinements in alignment and profile for an approximate centerline within each route band. It is often necessary to develop a profile for the establishment of approximate grades, within selected sections, from available topographic maps or by use of parallax measurements on stereoscopic pairs of airphotos.

3. Soil and foundation conditions are evaluated for each alternate, and sources of construction materials established.

4. Field reconnaissance of the route bands to properly clear any points in question. For example, it is usually impossible to determine from the airphotos between well maintained occupied buildings and deteriorating unoccupied buildings.

5. Final selection of the best route band either by: (a) visual comparisons where choice between alternates is not difficult or (b) a benefit-cost ratio is established for each route to provide a basis for correct selection.

Stage 3—Preliminary Survey

First the route band is studied to determine just what preliminary survey techniques are required. This study usually indicates that some sections of the route band are subject to different methods of survey, as follows:

1. Rural sections wherein centerline and grade can be established satisfactorily by ground survey prior to photography. The centerline is established and selected stations along the centerline are targeted prior to photography. Planimetric mapping and cross-sections may or may not be required. However, the aerial photographs are extremely valuable for right-of-way negotiations.

2. Rural sections with terrain of such a nature that topographic mapping is necessary for the proper positioning of centerline and the establishment of grades. Semi-permanent markers are established and targeted at selected locations near the expected final position of the centerline, prior to photography. The photography is designed for topographic mapping with a 5-ft. contour interval and cross-sections of either plus or minus 1.0-ft. or 0.5-ft. accuracy as desired.

3. Urban sections where detailed topographic mapping is desirable for the proper positioning of centerline and location of interchange sites. Semi-permanent markers are estab-



FIG. 3. A small scale uncontrolled mosaic indicating the five main route bands, A, B, C, D, and E. Boundaries of abandoned alternatives are shown with dotted lines, and boundaries of best route in dashed lines. Air line distance between control points U and V is 9½ mi.

lished and targeted at selected locations near the expected final position of the centerline, prior to photography. The photography is designed for topographic mapping with a 2.5-ft. contour interval. No cross-sections by photogrammetric methods are required, as those from the topographic maps with this small contour interval are satisfactory.

Plans, specifications,⁵ and special provisions are then drawn up for the required large scale aerial photography, planimetric mapping, topographic mapping, bridge site plans, interchange site plans and cross-sections by photogrammetric methods.

Several aerial surveying and photogrammetric firms are furnished plans, schedule, specifications and special provisions. Upon receipt of their proposals and contract plan for performance, the selection of the firm, for project negotiations, is based upon: (1) experience and qualifications, plus the specific personnel and equipment available for the job, (2) delivery dates, and (3) price.

Most aerial photography has been with 6-in. focal length precision cameras. Some have a negative scale of 1:12,000, (1 in. to 1,000 ft.) which with a Kelsh Plotter and a 1:1,200 contour factor will provide a plotted manuscript scale of 1 in. to 200 ft. with a 5-ft. contour interval and an accuracy of 1.0 ft. (1/200 the plotted map scale) for cross-sections. Other photography provides a nega-

tive scale of 1:6,000, (1 in. to 500 ft.) to provide a manuscript scale of 1 in. to 100 ft. with a 2½-ft. contour interval and an accuracy of 0.5 ft. for cross-sections.

After receipt of the large scale photography the procedure is as follows:

1. Photography is examined for adherence to specification requirements.
2. Further adjustments are made, on the new photography, in the approximate centerline and boundaries for planimetric or topographic mapping.
3. Photography is returned to the aerial surveying firm for initiation of ground control and subsequent mapping. Sometimes highway engineers execute the ground control, and on one project now under contract the ground control was planned, targeted, and initiated while negotiating for photography and topographic mapping to reduce time between negotiations, and topographic map delivery.

Upon receipt of the topographic mapping a paper-location is made by establishing grade contours between selected control points or grade points. From these, with the aid of a spline line, various alignments and profiles are developed to determine the desirable centerline location. It is necessary to study and evaluate soils, foundations, geologic formations, drainage, land use and probable right-of-way costs in con-

junction with the location of centerlines and resulting grades. Fig. 4 shows a section of a geologic profile on the centerline of the median. With varying width medians in rough mountainous terrain it is often desirable to develop individual centerlines and geologic profiles⁶ for proper determination of grades, location of the better foundation and embankment materials, and balance of cut and fill.

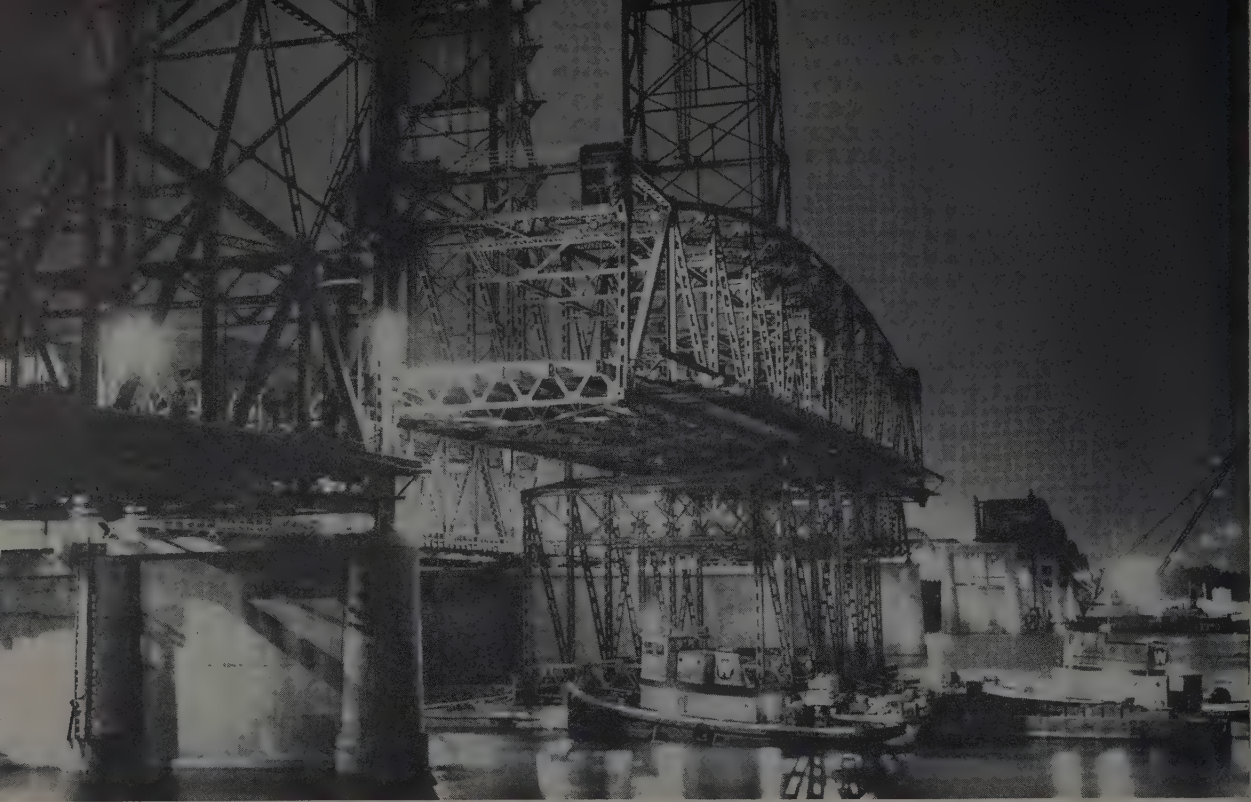
The centerline positions, as established on the topographic maps, are computed by coordinates from the coordinate grid lines and the coordinate positions of the semi-permanent markers as established on the topographic maps.

Stage 4—Location Survey

The centerlines are located and stacked on the ground, from the semi-permanent markers, using the alignment notes compiled during preliminary survey. These notes are also furnished to the aerial surveying firm for accurate establishment of the centerlines on the map manuscript prior to cross-sectioning by photogrammetric methods. The cross-section notes are later processed into the highway department punch-card type electronic computer for balancing of earthwork quantities.

Highway engineers obtain complete design and rights-of-way data,

(Continued on page 32)



Bridge span seats with ebbing tide

426-ton lift span for Columbia River bridge is erected on temporary truss mounted on barges, towed to site, positioned and lowered by ebb tide. J-P-M place 278-ft. section on tight schedule.

SINCE THE NEW Interstate Bridge over the Columbia River between Portland and Vancouver, which is under construction by Guy F. Atkinson Co., parallels the old existing bridge, it was not possible to build the lift span in place because ship traffic would have been blocked off for many weeks.

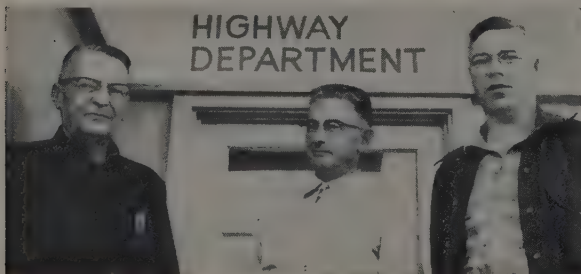
Judson Pacific-Murphy Corp., of Emeryville, Calif., which has the approximately \$3,000,000 contract for steel erection (subcontract under

GFA), solved the problem by building the span on barges and floating it into position during an operation of only a few hours.

Three 104 x 29-ft. steel barges,

FOR THE TWO state highway departments (l. to r.), Marshall Dresser is resident engineer for the Oregon Highway Department; J. W. Harris is resident engineer for the Washington Toll Bridge Authority; A. A. Rear is assistant resident engineer for Oregon. On the Judson-Pacific-Murphy subcontract on the Interstate Bridge, G. E. Merriman is office manager and Bill Ziegler is superintendent.

leased from Inland Navigation Co., were secured near the Oregon shore downstream from the bridge site, and within reach of GFA's big whirley crane. A large section of Span No. 11 was assembled on the barges, (bolted up so it could later be dismantled) thus tying the barges together as a unit. Permanent construction of the 278 x 45-ft. lift span was then started on top of the falsework structure provided by Span No. 11. Four legs served as pedestals





SLOWING LOWERING, as the tide ebbs, the span is approaching final seating with pintles on the pedestals about to engage. Clearance was only 1½ in. at each end.



FINAL POSITIONING approaches as one corner of the 426-ton span is kept under close observation. Jockeying into position and lowering was accomplished from 4 to 7 a.m.

atop the falsework structure to give level footing for the lift span across the curved top of the temporary span.

18 in. of tide available

It was calculated that the permanent span should be thus constructed at an elevation above the water high enough so that when it was floated into place the small tide prevailing at this point on the river could be utilized to drop it onto the temporary supports prepared to receive it.

The lift span, when ready to put

in place, had all the major work done on it including the operator's control house, hoisting gear, and machinery installed. It weighed approximately 426 tons, and there was a clearance of 1½ in. between each of its ends and the adjoining spans which it was to connect.

J-P-M's superintendent, Bill Ziegler, who was in charge of the operation, had taken tide reading for days before the time set for the move. He had calculated that they would have 18 in. of tidal fall in the water level. The float-in was planned to be done at night when the chances of trouble from strong winds would be less likely. Wind was the unpredictable factor and this great, unwieldy, floating load would have been an easy target for a blow.

Time and procedure set

The time was set for the night of Oct. 7-8 and the procedure was scheduled to great precision. The water was smooth as glass when the two powerful tugs of Willamette Tug & Barge Co. brought their awkward charge into position below the gap which the lift-span was to fit into—with 1½ in. to space on each end.

When the tugs had pushed the barges close enough, cables were passed to the ends of the span and rigged across to a 3-drum hoist at the Oregon side of the opening, and the span section was then held more securely and could be warped into the opening with more exactness.

According to Ziegler, he actually

needed only 8 in. of tidal fall to seat the span in its sockets. At this crucial point, as the structure was descending with nerve-racking slowness, the threat of a rising east wind made it necessary to hasten the process, and pumps began flooding the barges to bring them down in the water.

Job done in 3 hr.

The placement jockeying and final securing of the span took from about 4 a.m. to a little after 7 a.m. By the time the wind came up enough to bother, the structure was safely in place.

Steel pedestals, like table legs, are the temporary support of the span in place, and will be removed when the span is permanently held in the bridge and the hoisting cables and rigging are installed. The two temporary legs at the Washington end have 6-in. diam. pintles, one on top of each, which fit snugly into 6 1/16-in. holes in the base of each corner of the span. The supporting legs at the Oregon end are topped with special steel blocks matching heavy pads on the corners of the span so as to allow lateral movement in compensating for expansion and contracting of the span. This sliding connection is greased.

Contractors' staff

Temporary offices are maintained at the job by Guy F. Atkinson Co., whose office location is on the Oregon side, with George T. McCoy, Jr., as project manager; Louis Shedd, general superintendent; and W. F. Henniger, Jr., project engineer. The Judson Pacific-Murphy Corp. office is located on the Washington side where, in addition to Superintendent Bill Ziegler, G. E. Merriman is headquartered as office manager.

Highway supervision

Both Oregon and Washington highway departments are represented by resident men on the site. The Oregon Highway Commission has a temporary office on the Oregon side, near the Atkinson headquarters, where Marshall Dresser is resident engineer and A. A. Rear is assistant resident engineer. Resident engineer for the Washington Toll Bridge Authority is J. W. Harris, who is headquartered in this office.

WYOMING SURVEYS

(Continued from page 29)

including drainage surveys, soil and foundation surveys, construction materials location, bridge site surveys, interchange site surveys and rights-of-way surveys. To obtain these necessary data in this fourth stage the highway engineer now has the following new aids: (1) aerial photography of several different scales, (2) planimetric and topographic maps with much wider widths than ever before, and (3) geologic profiles.

Special Considerations

The Interstate highway locations currently being made with the assistance of the new methods vary from 30 to 60 mi. in air line distance between terminal points. Although it appears that it will involve a time lapse of approximately 9 to 18 months between initiation of these highway locations and the awarding of the initial contracts, there will be a large backlog of each highway location in reserve at that time for construction during the ensuing years as funds become available.

The location illustrated for this article was selected for aerial survey after a centerline with tentative grades had been established by ground survey. The ground survey, which could be considered a good location survey in this mountainous terrain, indicated 13,000 ft. of length having tentative grades ranging from 4.4% to 5.0%. The subsequent aerial survey indicates only one grade exceeding 3.0%, (3,000 ft. of 3.5%) plus a reduction of 10% for earthwork quantities within the mountainous section. This location is

also an advancement in the desired esthetics for interstate highways.⁷

The new methods are invaluable for preliminary reconnaissance and route reconnaissance, as they enable the magnitude of the project to be condensed to a comprehensive size for study and evaluation. Study of the aerial photographs is also used in flatter terrain for positioning curves to break up excessive tangent lengths in order to obtain a pleasing sinuous line that conforms with the terrain.

Additional Applications

Application of these new methods is being extended to primary and secondary location during preliminary reconnaissance and route reconnaissance stages. After the desirable route has been thus selected the location is completed by ground methods and aided by profiles prepared as elevations are computed from aerial photographs. Two men can compute and plot 4 to 6 mi. of profile per day in relatively rough terrain after only one week of training. This provides for better evaluation of more alternate routes, requiring less time and cost, than past practices permitted.

For relocation of one 6-mi. section of primary highway only several days' time for two men was required, in a warm and comfortable office, with existing small and medium scale aerial photography, U. S. G. S. topographic and geologic maps. The resulting relocation is 6 mi. in length, includes nine curves with a 3-deg. maximum, and a maximum grade of 4.5%. The present highway is 6 mi. in length with 29 curves, 18 within the 10 to 20-deg. group, and over 2 mi. of grades between 4.6 and 6.9%.

CONCLUSIONS

These new developments in highway location are rapidly gaining the acceptance and approval of highway engineers. After once being instructed in the methods and techniques through application on their own projects, and observing the advantages to be gained, they apply many of these same methods on subsequent location surveys. This indicates that the engineers recognize the value of faster and easier methods that lead to a better highway location and an improved facility.

The design engineer now has a better concept of the project. With such additional aids as aerial photographs, topographic maps and geologic profiles he is in an improved position for visualizing the terrain and the problems. Consequently, his design will approach closer to perfection.

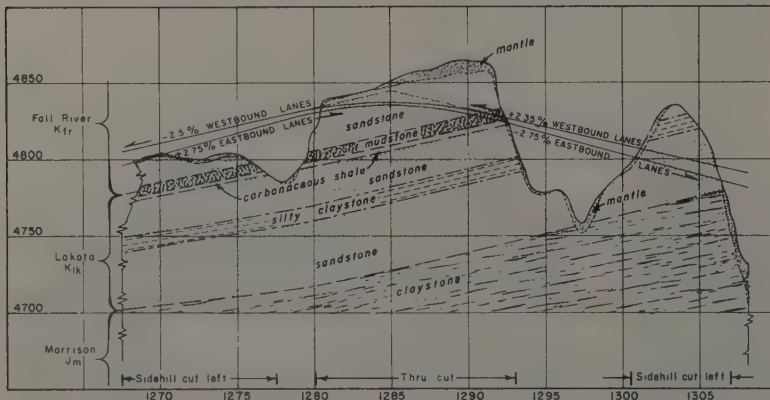
It is desirable to reduce the time required for bringing the longer location surveys to completion. Certainly experience will indicate improved planning and eliminate time losses. Better instrumentation plus other applications, as aero-triangulation, should eventually reduce both the time required for, and the cost of, ground control.

Results have been very gratifying. Improved methods under development make the road ahead appear to be both bright and challenging.

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FIG. 4. A geologic profile on the median. Also indicated are both eastbound and westbound grade lines. Sometimes it is desirable to have geologic profiles prepared separately for each roadway centerline. Geologic profiles in the preliminary survey stage afford information for establishment of centerlines and grade lines in the better foundation materials.





Preparing a mountain top development site in Beverly Hills

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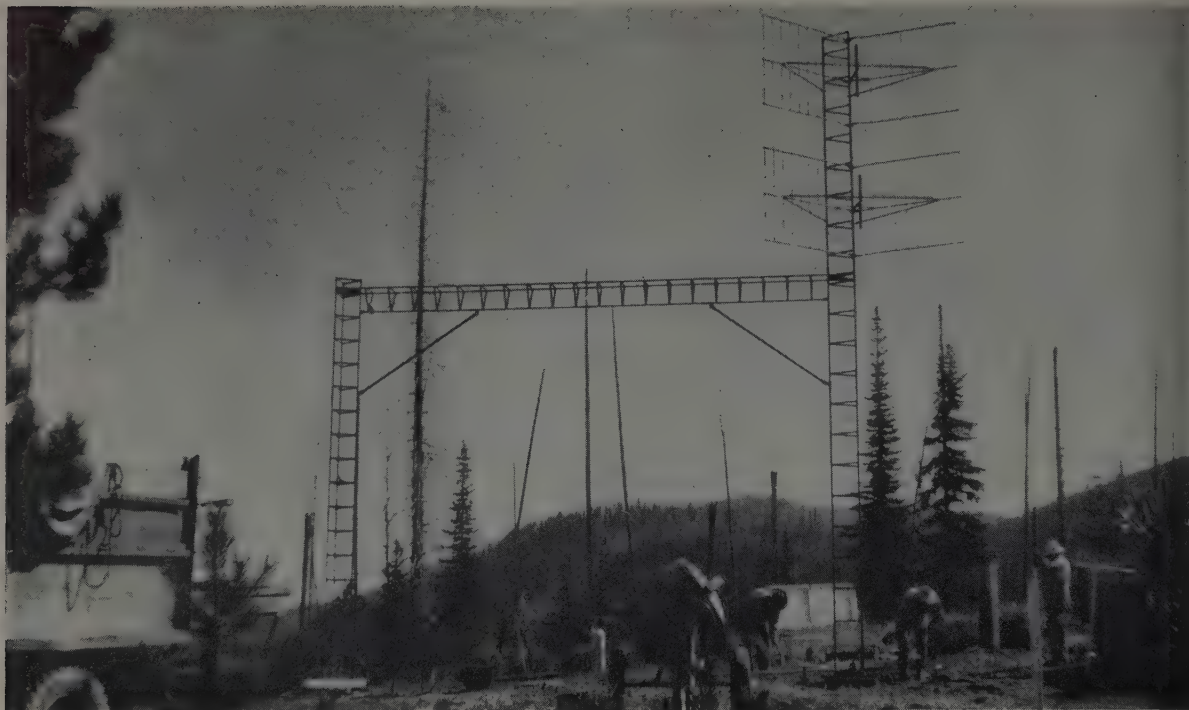
MACHINERY AND EQUIPMENT FINANCING

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Automatic snow gaging stations

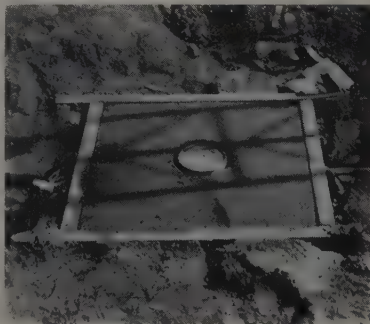
Recording impulses from radioactive cobalt buried in the ground is how a new gaging tower measures water content of snow. The Corps of Engineers is building a network of them in the Northwest.

THE ARMY ENGINEERS in the Walla Walla District of the North Pacific Division are putting to use the atom as a protective measure against flood hazards within the Snake River and its tributaries drainage area as well as a potential aid to the production of more firmed-up hydroelectric power.

A network of snow recording stations are being installed in the mountains of central Idaho, northwest Oregon and southwest Washington, by the Corps of Engineers. These atomic-powered gages will daily record the flood potentialities of the mountain snows in terms of water content and relay the information automatically to the Hydrology Section receiving station of the Army Engineers at the Walla Walla District.

While some experimental work has been carried on by the Army Engi-

neers and the Atomic Energy Commission in California with these automatic radio-telemeter gages, this will be the first time radioisotopes have been put to practical use for snow moisture content recording purposes. An expanded use of this radioactive



EMBEDDED in an 18-in. square of concrete is a cylinder containing radioactive cobalt which constantly emits impulses upward.

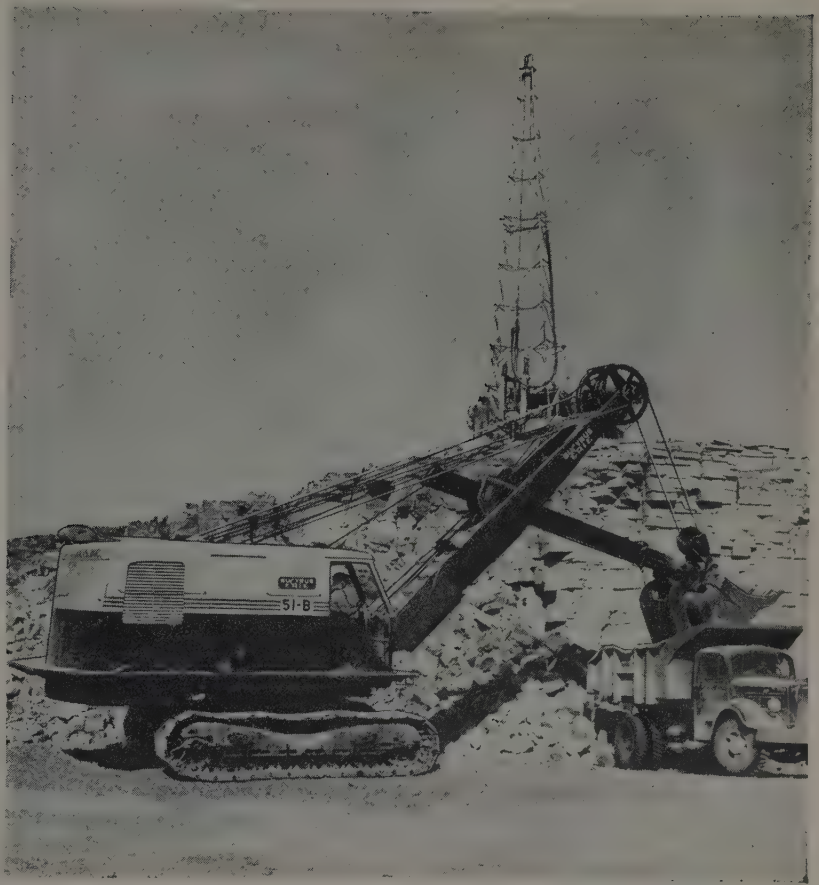
material principle is being envisioned by the Army Hydrology engineers who are studying the possibility of measuring precipitation, stream flow, and river discharges with atomic energy.

In the past, water content and snowfall have been measured by moisture weight. This was a slow process requiring mid-winter field parties snowshoeing high into the mountains with the information sometimes not reaching the control centers until too late to furnish accurate statistics as to the power production potentiality of the moisture and protection necessary from flood dangers.

The atomic snow-gage equipment consists of two vertical triangular steel towers 15 ft. in height, connected by a 20-ft. horizontal span of network steel. Directly beneath the center of the beam, embedded in an 18-in. square concrete block, is a lead cylinder container holding "cobalt 60." This radioactive material sends out a continuous series of atomic impulses similar to the impulses picked up by a geiger counter from a piece of radioactive ore. The cylinder containing the radioactive material fun-

(Continued on page 40)

3
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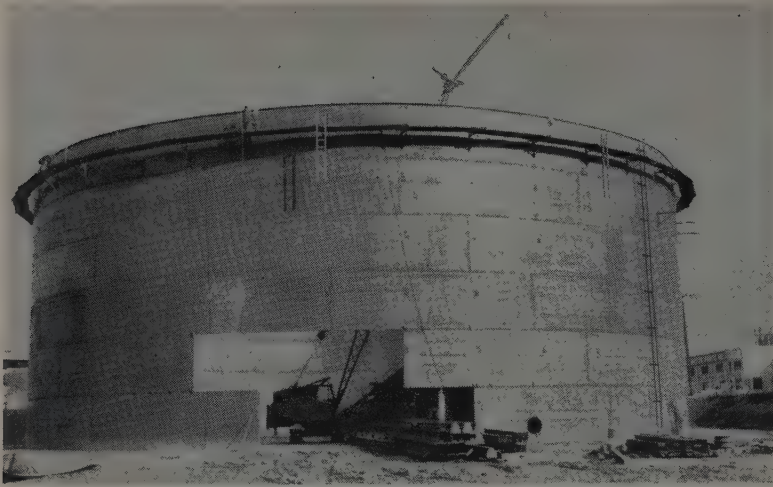
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Escape hatch on a tank

THE PROBLEM, a sign of the times in the West, was the virtually complete disappearance of a steady and reliable supply of sawdust with which to fire the boilers of Portland General Electric Co.'s steam plant, known as Station L, on the east side of Portland's upper waterfront. Solution was conversion to oil of the 85,000-kw. generating plant, a 47-year-old installation designed to consume the wastes of the once numerous local sawmills.

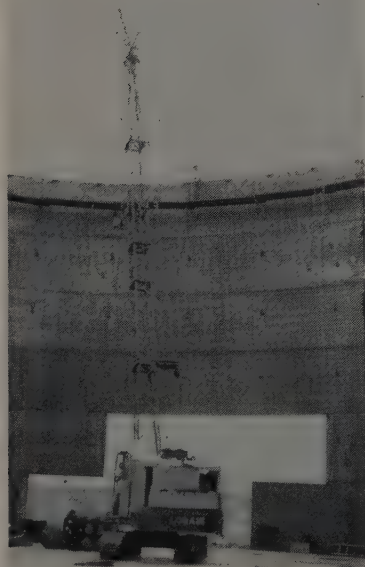
American Pipe & Construction Co. began construction, Sept. 30, of a \$385,000, 4,000,000-gal. steel oil

storage for PGE on a recently-acquired site of about 18 ac. which may some day also accommodate another steam generating plant.

The tank, which replaces a sawdust mountain which was almost a tourist attraction, is the last phase of a \$1,100,000 modernization and expansion project at the plant, according to Arthur J. Porter, PGE vice president.

Porter explained that the project is the result of years of planning which went along in recognition of the inevitable end of sawdust as a fuel supply. Conversion of one large boiler unit to oil and gas was completed last summer and extensive work is now under way on another boiler conversion job at a cost of some \$250,000.

The big storage tank was put up in about six weeks by American Pipe, with George Heim, of Portland, as superintendent on the job. Six courses of steel plate, forming the 48-ft. high by 120-ft. diam. shell were put in place by a Lorain 25 crane with 75-ft. boom and welded. Plate thickness of the bottom course is .822 in.; in the second, 11/16 in.; in the third, .542 in.; in the fourth, 13/32 in.; in the fifth and sixth, 5/16 in. Ten steel legs standing vertically in a circle about 18 ft. in from the outer shell, and five more in another circle some 20 ft. nearer the center from the first circle of 10, and a center leg make up the tank's interior framing. Radial beams will be carried from the center-post, connecting the legs and the outer shell to support the roof.



nels the impulses directly upward in an inverted cone-shaped field, 40 in. in diameter at the horizontal beam. The impulses are picked up by a scintillator detector and counter suspended from the center of the gage tower crossbeam 15 ft. above.

The series of impulses picked up by the counter is in turn relayed to a radio transmitter located in a metal container at one side of the tower and in turn is retransmitted out through the radio antenna attached to the one vertical tower support. At the Walla Walla District Office is installed a receiving system consisting of a base radio station fed by two-way voice relay pick-up stations located in the field.

Each telemeter snow gage station consists of its cylinder of radio-active sources (cobalt 60), a scintillator impulse detector and counter container, a radio transmitter and receiver with battery relay supply sufficient for nine months' operation, two-way voice communication and equipment housing. Each field relay station will have a radio transmitter and a receiver; two-way voice communication with battery power supply equipment. At Walla Walla will be a recording device to give a permanent graphic record and visual detection of data transmitted, plus automatic equipment for calling each field station.

All stations are inaccessible in winter except by helicopter or snowmobile, and equipment is designed to operate for nine months without attention.

Availability of this accurate system of gaging snowfall and moisture content will enable the Army Engineers to forecast river runoff far in advance of the present method and permit a more accurate forecast of potential storage waters and runoff timing. Possible health hazards brought on by use of radioisotopes have been guarded against by giving employees working with the snow-gage program specialized training in radiation hazards.

James C. Cannon, engineer employee of the Walla Walla District, has been in charge of the planning of the radio-transmitter program, and Army Engineers hope to have the system in operation this winter. Mountain installations of the stations are being properly fenced and marked with Atomic Energy Commission's hazard signs.

WHEN SNOW COMES...

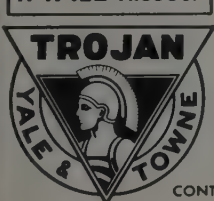
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California revises Safety Orders

**California's new Safety Orders are now in effect—
with the first major revisions since 1940. Here are features
of this outstanding code of safe construction practice.**

By V. L. WHITE

**Supervising Safety Engineer
Division of Industrial Safety
State of California**

IN CALIFORNIA and a number of other states it is a misdemeanor to violate a Safety Order. Because of their importance in the prevention of accidents, great care is taken to see that safety orders are reasonable and worthwhile.

The recently revised Construction Safety Orders, which became effective on September 28, 1957, are the result of extensive committee work, extending over a period of many months. Committees consisted of representatives from various interested groups such as labor unions, contractor organizations, construction equipment manufacturers, engineers, architects, and others in a position to help with a project of this kind. More than 40 committee meetings were held in connection with these orders, divided about equally between San Francisco and Los Angeles, the committee membership varying from meeting to meeting according to the subject under discussion. For example, when roofing safety was the committee topic, special effort was made to see that the roofers union and the roofing-contractors organization were well represented, along with manufacturers or distributors familiar with roofer's supplies, such as kettles and buckets. Prior to each committee meeting, about 200 copies of the subject matter were mailed to interested parties, so that they could attend or mail comments.

According to law it is necessary to hold public hearings prior to the adoption of safety orders. In this case, public hearings were held both in Los Angeles and San Francisco, and about 1,200 copies of the proposed Orders were distributed in advance along with the public hearing announcements. This resulted in well-attended public hearings which produced many worthwhile suggestions.

Public hearings are held by the

Industrial Safety Board, the chairman of which is the Director of the Department of Industrial Relations. The remaining membership consists of four men selected by the Governor to give a part of their time and ability to this state service.

All comments at public hearings are recorded, transcribed, and given careful attention. Those comments that are considered by the Board to be of real value are referred back to the Division staff for incorporation into the final Orders. After the Board has approved the final changes and adopted the Orders, they are mailed to all those who attended public hearings or who made written comments in regard to any part of the Orders, allowing a period of 20 days for anyone with serious objections to petition for a rehearing.

In this case, no rehearing was necessary and the revised Construction Orders are now in effect. The preparation and adoption of orders is time-consuming, but this procedure is more flexible and effective than a system depending upon regular legislative processes for establishing safety laws.

These new Orders supersede a set that had not undergone a major change since 1940. Needless to say, construction methods, equipment, and the size of the construction industry have changed tremendously since that time. In addition, statistical information as to causes and sources of injuries has grown, making it possible to locate danger spots and propose worthwhile regulations with greater accuracy than in the past.

Among the newer processes and tools covered in some degree by the revised Orders are lift-slab construction, tilt-up construction, powder-actuated tools, and stud-jack scaffolds.

Powder-actuated tools

These tools have actually been regulated in California since 1950, by means of voluntary standards issued by the Division after consultation with manufacturers, employer

groups, and organized labor. The standards have been of real value in eliminating injuries and the new Order, which is patterned after the standards, will probably be even more effective.

The injury record with such tools was not good in 1950. There were 27 disabling injuries in California involving powder-actuated tools. Two of these were fatalities, bringing the state death toll to four within a three-year period.

One of the 1950 deaths definitely pointed to the need for operator training, an important requirement of the new safety order. The worker had attempted to completely disassemble the tool without first removing the explosive charge.

By January 1951 the effect of the standards began to be noticed. During that year, powder-actuated tools were involved in 24 disabling injuries and there were no fatalities. The next year only 9 injuries were reported, but the steady increase in tool usage brought about a higher injury total in 1953, and one fatality. In spite of steadily increased tool usage the record in 1954 and 1955 remained good—13 injuries in 1954 and 14 in 1955, with no fatalities.

Safety program

One of the new Orders requires every California contractor to have a safety program. The details of the program are not specified for employers having less than 20 men employed on the project. However, the requirements are more specific if the contractor has more than 20 employees, providing for such things as regular inspections of work areas, investigation of accidents, and sponsorship of safety educational activities. Another requirement for contractors having more than 20 employees is the adoption of a code of safe practices and procedures—which essentially, is the contractor's own list of safety rules to be followed by the foremen and workers he employs.

Housekeeping

Only when accidents are thoroughly investigated are all the involved causes uncovered. It has been found, through such investigations, that poor housekeeping is often the underlying and hidden cause of con-

"FLYGT PUMPS SAVED US OVER \$55,000.00 ON THE LONG BEACH AIRPORT JOB,"

reports O. K. KRINGLEN, Job Superintendent

J. S. BOESPFLUG, CONTRACTORS

Seattle, Anchorage, Billings, Los Angeles

In the extension of runways for the Long Beach Municipal Airport, contractors must build two traffic underpasses for Lakewood Blvd. and Spring Street—major arteries in the City's roadway system. With funds from a municipal bond issue, the runways will be extended to 10,000 feet, over the two roads, so as to accommodate the largest jet transports now on aircraft manufacturers' drawing boards. The job totals \$5½ million, of which \$3,485,000 is allocated to construction of the two underpasses.

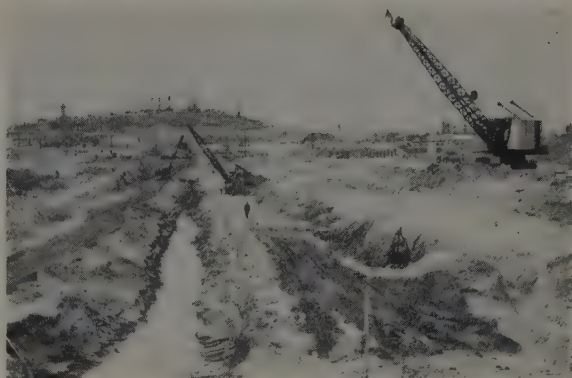
While under construction, the Spring Street underpass presented some interesting and difficult de-watering problems. The structure is designed to be 1083' long, 64'4" wide, and 31' high. Excavating for the 31' height revealed a "joker." After the tractor-scraper dirt moving had been completed, J. S. Boespflug, prime contractors on the job, moved in a crane to excavate foundation areas for the structure. This work required earth removal 12 feet below the 22-foot ground water level. Water intrusion was immediate.

The contractor's first impulse was to install a well-point system for de-watering. Investigation revealed that such a system would have cost approximately \$60,000. Then the Boespflug company observed a demonstration of Flygt submersible Electric Pumps. A short time later, 3 Flygt Model B80L Pumps were put on the job. Total investment in the Flygt Pumps: only \$3,000.

O. K. Kringlen, job superintendent, tells the story from that point in his own words: "We needed submersible pumps, each with a minimum 6000 gallon per hour capacity, that would reach a 35' head and move water at least 30' horizontally. Since the pumps would be working in both sand and clay, we had to have centrifugals which would move up to 30% solids. Flygt met all those specifications, so we purchased three 3" model B80L's. So far we've only needed two of the three to do the job, so one is a standby. The nice thing about the electrically powered Flygts is that they can be put to work and ignored. They run 24 hours a day on this job, and the only time we touch them is to lift and lower them with the water level, with a rope suspension. The two Flygts easily managed to keep ahead of our water intrusion. We figure Flygt Pumps saved us over \$55,000 on this one job, so we adopted the Flygt Pumping Method."

Pump operators find Flygt Pumps tops in performance. Users particularly like their fool proof features, the advantage that they work in any position, and the fact that they do not clog up. They can take a lot of solid stuff like mud and sand without hurting them in any way. The rubberized pump casing and hard chrome alloy impellers combine to make Flygt Pumps rugged equipment.

Flygt centrifugal pumps are manufactured in Sweden and range in size from 1½"—65 GPM capacity to 8"—2850 GPM capacity. Head capacities range up to 210 feet. Weights range from 70 to 1300 pounds. Ask for complete information today.



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struction injuries. Many falls, back strains, and bruises result, not from the careless worker, but indirectly from a job that is littered with debris. To help in controlling this situation the following Order was adopted:

"During the course of construction, alteration, or repairs, form and scrap lumber with protruding nails and all other debris shall be kept reasonably cleared from work areas, passageways, and stairs in and around buildings or other structures. The ground area within six feet (6') of a building under construction shall be reasonably free from irregularities wherever it is practicable to attain this condition by grading or similar methods, and open ditches shall be bridged to provide passageways at convenient places. Material storage areas and walkways on the construction site shall be maintained reasonably free of dangerous depressions, obstructions, and debris."

Head protection

It has been noticeable throughout the West that more and more construction workers are wearing hard hats as protection against falling objects. Safety-minded contractors and workers have helped this program along, but hard hats are often missing from the disorganized type of project where such protection is especially needed. A new order on this subject reads:

"Head Protection. Workers who are subjected to the hazard of falling or flying material from a higher level shall be protected by a hat designed to resist the impact of falling objects. Men working in trenches six feet (6') or more in depth shall be so protected."

Excavations

The revised Safety Orders will continue to require some form of protection against cave-ins in all trenches 5 ft. deep, or more.

Shoring and bracing requirements are about the same as in the past, except that the revised orders give greater attention to the alternative method of sloping the bank walls in lieu of shoring and bracing.

The following new Order is expected to clarify the circumstances under which sloping may be substituted:

"Sloping. In lieu of a shoring system, the sides or walls of an excavation may be sloped, provided equivalent protection is thus afforded. Where sloping is a substitute for shoring that would otherwise be needed, it shall be three-quarters

(¾) (horizontal) to one (1) (vertical) except where a safe angle of repose of material encountered is less steep, in which case the slope shall conform to this angle."

Better supervision and planning

Other new Orders are aimed at such things as better supervision and planning. Many of California's more serious construction injuries result when a trenching machine travels from hard, compact soil into unstable or filled material. With good supervision this situation can often be foreseen in advance, or at least noted promptly when it occurs, so that extra shoring can be placed at once.

The following new Orders are expected to have a worthwhile effect:

"Survey. Prior to the start of excavation work, the employer shall make a thorough survey of the conditions of the site to determine, so far as is practicable, the predictable hazards to employees and the kind and extent of safeguards necessary to prosecute the work in a safe manner."

"Supervision. Excavation work shall at all times be under the immediate supervision of someone with authority to modify the shoring system or work methods, as necessary, to provide greater safety. He shall frequently examine the material under excavation and improve the shoring or methods beyond the minimum requirements, as necessary, to insure protection of workmen from moving ground."

It has been found that California workers are sometimes killed or seriously injured while installing the very shoring and bracing that is intended to protect them.

The following Order is aimed at this hazard:

"Protection While Installing Shoring. Special provisions shall be made by the employer to prevent injury to workmen engaged in the installation of shoring. This may be done by providing and requiring the use of special devices such as long-handled jacks that will allow upper cross braces to be placed from the ground surface before men work in the trench at those points. In the deep trenches requiring additional braces, workers could then progress downward, protected by cross braces that have already been set firmly in place."

Construction elevators

The trend with construction elevators is toward more complete enclosure, to avoid having men or ma-

terials struck by the moving cage.

"Enclosures. Except for entrances, towers shall be enclosed on all sides at grade and all sides adjacent to, or within three feet (3') of any floor, landing scaffold, or walkway to a height of not less than six feet (6'). The enclosure shall be by means of wire mesh, slatted partitions, planks or plywood. Wire mesh shall not be less than No. 18 gauge with openings not exceeding one-half inch (½"). Wood slats shall not be less than three-fourths inch (¾") in thickness and spaced not more than two inches (2") apart."

Improved landing gates, required by a new Order will also help to prevent injuries from contact with moving cages.

"Landing Gates. Construction elevators with three (3) or more landings (including the bottom one) shall have slatted or solid gates at least six feet (6') high at all landings. Vertical sliding gates should be counterweighted. Hinged gates are acceptable."

While men are ordinarily prohibited from riding material elevators, it is often necessary for them to board the cage or platform to load or unload material. An improved method of preventing cage movement until everything is in the clear is provided by the following:

"Signaling Device. In addition to the signal arrangements called for in Safety Order 1607, the following shall be provided to prevent unexpected movement of any cage that a worker could board at a landing. Each landing gate on construction material elevators with three (3) or more landings (including the bottom one) shall be equipped with an adequate latching device and an electrical contact so designed and installed that a circuit which lights a green bulb is closed whenever all gates are closed. This bulb is to be in clear view of the operator, and the cage is not to be moved unless the bulb is glowing."

Power handsaws

It is not uncommon to find carpenters with missing fingers—often the result of accidents with the power handsaw.

The telescopic guard, which disappears into the saw frame as the blade enters its work, has given reasonably satisfactory protection. But there are always difficult cuts, such as those on lapped subflooring, where the carpenter is tempted to pull the guard back by hand in order

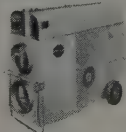
(Continued on page 52)

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OVERALL VIEW shows steel going into place for the 8-ft. thick main foundation mat. Re-bars up to 2 1/8 in. in diameter are being used in

the slab, which will require 11,000 cu. yd. of concrete. Note transit-mix trucks, long chutes, and power buggies in background.

Dewatering 46-ft. deep excavation

Foundation for the 20-story Crown-Zellerbach building is San Francisco's deepest. An impervious clay stratum is being used to maintain height of water-table surrounding site.

By **EDWARD T. HAAS**

Haas and Haynie, General Contractors
San Francisco, California

THE FOUNDATION EXCAVATION for the 20-story Crown-Zellerbach building now under construction by Haas & Haynie Corp. has a maximum depth of 46 ft. This is the deepest building excavation ever attempted in downtown San Francisco and it is about 20 ft. deeper than the foundation of the structures which surround the site.

The water-table in the area is at minus 6 ft. Our major problem during the foundation phase has been to maintain the height of the water-table around the site. If it were lowered the consolidation of the sandy materials which lie near the surface would very likely cause dam-

aging settlement to the nearby structures.

The building will occupy a wedge-shaped site of about 50,000 sq. ft. bounded by Market, Bush, Battery and Sansome streets. The building itself will occupy only one-third of the land area, the remainder being left open for sunken landscaped gardens, trees and walkways which will be open to the public. The underground portion, however, will extend to the limits of the site, to provide parking space for 150 cars.

In the early planning of the job it was thought that it would be necessary to recharge the ground with water outside the excavation in order to maintain the water-table at the required height. Fortunately, our soil investigations showed that such an expensive procedure would

be unnecessary, thanks to a feature of the local geology. At a depth of 18 to 26 ft. underlying the rather loose sandy material near the surface is an impervious clay layer which we found to extend over the entire area of the site and far beyond its boundaries. Underneath this is a very dense sand which becomes increasingly hard with depth.

This clay layer greatly simplified our ground-water control problem because it prevents the water-table from dropping as we proceed with the excavation, provided the excavation is lined with water-tight sheet piles.

The first job was pile driving, which was subcontracted to the Ben C. Gerwick Co. Piles were driven entirely around the site to a depth of about 50 ft. Graphite grease was used in the sheet pile joints to reduce friction and eliminate leakage.

Inside the sheet piles, wells were drilled to elevation minus 45, on 27-ft. centers. Three concentric casings were driven into each well hole, a 30-in., a 24-in. and an 8-in. perforated inner casing. The outer ring was filled with sand and pea gravel,

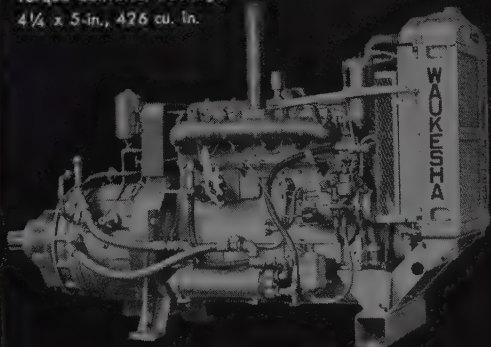
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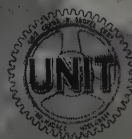
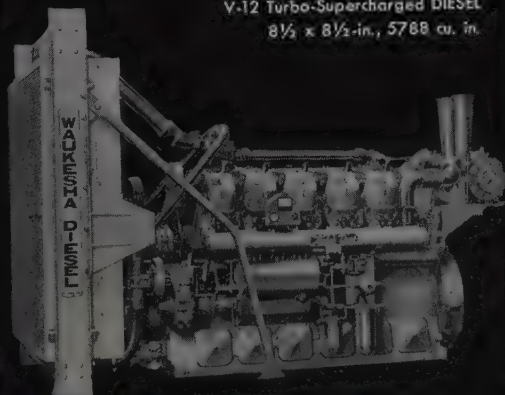
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the second ring with concrete sand. Then the outer casings were removed, leaving the small perforated pipe surrounded by two layers of graded materials to filter out the fine sand. This method has eliminated any silting of the pumps and has removed the possibility of creating any voids in the surrounding foundation material.

Two pump stations

At the bottom of each well was placed a siphon jet aspirator connected by two neoprene hoses to two 6-in. steel pipes which circle the site. The amount of water to be removed didn't justify a series of separate pumps. The 6-in. pipes tie into two 500-gpm. pumping stations, one on each side of the excavation. With this type of eduction pumping the same water is constantly recirculated, and about twice as much is pumped as is removed.

While dewatering the section above the clay layer about 700 gpm. was removed. When the excavation had progressed below the clay layer only 117 gpm. was removed. A



WATERPROOF membrane underlies the foundation slab. Membrane has seven layers. Each layer consists of mopped asphalt, tarpaper, and glass fabric (above).

series of observation wells surrounding the site shows that the water-table outside the excavation is not being disturbed.

The sheet piles are being held in position by a bank of soil which was allowed to remain in place as the ex-

cavation progressed. When the central section of the foundation slab is completed the piles will be braced against it, the remaining soil excavated, and the foundation slab extended to its designed position, which is about 4 ft. from the sheet piles. The natural angle of repose of the soil supporting the sheet piling is about 45 deg. when dry. During the excavation it was essential to keep the soil absolutely dry because when saturated the angle of repose would be much less.

No friction or bearing piles will be driven at the bottom of the excavation to support the building. The building will rest entirely on a huge concrete slab with a volume of 11,000 cu. yd. and a maximum thickness of 8 ft. Reinforcing steel in sizes up to 2 1/8 in. in diameter is now being placed for this slab. Underlying the concrete slab and extending up the walls is a waterproof membrane consisting of 2 in. of concrete to provide a working surface, seven layers of mopped asphalt, tarpaper, and glass fabric topped by another 2 in. of concrete. This work is now under way.

Structural steel erection is scheduled to begin in December 1957. The building should be ready for occupancy in April of 1959.

Personnel

Project manager for Haas & Haynie on this job is Arch Johnson. Associated architects are Hertzka & Knowles and Skidmore, Owings & Merrill. H. J. Brunnier was structural engineer, and Dames and Moore were soils engineers.



TWIN 6-in. steel pipes encircle site to carry water for eduction pumping system. Note neoprene hoses every 27 ft. which bring water up from 45 ft. below.



Above, 50' x 36" KOLMAN Portable Conveyor-Screen Plant equipped with built-in feeder and wing wall. Owned by Peter Kiewit Sons' Co.



Cutaway view of Portable Feeder-Trap Combination.



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This new portable Feeder-Trap-Combination is now available on all Model 101 Heavy Duty KOLMAN portable Conveyors. Loss of time in setting up, taking down, and moving a separate feeder and hopper is eliminated entirely. Your portable plant is ready for operation as soon as it reaches a new job.

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The Portable Trap can also be equipped with steel wing walls extending forward and up beyond the regular loading trap walls. This additional enclosure prevents loose gravel, earth or other material from working into the conveyor tail section and eliminates the need for planks. The Wing Walls are permanently mounted and portable with the rest of the plant.

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"... necessary to maintain traffic..."

Traffic control requires careful job planning on extension of Oregon's Baldock Freeway.

"IT WILL BE necessary to maintain traffic on Barbur Blvd. and Capitol Highway throughout the entire construction period . . ." Thus does the Oregon Highway Department establish, in its specifications, one of the principal problems to be met in the extension of the R. H. Baldock Freeway into the southwest section of the city of Portland.

Barbur Blvd. is U. S. 99, the four-lane artery leading south out of Portland. Capitol Highway is a state highway running at an angle to Barbur

with an intersection at a point where the new Baldock Freeway right-of-way also intersects it.

The problem is the construction of an undercrossing structure to carry the six-lane freeway beneath the intersection without interfering with traffic on the two existing thoroughfares. A third thoroughfare, Taylors Ferry Road, is also involved in the juncture, running generally east and west, but it is being interrupted by the construction.

Gibbons & Reed, Portland, are

putting in the structure, under a \$446,236 contract, consisting basically of a 200-ft. reinforced concrete, box girder bridge having two 100-ft. spans and an 82-ft. wide roadway; a 225-ft. reinforced concrete, deck girder, off-ramp undercrossing to connect to Taylors Ferry Road; a 270-ft. reinforced-concrete deck-girder on-ramp connection to the Pacific Highway (Barbur); 450 ft. of reinforced concrete retaining wall and 250 ft. of main road bed involving about 35,000 cu. yd. of general excavation. The job got under way in September with a specified 325 working-days time allowance.

To meet the traffic requirement, construction was planned to be done in two stages. Stage 1 is the construction of one-half of the undercrossing structure on the east side of Barbur which, upon completion, will carry Barbur and Capitol Highway during Stage 2, construction of the other half.

Beginning Stage 1, a 650-ft. bypass was thrown up on the west grade embankment of Barbur Blvd., the top of which could accommodate a 44-ft. roadway. This fill was covered with a 16-in. base course plus a 1½-in. topping and given a 2-in. wearing surface of Class B mix asphaltic concrete. The four-lanes of Barbur Blvd. were switched onto this curved bypass with Capitol Highway traffic combining.

Stage 1 construction began on the



DIFFICULTIES were encountered in pile driving for abutment footings. Boulders as large as 7 ft. across deflected and split piles as they neared bedrock.

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Pictures Show How Armco Buildings Provide Efficient, Low-Cost Answer to Contractors' Building Problems

This contractor got an attractive, yet low-cost home office with imaginative use of brick veneer for part of the front wall of an Armco Steel Building. The wide roof overhang is both a practical weather shield and a good looking design feature.



This Armco Building serves as a portable field office for an Ohio contractor. Its relatively light weight makes moving a simple job. And the all-steel construction requires little or no maintenance.



Batching plant was set up to handle part of the Indiana Toll Road requirements. The Armco Building serves as an efficient, weathertight equipment repair and storage shop. Armco STEELOX® Panel construction makes it easy to dismantle and move to a new site with 100 per cent re-use of materials.



Winter headquarters for this Kansas contractor include, from left to right: Paving Equipment Repair, Grading Equipment Repair, Paint Shop and Truck Shop in Armco Buildings. Office and Storage facilities are provided in other Armco Buildings not shown. Low erection costs, durability and fire-resistance make Armco Buildings ideal for permanent installations like this.



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east side of the grade with excavation into the embankment for the driving of piling for footings and putting in cribbing to hold the bank until retaining walls are complete. The ground is clay with large boulders of considerable size overlying the bedrock. Weather has been an important factor in the preliminary work of excavation and pile-driving, since heavy rains, common at this time of year, could make the work miserable and expensive, if not impossible. This fall has been an unusually good one in this respect, however. Superintendent C. U. Shafer, of Gibbons & Reed, says the work is substantially ahead of schedule and he anticipates, with good weather-luck, that he will reach completion by September 1958. Highway engineers expect to finish by the end of 1958, according to their maximum time estimates.

Shafer is using a truck-mounted Bucyrus 22B crane with a piledriver rig carrying a 3,500-lb. hammer for driving the 370 timber piles required for the retaining wall and abutment footings. A 22B backhoe and a D8 Caterpillar dozer are being used in the excavating work.



E. L. Hardt

C. U. Shafer

The Oregon Highway Department has established a branch office in the project area from which work on several Portland bridge jobs are supervised in addition to the work on the freeway construction. Edward L. Hardt is headquartered in the office as resident bridge engineer, with Don Gallaher as assistant resident. Division engineer in charge for the state is A. G. Skelton. The project office will be maintained through completion of the entire freeway project, generally estimated at about two years.

Gibbons & Reed key personnel in addition to Superintendent Shafer are W. D. Hughes, engineer for the company, and F. H. Peterson, general foreman on the undercrossing structure.

SAFETY ORDERS

(Continued from page 44)

to start his cut. Eventually, this practice becomes automatic—unfortunately—and one day he grips the rotating blade instead of the guard which, because of sawdust or clogging, is already in a retracted position.

Some new models of power handsaws have a lifting lug or lever on the telescopic guard.

A new Order requires this lug or lever: "Telescopic guards shall be equipped with a lifting lug or lever, remote from the blade teeth, that will permit the operator to safely shift the guard for starting unusual cuts."

Hinged guards, sometimes used on power handsaws, allow the blade to enter the work by folding backward out behind the saw frame. Experience proves that such a guard, when in the open position, provides a convenient but dangerous second handle; and when the saw kicks backward, the hand that grips the guard is sometimes forced into the blade, with serious consequences.

The following Safety Order is probably a step in the right direction: "Saws with hinged guards shall be equipped with two (2) handles so arranged that neither hand is exposed to the hazard of the rotating blade. One (1) handle shall be on the hinged guard and of such design that its use will avoid exposure of the hand or fingers between the retracted guard and the blade."

The new Order also requires that such guards be adequately maintained, and it prohibits the practice of pinning or wedging them back into an inoperative position.

Electric blasting

One of the newer and more interesting safety problems related to electric blasting has come from the discovery that, under certain circumstances, the energy from nearby radio transmission stations may discharge blasting caps.

Several conditions must exist simultaneously for this to happen, which is one reason why these unexpected explosions occur only infrequently.

Blasting cap wires act somewhat like an antenna, to pick up the radio frequency current induced by nearby transmitters. Strangely enough, the length of the leg wires and the

position of the cap between the wire ends have a bearing on the likelihood of an explosion.

This is partly because the induced current is not of equal intensity throughout the wire length, and there is thus more danger when the cap happens to be located at the point of maximum intensity.

The best way to prevent such explosions is to prohibit electric blasting in the danger zone near transmitting stations, so the new Safety Orders include distance tables which establish limitations on electric blasting near radio transmitters.

Radio-telephones (with which many construction vehicles are now equipped) are also considered capable of discharging caps under some conditions. These sets ordinarily have a power of about 30 watts, which would require a safety zone of about 15 ft., according to the appropriate table in the Orders.

Erection of trusses

California has had a number of truss and roof collapses that seriously injured construction workers. Some of these have occurred during the truss placement operations, showing the need for compliance with the requirement that all trusses must be braced laterally during construction to prevent overturning.

In other cases, structural collapses have occurred *after* trusses were erected, but before the roof structure was completed, causing destruction so complete that the exact cause of a failure was difficult to establish. However, it is apparent that some of these failures would have been avoided if an established safe procedure had been followed in completing the roof and ceiling.

It is not uncommon for companies specializing in the design and erection of trusses to do the major erection work leaving the installation of rafters, purlins, roof sheeting, ceiling joints, etc., to the general contractor.

As the designer of the trusses is one most familiar with the types of loads that may be carried safely, it seems logical that the general contractor should get a schedule or guide sheet from him, to follow in completing the roof structure.

This precaution, required by a new Safety Order, will reduce the possibility of overstress from loads that should not be applied until the trusses have been stabilized by the completed roof structure or other adequate means.

(Concluded on page 58)



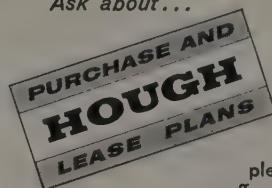
there's no comparison...."

Our model HH 'PAYLOADER' handles an average of 100 tons per hour working a 50 foot radius loading the bins at our plant," says C. A. Pratt, plant manager of Osborne, Inc., Mentor, Ohio, who also use it on highway construction. "It has our larger, heavier loader beat in all these features — ease of operation, operator safety and work-ability. There's no comparison."

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EARTHMOVING . . .

Fifth in a series—Power shovels

By **RICHARD BENNETT**
Construction Consultant
Saratoga, California

ALL GRADING contractors and job managers should make periodic loading cycle analyses of power shovel performance—not only for good job control, but also to determine the influence that varied job conditions have on production.

The impact of cycle analysis on shovel production is illustrated in the table. These data were arranged from time studies made by the Public Roads Administration on 16 power shovels, on 10 jobs, and timing several thousand individual cycles.

POWER SHOVEL CYCLE ANALYSIS—NO DELAYS

	JOB CONDITIONS & MANAGEMENT		
	Poor	Avg.	Good
1. Load	.22 min.	.15 min.	.10 min.
2. Swing	.17 min.	.10 min.	.08 min.
3. Dump	.13 min.	.05 min.	.03 min.
4. Return	.15 min.	.10 min.	.09 min.
5. Total dipper load cycle (excluding all delays)	.58 min.	.40 min.	.30 min.
6. Angle of swing	102 deg.	80 deg.	62 deg.
7. Average pay yardage per dipper load— percent of rated capacity of dipper	35 %	62 %	88 %

Under "good" job conditions operation cycles can be completed in 0.30 min. This requires small individual time elements. Any slight increase in loading time, a pause before beginning the swing, failure to utilize the engine surge on completion of loading, greater than necessary swing angle, slight hesitation in spotting dipper over hauler, any or all will materially affect production.

An increase in cycle time of 0.03 min. will decrease production approximately 10%. Such job losses can be detected only through stop watch observations, using a watch divided into minutes and hundredths. The ease with which such time studies and analyses can be made is fully illustrated in the chart in which three complete cycles are broken down into their proper elements.

The observer merely jots down the elapsed time, then marks an "x" under the appropriate element. All calculations are done later when ample time is available. An occasional "remark" is sandwiched in between timing elements. The stop watch does not "stop," it runs continuously. All elements are timed progressively, thus making "time study" an easy matter.

Loading time is affected by working height of bank and nature of materials.

The swing time required to spot the dipper in dumping position ranges from approximately 0.07 min. for 45 deg. to 0.14 min. for 180 deg. There are two distinct areas over which the swing is made, (1) the digging area, and, (2) the hauler spotting area. A digging area of about 45 deg. reflects an efficient set-up, and 35 deg. for the hauler spotting area. Large cost reduction is possible if the swing angle can be reduced which, more often than not, can be accomplished by correct spotting of haulers. Average swing angle is about 80 deg.

Dumping time for earth with no boulders, ranges from approximately 0.03 min. to 0.09 min. for either earth or rock containing a large percentage of boulders or oversize. Dropping rock from too great a height may damage the haulers; dumping too far off center of the hauler results in material being wasted over the side, thus adding to pit cleanup costs. All sizes of shovels require approximately the same dumping time in given conditions.

Digging conditions in the table ranged from "easy digging" in light sandy materials with optimum bank heights to "hard digging" in poorly blasted rock with low working face. Cycle time in loading and dumping is greatly increased when loading wet, sticky clay. However, the pay yardage per dipper load is usually above average. The principal effect of sticky clay on production is to increase dumping time. One of the toughest digging problems for shovels is loading broken concrete pavement involving large chunks and low digging face.

Oversize material is that not readily passing through the dipper. These large solid rocks or boulders (in earth) affect dipper loads in per-

centage of capacity, and loading time. Earth with no boulders will give a dipper load percentage capacity ranging from 80% to 90%, but with 20% boulders this will drop to 60% to 70%. Rock with no oversize will give dipper load percentage capacity ranging from 70% to 75%, but with 20% oversize the load will drop to 50% to 60%. Oversize delays shovel cycles ranging from zero for no oversize to 0.04 min. for material containing 20% oversize.

Oversize is a thorny problem of considerable magnitude in shovel excavation. Large amounts of oversize tend to create greater abuse to the shovel; excessive abuse may double excavation costs. On many jobs blasting techniques and breakage can stand much improvement, which can be accomplished by, (1) investing a nominal sum in additional explosives and/or (2) hiring more qualified blasters or, better yet, by placing blasting control under skilled technicians. This is so important, why let a mediocre man assume this responsibility? On one trench job, a change in blasting techniques cut job costs more than half.

A dipper load can usually be obtained by making one pass through the material. Second and third passes are justified if enough additional material is added each pass to maintain or better the over-all accomplishment. In a study of over 80,000 dipper cycles, about 15% required more than one pass to obtain a satisfactory load, with oversize and low height of digging face being the major contributing factors.

If the material contains oversize, the percentage of dippers loaded with more than one pass decreases up to a working face of 20 ft. For earth this ranges from 30% for a 2-ft. working face to 10% for a 20-ft. face. For rock the range is 25% for a 2-ft. face to 17% for a 20-ft. face.

Good operators make fewer second passes than those less skilled. In shallow digging constant crowding of the working face requires fewer passes to load the dipper. This requires working close to the face for maximum digging arc. The greater the percent that loading time is to total cycle time, the less desirable it becomes to make additional passes. Skilled operators also note whether or not a full dipper can be loaded onto the hauler to finish out the load. If a partial dipper load will suffice, he reduces cycle time by taking a partial dipper load.

Height of digging face affects both loading time and cubic yards

Study No.		POWER SHOVEL CYCLE ANALYSIS				Date	
Job No.						Sht. of	
Location		Total No. cycles				Study by	
Equipment		Power unit				Operator	
Total moves		Total cycles per move				Workface-hf. ft.	
Swing-degrees-range		Digging area-degrees				Spotting area-degrees	
Well blasted		Poorly blasted				Percent oversize	
Material				Moisture			
Cohesive propetties				Number 2nd dipper passes			
Average load time		min.		Average total cycle time		min.	
Average swing time		"		Average cycle time - no delays		min.	
Average dump time		"		Actual cycles per hour			
Average return time		"		Average load - bank cu. yds.			
Average waits & delays		"		Production per hr. - bank cu. yds.			
Time (min.)							
Elapsed	Cycle	Load	Swing	Dump	Return	Waits & Delays	Remarks
0	x -	x -					
0.14		x .14					
0.25			x .11				
0.30				x .05			
0.41	x 0.41				x .11		
0.67		x ② .26					2 passes
0.78			x .11				
0.81				x .03			1/3 Spill
0.91	x 0.50				x .10		
1.07		x .16					
1.18			x .11				
1.36						x .18	Wait for hauler
1.40				x .04			
1.50	x .59				x .10		
Total	1.50	.56	.33	.12	.31	.18	
Average	.50	.19	.11	.04	.10	.06	

per dipper. Dipper load, in percent of capacity does not increase with working faces of 14 ft. or more. For rock it does not increase for working faces of 10 ft. or more. Optimum working face for earth is 10 to 18 ft.; for rock from 6 to 13 ft., with loading time being increased about 0.01 min. on either side of these ranges.

These production data do not apply to height of digging face of less than 2 ft. Below this the load percentage capacity may range from about 50% for rock to 60% for earth. While larger loads are generally secured from higher faces, skilled operators manage to secure reasonably good loads from shallow

working faces. However, shallow digging faces are a problem outside the contractor's control. If you have them, study them but "lick" them.

Shovels can operate continuously, but under most job conditions there is a large gap between theoretical and actual performance. This can be reduced through improved practices based upon knowledge of the nature and magnitude of controlling factors. Many variables affect shovel performance, but there are certain basic controls which contractors can apply to maintain high job production for all existing conditions. Efficient shovel operation is influenced by such factors as coordination by

management, mechanical difficulties of shovel, operator skills, type of materials, topography, number and kind of hauling units, etc.

Completion of each cycle in minimum time is of maximum consideration for job and cost control. More contractors could reduce shovel excavation costs by, (1) reducing or eliminating oversize materials, (2) positioning the shovel to obtain optimum height of working face and swinging angle in digging area, and (3) proper spotting of haulers to obtain minimum and economic swing angle. Proper, more and better, job planning will lower unit shovel operation costs.

SAFETY ORDERS

(Continued from page 52)

"Erection Guide for Trusses Over Twenty-Five Feet (25') Long. During that period after trusses or tapered steel beams are erected, prior to completion of other structural parts that increase their load-carrying capacity, the magnitude and placement of applied loads shall be held within safe limits by the employer, who, in so doing shall follow an erection completion plan acceptable to the truss designer or a Registered Civil Engineer."

Scaffolds

Poor scaffolds have long been recognized as a dangerous agency of construction injuries, with deaths and crippling injuries a not uncommon result of scaffold falls and failures.

Those who prepared the old Safety Orders fifteen years ago were aware of this situation, and adopted scaffold regulations that did not require a great deal of change.

One important revision applies to light-trade pole scaffolds. It calls for either the addition of a midrail to the guardrailing, or the use of wider work platforms.

In the past, the Orders called for a 20-in. work platform, with the backrail approximately 16 in. farther back, since it was normally nailed to the outside uprights of a scaffold 3 ft. wide.

A new requirement specifies that the horizontal distance between the outer edge of the platform and the guardrailing be no more than 8 in., unless the guardrail is improved by the addition of a midrail, in which case the distance may be as much as 16 in. This Order will greatly reduce the likelihood of a worker falling backward under the backrail, which in the past consisted of a single 1 x 6 or 2 x 4 member, located 42 in. above the working platform.

Stud jacks

The stud jack is a newcomer in scaffold service. It grips vertical studs somewhat as a pipe wrench grips a pipe; and thus supports a horizontal arm that in turn supports one end of a plank platform.

The stud-jack scaffold has been handy on housing tracts for working on the eaves, and in similar operations. A number of serious accidents have occurred, however. In some

cases, studs have broken. In others, ledgers have failed, especially when excessively long.

There has been some support for the outlawing of stud-jack scaffolds, but the Orders allow their use "if the teeth of the stud jack grip two adjacent building studs" (instead of one as in the past) and "if the ledgers are made from 2" x 6" material, not more than five feet in length."

Metal scaffolds

In general, metal scaffolds of the type now in use have been quite satisfactory.

However, those concerned with safety have never been well satisfied with the practice of accepting various types of X-bracing in lieu of a horizontal backrailing located 42 to 45 in. above the work platform. A new Order permits X-bracing in lieu of a guardrailing, but only if the X-bracing members cross at a point that is within 6 in. of the normal guardrailing height.

It is believed that this provision will provide X-bracing that is at least the equivalent of a guardrailing, and thus a safe substitute.

Suspended scaffolds

For obvious reasons, suspended scaffolds often fail to pass the safety inspections of "sidewalk superintendents," who frequently call the Division's attention to "bad ropes" and other items that fortunately are not as weak as they appear. However, when injuries from this source occur they are usually serious—and such injuries may tend to become more frequent, now that work is generally becoming more complex and scaffold loads greater.

The rigging supporting suspended scaffolds often makes use of a small hook in addition to the large hooks used at the roof level. In the past, these small hooks—especially those on the upper blocks—have been known to become disengaged. For this reason, a new Order requires them to be tied or "moused" so that they cannot become unhooked. A latched safety hook or a closed shackle would of course be a satisfactory substitute.

Another change allows the backrailing height on suspended scaffolds to be as low as 36 in. above the platform.

The 42-in. backrail is ideal wherever it can be attached to a substantial and stable object; but in the case of a suspended scaffold, the

36-in. height will reduce the danger of tipping.

From now on, all lumber backrails on such scaffolds must be at least 1 7/8 x 3 1/2 in. in cross section; and if the railing is more than 16 ft. long between normal supports, a third support located at the center is required.

The Order also states: "In securing this center support to the staging, bolts or screws inserted into the staging might have a weakening effect which must be avoided. The use of a metal sleeve is recommended for this purpose."

Lift slab

It is well known that the comparatively new lift-slab method of erection presents a serious catastrophe hazard. Precautions must be taken to prevent building columns being overstressed while the jacks, in position on the column tops, are hoisting the roof or floor slabs.

Later on, when the columns are restrained by the roof and floor slabs, they are, of course, better able to support loads.

The usual solution is to use a heavier and stronger column than would otherwise be required, or to provide temporary braces and guys to strengthen the columns during the erection stage. The important need is to make an engineering study of these erection problems during the design stage, so that any necessary guys, deadmen, and braces will be planned in advance. The new Safety Order on Lift-Slab Operations reads in part as follows:

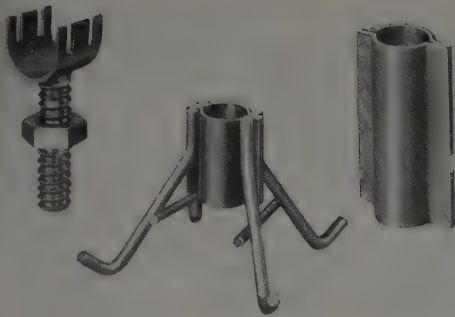
"Columns. The building columns and related elements shall be adequate, according to recognized engineering formulas and standards, to resist without undue deflection all vertical and lateral loads to which they will be subjected during and after slab-lifting operations. Credit may be taken for the effect of temporary braces, shores, guys, or other column-strengthening methods."

Advisory precautions

It has been found that many construction injuries involve operations for which workable Safety Orders cannot be written.

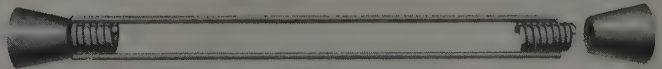
An effort was made to cover some of these situations by worthwhile advisory material in the appendix to the Orders.

It is expected that the sketches, illustrations, and recommendations in the appendix will be of real value to those wishing to go beyond the minimum requirements.

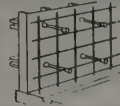


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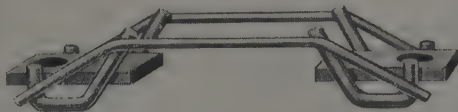
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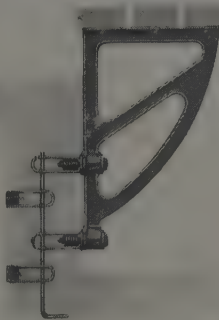
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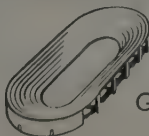
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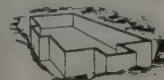


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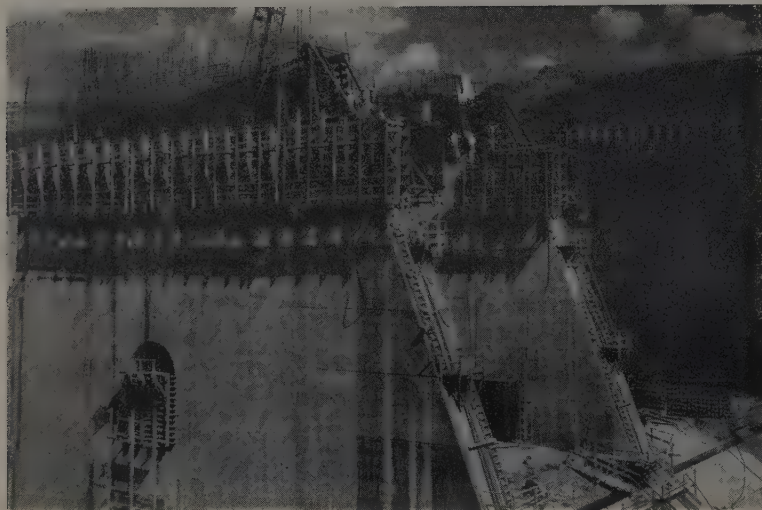
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Big bars for Rocky Reach

STEEL BARS 50 ft. long, 6 in. in diameter and weighing 4,885 lb. each have been installed at Rocky Reach Dam on the Columbia River north of Wenatchee, Wash. These tension bars, 304 of them, will provide the strength to resist the entire weight of Columbia River water against the tainter-type crestgates, largest of their kind in the world.

Imbedded in the concrete piers, the tension bars will support stainless steel trunnion pins on which the tainter gates will swing up and down to open and close.

Threaded for a length of 12 in. on both ends, each steel bar has two hexagon nuts which themselves weigh 81 lb. apiece. Bethlehem Steel Company's Bethlehem, Pennsylvania, plant supplied 152 of the threaded bars and all 608 of the huge nuts to Todd Shipyards Corp., a subcontractor on the Rocky Reach project. Todd Shipyards' Seattle plant threaded the other 152 steel bars in a new 60-ft. shaft lathe.

The steel bars were placed in the dam's 14 piers. Each bar had to be wrapped in burlap and tarred to prevent the concrete from sticking to them, as they elongate when loaded.

Rocky Reach's 750-ft.-long spillway will have twelve 58 x 50-ft. tainter gates. The total discharge capacity, including flow through turbines, will be 1,200,000 cu. ft. a second. The 43-mile-long reservoir will have an area of 9,080 ac.

These facts help explain why such

large steel rods are needed to anchor the tainter gates at Rocky Reach Dam. A Bethlehem Steel spokesman said they are the biggest steel bars ever rolled by his company for this purpose.

The dam was designed for Chelan County Public Utility District No. 1 by the Stone & Webster Engineering Corp., which is also supervising construction. The Rocky Reach Dam Builders are the prime contractor. The \$250,000,000 project is scheduled for completion by late 1962.

New Northwest Editor for Western Construction

BLAKE JACKSON has taken over as Western Construction's Northwest Editor. His background in both construc-

Blake Jackson



tion and journalism will enable him to thoroughly cover construction activities in Washington, Oregon, Idaho, and

Montana. This is familiar territory for him, as he has lived and worked in the Northwest for 25 years. Before joining **Western Construction** he was editor of **Construction World**, U. S. Edition.

His address: 125 N.W. 20th Place, Portland 9, Oregon. Phone CAPITAL 2-2049.

More dams coming up

A 400,000,000-hp. dam may be constructed on the Peace River in northern British Columbia by the Swedish industrialist, Axel Wenner-Gren and the provincial government, according to an announcement made by Premier W. A. C. Bennett. The project, which would be one of the largest power developments in the world, would create a reservoir 260 mi. long.

ANOTHER DAM on the Columbia River has been reviewed in an engineering report by Harza Engineering Co. of Chicago and is estimated to have a final cost, including financing, of more than \$230,000,000. This is the Wanapum Dam for which a preliminary license is already held by the Grant County Public Utility No. 2, with headquarters at Ephrata, Wash. One of the two proposed sites for the structure would be about 18 mi. upstream from the Priest Rapids Dam now under construction.

The report was recently presented to representatives of private and public utilities in the general area interested in the possibility of power from this proposed project.

The report of the engineering firm recommended a dam somewhat similar to that being built at Priest Rapids with a powerhouse which would contain eight 75,000-kw. generating units. Interested utilities are expected to advise the Grant PUD as to their interest in taking on blocks of the power from the proposed Wanapum Dam.

FOLLOWING another amendment to its application, the California Oregon Power Co. has received a 50-yr. license to develop its Big Bend project on the Klamath River in Klamath County, Oregon. Estimated cost of the power project is about \$12,500,000.

Construction would include a diversion structure consisting of an earth-fill dam and concrete spillway, fish ladder, 2.25 mi. of conduit and a 1,600-ft. tunnel. The powerhouse would have an installation of two turbines rated at 56,000 hp.



Teer's CAT* No. 12s help build approach to Patapsco River Tunnel

An important new highway link for North-South travel is the Patapsco River Tunnel, south of Baltimore, Md. It will create a direct connection between Rt. 40 and U. S. 1 without bucking mid-city traffic.

Nello L. Teer Co. of Durham, N. C., is building a 2½-mile section of the four-lane divided expressway leading to the tunnel. The contract calls for moving 1,200,000 cubic yards of earth. Teer's spread on this job includes 12 Caterpillar DW20 Tractor-Scraper units, six D8s, a D9 and two Cat No. 12 Motor Graders.

Good haul roads contribute to low-cost earthmoving, and keeping roads in shape is a motor grader job. With its rugged construction, balanced design and dependable four-cycle Cat Diesel Engine, the No. 12 is built for top production around the clock. Positive-acting controls, easy blade positioning and excellent job visibility all help the operator do more work with less effort. The exclusive Caterpillar oil clutch operates smoothly many hundreds of hours without adjustment. Tubeless tires, at no extra cost, reduce tire down time. And in-cab starting, electric or gasoline, is standard.

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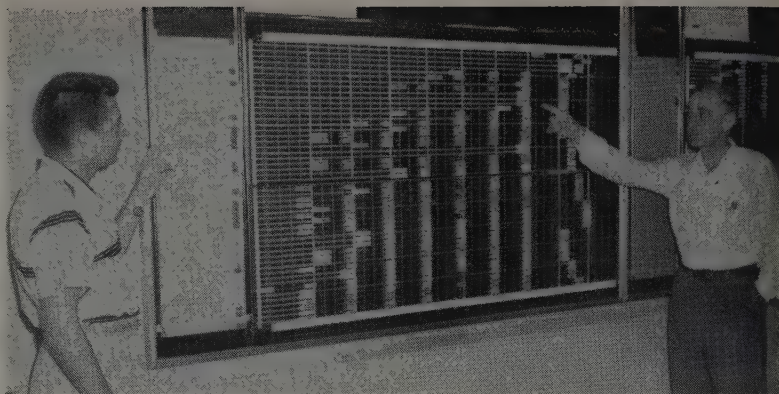
Still more dams

THE FIRST MAJOR construction contract at the Navajo Dam and reservoir site near Farmington, New Mexico, has been authorized for award to the Oehrting Construction Company, Omaha, Neb., on a low bid of \$258,075.

Navajo Dam, when completed, will provide a 386-ft. high, 4,000-ft. long earthfill structure for storage of 1,700,000 ac. ft. of water to irrigate approximately 105,000 potentially productive acres of Indian lands on the Navajo irrigation project. The Navajo irrigation project is one of the potential participating projects of the Colorado River Storage Project on which the Bureau of Reclamation was directed to give priority in completing a planning report by the Congress.

Second and third low bidders for the Government campsite contracts were: Douglas Brothers, El Paso, Texas, \$294,584; and George A. Rutherford, Inc., Albuquerque, New Mexico, \$306,525. Bureau of Reclamation engineer's estimate of cost was \$282,265.

Under the contract, the bidder will construct 15 three-bedroom residences, provide streets and other improvements, install a central water supply system, sewage works and electrical distribution systems, and a powerline to a pumping plant, as well as provide housing and camp facilities during construction. The job is to be completed in 240 days.



ARIZONA INTRODUCES PROJECT PROGRESS BOARD

THE ARIZONA HIGHWAY Department has recently instituted a Production Control Board and has put it into use to present visual information on the exact status of every major highway job from planning to completion.

The information presented on the board is the project number, exact location, type of construction, miles involved and the Commission district in which it is located. This information is listed vertically on the board under the project number. From left to right, in each of these vertical columns is the progress status on surveys, materials, computing, plans, bridges and right-of-

way. Different colors designate Interstate, primary and secondary routes. Lastly, each section is sub-divided to show when the work on any division is 25, 50, 75, or 100% complete.

As the work of each division has been completed, the tab is removed from that section until the job finally reaches the Bureau of Public Roads. After approval by the Bureau, the project is advertised for bids and the project is removed from the board. Any changes in the progress on a job is indicated as it occurs and a complete revision of the board is made every two weeks to insure an accurate progress check.

End-Welded NELSON® Stud

This NELSON torture test was performed on the testing platform at Thew Shovel Company, Lorain, Ohio. The equipment is a 30-ton Lorain Moto-Crane.

Close-up of Hydroscale measuring the 16,000 lbs. of tension against the end-welded NELSON stud. In the interest of safety, the test was not carried out to the point of destruction.

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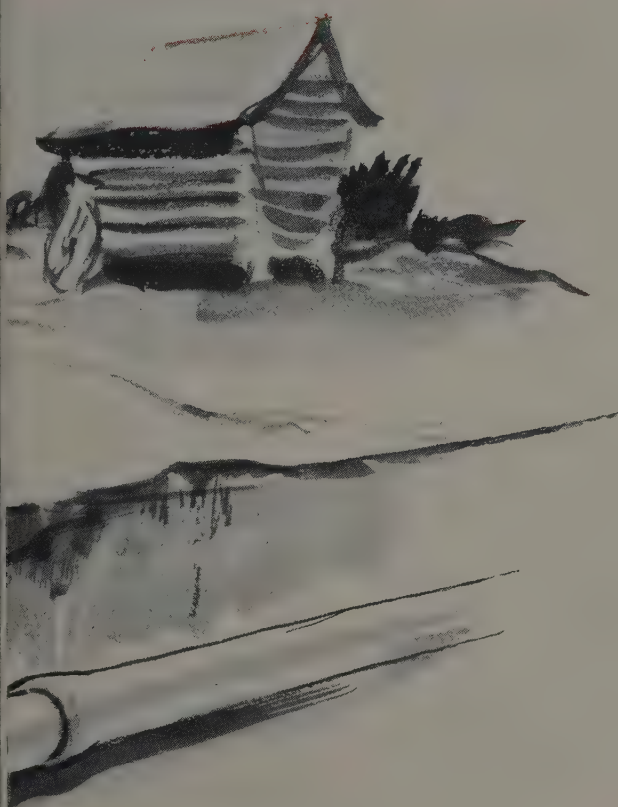
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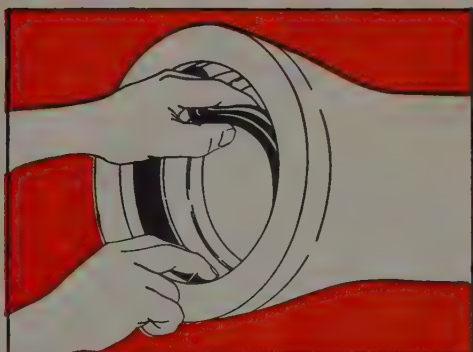


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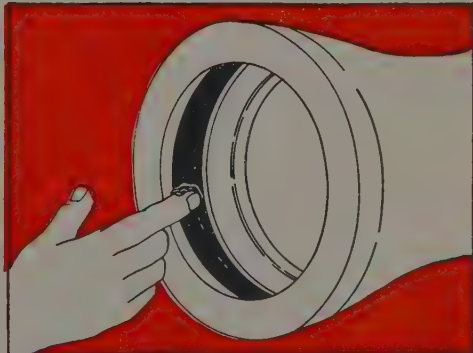
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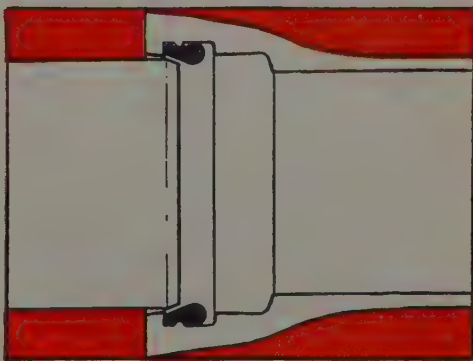
ONLY FOUR SIMPLE ACTIONS



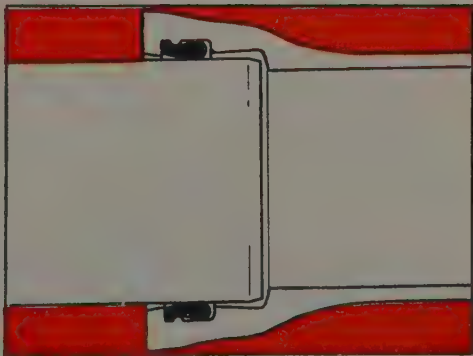
Insert gasket with groove over bead in gasket seat



Wipe a film of special lubricant over inside of gasket



Insert plain end of pipe until it contacts gasket



Force plain end to bottom of socket . . . the job's done!

Hawaii Report

ALAN GOODFADER

Honolulu, Hawaii

MOLOKAI IRRIGATION PROJECT

—Morrison-Knudsen teamed up with Honolulu's Hawaiian Construction and Dredging Co. to offer a \$4,772,950 low bid on a contract to construct the Molokai irrigation project for the Hawaii Water Authority. Main job in the project will be a 5-mi. horseshoe-shaped tunnel through solid rock from Kauna-kaikai gulch to water sources in Waikolu Valley. It will be the longest water tunnel in the Territory.

The contractors also will build a small bridge, and a diversion dam and will drill nine deep-level wells. The job is expected to turn the parched leeward area of Molokai Island into the Territory's "bread-basket."

Four and a half years have been allowed for the job. Three other bidders submitted offers with a high of \$8,634,569.

DYNAMITE SHORTAGE—A shortage of dynamite which has been strangling the Territory's construction industry was expected to be ended this month by a shipment here of 450 tons of the explosive. The Coast Guard cut off shipments to Honolulu this summer for safety reasons. A small dynamite plant being constructed on Oahu won't be ready for production for some months. The Navy had agreed to allow use of its docking facilities for this month's shipment if a satisfactory insurance agreement could be worked out.

LOW BIDDERS—Low bidders on four major Honolulu construction projects were: Moses Akiona, who bid \$872,272 on a combined project including the extension of University Ave. to Kapiolani Blvd. and a flood control box drain serving the area from Varsity Place to the Ala Wai; Walker-Moody Construction Co., \$780,321 on an elementary school construction project; Harry I. Kobayashi, \$222,599 on another elementary school, and G. K. Buckert, \$20,580, on a contract to gunite the face of Waihee reservoir site.

JOB DELAY—Contractor A. L. Ho, doing the \$600,000 Keehi Lagoon park site dredging and filling job, was one of those hit by the dynamite shortage. He was supposed to have finished the job by early September. However, the dynamite shortage left him unable to blast coral from the edges of the park site, where he is changing the shoreline and digging a small lagoon. Honolulu parks officials agreed to allow him time to finish the work after more dynamite arrived here. Also awaiting arrival of explosives here is E. E. Black, Ltd., who

has been awarded the contract to drive the second bore of Honolulu's Wilson Tunnel, a 2,800-ft. vehicular tunnel through the rock and mud of Oahu's Koolau Mountains. Black was the lowest of three bidders on the project, offering to do the job for \$3,845,352. He is just finishing work on the first bore. He has 18 months for the second.

NUUANU PALI HIGHWAY—J. M. Tanaka, who drove the first Nuuanu Pali Highway tunnels for \$2,177,000, was expected to start the second set of two bores the middle of November. He was low bidder on the project with an offer of \$2,237,869.

He is to build a 1,080-ft. tunnel, a 496-ft. tunnel and 280 ft. of connecting roadway.

SCHOOL CONSTRUCTION—The City of Honolulu expects to spend \$9,700,000 on new school construction before September 1959, but is having a hassle with the Territory over the money. Under a set-up drawn by the Territorial Legislature, the Territory is supposed to borrow the money and turn it over to the City.

However, Territorial officials have said the Territory is too near its debt limit to borrow money for the city. Mayor Neal S. Blaisdell and Governor William Quinn were scheduled to confer on the problem shortly after this column was written.

BRIDGE REPLACEMENT—Territorial and city officials hope to have plans ready for bids in December for a replacement to the 35-year-old bridge over the Ala Wai at McCully St. in Honolulu. The job will cost up to \$400,000, with the Territory putting up the first \$225,000. The Territory already has set aside its share of the money.

HARBOR WORK—The Territorial Board of Harbor Commissioners hopes to advertise in January for \$3,500,000 worth of harbor work in the Islands. Included are two projects. About \$2,750,000 will be spent to construct the substructure of a new Honolulu Harbor terminal which will replace the present Piers 5, 6 and 7. Removal of the old Pier 5 and part of Pier 6 already is under way.

The second project includes construction of \$750,000 worth of shore facilities at Kawaihae, Hawaii. Completion of the work contemplated at Honolulu will produce one continuous bulkhead of marginal wharf type which will accommodate two 800-ft. vessels.

HEADQUARTERS FOR

**THE W
LORAIN**

**ANDREWS
EQUIPMENT SERVICE**
Spokane, Wash.

**ATLAS EQUIPMENT
COMPANY**
Salt Lake City, Utah

CENTRAL MACHINERY CO.
Great Falls, Havre and Lewistown, Mont.

COAST EQUIPMENT CO.
San Francisco 3, California

A. H. COX & COMPANY
Seattle 4 and Tacoma, Wash.

GENERAL EQUIPMENT CO.
Reno, Nevada

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

MCCOY COMPANY
Denver 17, Durango, Grand Junction,
Pueblo and Sterling, Colo.

MOUNTAIN TRACTOR CO.
Missoula and Kalispell, Mont.

NASH-DAVIS MACHINERY CO.
Billings and Bozeman, Mont., Greybull, Wyo.

NEW MEXICO EQUIP. CO.
Albuquerque, New Mexico

LEE REDMAN EQUIP. CO.
Phoenix, Arizona

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

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

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

**WORTHAM MACHINERY
COMPANY**
Cheyenne, Casper, Sheridan and Rock Springs, W.

**YUKON EQUIPMENT
INCORPORATED (for Alaska)**
Seattle, Wash., Fairbanks and Anchorage, Ala.

**SHOVELS • CRANES
CLAMSHELLS • DRAGLINES
HOES
SALES • PARTS • SERVICE**

**DIG . . .
TRAVEL**

Anywhere

with a fast, mobile
LORAIN SP-107



DRAGLINE—Here a Lorain SP-107 with a $\frac{3}{8}$ -yd. dragline bucket mucks out channel bottom $\frac{1}{2}$ mile from road.

Here's a new contractors' excavating tool with rubber-tire travel speed to get it where it's wanted—fast . . . yet, with the tractive effort, flotation and power usually associated only with crawler machines.

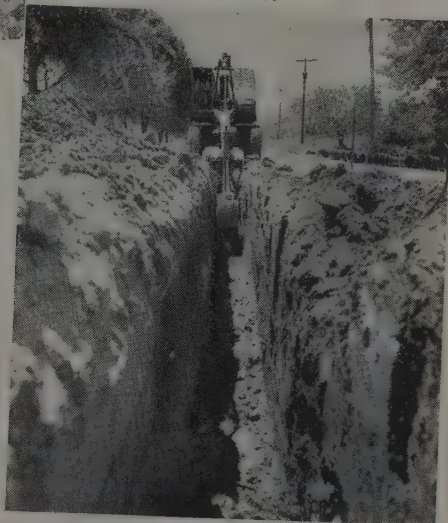
Whether for "handy-andy" use on big construction projects . . . or as the prime excavator on a residential basement, the agile, high-speed, $\frac{3}{8}$ -yd. Lorain SP-107 is designed to be a profit-making contractors' tool.

Take it where the jobs are, over city streets, highways or cross-country where the going can be rough. Move it in and go to work and see what this "powerhouse" can do for you. Here are some additional features of the "107" you'll want to know about:

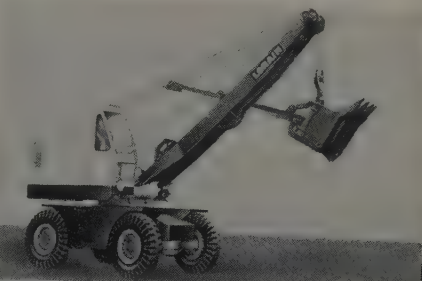
- Torque converter power take-off gives it lots of hang on . . . won't give up on the tough jobs.
- With 3 or 6 travel speeds—up to 15 m.p.h.—the Lorain SP-107 is fast from job to job . . . fast around the job.
- The 4-wheel drive—and big tires take it easily over soft, rough ground.
- No outriggers needed . . . no fuss, no bother, no lost time . . . move in and go to work.
- Power steering and power brakes make the Lorain SP-107 easy, simple to handle.
- Hydraulic control of all clutches . . . the Lorain SP-107 is easy and fast to operate.

Your Thew-Lorain Distributor can show you how the Lorain SP-107 can be quickly converted for any kind of contractor's use. See him for details soon.

THE THEW SHOVEL CO., LORAIN, OHIO



HOE—This Lorain SP-107 hoe is digging a sewer trench through tough blue and yellow clay.



SHOVEL—The Lorain SP-107 is easily converted to a $\frac{3}{8}$ -yd. shovel.

THEW LORAIN

Low bids and contract awards

ARIZONA

D. M. Bradley and S. R. Dysart of Phoenix submitted a low bid of \$146,575 for 6 mi. of grading and surfacing the Frontier road, northeast of Lowell in Cochise County. A low bid of \$116,641 was submitted by **Phoenix-Tempe Stone Co.**, Phoenix, for 2.3 mi. of grading and

surfacing the Kirkland-Prescott Highway in Yavapai County. **Tiffany Construction Co., Inc.**, Phoenix, submitted a low bid of \$120,969 for grading and surfacing approximately 3 mi. of the 56th Street and Transmission road in Maricopa County.

CALIFORNIA

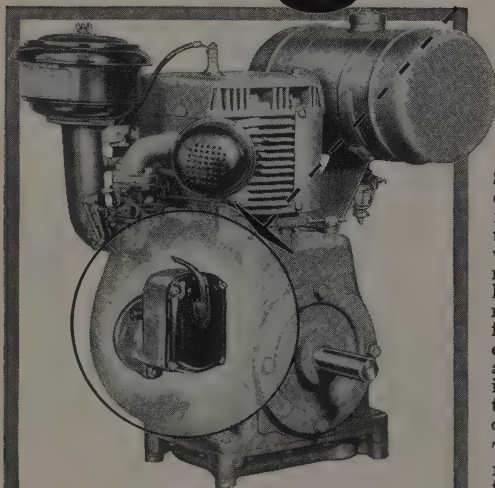
Ukropina-Polich & Kral of San Gabriel submitted a low bid of \$4,878,927 for two separate roadways and frontage roads to be graded and surfaced and separation structures to be constructed on 1.6 mi. in Glendale and Burbank, Los

Angeles County. **Matich, Sundt & Bevanda** of Colton received a \$2,328,523 contract for 8.6 mi. of grading and surfacing and construction of six bridges in city and county of San Bernardino. A \$546,314 contract was received by **Daley Corp.** of San Diego for grading, surfacing and construction of one bridge in city and county of San Diego. **C. K. Moseman** of Redwood City submitted a low bid of \$1,245,891 for construction of eight bridges and one bridge to be widened and approaches to be graded and detours to be constructed in city and county of San Diego. **Rice Bros.** of Lodi submitted a low bid of \$537,376 for 7.7 mi. of grading and surfacing on Rte. 187 in Imperial County. A low bid of \$243,612 was submitted by **Peter Kiewit Sons' Co.** of Arcadia for 2.7 mi. of grading and surfacing north of Port Hueneme in Ventura County. **Stolte, Inc.**, Oakland, submitted a low bid of \$200,983 for construction of bridge, approach roadways and electrical systems to be installed and modified in Tipton, Tulare County. **Granite Construction Co.** of Watsonville submitted a low bid of \$197,691 for 2.9 mi. of grading and surfacing Reservation Road, between East Garrison Gate of Fort Ord and southeasterly of Davis in Monterey County. A low bid of \$174,117 was submitted by **Calif. Asphalt Co.** of Colton for 2.1 mi. of grading and surfacing west of Riverside in Riverside County. **C. B. Tuttle** of Los Alamitos submitted a low bid of \$151,151 for construction of bridge across Santa Ana River in Orange County. **Madonna Construction Co.**, San Luis Obispo, received a \$351,083 contract for grading and surfacing 8.3 mi. and widening a bridge on Los Osos road southwest of San Luis Obispo in San Luis Obispo County. **I. L. Croft & Son, Inc.**, of Saugus submitted a low bid of \$316,236 for 3.9 mi. of grading and surfacing on Whitney Portal road west of Lone Pine in Inyo County. A low bid of \$412,292 was submitted by **Strecker & Scott & Jessie H. Harrison**, Sun Valley for construction of roads, parking areas and launching ramps and miscellaneous facilities installed in Folsom Lake State Park at Beal's Point and Granite Bay, Placer County. A low bid of \$2,937,000 was submitted by **M & K Corp.** of San Francisco for construction of three-story hospital-type building, food service building and a one-story addition to existing food service building at the Agnews State Hospital, Santa Clara County. **E. A. Irish**, Los Angeles, submitted a low bid of \$5,263,542 for schedules 1 thru 9, roads, structures and pipe lines, Ventura River Project. **Robert E. McKee**, contractor of Los Angeles received a \$2,773,300 contract for general work for two ward buildings and site development at Patton State Hospital in San Bernardino County.

COLORADO

Colorado Constructors, Inc., Denver, submitted a low bid of \$918,116 for grading, structures and plant-mix asphalt surfacing on 6.9 mi. between De Beque

SELF-CONTAINED Magneto



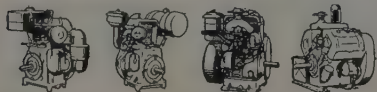
The finest ignition system ever developed for air-cooled engines, 3 to 56 hp. . . . and here's why!

Each Wisconsin Engine magneto is entirely self-contained, mounts OUTSIDE the engine, and is accessible for service by simply removing two bolts. No need to disassemble the engine when servicing. Also, each magneto is gear-driven, tightly sealed against dust and moisture and impulse-coupled for a quick, hot spark and easy starting in any weather, any climate . . . a heavy-duty industrial type magneto of the type usually found only on much larger engines.

The magneto is another good reason why you should specify Wisconsin Engines for your equipment . . . and gain more service, do less servicing.

Write for handy service map S-198 pinpointing locations of more than 2000 authorized service stations ready to serve you.

...another reason why
**WISCONSIN
ENGINES** rank
1st in the world, 3 to 56 hp.



WISCONSIN MOTOR CORPORATION

MILWAUKEE 46, WISCONSIN
World's Largest Builders of
Heavy-Duty Air-Cooled Engines

Better Performance Depends on Better Features...

A7-6049—1/2

THE CASE OF THE IDEA THAT SAVED TWO DAYS

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



IS IT EXPENSIVE?

NOT AT ALL...



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

CAT



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

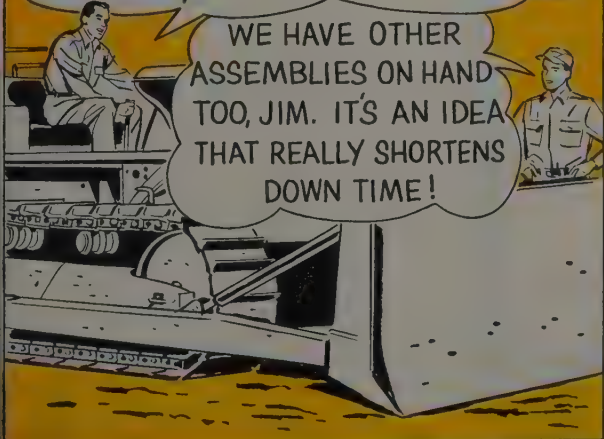
EXCELLENT IDEA!
GO AHEAD...



THAT AFTERNOON

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

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



CATERPILLAR*

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



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



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

YOUR DAVIS DEALER IS DEALING... SEE HIM NOW!



Davis Model 210 Backhoe and 102 Loader on a Model 202 Work-Bull Tractor.

YOU CAN SEE FOR YOURSELF

— it's the greatest
LOADER-BACKHOE
at any price... on any tractor!

Davis 210 digging flush alongside a building.

Only the Davis Loader-Backhoe allows you unrestricted vision. You can see why this rig, with many such exclusive features gives you more earning power.

You sit high on the backhoe so you can see exactly where you're working and you move with the boom so you always face the bucket — just like on the big power shovels.

Only the Davis 210 Backhoe lets you dig flush alongside a building, wall, or fence. Vertical stabilizers, right-angle digging, and 10,000 pounds breakaway power give you the advantage on every job.

The Davis Loader — with built-in strength and streamlined design — has been widely copied, but never equalled.

You would naturally think that this rig would cost you more, but it actually costs less than most other makes.

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

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For the name of your nearest dealer call Western Union by number, and ask for Operator 25... or write direct. Please specify make of tractor.

**MASSEY-HARRIS-FERGUSON, INC.
INDUSTRIAL DIVISION**

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WICHITA 15, KANSAS

and Palisade in Mesa County. **Graham Construction Co.**, Pueblo, submitted a low bid of \$140,054 for grading, surfacing and structures on 5.4 mi. between Las Animas and Hartman in Prowers County. **Northwest Engineering Co.**, Denver, submitted two low bids for roadwork in Fremont and Cheyenne counties: \$308,898 for surfacing between Cotopaxi and Parkdale in Fremont County and \$352,172 for 5.2 mi. of grading, structures and surfacing east and west of Wildhorse on S. H. No. 8 in Cheyenne County. **C. L. Hubner Co.** of Denver submitted a low bid of \$246,053 for grading and structures on 1 mi. of highway north of Pueblo at the Bragdon Underpass in Pueblo County. **Western Paving Construction Co.**, Denver, submitted a low bid of \$205,493 for grading and surfacing Federal Blvd., West Holden Pl. to West Alameda Avenue, city and county of Denver. **Lawrence Construction Co.**, Littleton, submitted a low bid of \$176,813 for construction of overpass and approaches, city and county of Denver. A low bid of \$252,243 was submitted by **Harrison Construction Co.** of Denver for grading, structures and surfacing east of Dolores on State Highway No. 145, Montezuma County. **Carl V. Hill**, Greeley, submitted a low bid of \$164,805 for grading and surfacing between Mesa and Collbran and from Jct. of S. H. No. 6 and 340 easterly in Mesa County. **San Ore Construction Co.** of McPherson, Kansas, submitted a low bid of \$1,253,901 for grading and surfacing from southwest of Fountain, south toward Pueblo in El Paso and Pueblo counties. **Herron-Strong** of Platteville submitted a low bid of \$157,201 for grading, surfacing and structures on 3.1 mi. west of Barnesville, Weld County. A low bid of \$131,660 was submitted by **Blanchard Construction Co.**, Derby, for grading and surfacing on 4.4 mi. of highway north of Basalt in Eagle County. **Bergland-Cherne Co.** of Denver submitted a low bid of \$660,666 for construction of West 6th Avenue Viaduct and approaches in city and county of Denver.

IDAHO

S. S. Mullen, Inc., of Seattle, Wash., submitted a low bid of \$2,011,540 for constructing 13.3 mi. of U. S. Highway 95, southeast of Lewiston in Nez Perce and Lewis counties. **Carl E. Nelson Construction Co.** of Logan, Utah, received a \$1,081,825 contract for constructing the roadway, structures and surfacing 7.4 mi. of U. S. Highway 91 and surfacing a portion of the Roberts-South road in Jefferson County. A \$685,764 contract was received by **Jack B. Parson Construction Co.** of Smithfield, Utah, for constructing the roadway, drainage structures and surfacing 5.1 mi. of U. S. Highway No. 30, Bennington-Montpelier, in Bear Lake County. **R. M. Chastain and Sons** of Idaho Falls received a \$157,297 contract for construction of an access road to the Breeder Reactor Station.

MONTANA

Robertson & Cave Inc. and Sletten Construction Co. of Great Falls received a \$647,370 contract for grading, surfacing and construction of underpass in Great Falls, Cascade County. **Naranche & Konda** of Butte received a \$270,895 contract for 9.7 mi. of grading and gravel surfacing the Augusta-Southwest Highway in Lewis and Clark County. A \$557,392 contract was received by **Peter Kiewit Sons' Co.** of Billings for 10.9 mi. of grading, surfacing and draining the Crow Agency-Broadus Highway in Powder River County. **Union Construction Co.**, Missoula, received a \$350,402 contract for 8.4 mi. of grading and gravel surfacing Echo Lake-East and West Highway in Flathead County. A \$156,401 contract was received by **Zook Bros. Construction Co.**, Bigfork, for 6.9 mi. of grading, surfacing and construction of bridge on the Cleveland-Chinook Highway in Blaine County. **Holzworth Construction Co.**, Miles City, received a \$139,479 contract for 6.8 mi. of grading and gravel surfacing Wyoming Line-Moorhead-Broadus Highway in Powder River County. **Richardson Construction Co.**, Miles City, received a \$292,455 contract for 2.3 mi. of grading and gravel surfacing the Wolf Point Streets and west of Wolf Point-North Dakota Line in Roosevelt County.

NEVADA

Lembke Construction Co., Las Vegas, submitted a low bid of \$4,530,646 for construction of a Convention Center in Las Vegas.

NEW MEXICO

A contract for \$1,258,121 was received by **Allison and Haney, Inc.**, of Albuquerque for 3.8 mi. of grading and surfacing U. S. 66, 10 mi. west of Top of the World-West in McKinley County. **Wylie Brothers Contracting Co.** of Albuquerque received two contracts for roadwork in McKinley and Chaves counties. An \$848,429 award for 1.8 mi. of grading, structures and surfacing the Gallup Urban road on highway U. S. 66 in McKinley County and \$877,231 for 11.6 mi. of grading, surfacing and structures on the Roswell-West road on U. S. 70-380 in Chaves County. **Leslie Wheeler** of Albuquerque received a \$245,492 contract for 17.2 mi. of grading, surfacing and structures on SR-508 Highway, Crossroads-Easterly in Lea County. **Boswell Construction Co.**, Albuquerque, submitted a low bid of \$421,527 for channelization of the Rio Grande Socorro area, Socorro Div., Middle Rio Grande Project.

OREGON

Rogers Construction Co. and Rogers Construction, Inc., of Portland received

a \$1,704,932 contract for 8.4 mi. of grading and paving the Sandy-Alder Creek Section of the Mt. Hood Highway, east from Sandy in Clackamas County. **Cherf Bros., Inc.**, and **Sandkay Contractors, Inc.**, S. Birch & Sons, and **Cheney Construction Co.** of Ephrata, Wash., received a \$1,285,057 contract for earthwork, concrete canal lining and structures, Howard Prairie Delivery Canal Station, Little Beaver Creek Feeder Canal. **Henry H. Miller Contractors, Inc.**, of Roseburg received an \$886,805 contract for construction of relocated U. S. Forest Service West Side Road, Annie Creek to Upper End at Cougar Reservoir on the South Fork McKenzie River in Lane County. **Rogers Construction Co.**, Portland, received a \$1,274,927 contract for paving the Meacham-Glover Section of the Old Oregon Trail Highway in Umatilla and Union counties. **Cedar Creek Logging Co.** and **Farber & Sherwood Logging Co.** of Sweet Home received a \$572,030 contract for construction of relocated U. S. Forest Service West Side Road below Cougar Dam on the South Fork McKenzie River south of Blue River. **F. H. McEwen** of Eugene submitted a low bid of \$154,957 for grading, surfacing and structure on the Springfield-Cresswell Highway, Cloverdale-Coast Fork Bridge Section in Lane County. A low bid of \$146,431 was submitted by **R. H. Jones** of Hillsboro for bridge construction, Meacham-Glover Section on the Old Oregon Trail Highway in Union and Umatilla counties.

UTAH

L. A. Young Construction Co. of Salt Lake City received two contracts for road work in Juab and Millard counties. A \$268,527 contract for grading and surfacing near Lynndyl in Millard and Juab counties and \$164,212 for grading and surfacing, Leamington towards Lynndyl in Millard County. **Paulson Construction Co.** of Salt Lake City received a \$1,140,546 contract for the general construction of Southeast Junior High School in Salt Lake City. **Union Construction Co., Inc.**, of Murray received a \$271,000 contract for grading and surfacing 5.7 mi. of the Vernal-Utah, Wyoming State Line Route in Ashley National Forest, Daggett County. **Fire Construction Co.** of Brigham City submitted a low bid of \$223,276 for grading and surfacing 2.3 mi. of State road 84, Weber County. **Larson Construction & Engineering Co.**, Ogden, submitted a low bid of \$1,396,227 for construction of Marquardt Aircraft Corp. in Ogden.

WASHINGTON

Osberg Construction Co., Seattle, received a \$1,089,713 contract for 2.1 mi. of street construction, Fielding Street to North Street in Bellingham, Whatcom County. **Max J. Kuney Co.** of Spokane

received a \$363,284 contract for grading and surfacing 6.5 mi., Loon Lake to Grouse Creek in Stevens County. A \$250,033 contract was awarded to **Fiorito Bros.**, Seattle, for grading and surfacing 6.5 mi. of the King County military road in King County. **John E. Alexander, Inc.**, Seattle, received a \$150,581 contract for construction of undercrossing in Pierce County. A \$347,929 contract was received by **Thos. Scalzo Co.** of Seattle for 1.5 mi. of grading and surfacing, Ponders to N. P. Railway in Pierce County. **Woodworth & Co., Inc.**, Tacoma, received a \$265,292 contract for construction of one overcrossing and one undercrossing in Pierce County. **R. A. Heintz Construction Co.**, Portland, Ore., received a \$258,292 contract for 1.6 mi. of grading and surfacing, Vancouver Lake vicinity in Clark County. **S. S. Mullen, Inc.**, of Seattle received a \$219,586 contract for Squalicum Creek bridge construction in Whatcom County. A \$185,405 contract was received by **Pakar Construction Co.**, Chehalis, for 13th Street and National Avenue undercrossing, Lewis County. **Acme Construction Co.**, Redmond, received a \$142,064 contract for 3.3 mi. of grading and surfacing in King County. A \$125,936 contract was received by **Herman Kathman** of Kenmore for 1.3 mi. of grading and surfacing North Fork Bridge approaches, Skagit County road in Skagit County. **C. E. Oneal Inc.**, of Ellensburg received a \$124,389 contract for 2.7 mi. of grading and surfacing Entiat River road in Chelan County.

WYOMING

Read Construction Co. of Cheyenne received a \$488,949 contract for grading, surfacing and construction of a twin-4 continuous girder interchange structure and miscellaneous work on 4-lane divided highway on the Cheyenne Urban System in Laramie County. A \$690,745 contract was received by **Taggart Construction Co.**, Cody, for grading and surfacing 2.5 mi. of 4-lane divided highway on the Evanston-Lyman road from Bigelow Bench west in Uinta County. **Carruth & Son, Inc.**, of Evanston received a \$131,123 contract for construction of interchange structure on 4-lane highway on the Evanston-Lyman road at connection with U. S. 189 in Uinta County. **Etlin E. Peterson** of Casper received a \$324,297 contract for construction of a bridge consisting of two plate girder spans and three-continuous plate girder spans and widening a bridge over the North Platte River on the Casper Urban System in Natrona County. **Wilson Bros.** of Cheyenne received a \$341,038 contract for grading and gravel surfacing 7.3 mi. of the Laramie-Ft. Collins road in Albany County. A \$294,280 contract was received by **Lamb Construction Co.** of Lusk for grading, surfacing and construction of box underpass on 7.6 mi. of the Torrington-Nebraska State Line road in Goshen County.

100% INTERNATIONAL *chosen to highball*

To turn miles of prairie and millions of yards of Texas real estate into the Amarillo jet base takes a giant fleet of big-capacity, dirt-delivering equipment!

That's why the contractor, Terra Construction Co., of Great Bend, Kansas, chose International equipment 100% to high-ball this big base!

Texas hardpan boils into "75" Payscraper® bowls with cycle-clipping speed. Highly maneuverable TD-24 tandem pushers not only cut actual loading time, but rely on full-time, exclusive, Planet Power steering to reposition quickly to sharply reduce overall cycle time. And king-sized TD-24 power is instantly adjustable to the load with exclusive on-the-go Hi-Lo shifting!

Terra's International "75" Payscraper fleet makes fast loading count with fast get-away—and travel speeds up to 24 mph! High power-to-weight ratio, load-heaping bowl design, exclusive Hydro-Steer—all help give the Payscraper production-boosting operating ease and safety!

Investigate the advantages of powering-up with an all-International matched crawler-scraper fleet. See how International Payscrapers give you top speed, operating ease, and safety. Find out how International TD-24 Planet Power steering gives you pusher performance unmatched by conventionally-steered crawlers. See your International Construction Equipment Distributor for a demonstration!



**INTERNATIONAL®
CONSTRUCTION
EQUIPMENT**

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

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors... Self-Propelled Scrapers... Crawler and Rubber-Tired Loaders... Off-Highway Haulers... Diesel and Carbureted Engines... Motor Trucks... Farm Tractors and Equipment.



Part of the Payscraper and TD-24 crawler fleet on the 100% International-equipped Amarillo air base job. Schedule calls for moving 25,000 cu. yd. per double-shift day—placed on the fill in 3-inch lifts.

To deliver the 40,000 gallons of water per hour—required to compact the dry soil to 95% of original density—the International Distributor came to the contractor's aid and specially modified Model "75" bottom-dump wagons into 5,400-gallon tanks.



FLEET.....

Texas-Sized" jet base!



Tandem TD - 24 pushers profitably overcome the obstacle of loading heat-hardened hard-pan by reducing loading time by 44.4%!

Terra gets an 11.3% production advantage with profit-wise TD-24 tandem push-loading.

	Single TD-24 pusher	Tandem TD-24 pushers
Av. Loading Time:	1 min. 43 sec.	.57 sec.
Trips per 60 min. hr.	8.78	9.89
Av. Payload	17.3 cu. yd.	17.3 cu. yd.

ALASKA Newsletter

By CLIFFORD S. CERNICK, Anchorage

YEAR END VIEW—As the year 1957 draws to a close, a number of pertinent questions present themselves. For example: What lies ahead in the construction field in Alaska? How will defense construction hold up? What is the outlook for municipal and commercial construction? In the lull which falls each year on Alaska's construction industry, there is time to explore such questions, to get the views of the top men in the industry for the guidance of those with present or potential interest in the North. As yet, I've been able to do only preliminary research on the questions. A few facts are emerging already, however, and most of these will be included in my regular year's-end summary on Alaska. Right now, a few general observations can be made about the overall construction picture.

SCOPE FOR 1958—The scope of 1958's season still has not been fully formulated. At the Army Engineer District, for example, where the bulk of defense construction planning is done, they are still not ready to announce plans for the next season. I'm given to understand that such an announcement is now in preparation, however. I hope to include it in the January letter. What is the outlook for non-defense construction? There are several signposts, chiefly municipal building permits issued by Anchorage, the Territory's largest city. Valuation of permits issued since the first of the year is now close to \$5,000,000. The permits consist principally of commercial structures and new homes. Each year, the tempo of commercial construction grows and there's room for nothing but optimism in this regard.

HOUSING PREFERENCES—Alaskan housing preferences, of interest to the stateside builder who may plan Alaskan housing ventures, were brought out during the conference. Architect Edwin B. Crittenden reported he is being called on to design larger, more expensive homes, costing around \$30,000 and having three bedrooms and a minimum of 1,000 square feet. Realtor Bob Dow reported there is still a great market for one- and two-bedroom homes for young married couples. Greatest market, according to Dow, is in homes costing from \$18,000 to \$22,000. One of the big problems confronting builders and architects, Crittenden revealed, was that

more and more buyers want a \$30,000 house but are willing to pay only \$18,000 for it.

UNEMPLOYMENT FUND—Benefit payments issued from the Alaska unemployment compensation fund were greater by \$176,000 in October of 1957 than they were for October 1956 reflecting the heavier unemployment this winter. Merrill E. Weir, director of the Employment Security Commission, said this higher jobless pay cost was merely the continuation of a trend toward higher unemployment which started last March and continued through the summer months. In Alaska the usual seasonal declines in employment in construction and in the fishing industry added to the higher summer unemployment resulted in the higher than usual claims load for October.

COOPER LAKE—One of the big governmental projects slated for construction in Alaska in 1958 is the Cooper Lake hydroelectric job on the Kenai peninsula south of Kenai Lake. The Chugach Electric Association, a power cooperative, reports that construction will start next spring providing the Rural Electrification Administration approves a loan for the project. Clyde Ardin, CEA manager, estimated the project will cost between \$10,000,000 and \$11,000,000. While Cooper Lake is not as large as most hydroelectric projects, its importance looms large in Alaska whose economy has been threatened by drastic slashes in military expenditures.

HARD-TO-FILL JOBS—Despite heavy seasonal unemployment in Alaska, there are a number of hard-to-fill categories in which jobs are going begging. Typical of these in the Anchorage area are graduate nurses and medical technicians. In Fairbanks during October there were unfilled openings for office machine servicemen, A and E mechanics, electronics technicians and auto body repairmen. In Juneau, scarcities were noted in the classifications of stenographer, typist, draftsmen, nurses and medical technicians. There is, of course, no demand whatever for the majority of construction crafts and skills at this time of the year even though a few hopefuls each year mistakenly pick the winter season to launch a job hunt in the Territory.

EMPLOYMENT—An interesting item is contained in the latest report of Alaska employment conditions issued by the Alaska Territorial Employment Service. The report declares that "by spring it is expected that construction contracts now in progress or in the planning stage will bring construction employment to a greater number than were employed in the Anchorage area last spring." Among the factors upon which this optimistic employment forecast is based are the plans for a \$3,000,000 expansion of the Anchorage telephone system and an extensive amount of public school building activity.

AIR FORCE CONSTRUCTION—The "White Alice" budget for defense communications stations in Alaska is being boosted from \$7,000,000 in 1957 to about \$16,000,000 in 1958. In one Alaska Air Force sector—the 10th Air Division, total construction last year amounted to \$28,000,000. The figure this year, according to Air Force authorities, will probably drop to around \$12,000,000. The \$12,000,000, it was pointed out, represents money for the smaller-type projects which are let out to Alaskan contractors rather than the large projects which are usually handled through large stateside construction firms.

HOME BUILDING—Shortage of stateside lending capital is putting a crimp on Alaska home building. This view was expressed by Wiley Bucher, assistant vice president of a Portland mortgage financing firm in a speech at the governor's conference on housing and community development held in Anchorage early in November. In the absence of stateside private investors, Bucher said, the government must step in to finance Alaskan home building. The tight-money situation is causing banks to charge high interest rates and require larger down payments, Bucher pointed out in his discussion.

CONSTRUCTION NEWS NUGGETS—Large projects in the Fairbanks area completed recently included a \$320,000 coal handling facility and a \$1,680,000 water system . . . Employment in the Ketchikan area declined by 350 workers from September 1 to October 1 . . . A proposed highway from the Matanuska Valley to McGrath is receiving increasing attention from Alaska boosters. If approved, it would provide considerable employment in the construction industry and also open up a new farming area . . . The city of Bethel was recently incorporated as a city of the fourth class. It became the first city to incorporate under the new Alaska Village Act passed by the 1957 legislature. Bethel has a population of 950.

Roebling
Royal Blue
Wire Rope goes
to any length
to prove its
high strength!

Every inch of every foot of Royal Blue is stronger than any rope you've ever used on *any* job. This on-the-job tenacity helps to make it the most widely and readily accepted rope in Roebling's history. It is but one of Royal Blue qualities that makes for its long service life—on any job you choose. For full details on Roebling Royal Blue Wire Rope talk to your distributor or write to Wire Rope Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey, for your copy of "*Wire Rope Recommendations and Catalog.*"

ROEBLING



Branch Offices in Principal Cities—Subsidiary of The Colorado Fuel and Iron Corporation

SUPERVISING the jobs

Ted Willis, project engineer; **Herman Gold**, superintendent; **Robert Walker**, estimator, and **Ronald F. Mayer**, purchasing agent, are top men employed by Crown Construction Co. on erection of a junior high school in Los Angeles, Calif. A \$2,129,500 project which started in September, estimated completion time is 475 days.

* * *



RICE BROTHERS, INC., of Lodi, Calif., successful bidder on 14-mi. stretch of new alignment, grading and surfacing on U. S. Highway 6 in White Pine County, Nev., has named **Harold A. McGagin** project manager (left), and **W. C. Covington** general superintendent on the \$872,241 project. A 9-month job, work got under way in October.

Carl Jarboe, superintendent, **Robert Billings**, assistant superintendent, and **W. D. Larsen**, engineer, are key men for B. O. Larsen who on a low bid of \$975,000 received contract for construction of four 2-story concrete barracks, and another award at \$400,500 for one 2-story concrete office building at the Naval Air Station, Miramar, San Diego County, Calif. A 12-month job, work got under way in July.

* * *

C. V. Stromer is project manager on a recent award to B. C. Richter Construction Co., and **William Stromer** is superintendent on the same job which covers 14.5 mi. of grading and surfacing from south of Steels Creek to Junction U. S. 93 south of Wells in Elko County, Nev. Grade foreman is **Wayne Hall**, and master mechanic is **Herman Bonham**. Under way since September, the \$448,546 job will be completed about June 1958.

* * *

J. A. Connelly, project manager, and **T. Brennan**, superintendent, are key men for Barrett Construction Co. on erection of a 7-story reinforced concrete frame office building with basement, pent-houses and connecting bridges to existing State office building in San Francisco, Calif. Under way since September at a cost of \$3,817,000, the building is scheduled for completion in June 1959.

Raymond Burns has been named to superintend a \$1,466,898 contract for Gardner Construction Co. when work starts on grading, structures and bridge over railroad tracks and river in Pueblo, Colo.

* * *

R. B. Miles, general manager for Howard S. Wright Construction Co. and S. Birch & Sons Construction Co., has charge of a recent award to this joint venture for construction of flight engine test facility at the National Reactor Testing Station in Idaho. Other important men for the contractor on the \$6,044,690 project are **Robert Good**, project manager; **George S. Schuchart**, job engineer, and **Ernest Olstead**, office manager. Scheduled for completion the fall of 1959, preliminary work started in September.

* * *

Theo, Ron, Wendel, and Zan Aslett, co-owners of T & S Construction Co., recent awardee of a \$165,029 contract for a farm-to-market road, are all working on the project, **Theo Aslett** as foreman, and the other three as operators. The contract is for 4.9 mi. of grading and surfacing and four concrete structures on the Aberdeen Loop in Bingham County, Idaho. Under way since August, dirt is now finished and surfacing will be complete in the spring.

* * *

Eddie Erickson is superintending construction of a 180-ft. main span box girder bridge with precast concrete slab approaches over Wishkah River in Grays Harbor County, Wash. **Harry T. Johnson** is engineer. **Andy Johnson & Co.** successfully bid the job at \$168,205, started work in August, and will be finished some time in January.

* * *

Milt Stein, project engineer, and **Garland Cannon**, general superintendent for Morley Construction Co., are in charge of construction of a new junior high school plant at Tujunga, Calif. Morley won the award on a bid of \$2,897,000, started on the project in September and expects to be finished next September.

J. C. Ryan, general manager of T. M. K. Construction Co., has over-all charge of a recent award to the company for reshaping of existing roadway, including furnishing and placing of select material, and furnishing and placing of 67,000 tons of asphalt concrete paving. The location of the project is a 11.6-mi. stretch of U. S. Route 66, Holbrook-Lupton highway in Apache County, Ariz. Superintending the \$551,845 project is **N. L. Combs**, while **R. H. Maud** is job office manager, and **W. J. Flynn** is hot plant foreman. The work has been under way since July and is now in the final stage.

* * *

Wayne A. Lowdermilk is superintending a \$499,302 project for the contracting firm of Z. H. Lowdermilk, Inc. Job consists of 2.9 mi. of grading, structures and surfacing from Cortez extending south on State Highway 106 in Montezuma County, Colo. **Lloyd C. Smith** is office manager. Foremen are **Jack Gibson**, grade; **S. D. Coffee**, structures; **J. M. Ledbetter**, crusher, and **Dan Lopez**, labor. Structures and grading work is about finished, and curb and gutter, and asphalt will be complete in the spring.

* * *



GEORGE HEIM, superintendent for American Pipe and Construction Co., Portland, in the erection of PGE's new 4,000,000-gal. fuel oil storage tank described on page 40 of this issue.

Cliff Tabidisto is job superintendent on a recent award to Cotton Construction Co. for construction of a junior high school in San Diego, Calif. Assisting as foremen on this large school project are **William L. Turner**, **Ivan Jacobs**, **Harvey H. Heaton**, and **Laurence G. Holmes**. To cost \$1,366,321, the job started in September and is earmarked for completion September 1958.

* * *

Charles P. Finnerty, Jr., project manager; **Don Gavel**, superintendent, and **Dick Hellier**, general foreman, are top men for William C. Crowell, Inc., who in September started work on the \$1,769,900 construction of a high school at Azusa, Calif. Other key men on the structure, which is of tilt-up prestressed girder design, are **Louie Verrilli**, timekeeper, and **Tony Rodriquez**, labor foreman. Finnerty estimates the work will be finished in September next year.

* * *

John F. Burke, general superintendent for the San Xavier Rock & Sand Co., is in charge of a \$457,231 recent award for grading, draining, select material, aggregate base and bituminous plant-mix surfacing in the city of Tucson, Pima County, Ariz. Other key men for the contractor are **B. J. Shell**, project engineer, **W. H. Barrett**, concrete superintendent, and **DeWitt Green**, superintendent on grading and paving. Under way since September, the work will finish next April, according to **D. M. Kelly**, vice president of San Xavier.

* * *

F. A. Nichols, project manager, **R. L. Nichols**, job supervisor, **D. L. Ethridge**, job superintendent, and **Jack Brown** and **C. L. Ethridge**, foremen, comprise the top men in the construction of two concrete 2-story science buildings in Long Beach, Calif., a \$1,574,300 contract recently awarded to Harvey A. Nichols Co. Job started in October and will be finished November 1958.

* * *



FAY C. RAMSEY, superintendent on a recent highway job awarded to Hilde Construction Co. for construction of a section of Montana Highway 20.

Howard Storks as grading foreman is in charge of grading and paving the Ross Lane-Jacksonville section of the Crater Lake highway—Jacksonville road in Jackson County, Ore., a \$156,703 contract in the hands of Glen Ousley Construction Co. Other key men on the job, which started in September and will probably end June 1958, are **Ray Luscombe**, equipment foreman, and **Don Ladd**, master mechanic.

* * *

Robert Frickson, superintendent, assisted by **William Baltrusch**, foreman, is in charge of grade, gravel and oil on 3.7 mi. on the Chester-Gildford highway in Hill County, Mont. Baltrusch Construction Co., successful bidder at \$160,032, started work Sept. 24 and will finish next July.

* * *

Sam Bergstrom is superintendent on K. L. Goulter & Son's recent award covering relocation of a U. S. Forest road from Hills Creek Dam to the Packard Creek section, Middle Fork Willamette River, southeast of Oakridge, Lane County, Ore. General foremen on the \$1,509,290 project are **A. L. Samson** and **F. W. Hoskins**; shop foreman, **Earl Chandler**. **Roy C. Johnson** is office manager. This work got under way in October and will be finished about December next year.

* * *

Jess "Sully" Willis is superintending a \$1,172,599 job for Peter Kiewit Sons' Co. in Beaverhead County, Mont. Work consists of 12 mi. of grading and surfacing of the Idaho line—Dillon highway, and involves 1,150,000 cu. yd. unclassified excavation, drainage pipe, 380,000 tons gravel surfacing and 2-shot oil treatment. Job office manager is **W. D. Gebhardt**. Foremen consist of **Lyman Tippets**, **Alex J. Karst**, **Gerald L. Acton** and **Fred J. Crable**. Under way since Oct. 15, the work is scheduled for completion late fall 1958.

* * *

Russell Forgey is acting as superintendent on one of Forgey Bros. Co.'s contracts, this one covering grading, draining and miscellaneous work on 6.2 mi. of the Greybull River road in Park County, Wyo. The \$107,601 job started in September, has been working two shifts and is now about finished. Working the morning shift as foremen are **Rodney Forgey** and **Dan Carr**; in the afternoon, **Ray Forbis**. Labor foreman is **Pete Gard**, and head mechanic, **Nick Hahn**.



ARCHITECT RALPH BERGER (left) confers with **Dick Wilkinson**, project superintendent on the \$1,000,000 QFI supermarket in Buri Buri, South San Francisco, as the building nears completion. Associated Construction & Engineering Co. of San Francisco is the builder of the 35,000-sq. ft. structure.

Robert C. Lewis is superintending a job of earthwork, concrete lining and structures on the Wahluke Branch Canal, part of the Columbia Basin Project in Washington. Master mechanic is **Wade Criswell**. This contract went to George W. Lewis and Thompson Construction Co. on a low bid of \$613,028. A year-long job, work started Nov. 1.

* * *

Andrew B. Carlson is superintendent under **Cleo Walling** of the Walling Construction Co. who recently bid low at \$172,746 for grade, plant-mix, oil, and concrete bridge on the Lewistown—Forest Grove highway in Fergus County, Mont. Walling started work in September and will finish next July.

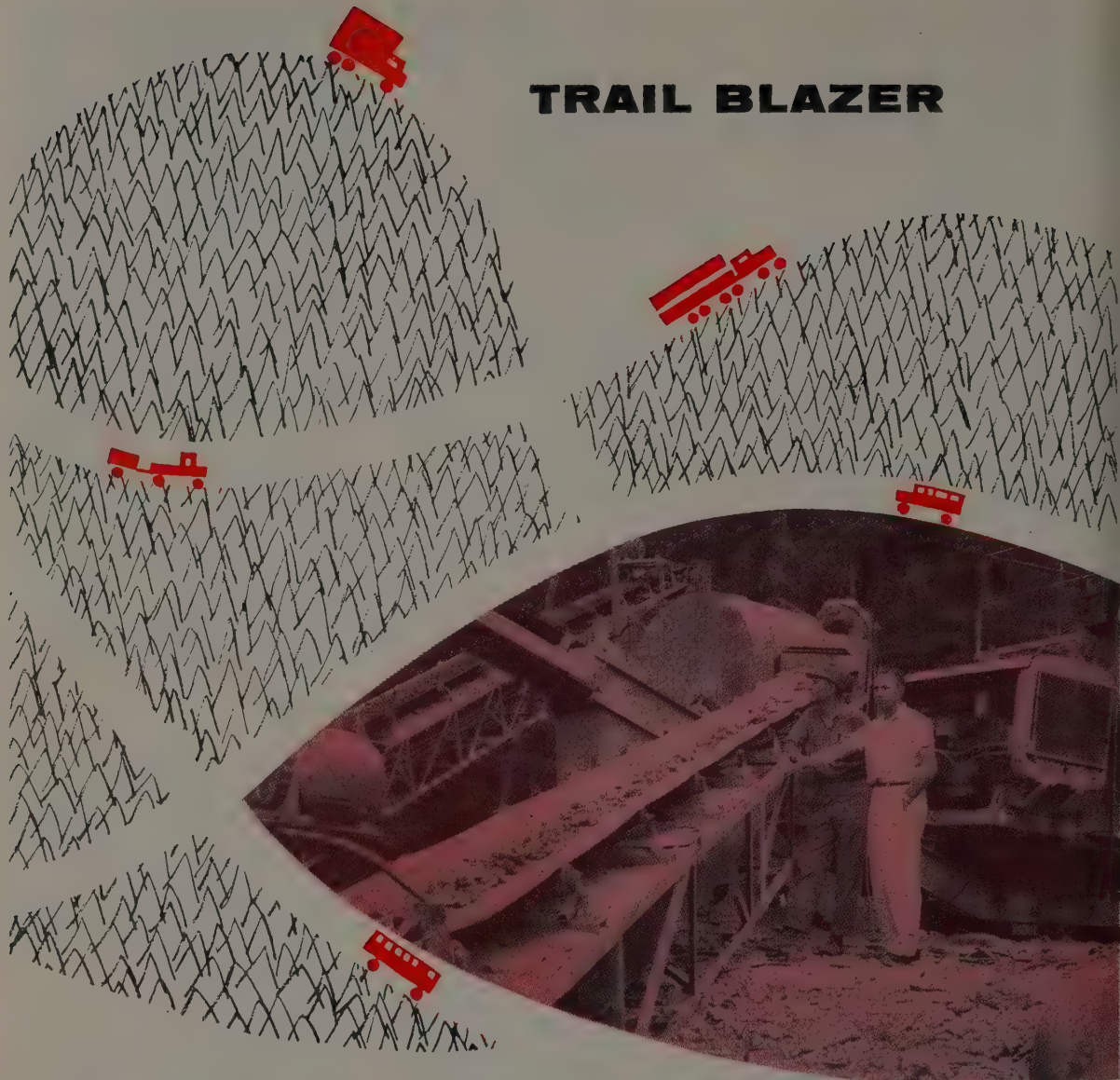
* * *

Gerald R. Smith, **C. F. Metzler**, and **K. Dreher**, project sponsor, manager, and engineer respectively, are the key men on a \$2,100,000 contract being executed by The Ralph M. Parsons Co. covering design and construction of facilities to house Materials Testing Reactor, Vallecitos Atomic Laboratory at Pleasanton, Calif. Project has been under way since June and will be finished June of next year.

* * *

Philip W. Hamilton, project manager, **Lloyd Moen**, field superintendent, and **C. W. Brubaker**, assistant superintendent, are top men on military housing erection at Cape Hart housing project, Point Mugu, Calif. Of frame and stucco construction on slab floor, Murray-Sanders Construction Co. is doing the work at a cost of \$5,200,200. Started in October, the project will reach completion about December 1958.

TRAIL BLAZER



Nester chats with Joe Webb (in checked shirt), Job Superintendent



J. Wesley Webb
— busy as usual

The rugged job of carving access roads through heavy timber country is an every day occurrence for the J. Wesley Webb Co. of Salem, Oregon. These roads are necessary for the productivity and protection of the forests.

J. Wesley Webb, head of the organization, must depend on continuous day to day performance of his heavy road building and rock crushing equipment. Every unit must operate under severe conditions from dry summer dust to heavy winter rains and mud.

Mr. Webb and his staff count on the local General Petroleum Contractor Representative to assist them in solving their fuel and lubrication problems. Because of his "know-how" and help, G.P.'s Walter Nester is just like another member of the crew.

When you are faced with a lubrication or fuel problem, take a minute and call your local General Petroleum office. You'll find your local G.P. Contractor Representative ready to pitch in and give you effective help.



GENERAL PETROLEUM CORPORATION

2-195

ENGINEERS and CONTRACTORS

dustrial construction activities on Kaiser Engineers' U. S. projects.

* * *

Lt. Col. Lemuel W. Boykin, II, (retired) after six years in Alaska has returned to his home in South Carolina. He was an inspector on big projects in the construction division in the U. S. Army Engineer District.

* * *



W. D. HUGHES (left), engineer on the Pacific Highway undercrossing at Portland now under construction by Gibbons & Reed Co. Shown with him are Edward L. Hardt (center), resident bridge engineer, and Don Callaher, assistant resident for Oregon State Highway Department. This job is described on page 50 of this issue.

Major James L. Henshaw, Portland, Ore., for the past two years a project engineer of the Portland District, Corps of Engineers, directing construction of a dike across the break in the Bayocean peninsula in Tillamook Bay, has been assigned to duty with the Corps at Cape Dyer, Baffin Island, Canada, to supervise military construction there.

* * *

Fred Fowler, highway coordinator for the City of Portland, has been appointed a member of the national highway committee of the American Municipal Association.

* * *

Holmes & Narver, Inc., has formed a separate nuclear engineering and construction division following a decade of continuous experience in this field, according to announcement from G. E. Eggert of the Los Angeles office of the firm.

* * *

A reassignment of administrative and service functions of officers and executives of Bechtel Corporation, San Francisco, has recently been put into effect, with various functions allocated to the following senior sponsors. W. E. Waste will sponsor the Refinery Division. Reporting to him will be vice presidents C. T. Draney, A. J. Orselli, F. W.

Meyer, J. F. Brady, M. Van Hoesen and W. R. Ayers. S. D. Bechtel, Jr. will sponsor the Pipeline Division, with S. M. Blair, president of Canadian Bechtel Limited, and vice presidents R. D. Grammater, R. L. Hamilton, E. J. Mahoney, Jr., and A. T. Krook reporting to him. J. W. Yates will sponsor the Power Division. Reporting to Yates will be John R. Kiely, senior vice president, as well as vice presidents John F. O'Connell, J. N. Landis and J. S. Sides. George S. Colley, Jr., will continue the sponsorship of various overseas Bechtel companies, with vice president J. W. Komes, and overseas vice presidents reporting to him.

* * *

Carl L. Junge has been named executive director of the Alaska International Rail & Highway Commission. He moves to his new position from Nebraska where he was with the Interior Department as special assistant to Assistant Secretary Roger Ernest. The AIRHC is a 13-man commission appointed by President Eisenhower to study economic and military advantages of additional highway routes and rail routes between the Pacific Northwest and Alaska.

* * *

Kaiser Engineers' W. Frank Bort has been elected a vice president of Henry J. Kaiser Co. In his new office Bort will continue to be responsible for all in-



COL. ALLEN F. CLARK, JR., successor to Brig. Gen. Louis H. Foote as Division Engineer, North Pacific Division, with headquarters in Portland, Ore. General Foote is retiring from active service and Colonel Clark is leaving his post as district engineer in Philadelphia to take over his new duties Dec. 1.

CALENDAR

- Jan. 16—Beavers Award Dinner, Biltmore Bowl, Los Angeles, Calif.
- Jan. 20-23—American Road Builders Association, annual convention, Washington, D. C.
- Jan. 26-30—Associated Equipment Distributors, annual meeting, Conrad Hilton Hotel, Chicago, Ill.
- Jan. 29-31—The Institute of Transportation and Traffic Engineering, annual California Street and Highway Conference, Los Angeles campus of the University of California.
- Feb. 10-13—The Associated General Contractors of America, national convention, Dallas, Tex.
- Feb. 26-28—American Society of Civil Engineers, annual convention, Chicago, Ill.
- March 3-5—University of Utah, annual Highway Conference, Salt Lake City, Utah.



ON THE CONNECTICUT TURNPIKE



No place for trucks you have to "baby"! Gammino's Macks are hauling close to seven million yards of rock and earth as the Connecticut Turnpike is rushed to completion. That means those mighty shovels are really moving as they drop the heavy, jarring loads of rock into the trucks beneath. It also means that Gammino's Macks are taking tremendous punishment, both from the hustling shovels and from the make-shift roadbeds over which they operate in an endless loading-dumping cycle.

"Sure, it's backbreaking work for any other truck," says Mr. Gammino. "That's why we use Macks."

No job's too tough for Gammino

because... THEY

Want the real pitch on Mack can-do?

Ask Frank Gammino of M. A. Gammino Construction Company, Providence, Rhode Island. He'll talk Macks with you all afternoon.

Ask him about the small but important jobs, where Mack economy enables him to deliver at a profit.

Ask him about the big jobs, where the power and schedule-meeting dependability of his Macks pace the entire operation.

And ask him about the really rugged jobs—the chassis-jolting rock-loading jobs... the up-to-the-hubs-in-mud jobs... the jobs where his Macks work round the clock, rushing out big-yardage loads week on end without a break or a breakdown.

Then ask him why he has still *more* Macks on order. We'll stand on that. Mack Trucks, Inc., Los Angeles, Denver, San Francisco, Seattle, Portland, Salt Lake City, Albuquerque.

YEAR AFTER YEAR IN THE U.S.A., MACK DIESEL TRUCKS OUTSELL ALL OTHERS



ON THE PROVIDENCE RIVER BRIDGE JOB

Gammino's Macks are keeping big buckets busy. Concrete, not excuses, is what this job calls for—any late deliveries mean expensive, profit-robbing delays. "With Macks on the job," says Mr. Gammino, "no one sits on his hands."

DEPEND ON MACKS

OVER-THE-ROAD HAULING OF CRUSHED STONE AND DIRT

... a wise contractor keeps a close eye on running costs—fuel, maintenance, down time, tire wear, etc. Mr. Gammino does just that, and he reports: "Nothing touches a Mack for ton-mile economy."



MACK
first name for
TRUCKS



NEW LITERATURE

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

Horizontal shoring for concrete floor forms

Describing a recently-developed method of horizontal shoring is an eight-page booklet on Spanall. The booklet gives complete descriptions of Spanall plates and lattice members, illustrates how the plate slides inside the lattice member and can be adjusted and set at the desired length. It also shows many applications of the product for various types of construction, and provides charts which show suitable spacings and members needed for a wide range of loads and spans. The two-color illustrated publication may be obtained from **Spanall of the Pacific, Inc.**, 600 California St., San Francisco 8, Calif. Ask for "Spanall, Horizontal Shoring."

Non-heeling buckets

Sloping-back construction which prevents heeling and gets a full load every time is one of the features of the Renner trench hoe dipper. In a 4-page leaflet published by **Renner Manufacturing Co.**, Box 125, Butler, Wis., diagrams and specifications are given for the cast-weld shovel dippers and cast-weld trench hoe dippers. The Renner dippers offer quick filling action and maximum speed in dumping. All buckets in this line are available with mounting brackets to suit your specifications.

IH pamphlet on 350 utility tractor

The International 350 Utility tractor is described in an 8-page mailer just released by International Harvester Co. The free pamphlet points out that the wheel-type unit can be obtained with carbureted (gasoline or LPG) or diesel engine and can be used with 75 attachments on countless applications. Some of the advantages of the new unit recounted by the booklet is unmatched power-weight balance, heavier front-end construction to withstand heavy-duty loading and dozer work, greater built-in weight, properly distributed to provide better traction for bigger loads. Request: Booklet CR-1333-G, from Construction Equipment Div., **International Harvester Co.**, 180 N. Michigan Ave., Chicago 1, Ill.

Details on sprockets

Link-Belt sprockets, with shear pin protection, are now available from stock in a new "off-the-shelf" roller chain shear pin sprocket program. This program, the first of its kind in industry,

meets the need for quick delivery under emergency conditions and facilitates normal order handling. Folder 2749, published by **Link-Belt Co.**, gives detailed information and tables listing stock sizes, torque ratings, hub dimensions, and keyseats. Examples for selection and "problem and solution" instructions are detailed. Folder 2749 is available upon reader request by writing to **Link-Belt Co.**, Dept. PR, Prudential Plaza, Chicago 1, Ill.

Gradall reference manual

Now available from Warner & Swasey is a handy pocket-sized reference manual on the Gradall. This spiral-bound manual contains drawings portraying all Gradall dimensions and specifications and a well-rounded selection of photographs of the various models at work on actual jobs. Shown are the standard truck-mounted, the crawler-mounted, the self-propelled, and the railroad model Gradall. Also included are complete descriptions of available attachments. The new manual can be obtained through any Gradall distributor or by writing to the Gradall Division of **The Warner & Swasey Co.**, 5701 Carnegie Ave., Cleveland 3, Ohio.

Automatic warmer

A data sheet and price list on their automatic drum warmer to insure easy removal of heavy or viscous materials may be had on request from the **Harold L. Palmer Co.**, 2908 W. Davison, Detroit 38, Mich. Made for 30- or 55-gal. steel drums, the warmer is ideal for overnight heating, for maintaining required temperature of contents over a period of time, and for mixing small batches at controlled temperatures. Hours are saved in bringing cold drums of paint, enamel, etc. to required temperature and consistency.

Rubber based sealing compound

An illustrated bulletin has been released by the **Presstite-Keystone Engineering Products Co.**, on Presstite No. 67, a single-component ready-mixed joint and crack sealing compound that is cold applied. The sealer has a high rubber content of a type and grade

which imparts maximum adhesion, high cohesive strength and unusual ductility to the sealant, even at low temperatures. The result is a tough, tight elastic seal that provides positive protection against water, weather and traffic. A copy of the bulletin is available on request. Write to the **Presstite-Keystone Engineering Products Co.**, Division of American-Marietta Co., 39th and Chouteau Ave., St Louis 10, Mo.

Bulletin describes power transmission equipment

A complete line of power transmission equipment is described in a 12-page color booklet issued by the **Transmission Division of Clark Equipment Co.**, Jackson, Mich. Included in the booklet are illustrations of the company's synchronized transmission series, new StepMatic transmissions, TransVerters and torque converters ranging from 11 in. to 26 in. in size. Cutaway photographs of the Model 265V transmission and the Model 17BK torque converter are included in the booklet, which also describes torque rating, speeds, weight and synchronization of all other Clark transmissions.

Wire rope and sling operations

A bulletin issued by the Public Relations Department of the **Macwhyte Co.**, 2909 14th Ave., Kenosha, Wis., illustrates and describes uses of wire rope and wire rope sling. The handling of a 10-ton machine bed, a 15,000-lb. yacht, 11½-ton steel girders, and the drilling of a 5-in. ID well and a 24-in. well are among the applications described. Ask for free bulletin "Ropeology 5781."

Tour of Exide lab and plant

A 30-page booklet which takes you on an inspection tour of the engineering research laboratories of **The Electric Storage Battery Co.** and the recently enlarged modern production facilities at the Crescentville Plant in Philadelphia, Pa., is now available. Extensive pictures of the plant's facilities and a summary of the company's contributions to industry since 1890 are part of this interesting booklet. Copies may be obtained from the **Electric Storage Battery Co.**, 42 S. 15th St., Philadelphia 2, Pa.



Four of many Caterpillar-built machines on the Great Falls Paving Project: two DW15 (Series E)-No. 428 LOWBOWL Scrapers, a D8 Tractor and a No. 12 Motor Grader. The

blocks in this area of the project are 430 feet long, and the street width 35 feet. Excavation of heavy clay soil averaged 525 cubic yards a block here.

HIGH PRODUCERS IN NARROW STREETS

New CAT* DW15 (Series E)-No. 428 LOWBOWL Scrapers set fast pace on \$4,186,721 Great Falls Paving Project

Four firms associated under the name of City Constructors were awarded the contract to handle the Great Falls Paving Project, Montana. The project involved the reconstruction of about 900 blocks. Among the new Caterpillar DW15 (Series E)-No. 428 LOWBOWL Scrapers on the job were these two units, owned by S. Birch Inc. & S. Birch & Sons Construction Co. Here you see them at work in heavy clay soil on a typical 35-foot-wide street.

The street was excavated to the depth of a foot for rebuilding. Loads were restricted to avoid damage to utilities and improved streets. Averaging 12 cubic yards a load, each unit made five trips an hour on a 3,000-yard round-trip haul through traffic.

This is just one of many jobs where the new DW15 (Series E) unit proved itself a high producer. In fact, in reports from other jobs, this point is clear: When the new DW15 is compared with competitive units of similar capacity, it leads the pack in performance. Many factors contribute to its superiority. For example, it has a high travel speed of 37.2 MPH with the stability of four wheels. Very maneuverable, it turns within a 35-foot diameter, and its stability permits short turns at high speeds. Its wide-section 26.5 x 25 tires provide maximum flotation. And the new No. 428 Scraper's LOWBOWL design means a faster loading rate clear to the end of the loading cycle.

The new DW15 (Series E) delivers 200 HP (maximum output capacity). The new No. 428 has a capacity of 13 cubic yards struck, 18 cubic yards heaped.

Your Caterpillar Dealer, who backs you with prompt service, will be glad to show you cost-of-operation figures on actual jobs. Better still, name the date—he'll demonstrate, right on your job!

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

CATERPILLAR*

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ONE GOAL: To concentrate our capabilities, resources and experience on the design, manufacture, distribution and service of job-tested heavy equipment.

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Here in one booklet is *all* the latest information on the new highway program. Find out how, where and when the money will be spent; standards for the new freeways; final routes of the Interstate System. Everything you need to know to share in the greatest construction job in history.

Dept. WC-12, Caterpillar Tractor Co.
Peoria, Ill.

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Name _____

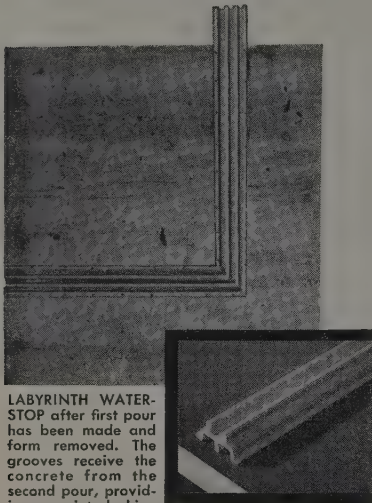
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Address _____

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Waterstop in place in seconds!



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

Just a few seconds were needed to nail this LABYRINTH WATERSTOP to the form... just a few seconds and water seepage worries were over before they could ever have a chance to start. LABYRINTH WATERSTOP forms a waterproof bond between two pours. The corrugated ribs bond firmly with the concrete.

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

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

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CONSTRUCTION BRIEFS

Navy hangars get new roofs

(See cover photo)

THE U. S. NAVY is solving a costly maintenance problem by re-roofing two huge airstrip hangars with industrial corrugated aluminum sheet.

More than 600,000 lb. of Kaiser Aluminum corrugated aluminum roofing and flashing sheet is being installed on the roof of two hangars at Moffett Field on the shores of San Francisco Bay near Palo Alto, Calif. Each hangar has a roof area of approximately 9½ ac. and enough floor area to hold 9 Navy blimps.

The project is part of a Navy program to save the wood frame structures from rot and deterioration caused by leaks in the old composition roofing and at the same time put a sturdy cover over vital aircraft maintenance and repair shops.

The material together with a new underlayer of asphaltic felt is ½ lb. per sq. ft. lighter than the old composition roof and no alteration of the existing structural framework is required.

The new roofing material is being applied by Dale Benz, Inc., of Phoenix, Ariz., under the supervision of the Navy's Bureau of Yards and Docks and Leo W. Ruth, consulting engineer and general partner of the firm of Waters, Ruth and Going, San Jose, Calif., with the technical assistance of Kaiser Aluminum & Chemical Corp. engineers.

Old composition roofing material is being removed from the hangar roof to permit replacement of rotted sections of 2 x 6 tongue and groove wood sheathing. The sheathing is then covered with 35-lb. asphalt saturated asbestos felt tacked to the sheathing with aluminum roofing nails.

All the aluminum sheets were shipped from Kaiser Aluminum's Trentwood, Wash., rolling mill 45½ in. wide in a variety of lengths between 6½ to 12 ft. The metal is .032 gage with ⅞-in. deep corrugations having 2.67-in. pitch. This sheet weighs approximately 55 lb. per 100 sq. ft.

The sheets are being laid from the bottom to the top of the hangar's 235-ft. roof arc with the corrugations running vertically and the side laps away from the prevailing wind. Length of the individual sheets up the roof line varies with the degree of curvature required by the pitch of the roof at different points. Each sheet is laid so that the

"angle point" or change in roof slope occurs at approximately the center of the sheet. Bending of the sheets to fit the curvature is accomplished by hand as they are applied and no special forming equipment or tools are required.

The metal is fastened to the deck by 2½-in. self-tapping No. 14 chrome-nickel steel screws which have hex heads integral metal washers and neoprene washers. These screws are inserted in drilled holes at the crown of every third corrugation in rows running across the roof at 4-ft. levels.

At locations where the sheet is fastened to 1 x 4 furring, 3¼-in. screws are used while 4-in. lengths are employed on 2 x 4 furring. Three-quarter inch screws are used for side laps. Side laps are 2½ corrugations while end laps are 6 to 16 in.

Crews work from specially designed scaffolds equipped with rubber tired wheels to fit the pitch of the roof. Generally the crews work in pairs at three to four staggered levels up the roof. They lay five sheets of metal side by side across the roof attaching each sheet with only one screw to hold it against the wind. The sheets are then squared and screw lines for the five-sheet section marked with chalk line. While one workman drills holes, the other follows with the torque power wrench and screws. In this manner 16 men are able to lay 400 to 450 sheets of metal during an eight-hour day.

Piercing rock with flame

ON THE ST. LAWRENCE Seaway project, blast holes are being sunk in rock with a flame process known as Jet-Piercing. Developed by Linde Co., Division of Union Carbide Corp., the new method works on the rocket principle and makes it possible to pierce rock at speeds up to ten times faster than conventional drilling methods.

United Waterways Constructors Ltd., a group of Canadian contractors, is using the process on a \$14,000,000 contract involving the removal of 3,000,000 tons of rock.

Reaching temperatures of 4,000 deg. F., the flame spits out of a rocket-type burner and disintegrates or spalls the rock in its path. This is a continuous operation. Disintegrated rock particles are thrown up out of the hole by the

Allis-Chalmers HD-6

63 belt hp
up to 15,500-lb drawbar pull
forward speeds from 1.5 to 5.5 mph
reverse to 4.1 mph
15,850-lb (approx. as illustrated)



**MORE DRAWBAR PULL ... BETTER DOZING SPEEDS
EASIER HANDLING ...**

...than anything near its size

More drawbar pull for extra output ...

up to 44 percent more drawbar pull enables the HD-6 to handle tougher jobs — bigger loads than other crawler tractors in its size.

Better dozing speeds ...

five forward speeds — including a 1.5 dozing gear as standard equipment — provide the right combination of power and speed for better dozing and higher production.

Easier handling ...

owners and operators of an HD-6 like its easy-to-reach controls, low lever pull clutches, direct electric starting and convenient rotary-valve dozer control.

Ask your Allis-Chalmers construction machinery dealer to demonstrate the HD-6 on your job. You'll agree that the HD-6 is the best tractor-dozer in its size.

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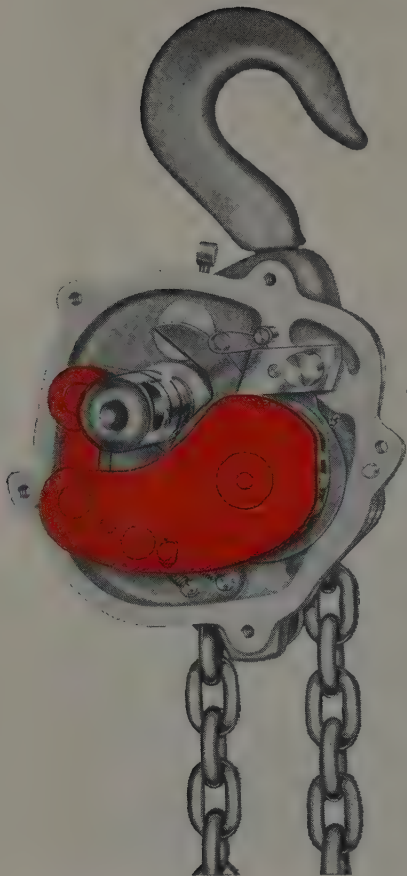
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A D Machinery Company, Inc.—Elko and Las Vegas
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OREGON
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New Compound Levers

Make Coffing Super Powers the most efficient hoists in their class

Super Power hoists are designed around a new compound leverage principle. The levers, which replace the gears of conventional designs, enable workmen to raise loads with less handle pull than other hoists of the same capacities. Since use of the levers also reduces hoist size and weight, the workmen have 20% less weight to carry to the job.

Available in 1½ and 3 ton capacities in aluminum, and 1½ to 5 tons in malleable iron, Super Powers require little maintenance, since moving parts have sealed-in lubrication. Overload testing, "Safety Valve" handles, and constant load-locking ratchet and pawl assure safe operation. For complete details on these hoists, consult your Coffing distributor, or write to us for Bulletin L-3.

BRANCH OFFICE: 1016 Howard Street, San Francisco, Calif.



Coffing Hoist

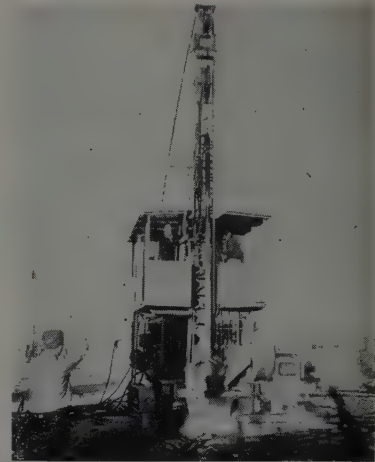
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Ratchet Jacks, Screw Jacks, Hydraulic Jacks, Special Worm Gear Jacks,
Ratchet Hoists, Electric Hoists, Load Binders, Spur Gear Hoists

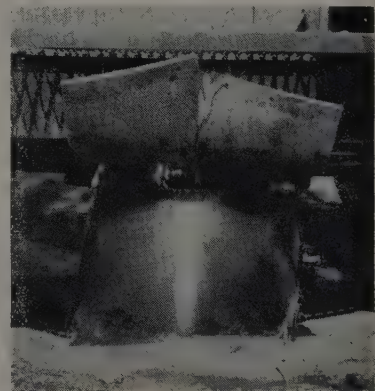
combined force of burning gases and steam so that a fresh surface is continually exposed to the jet flame. The only limitation to penetration depth is the length of the hoses (carrying fuel, oxygen, and water) that are lowered into the hole. Deepest penetration obtained to date is 160 ft.

Low viscosity fuel oil or a liquid hydrocarbon fuel such as kerosene is combined with high-purity oxygen to produce the intensely hot Jet-Piercing flame. A blowpipe suspended from a crawler



carrier controls flame combustion and action. Bucyrus-Erie Co. cooperated with Linde in the development of this rig, which is actually a modified churn drill.

Linde has found that the process works fastest on the class of spallable rocks which normal drilling methods



find toughest—especially those containing silica—such as granite, syenite, quartzite, sandstone and magnetic taconite. Potsdam sandstone, the rock being pierced on the St. Lawrence Seaway, is a highly abrasive material that would normally cause excessive bit wear. In the past it has taken as long as a week to drill a 100-ft. hole in this very hard rock using churn drills. But with Jet-Piercing, a 100-ft. hole can be sunk in a single shift.

NEW EQUIPMENT

For your convenience in obtaining more information quickly, the manufacturer's address is provided with each review.

Finisher goes to 4,000 ft. of 24-ft. pavement a day

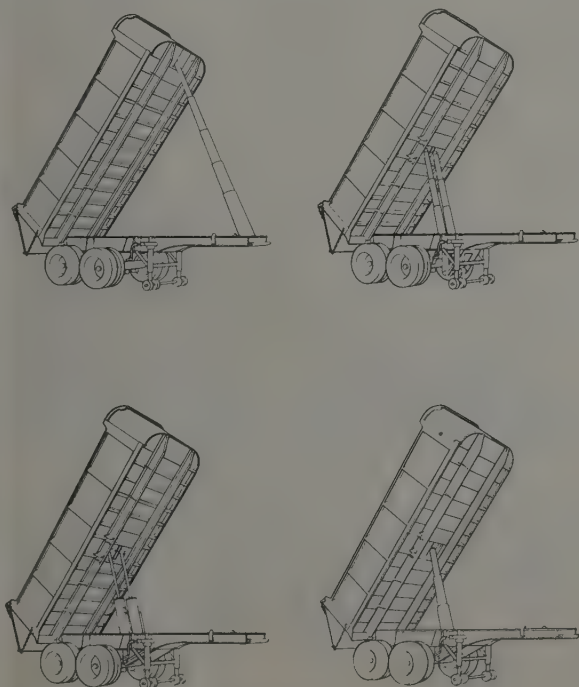
The Flex-Plane Combination Finisher, using two or three hand finishers, can finish up to 4,000 lin. ft. of 24-ft. pavement a day. Basically the finisher consists of two Detroit special



finishing machines engineered into a single unit. It combines the operations of a transverse finisher and a longitudinal straight edge. Both screed and float are equipped with quick crown change devices. Where desirable, the front unit of the machine can be used individually as a standard transverse finisher by simply locking the bogies. The combination is available in 12- to 20-ft. or 20- to 25-ft. working widths. Hydraulically controlled, pneumatic tired transportation rigs are optional. Write to the **Flexible Road Joint Machine Co.**, 1750 Thomas Rd., Warren, Ohio.

New line of dump trailers

Trailmobile Inc., 901 Gilman St., Berkeley 10, Calif., has announced a new line of dump trailers. The new line makes available a wide variety of body capacities that range up to 25 tons. Body heights will range from 12 to 72 in., lengths from 14 to 24 ft. Special body options will be offered, such



as standard or heavy duty hardware, square 18-in. radius corners, or 58-in. semi-round front construction. A complete selection of piston or telescopic lifting mechanisms will be available in the new Trailmobile line. Hoist arrangements, shown in illustration, include front mount telescopic, twin telescopic underbody, single telescopic underbody and twin piston underbody. To satisfy exact hauling needs, either the reinforced channel HD chassis or the rugged I-Beam ID chassis can be specified. HD main rails are 15 in. deep, die formed from 5/16-in. high-tensile steel to provide rigid support for normal use with single axle tractors. In the ID chassis, 16-in. deep, high-tensile I-Beams with 7-in. flanges provide the extra strong support required for double tandem applications.

Hydraulic backhoe attaches in 30 sec.

A hydraulic backhoe with features of quick attachment and detachment has been announced by the **Snap-On-Digger Co.**, 1115 West Fourth St., Winona, Minn. Called the Snap-On-Digger and engineered to fit standard make tractors, the



all-hydraulic unit attaches or detaches in 30 sec. One release lever and a single break-away coupled hose are the only manipulation required to detach, leaving the unit standing on a tripod of the backhoe and the two hydraulic stabilizers. This frees the tractor for other equipment. Another feature is attachment or detachment of backhoe or shovel bucket in less than 1 min. without the use of any hand tools. The unit has more than 12 ft. of digging depth, almost 9-ft. loading clearance, and a continuous swing of 190 deg. by means of an easily controlled heavy-duty hydraulic system.

Monarch heavy-duty benders

The new heavy-duty benders for the construction industry have been introduced by **Monarch Forge & Machine Works, Inc.**, 2130 N.W. York St., Portland, Ore. The Monarch Model 25 Heavy Duty Square Bender is a simplified, flush-table type. Design simplicity promotes easier operation and accounts for reduced maintenance. Faster set-up is afforded, speeding the work volume. Model 25 will make bends in reinforcing steel up to 2½ in. in diameter. It is operated by a 20-hp. motor,

**For More
"DIG"**

**ERIE 2-LINE
CLAMSHELL BUCKETS**

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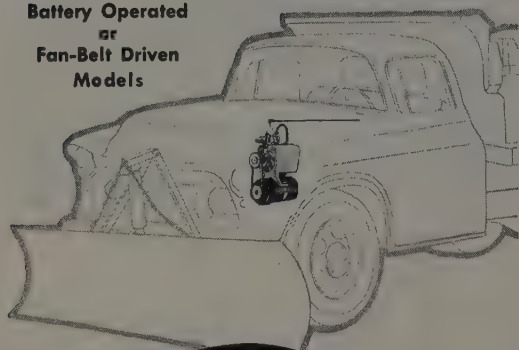
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Lift Snow Plows . . . automatically!

Battery Operated
or
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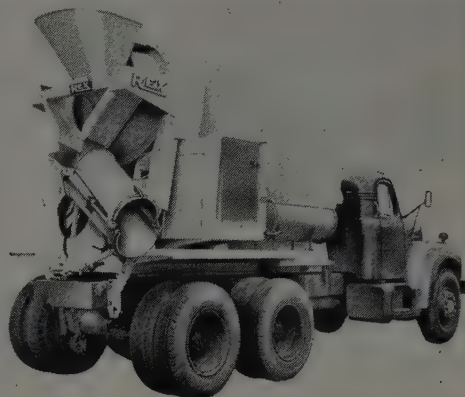
Lift or lower your snow plow automatically . . . with Monarch Power Hydraulic Controls. One man operates the plow right from the truck or jeep cab. Snow removal is faster, easier and more efficient. See your dealer or write for full details.

MONARCH ROAD MACHINERY COMPANY
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weighs 7,400 lb., and takes up a space of 6 ft. x 6 ft. 6 in. The table is 30 in. high. Model S Stirrup Bender will make any kind of bend, except radial bends, in reinforcing steel of any size up to No. 9 bar—about 1½ in. in diameter. Power is provided by a 5-hp., 1,200-rpm. electric motor that drives through a gear reducer. It stands 30 in. high and measures 36 x 52 in.

New Rex truck mixers

High-speed cycle, along with achievements in design and operational simplicity, are offered by the new Rex Adjustable Moto-Mixers, now in production by Chain Belt Co., Milwaukee 1, Wis. There is new single-lever operation with a new design instrument panel having all controls clustered



close before the operator. This new arrangement increases efficiency of the operator by saving waste motions and awkward movements. The charging-mixing-discharge cycle of these new models is made faster by many improved features. The hopper opening is larger and steeper sloped. Drum rpm. has been greatly increased and a new fast shrink blade is located in the drum head. For the mixing operation, a faster, more efficient action is achieved by the Rex Low-Incline Drum, just 12½ deg. This low angle, with new drum blading design, results in material tumbling freely within itself, with more free mixing space above the batch for faster, more consistent mixing. Complete information on the new machines may be obtained by writing to the company.

Hobbs trailers redesigned

Production of a line of pull and semi-trailers, completely redesigned, has been announced by the Hobbs Trailer Co., 609 N. Main, Fort Worth, Tex. In the past, this manufacturer



built pull trailers for special orders only. Now, pull trailers will be regular production models. The new unit is a sturdy, lighter weight and can be put to a variety of hauling chores. The semi-trailer models are built to mount on a truck fifth



They beat the schedule and reduced the cost —



thanks to
STANG
WELLPOINTS

"Build seven bridge piers, base them 18½ feet below a wet, sandy riverbed, at an elevation of 3500 feet... and do it in a hurry!" Such was the order confronting contractor Gordon H. Ball during construction of a new section of U. S. Highway 66 near Victorville, California, for the State of California.

Aware of the difficulties involved with a project of this type, general superintendent W. W. Haapala and job superintendent Joe Farrell immediately called on the John W. Stang Corporation.

Acting promptly upon the STANG recommendation, a system of STANG wellpoints was engineered and installed. At an elevation of 3500 feet, the single-stage STANG system achieved a drawdown of 18½ feet and completely dewatered the area to be excavated. *This speedy dewatering, done at a much lower cost than by other methods, allowed project completion ahead of schedule and at a profit!*

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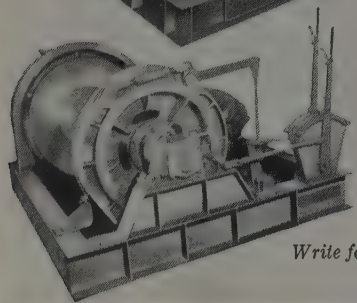
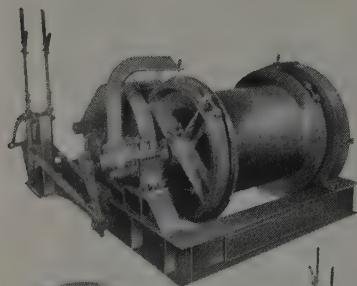
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THE PATENT SCAFFOLDING CO., Inc.

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420 Eighth Avenue N., Seattle, Washington. Phone: Seneca 7142

Standard Builders Supply Co. 2627 S. Second West St., Salt Lake City, Utah
Allied Industries, Inc. 1028 East First St., Spokane, Wash.
Columbia Concrete Pipe Co. Foot of Ninth St., Wenatchee, Wash.
James A. C. Tait Co. 316 S.E. Madison St., Portland, Ore.
Evergreen-Stone Co. 3323 Tacoma Way, Tacoma, Wash.

wheel or to be mounted on a converter dolly and used as a pull trailer. The standard pull trailer model is equipped with a cone type fifth wheel that allows the front wheels a full 27-deg. turning radius. The fifth wheel connection turns on ball bearings. The pintle hook, on the rear of the first trailer or the truck, features a shock absorbing grip arm. It operates off a compressed air chamber to hold the lunette eye firmly in place while the connected trailers are in motion. In the under-construction, all cross members on both models are gusset welded to the centerbeams for additional strength, and are spaced for proper transfer of weight of the payload throughout the frame of the trailer. Both semi and pull trailers are available in 20-, 22- and 24-ft. lengths, and slatted or solid sideboards are available with either model.

Noble plant batches 7 yd. in 150 sec.

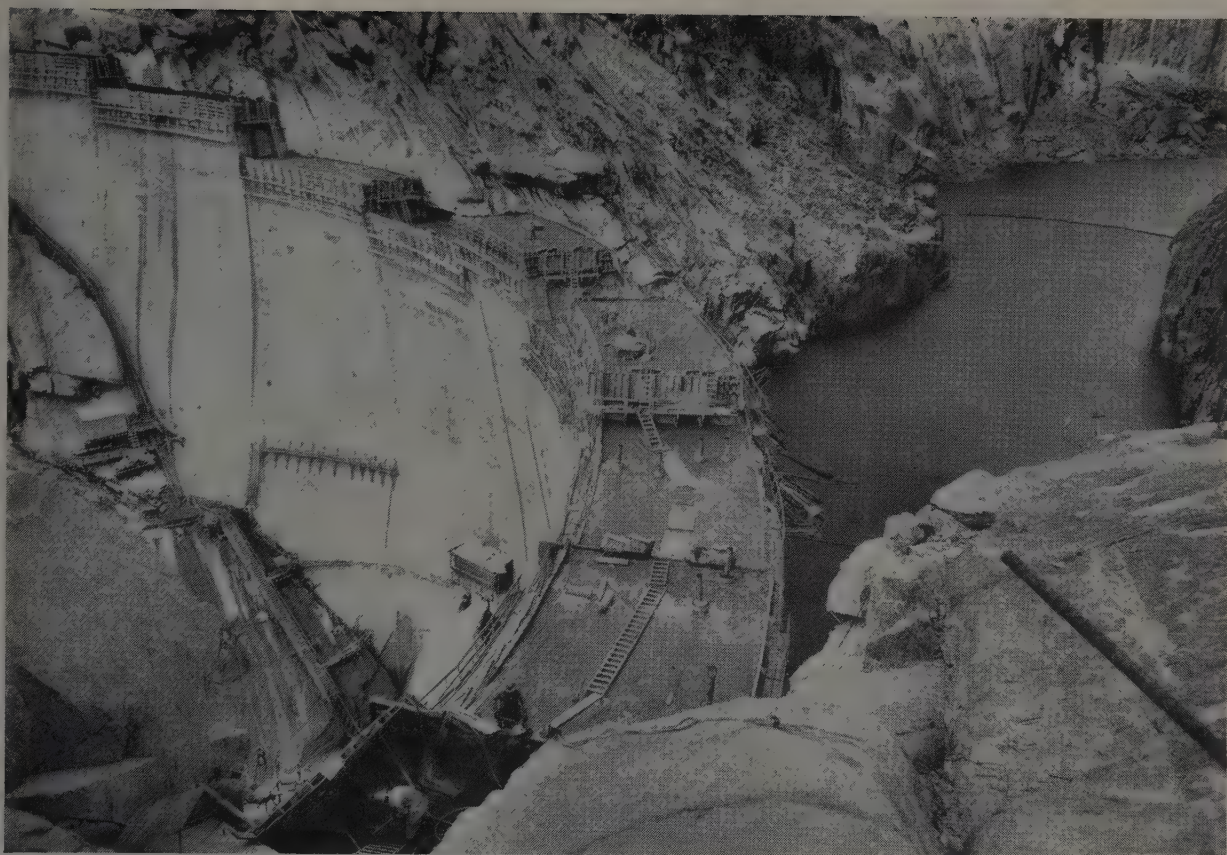
Cement and aggregates are batched at the same time in this latest version of the Noble 240-ton batching plant. Through a system of multiple scales, the batching cycle is completed faster. The plant can deliver 7-yd. batches every



150 sec. Smaller batches down to 2 yd. are delivered in correspondingly shorter periods. Operation is automatic or semi-automatic. Factory assembled center section complete with all batching components and controls is now housed in a rigid "A" frame providing easy accessibility for operator. The distance between supporting columns has been increased to allow even greater clearance for trucks. 240-ton aggregate bins are available in from 2 to 6 compartments. The plant is designed to accommodate 2 tilting type mixers. Cement storage from 1,200 cu. ft. to 2,500 cu. ft. Manufactured by The Noble Co., 1860 Seventh St., Oakland 20, Calif.

Kenworth rear-dump semi has 228,000 lb. gross vehicle rating

The Kenworth extra large 803-B rear-dump semi is now in production. It has a rated payload capacity of 64 tons or 40 cu. yd. struck and a gross vehicle weight rating of 228,000 lb. Powered by a single 12-cylinder diesel engine, it will be offered with either the 400- or the 600-hp. version of this engine. The 803-B tractor has front and rear axles of Carco metal, a special high-strength cast steel. Front axle capacity is 50,000 lb. and rear axle capacity is 100,000 lb. Measuring 41 ft. 11 in. from the front of the bumper to the rear of the single axle semi-trailer, the 803-B has a turning radius of only



DONNELLS DAM, located 40 miles above Sonora, California, rises 484 ft. from its granite bedrock foundation. Blaw-Knox Steel Forms were used extensively in forming the 317 ft. high concrete arch which tapers in thickness from 41 ft. at its base to 10 ft. at its crest.

Special Blaw-Knox Forms shaped for Arch Dam Contours *... can be re-used again on flat surfaces*

Blaw-Knox forms engineers designed a special jack screw to curve, twist and warp steel forms to fit both the concave and convex contours of Donnell's Arch Dam in California. And, these same forms can be re-used again for flat surface forming.

Other special features allowed the same set of forms to be used over and over again on all parts of the dam. This meant big savings in on-the-job construction and engineering costs. Setting and stripping of the forms was made faster on the adjusting screw system.

Donnell's is part of the huge Tri-Dam project

which will supply water and electric power to a large part of Northern California. The project is a joint effort of Tri-Dam Constructors headed by Morrison-Knudsen Company, Inc., and includes Macco Corporation, Peter Kiewit Sons' Company and Stolte, Incorporated.

If you are engaged in heavy concrete construction, such as Dams, Tunnels or Bridges, call in the Blaw-Knox Forms Engineers early in your planning. You will get the benefit of their unmatched experience in this field to help you form faster, cut labor and material costs.

BLAW-KNOX

BLAW-KNOX COMPANY

Blaw-Knox Equipment Division

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37 ft. with a turning angle of 30 deg. The tractor wheelbase is 168 in. The double-core radiator has an area of 2,100 sq. in. or 2,800 sq. in., depending on the engine specified. The 18:00 x 33 tires used on all axles are approximately 6 ft. in diameter. Complete information may be had by writing to Kenworth Motor Truck Co., 8801 E. Marginal Way, Seattle, Wash.

Cement silo is water-tight and rugged

Savings in the handling costs of dry cement are offered by the pneumatic-unloading Forster bulk cement silo and trailer,

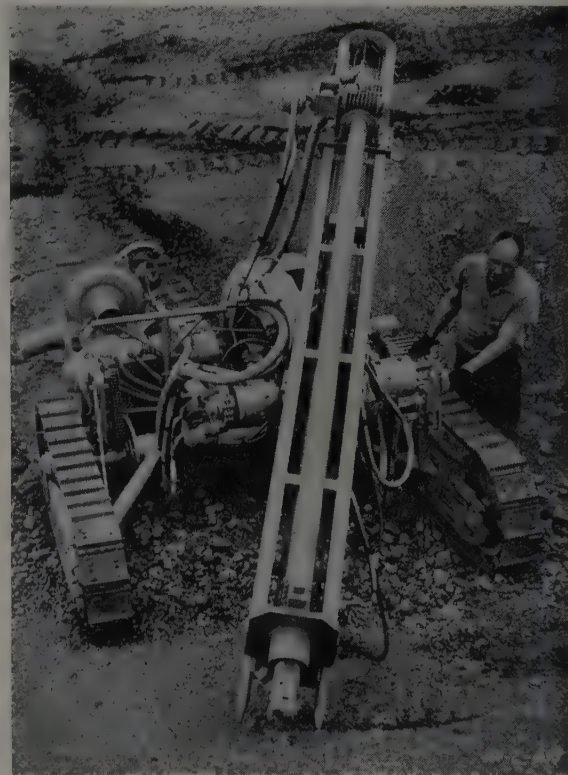
made by the Forster Manufacturing Co. of Ada, Oklahoma. Available in a standard unit, or custom-made to requirements, the new unit aims at eliminating unloading delays,



with positive and efficient pneumatic or conveyor-combination unloading. Featuring low clearance, and even load distribution, the big, 100-barrel-capacity silo is permanently water-tight, and the entire unit is built to withstand rugged road conditions.

Rock drill combines rotary and hammering actions

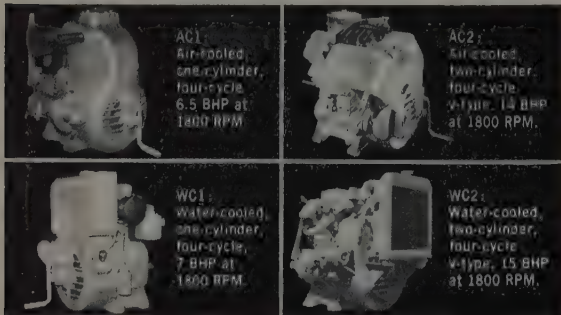
Drilling 4-in. diameter holes in hard rock is a job that the 150 Blast Hole Driller, built by Reich Bros. Mfg. Co., Inc., 1400 Ash St., Terre Haute, Ind. handles with ease. The machine is capable of drilling holes as high up as 7 ft., or as



close as 9 in. to the ground. Horizontally, the 150 can swing in an arc of 150 deg.; it handles the same range in a vertical arc. All controls are in a single location for either driving or drilling operations. Fast drilling results from the efficient combination of rotary drilling plus a continuous hammering action on the end of the drill. Supporting the drill at the drive end is a standard, hollow shaft Cone-Drive speed reducer, which also drives the drill from a hydraulic motor. The small 3-in. center distance reducer has a ratio of 15:1 to give the drill a speed of 60 rpm.

THE BIG 4 IN DIESEL POWER

AMERICAN MARC Inc. dominates the field of lightweight, low-horsepower Diesels by building its diversified line from the "Big Four" basic models illustrated here. Purchase and maintenance of engines and parts are simplified by the use of these compact and rugged prime movers.



AC1:
Air-cooled,
one-cylinder,
four-cycle,
6.5 BHP at
1800 RPM

AC2:
Air-cooled,
two-cylinder,
four-cycle,
V-type, 15 BHP
at 1800 RPM.

WC1:
Water-cooled,
one-cylinder,
four-cycle,
7 BHP at
1800 RPM.

WC2:
Water-cooled,
two-cylinder,
four-cycle,
V-type, 15 BHP
at 1800 RPM.

AMERICAN MARC also manufactures Diesel generating plants from 3 to 10 KW (AC or DC, and industrial three-phase), Diesel pumping units from 48 to 1700 GPM, marine propulsion, refrigeration units and power-packages for other services. American MARC can adapt any of its Big 4 engines to fit every job requiring from 5 to 20 BHP.

INQUIRIES ARE INVITED FROM DISTRIBUTORS AND DEALERS

AMERICAN MARC INC.
DIESEL ENGINES

1601 West Florence Ave.
Telephone OR 8-7174



Dept. WC-127
Ingleswood, Calif.

AMERICA'S LARGEST MANUFACTURER OF AIR-COOLED DIESELS

How prompt payments will help cut highway costs

When a contractor bids the big jobs coming up on the Interstate Highway program, he must take into consideration the cost of financing. This is true whether he has ample capital or whether he must borrow funds to finance his expenses. He must include in his bid present high interest rates on all his costs caused by deferred work payments. He must allow for this interest burden for all the months until completed work and authorized payments can catch up with his accumulated job costs. Not only does his problem of financing include the actual cost of producing the unit-pay items, but it also includes:

- Cost of pre-survey of job site, study of blue prints, job planning, estimating, and bidding.
- Cost of his performance bond, and all his job insurance policies.
- Cost of staffing for the job ahead.
- Cost of special equipment needed to fit job requirements.
- Cost of modernizing his equipment fleet to obtain lowest cost of work in place.
- Move-in costs including offices, shops and housing.
- Cost of job-supply inventory . . . repair parts, fuel, oil, tires, as well as stockpiles of aggregates, cement, steel, etc.

- Initial make-ready work on haul roads, drainage, etc., prior to start of paid production.
- Financing cost of payroll and job supplies, not only prior to initial payments, but until current payments accumulate enough surplus to repay the initial job investment.

In many states, "hold-back" provisions intended to protect the government investment in contract payments have been built up and added to over the early years when we had smaller jobs and contractors with limited capital and small investment in equipment. The theory was to make "assurance doubly sure". As our jobs became larger, more highly mechanized, and required a tremendous increase in a contractor's initial expense and financial responsibility, these well intentioned, multiple safeguards have, in many states, been retained at an added cost in bid prices far beyond their need or worth to the contracting agency.

If every road-building department will give this problem careful study and consideration, we believe equitable and more liberal safe payment arrangements can be more widely applied. This will encourage more competitive bidding, lower costs, and faster completion of the gigantic road-building program ahead of us.

The contractor is "worthy of his hire" . . . his money, too, is worthy of its wage.

1726-G-1

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

Redesigned pump easy to service

A line of redesigned non-clog sump pumps is now available for drainage, sewage disposal, underpass service, and industrial service. C. H. Wheeler Manufacturing Co. makes the new pumps in 3-in. and 4-in. sizes. Capacities range from 20 gal. to 1,100 gal. per min. Heads go as high as 160 ft. Principal gain from the new design is less maintenance and easier servicing. The latter is achieved by a split motor stand, allowing access to motor, pump shaft and bearings. After removing only four bolts, motor can be lifted off the pump without disturbing piping. Self-lubricated bearings are used to eliminate

lubrication problems. Both the double sealed ball thrust bearings above the floor plate and the intermediate sleeve bearings used on the shaft when the sump depth exceeds 4½ ft. will operate for the lifetime of the pump without outside lubrication. The sleeve bearing is in a registered housing to assure perfect alignment. Information on these pumps—Type EUN—can be obtained from the Economy Pump Division, C. H. Wheeler Manufacturing Co., 19th and Lehigh Ave., Philadelphia, Pa.

77-lb. trowel has big trowel features

The latest addition to the Master power trowel line is the 29-in. power

trowel. The design and weight distribution of the trowel give it greater stability than similar or smaller trowels. A handy push-pull lever on the handle adjusts the troweling angle of all three blades while the trowel is running thereby saving the operator work. The trottle lever on the handle keeps full control in the operator's hands at all times and a "dead man" control idles trowel if operator lets go of the handle. Like all other trowels in the line, the 29-in. features an automatic clutch to make sure the engine is at operating speed before the hi-quality steel blades are engaged. The new trowel weighs only 77 lb. It uses a 2.25-hp. Briggs & Stratton engine. For complete information and free data sheet write **Master Vibrator Co.**, 462 Stanley Ave. Dayton 1, Ohio.

CAN YOU REPLACE A TRACTOR ROLLER FOR \$7.00?

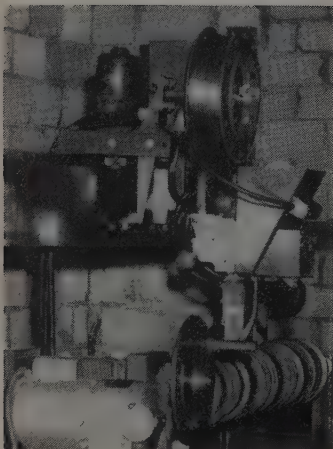


No? Well, for \$7.00, on an average, you can rebuild a tractor roller—by hardsurfacing with a Lincolnweld Automatic Submerged Arc Welder. And it will outlast original equipment!

Lincolnweld deposits a special alloy surface which will stand hard wear for a long time. This deposited surface is so smooth that no machining is required.

If maintenance of earth moving equipment is your problem it will pay you to investigate the advantages of Lincolnweld Automatic Submerged Arc Welding.

CONTRACTORS! Write for Bulletin SB-1355 giving detailed information about Lincolnweld Automatic Welders.



THE LINCOLN ELECTRIC COMPANY

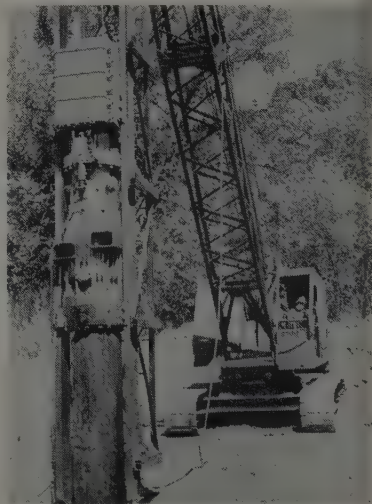
Dept. 4319

Cleveland 17, Ohio

The World's Largest Manufacturer of Arc Welding Equipment

Diesel pile hammer added to Link-Belt line

Link-Belt Speeder Corp., subsidiary of Link-Belt Co., has introduced a diesel pile hammer to its line of shovel-crane. The hammer is easily transportable, is completely self-contained, needs no auxiliary equipment, and is one-man controlled. It eliminates the need for compressors, boilers, high-pressure hose, fresh water supply and other auxiliary equipment required for conventional air or steam hammers. The



use of the new diesel pile hammer can transform any power crane economically into a pile driver. A single cable to hoist the hammer into the leads in which it operates, is all that is necessary to position it and to start its operation. The pile hammer is a self-contained, free-piston, compression ignition machine operating on the two-cycle principle. Energy is delivered to the pile head, through the anvil, in three stages—preload, impact and explosive force. The new line includes three models which can be used on any make of power crane. One (Model 105) delivers up to 7,500 ft. lb. per blow and strikes 90 to 98 blows per min. Another (Model

**"TOUGHEST, MOST
FLEXIBLE HOSE WE'VE
EVER USED!"**



THUNDERBIRD WIRE BRAID AIR HOSE

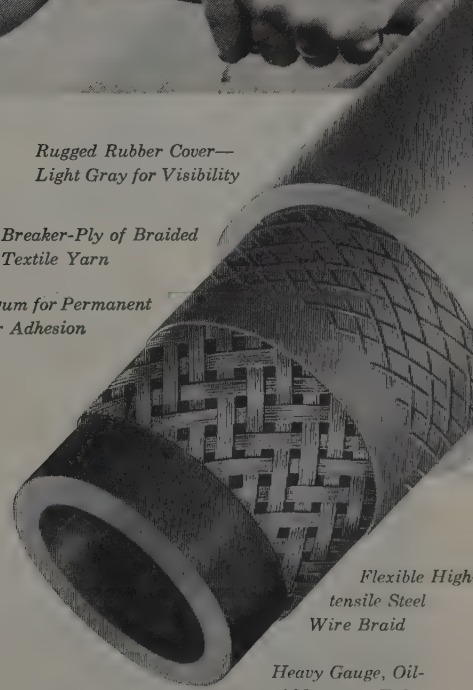
Put this super-tough, flexible hose to work on your most severe heavy duty job. Thunderbird's heavy gauge Neoprene tube resists abuse from hot or cold oil—won't flake or swell. High tensile steel wire braid prevents bursting from outside impact, stands many times the maximum working pressure from within. Light gray cover resists abrasion and wear . . . and is easy to see.

Available in sizes from $\frac{3}{8}$ " to 4". Working pressures up to 400 psi air, or 2,000 psi water. Get the facts now from your Thermoid Distributor, or write direct.

*Rugged Rubber Cover—
Light Gray for Visibility*

*Breaker-Ply of Braided
Textile Yarn*

*Tie-gum for Permanent
Cover Adhesion*



*Flexible High
tensile Steel
Wire Braid*

*Heavy Gauge, Oil-
proof Neoprene Tube*

Thermoid

Thermoid Company
Trenton, N. J. • Nephi, Utah

312) delivers up to 18,000 ft. lb. per blow at from 100 to 105 blows per min. The largest (Model 520) exerts up to 30,000 ft. lb. per blow 80 to 84 times per min. The three range in length from 10½ in. to 13½ ft. and weigh from 3,600 to 12,500 lb. The prices of the diesel pile hammers range from \$8,250 to \$16,500. Details are available in a new catalog No. 2582 which may be obtained from **Link-Belt Speeder Corp.**, Cedar Rapids, Iowa, or the company's distributors.

Continuous portable power

A heavy duty electric generator for use with trucks and tractors to provide 115-volt single phase a. c. power has been developed by **Electric Controls, Inc.**, Wales, Wis. Designed for both continuous portable auxiliary power and emergency power during service failures, the Electrol GenerAC will operate motors up to 2 hp. The unit is driven by an electric clutch which provides trouble-free belt drive. It is mounted on a bracket that is attached to the engine and connected by belt to the engine crankshaft pulley. It contains only two moving parts, the rotating field and the clutch. The control panel is installed below the instrument panel of the truck or tractor. Load may be applied at the operator's

discretion. The unit pictured provides 3,500 heavy duty watts of 60-cycle 115/230 volts single phase electric power. The generator operates only when the control switch is turned on, engaging the clutch. When electricity is needed, operator turns on the switch and sets the engine throttle so that the control meter registers at the operation line. The unit sells for \$325.00.

Sweeper used with any front-end loader

An end-loader sweeper, Model EL-C, which can be mounted on the front of any tractor end loader, has been developed by **Little Giant Products, Inc.**, 1530-50 N.E. Adams St., Peoria, Ill. (Specifications sheet avail-



able.) The EL-C has a left hand drive permitting sweeping in gutters and near the curb. The arms of the end-loader can be raised while the brush is rotating. Speed rotation of the brush is constant and entirely independent of the prime

mover. The sweeper is available in brush lengths of 6 or 7 ft. filled with either palmyra fiber or spring steel. The brush can be turned end for end to give even wear. Equipped with an independent engine the sweeper uses either a Wisconsin 7-hp. AEN or a Wisconsin 14-hp. TH. A front deflector for windrow sweeping and a sprinkling system and water tank (to keep dust at a minimum) are available as optional equipment.

Agricat Loader has hydraulic bucket tilt

A new, improved Agricat Loader equipped with a hydraulically operated bucket tilt mechanism has been developed by Joost Manufacturing Co. Designated the Model F Long Track Hydraulic Agricat Loader, the new machine may be quickly converted from a loader into an efficient light earthmover simply by replacing the bucket with a blade attachment. The change-over takes less than 10 min. For loading operations, the new hydraulic bucket tilt mechanism permits fully controllable spillage, and may be used for breaking and loosening hard-packed soil after the bucket ripper teeth have penetrated. The Model F Agricat Loader is equipped with a bucket of steel welded construction with high carbon cutter bar



Maximum SAFETY plus SAVINGS

1. Matched set of angular contact bearings.
2. Practically friction free.
3. Seal keeps grease in, foreign matter out.
4. Faster hoisting due to non-spinning loads.
5. Faster load placement due to easy load turning.
6. Faster rigging due to elimination of cranky wire rope performance.
7. Elimination of twists and kinks means longer wire rope life.
8. Safer load placements due to non-spinning loads.

21 standard types available from
½ ton to 250 ton working load



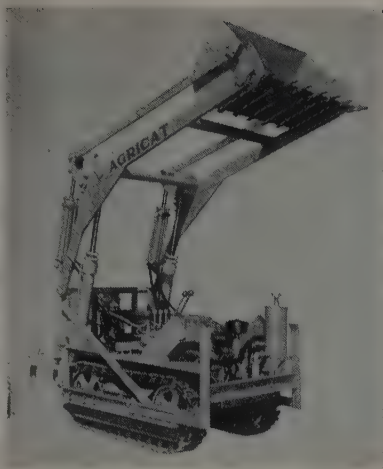
MILLER HIGH LIFT BLOCK

Welded Construction, Large Diameter Pin; Shortest Headroom, Moveable Swivel Hook, Individual Sheave Lubrication; Bronze spacers between Sheaves. Available with MILLER SWIVEL HOOK or TIMKEN BEARING HOOK. 5-50 Ton Capacity.



GENERAL MACHINE & WELDING WORKS, INC.

1100 East Second St., Pomona, Calif.



and ripper teeth. It is powered by a Vickers vane type 1,000-psi. pump for operating both the hydraulic lift and bucket tilt mechanism. It can load to a maximum height of 87 in. from a depth of 5 in. below track level, and easily loads a 2-yd. dump truck in 10 min. Hydraulic draw bar and scarifier are optional equipment. Free descriptive literature and complete information is available upon request from **Joost Manufacturing Co.**, 742 Bancroft Way, Berkeley 10, Calif.

Rex road form line expanded

The Rex Road Form line has been expanded by Chain Belt Company's General Road Machines Division. Offered are both single and double-wedge types. These have specially designed



standard slide locks which make them fully interchangeable. Construction of the one-piece slide lock is extremely simple for lasting ease of engaging operation. Formed of heavy 1/4-in. alloy steel plate, the slide locks have top and bottom rolled design which gives the strength of channel section. The double-wedge stake pocket forms have a rugged box-design stake pocket. Slotted stake holes with two wedge keys give automatic alignment, a time-saving setup feature. A fully illustrated bulletin is available from **Chain Belt Co.**, 4701 W. Greenfield Ave., Milwaukee 1, Wis. Ask for Bulletin No. 57-165.

Form coating re-usable

Formgard, a new type of coating for concrete forms, has been announced by **Industrial Synthetics Corp.**, 2000 West Walnut St., Chicago, Ill. The new coating is a departure from the former theory of coating forms with viscous oil. The improved compound, which has the viscosity of water, penetrates deeply into the pores of the wood and surrounds the fibres, coating them and drying to a hard finish. Drying is accomplished in minutes and a hard, though non-brittle coat is formed that is impervious to water, oil, or the chemical action of wet concrete. Because of the complete saturation, the coating does not come off on the wet concrete and recoating is unnecessary until the form has been used many times. Price is \$65 per drum, FOB Chicago plant.

Increased hp. in McCulloch saws

Two chain saws with high power-to-weight ratio have been introduced by **McCulloch Motors Corp.**, 6101 W. Century Blvd., Los Angeles 45, Calif. In addition, they feature improved cool-



ing, longer life, and easier maintenance. The Super 44, which produces 6.5 hp., weighs only 19 lb. Its gear-driven companion, the McCulloch Super 55, produces 6.5 hp. and weighs 22 lb. The increased horsepower of the new saws is made possible by increased cylinder size. The 44 is available with 12-, 18-, 24-, and 30-in. blades. The 55 adds a 36- and 42-in. blade, and a 15-in. plunge bow for pulp cutting. Retail prices for the two models start at \$253 for the 44 and \$329 for the 55.

Power steering for heavy front-mounted equipment

Power steering—of particular advantage in operating tractors when equipped with front-end loaders or other heavy front-mounted equipment—is the latest advancement in the John Deere line of industrial tractors and equipment. The new power steering assembly is available for factory or field installation on the 420 Utility and 420 Special Utility industrial tractors. It includes a hydraulic cylinder located between the tractor front-end support and a special heavy-duty steering arm. The hydraulic cylinder, which has an 8-in. stroke, receives oil from the regular Touch-o-matic hydraulic system through a special hydraulic flow divider

and control valve. The hydraulic flow divider, control valve, and oil lines are located under the tractor hood where they do not affect the clean appearance of the tractor. The system is actuated by applying approximately 3 lb. of pressure to the steering wheel. Tractor can be steered manually if it is desired to move it without starting tractor engine. Complete information may be had by writing to **John Deere & Co.**, 1325 3rd Ave., Moline, Ill.

Crane has 360-deg. swing

Davis Engineering Inc. announces a completely hydraulic operated crane with 360-deg. swing, continuous rotation left or right, and road speeds up to 40 mph. With a turning radius of 17 1/2 ft., the model B-4 Hydra-X-Cavator can be maneuvered in close quar-



ters. With the back-hoe attachment it has a digging depth of 11 1/2 ft. and the ability to load high-sided trucks—loading many over the front if necessary. Besides the 3/4-cu. yd. back-hoe, attachments available include shovel, crane, clamshell, grapple, ditch cleaner, and catch basin cleaner. The B-4 is powered by a Continental F-226 6-cylinder engine, and equipped with heavy-duty 4-speed truck transmission and clutch. Full information available from **Davis Engineering, Inc.**, M-139 North, Benton Harbor, Mich.

Feather-light steering with torque booster

Torque Steering Booster, a low-cost hydraulic steering unit for Caterpillar Motor Graders has been announced by **Rivinius, Inc.**, of Eureka, Ill. The new



unit is compact, easily installed, and gives essentially all of the advantages of costly full-time power steering. Besides furnishing easy steering control, the booster will supply power for hy-

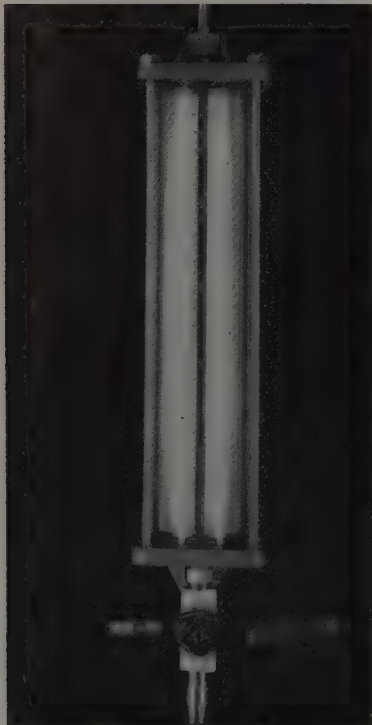
draulic moldboard shift operation. Power for each unit is supplied by the same pump that is furnished with the booster. A touch of a lever quickly moves the moldboard through its full distance of travel, or it can be stopped where the operator desires. The unit is priced to sell for slightly over \$200.

Economy diesels for trucks and buses

Detroit Diesel Engine Division of General Motors Corp., 13400 W. Outer Drive, Detroit 28, Mich., have made available a series of diesel engines, models 71-E and 71-T, to truck and bus manufacturers for installation as original equipment in four and six cylinder models. Added economy of the new engines is derived from improved combustion and freer engine breathing. The result is an engine that has lower fuel costs per mile, requires less maintenance, and has substantially longer life. The four cylinder 71-E has a basic brake horsepower rating of 140-hp. at 2,100 rpm; the six-cylinder is rated at 210 hp. at 2,100 rpm. The 71-T series includes a turbo-charger, and has a rated horsepower of 171 at 2,300 rpm; the six cylinder is rated 236 at 2,100 rpm.

Dispenser offered for Ayr-Trap

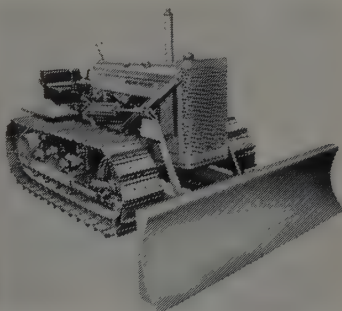
A semi-automatic dispenser for use in dispensing Ayr-Trap as the air entraining agent in concrete has been made available to contractors and ready-mix



plants by the A.C. Horn Companies, subsidiaries and divisions of Sun Chemical Corp., 10th St. and 44th Ave., Long Island City 1, N. Y. The dispenser may be had at a nominal cost and the full cost is rebated following the purchase of a limited number of gallons of Ayr-Trap. The dispenser is a precision engineered measuring device, made of cast aluminum with a plexiglas cylinder, and precalibrated up to 25 ounces. Full instructions for use may be had from A. C. Horn.

Dozer has extra high lift

Latest addition to the John Deere line of industrial and logging equipment is the new 62 bulldozer—a sturdy, extra-high-lift, deep cut, angling and tilting blade for use with John Deere 4- and 5-roller crawler tractors. Single and



double remote hydraulic systems are available for the tractors, but only one circuit is needed for operating the two double-acting hydraulic cylinders which raise and lower the blade. The "62" cuts more than 10 in. deep and its blade is properly shaped to produce a rolling action of the material being moved. The mounting frame is attached solidly to the cross bars on the tractor. Skid shoes permit the operator to do good work easily on finish grading. The blade is available in cutting widths of 6 ft. and 7 ft. 4 in. **John Deere Industrial Division**, 1325 3rd Ave., Moline, Ill.

Clamshell buckets fast, easy to operate

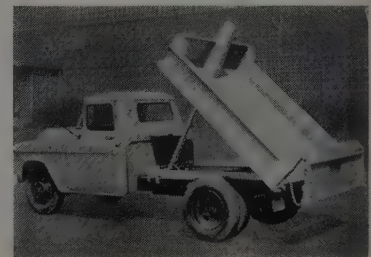
A line of fast release, easy-operating production clamshell buckets has been developed by the **Hutton Fabricating Mfg. Corp.**, 2736 E. 79th St., Cleveland, Ohio, for excavating, dredging, and material handling operations. These buckets, called the Hutton Pelican line, feature carefully calculated inside and outside arm lengths, which together with the proper distribution of weight and a special pulley design result in a bucket that opens and closes with extreme speed and has exceptional digging efficiency. The cutting teeth and cutting lip are forged of T-1 steel, a low-carbon, quenched and tempered alloy plate steel, which combines a high yield



strength, (90,000 psi. or more), with extreme toughness necessary to withstand unusual impact and abrasion abuse encountered in excavating, dredging and materials handling operations. This steel helps make the bucket durable, increases bucket life, and reduces downtime for the operator. Further information on the new buckets can be obtained by writing to the company for Bulletin 757.

Dump body has 1½-yd. capacity

The Anthony Co., Streator, Ill., is now manufacturing an all-purpose dump body designed especially for 1-ton truck chassis. Called the "Yard Bird," the body has a 1½-cu. yd. capacity. The



hydraulic hoist is the single cylinder, telescopic head-life type, with a 61-in. stroke. Its high pressure cylinder has V-type packing and a 5-ton capacity. Pump reservoir and valve are in a single unit, driven by power take-off from truck transmission. The body itself is made of 12-gage steel and has gussets for adding sideboards. Body is 8 ft. long. Formed steel crossmembers and structural longitudinals give full support to the entire floor area. More complete information may be had by writing to the company.

Loader has 100% breakout action

A 1½-cu. yd. Scoopmobile loader has been announced by **Mixermobile Manufacturers, Inc.**, P. O. Box 7527, Portland, Ore. The bucket on this loader,

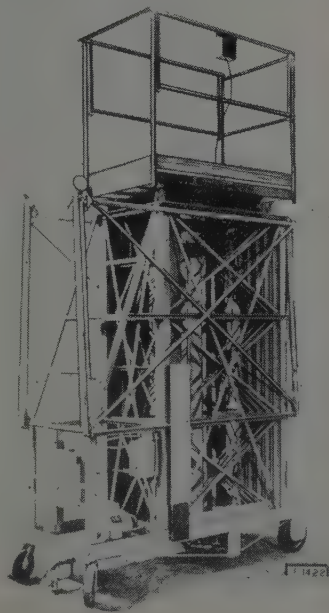
which has 100% breakout action, clears a path the full width of the wheels to eliminate damage to the tires. Four-wheel planetary drive gives power to



spare. Full visibility, power steering, power shift forward and reverse transmission, and four-wheel power brakes lighten the work of the operator. This new unit can be obtained with either gas or diesel engine and such optional equipment as cab, heater and defroster, lights, sand flotation tires and L. P. gas. Lift fork frame, concrete hopper, back-fill blade and rotary snow plow are some of the attachments which are available. Standard equipment includes hydraulic booster steering, oil bath air cleaner, power brakes, and torque converter.

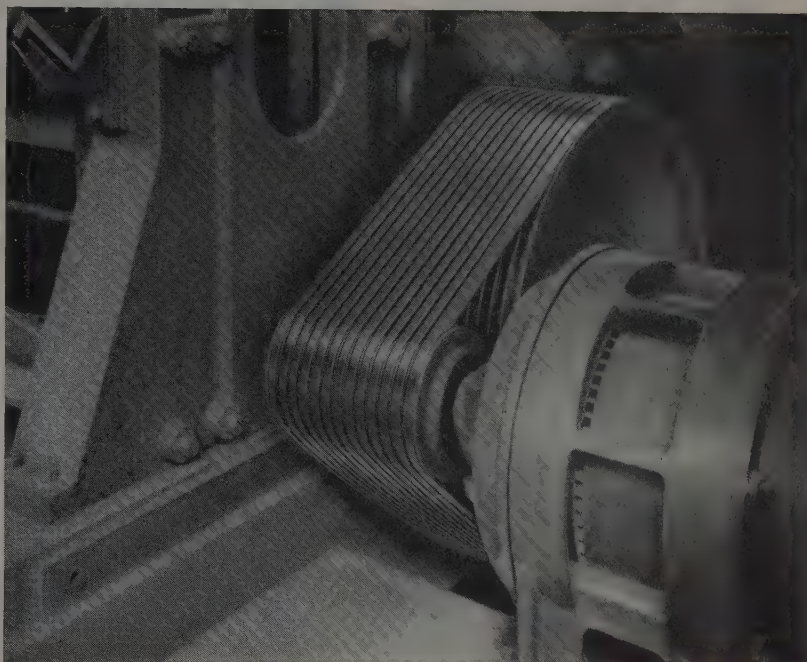
Platform Lift offers safety features

The Grand "Sky-Ride," a mobile, hydraulic platform lift, adds three safety features aimed at insuring the confidence of the operator. The first safety advantage is the safety control valve

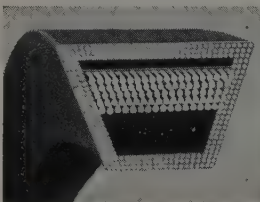


at the hydraulic fluid return outlet. This valve is pre-set at the factory to control the descent of the platform in case of

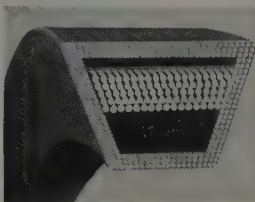
Are you using the *right* QUAKER V-BELT?



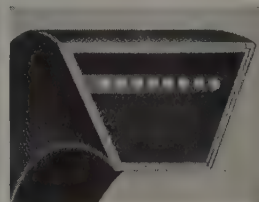
Quaker Rubber Division offers a full line of tough, long-lasting V-Belts. Each is designed to give long, efficient service. And each is designed to do a specific job. For example . . .



For drives requiring additional horsepower, the Quaker Super V-Belt—40% stronger than standard V-Belts—is available in a complete range of sizes, AP through EP cross-section.



For normal operating conditions without special speeds, loads or center distances, Quaker has the Multiple V-Belt at reasonable cost. Available from 26" to 660" in all cross-sections from A to E.

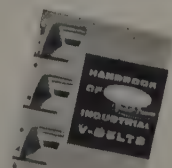


For drives under 1 HP, the Quaker Fractional Horsepower V-Belt gives quiet operation without vibration, stretch or twisting. Ideal for light duty applications. Available in cross-sections from 15" to 100".

HOW TO SELECT V-BELT DRIVES

Send for free, illustrated, 72-page handbook packed with facts on selecting V-Belt Drives . . . service factors . . . recommended V-Belt cross-sections for various horsepower and speeds . . . maintenance hints. Write:

H. K. Porter Company, Inc.
Quaker Rubber Works, Philadelphia 24, Pa., or
Pioneer Works, Pittsburg, California



H. K. PORTER COMPANY, INC.

QUAKER RUBBER DIVISION

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

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



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

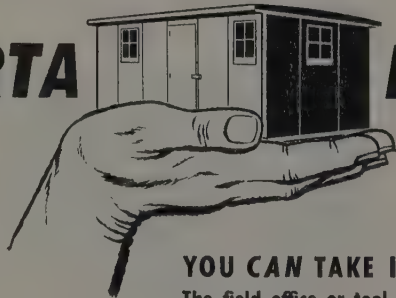
See your nearest ROLATAPE dealer or write today for complete information.

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1741 Fourteenth Street

Santa Monica, California

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YOU CAN TAKE IT WITH YOU!

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

Quickly assembled and disassembled by unskilled labor.

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

Light, watertight, strong.

Mass produced cheaper than you can build it!

Rental arrangements if you wish.

Write or phone collect.



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IMMEDIATELY

Plan to include

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all future jobs.

Manufactured and Distributed by

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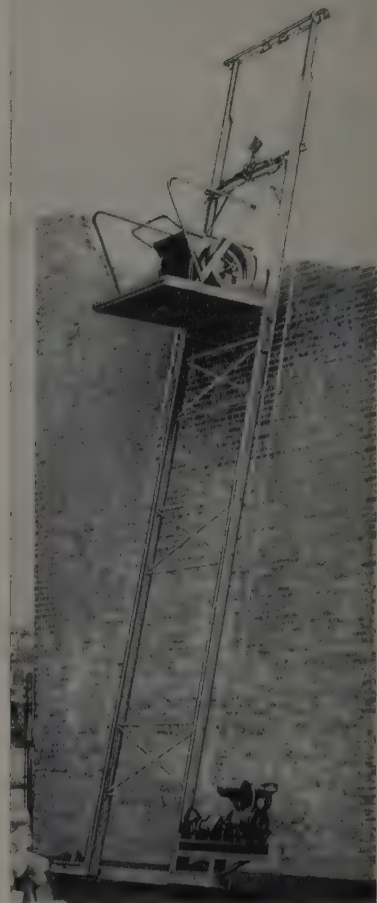
6767 Broadway Terrace • Oakland 11, Calif.
Olympic 2-7237



unexpected leakage. Two other new safety advantages include the built-in leveling plumb for ease in leveling platform with the outriggers, and the unique all riveted and welded construction. There are no bolts to break in this unit. Engineered for safety, this unit can be stopped and safely locked in any position from 9 to 35 ft. The compact "Sky-Ride" rolls easily from job to job on four 10-in. Texite wheels. Requires only ordinary oiling and minimum maintenance. Other models include a 40-ft. lift and still others can be made to lift to heights as great as 70 ft. For full information write **Grand Specialties Co.**, 3101 W. Grand Ave., Chicago 22, Ill.

Portable materials elevator

The Liftamatic, an automatic mobile elevator developed by the Sasgen Derrick Co., makes easy work of transporting materials from ground level up to



heights of 90 ft. Models are available which will handle 1,200-lb. loads at the rate of 75 fpm. Units are supplied with a choice of either gasoline engine or electric motor power. No hoisting engineer is needed with a Liftamatic on the

job. Limit stops permit the platform to be stopped at any predetermined level. Because of a remote control feature, operator control is maintained from any level. Safe operation is assured by a foolproof slack-cable brake which will stop a fully loaded platform immediately on all steel models. The elevator is constructed from either aluminum or steel. It is equipped with large pneumatic-tired wheels which allow movement along building walls without aid of mechanized equipment. Dual speeds and lifting capacities may be obtained through single or two-part reeving of the steel hoisting cable. Sasgen power puller units are quickly detachable from the chassis for independent use to power derricks, truck A-frame cranes, etc. For complete information, write **Sasgen Derrick Co.**, Dept. WNS, 3101 West Grand Ave., Chicago 22, Ill.

Concrete saw blades cut 2½ to 5 times more footage

Two concrete saw blades have been added to the line produced by **Diamond Tool Associates**, Box 85, 940 E. El Segundo Blvd., Hawthorne, Calif. These blades will cut 2½ to 5 times more footage of both green and cured concrete than any of the other saws in the company's line. Diamond's Trimetric Process has made possible improvements in the banding process which assures optimum diamond efficiency and thus increased blade life. For cutting green concrete, the designation is C225. For cutting cured concrete, C125. Further information and prices may be had by writing to the company.

Ground-gripping backhoe

The Henry Hydraulic Backhoe Super C-10H has been approved for use with the International Harvester 130 Tractor. The backhoe is particularly suited for use with this tractor because of its ground-gripping feature. It sets its main frame right on the earth, putting the



entire digging weight on the ground rather than on the tractor itself. The main frame is raised and lowered hydraulically. Available with either hydraulic or manual outriggers, the hoe makes 9 ft. of ground contact. The



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HEATER!

**We'll forget the cold weather
and keep your winter profits high**

"We won't be slowed down by cold weather. And we'll be a lot more comfortable, too, with a Master heater on the job.

"It puts out a steady stream of warm air wherever you want it. You can plaster, pour concrete, thaw and dry materials, spot heat outside, etc. It's portable, just wheel it around, plug it in and flip the switch. It'll run for 16

hours or more on a tank of kerosene or fuel oil. And for only 30c an hour it puts out enough heat to warm the biggest jobs. It's perfectly safe, too, boss . . . doesn't need a vent. So see your Master distributor, or write for all the facts on the new Master B-250 and other models. You'll see that only Master has all the features you want. No obligation."



100,000; 160,000; 250,000 and
400,000 BTU/hr. units available.

MASTER

MASTER VIBRATOR COMPANY
1752 Stanley Ave., Dayton 1, Ohio

DISTRIBUTORS

ANDREWS EQUIPMENT COMPANY.....Spokane, Washington
ANDREWS MACHINERY OF WASHINGTON, INC......Seattle, Washington
POWER EQUIPMENT COMPANY.....Denver, Colorado
SHRIVER MACHINERY COMPANY.....Phoenix, Arizona
SIERRA INDUSTRIAL CO., INC......Reno, Nevada
THE SAWTOOTH CO......Boise, Idaho
WEST COAST MASTER, INC......Los Angeles, California

boom swings in a continuous 160-deg. arc without the necessity of resetting pins. It will dig from any angle within that arc, and can easily swing a load to either side of a wide ditch. Sixteen bucket sizes are available with the Henry, ranging in width from 12 to 38 in. For further details write to **Henry Manufacturing Co., Inc.**, 1700 N. Clay St., Topeka, Kan.

High break-out power in JD420 loader

Designed for the John Deere 420C crawler tractor, a new version of the hydraulically-operated L-420C loader is now in production by American Tractor



Equipment Corp. Features of the new loader include increased ground-level tilt-back for exceptionally high break-out power, increased bucket capacity (to $\frac{7}{8}$ cu. yd.), reinforced lift arms to handle the larger bucket, replaceable

bushings at all hinge points for longer service life with less maintenance, increased track clearance and improved mounting method to improve stability, eliminate excessive tractor strain and track wear. Maximum lift is 9-ft. 7-in. for ample truck loading clearance. Bucket is 60 in. wide, dumps at 50-deg. angle; maximum tilt-back at ground level is 32-deg. Scarifier-counterweight, lift fork, hay fork and crane attachments are available. Literature and complete data can be obtained by writing **American Tractor Equipment Corp.**, 9131 San Leandro Blvd., Oakland 3, Calif.

Wisconsin Motor introduces single cylinder engine

Wisconsin Motor Corp., 1910 S. 53rd St., Milwaukee, Wis., is announcing a 4-cycle single cylinder engine—the Model AGN, rated at 12½ hp. AGN has a speed range from 1,600 to 3,200 rpm. and a piston displacement of 38.5 cu. in. Basic high torque provides the load-holding lugging power that resists rpm. slowdowns under sudden shock loads, prevents stalling, and permits a quick power recovery. In addition to the AGN, Wisconsin 4-cycle single cylinder engines are supplied in several other sizes, ranging from 3 to 9 hp.

Other models include 2-cylinder and V-type 4-cylinder sizes from 10 to 56½ hp. Described and illustrated in specification Bulletin S-216, available from the company.

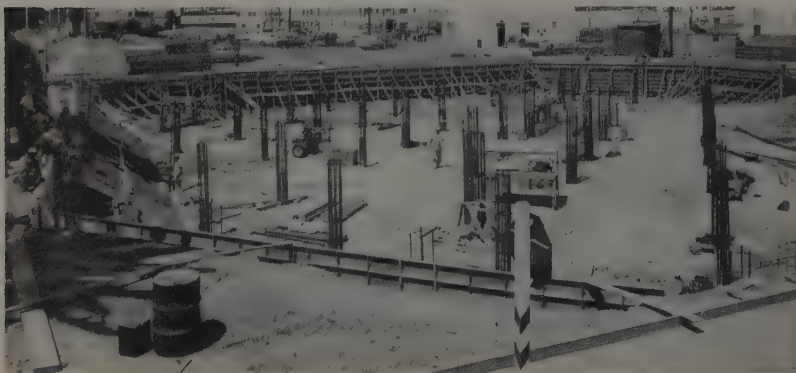
Safety hat liners warm, washable

Winterliners in six styles which afford protection against all types of winter weather are available from the E. D. Bullard Co. The fabric liners are made



of heavy duty, pre-shrunk drill. They are lined with strong, flame resistant fleece. All materials, both inside and out, are vat dyed, non fading, in forest green colors. Materials are lock-stitched to prevent raveling, and may be laundered without damage. For literature showing photographs of all models and styles, write **E. D. Bullard Co.**, 2680 Bridgeway, Sausalito, Calif., or contact your local Bullard distributor.

(Advertisement)



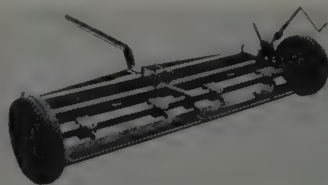
Entire Basement Structure of Royal Palms Apartments Formed with SYMONS 8-Foot Mag-Ply Forms

Tom E. Norcross, Inc., Long Beach, California, used 7,000 square feet of Symons Mag-Ply Forms to pour the one story basement section of the Royal Palms Apartments, Long Beach, California. The forms and fillers proved particularly adaptable in forming around the 45 degree corners and the special column structures which were up to 24" wide and will support the basic concrete shear walls of the super structure. Also, the lightweight of the Mag-Ply Forms made it possible to move the forms from pour to pour with speed and efficiency.

Symons Mag-Ply Forms average only 3 pounds per square foot. The frame, of extruded, rust-proof magnesium, completely encases the plywood face. 2½" wide frame reduces loading and storage space. Symons Forms may be rented with purchase option. Write or phone for more information on Symons products and engineering service. Symons Clamp & Mfg. Co., 634 Williams Street, San Leandro, California. Phone: Lockhaven 9-9159.

Cesco magnetic sweeper re-designed

Available for delivery in 4-, 5-, 6-, or 8-ft. sweeping widths are revised models of the Cesco Permanent Magnetic Road Sweeper for use in removing tramp iron from roads, ramps, depots, corporation yards, and other installations where



metal is a fire or vehicle tire hazard. Modifications of the sweeper are: a re-designed towing hitch that is now permanently attached to the sweeper, but can be pivoted inward to be out of the way for shipping or storage; a hinged elevating crank handle that permits the handle to be extended for accessibility

while the sweeper is in use, or folded for compactness when the sweeper is being transported or stored. Another design change is the all-welded, stainless steel magnet housing unit. This housing is now impervious to moisture, salt air, chemical fumes, and vapors. The magnets remain free from corrosion, sealing, or deposits that may affect their functional life span. Complete information and specifications may be had by writing to **Cesco**, 4025 Sebastopol Highway, Santa Rosa, Calif.

Renner dipper has new lip design

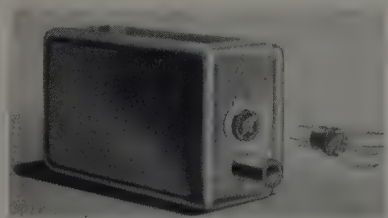
Renner Manufacturing Co. of Wisconsin has recently introduced a ¾-cu. yd. cast weld trenchoe dipper to fill an urgent need for 30-in. wide trenching



operations. The trenchoe dipper has a new lip design and a one-piece heat treated alloy bottom casting which assures long life and good wearability in the toughest digging. The sloping-back construction eliminates heeling, and assures maximum dumping speed. The trenchoe will fit any make machine. Full information may be obtained from **Renner Manufacturing Co.**, Box 125, Butler, Wis.

Flash timer guaranteed for one year

R. D. Fageol Co. announces its flasher safety light timing unit. Known as the Flasher Depend-a-Pak and designed for use with Fageol's long-life eight-cell battery, the timer is uncondi-



tionally guaranteed against failure for one year. The mechanism is shock-mounted on rubber, and completely enclosed in a sealed heavy gauge stamped steel case. Standard flashing rate is approximately 100 per min. Indicators on case socket and harness plug are reputed to cut servicing time. These also eliminate the possibility of connector damage caused by incorrect alignment of the plug with the socket. Complete information from **R. D. Fageol Co.**, Kent, Ohio.

Veteran operator Delbert Corman "at ease" while his Cleveland is digging gas and water lines for a Lexington, Ky. subdivision



Cleveland's exclusive multi-speed transmission provides right power/speed ratio for every job

"For easy handling and dependable digging even under the toughest trenching conditions give me a Cleveland every time," says long-time heavy equipment operator Delbert Corman of Aldridge & Poage Co., Lexington, Ky., owners of 3 Cleverlands. Thousands of trench operators and owners throughout the world agree with him. Credit for this worldwide preference for Cleverlands is due to the perfectly balanced combination of practical performance-proved features found in every Cleveland. Practically every modern trencher feature originated with Cleveland. But no single trencher feature ever developed is the equal of Cleveland's exclusive multi-speed crawler transmission.

For each of 4 digging wheel speeds this transmission provides 12 individual crawler speeds forward and 12 reverse, all closely and evenly graduated. The 48 forward speeds give the operator a choice of over 30 practical digging speeds—over 30 usable combinations of digging wheel and crawler speeds, providing the right combination of power and speed for digging every soil, under every digging condition. The following table of non-slipping, power-saving digging speeds for the Cleveland 95 is typical.

Cleveland's exclusive multi-speed transmission has no equal

For each of 4 wheel speeds				there are 12 individual crawler speeds											
With Main Transmission (and Digging Wheel) in				SPEEDS (in Feet per Minute) — Available in Either Direction (Bold Face Indicates Most Commonly Used Digging Speeds)											
First Speed	.5	.7	1.1	1.5	2	2.8	3.4	4.7	5.9	12.6	22.5	38			
Second Speed	1	1.4	2.2	2.9	3.9	5.3	6.6	9	11.5	23.8	43	73			
Third Speed	2	2.8	4.3	5.8	7.8	10.6	13.3	17.9	22.8	47	86	146			
High Speed (Ordinarily used when digging)	3.3	4.6	7.1	9.5	12.8	17.5	21.7	29.6	38	78	143	240			
Reverse (not used when digging)	.4	.6	.9	1.2	1.6	2.2	2.7	3.7	4.8	9.9	18	30			

THE CLEVELAND TRENCHER CO.

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Everywhere



OFFICIAL HOST for the meeting was Region 11 under the directorship of *Beal Shaw* (left), Shaw Sales and Service Co., Los Angeles. *Walter W. Kershaw* (center), Atlas Equipment Co., Salt Lake City, is director of Region 14, and *Frank A. Cooper* (right), Howard-Cooper Corp., Portland, is director of Region 12. The three regions include all of "The West"—the eleven Western states.



NATIONAL PRESIDENT OF AED, Miner Doolen, of Lansing, Mich., addressed the opening meeting on "AED and Members." Several past national presidents from the West attended the conference.



H. D. "ANDY" ANDERSON (left), executive vice-president of AED from Bluefield, West Virginia, regaled a luncheon session with tall tales from the South.

SERIOUS BUSINESS of the conference was conducted during the Shirt Sleeve Sessions (below, left) where groups discussed such subjects as AED ethics, credits and collections, personnel training and dealer service policies.

MINER DOOLEN also spoke at one of the luncheon sessions (below, right) where his message on the broader aspects of the construction equipment business at the national level was heard by all.



AED holds its third Tri-regional Conference

THE THIRD AND best Tri-Regional Conference of the Associated Equipment Distributors was held at Pebble Beach, Calif., October 24-26. Hosted by Region 11, under the directorship of Beal Shaw, the other groups were Region 12 with Frank A. Cooper, director, and Region 14 with Walter W. Kershaw, director. These three regions represent and include the entire eleven Western states. With a registration of more than 250 the attendance exceeded the estimate and represented a new record for attendance at these conferences.

This Western Conference was selected for a meeting of the executive committee of AED which was held the day preceding the opening of the regular meeting. As a result of the committee meeting the conference was honored by National President L. Miner Doolen, Telford Equipment Co., Lansing, Mich. and the Executive Vice-President of the national body, H. D. Anderson, Rish Equipment Co., Bluefield, W. Va. Other vice-presidents attending the executive committee meeting and the conference were F. J. Fitzpatrick, Parker-Denver Company, Hyde Park, Mass., J. A. Benson, Benson Tractor Co., Houston, Tex. and the national treasurer, J. R. Borchert, Borchert-Ingersoll, Inc., St. Paul, Minn.

Also as a result of the meeting of national officers, the conference was attended by three staff members from Chicago headquarters. These staff executives were P. D. Hermann, executive secretary; Frank Skidmore, director of industry relations, and Jack Randle, field secretary.

Of equal significance was the attendance of several past national presidents of AED from the Western states. The number of these past presidents indicated the importance of the West in AED national affairs.

The 1957 Tri-Regional Conference

had its origin a year ago when Director Beal Shaw of Region 11 put forth an invitation to the other two regions for the combined meeting. Preliminary arrangements at the selected site of Del Monte Lodge, Pebble Beach, Calif. were made by Irv Kraemer. The program and final arrangements were the work of the three directors under the chairmanship of Beal Shaw. The chairmen of the various conference committees were divided among the regions as follows: Reception committee, Mr. and Mrs. W. H. McIntyre, Mountain Tractor Co., Missoula, Mont.; Golf committee, J. F. Kimball, Kimball Equipment Co., Salt Lake City, Utah; Entertainment committee, J. E. Angle, Arizona Equipment Sales, Phoenix, Ariz.; Finance committee, W. F. Allen, Kimball Equipment Co., Salt Lake City, Utah; Women's activities, Betty Kraemer.

The opening session on Friday morning started with an introduction of all the national and Western officers present. Miner Doolen then spoke to the conference as its national head, reviewing current AED affairs, committee activities and other matters which were of direct interest to the members of these regions. He complimented the three regions for having such active participation in national committee work.

Ray Arnold, Arnold Machinery Company, Salt Lake City, and a past national president, reviewed the "Cost of Doing Business Survey," pointing out some of the pertinent information developed and some of the highlights which should have the direct attention of members. He urged all members to participate by answering the questionnaire for these surveys since the results are only as accurate as the basic information. Two speakers, E. E. Cochrane, of the American Trust Co. and Ed Thrower, vice president, C.I.T. Corp., discussed different aspects of the financial and credit situation as it exists today. John M. Server, Jr., editor, Southwest Builder and Contractor, reviewed the highway program and other aspects of the construction future.

The principal business and the serious exchange of ideas took place at the usual shirt-sleeve sessions, restricted to members divided into groups with discussion chairman to stimulate the exchange of ideas. The first of these two sessions was presided over by Walter Kershaw, director from Region 14, and the second was conducted by Frank Cooper, director of Region 12.

At one of the luncheon meetings attended by all of those at the Conference, H. D. "Andy" Anderson, executive vice-president of AED, added the light touch with stories and information comment. Another national vice-president, J. A. Benson, was speaker at the dinner meeting. At this same function, the golf prizes were awarded and presented by Irv Kraemer.

H. W. Hurd, Engineering Sales Service, Inc., of Boise, Idaho, reported on "Traffic and Transportation." He headed the group of distributors in southern Idaho which conducted the first study on this important problem.



GOLF TROPHY ceremony was conducted and approved by: *W. W. Kershaw*, Director Region 14; *Beal Shaw*, Director Region 11; *P. D. Hermann*, Executive Secretary of AED; *Miner Doolen*, National President of AED; and *Frank R. Cooper*, Director of Region 12.



AT THE FIRST tee of the Pebble Beach course: *Charlie Grant*, *C. H. Grant* Equipment Co.; *Stan Laskey*, Past National President; *Walter Kershaw*, Atlas Equipment Co.; *Mrs. Walter Kershaw*; *John Oeschlie*; *Mrs. Stan Laskey*.



ON THE EIGHTEENTH green: *W. F. Allen*, Kimball Equipment Co.; *J. F. Kimball*, Kimball Equipment Co.; *Ben E. Lingenfelter*, Buffalo-Springfield Roller Co.; *Ray Arnold*, Arnold Machinery Co., and a Past National President of AED.

The results of this survey, both at the local and national levels, had previously been reported in **Western Construction**.

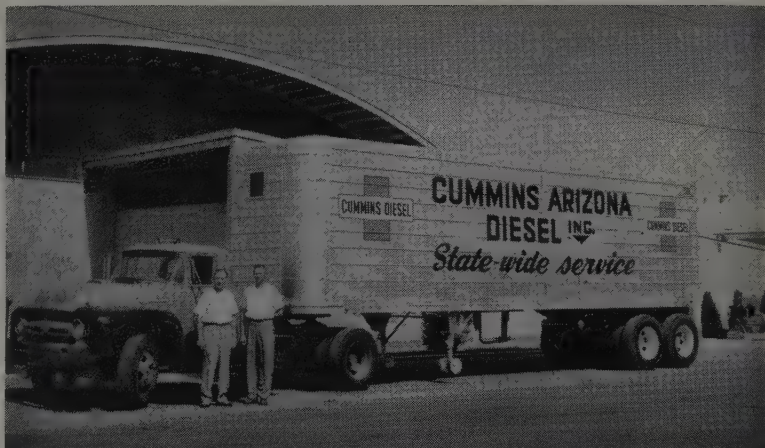
A word of history

This is the third of the Tri-Regional meetings to be held in the West. The first was held in 1951 at Sun Valley, Idaho, and was rather an experiment based on the accepted fact that distributors throughout the entire West (the eleven Western states) comprising Regions 11, 12 and 14 had common problems which deserved broader consideration than could be secured by the usual annual meetings held by each of the three regions. The exchange of ideas at this level was tested and found most desirable at that original meeting.

It was obvious that such meetings would not be feasible on an annual basis but it was agreed by those attending the original conference that such Tri-Regional gatherings should be held at regular intervals, possibly every third year.

The second meeting was sponsored by Region 14 and was held in Colorado Springs in 1954. This meeting again demonstrated the value to be realized by the AED members of the entire West when they exchange ideas with other distributors who have Western problems but are located in the other regions. The further success of that second meeting provided the incentive for this third Conference held this year under the sponsorship of Region 11.

News of DISTRIBUTORS



CUMMINS ARIZONA DIESEL, INC., following its policy of statewide service, is setting up a parts trailer to be located at the Glen Canyon Dam Project on the Colorado River in Arizona. This trailer will be used as a parts and service headquarters for servicing Cummins diesel engines employed by various contractors in construction of the dam. This service unit will be staffed by **Paul Daily**, field service department, and **Mike Hayes**, parts department. **Paul O. Miller** (left), president of Cummins Arizona Diesel, and **H. O. Wold**, vice president, appear here alongside the trailer.



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(Fire and Extended Coverage)



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New salesman and additional lines

Thomas M. Schmitt recently joined Western Machinery Co. at Denver, Colo., as territory salesman. This distributor recently added six new lines: Air Placement Equipment Co., Diamond Iron Works, Champ Corporation, Hetherington & Berner, Inc., Morgen Manufacturing Co. and Pitman Manufacturing Co.

Ribble takes on Heltzel line

N. C. Ribble Co. of Albuquerque, N. Mex., was recently appointed distributor covering all of New Mexico for Heltzel construction machinery including Flex-Plane equipment manufactured by Heltzel Steel Form & Iron Co. of Warren, Ohio.

Santa Fe adds Jersey spreader

Santa Fe Equipment Co. of Los Angeles was recently appointed exclusive distributor in the Southern California territory for the Jersey spreader manufactured by Tractor Spreader Co. of Hasbrouck Heights, N. J.

Caterpillar featured at open house

At recent open house festivities hosted by the McCoy Company of Denver, Colo., this distributor's complete line of Caterpillar equipment was featured, with emphasis on the engine line. McCoy's parts assembly exchange plan received special attention, as well as their used parts sales program, new building for track repair facilities, roller, idler, pad and rail build-up machines. A buffet luncheon was served to the six hundred persons attending and a television set was awarded to the closest guess of the weight of a loaded Caterpillar DW21 tractor and scraper.

New men and accounts

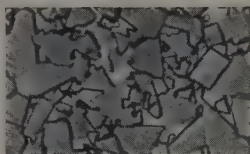
Two salesmen have been added to the organization of Contractors Equipment & Supply Co., Albuquerque. W. R. "Bob" Martin, Jr., will travel northern New Mexico and parts of Albuquerque.



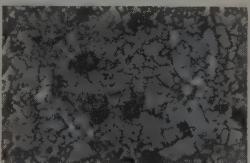
W. R. "Bob"
Martin, Jr.

He has considerable experience in construction machinery in Colorado and Texas. Also new to the sales organization is Joe Wells. Coming from another equipment distributor in Albuquerque, Wells' territory will cover eastern New Mexico. The following accounts were recently added to Contractor Equipment's major lines: Buffalo Springfield rollers, P & H shovels and stabilizers, and Kohler generating plants.

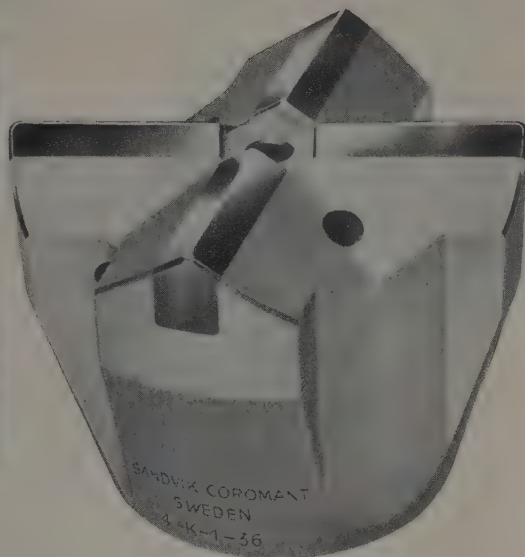
Longer bit life—with *new* Sandvik Coromant X-Bits



Sandvik Coromant Tungsten Carbide. (Microphoto) Uniformity of size, even distribution of grain are marked. Free from porosity and impurities—therefore stronger, longer-lived.



Low quality Tungsten Carbide. (Microphoto) Black marks are contaminations caused by deficient production control. They weaken the carbide, reduce its working life.



NEXT time you buy bits, specify Sandvik Coromant because they give you more footage per bit, lower drilling costs. Here's why:

- 1 Only first-quality tungsten carbide is used—as shown in the microphotos above. This means less wear, longer life and a better job.
- 2 the bodies are precision-made of high quality alloy steel—tough enough to take the strain throughout the extra-long bit life.
- 3 the bigger Sandvik Coromant bits are all of X-design, which prevents rifling. No wonder Sandvik Coromant inserts are the most widely used in the world, drilling more than one billion feet every year.

THESE STANDARD SIZES ARE AVAILABLE

	THREAD	DIAMETERS AVAILABLE (IN INCHES)
SHOULDER TYPE	$\frac{7}{8}$ " F	<u>1½</u>
	1" H	<u>1½</u> , <u>1⅞</u> , <u>1¾</u> and <u>1⅞</u>
	$1\frac{3}{16}$ " D	<u>2</u> , <u>2½</u> , <u>2¼</u> , <u>2⅝</u> , <u>2½</u> , <u>2¾</u> and <u>3</u>
	$1\frac{1}{4}$ " K	<u>3</u> , <u>3½</u> , <u>4</u> and <u>4½</u>
BOTTOMING TYPE	$1\frac{1}{4}$ " Rope	<u>1⅞</u> , <u>2</u> , <u>2¼</u> , <u>2½</u> , <u>2¾</u> and <u>3</u>
	2" Rope	<u>3½</u> , <u>4</u> , <u>4½</u> and <u>5</u>
	400	<u>2</u> , <u>2¼</u> and <u>2½</u>
	600	<u>2½</u> , <u>2¾</u> , <u>3</u> and <u>3½</u>

The sizes underlined are X-shaped bits

SANDVIK COROMANT bits are supplied through Atlas Copco, the world's largest manufacturer of rock drills, who also supply Sandvik Coromant integral steels—the most widely used in the world—cross bits from $1\frac{1}{2}$ " to $2\frac{1}{2}$ " and extension steel equipment.

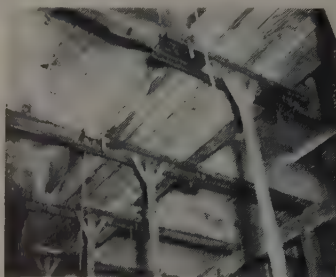
Write, phone or cable today for further details to any of the addresses below:

Atlas Copco

EASTERN — P.O. Box 2568 Paterson 25, N.J. Phone — Armory 4-3310
 PACIFIC — 930 Brittan Avenue, San Carlos, Calif. Phone — Lytell 1-0375
 CANADA — Montreal Airport, Quebec. Phone — Melrose 1-1871
 MEXICO — Apartado Postal 56, Torreon, Coahuila. Phone — 39-07

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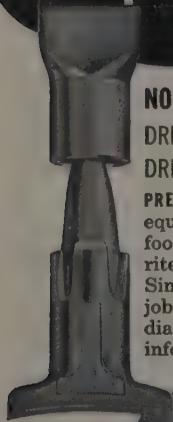
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MANUFACTURERS

H. C. Clark joins Utica-Bend

Appointment of Harold C. Clark as general sales manager, diesel equipment, is announced by Curtiss-Wright Corp.'s



Harold C. Clark

Utica-Bend subsidiary in Utica, Mich. He will direct the sales of the Mercedes-Benz diesel engine line recently acquired by Curtiss-Wright. Clark comes from the Findlay Division of Gar Wood Industries where he held the post of sales manager.

R. M. Wade promotes Hugh J. Rear

Hugh J. Rear, well known throughout the Pacific Northwest as well as in national irrigation and pump circles, is named sales manager of the Industrial Pump Division of R. M. Wade & Co., Portland, Ore., Rear's appointment represents a promotion from field to executive duties.

Key personnel changes by Thew

Alan W. Smythe, vice president and general manager of The Thew Shovel Co., Lorain, Ohio, is elected president of Byers Machine, Inc., Ravenna, Ohio,



Alan W. Smythe

replacing A. C. Lundgren who has retired. Smythe continues as a director of Byers and in his present capacities at Thew, the parent company. Simultaneous announcement is made of the election of W. J. Allaback as vice president and a director of Byers, and of the appointment of H. G. Dehnal as manager of Byers. Allaback also was made director of operations at Thew. W. W. Blauvelt, formerly general manager of Byers, has resigned that position to become director of the business planning and control division of Thew, but will continue as Byers' vice president and member of the Board.

Angell made Western district mgr.

Beaver-Advance Corp., Ellwood City, Pa., manufacturer of tubular steel scaffold and material hoisting towers, an-



R. Bruce Angell

nounces the appointment of R. Bruce Angell as Western district manager. Making his headquarters at 933 Seventh Ave., Redwood City, Calif., Angell will represent the company in a sales-engineering capacity and be responsible for distribution of the company's products in the Mountain and Pacific states region.

Watrous retires; Reichel named

The retirement of John H. Watrous, San Francisco district manager, is announced by D. W. Widmayer, vice president of Keasbey & Mattison Co., Am-



James R. Reichel

bler, Pa., manufacturer of asbestos-cement, magnesia and asphalt products, with a large water and sewer pipe factory at Santa Clara, Calif. Watrous completed 38 years of service with the company. Appointed to succeed him is James R. Reichel. Reichel joined K&M in 1950 as a West Coast salesman and has been assistant district manager for a year and a half.

Cone buys assets of Pippin concern

Cone Automatic Machine Co., Inc., Windsor, Vt., manufacturer of the Pippin excavator, the Pippin front-end loader, and associated products, announces the purchase of Pippin Construction Equipment, Inc., White River Junction, Vt. Henry P. Chaplin, president of Cone, said that M. J. Pippin, president of the absorbed company, becomes general manager of the new division known as the Conomatic-Pippin Division of Cone Automatic Machine Co., Inc.

UNIT PRICES

Selected abstracts for Western projects

HIGHWAY—Bituminous surfacing of 1.2 mi. in Utah

Utah—Utah County—State. A low bid of \$353,066 was submitted by Thorn Construction Co., Inc., for 1.26 mi. of bituminous surfaced road and 1 concrete structure over 20-ft. span.

(1) Thorn Construction Co., Inc.	\$353,066
(2) W. W. Clyde & Co.	361,857
Strong Co.	455,931

	(1)	(2)
16,500 ton	Plant mix bit. surface, Type "A".....	\$ 2.50 \$ 2.60
900 ton	Bit. material, Type 85-100 penetration.....	30.00 32.00
127 ton	Bit. material, Type MC-1 or MC-2.....	36.00 35.50
75 ton	Bit. material, Type RC-1 or RC-2.....	40.00 37.00
10,500 ton	Gravel surface, Type "B".....	1.00 1.03
17,000 ton	Gravel base course.....	1.00 .98
5,000 cu. yd.	Unclassified roadway excavation.....	.40 .33
71,500 cu. yd.	Imported borrow.....	.50 .33
361,000 sta. yd.	Class "A" overhaul.....	.005 .01
115,000 yd. mi.	Class "B" overhaul.....	.05 .10
4,000 1,000 gal.	Watering.....	1.00 1.25
550 hr.	Rolling, tamping roller.....	8.00 9.00
1,850 hr.	Rolling, pneumatic tire or power roller.....	6.00 7.00
139 lin. ft.	15 in. reinforced concrete pipe.....	4.50 3.60
648 lin. ft.	18 in. reinforced concrete pipe.....	5.00 4.35
50 lin. ft.	24 in. reinforced concrete pipe.....	7.00 5.90
68 lin. ft.	Relaying 18 in. reinf. concrete pipe.....	3.00 1.50
118 lin. ft.	C.M. pipe arches 18 in. x 11 in.....	4.00 3.60
426 lin. ft.	C.M. pipe arches 29 in. x 18 in.....	6.50 6.45
312 lin. ft.	C.M. pipe arches 43 in. x 27 in.....	12.00 12.35
2,000 lin. ft.	Concrete curb, Type 1-E.....	1.40 1.50
575 lin. ft.	Concrete curb, Type 1-F.....	1.40 1.50
295 sq. yd.	Concrete sidewalk 4 in. thick.....	3.60 3.60
300 sq. yd.	Removal of existing pavement.....	1.00 .75
570 sq. yd.	Removal of existing sidewalk.....	.50 .50
500 lin. ft.	Removal of existing curb and gutter.....	2.50 .40
283 cu. yd.	Concrete, Class "A".....	60.00 80.00
19 cu. yd.	Concrete, Class "AA".....	75.00 100.00
50,600 lb.	Reinforcing steel.....	.14 .15
5,400 lb.	Structural steel.....	.40 .30
1,000 cu. yd.	Excavation for structures, unclassified.....	2.00 2.00
50 ea.	Removal of trees.....	50.00 40.00
Lump sum	Clearing and grubbing.....	10,000.00 1,500.00
70 hr.	Mechanical tamping.....	6.00 6.00
100 cu. yd.	Small ditch excavation.....	3.00 1.00
794 lin. ft.	Deep beam hiwy. grd. rail (conc. psts.).....	4.00 3.50
64 ea.	Guide posts.....	7.00 7.00
5 ea.	Reconstr. cleanout, mnhl. & mon. bxs.....	50.00 50.00
4,650 lin. ft.	Right-of-way fence, Type "B".....	.35 .35
10 ea.	12 ft. Gates.....	35.00 40.00
6 ea.	14 ft. gates.....	40.00 45.00
22 ea.	Right-of-way markers.....	7.00 7.00
2 ea.	F.A.P. markers.....	30.00 25.00
Lump sum	Furnishing water equipment.....	2,000.00 2,000.00
Lump sum	Furnishing construction signs.....	2,000.00 1,000.00

1 CONCRETE STRUCTURE 82.57 FT. O. TO O. STA. 12+58.78

610 cu. yd.	Excavation for structures, unclassified.....	5.00 3.00
866 cu. yd.	Concrete, Class "A".....	55.00 72.00
133,000 lb.	Reinforcing steel.....	.14 .145
6,140 lin. ft.	Piles (other than timber).....	6.00 6.00
337 lin. ft.	Steel handrail.....	14.00 12.50
Lump sum	Furnishing pile driving equipment.....	3,000.00 2,500.00

HIGHWAY—Construction of 11 mi. of highway and miscellaneous work on 11 mi. of shoulders and service roads in Wyoming.

Wyoming—Laramie County—State. A contract for \$856,529 has been awarded to Schmidt Construction, Inc., for 11 mi. of crushed gravel base course, bituminous stabilized base course, and plant mixed surface course. Also miscellaneous work to be done on 6.6 mi. of shoulders and 4.4 mi. of service roads.

(1) Schmidt Construction, Inc.	\$856,529
(2) Big Horn Construction Co.	872,126
Western Paving Construction Co.	875,978
Richardson Construction Co., Inc.	876,607

	(1)	(2)
3,100 cu. yd.	Excavation.....	\$ 1.00 \$.40
350 cu. yd. mi.	Cubic yard mile haul.....	.20 .40
1,141 M gal.	Watering.....	2.00 2.00
5 hr.	Sheep's foot Roller operation.....	11.00 20.00
305 hr.	Pneumatic tired roller operation.....	8.00 5.00
55 hr.	Smooth steel roller operation.....	10.00 10.00
2,700 ton	Selected mat. surfacing—Type 1.....	1.00 .60
50,895 ton	Cr. gr. base course (¾ in. max.).....	.60 1.00

77,600 ton	Plant mixed base course (stab.).....	2.55 2.60
50,410 ton	Plant mixed surface course.....	3.00 3.14
3,250 ton	Stone chips—Type B.....	6.00 6.00
1,106,140 ton mi.	Haul of surfacing material.....	.07 .08
369 ton	Asphaltic material MC—prime.....	26.00 33.00
265 ton	Asphaltic material RCF—3 seal.....	30.00 41.00
6,181 ton	Asphaltic material AC (85-100).....	26.00 26.00
79 ton	Asphaltic material RC-2 tack coat.....	28.00 43.00
106 ton	Asphaltic material RC-2 fog seal.....	30.00 45.00
12,120 lin. ft.	Metal plate guard fence.....	2.70 2.50
1,380 ea.	Reflectorized guide posts—Type B.....	8.00 9.00
365 ea.	Reflectorized guide posts—Type E.....	6.00 5.00
39,664 lin. ft.	Wood portable snow fence.....	2.50 2.00
Lump sum	Permanent signs and markers.....	40,000.00 30,000.00

BRIDGES AND CULVERTS—Construction of three bridges and two culverts in California

California—Kern County—State. C. B. Tuttle has been awarded a \$221,478 contract for the construction of three bridges and two culverts on County Route 887.

(1) C. B. Tuttle.....	\$221,478
(2) Walter Raucher.....	224,712
Hermreck & Easter.....	231,125
Tumblin Co.....	232,790

	(1)	(2)
655 cu. yd.	Struct. excav.....	\$ 5.00 \$ 3.00
350 cu. yd.	Struct. backfill.....	4.00 2.50
Cont. sum	Class "A" conc. (brgs.) (1,750 cu. yd.).....	113,549.00 105,000.00
Cont. sum	Bar reinf. steel (bridges) (372,000 lb.).....	45,574.00 50,000.00
3,475 lin. ft.	Furn. conc. piling.....	4.25 4.20
124 ea.	Driv. conc. piles.....	68.00 190.00
2,000 lb.	Misc. iron & steel.....	.35 .50
622 lin. ft.	Remov. & resett. bridge rail.....	1.40 3.00
1,125 sq. ft.	Wire mesh.....	.60 .60
1,547 lin. ft.	Mtl. beam bridge rail.....	5.40 8.00
8 ea.	Furn. precast prest. conc. deck units.....	2,517.00 1,450.00
8 ea. }	Erect. precast prest. conc. deck units.....	368.00 150.00

HIGHWAY—3 mi. of highway construction in Arizona

Arizona—Conchise County—State. A low bid of \$230,834 has been submitted by Martin Construction Co. for grading, draining, and surfacing 3 mi. of highway over U. S. Route 80.

(1) Martin Construction Co.....	\$230,834
(2) L. M. White Construction Co.....	235,925
San Xavier Rock & Sand Co.....	237,229
Isbell Construction Co.....	239,443

	(1)	(2)
50,800 cu. yd.	Roadway excavation.....	\$.45 \$.40
2,600 cu. yd.	Drainage excavation.....	.35 .36
10,900 lin. ft.	Grader ditches.....	.10 .05
830 cu. yd.	Structural excavation.....	3.00 2.00
2,300 cu. yd. mi.	Overhaul.....	.30 .25
15,400 cu. yd.	Borrow (CIP).....	.38 .34
1 lump sum	Provide water supply.....	500.00 500.00
6,000 M gal.	Apply water.....	1.95 2.50
1,100 hr.	Rolling.....	9.00 10.00
49,600 ton	Select material (CIP).....	.66 .85
10,200 ton	Aggregate base (CIP).....	1.00 1.15
7,200 ton	Bit. mix (Cl. II-plant mix) (CIP except cost of paving asphalt).....	3.00 3.00
1,900 ton	Plant mixed seal coat (CIP) except cost of paving asphalt.....	7.00 4.75
136 ton	Liquid asphalt for prime coat (gr. MC-2 or MC-3) (CIP).....	50.00 52.00
27 ton	Liquid asphalt for first tack coat (gr. MC-2 or MC-3) (CIP).....	80.00 80.00
300 ton	Paving asphalt for bituminous mix (gr. 200/300 penetration) (CIP).....	45.00 46.00
95 ton	Paving asphalt for plant mixed seal coat (gr. 120/150 penetration) (CIP).....	45.00 46.00
28 ton	Emulsified asphalt for second tack coat (gr. A) (CIP).....	80.00 80.00
553 cu. yd.	Class "A" concrete (CIP).....	55.00 45.00
62,300 lb.	Reinforcing steel (bars) (CIP).....	.145 .145
442 lin. ft.	24 in. C.M.P. (CIP except excava.).....	6.35 6.50
384 lin. ft.	30 in. C.M.P. (CIP except excava.).....	7.50 8.10
314 lin. ft.	36 in. C.M.P. (CIP except excava.).....	10.00 12.00
64 lin. ft.	29 in. x 18 in. arch Type C.M.P. (CIP except excava.).....	7.00 7.00
17 cu. yd.	Removal of structure concrete.....	45.00 30.00
106 ea.	Place dowels.....	2.00 1.00
Lump sum	Removal of conc. bridge (sta. 1008+).....	1,500.00 2,500.00

1,100 lin. ft.	Road guard (std. C-7) (CIP).....	4.50	4.15
125 lin. ft.	Road guard (special) (CIP).....	5.50	5.50
34 ea.	Guide psts. (std. C-8) (Type BR) (CIP)	7.00	6.00
22 ea.	R/W mkrks. (std. C-1) (Type B or C)		
	(CIP).....	10.00	10.00
32,100 lin. ft.	Line fence (std. C-16) (CIP).....	.205	.23
4 ea.	Steel fence gate (Type 1) (std. C-16)		
	(CIP).....	75.00	70.00
1 ea.	Survey monu. & cov. (std. C-1) (CIP)	50.00	55.00
8,950 lin. ft.	Placing bituminous mixed curb.....	.10	.10
455 lin. ft.	Placing bituminous mixed gutter.....	2.00	.60
Lump sum	Miscellaneous removal and other work	2,000.00	4,200.00

56 ea.	Right-of-way markers.....	12.00	10.00
1 ea.	Std. Fed. aid proj. mkrks., Type I	60.00	50.00
210 ea.	Treated tmbr. warn. posts, refl.		
	(6 in. diam.).....	8.00	7.00
79,960 ton	Controlled gradation subbase....	.65	.60
54,370 ton	Base course.....	.90	1.13
2,568 bbl.	Bituminous material, Type MC-1	8.50	7.90
591 bbl.	Bituminous mat., Type 120/150.	9.00	9.50
1,032 ton	Cover material.....	5.00	6.00
36,420 ton	Plant mix surface course.....	3.00	3.35
11,214 bbl.	Bituminous material, Type 85/100	6.60	6.95
1,081 bbl.	Bit. mat., Type 85/100 (tack coat)	8.50	8.75
2,007 cu. yd.	Class "A" concrete.....	61.00	52.00
700 sq. yd.	Class "A" concrete for blankets..	7.50	10.00
230,380 lb.	Reinforcement for conc. structs..	.15	.16
2,650 lb.	Wire fabric for concrete blankets	.25	.40
610 lb.	Wire fabric for concrete structs..	.25	.40
2,710 lin. ft.	Concrete median curb & gutter..	1.70	1.90
168 cu. yd.	Grouted rock retarders.....	20.00	20.00
280 lin. ft.	Culv. pipe for syph.—24 in. diam.	10.00	7.75
5,114 lin. ft.	Culvert pipe—24 in. diam.....	8.00	6.30
856 lin. ft.	Culvert pipe—30 in. diam.....	12.00	8.50
518 lin. ft.	Culvert pipe—48 in. diam.....	25.00	17.50
664 lin. ft.	Culvert pipe—54 in. diam.....	30.00	21.00
124 lin. ft.	Culvert pipe—60 in. diam.....	40.00	25.00
104 lin. ft.	Corr. met. culv. pipe—24 in. dia.	10.00	7.75
126 lin. ft.	Bevel 2:1 corr. metal culv. pipe—		
	72 in. diam.....	50.00	37.50
304 lin. ft.	Bevel 2:1 corr. metal culv. pipe—		
	84 in. diam.....	70.00	52.50
576 lin. ft.	Structural plate pipe—180 in. dia.		
	Bevel 2:1, gage 98-17.....	115.00	118.50
492 lin. ft.	Structural plate pipe—180 in. dia.		
	bevel 2:1, gage 910-18.....	105.00	103.00
4 ea.	3-way concrete headgates.....	200.00	350.00
1 ea.	4-way concrete headgate.....	250.00	450.00
54 ea.	Remov. & resett. right-of-way		
	markers.....	10.00	9.00

HIGHWAY—Grading and paving of 5.8 mi. in New Mexico

New Mexico—San Juan County—State. A \$1,221,097 contract has been awarded to Allison & Haney Inc. and Daniels Constructoin Co. for grading and asphalt paving of 5.8 mi. of highway.

(1) Allison & Haney Inc., & Daniels Construction Co.....	\$1,221,097
(2) Wayne A. Lowdermilk, Inc.....	1,237,202
Imperial Paving Co.....	1,297,263
Skousen-Hise Construction Co. & Skousen Construction Co.	1,382,105

	(1)	(2)
Lump sum	Removal of old structures.....	\$21,000.00 \$20,000.00
Lump sum	Removal of obstructions.....	1,000.00 5,700.00
Lump sum	Clearing and grubbing.....	10,000.00 20,000.00
552,850 cu. yd.	Excavation—unclassified.....	.20 .27
3,423 cu. yd.	Excavation for structures.....	2.00 3.00
7,097 cu. yd.	Excavation for pipe culverts.....	2.00 2.00
30,361 M gal.	Watering.....	1.00 .50
1,399 hr.	Rolling (tamping roller).....	8.00 10.00
1,942 hr.	Rolling (pneumatic tired).....	5.00 5.50
1,236 hr.	Rolling (steel tired).....	7.00 8.50
1,758 hr.	Fifty (50) ton roller operation.....	12.00 12.50
3,501 hr.	Mechanical tamping.....	6.00 5.75
1,185,380 sta. yd.	Station yard overhaul.....	.01 .01
465,720 ¼ mi. yd.	Quarter mile yard haul.....	.04 .04
316,530 ton mi.	Ton mile haul.....	.09 .07
1,600 lin. ft.	Pipe underdrains—perf. corr. galv. met. pipe—8 in. dia. (bit. ctd.)	4.00 4.50
300 cu. yd.	Wire enclosed riprap.....	6.00 12.00
7,870 lb.	Wire fabric for riprap.....	.30 .40
127 cu. yd.	Excavation for riprap.....	4.00 3.00
2 ea.	Cattle guard—18 ft. roadway.....	2,000.00 1,800.00
45,010 lin. ft.	Galvanized barbed wire fence.....	.30 .20
48 ea.	Gates—standard type.....	40.00 50.00
308 ea.	Bracing.....	15.00 12.50
6,720 lin. ft.	Galv. woven wire farm fence.....	.35 .40

HIGHWAY—Construction of 4.7 mi. of highway in Idaho

Idaho—Bonner County—State. A \$609,009 contract has been awarded to Kiely Construction Co. for construction of roadway and bituminous surfacing on 4.7 mi.

(1) Kiely Construction Co.....	\$609,009
(2) Carbon Bros. Construction.....	660,629
N. A. Degerstrom and Chas. A. Power.....	672,961
James Crick & Sons Construction.....	713,960



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 **Pacific Telephone**

358,000 cu. yd.	Uncl. excav.	(1)	(2)	2 ea.	36 in. aprons for pipe culv.	125.00	110.00
1,025 cu. yd.	Excav. for struts.	.53	.86	3,800 cu. yd.	Pl. salv. topsoil.	.45	2.00
66,500 cu. yd.	Selected borrow, Class "A"	3.00	2.00	840 lin. ft.	Reconst. fence.	.50	.28
48,500 y. u.	Haul	.85	.30	1,050 lin. ft.	2 in. welded galv. tubing.	1.00	9.00
10,750 M gal.	Watering embankments.	.36	.50	3 ea.	16 ft. cattle guard.	1,000.00	750.00
2,900 M gal.	Watering base and surf. courses.	1.00	2.00	1 ea.	24 ft. cattle guard.	1,250.00	900.00
500 hr.	Rolling, power roller.	8.00	7.00	170 lin. ft.	Move and reconst. fence.	1.50	.26
1,800 hr.	Rolling, tamping roller.	10.00	.10	1,500 lin. ft.	Move and reconst. fence.	.50	.26
2,500 hr.	Rolling, pneumatic tire roller.	8.00	.10	1 ea.	Move and reset gate.	50.00	15.00
1,850 cu. yd.	Mech. tamping.	3.00	2.50	130 lin. ft.	6 in. helical corr. met. pipe.	2.00	2.00
320 lin. ft.	Small ditches.	50	1.00	120 lin. ft.	Move and relay 1 in. water pipe.	3.85	2.00
30 sta.	Oblit. of old road, Class II.	18.00	50.00	910 lin. ft.	12 in. reinf. conc. sewer pipe.	3.00	3.00
49,800 ton	Cr. gr. base, Type "B" ¾ n. max.	1.46	1.47	8 ea.	Catch basins, Type 2.	3.50	140.00
41,500 gal.	RC-1 asph. rd. mat. for prime.	.20	.21	5 ea.	Manholes, Type "B"	450.00	250.00
690 ton	Blotter material, Class "B"	4.00	3.00	170 sq. yd.	Conc. driveways, Type "A"	5.50	5.20
850 ton	120-150 Pen. asph. rd. mat.	45.00	40.00	2,200 ton	Pl. pl. mix bit. surf. on appr.	1.00	5.35
17,000 ton	Plmix bit. surf., Class "C"	3.70	4.35				
12 cu. yd.	Conc., Class "A"	115.00	200.00				
830 lb.	Metal reinf.	.26	.20				
100 lin. ft.	Pipe handrail.	10.00	4.00				
0.08 mfbm.	Timb. untr. F-1200 str. gr.	400.00	500.00				
3,250 lin. ft.	12 in. pipe culv.	2.50	3.00				
170 lin. ft.	18 in. pipe culv.	4.50	5.00				
1,380 lin. ft.	24 in. pipe culv.	6.25	7.00				
290 lin. ft.	30 in. pipe culv. (10 ga.) or ext. str.	12.00	14.00				
220 lin. ft.	36 in. pipe culv. (10 ga.) or ext. str.	16.00	16.00				
1,320 lin. ft.	Comb. curb and gutter, Type "A"	3.00	2.75				
3,775 lin. ft.	Steel beam type guard rail.	3.75	3.05				
50 ea.	Guide posts, Type 4.	9.00	5.00				
20,000 lin. ft.	Wire fence, Type 1-A.	.40	.21				
1,750 lin. ft.	Wire fence, Type 3-A.	.45	.29				
36 ea.	8 ft. steel gates.	135.00	39.50				
1 ea.	10 ft. steel gates.	145.00	52.00				
6 ea.	12 ft. steel gates.	155.00	55.00				
4 ea.	14 ft. steel gates.	165.00	61.00				
530 sq. yd.	onc. sidewalk.	5.50	4.50				
66 cu. yd.	Spec. backfill, Class "A"	3.00	5.00				
2 ea.	Project markers.	30.00	20.00				
100 ea.	Right-of-way markers.	8.00	8.00				
4 ea.	12 in. aprons for pipe culv.	10.00	20.00				
30 ea.	24 in. aprons for pipe culv.	55.00	42.00				
1 ea.	30 in. aprons for pipe culv.	75.00	60.00				

HIGHWAY—7 mi. of highway construction in Montana

Montana—Meagher County—State. A \$165,147 contract has been awarded to Richardson Construction Co. for 7.4 mi. of plant mix & seal coat oil highway.

(1) Richardson Construction Co., Inc.	\$165,147
(2) Northwestern Engineering Co.	167,879
S. Birch, Inc. & S. Birch & Sons.	168,489
Peter Kiewit Sons' Co.	170,049

	(1)	(2)
1,358 ton	Crushed gravel cover material ¾ in.	\$ 9.00 \$ 9.00
17,877 ton	Type II plant mix.	5.65 6.35
231,361 gal.	150/200 pen. asph. cem.	.18 .14
30,670 gal.	Applying RS-2 emuls. asph.	.20 .18
263 gal.	Applying RC-1 liq. asph.	.30 .50
10,813 gal.	Applying RC-1 liq. asph.	.20 .18
40 hr.	Watering.	10.00 10.00
Lump sum	Furn. and maint. water pl.	1,000.00 1,250.00
50 unit	Rolling.	10.00 10.00

Space is sold as advertisers' inches. All advertisements in this section are 1/8 in. short of contracted space to allow for borders and composition.

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

FOR SALE

- 1—9W Bucyrus-Erie Dragline
- 4—200W Bucyrus-Erie Draglines
- 1—620 Page Dragline
- 1—1201 Lima Dragline
- 1—80D Northwest Shovel & Drag. Comb.
- 1—120B Dragline Boom
- 1—Koehring 1 1/2 Yd. Elec. Tunnel Shovel
- 1—44B B-E Comb. Drag. & Shovel
- 6—9LTD Euclids Bottom Dump
- 4—36TD Euclids End Dump

Catalog on request.

J. A. TERTELING & SONS, INC.
Box 1428 Ph.: 3-5401 Boise, Idaho

Equipment and Small Tools, Rigging Supplies, Diving Equipment from heavy construction project. Soon available for sale at bargain prices. List available.

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P. O. Box 518
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FOR SALE

- 4 Euclid Rear-end Dumps Model 36TD Cummins NRT Diesel. New June, 1957. 700 hours.
- 2 International Payhaulers "Model 95," Turbocharged Diesel Engine. New June, 1957. 500 hours.
- 4 DW-21 Caterpillar Tractors Series "C." 29.5 x 29-34 Ply Tires. New June, 1957. 600 hours, and
- 4 PR-21 Athey Rear Dump Trailers. 600 hours.
- 1 4500 Manitowoc 5 Yd. Shovel Cummins VT12 Diesel Engine with Torque Converter. 1000 hours.

DONALD M. DRAKE COMPANY
1600 N. W. Savier St.
Portland 9, Oregon
CA 6-3991

ADVERTISEMENT AUSTRALIA

Snowy Mountains Hydro-Electric Authority
Tenders are invited for Schedule of Rates contract for furnishing labour and materials and performing all work for the construction in New South Wales, Australia, of the following works:

CONTRACT NO. 20,034—MURRUMBIDGEE-EUCUMBENE TUNNEL, TANTANGARA DAM AND APPURTENANT WORKS

Tantangara Dam will be a concrete gravity dam approximately 145 feet high with a crest length of approximately 710 feet.

The Murrumbidgee-Eucumbene Tunnel includes a concrete intake and trashrack structure, a concrete lined circular tunnel 10 feet 2 inches in diameter and approximately 160 feet long, a concrete lined underground control structure approximately 210 feet long by 30 feet high by 12 feet wide, a partially lined tunnel of horse shoe section approximately 12 feet high by 12 feet wide and 10.8 miles in length and a concrete outlet structure including a measuring flume and baffled apron approximately 210 feet long.

LOCATION

The site of the works for the contract is in the Snowy Mountains Area in the south-

eastern part of the State of New South Wales, Australia, at approximately longitude 148° 30'E and latitude 36°S. The elevation of the works varies between 3,600 feet and 4,200 feet above sea level.

TENDER DOCUMENTS

Tender documents comprising Form of Tender, Conditions of Tendering, General Conditions of Contract, Draft Form of Agreement, Schedule of Rates, Table of Estimated Quantities and Amounts, Specification and Drawings may be obtained by prospective Tenderers on or after 4th November 1957, on application to:—

Australian High Commissioner,
Fifth Floor,
Royal Bank Chambers,
100 Sparks Street,
OTTAWA, Canada.

Australian Consulate-General,
Fourth Floor,
International Building,
Rockefeller Center,
636 Fifth Avenue,
NEW YORK, U.S.A.

Australian Consulate-General,
153 Kearny Street,
SAN FRANCISCO, California,
U.S.A.

Liaison Officer,
Snowy Mountains Hydro-Electric Authority,
c/o United States Bureau of Reclamation,
Federal Center,
DENVER, Colorado, U.S.A.

Tender documents may be obtained on payment of Twenty-two Dollars Fifty Cents (U.S.) for each set of documents for the contract. Four additional sets of documents for purposes of tendering will be provided free of charge at the time of inspection of the site.

PRELIMINARY DEPOSITS

A preliminary deposit of £A10,000 payable at Sydney, New South Wales, Australia, must be lodged with the tender.

INSPECTION OF SITE

Tenderers are required to inspect the site of the works and should communicate with the Snowy Mountains Authority, Coombe New South Wales, Australia, regarding detailed arrangements.

GENERAL INFORMATION

For its own purposes the Authority has compiled certain information regarding the geology, hydrology, and meteorology of the region and general information concerning local conditions. The information is not part

(Adv. Australia Cont'd)

of the tender documents. This information will be made available to Tenderers when they inspect the site.

SPECIAL QUALIFICATIONS REQUIRED OF TENDERERS

Consideration of tenders is dependent upon Tenderers having a background of successful achievement in the execution of similar large civil engineering works and possessing technical and other resources necessary to complete the work successfully within the contract period.

ALTERNATIVE TENDERS

Concurrent with the invitation to tender for the construction of these works the Authority is also inviting tenders for the construction of:—

CONTRACT NO. 20,025—

TOOMA DAM, TOOMA-TUMUT TUNNEL AND APPURTENANT WORKS

CONTRACT NO. 20,033—

T2 DIVERSION DAM, T2 POWER STATION AND APPURTENANT WORKS

Tenderers are invited to submit alternative tenders conditional on the Authority accepting their tenders for more than one contract.

SUBMISSION OF TENDERS

Tenders for the contract must be submitted in duplicate in accordance with the Conditions of Tendering, enclosed in sealed envelopes appropriately endorsed with the contract number and name of the work tendered for, and addressed to:—

The Business Manager,
Snowy Mountains Hydro-Electric Authority,
Post Office Box 332,

COOMA NORTH, N.S.W., Australia.

The tenders must be lodged in the Tender Box at Head Office of the Authority at Cooma or be sent by pre-paid post in time to be delivered in the ordinary course of mail by 12.00 noon on Monday, 3rd February 1958.

K. See,
Business Manager.

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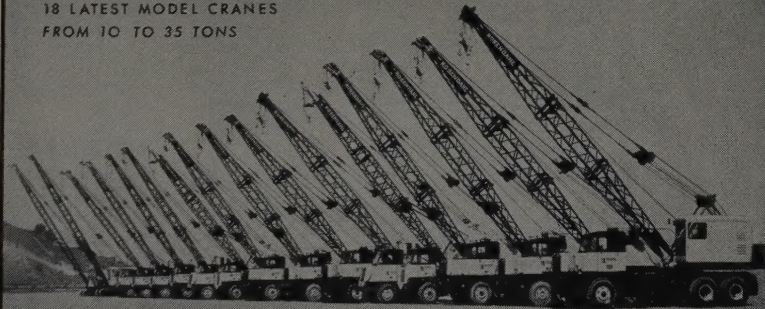
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Thomas E. Kilty
Personnel Director
Wyoming Highway Department
Cheyenne, Wyoming

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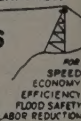
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Get out of the West

Engineers with the Materials and Research Department of the California Division of Highways, as reported in their monthly paper, have uncovered some frightening statistics. Using the 1947-1957 rate of expansion of freeways and subdivisions, they have found that at 6:39 p.m. on October 5 in the year 2022, all available land in California will be occupied by freeways or subdivisions. They assure us, though, that we needn't worry

about the future of the construction industry beyond that date because by that time they will have perfected P.T.B., which will allow us to extend operations into the Pacific Ocean. P.T.B. is "pontoon treated base."

More cats on poles

Last month on this page we printed, without fanfare or ado, a few things about the problem of removing cats from street-light poles. The lack of response to our remarks was so complete that it seems safe to pursue the subject a little further.

To review, we reported that Seattle City Light engineers discovered that their linemen last year removed 114 cats from street-light poles, and the end is not in sight. Among the many suggestions our readers thought about sending in was no doubt one like this: The poles could be wired in such a way that by pushing a button huge quantities of electrons would be sent surging through any trespasser. This idea has a good deal of merit but unfortunately it cannot be explored here because the analysis quickly gets into theology, which is beyond the scope of this magazine.

Happily, research in the general area of cat psychology is being carried out by the Corps of Engineers and already an important discovery has been made. It was the result of sheer accident, as is so often the case with great scientific advances, like the lever, the cigar, and the diesel locomotive. It is now definitely known that curiosity need not kill the cat, but it might make him radioactive.

For this guiding principle we have to thank a construction crew headed by Tom Marrs. The Corps of Engineers sent Marrs and four men into the wilds of the South Fork of the Clearwater River in Idaho to build a snow gaging tower. (An article on page 34 shows how such a tower is built and how a buried deposit of radioactive cobalt is used to measure water content of the snow.) The men carried sleeping bags in order to camp at the site and finish the job in a week or less.

On the very first day they noticed some cougar tracks as big as pie tins. As it turned out, there were tracks all over the place. In fact, there was the

cougar, watching them from the edge of the clearing. Loud hammering didn't scare him away; it made him all the more interested in the proceedings. As is always the case with wild beasts, he knew perfectly well that firearms were not included in the camping equipment, and he paraded brazenly at point-blank range.

When evening came one of the men said that it seemed kind of silly to camp out on the hard ground when just a few miles away was Orogrande, an abandoned ghost town. There were some swell rotten buildings they could stay in, he said. The idea was enthusiastically approved and in the gathering gloom they trudged into Orogrande, whistling loudly.

Every evening they made the trek to Orogrande and each morning when they returned to the job the cougar was waiting. The job was finished without hostilities breaking out and it was with great relief that Marrs and his men left the site for the last time. The last they saw of the cougar he was scratching his back on the sharp edge of one of the up-rights. He probably feels it was mighty nice of the Corps of Engineers to go to so much trouble.

Racing with the moon

With sputniks spewing into the atmosphere like puffed wheat shot from guns, we should all pause and ask ourselves some of the big questions. For instance, when Man finally reaches the moon, what will he write on it first, "Workers Arise," or "Drink Coca Cola"? If "Workers Arise" is first, will we add, "And workers, while you're arising, drink Coca Cola"?

Construction—4 B.C.

"May they toss in their graves and the clay rest heavy upon them, those designers of roads, those highway engineers!" Ovid. The Loves, Book Two, XVI-8.

... The Editors