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This month . . .

Subdivisions: Big construction in the West

New way for picking FAS routes in Washington

Insulation holds heat in winter concrete

COVER see page 4

NOVEMBER 1954

OVER 15 YEARS OF LOW MAINTENANCE COSTS

reports Isbell Construction Company, Reno, Nevada



TEXACO SIMPLIFIED LUBRICATION PLAN — With not more than six Texaco Lubricants you can handle all your major lubrication. The plan saves time and money, reduces lubricant inventories, eliminates lubrication mistakes. Ask a Texaco Lubrication Engineer all about it.

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UPSY-DAISY

ANOTHER ROCK PROBLEM

for R. A. Heintz, Portland, Ore.

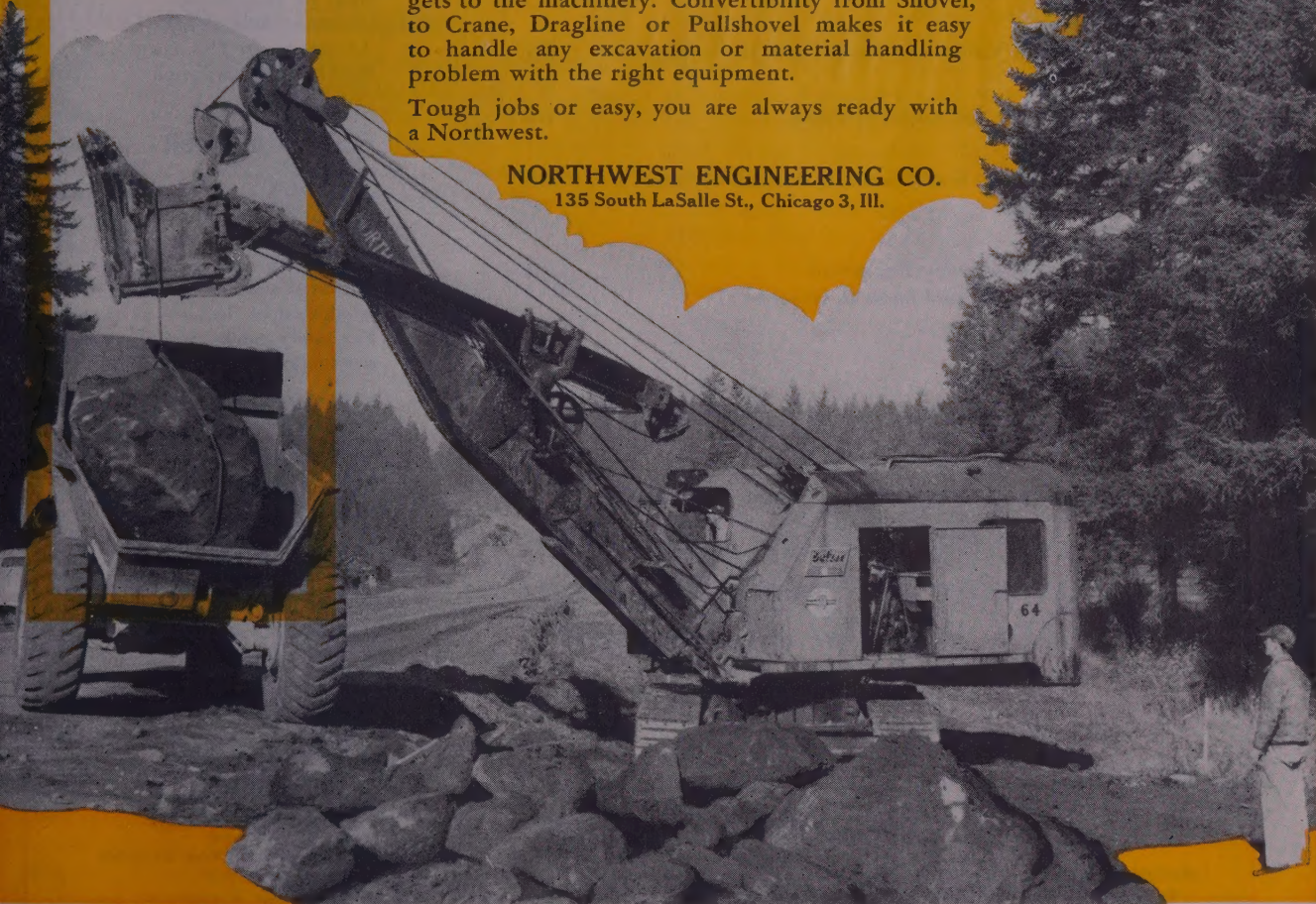
THIS bit of load lifting is on the Vancouver Expressway and the shovel, of course, is one of the nine Northwests that R. A. Heintz of Portland, Oregon has owned.

But that's the main thing about a Northwest! You're always prepared for the tough ones. You're equipped with the maximum in digging ability even when the jobs look easy—you're ready when the unexpected surprises you because your Northwest is built for the hardest job a Shovel, Crane, Dragline or Pullshovel has to do. Simplicity reduces upkeep and adjustment and cuts "down" time. Ease of operation without delicate mechanical complications is assured by the "Feather-Touch" Clutch Control. Uniform Pressure Swing Clutches take the jerks and grabs out of swinging and make spotting easy. The Cushion Clutch eliminates shock overloads before the shock gets to the machinery. Convertibility from Shovel, to Crane, Dragline or Pullshovel makes it easy to handle any excavation or material handling problem with the right equipment.

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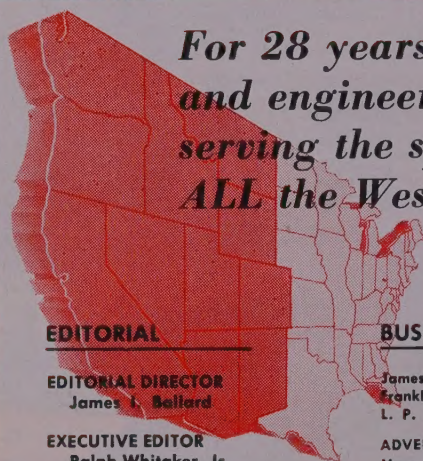
- Subdivisions: Big construction in the West**
Part 1: Clearing 1,000 acres, moving 6,500,000 yd. 49
- New way for picking FAS routes in Washington counties . . .** 53
By Pat Thomson
- Insulation holds heat in winter concrete** 56
By George B. Wallace
- WASHO meets at Sun Valley—a report and three papers . . .** 59
- Low bidder shows how on underpinning** 64
- Steam plant construction is different at Alaska airbase** 66
By George Avery
- Paving on the slope at Garvey Reservoir** 68
By Phillip L. Bailey and Louis R. Horater

DEPARTMENTS

- Editorial Comment 47
- Reports from the Courts 70
- News 76
- Alaska Newsletter 90
- Engineers on the Move 92
- Supervising the Jobs 96
- Tricks of the Trades 108
- New Literature 114
- New Equipment 118
- Unit Prices 130
- News of Distributors 132
- Classified Advertising 134
- Advertisers in This Issue 135
- Backfill, Uncompacted 136

FRONT COVER

YOU DON'T HAVE to be in England to drive on the left side of the road. The fast moving heavy equipment pictured here is passing over a limited width timber bridge under good control because of this trick. For more tricks for earth-moving production, see page 51.



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\$10,000,000,000 for highways

Elsewhere in this issue a report of the 1954 convention of the Western Association of State Highway Officials touches on the federal administration's proposal for a 10-year, \$50,000,000,000 program of highway construction. Confidence in the positive outcome of the proposal was expressed by a member of the AASHO staff as well as by individual delegates and guests at the WASHO meeting.

Just what does the coming program mean to the West? It means about \$10,000,000,000 in highway construction. The full impact can better be expressed this way:

Say, conservatively, that the program gets off to a gradual start with only \$500,000,000 worth in the West during the first year—when it comes. On the basis of past performance this will mean an additional \$65,000,000 in Washington—145% of current expenditures. Additional! For California the percentage is about the same, the amount running close to \$200,000,000. Colorado will be applying \$29,000,000—over and above a typical current year's figure of about \$20,000,000.

At first glance, it would appear that our highway departments will have a bear by the tail. Actually, they will have widespread support in meeting the challenge. First and foremost will be the construction industry of the West. Not inconsiderable will be the West's entire—and almost universally motoring—population. Their interest is well expressed in the statement of a California highway official, recently quoted at the time of a new freeway opening: no ribbon cutting, but “a man on the construction crew will just pull away the barricades and run for his life”!

What's the life expectancy?

This question may take various forms, because not every engineering problem involves a tangible design to which a life can be assigned. Phrased in a ridiculous manner: An owner wishes to use 35,000 sq. ft. on a 7,000-sq. ft. piece of property! The engineer's reply necessarily takes the minimum form of a five-story structure. But this is not design of a structure for its own sake. It is the solution to a problem of needs.

And there are other constituent needs within the main problem. They comprise a set of limits that further narrow the engineer's choice of solutions. In a metropolitan situation where streets and patterns of land use are well established, life expectancy may not be a primary design criterion. In the West, chances are that lateral force alone will call for stouter design.

But what about the importance of economic life in another important civil engineering field—highways? Here is a fluid situation. The pattern of Western automotive transport is in every respect a changing one.

Vehicles change in weight, dimensions and speed. They change in character, their evolution having now made Western highways into major avenues of commerce. And they have steadily increased in numbers.

The Western community changes, and it is vital to the pattern of automotive transport. For the most part, growth is the rule. But the rate varies from one place to another. Exploitation of a newly discovered resource brings early congestion to every passable road in the area.

The result of this shifting pattern is constant change in Western highway needs—as expressed by design standards and location. Today's highway location, unlike today's 12-story building, cannot realistically be assigned an extended economic life.

Why, then, build so many of our highways and highway structures “hell-for-stout”? Geometric standards and physical standards for carrying capacity can be met with our cheapest construction methods and materials. And a 15- or 20-year expectancy is well within the time limits for full performance of such materials.

To build for a 50-year life with today's geometric and physical standards is unrealistic on the basis of past experience. In addition, the more durable methods and materials are more expensive.

It is not a case of knowing when the highway will be realigned, or where its new location will be at that distant date. It is enough to know only that there will be change. Otherwise, continuing as at present, this hell-for-stout structure some day will be at best a farmer's access bridge, and at worst the object of some expensive demolition work.

TAKE IT FROM A MAN WHO KNOWS

HERE'S A MISSOURI CONTRACTOR WHO SAYS...

SHOUCE



1144 SOUTH KENNEDY AVE.
SPRINGFIELD 4, MO.

Registered Professional Engineer

September 23, 1954

Austin-Western Company
Aurora, Illinois

Gentlemen:

After using our new Austin-Western hydraulic crane for approximately three months, we would like to express our thoughts to your company as to the maneuverability of this piece of equipment.

Up to date we have laid approximately 11,000 lineal feet of concrete pipe ranging from 48 inches in diameter down to 12 inches in diameter.

The location of this drainage pipe was such that it was impossible for us to use a crane with a long boom attached, on account of the high tension transmission lines and the large lead telephone cables that were approximately 14 feet above the ground. Also this drainage was located in places that were inaccessible with other type of equipment. Our Austin-Western hydraulic crane due to its horizontal and telescopic boom made it possible for us to place all this tile with two workmen. Otherwise, it would have required ten workmen with a flat bed truck to transfer these heavy concrete pipes from the stock pile to the site.

It also replaced another machine that would have been necessary to perform these operations had we not purchased our Austin-Western crane. Generally, we are very pleased with the operation of this equipment as of date and will recommend same to other prospects who wish to contact us for further proof of the maneuverability of this equipment.

Very truly yours,

R. S. Houce
R. S. HOUCE
P.E.

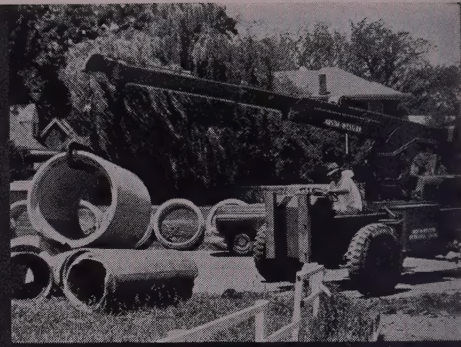
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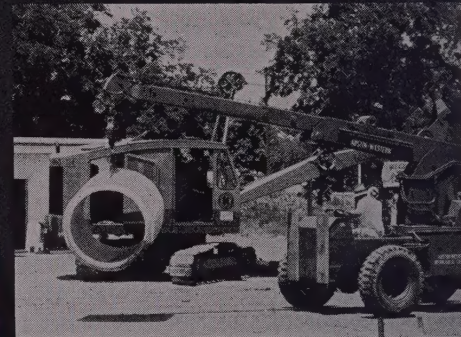
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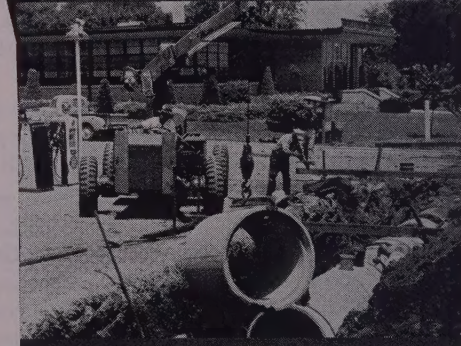
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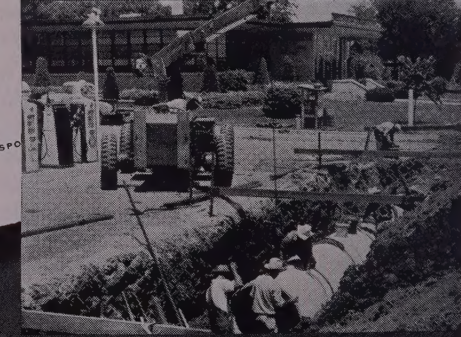
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NOVEMBER 1954

SUBDIVISIONS: Big construction in the West



PART 1 OF 4

Clearing 1,000 ac., moving 6,500,000 yd.

This year—1954—one out of every three construction dollars in the U. S. is being spent on private residential subdivision development. The size and scope of this work rivals the large public works projects for the amount of men, equipment, and materials involved (\$7.3 billions for the first eight months this year). This article—the first of four—describes initial site development on a typical large Western subdivision now under way.

EXPANSION IS THE WORD. California is busting at the seams from a tremendous population increase. The result has been a big boom in housing, commercial and industrial development.

Typical of this trend is the current undertaking at the old Mills Estate in San Mateo County. The Trousdale Construction Co. of Los Angeles is developing this 1,000 ac. of ground, title of which is vested in Atlantic Life Insurance Co. of Richmond, Virginia. The tract extends from (east to west) sea level to over 600 ft. in elevation. It was bounded on the south by the city of Burlingame and to the north by Millbrae. A north-south railroad and major highway artery dividing the area into three distinct sections posed further problems. Improvements to this ground to ready

it for buildings will be in the order of \$10,000,000. That's big construction!

A great amount of planning and co-operative effort was required between Trousdale and the two neighboring cities before the actual type of development was decided upon. This ate up almost another year's time after the original purchase date early in 1953. As it now stands, about two-thirds of the land will be incorporated into Burlingame and about one-third into Millbrae.

A first step—engineers

Two firms were retained by Trousdale to handle the engineering problems involved. One of these is Wilsey & Ham who have been instrumental in the basic layout development. Determination of the street layout and utility design (water, storm drains,

sewage, electrical) were important. The rolling terrain presented important decisions to be made on the amount of fill required in the low level mud flats and the cut and fill requirements of the higher hills. They act as agents for Trousdale in handling the various contracts for actual construction.

Another firm, Dames & Moore, is handling soil investigations. A complete community presents many foundation requirements where there are to be light industries, commercial buildings, and homes. Likewise, the soil itself, varying from clay to sand, required careful analysis as to what it would provide as foundation material for buildings—as well as for streets and utility use. The preliminary work has now been done and the firm is continuing as consultants



DIRT IS FLYING as each of these Wooldridge Terra Cobras is push-loaded by two Allis-Chalmers HD20's. The rapid loading time is only 15 to 20 sec. in a distance of 100 to 150 ft.

on compaction tests of fill areas and slopes.

Of the original 1,000 ac., about 200 have been set aside for a high school, intermediate school, hospital, and airport and freeway extension. The remaining 800 ac. will be sub-divided as follows:

180 ac.—light industry and manufacturing.

30 ac.—commercial (shopping centers, filling stations).

25 ac.—professional buildings.

20 ac.—garden apartments.

35 ac.—Four grammar schools.

500 ac.—residential homes (about 3 per ac.).

Clearing

A unique clearing operation was started in March 1953. Trousdale called upon the LaFon Bros. Tree Service to remove about 40,000 eucalyptus, pine, fir, cypress and other species. Delayed by late rains, the clearing job encountered further difficulties when the accepted method of clearing by means of a heavy chain dragged between two crawler tractors failed to uproot the tough-rooted eucalyptus trees. These trees would bend, to snap off at the trunk several feet above the ground, leaving a lengthy and expensive stump removal operation. A solution to the problem was found in special equipment designed and built by Peterson Tractor & Equipment Co. of San Leandro, Caterpillar dealer, and American Tractor Equipment Corp. of Oakland.

Peterson equipped a Cat D8 tractor with a special tree dozer on the front, and an ATECO hydraulic rock ripper mounted on the rear. In place of the usual rock ripper standards, ATECO furnished special root cutting knives for the ripper capable of penetrating 30 in. below ground surface and severing roots up to 10 or 12 in. in diameter. Made of alloy steel plate 3 in. thick, the knives are

slightly hook shaped to aid penetration and shearing action. One face of the tapered cutting edge is hard faced, providing a self-sharpening effect. Each knife weighs 860 lb. The tree dozer is carried on a special head frame attached to the standard bulldozer push beams. It rests on top of the regular bulldozer bowl and is bolted to it so the tree dozer can be raised or lowered with the bulldozer power control unit. The long tree dozer push arm carries a head equipped with hard faced teeth to bite into the tree trunk without slipping.

Two San Franciscos . . .

To fully appreciate that subdivision development is big business, here are some facts and figures: "Ninety square miles or 57,619 acres of land in the Bay area were subdivided in the seven year period ending June 30, 1953," a recent study by the San Francisco Bay Area Council revealed.

"As a contrast, San Francisco occupies 45 square miles with a net residential area of approximately 13 square miles. During the seven year period covered by the fiscal years 1947 through 1953, the acreage subdivided in each of the three Bay Area counties, Contra Costa, San Mateo and Santa Clara, exceeded the net residential area in San Francisco.

"The study showed that a total of 2,833 subdivisions in the nine counties had been approved by the California Division of Real Estate during the seven year period. Santa Clara County had the greatest number of subdivisions in the Bay area, 768, while Contra Costa led in the total subdivided acreage, 14,050."

The arm has a reach of 9 ft. 4 in. in front of the bulldozer bowl when in its normal position with the head 12 ft. above ground level.

To fell a tree, the operator lowers the knives into the ground and makes three or four passes close to the trunk to sever the supporting roots. He then rams the tree 12 to 15 ft. up the trunk with the tree dozer, toppling it to the ground. The entire operation requires but 3 to 4 min., even on trees several feet in diameter.

A final step in mechanizing the job came about when LaFon had trouble keeping the green trees burning. This problem was solved by mounting the propeller from a wind machine used for frost protection in citrus orchards on the front frame of an old Cat D4. Belt driven from the former power-take-off, the 4-bladed 7½-ft. propeller provided a steady draft to keep the fires burning.

Earth moving

Four general areas, involving about 6,500,000 cu. yd. of earth moving, are involved. The first area for light industry, calls for 1,750,000 cu. yd. of fill. The second area, commercial, required 200,000 cu. yd. of fill (now completed). The third area of professional buildings and apartments calls for about 650,000 cu. yd. of fill. The fourth and largest area for residences will require 4,000,000 cu. yd. of balanced cut and fill. For the first three areas, or about 2,500,000 cu. yd. of fill, all material—a sandy loam—is being taken from one borrow area near the foothills. Haul lengths for the fill area vary from 2,000 to 10,000 ft. Between February and September, this year, about 550,000 cu. yd. of fill operations had been accomplished.

The contractor handling all of the earth moving is J. A. Thompson & Son of Los Angeles who has in turn a subcontract with the Hindry Construction Co. for this project. Thompson is furnishing all of the earth moving equipment. Work was started in February 1954, on two bridges and their approaches. These were necessary to the fill operations and pass over a busy highway and railroad.

By this September Hindry had 18 Wooldridge Terra Cobras on the job, with 14 of them in operation. This number has been built up over a period of time as they became available from other work in Los Angeles. Most of these Terra Cobras were acquired by Thompson in 1946. The total number will be about 24 at the height of earth moving operations later this year. The need for them is great at present, and they are being sent up immediately from Los Angeles with no major overhauling being done.

Main filling operations are proceeding at present on the industrial area with a haul length of about 1

mi. On this haul, the Terra Cobras are averaging about 6 trips per hr. Each is being loaded at the borrow pit by 2 Allis-Chalmers HD20s. Four pushers in all are kept busy at the pit. Loading time for each unit is 15 to 20 sec. in a distance of 100 to 150 ft. A fast rate of hauling is evident from the 12,000 cu. yd. being handled daily. All roads are kept well watered down and bladed.

New tricks

Here are two new tricks. Because of the relatively narrow haul road over the bridges and approaches, which is approximately 32 ft. out-to-out with 12½-ft. lanes, the drivers are driving on the left side of the road. Better able to see the edge of the road and bridges, the drivers are rolling along at full speed with no fear of collision. Also, the drivers are strapped into their seats with safety belts; this is in case a bowl should drop or if they run off the bridges or approaches. Such a precaution has already saved one man's life.

Marvin McCoy, superintendent for Hindry, is doing an excellent job to obtain the maximum efficiency from his Terra Cobras. He has one man whose full time job it is to keep time records on this equipment. This procedure helps to measure the performance of the drivers (which varies considerably) as well as the equipment.

With regard to lubrication and preventive maintenance, McCoy has two shifts on his one grease truck. The major portion of the routine greasing is done on night shift when the equipment is lined up.

Bridges

An economical and interesting solution to the problem of earth moving over the highway and railroad was found. Timber Structures, Inc., contracted for the design, fabrication, and erection of two bridges that will have better than a 50% salvage value when this project is through. The girders can be used for other timber bridges or for formwork beams in concrete bridge construction.

In both bridges, 6 girders are used parallel to the road haul, giving a 32-ft. out-to-out width. One span of 37 ft. 6 in. over the railroad requires 11x32½-in. girders and another over the highway of 60 ft., requires 12½x45½-in. girders. Minor approach spans of 15 and 20 ft. use 12x19½-in. girders and 11x24¾-in. girders respectively.

The decking is solid 2 x 12 No. 2 Douglas Fir planking on edge with 2 in. of blacktop wearing course on top of this. Terrific vibration, set up by the extremely heavy moving equipment, requires that the bolted connections of the bridges be tightened about once monthly. If all goes well, about 3 yr. more will be required to complete layout and construction of the improvements. Two more



TWO LAMINATED WOOD BRIDGES with spans up to 60 ft. were manufactured by Timber Structures, Inc., to solve the problem of earthmoving over a four-lane highway and over railroad tracks. All timber parts will have excellent salvage value.



FULL 1,000 AC. OF DEVELOPMENT can be seen here. Trees have been cleared from the hills in the foreground with burning still in the process. Borrow pit is located at left center of photo with material being hauled to the flat area in far background.

years after that should see a major portion of the various buildings completed.

Key personnel

Trousdale Construction Co. is maintaining a Northern California office at Millbrae. For this company, Paul W. Trousdale is president; L. E. Weisenburg, vice-president and

civil engineer in charge of this development; John G. Vasos, superintendent; William Irwin, supervision of house planning. Legal matters are handled by Charles H. Church, attorney of Los Angeles, while accounting and fiscal matters are supervised by Louis M. Clark, C.P.A. of the accounting firm of Parker & Parker, also of Los Angeles.

For the engineering firm of Wilsey & Ham, with headquarters in Burlingame, general plans were prepared under the direct supervision of Charles Blair and his assistants Herbert Hall and William Fitch. Construction plans were prepared under the direction of Jack Van Zant. William Wright is head of the survey section and field supervision is under Albert Brown.

For Hindry Construction Co. Marvin McCoy is general superintendent, R. E. Price is office engineer, Robert R. Moodie is master mechanic, and Hal Von Scoy, Henry C. Jones and Lyle McCann are foremen.

Equipment List

- 18—Wooldridge Terra Cobras
- 8—Allis-Chalmers HD20 tractors
- 2—Caterpillar D8 tractors
- 2—Southwest sheepfoot tampers
- 2—Caterpillar No. 12 blades
- 1—Ferguson pneumatic roller hauled by a Euclid tractor
- 3—Wooldridge 25-cu. yd. scrapers
- 4—Shopbuilt 1,800-gal. water wagons with International bodies, 4-in. pumps added for quicker front or rear delivery
- 1—GMC grease truck with Alemite unit
- 1—Welders truck with 3-ton boom

New look at salt water barriers

Measurements being taken to determine practicability of salt water control in the delta opening on San Francisco Bay—Noted Dutch engineer compares problems to those successfully handled in Holland—Feasibility of master levees and barriers key to growing economic water problems.

PURSUANT TO A REQUEST from the Board of Consultants on the San Francisco Bay Salinity Control Barrier Investigation, State Engineer A. D. Edmonston has assigned 40 highly trained technicians of the Division of Water Resources and Water Project Authority to conduct studies at Pittsburg below the confluence of the Sacramento and San Joaquin Rivers to measure the quantity and quality of fresh water in the Delta region, something that has never before been determined.

Edmonston said that it is hoped these studies will provide the answers to problems involved in the operation of Central Valley Project and construction of the Feather River Project as well as the proposed salt water barriers.

Nature of measurements

A new and unique method will be followed to definitely ascertain the direction and quantity of flow during the tidal oscillation of the water in the vicinity of Pittsburg and how much fresh water is being lost out of the Delta each day. This method consists, basically, of moving a current meter through the water by a moving boat over a measured distance parallel to the thread of the stream.

The engineers and technicians of the Division of Water Resources and Authority will work for 15 days in three 8-hr. shifts. They will report their findings to the Board of Consultants, Edmonston said:

"The early estimated figure of 3,300 sec.-ft. of fresh water outflow needed to control sea-water intrusion has never been verified by any direct or indirect measurement process. Whether the actual flow is 3,000 or 6,000 sec.-ft. is a question which must be answered before the water supply of the Central Valley can be firmly established, and before the economic and financial feasibility of the proposed Bay Barrier Project can be firmly ascertained.

"A 1,000 sec.-ft. variation in this assumed salinity control demand will spell a substantial difference in the economic feasibility of any project designed to divert water from the channels of the Delta. If we find an extra 1,000 sec.-ft., it may have a \$20,000,000 capital value. The wide amplitude of tidal flows at the confluence of the Sacramento and San Joaquin Rivers and the large volume of

flow oscillating up- and down-stream past that confluence have defeated earlier attempts to directly measure the flows with the hydrographic equipment available."

The Board of Consultants comprises Raymond A. Hill, Los Angeles; Hans Kramer, Brig. General, Ret., San Francisco; Malcolm Pirnie, New York; Philip C. Rutledge, New York; and Charles E. Deleuw, Chicago. Ir C. Biemond, noted Dutch engineer, collaborated in the preparation of the Third Progress Report, and concurred in its findings and recommendations. Biemond spent two months in California making studies of possible salt water barriers at several locations in the San Francisco Bay Area. He returned to The Netherlands on August 28. The Board has scheduled its next meeting in Sacramento for the week of December 6 to 10, 1954, inclusive.

The report of the Board of Consultants made to the Water Project Authority and released September 14 recommends that in the finalization of the investigations in progress, precedence be given to determination of the quality of the water that would be available for use if a barrier or barriers were constructed. The report further recommends that the principles utilized in the protection of reclaimed lands in The Netherlands be applied to correct adverse conditions in the Sacramento-San Joaquin Delta with reference to floods and water quality. The final report of the Division of Water Resources will include studies based on these suggestions, Edmonston stated.

Dutch comparisons

All members of the Board were greatly impressed by Biemond's description of what had been done in The Netherlands to protect reclaimed lands from floods and with his views on the applicability of such principles to correction of present adverse conditions in the Delta. Application of these would involve the following:

1. Restriction of flood flows in Sacramento River, San Joaquin River and Mokelumne River to defined channels confined by master levees.
2. Closure of all connections, except for small locks, between these primary flood channels and the interior Delta channels and maintenance of water levels in these interior channels at lower elevations.

3. Construction of an independent canal for the conveyance of Sacramento River water across the Delta to the pumping plants used and planned for the delivery of surplus water to regions of shortage.

4. Provision of diversion works for the delivery of water out of the cross-Delta canal into the interior channels for irrigation of lands within the Delta.

5. Provision of pumping plants for the discharge of return and drainage waters into the primary flood channels.

6. Works to prevent the encroachment of saline waters up to the point of diversion from Sacramento River, if such works be found necessary.

Scope of investigations

The investigations must cover means of delivery of water to areas adjacent to the San Francisco Bay in urgent need of an adequate supply of fresh water for domestic and industrial uses, because such needs cannot be satisfied until the water is brought to the point of use. If it should be found from further and more detailed investigation that the lakes created by a barrier or barriers may not be relied upon as a permanent source of potable water for the San Francisco Bay region, then alternative means for the delivery of water of good quality into that area must be considered. Should this not be done as part of the current investigation, the solution of the basic problem of providing additional water to offset present shortages and potential needs will remain unsolved.

The Water Project Authority, through the Division of Water Resources, is conducting the bay barrier investigations with an appropriation of \$250,000 voted by the legislature when it adopted the Abshire-Kelly Salinity Control Barrier Act of 1953. The Water Project Authority shall report to the legislature the result of its studies not later than March 30, 1955.

Save time and money—electric stud welding

STUD WELDING HELPED Soule Steel Co. of San Francisco save upwards of \$5,000 on the installation of sash in the concourse building at the city's new municipal airport. Charles Hoss, erection superintendent for Soule, subcontractor to Carl N. Swenson Co., general contractor, reported that about 12,000 5/16x3/4-in. AF threaded studs were fastened to the exterior of the steel columns with a Nelson stud welding gun. This work was completed in half the time it would have required if through bolts had been used.

New way for picking Federal Aid

Secondary route in Washington counties

If enough money were available, every cowpath could be paved. The amount that is available just won't stretch that far. It's a matter of determining—by some sound and easy-to-apply method—what secondary road should have priority ahead of another within the county. The author tells you from his own experience of a new method that can be easily applied to help solve the problem.

By **PAT THOMSON**
County Engineer
Douglas County, Washington

UNDER THE FEDERAL AID highways acts all of the forty-eight states as well as Hawaii, the District of Columbia, and Puerto Rico, receive annual allocations of Federal Aid Secondary (FAS) funds. The extent of the financial aid given is shown by the Department of Commerce announcement of the amount for the 1956 fiscal year, which begins July 1, 1955. The annual federal aid authorization for highways is \$875,000,000. Of this \$315,000,000 is for primary highways, \$210,000,000 for secondary roads, \$175,000,000 for urban primaries, and \$175,000,000 for the national interstate system. Almost \$65,000,000 will be spent in the Pacific Northwest.

Who gets FAS funds

The Acts require all states, except those directly responsible for all road mileage within the state, to share the secondary funds with county road departments. In Washington, all counties but one have actively participated in the program. Federal regulations governing expenditures of FAS funds contemplate 50% shall be expended on county routes and the balance on state routes of the FAS system. Eligibility is somewhat loosely defined though, for original regulations say, "Roads selected shall be roads not included in the Federal Aid highway system and shall be exclusively within the rural areas."

Federal aid secondary routes in any county are required to form an integrated system of rural roads. By federal interpretation, a route is considered integrated if one end of that route ties in directly with another road on either the federal aid primary system or secondary system.

Actually, there is no statutory limit to the mileage a county may have on its federal aid system. Common sense analysis governs this mileage, however, to that amount a county can maintain, construct, and

reconstruct on its total estimated matched federal aid funds.

The initial mileage selected in Washington State counties was limited in extent, selected from what seemed the most important routes in the county. However, most of these routes have been constructed, or economic conditions have been changed drastically, so that counties are requesting additional mileage.

The FAS program was established contemplating a cooperative construction program on a pre-selected system of the most important routes in the county. Previous county-wide studies for system selection tried in this state have not proved satisfactory. Consequently selection has degenerated to a "add a route a year" policy.

Fred Dixon, district engineer for the Bureau of Public Roads in this state, was highly concerned because the principles of the Highway Acts were not being adhered to and very definitely felt that a program of system overhaul was in order. The annoying question was how to do it at a reasonable cost and within a rea-

sonable length of time. He reasoned that if means could be devised that (a) would make it possible to evaluate the importance of the county mileage not included in the approved system, (b) would not be excessively time-consuming, and (c) could be done by the local officials themselves with assistance from the state and bureau—then those counties in need of program latitude should be willing to cooperate by making such a study. These specifications suggested a rating system based on evaluating the various elements that make importance on a relative basis rather than on the basis of a mass of statistics. Thus, the time involved in gathering the statistics and most of the cost would be eliminated. To do this and still come up with a study of value would require that the relative rating be done by those best informed in the study area. This immediately suggested the county commissioners and county engineer.

Dixon method

The Dixon method, used successfully in one county prior to the Douglas County study, is based on rating a set of elements for each route, or section of a route, included in the study. This is on a 1-10 scale and computed for each route or section. From these ratings, an index is derived to arrange the route or sections by order of importance and permit selection of routes for system expansion in a descending order of economic value.

Dixon hopes the counties in this state that are in need of system expansion will take advantage of this



LOOKING OVER THE RESULTS of the Douglas County road survey are (left to right) Roy Nelson, P. C. Thomsen, and Morris Sachs. All are members of the county board of commissioners.

RATING SHEET

County Douglas Road Armstrong Study Section No. 3

ECONOMY	IMPORTANCE										Rating	Weight	Adjusted Rating
	1	2	3	4	5	6	7	8	9	10			
Agriculture										X	3.8	10	38
Stock											15/4		
Dairy													
Poultry													
Forest Products													
Mining													
Commercial Fishing													
SERVICE ROUTE											Rating	Weight	Adjusted Rating
School											3.8	10	38
Mail & Newspaper											15/4		
Milk													
Egg													
Commercial Bus.													
Commercial Haul.													
Logs - Lumber													
Commutor													
RELIGIOUS & SOCIAL											Rating	Weight	Adjusted Rating
Church											1	5	5
Grange or Lodge											3/0		
School													
RECREATION											Rating	Weight	Adjusted Rating
Hunting											2.2	3	7
Boating & Fishing											11/5		
Stream Fishing													
Summer Homes													
Camping													
Skiing													
TRAFFIC VOLUME											Rating	Weight	Adjusted Rating
											7	10	70
ACCIDENT RECORD											Rating	Weight	Adjusted Rating
											2	1	2
Total Adjusted Rating											160		
Speedometer Length <u>6.3</u> Miles													

FIGURE 1

study method to support the addition of a sufficient mileage to their system. This should provide programming latitude for about 10 years and get this cooperative construction program back on a long-range basis.

How to start in

Douglas County began its system survey, the second in the state, by outlining on a map the mileage to be studied. This included all mileage not on the approved system—except those local roads that provide so little service they need not be considered in a study of this kind. The map was given to the state aid engineers of the local state highway district, who broke each route into appropriate, numbered study sections. This was done so that the entire route was not condemned if certain sections did not meet approval.

Rating sheets, one for each official for each study section, were provided. In Washington, school and mail routes are a matter of public record. State aid officials placed these

on the service elements, calculating each portion of the route as a percentage of the total route that was school or mail route.

Each study section had to be traveled with the rating done at the end of the section. Thus, the field trip was outlined to cover the mileage with a minimum of driving. Two cars were used with two county officials in each car. One car was driven by James Gray, state aid engineer, who came as an interested observer and to become acquainted with the study method so that it can be carried out in the remainder of the district. The other car was driven by Don Manning, Washington district planning engineer, Bureau of Public Roads.

After traveling each study section, mileage was recorded for that section and the rating sheet marked by each individual. Each road was rated in relationship to the total mileage to be studied under the following points:

ECONOMY: In Douglas County, where the economy is primarily

wheat, the routes or the route most important to agriculture was rated 10. All other routes rated in direct ratio. The other economy elements (Fig. 1) were rated below this in accordance with a direct percentage of land use.

SERVICE: Each function was rated as a percentage of the mileage on that section in accordance with the following table:

0-14%—1	55- 64%—6
15-24%—2	65- 74%—7
25-34%—3	75- 84%—8
35-44%—4	85- 94%—9
44-54%—5	95-100%—10

RELIGIOUS AND SOCIAL: Only two ratings were considered here. If the route served directly a gathering place for the element concerned or if any of the elements were on the route, it was rated 10, otherwise 1.

RECREATION: The route serving the greatest direct recreational functions was marked 10 with the other graded routes down in direct proportion.

TRAFFIC VOLUME: A one-day traffic count brought the traffic volumes up-to-date. The highest volume was rated 10 and the others in direct descending ratio.

ACCIDENT RECORD: Only those routes having a series of recurring accidents were considered. This indicated that something should be done for public interest and benefit.

Composite rating sheet

All four sheets were transferred to a composite sheet in the office. To get an average factor rating, the score of each element of the factor was totaled and divided by the number of elements. It is entirely conceivable that every factor could have a rating of 10. Therefore, for differentiation purposes, each factor was given a weight. These were determined by all four county officials who reached agreement on the degree of importance of each major grouping.

In Douglas County, we felt that economy was of primary importance. For the agricultural economy determined the extensiveness of our total mileage and governed somewhat the character of road to be built.

Traffic volume was considered equally important since the character, type, and extent of traffic determined the design standards of construction.

Service routes were also considered of high importance. For the amount of school and mail route determines to a large extent the areas of heavy maintenance required on the total road system. All other categories were graded descendingly in importance.

On the composite sheet, Fig. 1, each dot represents an individual rating, and the cross the average of all four ratings for the particular ele-

ment of the group. The total averages, as designated by the crosses, were computed for each group and divided by the number of persons marking rating sheets. This gave a rating for each group, which multiplied by the weight factor, gave the adjusted group rating. The total of the adjusted group ratings gives the final qualification number or total adjusted rating for each study section. Table 1 lists all routes in descending order of importance as determined by total adjusted rating.

Break point

More routes were surveyed than was feasible for the county to construct in the 1-yr. period with the funds available. Two curves were plotted to see if a natural cutoff point existed. One chart was plotted with adjusted ratings over study section number. Another chart was plotted with adjusted ratings over accumulated mileage. Both curves indicated a natural break at an adjusted rating of 139. All routes above this figure were deemed system possibilities while roads rating 139 and below were rejected as too low for further consideration.

To determine if all of the mileage with rating above 139 should be included in the proposed system increment, the estimated cost of final stage construction for the 92.8 mi. was computed. Allowances were \$7,900 per mile average cost for sub-grade and ballast, \$5,000 per mile for light bituminous surface treatment (LBST), and \$1,500 per mile for seal coating. These computations (Table 2) produced an amount of \$1,156,850 needed for construction of present and proposed increment. Inspection of yearly construction expenditure reveals a possible \$1,515,570 available for the 10-yr. construction plus an additional amount of \$250,000 federal aid allocation.

Sound 10-yr. program

Since county policy sets aside from the top of construction funds an amount equal to the FAS allocation, about \$500,000 will be spent exclusively on FAS route construction. All of the routes shown feasible for programming also exist on the county primary system 10-yr. program selected in 1950. Therefore, it is safe to assume that the county will carry out a certain amount of construction on them and the program is feasible.

Douglas County feels the study method substantiates the previously determined 10-yr. county construction program. If counties would expand the study system to cover all county mileages, each road in the county system would be rated in economic importance to every other road. Such a system could easily support individual construction programs and be used to resist pressure groups in vetoing haphazard area construction. These computations produced an amount of \$497,500.00.

TABLE 1

DOUGLAS COUNTY

Routes Listed by Order of Total Adjusted Rating Received

Total Adjusted Rating	Section Number	Section Name	Section Mileage	Accumulated Mileage
241	22	Douglas-Withrow	14.3	14.3
239	1	Waterville-Alstown	6.8	21.1
239	16	Crane Orchard	2.4	23.5
225	21	Beebe Orchard South	3.9	27.4
221	11	St. Andrews-P.S.H. No. 10	7.6	35.0
214	9	Palisades-Three Devils	7.6	42.6
206	13	St. Andrews-P.S.H. No. 2	5.5	48.1
199	7	North Whitehall Road	5.2	53.3
183	15	Leahy North	6.5	59.8
181	19	Logan Road	13.7	73.5
169	14	Leahy South	13.0	86.5
160	3	Armstrong Road	6.3	92.8
139	4	Titchenal Canyon	8.2	101.0
137	10	Jameson Lake	6.7	107.7
135	8	Highland School	9.3	117.0
131	12	St. Andrews North	6.9	123.9
129	20	McNeil Canyon	8.2	132.1
128	18	Dyer South	9.1	141.2
127	5	Rock Island Grade & North	11.8	153.0
113	6	South Whitehall Road	6.2	159.2
111	2	Alstown East	10.5	169.7
105	17	Dyer-Central Ferry	9.9	179.6

TABLE 2

CONSTRUCTION REQUIRED TO COMPLETE AND PERPETUATE THE PROPOSED FEDERAL AID SECONDARY SYSTEM TO TOLERABLE STANDARDS FOR THE TEN YEAR PERIOD

Study Sec.	No.	Type of Improvement Needed	Length	Cost
	22	Ballast & LBST	14.3	\$114,400.00
	1	Ballast & LBST	6.8	54,400.00
	16	Non-Skid Seal	2.4	3,600.00
	21	Grade & Surface	3.9	30,810.00
	11	Grade, Surface & LBST	7.6	114,000.00
	9	Grade & Surface	7.6	60,040.00
	13	Grade, Surface & LBST	5.5	82,500.00
	7	Surface	5.2	20,800.00
	15	Ballast & LBST	6.5	52,000.00
	19	Grade, Surface & LBST	13.7	205,500.00
	14	Grade & Surface	13.0	102,700.00
	3	Ballast & LBST	6.3	50,400.00
	5	Surface	11.8	47,200.00
		SUBTOTAL FOR PROPOSED INCREMENT	104.6	\$938,350.00
	Approved FAS Route No.	Type of Improvement Needed	Length	Cost
	491	Ballast & LBST	2.0	\$ 16,000.00
		Ballast & LBST	3.0	24,000.00
	439	Grade, Surface & LBST	6.0	90,000.00
		Non-Skid Seal	4.0	6,000.00
	584	Non-Skid Seal	5.0	7,500.00
	1022	LBST	7.0	35,000.00
		2 Steel Bridges	45 ft. each	40,000.00
		SUBTOTAL FOR APPROVED ROUTES	27.0	\$218,500.00
		GRAND TOTAL	131.6	\$1,156,850.00

Since the total amount available for federal aid construction was estimated to be \$500,000 we felt the monetary check substantiated this mileage.

Final evaluation

The findings of this study will be used to support a request for the addition of 92.8 mi. (roads rating above 139) to our federal aid system and if approved by the Bureau of Public Roads, Douglas County will be in a position to program the federal aid construction where need is most urgent for a reasonable period of time. We feel that the routes included in the increment were chosen by a logical system of elimination, leaving

only the most important routes in the county's economy. It is a system the county can construct readily and reasonably and maintain satisfactorily. It is a system that has been properly evaluated.

The Dixon method of evaluating the importance of potential federal aid routes for counties should be considered by other counties having difficulty with program latitude for it is a survey method that is logical, economical, and easily prepared. It will permit the continuance of FAS construction as contemplated under the Highway Acts. Fred Dixon is to be highly commended for his forthright solution to what has been a difficult problem.

Insulation for heat in winter concrete

Success on Bureau of Reclamation jobs has proven insulation to be effective and economical in protecting winter concreting operations. The new method utilizes insulated forms and insulated surface blankets to seal in the heat and moisture and the heat developed by hydration of the cement.

Laboratory investigations and analytical studies begun in the Bureau's Denver offices in 1951 showed the soundness of protecting fresh concrete by insulation. Field trials in the Missouri River Basin have confirmed the

laboratory studies and proved the practicality and economy of the method.

Many of the difficulties and costs of protecting winter concreting by using heated enclosures may be avoided by using proper insulation. When a dry heat is used there is danger of overheating the concrete surfaces nearest the source of heat. Fire danger is also prevalent. Enclosed steam heating provides excellent curing conditions, but is expensive and must be watched constantly to maintain desired uniform curing temperatures.

By **GEORGE B. WALLACE**

Engineer, Design Division
Bureau of Reclamation
Denver, Colorado

EXTENSIVE LABORATORY TESTS and field observations have determined the amount of warmth and moisture required to develop adequate strength and resistance to freezing and thawing. Walls, floors, barrels, boxes, beams, columns, and similar sections constructed with air-entrained concrete containing 1% calcium chloride require a minimum of 3 days of moist curing at 50 deg. F. As further precaution in severe weather, Bureau specifications, unless approved insulation is used, require an additional 3 days' moist curing above freezing. As a general practice, massive blocks in dams, piers, and similar sections require the same length of protection and moisture curing at a minimum temperature of 40 deg. F. If the above protection is provided, the engineer need not be concerned that freezing will cause latent defects in the concrete to appear after construction is completed, provided that the specified 3 days' protection is obtained.

The heat of fresh concrete is utilized during the first few hours of curing before hydration has progressed sufficiently to sustain the desired concrete temperature. In many parts of the United States the temperature of fresh concrete can be produced at 50 deg. F. or above by heating only the mix water. In the mixer the temperature of the concrete should be above 50 deg. F., and a few simple precautions should be taken to preserve its heat during mixing, transporting, and placing so that the desired temperature is maintained when protection is applied. A shelter for the mixer and a tarp over the concrete during transportation will help. However, it is most important to have a sufficient number of vibrator and access openings to place and consolidate the concrete quickly; before

it loses an objectionable amount of heat. As soon as a concrete surface is brought to grade and finished, protection should be started.

For many years, pavements and other slabs cast against the ground have been protected from freezing by cover of straw, hay, damp sand, or earth. These blankets are effective in retaining the moisture and heat of the concrete, but are laborious to apply, move, and reuse. Commercial insulation blankets and bats of rock wool, fiber glass, balsam wool, and Sisalkraft paper have been produced which offer excellent protection. These products are, to varying degrees, weather resistant and easily moved and relaid on flat work. They may also be fastened to the forms or laid as blankets on unformed concrete surfaces.

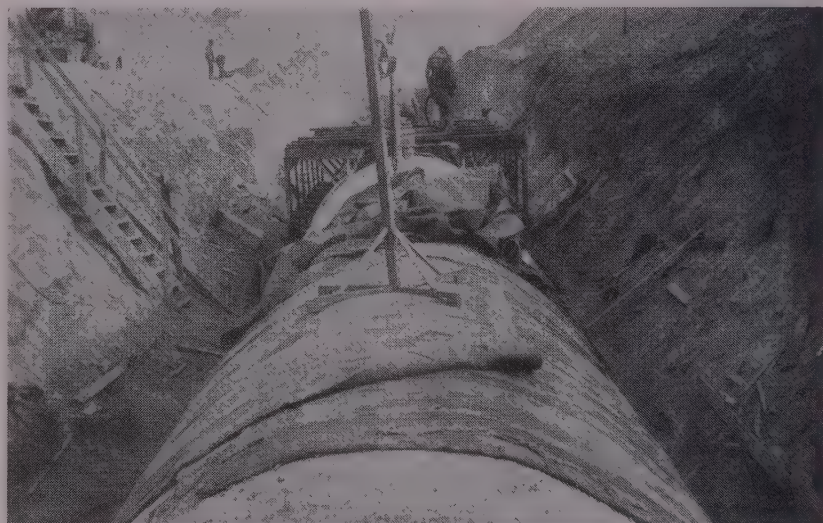
Good temperature control is thus obtained for a wide variety of concrete structures built during cold-weather months. Current estimates indicate that such insulation practices can be utilized during construc-

tion under severe winter conditions for approximately one-half the cost of installing heated enclosures.

The following describes the application of several types of insulators at four of the Bureau's construction undertakings—Trenton Dam and Courtland Canal in Nebraska, Kirwin Dam in Kansas, all of the Missouri River Basin Project, and Flatiron Afterbay Dam on the Colorado-Big Thompson Project in Colorado. The Missouri River Basin structures exemplify the effectiveness of cold-weather insulation, as extreme winter conditions usually prevail in Kansas and Nebraska.

Description of insulators

Fiber glass blankets were used by the contractor to protect concrete during construction of Kirwin Dam and appurtenant structures during the extremely cold winter of 1953-54. The blankets, obtained in rolls, were 10 ft. wide, 25 ft. long, 1 in. thick, and weighed 60 lb. per blanket. The light weight of the rolls made them partic-



ROCK WOOL INSULATION blankets were placed directly on the exterior concrete surface of Courtland Canal siphon barrels. Metal slip forms were covered for 12 hr. prior to stripping while the concrete hardened.

ularly suitable for construction; one workman could carry a roll to a concrete placement and cover the top as placing operations proceeded. The blankets consisted of a 1-in. layer of fiber glass, encased between durable, weather resistant reinforced Sisal-kraft paper.

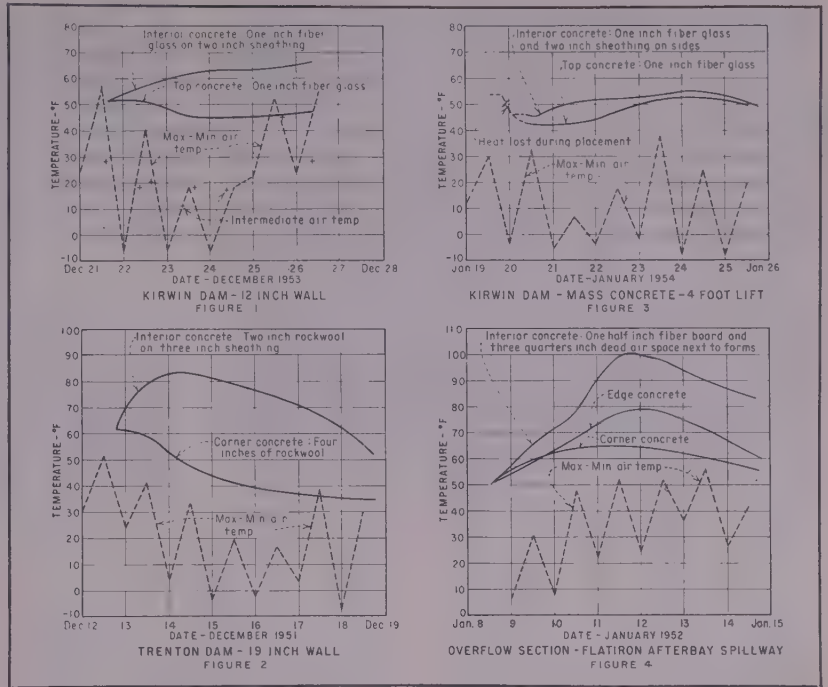
Applied to walls, the blankets were cut to stud spacing and secured between the studs outside the sheathing by 1x2-in. wood strips placed along the edges of the insulation and nailed to the forms. For unformed surfaces, the blankets were placed in direct contact with the concrete to avoid flow of air beneath the blankets which would lower their effectiveness to retain heat and moisture. The blankets were easily cut to special shapes and fitted snugly around reinforcing steel protruding through concrete surfaces.

To protect newly placed concrete in the spillway wall at Trenton Dam during the winter months of 1951-52, rock wool bats, factory made, were used. The bats, 2 in. thick and having black building paper encasements, were placed between the studs and fastened to the outside form sheathing with battens along the edges. The top of walls were protected by two blankets each composed of 2 in. of rock wool held together with burlap covering. The extra blankets were required to provide sufficient protection for corners and edges.

Use of blankets

Rock wool blankets, job made, were applied during the winter of 1952-53 to protect the concrete in siphon barrels for the Courtland Canal near Superior, Nebraska. These blankets originally consisted of a 2-in. layer of rock wool mopped with hot tar onto canvas on one side and burlap on the other. However, soon after construction the blankets consolidated to slightly less than 1 in. thickness. The resulting blankets, 12 ft. wide and 16 ft. long, protected the concrete before and after forms were stripped, as well as the sub-grade for future placements. During extremely cold weather small butane heaters inside the siphon barrel provided supplementary heat prior to stripping the forms, and were also occasionally used underneath insulation protecting subgrades. After the forms were stripped the blankets were placed in direct contact with outside concrete surfaces of the siphon barrels to prevent circulation of air underneath the blankets. The blankets were moved forward with backfilling operations or when the required protection period was completed.

For the Flatiron Afterbay Dam, fiber board was used in January 1952 to protect formed surfaces of the overflow section of the dam. Panels $\frac{3}{4}$ in. thick were fitted between form studding, separated from the sheathing by 1-in. furring strips thus forming a $\frac{3}{4}$ -in. dead air space.



THE GRAPHS show that the temperature of concrete protected with nominal thicknesses of fiber glass, rock wool, and fiber board can be maintained well above freezing even when the work is exposed to sub-zero temperatures.

Earth blankets were used to protect concrete in floors and the gate structure at Trenton Dam. As portions of a structure were completed, canvas shelters provided protection until all of the horizontal surface could be covered with sand. Silt was also used in place of the sand as the protective agent for a surface which was backfilled with impervious soil.

Performance of insulators

The effectiveness of these insulators may be evaluated by comparison of the concrete temperature observed during the protection period with the maximum and minimum daily air temperature to which the insulators were exposed. Interior concrete temperatures were measured in form tie holes or special holes located at the center of each formed surface and penetrating into the concrete 3 to 6 in. The holes were sealed with insulation material and readings were obtained after the temperature became stabilized. Surface temperature of concrete was measured by placing a thermometer in direct contact with the concrete, covering the thermometer with insulation and reading after the temperature became stabilized.

Fig. 1 and 2 show that for concrete walls both 1-in. fiber glass attached to 2-in. sheathing and 2 in. rock wool attached to 3-in. sheathing satisfactorily retained heat in the concrete even under prolonged subzero temperature. However, the 1 in. of fiber glass insulation on the unformed tops of walls did not continually maintain the top surface temperature at 50 deg. F. This deficiency could probably be

avoided by increasing the thickness of the top cover from 1 to 2 in. The figures also show that 4 in. of rock wool did not maintain the temperature of concrete in corners at 50 deg. F., although the temperature was well above freezing and the concrete was not damaged in any way. It is of interest to note that the corner temperature dropped as much as 30 deg. F. below the main body of concrete.

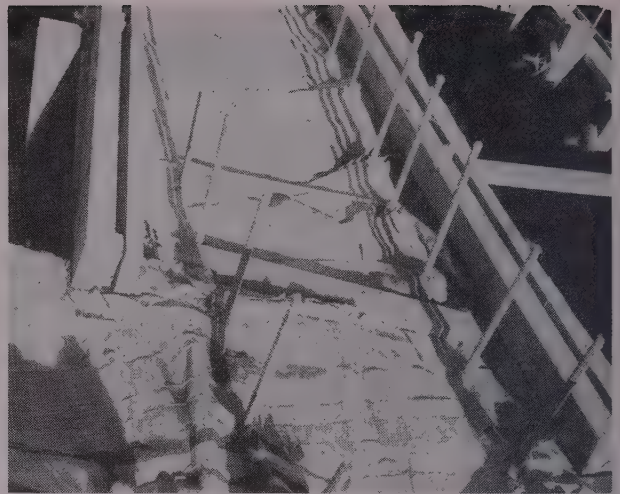
Corners, edges, and tops of walls have extensive surface per unit of volume and therefore require extra insulation to sustain the desired temperature. The temperature of concrete in one wall protected with 2-in. rock wool on 3-in. sheathing reached 98 deg. F at 2-day age. Since higher temperature would be conducive to cracking the concrete upon subsequent cooling, the forms were loosened and the temperature dropped 14 deg. F. in the next 14 hours. In placing following units the initial temperature of concrete was materially reduced.

Temperatures uniform

Temperature measurements were made of concrete in the Courtland Canal siphon barrels after 72 hr. of protection by the job-made rock wool blankets. The temperature was measured near both inside and outside surfaces by inserting a thermometer in form tie holes. Outside temperatures averaged 2 to 3 deg. F. lower than inside temperatures. The measurements showed that these rock wool blankets maintained comparatively uniform concrete temperatures well above freezing in the barrels. Approximately 96% of concrete tem-



FIBER GLASS insulation blankets were cut to stud spacing and fastened to outside of sheathing by 1x2-in. wood strips nailed to the forms. The form shown here had been used 7 times previously.



SPECIAL SHAPES such as this sluice pier at Kirwin Dam can be covered with little difficulty. Reinforcing steel bars will fit snugly in holes punched through the blankets.

perature measurements made near the inside of barrels and 82% of those made near the outside of barrels were 50 deg. F. or above. Only one temperature of 40 deg. F. was observed and the next lowest was 46 deg. F. No difficulty was experienced in stripping the forms in 12 hr. after placement. However, several barrels were damaged when steel forms were reset against the concrete near ends of the barrel in preparation for adjacent placements. The damage was avoided by waiting 24 hr. before resetting the forms.

From these results it appears that insulating blankets were satisfactory in protecting the siphon barrels from freezing temperatures. The fact that siphons are usually constructed below surrounding ground level, which naturally protects them from winds, makes them especially suited for this type of protection. It is doubtful that 1-in. thick rock wool blankets would provide adequate protection for similar structures exposed to Nebraska winter winds.

At Trenton Dam, temperature measurements were taken for the concrete in floor slabs protected by a blanket of sand. These measurements indicated that the sand blanket maintained the concrete temperature above freezing but permitted a rapid drop of temperature when it was exposed to melting snow and strong winds. A mass concrete foundation was similarly protected except that 10 in. of silt was used. Silt produced better protection and was unaffected by snow or ice. A durable mat of fiber glass would probably be superior to earth blankets for ease of handling, and could be placed much sooner without marring fresh concrete surfaces.

As shown in Fig. 3, the temperature of mass concrete at Kirwin Dam protected by 1-in. fiber glass was strikingly uniform despite wide variations in air temperature. Here the temperature of top surface concrete

dropped as low as 42 deg. F. during exposure to subzero air temperatures. Although 40 deg. F. is considered by many to be an adequate curing temperature for mass concrete, Bureau specifications usually specify a minimum curing temperature of 50 deg. F; this could doubtless be reduced safely when uniformity of protection is assured. The lower range of curing temperatures shown in Figure 3 is an asset in that the concrete will have a lesser tendency to crack when subjected to low temperature some time after protection is removed.

As indicated in Fig. 4, 1/2-in. fiber board with a 3/4-in. dead air space was more than adequate protection for formed surfaces of mass concrete exposed to comparatively mild air temperatures. The high concrete temperatures shown in the figure may be avoided by loosening the forms. The figure indicates also that the temperature of concrete near corners and edges was considerably less than that of interior face concrete.

Moist curing insulated concrete

Concrete surfaces to be cured by painting with a sealing compound offered no particular problem with the use of insulation. When insulated forms were stripped immediately at the end of the required protection

period the concrete surfaces appeared damp, indicating that adequate moisture for curing had been maintained during the protection period. After the forms were stripped the concrete surfaces were immediately painted with white pigmented curing compound. Unformed surfaces were sprayed with curing compound prior to covering, if weather conditions permitted. During severe freezing weather the concrete was covered immediately following placement and curing compound was applied later. The Sisalkraft paper encasement of fiber glass blankets in contact with the concrete kept evaporation of surface moisture to a minimum.

Spraying of concrete

Continuous application of water to concrete surfaces protected by insulation blankets proved difficult. On the first large mass placement for the Kirwin Dam spillway, water was pumped underneath the fiber glass blankets. This procedure soon damaged the blankets and caused ice and water to build up in adjacent areas. The most satisfactory method was to roll the insulation back in panels and spray the concrete with water and

(Continued on page 74)

TABLE I
COLD WEATHER CLIMATIC DATA FOR SELECTED CITIES*

Location	El. (ft.)	Temperature (deg. F.)		Mean no. of days per		Mean yearly snowfall (in.)
		Daily maximum	Daily minimum	year min. temp. is 32 deg. F. or below	year min. temp. is 0 deg. F. or below	
Yakima, Washington	1,061	35.7	19.7	128	3	21.7
Pocatello, Idaho	4,444	30.9	13.0	162	10	38.4
Red Bluff, California	341	52.4	34.6	26	0	3.1
Flagstaff, Arizona	6,895	...	...	198	9	...
Reno, Nevada	4,397	43.0	20.3	157	3	28.9
Salt Lake City, Utah	4,260	36.5	21.8	106	1	55.3
Roswell, New Mexico	3,612	54.7	24.8	98	1	10.3
Helena, Montana	3,893	28.4	11.4	157	23	54.6
Lander, Wyoming	5,563	31.6	5.6	191	28	72.0
Denver, Colorado	5,292	42.6	18.5	139	8	56.1

* Data for this table based on records of the U.S. Weather Bureau through 1952.

Sun Valley spotlight on federal plan for \$50 billion on nation's highways

Attendance over 300 as engineers plan how to handle \$10 billion added Western highway construction—Hewes Award recognizes work on highway maintenance radio network—New conference sessions tackle contractor-engineer relations.

WITH THE LARGEST ATTENDANCE in more than a decade and stimulated by President Eisenhower's proposal for an important expansion in the federal highway program, the 33rd annual conference of the Western Association of State Highway Officials held at Sun Valley September 16-18 was a meeting of unusual significance to highway development in the West. Under the general direction of E. V. Miller, State Highway Engineer of Idaho and President of WASHO, aided by the members of his organization, those attending were offered a strong program of general meetings and important technical sessions combined with social events and entertainment.

At the close of the conference the following officers were elected for the coming year: President, C. O. Erwin, Chief Engineer, New Mexico Highway Dept.; Vice President, J. R. Bromley, Superintendent, Wyoming Highway Dept.; Secretary, H. B. Glaisyer, Secretary, Oregon Highway Commission. Other members of the executive committee will be E. V. Miller of Idaho, W. A. Bugge of Washington, and Scott Hart of Montana. The 1955 conference will probably be held in Wyoming.

Financing more highways

Among the resolutions passed at the concluding session of the conference, probably the most important related to the proposal of President Eisenhower for the expenditure of \$50,000,000,000 on Interstate and other Federal-Aid Highways. This resolution presents the following definite suggestion for the financing of this plan:

"The Western Association of State Highway Officials recommends to the Governor's committee that a plan be formulated wherein the Federal Government will use the present federal 2c gasoline tax to service the issuance of government securities to pay for the building of the interstate system totaling \$20,000,000,000 in a ten year pe-

riod, as a 100% federal obligation, because of the importance of the interstate system to the national defense and to pay for 50% of the cost of the other federal aid systems totaling \$30,000,000,000 in a ten year period, provided the states match the federal funds on all Federal Aid systems except the interstate system; the apportionment to be made in accord with the existing law, or modification made by the Congress, state matching requirements to be under the present sliding scale provision with reference to the public land states; and the roads to be constructed and maintained by, and subject to the police power of the several states . . ."

Another resolution recommended that no federal aid highway funds be made available for toll road facilities. Several resolutions, as in former years, urged the federal government to advance the road building program

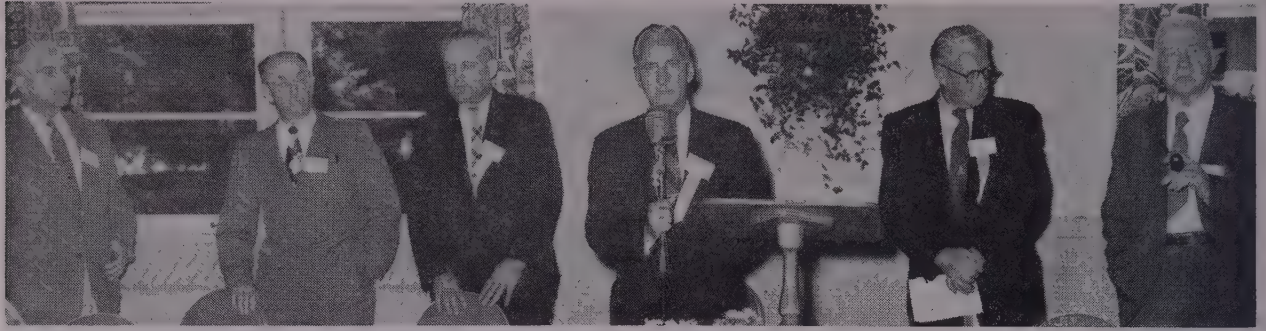
in the national forests, not only making up the present deficiency in appropriations which have been authorized but also to carry out a forest road program which would parallel the new proposed federal aid plan.

At the concluding luncheon session the annual presentation of the "Dr. L. I. Hewes Award" was made. This annual award of \$500 is financed by Western Construction and made in the name of WASHO to the engineer of the West who made the most significant contribution to highway development during the preceding year. Nominations for the award are made by the various state highway departments and final selection is by the executive committee of WASHO. The award this year was presented to Arnold H. Carver, Departmental Communications Engineer of the California Division of Highways for "Outstanding Work in Developing a State Wide Radio Communications System for Highway Maintenance."

For the first time the conference program included a separate session on contractor-engineer relations. This group included members of state highway engineering staffs most directly concerned with construction



ARNOLD CARVER, left, is the 1954 Hewes Award winner. Here he receives the award certificate and a handshake from James I. Ballard, president and editorial director of Western Construction.



problems and about an equal number of contractors and chapter officials of the AGC. Active discussion covered such subjects as the problems of pre-qualification of contractors, the handling of damages resulting from overruns in contract time, the various advantages of setting contract completion by either a fixed terminal date or by the number of working days, and the perennial question of whether specifications should be stated in terms of results to be accomplished or the methods contractors should use.

Another feature of the conference was the usual early morning breakfast session sponsored by the AGC where AGC chapter officials, under the general direction of A. H. Carter, head of the Highway Division, met with highway administrators in the discussion of common problems.

Of particular significance was a paper presented by R. H. Baldock, State Highway Engineer of Oregon, on "Hauling of Overloads of Natural Resource Roads." In essence this veteran authority on the subject of highway loading and taxation found no reason to compromise on a matter of loads which exceed the legal limits as established by state highway officials and state laws. At the conclusion of his remarks vigorous discussion was offered by three mem-

NEW OFFICERS of the WASHO are shown above immediately after their election during the final luncheon. Left to right are H. B. Glaisyer, Secretary - Treasurer, Secretary to Oregon Highway Commission; Vice President J. Ray Bromley, Chief Superintendent and Engineer of Highways, Wyoming; Executive Board Member W. A. Bugge, Director of Highways, Washington; President C. O. "Pete" Erwin, Chief Highway Engineer, New Mexico; Executive Board Member and Retiring President Earle V. Miller, Idaho, State Highway Engineer; Executive Board Member Scott P. Hart, State Highway Engineer, Montana.

bers of the California Legislature who were particularly interested in having exceptions made for the haulers of logs operating in areas where lumbering is the essential industry. To this plea, Mr. Baldock replied that: (1) Overloading would eventually result in the breaking down of the highways which are essential to the success of the industry and (2) any exceptions made for one industry could not be denied another, which could only lead to the widespread extension of overloading with obvious results. His position on this matter remained unchanged during the extended discussion.

In his opening address to the conference, President Miller urged the establishment of a highway research laboratory at the national level with

corresponding long range field testing. He pointed to the WASHO test road program as an illustration of joint research effort among several state highway departments but indicated that the results from these occasional and unrelated tests were not adequate.

Hal Hale, Executive Secretary of the American Association of State Highway Officials, spoke at one of the general sessions reviewing for WASHO the work of the last Congress in connection with federal and state highway programs. He indicated the assurance that the proposal of President Eisenhower for a \$50,000,000,000 highway development program to be planned for the coming 10 years is more than a casual suggestion and is now being actively considered as to financing problems by the Administration. He predicted that at the convening of the next Congress, bills would be introduced, including one probably sponsored by the Administration, which would provide for implementing such a highway program, including many variations of the general proposal. From these numerous legislative bills a decision would ultimately be reached which would provide for the biggest decade of highway construction and improvement in the history of the country.

Should specs point to methods or results?

By **SAM C. GUESS**

Executive Secretary
Spokane Chapter, AGC

THIS SUBJECT IS ONE on which I have held a very definite opinion for a number of years. I propose to support the view that to write specifications requiring the contractor to meet the end results will cost the owner less in the long run.

Progressive, successful contractors spend their lifetime organizing and equipping to do construction as economically as possible, using methods

of their own devising. Today we find that contractors have largely specialized, or that they use specialty subcontractors in order to attain the highest efficiency and to perfect methods which will make them competitive. Specifications in which methods are prescribed prevent their using this knowledge.

For the contractor who hasn't this experience and knowledge there are a number of trade journals which disseminate recent improvements in the methods of practically all construction. The forward looking con-

tractor can and does visit jobs in progress to learn new methods. He also hires experienced personnel with construction "know how" to supplement his own.

From personal experience and from the testimony of others within the industry, it is known that the technical writers who are charged with the preparation of specifications lack field experience. Since the specification writer is by nature, temperament, and environment an "in-the-office-man," it is difficult for him to specify the construction method which uses

the most economical approach to the problem. Neither can he take the gamble of specifying a new method until it is thoroughly proven. This is a gamble that the contractor takes. To specify methods penalizes the contractor who has worked out economical methods, and thus the owner spends more in the long run for his construction.

Recently in discussing this matter with one of the contractors in my area, he said, "It is sometimes mighty nice to be able to follow a specification to the letter, step by step, and to know how they expect you to do a job. But it is a bitter experience to find out somewhere along the line one of your steps was inadvertently wrong and that the whole job has to be torn out. When we get a job with this type of specification we try to see that the inspector gives approval to the work when one step is completed and before the next is begun. Very often, however, we find that the inspector will refuse to approve on the step basis and it is this added gamble that we must include in our cost estimate."

The contractor is a true individualist. It is part of his nature that makes him think there is no job he cannot build or learn to build. It is also this characteristic which causes the owner rightfully to erect barriers

in the bidding procedure to protect himself. The owner who takes the steps to pre-qualify all persons before giving them a chance to bid is wise.

Qualifications assure methods

What does pre-qualification do for the owner? I would definitely say that it saves him money, gives him a better job at less cost and results in a better climate in which future construction can be done. Too often bids submitted by incompetent contractors are abnormally low as the result of a lack of knowledge of the type of construction and a lack of judgment. Costly delays, disputes, claims, and disagreeable situations lie in wait for the owner who takes the bid of the incompetent. Abnormally low bids result in a disruption to the rest of the industry within the area and create a question in the mind of the contractor bidding future work with that owner.

Since accepting the invitation to appear before you, I have had an experience which I would like to recount. For a sizable bridge job in our area the successful contractor was some \$100,000 lower than the next bidder, and the difference was principally on one item, pile driving. The specifications called for the use of a composite pile made up of a wooden pile driven to below lake bottom capped by a steel pile which was to be

filled with concrete after driven. The crux of the cost was the method of connection between the two component parts of the pile. The drawings showed three methods possible of use and the specifications stated that the contractor might propose a further alternate.

In an interview with the contractor's representative on the job shortly after work commenced, I learned that the method of connection being used was one the contractor had devised some three years ago, and that he had been waiting for the right bridge to come along. Did the owner profit by specifying the end results? In this instance, and in many, many others, the answer is yes.

One of my favorite specifications states that the road shall be rolled lightly with a 10-ton roller and that a fast shot of water shall be applied to lay the dust. When you encounter such terms in specifications they give you a laugh; but in other instances where the specifications spell out construction methods which hamper the contractor in his operations it is no laughing matter.

When the owner lets a contract he is, in effect, buying the contractor's ingenuity. To specify methods is to limit that ingenuity. Therefore, for the owner's sake, specify the end results.

Uniform measurement and payment specs

By HENRY C. HELLAND

Planning Survey Engineer,
Montana Highway Commission

EACH STATE HAS its own special problems which must be treated on an individual basis, but there is a great area in which all states could profit by adopting uniform specifications. No single facet of the relations between highway departments and contractors is cause for more argument and dissention than that of measurements of and payment for contract items.

An average specification is a volume of 300 to 700 pages, usually containing about 500 pages of fine print. Of the 60 to 100 construction items covered, there is a wide divergence of opinion not only in how they should be measured and paid for but also whether the item is worthy of such consideration. Most specifications give several methods of payment for certain items. As an example, Clearing and Grubbing may be paid for as acres of clearing, acres of grubbing, acres of clearing and grubbing or as a lump sum item for the job. In most

cases the provision for a lump sum bid will result in a higher price for the item, and this is especially true if it is a quick money item.

The purpose of specifications is to outline clearly the finished product which the contractor must produce and the quality of the materials which he must use. The contract lists the items on which he establishes his price for doing the job. There may be dozens of ways to measure items for payment but there must be one which would be advantageous or at least satisfactory for adoption by most states.

In selecting seven specifications at random, it is interesting to note the treatment of the item of Overhaul.

Specification 1 called for 600 ft. free haul and payment by cu. yd.-station to 1,200 ft. from origin and by 1,000-cu. yd. stations beyond that limit.

Specification 2 listed a free haul of 500 ft., payment by cu. yd.-station to 1,000 ft. and cu. yd.-mile for transporting material in excess of 1,000 ft.

Specification 3 had 500 ft. free haul, 1,000-ft. station-yd. haul limit and

yd.-mile overhaul beyond that distance.

Specification 4 provided that when the proposal shows an item for Overhaul the free haul distance shall be 3,000 ft. and when there was no overhaul item, all hauling shall be considered free haul.

Specification 5 called for 600 ft. free haul, short overhaul to 1,200 ft. by the yd.-station, and beyond 1,200 ft. long overhaul by the hundred-yd.-station. Also provided is truck haul by the yd.-mile.

Specification 6 provided for 500 ft. free haul and payment for further haul by the station-yd. or mi.-yd.

Specification 7 provided an entirely different concept of measurement and payment, and lest I confuse you by my interpretation, the specification is quoted herewith. (See next page.)

From these examples, you can see that not only is there quite a difference of opinion but also, it's a little confusing. And, when specifications are confusing, you don't save money. Whenever there is a doubt in the mind of the contractor, he makes allowance to cover the possible in-

Is this your specification for overhaul?

METHOD OF MEASUREMENT

The work of hauling a cubic yard of excavated material from the balance division of its origin into any other balance division, whether or not the balance division of deposit is adjacent to or beyond the balance division of its point of origin, will be computed as a cubic yard of "Overhaul."

If it is required that excavated material be hauled completely through a balance division or divisions intervening between its origin and place of use, then a unit of "Added Haul" will be computed for each cubic yard of excavated material for each intervening balance division through which such excavated material is hauled between its origin and place of use.

On road contracts, the following will apply to the determination of balance points for overhaul and added haul:

1. Where a grading exception, or a separate contract structure exception has a length of 1,000 ft. or less, a balance point shall be considered as located at the center of the grading exception or at the center of the separate contract structure, as the case may be, instead of a balance

point located at each end of the grading exception or structure exception as shown on the plans;

2. Where a grading exception, or a separate contract structure exception has a length of more than 1,000 ft., but does not exceed a length of 2,000 ft., the balance points shall be considered as located at each end of the exception, irrespective of the kind of exception;

3. Where a grading exception, or a separate contract structure exception has a length more than 2,000 ft., the balance points shall be considered as located at intervals of 2,000 ft., such intervals to be measured from the beginning of the grading exception or separate contract structure exception, as the case may be. Any remaining fraction of 2,000-ft. intervals which exceed 500 ft. will be considered as a balance division in determining overhaul, and any remaining fraction of 2,000-ft. intervals which is 500 ft. or less will not be considered as a balance division in determining overhaul;

4. Where the plans show an exception within a balance division, the exception shall be

considered as a part of the balance division, irrespective of the kind of exception;

5. Regardless of the foregoing statements, overhaul payment will not be allowed when the overhaul involved is that required for construction of approach ramps at the beginning or end of any exception, such individual ramp not exceeding a length of 500 ft.

BASIS OF PAYMENT

Overhaul, and added haul if any, will be paid for at the contract unit price per cubic yard for "Overhaul," and per unit of "Added Haul," which payment shall be full compensation for hauling and placing the material, and for all labor, equipment, tools, and incidentals necessary to complete the work specified.

If the proposal does not contain an item of "Overhaul" and if such is required to complete the work, it will be paid for at a rate of 7 cents per unit of "Added Haul."

If the proposal does not contain an item of "Added Haul," and if such is required to complete the work, it will be paid for at a rate of 5 cents per unit of "Added Haul."

creased cost. At least, those who stay in business do.

A study of construction specifications with a view to securing greater uniformity will either lead to improvement of the specifications or, at least, provide an opportunity to reaffirm the conviction that your method of handling the subject is right.

Should we include the asphalt in the price per ton for plant mix or measure it separately for greater flexibility?

Should compaction of embankment be included in the excavation price or should each needed operation, such

as watering and rolling, be included separately? While the latter method has the advantage of protecting the contractor and stabilizing prices, it also freezes progress in the development of better methods of compaction.

The tendency to establish separate bid items for various phases of a contract operational unit seems to be increasing. This procedure makes the life of the project engineer an easier one and eliminates much of the grounds for argument. It also eliminates the incentive on the part of the contractor to develop new and better methods of operation. Measurement

of and payment for a completed item requires closer field inspection, and diligence must also be exercised to see that the contractor is not put to needless effort and expense where specified requirements are practically unattainable.

The desirability of more uniform construction specifications is not open to question. The area of measurement and payment appears a most fertile one on which to begin the task. It is recommended that the Western Association of State Highway Officials initiate action on a study of construction specifications in order to develop the desired uniformity.

Overweight trucks on natural resource roads

By R. H. BALDOCK

Oregon State Highway Engineer

THERE IS A TENDENCY all over the United States to increase the sizes and weights of motor vehicles engaged in hauling commodities over so-called natural resource roads. In the timbered areas this ap-

plies to the movement of log trucks, and in the mining areas to the movement of ore or coal. Throughout the West there have been attempts by both of these interests to obtain special privileges.

About the time some of the logging concerns started to build private roads, in order to haul greater pay

loads, the U. S. Forest Service and the U. S. Bureau of Land Management permitted the movement of oversize and overweight vehicles over roads controlled by these agencies and which were tributary to these private logging roads. The question as to whether these roads through federal lands are public

roads under the jurisdiction of state laws has never been settled, but, insofar as Oregon is concerned, laws were enacted to permit such practice. Obviously, advocates for special oversize and overweight privileges are gaining ground.

This gain is further evidenced by the formulation of agreements between the logging companies and some of the counties in Oregon to utilize, first, short sections of county roads and, then, much longer sections under a contract plan wherein the loggers agree to build the roads stronger and to maintain them, provided they are permitted to haul loads in excess of the statute limitations. There is no question that the counties do not have the power to legislate. Finally the legislature legalized their action under certain conditions. For the most part, these conditions have been disregarded and the practice is still being carried on in an unlawful manner in Oregon.

Highway loads higher

A study of the contracts executed by those counties operating within the new law revealed that the maximum weights varied from 120,000 to 200,000 lb. and the tandem-axle weights from 50,000 to 95,000 lb. These weights appear to be substantially heavier than those carried by log trucks operating over private roads in Oregon, where maximum loads vary from 90,000 to 180,000 lb. and tandem-axle loads from 48,000 to 90,000 lb.

The states are obviously sanctioning a dangerous economic practice when they allow a specialized group to use a public highway with loads which exceed the limitations established for the general public. Furthermore, the general trucker will soon demand the same consideration—and why not? It must be remembered that the finished product is even more important than the raw material. If logs are allowed to be transported as a privileged load, perhaps lumber is entitled to the same consideration.

In this connection, it might be mentioned that the actual saving to the industry, by permitting heavier truck loads of logs, is probably quite small. I question whether proper consideration has been given to the economies of the situation. Perhaps the apparent savings in truck operation are not founded upon fact.

Recently there appeared a report entitled "Comparative Results of Trucking Logs by Various Size Vehicles," compiled for the Washington State Council for Highway Research by the Institute of Forest Products. The report indicates that the most economical size vehicle varies with

the length of haul—the longer the haul the greater the size for the most economical operation. The report shows that the 84,000-lb. gross weight class is the most economical up to a 16-mi. haul, that the 100,000-lb. gross weight class is the most economical between a 17- and 28-mi. haul, and that the 115,000-lb. gross weight class is best for hauls over 28 mi. The report shows the cost per Mfbm. per mile for the different weight classes on different haul distances.

For hauls in excess of 15 mi., it is interesting to find that while apparently there is a saving of from six to eight cents per thousand per mile in hauling, when a 100,000-lb. gross load is compared to a 68,000-lb. gross load on comparable type surfaces, the apparent savings are appreciably reduced despite the increase in loads when the large loads are hauled over a gravel surface and the smaller loads are hauled over a paved surface.

Expressed in another way, the savings that they are apparently making are partially consumed by the additional cost of operating over graveled roads and, conversely, if the hauling roads were paved, the cost of building and maintaining such pavements would probably consume a large part of the savings that are made by hauling the heavier loads. State highways are, in general, paved and the cost of building pavements strong enough to stand such heavy loads is material. When the pavement ruts under the load, it cannot be bladed smooth again as is done with a gravel surface.

No justification

Engineers can build heavier pavements and bridges to sustain greater sizes and weights with reasonable maintenance costs, but the costs requisite to sustain gross weights up to 200,000 lb. and tandem-axle weights of 95,000 lb. are so great that in all probability they may never be justified on state highway systems. It seems doubtful that the recipients of the benefits for such increases could afford to pay their share of the increased cost occasioned by such special usage and operate at costs competitive with other means of transportation.

Any discussion about increasing the dimensions and weights of trucks, based upon the building of new highways with commensurate geometric and structural design, is rather pointless because of the limitations of time and money. In fact, the repetition of legal axle weights, due to the phenomenal increase in heavy trucks, is causing fatigue in pavements and bridges built on present design standards which is rather alarming.

There appears little question but that the granting of special permits

and the changing of the statutes for selected groups, such as those in the mining and logging industries, which permit the movement of oversize and overweight vehicles over certain types of roads, will result in pressure from other groups to gain the same privileges on more and more highways.

Recommendations

On October 1, 1953, a committee was appointed by Charles M. Ziegler, President of AASHO, to make an investigation on the current practice of operating overweight logging trucks on private roads, special agreement county roads, and on national forest roads and land-use roads controlled by governmental agencies. In conclusion, this Committee recommended:

(1) That governmental agencies do not expend public funds to construct highways and thereafter permit the movement of vehicles over such highways within a state in excess of statute limitations with respect to gross weights and dimensions.

(2) That special privileges should not be granted, either by statute or permit, to selected industries, thus permitting the movement of vehicles of gross weights and dimensions in excess of those allowed to other industries.

(3) That no increases in vehicle size and weights be made over present standards of the AASHO until the loading tests now under way or proposed are completed and the economic studies in connection therewith are made and published.

Plastic pipe to be used in steam plant

FIBRE-GLASS reinforced plastic pipe will be used by the City of Los Angeles for condensate make-up lines in its \$71,000,000 Valley Steam Generating Plant, now under construction. City engineers selected the Reflin pipe because its smooth interior minimizes the mineral and biological deposits usually found in steel-lined pipelines.

Plastic pipe is lighter than steel pipe, allowing cheaper handling and installation. Using standard fittings and simple tools, two men can lay Reflin pipe under average conditions. According to Reflin officials, the pipe is resistant to rust, chemical attack, electrolytic action, and other factors causing deterioration of steel pipe. Its high impact strength, light weight, and rigidity enable ordinarily difficult installations to be made easily. It is adaptable to all standard auxiliary equipment, including valves, pumps, and tanks.



Difficult underpinning problem gave large bid spread, but

Low bidder shows how with Gradall

How to excavate 800 seven-foot deep holes located practically beneath two-story barracks was solved with this versatile piece of equipment. Old timber piling had rotted away and were replaced with concrete piles.

WHEN THE BIDS RANGE from \$108,000 to \$384,900 (12 bids), you know that an unusual job is involved. This was certainly the case at Mare Island Naval Shipyard in California where new underpinning was required on nine buildings supported on pile foundations.

These buildings, one- and two-story wood frame structures, are supported on a total of 1,283 piles. The average ground level is but 5 or 6 ft. above mean sea level. The piles concerned were driven in 1942. They project about 1 to 3 ft. above the ground to support 12x12 timber girders, that in turn support floor joists. During the years, dry rot has taken its toll on that portion of the piling above the water table.

Many solutions offered

The problem submitted to bidders was to excavate around the piles, cut them off below the water table, and to form and pour a 14 in. diameter concrete pile on top of them. A composite pile is the final result. An exception is made in the case of concrete foundation walls and concrete stairs that rest on piling. Here the exterior rotted wood of the piling is removed to leave a sound wood core.

Each of them is wrapped with wire reinforcement and gunited.

A breakdown of the total of 1,283 piles shows that about 220 of them will be gunited, and the remainder cut off and replaced with concrete. Also, one-third of the total are inner piling—that is, under the building and difficult to get at. The other two-thirds are located near the outside of the buildings and are relatively easier to get at. Pile centering averages about 16 ft. both ways.

Methods intended to be used by different contractors varied greatly. From jacking the building off the foundations and temporarily moving them aside (some measure 118 x 168 ft.) to major excavation for access to the piling were some of the schemes that might have been used. But here is how the Baldwin Contracting Co., Inc., is doing the job in a very efficient manner.

Gradall usage

Considering any one building, excavation averaging about 7 ft. deep is made at every other exterior pile with a Gradall. This versatile crane is equipped with a 24-in. wide bucket that enables it literally to reach under the buildings several feet. Unlike a backhoe, shovel, or any other piece

of equipment, the Gradall operates with the same precision that you would use with a spoon or fork in eating. The telescopic boom can be extended, retracted, and also rotated. It is a fact that the bucket's movement can be controlled within a quarter-inch tolerance. Its use here held hand excavation to a minimum. Often operating in small restricted areas, no damage has yet been done to any of the buildings.

Each girder is shored up at its mid-point where it spans between piles. This is done for an entire building before any excavation is started. Mentioned earlier, added advantages of working on alternate piles is twofold: (a) the danger of lateral swaying of the building is eliminated with one-half of the original piles still in place; (b) room is available for the excavated material next to the piles not being worked on.

With the small clearance to work in beneath the buildings, efficient hand labor methods are being used to excavate on the interior piles. It has been found that the upper 4 ft. of fill material and the underlying blue mud will stand with vertical cuts. Laborers equipped with Thor air-operated hand spades dig a hole with a 2-ft. clearance around the piles. Here, too, every other pile is worked on and excavated material thrown toward the remaining piles. Twelve laborers using six hand spades have been able to make an excellent rate of progress.

When excavation has been carried down below the water-table at a pile,



FOLLOWING EXCAVATION AND CUTOFF of timber piles to 7-ft. depth, two circular metal forms are placed in position for the new concrete

pile. Ready-mix concrete is delivered to pressure tank and then blown at 90 psi. through 2-in. diameter air hose to the forms.

two saw cuts are made with an 18-in. Homelite chain saw. One cut, the higher one, completely cuts the pile in two. The lower cut, 18 in. below the upper, is made only 3 to 4 in. deep around the perimeter. Using axes, the wood between the upper and lower cuts is removed, leaving a 7-in. diameter tenon 18 in. long. This acts as a dowel in the concrete to be poured around it.

Blowing concrete

Ready for the concreting operation, a cage of reinforcing steel is placed over the tenon consisting of six verticle $\frac{1}{2}$ -in. diameter bars spirally wrapped with $\frac{1}{4}$ -in. diameter wire. Two semi-circular sheet metal forms 8 ft. long are then bolted together around the base of the pile and they extend up to the girders. The forms are for a 14-in. diameter concrete pile. With the upper end against a 12-in. wide girder, there is a 2-in. crack through which to pour the concrete. The concrete mix is designed to attain a strength of 2,500 psi. in 28 days. Batch proportions for 1 cu. yd., for an 8-in. slump are 9 sacks of cement, 2,450 lb. of sand, 7 oz. of Darex air entraining agent, and about 45 gal. of water. Delivery of concrete to the job is by transit-mix trucks.

From the truck to the forms, a method is being used to pour concrete that Pete Andersen, superintendent, first saw used 18 years ago. A 7-cu. ft. sand blasting tank has

been mounted on concrete buggy wheels. A 6-in. diameter hole in the top, plugged by a rubber-covered steel ball, is opened to allow a charge of concrete to enter directly from the transit-mix truck. A valve is opened and air pressure at 90 psi. is supplied to the tank from a Jaeger compressor. The concrete charge is blown from the tank through 75 ft. of 2-in. air hose, through a flattened out metal nozzle, and into the pile form. Each pile requires about 7 cu. ft. of concrete.

Clogging of the delivery line is routinely prevented by two precautions. A $\frac{1}{2}$ -in. mesh screen over the tank charge opening prevents entry of oversized material—eliminating one possible source of trouble. And then the delivery hose is lubricated first with water before any concrete is blown. The delivery end of the hose is diverted from the forms until the concrete first appears.

The metal forms are stripped from the fresh concrete after 24 hours and Hunt Process applied for further curing. Exterior pile excavation holes are then backfilled, using a $\frac{3}{4}$ -

cu. yd. Hough Payloader. Interior excavation holes depend on good, old hand labor for backfilling. At this point, with one-half the total piles concreted, work is begun on the remaining one-half.

This project was begun on July 12 and will be finished by November 12. Most of the composite concrete piles are now completed. The 220 piles requiring guniting are to be done last. The latter require an entirely different process from that described earlier for the composite pile. The only similarity is from the excavation standpoint.

What might have been a muddy situation turned out otherwise when water seepage into excavated holes remained a small quantity. Three $1\frac{1}{2}$ -in. Homelite pumps are used each morning to dewater all the holes. This brief pumping is all that is required until the next morning.

Personnel

Key personnel on this smooth running project for Baldwin Contracting Co., Inc., are Donald K. Jorgenson, manager of general construction for Baldwin; Peter J. Andersen, general superintendent; Hugh Erwin, general foreman; Elton Henley, labor foreman.

For the U. S. Navy, Capt. G. K. Brodie is 12th Naval District officer in charge of construction; Cdr. C. E. Spellman is resident officer in charge of construction at Mare Island; E. E. Van Emon is inspector on the job.

EQUIPMENT LIST

- 1—Warner & Swasey Gradall
- 1—Hough Payloader, $\frac{3}{4}$ cu. yd.
- 1—Schramm 315 air compressor
- 1—Jaeger 105 air compressor
- 4—Thor Model 16 & 19 hand spades
- 2—Homelite chain saws
- 3—Homelite $1\frac{1}{2}$ -in. pumps

Special problems in construction of steam plant for Alaska air base

Thawing sheds for coal cars, insulation of steam lines and the structure, and the varied steam usages all combine to make this plant and its construction unusual.

By **GEORGE AVERY**

Construction Engineer
U. S. Army, Corps of Engineers
Alaska District

KILOWATTS AND STEAM B.T.U.'s are playing big vital roles in providing fighter cover over the top of the continent, a strong bombing arm to strike over the Pole if necessary, and ground troops to protect this northern anchor of our Pacific perimeter.

The World War II major forts and air bases had one small central heating and power plant, supplemented by a few scattered portable diesel plants for additional kilowatts and hand-fired, coal-burning hot air heating systems at each barracks. Today, these emergency utility units have been replaced by large modern heating and power plants. At each major base, at least one new plant has been built to meet the greatly increased heating and power load, and to modernize the utility systems. Additions to three of these new suppliers are already under way.

At Elmendorf Air Force Base, near Anchorage, Alaska, a new heating and power plant is being constructed.

In April 1953, Patti-MacDonald and Associates were awarded the contract by the Corps of Engineers at a low bid was \$11,514,007.

Unusual features

Alaskan design for heating and power plants in the Anchorage area calls for several features that are not usually incorporated in Stateside plants. Coal is plentiful all along the Alaska Railroad, north of Anchorage. The coal is purchased by the military from privately owned mines. In the winter, the loaded coal cars are solid blocks of black ice. A thawing shed, using heating coils under the tracks and steam lances, is necessary to thaw the cold mass of fuel. Indoor storage is then needed to stockpile the dried-out coal. Coal delivery to the coal building, direct from the mines, high up in the mountain valleys, is achieved by both railroad cars and huge 28-ton trucks. Naturally, the plants are designed with a steam output far greater than what is needed for power generation, as steam heat is really more important to the bases than electricity. If there is a power failure, you can see by candlelight as the sourdoughs did

during the old gold rush days. But life can become unbearable if the heat is turned off at 40 deg. below zero.

Steam usages

This project includes six large-for-Alaska water-wall boilers to run the plant, furnish steam heat to various new base installations through underground conduit, and generate electrical power. Three turbine-generator units with the condensing plants will be installed to provide the vital power. Steam will be supplied to the turbines at a pressure of 400 p.s.i.g.—750 FTT at the stop valve inlet. When operating straight condensing at 100 p.s.i.g. extraction pressure, the steam consumption of the units will not exceed 10.1 lb. per kw hr at the rated load of 7,500 kw.

Thus, when placed in operation, the plant will supply 900,000 lb. of steam for plant internal use, electrical generation, and base heating and 22,500 kw. of power. The 400-lb. installation will have pressure-reducing stations to feed 100 lb. of steam for ordinary consumption and 200 lb. to the laundry.

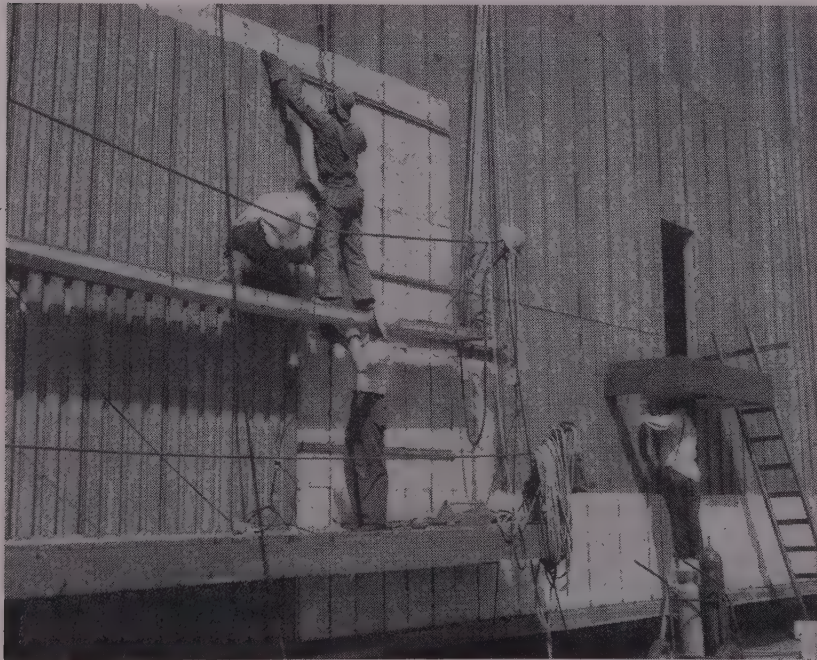
Quantities include: building excavation—48,000 cu. yd.; reinforcing steel—807 tons; concrete—11,530 cu. yd.; structural steel—1,807 tons; boiler structural steel—280 tons; boiler tubing—402 tons; steel roof decking—56,360 sq. ft.; insulated metal siding—88,160 sq. ft.; electrical conduit and duct—62,000 lin. ft.; electrical wire—290,000 lin. ft.; duct insulation—23,500 sq. ft.; railroads—5,325 lin. ft.

Of course, this is a small plant by comparison with the super PG&E giant at Pittsburg, California, now under construction. But in Alaska, it stands out like a colossus above the pigmy plants of the past.

Connecting utilities

A dam and weir will back up near-by Ship Creek to supply condenser cooling water. It will flow by gravity from a 250x750-ft. cooling pond to a pumphouse. From there it will be pumped up to the plant on the bluff. The job also includes railroad tracks to bring in the coal, outside steam distribution lines and power tie lines to connect to feed existing base systems. Z-crete with its Vermiculite insulation is being used on the underground steam conduits.

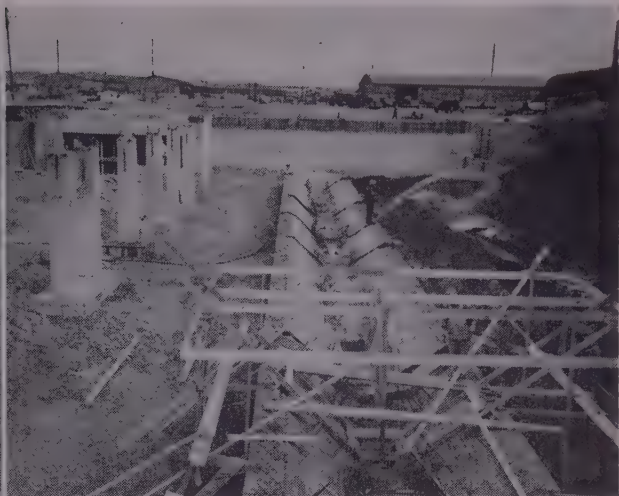
The boilers are manufactured by Erie City; the turbine-generators, switchgear, load centers by Westinghouse; the structural steel by Isaacson Iron Works; coal-handling equipment by Fairfield; roof decking and siding by Robertson; ash



WINTER TEMPERATURES of 30 deg. below zero make insulated metal siding a necessity. Federal Roofing is placing over 88,000 sq. ft. Welder to the right is tack-welding siding to girt.



Z-CRETE with its vermiculite insulation is being pumped into forms to encase underground steam lines. In background, ready-mix concrete is being poured on a concrete pad for expansion loop.



CARPENTERS INSTALL template prior to installation of reinforcing steel for concrete bin in power plant's coal storage building. In background, backfill is sluiced for consolidation.

handling equipment by United Conveyor; control instruments by Bailey Meter; deaerators and degasifier by Cochrane; soot blowers by Bayer; valves by Crane; air-preheaters by Buffalo Forge; pumps by Fairbanks-Morse, Peerless, and Warren; vacuum cleaning systems and stokers by Hoffman; coal scales by Richardson; cinder collector by Western Blower.

Seasonal construction

Starting in the spring of 1953, the main plant substructure was poured up to ground level; the cooling pond was excavated; the concrete pump-house was built; the 36-in. cooling water lines from the pump-house to the cooling pond were installed; and some outside water, sewer, and steam distribution lines were completed. When the temperature started tumbling down to zero late in November, the job shut down for the winter.

After the spring thaw this year, the project came alive in April, "red iron" erection began, boiler drums were being hoisted into place, and fans and ductwork were soon sitting in place on the fan floor. Coal hoppers were being bolted into place with impact wrenches. The job was rolling in July. Roofing and siding operations were in full swing. Operating floors were filling the forms. The coal building structural steel was being riveted into place after the main building red iron was completed. Coal-handling flight conveyors were going up. The project was as busy as a brown bear in a blueberry patch along the Kuskokwim.

Since ground was broken for this coal-burning steam plant on April 29, 1953, work on this essential installation has highballed ahead of schedule every month. At the end of July, the project was 7% ahead of estimated progress, and 50% complete.

In August, the job hit a crescendo of construction. All of the trades were on the payrolls, with an average



ANOTHER METHOD for insulating steam lines is the use of utilidoras as in the foreground. Utilidor walls are reinforced concrete and the lids precast. In the center background is the heat and power plant proper with coal storage building to the right.

of 225 men employed. This total will increase in the fall when piping installation starts full blast. It is anticipated that the building will be enclosed by winter, and that, with temporary heating units, the work will be pushed no matter what the thermometer reads on the outside. The contract completion date is April 1956, but high hopes are held that the plant will be turned over to the using agency, the U. S. Air Force, for their operation by November 1955.

Rapid progress

Several factors have had a helping hand in the progress accomplished thus far: good foundation subgrade with no unwatering required; the versatile use of an efficient guy der-

rick and top-hand erection gang to set the structural steel and most of the mechanical equipment; efficient expediting of materials and mechanical equipment from Stateside; the use of precast slabs for the indoor-storage concrete coal bunkers; and the valuable experience Patti-MacDonald gained in constructing a similar heading and power plant at neighboring Fort Richardson from 1951 to 1953.

This military installation was designed by the Bechtel Corp. of San Francisco, working as architect-engineer for the Alaska District. For a listing of the lead personnel for the contractors and for the government, see the Supervising section of this issue.



OVER 96,000 SQ. YD. of 3-in. thick asphaltic concrete was placed on these 3:1 slopes with conventional paving equipment. With an average

placement of 600 tons per day, this job came out months ahead of schedule. Reservoir is 2,000x1,000 ft. by 60 ft. deep.

First use of mechanical spreader for paving on 3:1 reservoir slope

By **PHILLIP L. BAILEY**
District Engineer
and

LOUIS R. HOVATER
Area Engineer
The Asphalt Institute

EXCAVATED OUT OF THE rolling hills at Monterey Park near downtown Los Angeles is Garvey Reservoir, a part of the long-range water plan by the Metropolitan Water District. With the rapid growth of Southern California areas, district engineers foresaw the need for a new reservoir and additional distribution system. Investigations of possible reservoir sites revealed that the Monterey Park Hills offered the last remaining close-in location to downtown Los Angeles. This site also provided sufficient elevation to insure an adequate hydraulic gradient for the proposed new distribution system. However, the location selected was no natural site and the great oval bowl with inside slopes of 3:1 had to be shaped by excavation and compacted embankments. Total

excavation amounted to 3,400,000 cu. yd., while compacted fill for embankments approximated 3,100,000 cu. yd.

The reservoir has a 3-in. pervious asphaltic concrete surface lining and an underlying impervious blanket of select material varying from a thickness of 10 ft. on the bottom to 3 ft. at the top of the slopes. This type of reservoir construction required over-excavation and under-fill to provide for the impervious blanket. To insure accurate grading for paving, the select material on the slopes was over-filled $1\frac{1}{2}$ ft., compacted and removed; thus also providing an easy method for supplying all the select material needed for the blanket of the reservoir bottom. By selecting the best materials on the job site to be used for the impervious blanket, and because of the method of compaction, a percolation rate was achieved better than the prescribed maximum of 0.06 cu. ft. per year per foot of head.

For compaction of the impervious blanket, especially designed small-diameter, heavy-weight rollers were

used. Each roller unit weighed 30,000 lb.; 3,000 lb. per linear foot of drum. It was figured that the small diameter, heavy rollers put 25,000 ft.-lb. of compactive effort into the soil in 16 passes of the roller. Also, 16 roller passes did the desired compaction job on the particular soils encountered. The actual compactive effort obtained averaged 30,000 ft.-lb.

High quality of work

A new technique in constructing the 3-in. asphaltic concrete lining over the impervious blanket was one of the reasons for the reservoir being completed months ahead of the contract schedule. The technique was developed by paving contractor, W. E. Hall Co., and made possible the use of a mechanical spreader on the steep 3:1 reservoir side slopes. The mechanical spreader insured an even spread of the asphaltic concrete and provided partial compaction before the surfacing was finished with a roller. Not only was the quality of work higher than can be attained by use of the conventional spreader-



THREE PIECES of equipment—truck, mechanical spreader, and 4½-ton roller—are held individually on the slope by cables attached to two tractors and a crane located at the crest.



SPECIAL RAMP attached to tractor allowed spreader to complete its run to the top of the slope. The ramp then tilted clear of the ground and was moved forward 12 ft. ready for a new pass.

box, but the quantity of asphaltic concrete lining placed on the slopes averaged 600 tons a day.

Tilting ramp at crest

Representatives of Hall conceived the idea of building a ramp at the crest that would enable the mechanical spreader to be pulled above the crestline. To do this, a ramp was attached directly to a tractor on the crest which was used as a hoist for the spreader. This enabled the hoisting equipment, the ramp, and the spreader to be moved simultaneously into a new position merely by moving the tractor along the crest. The rockers were so designed that the ramp tracks would tilt forward as soon as the rear of the spreader passed the crestline of the reservoir, lifting the ramp and the machine sufficiently to permit the tractor hoist with its attached ramp to be easily moved into a new position. Once set for the next course of asphaltic concrete placement, backing of the spreader down the ramp would tilt the rockers backward and the spreader again would be on the reservoir slope. Paving of the slopes required the use of three hoists on the reservoir crest—one on the trucks feeding the spreader, one pulling the spreader up the slopes, and one for the 4½-ton roller supplying the final compaction.

The reservoir lining, which covers 974,000 sq. ft. on the reservoir floor and 865,000 sq. ft. on the side slopes, was placed with sufficient material deposited to provide a compacted 3-in. thickness. Each course laid down was 12 ft. wide on the straight sides of the reservoir and on the bottom. On the curving sides a 5-ft. lap of joints at the bottom permitted the spreader to be hauled up the slopes in a straight line, laying down a course that came out 12 ft. wide at the reservoir crest.

The asphaltic concrete mix for the work was chosen to provide a porous lining. After the reservoir is filled, this porous lining will prevent any back pressures from developing and causing an upheaval of the pavement on drawdowns. Water in the bank storage will be allowed to seep back into the reservoir.

The mix for the asphaltic concrete lining is similar to that used by the Los Angeles Department of Water and Power at Stone Canyon reservoir. The gradation is as follows:

SIEVE SIZE	PERCENT PASSING
¾	95-100
½	85-95
No. 4	44-58
No. 10	28-38
No. 40	10-18
No. 80	4-10
No. 200	1-4

A 60-70 penetration paving asphalt was used in the amount of 5 to 6% by weight. A penetration type emulsion RS-1 was used as a tack coat at the joints. The lining was laid at a temperature of 260 to 285 deg.F. The material was hauled from a plant 12 mi. away by a fleet of trucks that averaged six loads a day each.

Breakdown and final rolling

The final rolling of the asphaltic concrete lining was accomplished by the use of various types of rollers. On the slopes, a 4½-ton steel wheel roller was used. For areas on the slopes inaccessible to the mechanical spreader and the 4½-ton roller, the material was spread by hand and compacted by a small hand roller. The 4½-ton steel wheel roller was also used for the breakdown rolling on the reservoir bottom. However, final compaction was obtained by using an 8-ton steel wheel roller.

For access roads and parking areas, a 60-70 penetration paving asphalt was used as the bituminous

binder in an asphaltic concrete mix having the following gradation:

SIEVE SIZE	PERCENT PASSING
¾	98-100
½	86-92
¾	72-78
No. 4	44-50
No. 8	29-35
No. 30	18-24
No. 100	8-14
No. 200	5-7

The 3-in. thick pavement contained 4.8% asphalt, by weight. Asphalt paving 1½ in. thick for drainage ditches conformed to Los Angeles County Road Department Specifications using an SC-6 asphalt binder. The mix conformed to the following gradation:

SIEVE SIZE	PERCENT PASSING
¾	100
¾	95-100
No. 4	40-60
No. 8	24-30
No. 30	9-15
No. 100	5-8
No. 200	1-2

The mix contained 4.5% asphalt, by weight. In connection with the drainage ditches, a prime coat and seal coat consisting of an RS-1 penetration type emulsion were used in the amount of 0.25 and 0.20 gal. per square yard, respectively.

Reservoir storage will be 1,500 ac. ft. with a water surface of 37 ac.

The Morrison-Knudsen Co., Inc., and R. A. Westbrook were joint venturers for the \$3,143,695 construction project. Key personnel in the Metropolitan Water District's planning, engineering, and construction supervision of the Garvey Reservoir project include: Robert B. Diemer, district general manager and chief engineer; R. A. Skinner, in charge of design; Henry J. Mills, construction engineer; W. S. Merrithew, resident engineer; Dexter L. Cleveland, chief inspector.

REPORTS from the COURTS

By HOWARD S. BURNSIDE, Attorney and Registered Engineer

Oral promise to pay for lumber enforced

IF MR. A PROMISES to pay Mr. B's debt, the promise must be in writing if the creditor wants to collect from A. Certain contracts must be in writing to be enforced, otherwise it would be easy to defraud others by "proving" oral agreements that never existed. Such contracts are said to be within the Statute of Frauds. But there are qualifications and exceptions as demonstrated in the case at hand.¹

Owner Makos promised to pay contractor Bean's outstanding lumber bill as well as materials to be shipped. Fairview Lumber Company had told Bean no further credit would be extended but they delivered more lumber based on Makos' oral promise. Thereafter Makos paid for the lumber shipped after the promise but refused to pay the outstanding bill. The lumber company sued and obtained a judgment.

Makos was the owner for whom the lumber was used, and for this reason his promise to pay Bean's debt did not have to be a written agreement. The underlying principle is that the lumber was used mainly for the promisor's (Makos) pecuniary or business advantage.² If Bean used the lumber for his own building or some other person, Makos' oral contract (his promise to pay) could not be enforced by the lumber company.

1. *Fairview Lumber Co. v. Makos* (Wash.) 265 P. 2d 837.

2. *Restatement Contracts*, Para. 184.

Fraudulent misrepresentation by salesman

IN AN ACTION by a furnace installer for recovery of the contract price judgment was entered in favor of the owner upon the defense of fraudulent misrepresentation by the furnace salesman. The following principles relating to sales of operating equipment are applicable to countless situations of equipment installation.

"A statement that (an) article will satisfactorily meet the buyer's requirements will be regarded as an expression of opinion about something to take place in the future. Actionable

fraud cannot be predicated upon such a statement."

"But where the salesman does assert such special and peculiar knowledge (of the article or of the condition under which it was to be used) a statement that the article is appropriate for, and will satisfactorily meet, the buyer's requirements will be regarded as a representation of fact.

"In his negotiations . . . Wing represented himself to be an expert in the design and sale of furnace installations . . . with the intent that respondent would rely thereon and 'with the knowledge the respondent was inexperienced in such matters.'"

The one who speaks must have knowledge of the falsity of the representation of a fact or be ignorant of the truth if he is to be held responsible in a fraud action. It is no excuse to show that one did not know his representations were false or that he believed them to be true. Thus ignorance of the truth of matter is no excuse if a representation is made as to the fact of the matter.

Holland Furnace Co. v. Korth (Wash.) 262 P. 2d 772.

Retrospective effect of building code

UNLESS the building code specifically excepts existing buildings, a requirement that all building stairways have handrails includes buildings constructed prior to the adoption of the code. The code is given retrospective application. Thus if an existing building is not properly equipped with a stairway handrail, it is a proper question for the jury whether the failure to erect a handrail was negligence by which a person would be responsible in damages to one who fell upon the stairway. This ruling was made in *Fay v. Allied Stores Corp.*¹ and is in accord with decisions in other states on this point.²

1. *Fay v. Allied Stores Corp.* 262 P. 2d 189.
2. *Finnegan v. Royal Realty Co.* 35 C. 2d 409.

Municipal corporation retains connection charge

THE SALT RIVER PROJECT Agricultural Improvement and Power District, a corporation, charged the Rubenstein Construction Company \$25 per unit to connect electricity to

500 dwellings built in 1951-52 at Williams Air Force Base.

An Arizona statute reads in part that "No charge shall be made by any public service corporation for making connection for water, gas, electricity, or telephones."¹

The contractor sued to recover its payments for the connection charges. The power company claimed itself to be a political subdivision and municipal corporation of the State and thereby entitled to all the privileges and immunities granted such political subdivisions.

The issue then is whether this power district is a public service corporation or a municipal corporation. The answer to this question has broad application because it can conceivably affect contractual relations of persons dealing with the district, liability to others for negligence, taxes, etc.

In a brief opinion,² the Supreme Court of Arizona affirms that the District is a municipal corporation and does not lose this status (or the immunities available) while engaging in an activity ordinarily identified with public service corporations.

1. *Sect. 76-109, A.C.A. 1939.*
2. *Rubenstein Const. Co. v. S. R. Proj. Agr. Imp. & Power* 265 P. 2d 455.

Notes on legal procedure

FOR A BETTER understanding of the Reports some of the terms used from time to time and legal procedure are described.

The person who commences a law suit is the plaintiff. He must state a "cause of action" against a defendant or several such causes. This document is the "complaint." A copy of the complaint together with a summons is "served" on the defendant who is required to file his "answer" within a prescribed time—usually 10 days.

If the defendant feels that he is entitled to some relief or damages which arise out of the same matter, he will file a cross-complaint stating a cause of action. The defendant is then also a cross-complainant. The cross-complaint is served on the plaintiff who becomes also a cross-defendant and must file his answer.

The matter, if it goes to trial (more cases are settled than tried) may be tried before a judge which is a "trial before the court" or it may be tried before a jury. Either party has the right to demand a jury trial. (In some few situations a jury is not a matter of right.)

The person who demands the jury must deposit fees which vary in different places. Sixty dollars a day jury fees are required in Superior Court in San Francisco. Whoever wins is entitled to be repaid jury fees by the loser.

The jury renders a "verdict." The court renders "judgment."



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design really pay off. The GYRO-FLO rotary sliding vane compressor has no valves, pistons, rings, rods or clutches to wear out, adjust or replace. It delivers an abundant supply of oil-free air at temperatures that never go above 200 F. And pressure is automatically controlled closely and smoothly all the way from 0 to 100% capacity.

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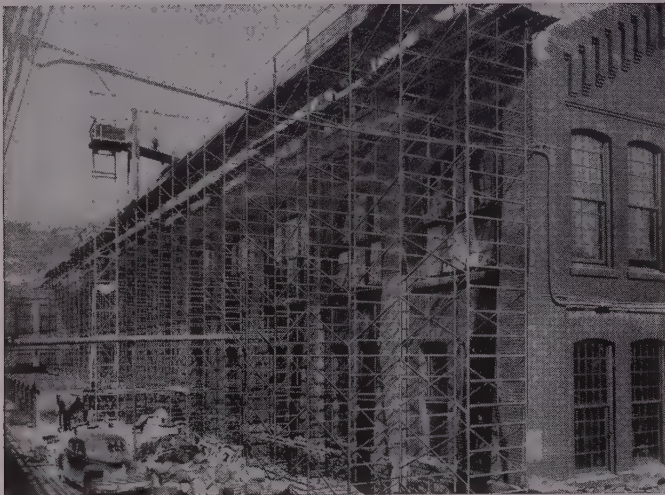
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Short Story—Valuable Reading!

Here's a contractor who saved plenty on a big job, using Universal's Ezebilt Scaffolding. He needed just 832 Braces (1648 connections) in this scaffold run—*single braces*, instead of cross-braces in 70% to 85% (six out of every seven) of the spans. He saved at least 60 seconds on each cross-brace he would have had to use with ordinary scaffolding. Ezebilt's fast-connecting 'Gravity-Lock' mechanism also saved him 20 seconds on each brace-connection. Small Talk?—Not when you multiply seconds by hundreds and thousands! This man, by using Universal Ezebilt Scaffolding, *saved many hours on this single job*. In dollars and cents—it made sense to use the *one* scaffolding that allows such savings.

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AMERICAN-UNIVERSAL OF CALIFORNIA, INC.

3146 RIVERSIDE DRIVE

PHONE: NOrmandy 4-6425

Colorado—DENVER 8

THE UNIVERSAL COMPANY

1426 ULSTER STREET

PHONE: DUDley 8-1624

Utah—SALT LAKE CITY

CONTRACTORS EQUIPMENT & SUPPLY CO.

650 SOUTH 6th WEST STREET

PHONE: 22-0501

Washington—SEATTLE 2

UNIVERSAL EQUIPMENT COMPANY

1549 EASTLAKE AVENUE

PHONE: Capitol 2136

WINTER CONCRETING

... continued from page 58

then replace the insulation. Usually one wetting a day would keep the unformed surfaces damp. This procedure was continued until just prior to placing the next lift or until the required water curing period was completed.

Durability of insulators

Sisalkraft encasement around fiber glass insulation made it more durable and resistant to weather than plain fiber board or rock wool bats having black building paper. The building paper covering on the rock wool bats deteriorated quite rapidly when exposed to wet weather and project engineers recommended covering the bats with chicken wire or water resistant paper. Approximately 80% of all fiber glass insulation purchased for the Kirwin job was in usable condition at the end of the construction season.

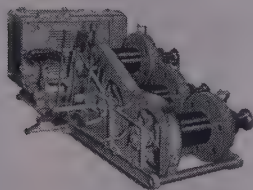
The job-made rock wool blankets were durable, and with proper care in handling they could be used continuously throughout two winter seasons.

Summary information

The performance records of the insulators described in this article indicate that in locations having winter climates similar to that of southern Nebraska or northern Kansas, 1 in. of fiber glass on 2-in. sheathing or its equivalent will usually be adequate for protecting formed surfaces of walls 12 in. or more in thickness; 2 in. of fiber glass blanket or its equivalent will usually be adequate for tops of walls or floor slabs; and 1 in. of fiber glass blanket or its equivalent will usually be adequate to protect unformed surfaces of mass concrete. If weather conditions are such that these thicknesses are inadequate, they probably will seriously limit performance of workmen.

The large number of continually changing conditions that affect generation and retention of heat in concrete make it advisable to check the temperature of the concrete twice daily throughout the first 3 days. If this is done it is not likely that the concrete temperature will drop to a critical point without ample time to provide additional protection.

The number of days having mean daily air temperatures below 32 deg. and 0 deg. F. at selected cities within the Bureau of Reclamation construction area in the 17 Western states are shown in Table 1. It is interesting to note how many days have air temperatures below 32 deg. F. but how few days are below 0 deg. F. throughout much of this great area. A comparison of the temperatures in this table with the exposure temperatures in Fig. 1 through 4 indicates that in much of the Bureau work area winter concrete can be protected by insulation throughout the entire winter season.



A new building system, plus modern, high-speed American equipment, have pared 10 months off construction time at the University Hospital of Portland, Oregon. Originally scheduled for completion late in 1955, the building's 1,200-ton structural steel framework is already completed.

The contractor followed the "Cofar" building system in which metal decking is welded to the steel frame and covered with lightweight concrete. Helping to speed the rate of construction and keep costs down is the highly-efficient American Model 75-B 3-drum Hoist.

With anti-friction bearings throughout, American Hoists not only speed the job by delivering more capacity loads per day, but they withstand longer, tougher usage. Years of experience are behind these famous hoists, built to satisfy the most exacting requirements of owner and operator alike.

American Hoists outsell all others simply because they do more work, with less maintenance, for a longer life span. Ask your distributor for details on the complete American Hoist line, *the line that leads the field!*

American Hoist

AMERICAN HOIST & DERRICK CO.

St. Paul 1,

Minnesota

MANUFACTURERS OF

Crawler & Truck Cranes • Steel Derricks • Crosby Blocks • Wire Rope Sheaves • Locomotive Cranes • Hoists • Portable Material Elevators • Genuine Crosby Clips • Revolver Cranes
• Utility Hoists •

ARIZONA

PHOENIX BUILDING BOOM—Two building projects totaling \$6,000,000 will have begun in Phoenix by the time this appears. Rubenstein Construction Co. is handling a 523-apartment project with shopping center for Rental Development Corp. of America. Del E. Webb Construction Co. has the Uptown Plaza, a commercial development of shops and offices. The apartments project recently gained an FHA mortgage insurance approval in the amount of \$3,749,900. Actually, with the investment in land and other improvements, the overall cost will be over \$4,000,000. Plans for the 34 brick wall buildings were drawn by Ralph Haver, architect. Construction of the Uptown Plaza will cost at least \$2,000,000. The buildings planned will form an "L" along two sides of the square 10-acre site,

with a separate two or three story building at the opposite corner. Architect was H. H. Green.

RECENT MAJOR CONTRACT AWARDS and low bids in Arizona include a low bid of \$211,869 submitted by **Bentson Contracting Co.** of Phoenix for construction of bridges and structures on US 60 & 70 near Superior. **Copper State Construction Co.** of Mesa submitted a low bid of \$300,555 for 11.3 mi. of grading and draining on an alignment paralleling SR 86 northeast of Willcox. **Lyle Price** of Flagstaff submitted a low bid of \$484,889 for 8 mi. of grading and draining on a new alignment of US 89 near Ashfork Junction. **Western Constructors, Inc.**, of Phoenix submitted a low bid of \$342,992 for 15.2 mi. of grading, surfacing, and construction of a steel girder bridge 16 mi. northwest of Tucson. **L. M. White** of Tucson submitted a low bid of \$431,264 for 12.7 mi. of widening and surfacing on US 60 & 70 near Aguila.

CALIFORNIA

\$150,000,000 TOWN—Development has begun on a \$150,000,000 community, Warren Park, to be built on an 1,876-acre site near Danville. It will be a model garbage-free community consisting of a 100-acre regional shopping center, schools, parks, recreational facilities, and churches. There will be more than 9,000 single-family residences. Experts in many phases of municipal development are being brought into the program, including Don Groom, Bay Area developer and builder. It is estimated that the project will take two years to complete.

OAKLAND SHOPPING CENTER—Demolition of the Oakland Speedway to make room for a \$25,000,000 shopping center is under way. This marks the first phase of construction for the 48-acre regional shopping center, named Bayfair. Architect Victor Gruen's design calls for 80 stores, dominated by a \$6,000,000 department store. The project is under the direction of Capital Co., Beckett & Federighi, and Macy's of San Francisco.

ROUND BUILDING—Plans have been approved for what is believed to be the world's first round office building. The unique structure is located in Hollywood and is being built for Capitol Records, Inc. Overall height of the structure will be 13 stories totaling 150 ft., the limit for the Los Angeles area. The building will be composed of a reinforced concrete cylinder 12 stories high and 90 ft. in diameter, rising above a rectangular, one-story base. Designed by Welton Becket and Associates, the building will cost close to \$2,000,000 and will be completed in January 1956.

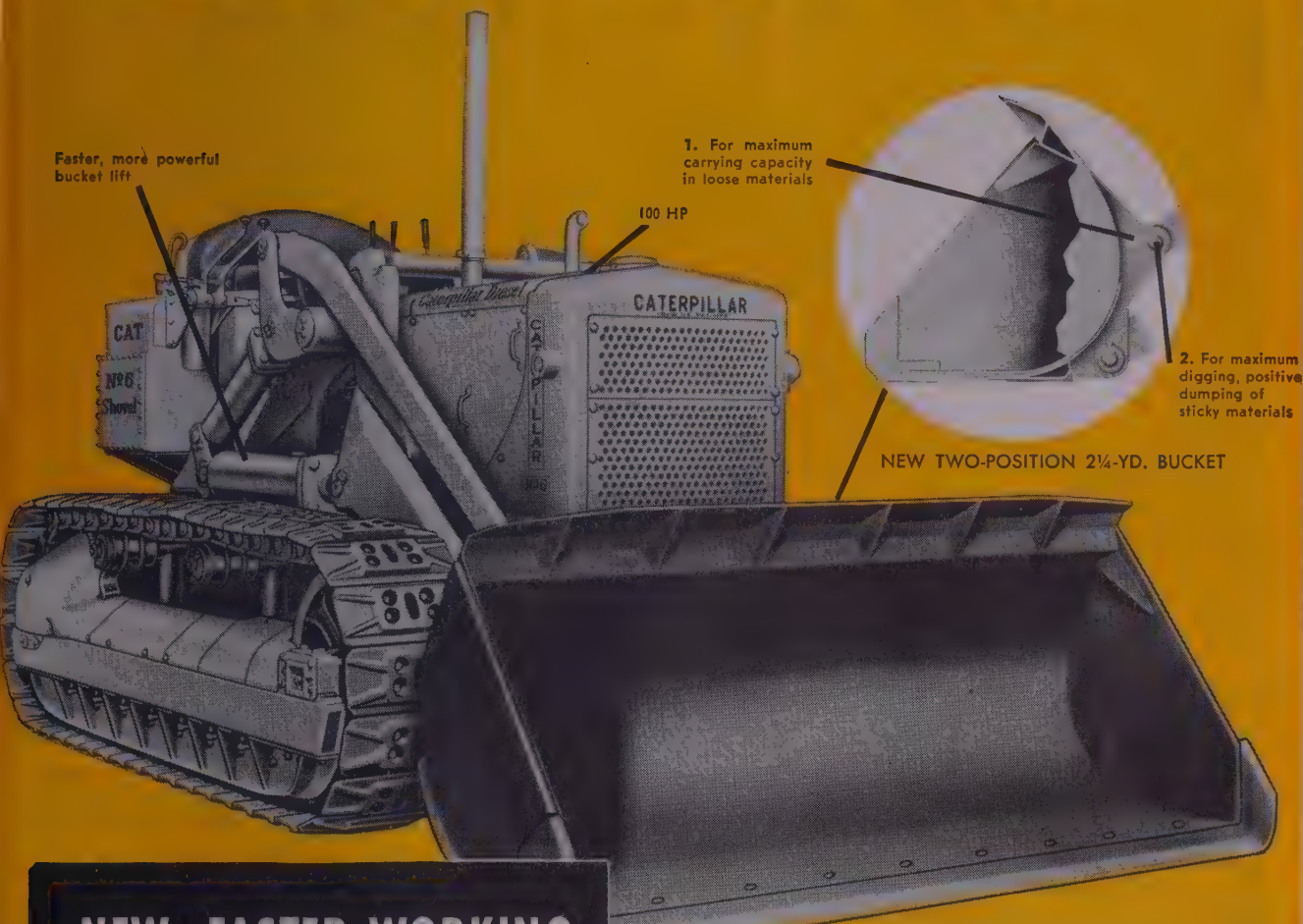
CONGRESS HAS APPROVED the joint water conservation and flood control project in Santa Barbara County. It is anticipated that expenditures will total \$17,000,000. The project includes a dam at the Vaquero site on the Cuyama River with levees along the Santa Maria River and a tributary stream.



PIT 4 HOLES THROUGH

Crewmen of Walsh Construction Co. show their jubilation at the final holing through of the 21,500-ft. Pit 4 tunnel (Western Construction—Sept. 1954, pp. 64-67; Sept. 1953, pp. 82-84). Fragmented lava rock made it necessary to timber closely all the way. The job was started in October 1952.

ANNOUNCING



NEW, FASTER-WORKING

NO. 6 SHOVEL

at no increase in price

NEW POWER—the CAT* Diesel Engine now gives you 100 HP, an increase of approximately 25 per cent—and you get it with Caterpillar ruggedness and economy.

NEW 2 1/4-yd. BUCKET gives you 12 1/2 per cent more capacity, gets heaping loads, dumps cleanly. Exclusive two-position feature gives maximum use of bucket capacity in *any* material: rear position for clean, fast dumping of sticky materials; forward position for carrying heaping loads of loose materials.

GREATER LIFTING POWER and speed with new hydraulic pump: its pressure is stepped up more than 40 per cent for fast, positive lifting action under *all* load conditions.

These extra values cost you no more in price!

These useful attachments increase your job range: skeleton rock bucket, quarry bucket, heavy-duty narrow bucket and bulldozer blade.

Versatile new No. 6 Shovel is built to do more work at less cost

Weight distribution, engine horsepower and bucket capacity are carefully balanced so that the tracks *stay* on the ground for maximum stability.

Your Caterpillar Dealer will be glad to demonstrate the new No. 6 Shovel *on the job*. See him today. And count on him for fast service and genuine factory parts.

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



CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—(R)

**NAME THE DATE...
YOUR DEALER
WILL DEMONSTRATE**

CONSTRUCTION of a \$7,100,000 low dam in the Colorado River to serve the Palo Verde Irrigation District has been authorized by Congress. The new dam will replace a rock structure which has been gradually giving way as a result of changes in the flow of the Colorado River. The problem has been developing since the operation of Hoover Dam.

PROGRESS AT TECOLOTE — Drilling in 6½-mi. Tecolote Tunnel is moving at 100 ft. per week since excavating crews passed an area of severe water seepage. Progress had been slowed to a few feet per day by incoming water which reached a peak of 7,800 gal. per minute. The forward heading area is now in dry rock, however, and is moving out of the trouble zone. The project has been under way since January 1950, and is scheduled for completion in September 1955. Close to 3,000 ft. remain to be bored.

AIRPORT OF THE FUTURE — Oakland's new airport, designed for jets, helicopters, and seaplanes, as well as the more traditional type of aircraft, has received the go-ahead signal from the Board of Port Commissioners and the Civil Aeronautics Administration. Plans for the project were included in a comprehensive report by the New York consulting firm of Knappen-Tippetts-Abbett-McCarthy. It is expected that the \$11,500,000 airport will be in use by 1957.

PACIFIC GAS & ELECTRIC CO.'S \$37,000,000 Poe hydroelectric project on the north fork of the Feather River has entered into the construction phase with preliminary work on an access road. Test drilling and prospecting of foundation conditions at the powerhouse site is also being done. Company officials stated the project will require three to four years and that at the peak of the work, two years hence, between 1,000 and 1,500 men will be employed. The initial contract on the access road is held by H. Earl Parker Co.

NEW PHONE BUILDING—A \$3,000,000 office building for the General Telephone Co. of California is under construction in Santa Monica. The structure will be earthquake resistant and will provide 200,000 sq. ft. of floor space. The plans, drawn by Albert C. Martin & Associates, provide for eventual doubling the size of the building.

REGENTS O.K. PLAN—The University of California regents have approved a capital improvements program calling for an expenditure of \$18,239,500 at eight campuses for the 1955-56 school year. Included is a \$1,500,000 offstreet parking structure in San Francisco and a \$1,800,000 arts building in Santa Barbara.



490,000 SQ. FT. OF FLOOR SPACE IN OFFICE BUILDING

Slightly over half of the \$7,000,000 office building being built in Sacramento is shown in this picture. The three plate girders which span 8th St., are 73 ft. long and 13 tons each. General contractor George A. Fuller Co. plans completion by December 1955.

RECENT MAJOR CONTRACT AWARDS and low bids in California include a low bid of \$1,498,951 by the **A.B.C. Construction Co.** of Norwalk for installation of a pipeline between Corona and San Juan tunnel for the Metropolitan Water District. **Guy F. Atkinson Co.** of South San Francisco submitted a low bid of \$610,151 for 3.2 mi. of paving in Tulare County. **James I. Barnes** submitted a low bid of \$3,560,000 for construction of six schools in Bakersfield. **Cox Bros. Construction Co.** of Stanton submitted a low bid of \$265,535 for 14 mi. of widening and surfacing on the Pacific Coast Highway near Newport Beach. **Granite Construction Co.** of Watsonville submitted a low bid of \$635,014 for 1.8 mi. of grading, surfacing, and widening of an existing steel bridge in Stanislaus County.

Healy Tibbits Construction Co. of San Francisco submitted a low bid of \$1,234,100 for installation of an outfall sewer for Los Angeles County Sanitation District at Torrance. **Huntington Bros.** of Napa submitted a low bid of \$170,000 for 2.2 mi. of grading and surfacing in Sonoma County. **Vern R. Huck** of Los Angeles is to develop a \$1,066,000 subdivision in Palmdale. **W. F. Maxwell Co.** of Los Angeles submitted low bid of \$497,782 for 12 mi. grading and surfacing and construction of two bridges in San Bernardino County. **K. E. Parker** of San Francisco received a \$1,381,000 award for construction of the San Mateo County Courthouse.

George W. Peterson and Jack W. Baker, Jr., submitted a low bid of \$722,657 for construction of bridges, ramps, and frontage roads on SR 158 in Los Angeles. **Stolte Inc.** of Oakland received a \$1,346,221 award for construction of a 4-story courthouse in Sacramento. **B. J. Ukropina, T. P. Polich, Steve Kral & John R. Ukropina** of San Gabriel submitted a low bid of \$1,061,539 for 4 mi. of grading and surfacing and construction of

two bridges in Orange County, and another low bid of \$1,923,764 for 4.1 mi. of grading, surfacing, and construction of six bridges in Santa Barbara County. **P. J. Walker Co.** of Los Angeles received a \$1,581,846 award for construction of hydrodynamics test facilities at Edwards Air Force Base.

COLORADO

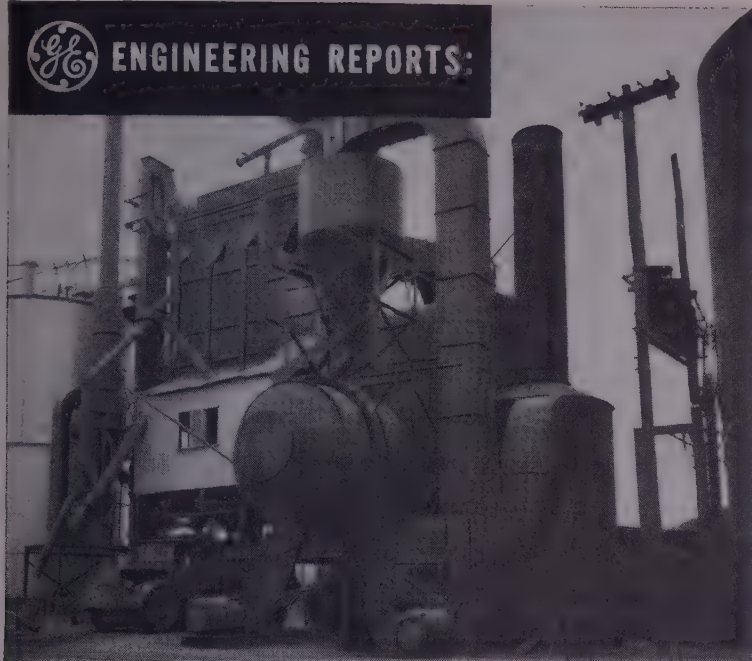
BOULDER GETS HOTEL—A \$4,500,000 hotel apartment and shopping center is to be built at Boulder. Site of development is the present 40-acre Mountain View golf course which was recently bought by the Murchison brothers of Dallas, Texas. Construction will begin in a few weeks, according to a Murchison representative. Architectural plans are being drawn by Raymond Harry Ervin. Liberal use will be made of Boulder flagstone, as used in many buildings on the University of Colorado campus a few blocks away. The contract is held by Mead & Mount Construction Co.

MORE HOMES FOR DENVER—Morrison & Morrison, Inc., has purchased 125 acres at the edge of east Denver as a site for 500 new homes. The overall cost of the project will be in excess of \$5,000,000. Since the location is outside the city limits, annexation is being studied. Only two weeks previously Morrison announced plans for construction of 300 homes in the same general area, also at an estimated cost of \$5,000,000.

RECENT MAJOR CONTRACT AWARDS and low bids in Colorado include a \$3,500,000 award to the **Stearns-Roger Manufacturing Co.** of Denver for the design and construction of a steam power plant for the Southern Colorado Power Co. at Canon City.



ENGINEERING REPORTS:



G-E SERVICE is quickly available to any Simplicity-built plant. An asphalt plant must be dependable above all—no G-E motor has failed in this Triboro Asphalt Co., Flushing, N. Y., installation since its construction in 1949.



ECONOMICAL OPERATION is one advantage of using General Electric drives. This 100-hp G-E motor operates main dust blower at Triboro.

Large asphalt-plant builder standardizes on General Electric equipment for dependability

G-E motors and controls help maintain continuous high output at Simplicity-built plants

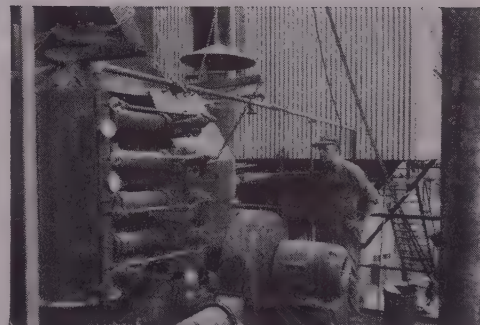
The Simplicity System Co. of Chattanooga, Tenn., has used General Electric motors and controls since they first electrified this type of asphalt plant. W. C. West, Simplicity general manager, says "We not only feel G-E apparatus is the most dependable of any available, but for years we've been highly pleased with G-E service."

Reliable, flexible motors are required for these applications. Simplicity-built plants are often remotely located at the end of utility lines or where power availability is low. Drive motors are subjected to very high starting torques. Even a one-hour shutdown can cost more than a thousand dollars in lost production alone. Because of these conditions, G-E motors designed to operate under high starting torques and low starting currents were selected after Simplicity ran a series of tests for various applications, in co-operation with G-E engineers.

Your construction equipment will gain in dependability and efficiency too, when you electrify with G-E drives and power distribution equipment. They're backed by G-E engineering help in application, installation and service, available through any G-E Apparatus Sales Office, or by writing General Electric Co., Section 664-33, Schenectady, N. Y.

WESTERN SALES OFFICES: Albuquerque, Bakersfield, Butte, Denver, Eugene, Fresno, Los Angeles, Medford, Oakland, Pasco, Phoenix, Portland, Riverside, Sacramento, Salt Lake City, San Diego, San Francisco, San Jose, Seattle, Spokane, Stockton, Tacoma.

GENERAL  **ELECTRIC**



DEPENDABILITY is built into this 25-hp G-E motor, which operates the burner controlling the temperature and consistency of asphalt mixture.



CENTRALIZED G-E CONTROL PANELS are factory assembled and system-wired; they provide safer control for all motors in a Simplicity plant.

IDAHO

TWO CLEARWATER DAMS — Preliminary investigations have started on dams to be built at Bruces Eddy and Penny Cliffs on the Clearwater River in north Idaho. Four companies have organized the Pacific Northwest Power Co. to handle the projects. It is estimated that the dams will generate 535,000 kilowatts and will cost \$300,000,000.

THE WASHO ROAD test is ended. After the application of 238,000 heavy axle loads to each of the test pavements, the Highway Research Board, which conducted the test for the Western Association of State Highway Officials, announced that traffic was at an end. Engineers have now begun detailed studies of the condition of the pavement down to the subsoil. The final report, which may have the answers to some of the questions concerning heavy use of pavements, will be published in the Spring of 1955.

RECENT MAJOR CONTRACT AWARDS and low bids in Idaho include a low bid of \$165,331 submitted by Aslett Construction Co. of Twin Falls for roadwork on the Ketchum-Clayton highway in Custer County. Frank J. Baulne of Yardley received a \$485,416 award for the construction of 4.9 mi. of US 95 between Fenn and Cottonwood in Idaho County. Kiely Construction Co. of Butte submitted a low bid of \$433,321 for roadwork on the Ketchum-Clayton highway. Morrison-Knudsen Co., Inc., of Boise received a \$232,493 award for grading and surfacing near Nampa. Carl E. Nelson of Logan submitted a low bid of \$237,075 for grading and surfacing in Jerome County.

MONTANA

EMPLOYMENT reached new highs in September at the Anaconda Aluminum plant two miles east of Columbia Falls. Over 1,500 were on the payroll with more than half working overtime building the new aluminum reduction works. This meant a flow of close to \$175,000 a week in construction payrolls into the Flathead valley. The contract is held by Foley Constructors, with Donovan Construction Co. the principal subcontractor.

BLASTS RIP PLANT—Three explosions damaged the Rainbow Dam power plant near Great Falls recently. The blasts resulted in a power



"...no difficulty during installation—everyone concerned is satisfied...."

Commercial Steel Tunnel Liners Speed Construction... Traffic Maintained

Traffic on the main line of The Central Railroad of New Jersey had to be maintained while a 97" pipe was laid in soft ground. With only 14 feet of cover above the pipe, the problem of adequate tunnel support was extremely important.

"Commercial" engineers were asked to design a structural tunnel lining to carry all loads that would develop until the pipe could be laid and properly back packed. Ground conditions were such that only small sections of the tunnel face could be mined and left unsupported — and then for a very short time. So the lining had to be one that could be erected quickly and in sections that one man could position until secured in place.

Agreement as to design and method was reached and "Com-

mercial" was told to produce and deliver the steel tunnel lining to meet the schedule. Solid corner "Commercial" Liner Plates curved to exact radii were set into position as the mucking was done, then quickly bolted together into a continuous lining. Closely behind, "Commercial" Steel Ribs, bent to proper contour and completely fabricated ready for field erection, were set inside the liner plates and bolted together.

From the field we are now told, "Everyone concerned is satisfied with this type of construction... the tunnel liners offered no particular difficulty during the installation."

Can we be of assistance to you in your tunnel job? There is no obligation.

THE COMMERCIAL SHEARING AND STAMPING COMPANY
YOUNGSTOWN 1, OHIO • CHICAGO, ILLINOIS • SALT LAKE CITY, UTAH

"COMMERCIAL"

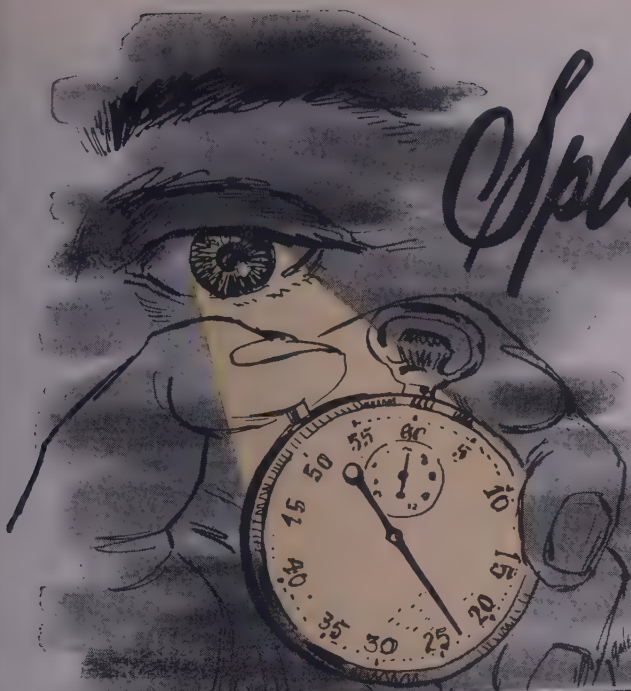
"PRODUCTS PREFERRED
BY CUSTOMER ACCEPTANCE"

"Commercial" engineers will gladly assist you;
they have the experience and know how.

LINER PLATES • RIBS • SETS • LAGGING

LA-11

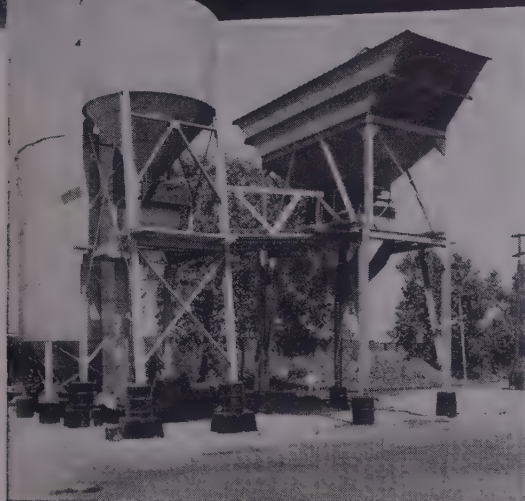
Split seconds count...



In manual batching operations, it may be only a split second between the time the operator looks at the dial and pushes the lever . . . but in a day's run, that time lapse can add up to a batch or two lost!

Automatic batching is as positive in its operational sequence as the sun. The plant works every split second of the cycle . . . and automatically insures the accuracy so essential for today's exacting specifications.

BLAW-KNOX BATCHING PLANTS WITH *Automatic* EQUIPMENT make every second count toward profit



- Push-button operation speeds each phase of cycle.
- Batch is predetermined by a turn of the selector knob.
- Interlocks, either electrical or mechanical, eliminate the possibility of human error.
- Fully automatic batchers include automatic filling, automatic cut-off and automatic power-operated discharge. Operated by remote control from a panel control board with all weighing scales in view.
- Indicator lights keep operator informed of each phase of the cycle.
- Weighing hoppers are steep sloped and perfectly smooth inside, with rounded corners to insure quick, clean discharge.

Whether your job requires the speed and accuracy of automatic batching, or whether manual or semi-automatic operation is satisfactory, Blaw-Knox bins and batchers for both aggregate and cement are available in the size and type you need.

ASK YOUR BLAW-KNOX DISTRIBUTOR
about the one-source advantages of
the Blaw-Knox "Complete Paving Package"

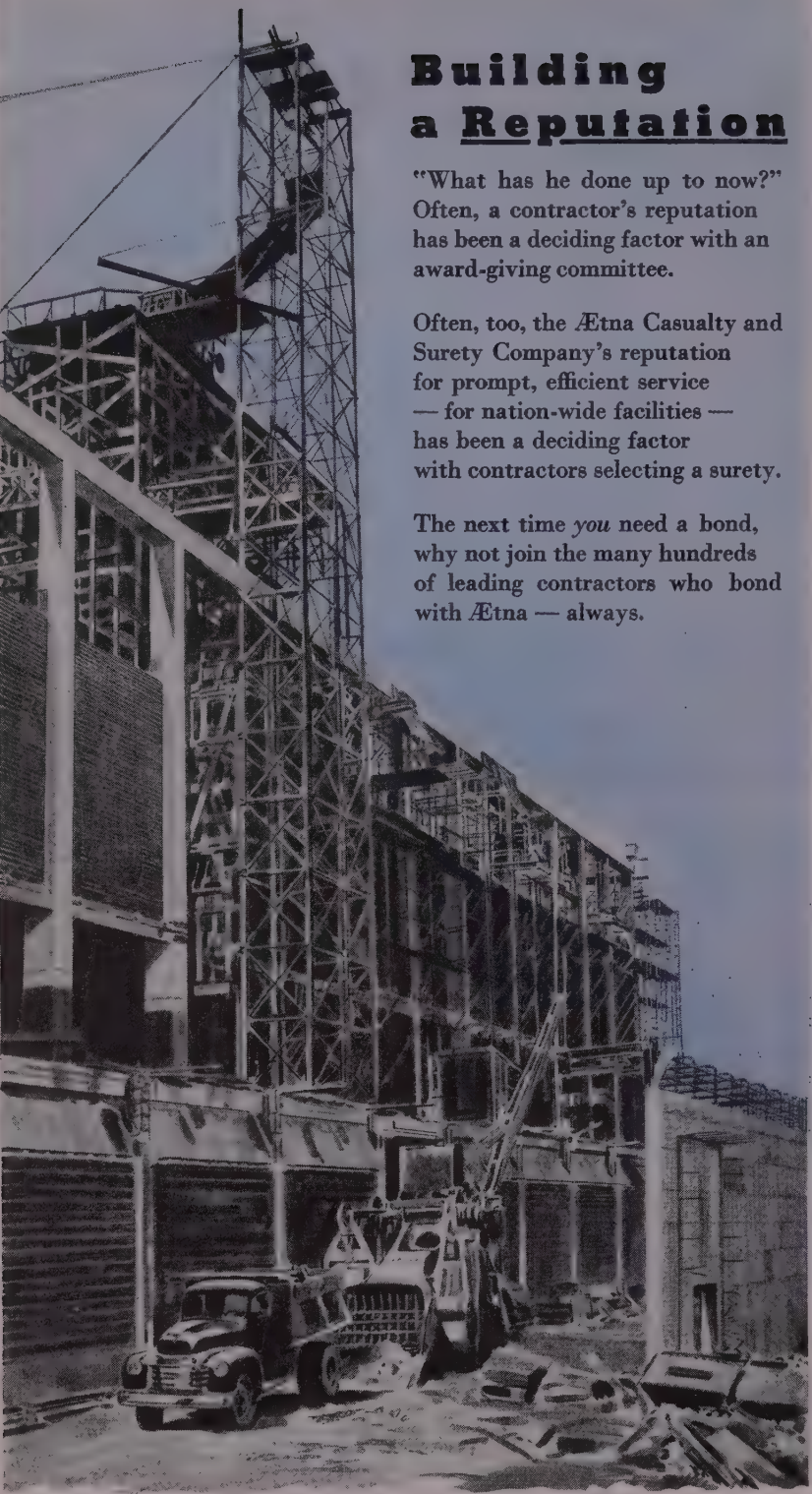
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—Branch: 2175 Newton St., San Diego, Calif.



Building a Reputation

"What has he done up to now?"
Often, a contractor's reputation
has been a deciding factor with an
award-giving committee.

Often, too, the Aetna Casualty and
Surety Company's reputation
for prompt, efficient service
— for nation-wide facilities —
has been a deciding factor
with contractors selecting a surety.

The next time you need a bond,
why not join the many hundreds
of leading contractors who bond
with Aetna — always.

cut-off for 45 min. in large areas of
Montana. The plant controls the op-
eration of four dams on the Mis-
souri River. Officials of the Montana
Power Co., which owns the plant,
blamed the explosions on a failure in
the transformer causing a concentra-
tion of power in the line, so that the
generator bus "blew up." Damage to
the building and equipment was esti-
mated at \$200,000.

**THE LARGEST SINGLE GRAD-
ING** project in Montana Highway
Dept. history was awarded Septem-
ber 29 to England & Roth Construc-
tion Co. Their bid was \$680,304. The
road is located in Fergus County and
will involve over 2,000,000 cu. yd. of
excavation.

**RECENT MAJOR CONTRACT
AWARDS** and low bids in Montana
include an award of \$218,969 to Stan-
ley H. Arkwright of Billings for
7.5 mi. of grading and surfacing on
the Livingston-Big Timber highway.
Clifton & Applegate of Yardley re-
ceived two awards: one of \$189,894
for 0.4 mi. grading, surfacing, and
construction of an overpass in Min-
eral County and one of \$193,759 for
1.5 mi. grading and surfacing in Flat-
head County. England & Roth Con-
struction Co. of Rapid City received
a \$680,303 award for 3.9 mi. grading
and draining on the Grassrange-
Malta highway in Fergus County.
Albert Lalonde Co. of Sidney re-
ceived a \$516,351 award for 14 mi.
grading and surfacing in Teton
County.

NEVADA

EARTHQUAKE—Nevada's second
earthquake in two months centered
between Lovelock and Fallon and
caused considerable damage, particu-
larly to irrigation facilities. Cost of
repairs was expected to reach \$200,-
000, as much as the bill for the first
'quake, which occurred in July. The
Rogers diversion dam two miles
northeast of Lovelock was reported
to be a complete loss. The \$10,000
structure went out during the 'quake
but there was no flooding of farm
land. It was pointed out by City En-
gineer Lloyd Whalen that had not
repairs taken place immediately after
the July earthquake tremendous
damage would have resulted, since
the second tremor would have been
the last straw for many walls.

**RECENT MAJOR CONTRACT
AWARDS** and low bids in Nevada
include a \$1,242,539 award to the
Thorn Construction Co. Inc. of
Springville for roadwork in Clark
County.

No job too big--no job too small

AETNA CASUALTY AND SURETY COMPANY

AFFILIATED COMPANIES: AETNA LIFE INSURANCE COMPANY

AUTOMOBILE INSURANCE COMPANY • STANDARD FIRE INSURANCE COMPANY

HARTFORD 15, CONNECTICUT





PELADOW GIVES CONCRETE FASTER SET, GREATER WORKABILITY, HIGH STRENGTH

Peladow, new high-test Dow calcium chloride, in concrete mix adds strength, permits faster, better work . . . speeds construction schedules . . . cuts costs

Modern construction methods won't permit long, wasteful periods of waiting for cement to gain working strength. For this reason, Dow's new high-test (94-97%) Peladow® calcium chloride in buckshot-size pellets should be used in the mix to accelerate the hydration action and speed up setting time.

Peladow, engineered especially for construction use, can be used in smaller quantities than ordinary calcium chloride, because *four bags of Peladow do the work of five bags of flake-type calcium chloride*. This advantage of compactness offers substantial economies through reduced transportation, storage and handling costs.

When your job requires pouring into forms, a Peladow admixture assures an even flow and a *complete* fill. It eliminates the greater part of voids in corners and on

surfaces where adhesion to forms causes pockets in ordinary mixes. When the forms are removed, you will find a smoother, better appearing, more uniform surface that requires a minimum of pointing up. In addition, the greater workability of the mix, induced by Peladow, makes it possible to decrease the amount of water which would otherwise be necessary to make the concrete flow. This reduction in gauging water reduces shrinkage and surface crazing and provides a denser, more waterproof concrete.

Assure yourself of the increased efficiency and productivity by taking advantage of the many benefits Peladow provides. Peladow is shipped in 100-lb. moisture-proof bags and covered bulk hopper cars. Write for detailed information to THE DOW CHEMICAL COMPANY, San Francisco, Los Angeles, Seattle, Dept. IN —991L-1

you can depend on DOW CHEMICALS

DOW

NEW MEXICO

A DAMAGE SUIT amounting to \$532,000 has been filed by Southwest Engineers against the city of Albuquerque. Southwest Engineers, a partnership, formerly were consulting engineers to the city on sewer and other utility expansion projects. The firm was fired by the city for alleged inadequate supervision and it filed suit for alleged breach of contract.

RECENT MAJOR CONTRACT AWARDS and low bids in New Mexico include an award of \$130,444 to **Jack Adams** of Los Alamos for 5.6 mi. of grading and surfacing SR 75 in Taos County. **Boswell Construction Co.** of Albuquerque submitted a low bid of \$127,989 for earthwork, clearing and structures for rehabilitation of drains on the Middle Rio Grande Project. **Haake Construction Co.** of Albuquerque received a \$127,472 award for 5 mi. grading and surfacing in Chaves County. **D. D. Skousen & Son** of Albuquerque submitted a low bid of \$273,510 for earthwork on the Middle Rio Grande Project. **Saul & Gilbert & Foster Construction Co.** of Santa Fe received a \$153,948 award for 5.5 mi. of grading and surfacing in Socorro County. **Skousen-Hise Contracting Co.** of Albuquerque received a \$1,042,659 award for 5.1 mi. of grading and surfacing on US 66 in Valencia County. **Wylie Paving Co.** of Albuquerque received a \$175,639 award for 7.7 mi. of grading and paving near Albuquerque. **Wylie Bros. Contracting Co.** of Albuquerque received a \$332,868 award for 31.8 mi. grading and surfacing in Lea County.

OREGON

CONGRESS has appropriated \$4,133,000 for construction of a major air force base at Klamath Falls. The original schedule called for a possible start of runway work this fall but weather may delay the beginning until spring. Preliminary engineering on the site has been completed.

BRIDGE NEAR McNARY—Erection of the steel superstructure for a new highway bridge across the Columbia River connecting Umatilla, Ore., and Plymouth, Wash., is moving ahead on schedule after a delayed start due to high water. The 3,400-ft. toll bridge will contain 3,500 tons of structural steel and will connect U.S. Highway Route 730 and Washington State Highway Route 8, presently joined by ferry boat service. The construction design of the new crossing is a double cantilever with two 600-ft. center spans, with girder type approach spans. Consulting engineer on the project is Tudor Engineering Co.

McNary rotors—largest ever

THE HYDRO-GENERATORS at McNary Dam, like the one shown here, are the largest pieces of rotating electrical equipment in physical size ever made. Each is 52 ft. in diameter and weighs 1,200 tons. The



70,000-kw. units were designed by General Electric Co. to specifications prepared by the Corps of Engineers. The thrust bearing will carry over 4,000,000 lb. This represents a 33% increase over the bearings at Bonneville Dam, previously the largest in the world.

Each of the McNary generators will revolve at a speed of 85.7 rpm., a comparatively slow speed made necessary by the large quantities of water available to turn the turbines, and the low head. By 1956 12 of the generators will be producing power.

Construction on the dam was started in 1947 and completed last winter when the 61-mi. long reservoir was filled. Overall cost was \$286,000,000. Fish passages alone cost \$22,491,000.

RECENT MAJOR CONTRACT AWARDS and low bids in Oregon include a \$157,410 award to **Hamilton & Thoms** of Eugene for construction of four viaducts over the Portland-Salem Expressway in Marion County. **Lee Hoffman** of Beaverton received a \$172,921 award for construction of a bridge and approaches north of Portland. **Roy L. Houck & Son** of Salem received a \$341,441 award for grading and paving near Salem. **R. A. Heintz Construction Co.** of Portland submitted a low bid of \$849,861 for construction of 6 mi. of Union Pacific RR and 5.4 mi. of US 30 at The Dalles Dam Project in Sherman County. **Kuckenberg Construction Co.** of Portland received a \$620,567 award for 2.3 mi. of grading and

oiling on the Pacific highway north from Myrtle Creek in Douglas County.

Tom Lillebo of Reedsport received a \$153,472 award for construction of six reinforced concrete structures on a new alignment of Pacific highway in Lane County. **J. Ira McNutt** submitted a low bid of \$432,000 for producing and stockpiling railroad ballast material for construction of the relocated Union Pacific RR near The Dalles. **Warren Northwest, Inc.**, of Portland received a \$208,205 award for 14 mi. of paving in Klamath County. **Porter W. Yett** of Portland received a \$294,286 award for 2.9 mi. grading and paving in Washington County.

UTAH

NEW PLANT FOR PROVO—Consolidated Western Steel Division of United States Steel Corp. announced it will construct a steel pipe manufacturing plant near Provo. The new mill, which is expected to have an employment roll of more than 200 when production begins next spring, will have about five acres under roof. The steel frame and corrugated sheet building will be fabricated and erected by Consolidated Western.

WORK ON WIDENING the Beck Street section of U.S. 89 and 91 between the Victory Road intersection and Beck's Hot Springs, a 1.7-mi. project, is nearing completion. The present four-lane road is being widened to six, with a buttressed neutral zone. Workmen have started to lay the 6-in. concrete base, after which they will pour an additional 3 in. of cover. **Gibbons & Reed Co.** has the \$365,000 contract.

CANAL SAFETY DEVICE—A new escape device to be used in the Gateway Canal of the Weber reclamation project in Utah is expected to make it one of the nation's safest large canals. At each of the canal's 7 siphons will be broad, low steps beginning below the water surface and extending the full width of the canal. If men or animals fall into the 8-ft. deep, 35-ft. wide canal and float for only a few minutes on the fast-moving water, they will be washed to safety on the concrete, open steps. This safety innovation is in addition to the usual fencing and escape ladders. **Morrison-Knudsen Co.** holds the \$1,948,822 contract for construction of the canal, wasteway, and power plant headworks.

RECENT MAJOR CONTRACT AWARDS and low bids in Utah include a low bid of \$2,360,370 submitted by **Jacobson Construction Co.** of Salt Lake City for construction of a hangar and related utilities. **Morrison-Knudsen Co., Inc.**, of Boise submitted a low bid of \$1,948,812 for

where
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must be
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STRENGTH**

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WEIGHT**



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BASALITE **Expanded Shale Aggregate**

● Construction scene on partially completed Richmond-San Rafael Bay Bridge, San Francisco Bay. **BASALITE Expanded Shale Aggregate** was specified to provide lightweight, high strength "10-inch pour" concrete roadbed.

BASALITE "rounded particle" surface sealed Expanded Shale Aggregate is being used in the manufacture of lightweight concrete for the "10-inch pour" floor of the Richmond-San Rafael Bridge, San Francisco Bay.

On this job—as on all other jobs requiring lightweight concrete—**BASALITE Aggregate** will make possible concrete weighing 40 to 50 pounds less PCF than conventional concrete of comparable strength. Less structural and reinforcing steel and cement will be required to obtain a high-strength mix. Curing shrinkage will be held to a minimum because **BASALITE Aggregate** is chemically inert, with low absorption . . . resultant low volume change. Placement characteristics will prove excellent because of the Aggregate's spherical shape and lack of voids that permit full utilization of cement paste.

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earthwork, concrete lining, and structures on Gateway Canal of the Weber Basin Project.

WASHINGTON

COWLITZ BONDS APPROVED

—The Tacoma City Council passed three ordinances providing for a \$146,000,000 bond issue to cover construction of two dams on the Cowlitz River for Tacoma City Light. Combined output of the powerhouses will be 474,000 hp. with provisions for a future installation of an additional 158,000 hp.

SPOKANE SPAN—

The proposed Maple St. toll bridge in Spokane could be constructed for \$4,610,000 with 3,367,000 vehicles using the span during its first year of operation. That was the estimate included in a report presented to the city council by Tudor Engineering Co. The quoted cost includes right-of-way, engineering administration, legal expenses and other contingencies, but no financing costs. A period of nine months to a year would be required to prepare contract plans and specifications and the awarding of contracts. Construction would not exceed two years.

HYDRO PERMIT—

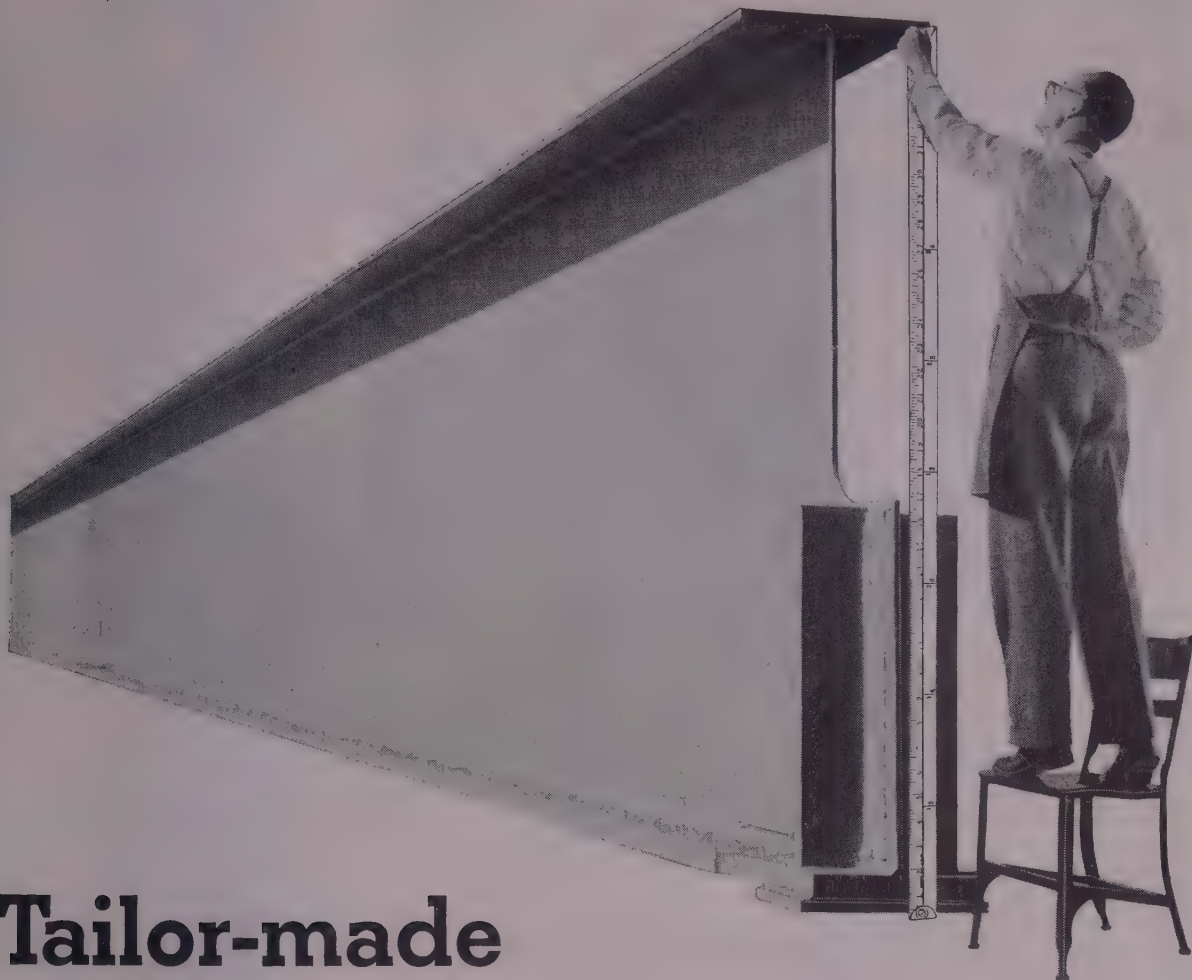
The power commission granted a three-year preliminary permit to public utility district No. 1 of Douglas County for a proposed hydro-electric development at the Wells site on the Columbia River. The project would include a concrete dam and a powerhouse with an initial capacity of 392,000 kilowatts. A preliminary permit is issued for the sole purpose of authorizing priority. It does not authorize construction.

BIG HOUSING PROJECT—

The first project under the new defense department program to improve conditions at military installations will be a \$10,000,000, 800-family housing unit at Fort Lewis. The Seattle firm of Durham, Anderson & Friede has been chosen architect-engineer for the planning and design of the project. It will take an estimated 18 months to build the 800 units. The Seattle district of the Army Corps of Engineers will advertise for bids about December 30.

CHIEF JOSEPH NEAR END—

Mass placement of concrete in Chief Joseph dam is now in the home-stretch with less than 40,000 cu. yd. remaining to go into the 981,000 cu. yd. structure. The last seven crest gates atop the dam were scheduled to go into place in early November. The final concrete pour is slated for mid-December.



Tailor-made

Today, Kaiser Steel plates are being welded together to form structural beams—*tailor-made* to fit exacting designs.

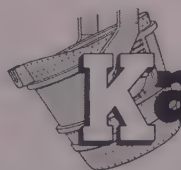
This is a dramatic advance over the old method of tailoring the designs to fit the size ranges of ordinary structural steel.

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Kaiser Steel plates are being used where larger-than-average structurals can improve construction, including major units of the multi-million dollar construction program currently underway through the California Department of Public Works.

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SPOKANE COLISEUM NEARS COMPLETION

Roof girders like this one in Spokane's \$2,500,000 coliseum span 125 ft. Plans for the structure, largest civic auditorium in the Pacific Northwest, specified 470 tons of concrete reinforcing steel. Public opening is slated for this month.

HYDRO STUDY ROLLING — Minneapolis Aerial Mapping Co. has begun aerial studies of the three dam sites in the proposed 145,000 kilowatt Wenatchee River-Chiwawa project. Stone & Webster are busy on cost estimates, water flow calculations and load studies for the development, which involves storing water on the Wenatchee and Chiwawa rivers and running the flow into the Chumstick through a 6-mi. tunnel. Power would be produced at all three locations. The investigations are for the purpose of determining the feasibility of the project.

BUGGE SETS TARGET — State Highway Director William A. Bugge named 1955 as the target date for completion of the \$56,250,000 reconstruction job on U.S. Highway 99. He also said that the \$8,250,000 improvement project on Snoqualmie Pass would be finished in 1955. Wet weather had been an obstacle to construction this year, particularly on Highway 99, where in some sections 1/3 to 1/2 of construction time was lost because of adverse weather.

RECENT MAJOR CONTRACT AWARDS and low bids in Washington include an award of \$5,514,000 to Drake & Fuller of Portland for construction of B-52 structures at Mose Lake. Peter Kiewit Sons' Co. of Longview received a \$1,328,367 award for construction of the Skagit River Bridge north of Mt. Vernon in Skagit County. Materne Bros. of Spokane received a \$165,487 award for 15.6 mi. of surfacing in Chelan National Forest. J. A. Terteling & Sons

of Auburn received a \$554,406 award for 18 mi. of surfacing on the Stevens Canyon Highway in Mt. Rainier National Park. C. E. Youngdahl & Co. of Portland received a \$1,478,000 award for construction of school buildings in Vancouver.

WYOMING

CITIES SEEK DAM HEAD-QUARTERS — Three southeast Wyoming towns, Douglas, Torrington, and Guernsey, have shown interest in obtaining the headquarters for workers on the \$50,000,000 Glendoe dam. More than 300 families would move into the selected area for a period of six years while the project is under construction. Work is to begin in December.

RECENT MAJOR CONTRACT AWARDS and low bids in Wyoming include a low bid of \$243,785 submitted by Sharrock & Pursel of Casper for construction of earthwork and structures on the Eden Project.

ALASKA

SCHOOLS LEAD ALLOTMENTS — Schools lead in importance in allotment of Federal funds from the 1955 budget with 11 projects to cost \$5,768,300, including a \$2,000,000 high school building in Juneau. Public utilities are next with \$2,831,250. All public bodies concerned with the

projects will reimburse the government for 50% of the cost.

RECENT MAJOR CONTRACT AWARDS and low bids in Alaska include an award of \$1,161,930 to S. S. Mullen, Inc., of Seattle for construction of barracks and messhalls at Ladd AFB. Pacific Alaska Contractors, Inc., of Tacoma received a \$969,519 award for construction of roads, streets and ammo storage facilities at Whittier and another award of \$696,517 for grading and paving for family quarters near Anchorage. Stock & Grove, Inc., of Anchorage received an award of \$244,680 for 2.4 mi. of roadwork on the Mitkof Highway.

Here and There

MEMBERS OF ASSOCIATED General Contractors feel that universal use of their new subcontract form will greatly reduce bid peddling practices that have hurt the profession. The one page form is largely the result of requests for Congressional action to further regulate contractors' operations. The following code of ethics is printed on the back of each form:

"The operations of the contractor are made possible through the functioning of those agencies which furnish him with service or products, and in contracting with them he is rightfully obligated by the same principles of honor and fair dealing that he desires should govern the actions toward himself of architects, engineers, and client owners.

"Ethical conduct with respect to sub-contractors and those who supply materials requires that:

1. Proposals should not be invited from anyone who is known to be unqualified to perform the proposed work or to render the proper service.

2. The figures of one competitor should not be made known to another before the award of the subcontract, nor should they be used by the contractor to secure a lower proposal from another bidder.

3. The contract should preferably be awarded to the lowest bidder if he is qualified to perform the contract, but if the award is made to another bidder it should be at the amount of the latter's bid.

4. In no case should the low bidder be led to believe that a lower bid than his has been received.

5. When the contractor has been paid by a client owner for work or material, he should make payment promptly, and in just proportion, to subcontractors and others."

Forms can be obtained at the AGC office, 217 Benjamin Franklin Hotel, Seattle 1, Washington.

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VICTORTUBE "SPECIAL"	Abrasion, severe impact	Oilfield bits, rock bits	Acety. only
VICTOR TUNGSTHROOTH	Thin cutting edges	Coal cutters, brick augers, pug mill knives, screw conveyors, farm tools	Acety. AC-DC Elec.
VICTORITE	Earth abrasion or sliding friction	Plowshares, cultivators, steel mill guides, cement chutes, shaft bearings, rolling mill guides	Acety. AC-DC Elec.
TUBE VICTORITE	Abrasion, impact	Plow points and farm tools	Acety. AC-DC Elec.
VICTORITE 1	Corrosion, heat, abrasion	Saw teeth, carbon scrapers, wire guides, rocker arms, steel mill applications	Acety. AC-DC Elec.
VICTORITE 6	Red heat, impact, corrosion and abrasion	Blanking, forming and trimming dies, cams, hot punches, pump shafts	Acety. AC-DC Elec.
VICTORITE 12	Heat, abrasion, impact	Saw blade inserts and other critical applications	Acety. AC-DC Elec.
VICTORITE CARBON ARC	High abrasion, thin deposit	Plowshares, lister shares, sweeps	Carb. arc Acety.
VICTORALLOY	Abrasion, severe impact	Tractor rollers, dredge pump impellers, bucket lips and teeth, rock crushers, steel mill wobblers, roll crushers	Acety. AC-DC Elec.
VICTORALLOY #1	High abrasion, medium impact	Bucket lips, rock crushers, Muller tires, gyratories	Acety. AC-DC Elec.
VICTORALLOY "A"	Angular shock, extreme impact, build-up	Clutch parts, gears, crusher plates, gyratory mantles, build-up for hardfacing	AC-DC Elec. only
VICTORALLOY "B"	Heavy impact, moderate abrasion	Tractor rollers and sprockets, shovel pads, plates, idlers, etc.	AC-DC Elec. only
VICTORALLOY "C"	High abrasion, moderate shock and impact	Tractor grousers, pressure rolls, crusher segments, roll crusher teeth	AC-DC Elec. only

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THIS TYPE	FOR THESE CONDITIONS	ON THIS KIND OF EQUIPMENT
VA #1	Abrasion, medium impact	Crusher rolls, crushers, gyratory crushers
VA #2	Abrasion, impact, Multi-pass application	Steel mill applications
VA #3	Abrasion, light impact	Mill guides, crushers, dredge bushings
VA #4	Multiple layer build-up	Tractor rails, crane wheels, general build-up
VA #5	Heavy impact, abrasion	Tractor rollers, idlers, mine car wheels, sheave wheels
VA #6	Medium abrasion, high impact	Crane wheels, drums, roll necks
VA #7	Abrasion, high impact	Build-up for hardfacing
VA #8	Abrasion, medium impact	Dozer bits, roll crushers, scraper blades
VT #60	Extreme abrasion	Tool joints, grader blades, scraper blades, augers

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H-11

ALASKA Newsletter

By CLIFFORD S. CERNICK, Anchorage

BIG FREEZE-UP LOOMS—Alaska's construction season has by now virtually reached its close for 1954. The few projects still at peak construction are being rushed to that stage of production which will allow workers to proceed with inside duties. As the first breath of winter is felt in northern construction camps there is a general slowing down in the tempo of activity. Contractors in the Anchorage area report that, although most of their jobs still are proceeding, there have been some layoffs because of the onset of winter weather. It will be only a little more than a month before sub-zero temperatures, bitterly cold winds, and supply difficulties bring most outside construction activities to a complete standstill. Construction workers, like Alaskan geese, are making the southward pilgrimage. Airlines report southbound planes are jammed and northward planes all but empty. The months ahead in Alaska, until next spring comes to the northland, will be again, as far as the construction industry is concerned, months of planning and preparation rather than months of large scale progress on actual construction.

DREAM DAM—The dream of a huge dam on the Copper river seems a step nearer reality with the announcement that the Portland, Oregon, firm of Ivan Bloch and Associates is making a study of the site for the dam at Wood Canyon. The Federal Power Commission recently issued a temporary permit to the Harvey Aluminum Co. of Torrance, California, in connection with that site. The industrial consultant firm is making arrangements for stream gauging, silt investigations, and core drilling on the proposed dam site which is located 85 mi. up-river from Cordova. The proposed 560-ft. dam would, according to preliminary estimates, produce 1,475,000 hp. of energy for electro-chemical and electrometallurgical plants at Cordova or Valdez.

FIFTY MILLION DOLLAR POSSIBILITY—A suggestion that the Territory of Alaska launch a fifty million dollar public works program of its own has been made by an Anchorage business leader. Jack White, a real estate executive and city councilman, believes that Alaska should embark on a large-scale program of road development, school construction, and hydro-electric power development. He envisioned that this development program would take place

on a 30-yr. basis and would be financed by means of bonds issued by the territory. The suggestion is an outgrowth of a mounting feeling among Alaskan leaders that too much reliance has been placed in the past on government appropriations for construction work and too little on ways in which Alaskans could finance projects they urgently need.

CONSTRUCTION CASUALTIES

—An example of the unexpected kind of delays some types of construction encounter in Alaska is the earthquake which rocked the Anchorage area early in October. While this quake did not cause a great deal of damage, it nevertheless put completed construction to a rigid test of stability. For example, two 14-story buildings in the Anchorage area were severely jolted by the quake but there was no damage beyond a few cracks in the outer walls. The ability of these structures to withstand earthquakes was laid to sound engineering. However, Mother Nature was not so kind to one section of the Alaska Railroad. The earth heaved violently, then dropped from under about 140 ft. of railroad track, leaving the rails suspended over a crater between 15 and 20 ft. deep. Five bulldozers were sent in to fill the area with heavy rocks and earth and within 20 hr. service was restored.

WILDERNESS PAVING PROJECT

—In the shadow of some of Alaska's most spectacular glaciers at the army port of Whittier, a contractor will soon be paving roads, streets, and walks only a stone's throw from rugged wilderness where bears roam and wolves howl. The contract was recently awarded by the Alaska District Engineer to Pacific Alaska Contractors, Inc. of Tacoma, Washington. That organization, working under a \$969,519 contract, is providing paving to serve Alaska's unique wilderness skyscrapers, the multi-story housing projects constructed by the military at Whittier where level land is at a premium. Work on the housing portion of the Whittier project is now well under way. Deadline on the paving project is October 1, 1955. This will require stepped-up construction from the first spring breakup throughout next spring and summer.

ALASKAN INNOVATION—Alaska's first prestressed concrete bridge, and the first bridge to be completed on the new Copper River Highway,

has been turned over to the Bureau of Public Roads by the contractor, M. P. Munter Co. of Seattle. The 255-ft. bridge is composed of one 45-ft. span and seven 36-ft. spans. Its approaches are 2,000 ft. long and made up of two 14-ft. traffic lanes. According to Richard Ellis, Bureau of Public Roads engineer, this type of construction is ideal for Alaska, cutting costs, simplifying construction, and making a more durable structure.

ROAD INSPECTION—The Territory's Highway Engineer, Irving Reed, recently completed a seven week's inspection trip of the entire Alaska Road Commission's work. He reported that the biggest road project under way is a secondary highway on the Seward Peninsula out of the historic gold mining town of Nome. This road eventually will connect with the main Alaska Highway System. Reed also checked progress on roads in the Anchorage, Cordova, Nenana, Seldovia and Fairbanks areas.

END OF HOUSING SHORTAGE

—Convincing proof that the housing shortage in the Anchorage area has been whipped, at least for the time being, is contained in the announcement by the government that seven public housing projects in the Anchorage area will be sold by Uncle Sam. The projects, comprising more than 200 units, were built during a period of severe shortage of living quarters during the post-war years. That shortage has by now been alleviated by construction of thousands of new home units by private contractors. Uncle Sam has given the situation the once-over and decided to unload all of his housing holdings. The reason the government gives for disposing of its low rental housing projects is a significant one for housing contractors. That reason is: there is no further need at this time for government subsidized housing and the pinch is over.

BIG MUD DAM—Refrigerated mud may be used to build many of Alaska's future dams. According to Oliver C. Riggs of Chugiak Electric Association, Alaskan construction men are beginning to study the idea seriously. Several mud dams exist in the Territory now, the largest of which is located near a large nickel mine at Livengood. Riggs believes these dams can be built to save money and the cost of importing materials. He added that when the temperature rises too high, mud dams could be equipped with a series of set coils constituting a regular refrigeration cycle. For this process ammonia would be boiled out of the tubes, pulled into special compartments and reduced to liquid form to start the cycle again.

UNITED STATES STEEL AT WORK IN THE WEST—the distinctive Los Angeles Union Passenger Terminal



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ENGINEERS

on the move

Col. H. George Gerdes (USA, Ret.) has been appointed power engineer for Kaiser Engineers, assigned to the company's hydroelectric development program. With more than 20 years' experience as a civil and military engineer, Colonel Gerdes during the 1930s was engineer in charge of design on the Bonneville Dam.

* * *

Recently chosen to serve on President Eisenhower's five-man advisory committee for his fifty billion dollar, 10-year national highway plan are **Stephen D. Bechtel**, president of the Bechtel Corporation, engineers-constructors of San Francisco, and **William A. Roberts**, president of Allis-Chalmers Manufacturing Co., a past vice president of the American Road Builders' Association.

* * *

George E. Lang has been appointed state highway engineer for Arizona, succeeding **R. D. Canfield**, who died in an automobile crash in early August, less than a month after he was chosen to succeed **R. C. Perkins**, deceased. **Angus L. Chadwick** was named district engineer of District 1, Lang's former post.

* * *

Robert F. Herdman has retired from the Bureau of Reclamation service at Denver, Colo., but intends to remain active in his profession, probably at an overseas location. Herdman served the Bureau for 24 years, the last two on an assignment



Ralph F. Herdman

in Lebanon. At one time he was office engineer for construction of Black Canyon Dam in Idaho, and resident engineer on Bartlett Dam in Arizona.

* * *

Howard C. Elmore, assistant Northwest area manager in Wenatchee, Wash., for the Bonneville Power Administration, recently resigned to accept a post as engineer for the Chelan County Public Utility District. He will handle all elements

relating to the Rock Island generation plant operation in connection with the Northwest power pool, inter-company pool, and Puget Sound Power & Light Co.

* * *

New national president of the American Society of Civil Engineers is **William R. Glidden** of Richmond, Va. Among the six new directors chosen is **Lawrence A. Elsener**, vice president of the Chicago Bridge & Iron Co., San Francisco.

* * *

Robert H. Griffin, formerly an engineer with the Federal Power Commission, who made his home in Oakland, Calif., has moved to Massena, N. Y., where he is on the staff of the St. Lawrence River Joint Board of Engineers.

* * *

George M. Williams, Bureau of Public Roads, is located in Washington, D. C., where he is assistant to the deputy commissioner. His post as division engineer in Denver is filled by **Karl Chamberlain**, as recently announced in these columns.

* * *

Ralph A. Hoffman, a member of the Arizona Highway Department for nearly 35 years, recently left the department. Since 1923, he had been bridge engineer, in charge of planning and construction supervision of all bridges and dams built by the state. Hoffman has joined with **Lloyd Miller**, another former member of the bridge engineering division, to engage in private engineering practice. Offices of the new engineering firm are in the New Post Office Building, 13th St. and McDowell Rd., Phoenix.

* * *

Personnel of Tudor Engineering Co. on erection of a bridge over the Columbia River at Umatilla, Ore., just below McNary Dam, are **Oral Conyers**, resident engineer; **Clyde Barrett**, chief inspector; and **Wally Simms**, "Hank" Callaway and **Ray Conyers**, inspectors. American Bridge Division of U. S. Steel received the contract for the construction from Umatilla County. **C. O. (Slim) Edmonds**, is superintending and **D. G. Engelhorn** is field engineer, under the general direction of **E. E. McKeen**, erecting manager in the San Francisco office of American Bridge.

* * *

Boyd Walter recently transferred from the Palisades project to take over supervision of the new office be-

ing set up at American Falls, Idaho, by the Bureau of Reclamation, in connection with planning and preparation of design for Michaud Flats project in southeastern Idaho. Construction of the Michaud project will provide irrigation water for some 11,035 ac. of land.

* * *

Walter de Berard, senior engineering aide, with more than 25 years of service with the county of San Diego (Calif.) and the Harbor Engineering Department, recently retired.

* * *

E. J. White, district engineer for the Alaska Road Commission at Anchorage, Alaska, has been replaced by **B. D. Stewart, Jr.**, of Juneau.

* * *

Dave Sontag is resident engineer for the Long Beach (Calif.) harbor department on the Ninth St. bridge under contract to the Macco Construction Co.

* * *

L. R. Richards, project engineer, is field engineer on a contract recently awarded by the New Mexico State Highway Department on a low bid of \$1,042,659 from Skousen-Hise Contracting Co. for a grading and draining job on US 66. This 5.16-mi. stretch, besides grading and drainage, includes four concrete and steel bridges, one 21.5-lin. ft. culvert, hot plant surfacing and miscellaneous construction. Assistant construction engineer for the state in that area is **J. J. Plese**, Albuquerque.

R. E. Miller is construction engineer for New Mexico and is in overall charge of this project as well as others in the state. **N. R. Sack**, assistant construction engineer for the entire state on structures, will probably be prominently identified with this contract since it has many major structures.

Charles A. McMahon, construction superintendent and engineer, is teaching a special six-week course in Management, Organization, and Supervision of Construction Projects at the University of California at Los Angeles. The course includes lectures on advantages of different types of contracts, estimating, budgets, financing, practical labor relations, specifications, job scheduling, records, organization, subcontractors, jobsite plant set-up, supervision and final inspection. The fee for the 15-hour course is \$12.00.

McMahon has supervised over \$150,000,000 worth of construction, including such projects as the new Anheuser-Busch Brewery, the underground Pershing Square Garage, and the Parklarea Tower apartment buildings in Los Angeles.

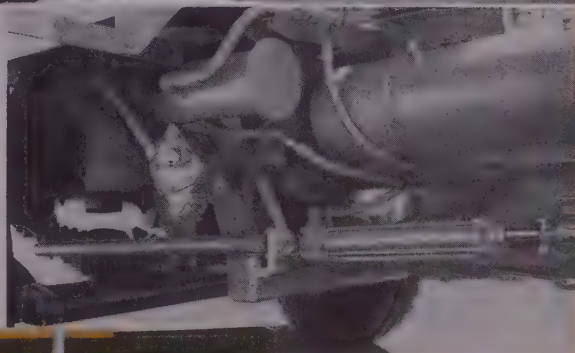
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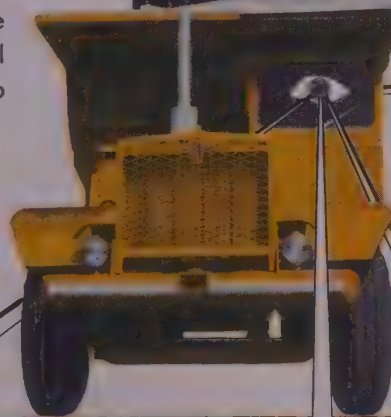
CAPACITY Pay load is 36,000 lbs. Body capacity struck measure is 12 cu. yds. Heaped load is 14 yds. (3 to 1).

DEPENDABILITY The Kenworth 801 is built strong where the strain comes, with variable section frame and all-welded steel body braced with longitudinal reinforcements. Spring mounted, this heavy-duty dump truck is engineered throughout for over capacity.



801

**HEAVY-DUTY
END-DUMP**



Power steering means control of the Kenworth 801 is sure and easy—loaded or unloaded—on any terrain. Ends road shock. Also, note rugged 25,000-pound capacity front axle—really big

Unique chassis design of the Kenworth 801 gives driver unequalled vision fore and aft, and on both sides. Safer to operate



KENWORTH

TRUCKS ★ BUSES

REDUCE BLADE WEAR AND BREAKAGE ON TOUGH, ROCKY JOBS...



Like all ESCO blades, this sectional ESCO Dozer Blade is cast of special work-hardening manganese steel.



ESCO Cast Blades Often Outlast 5 or More Rolled Steel Blades

The shock and pounding of rough work develops an extremely hard wear-resistant surface on ESCO Blades—because they are *cast* of special *work-hardening* manganese steel.

Working an ESCO blade on dozers, graders or scrapers actually makes the surface more wear resistant. Yet the blade core retains high impact toughness regardless of age or usage. That's why on tough, rocky jobs ESCO Cast Blades reduce blade breakage—regardless of work speed—and give far longer life than any rolled steel blade. ESCO Cast Blades often outlast five or more rolled steel blades. Result: Less downtime for repair, lower blade replacement cost—a definite increase in productive hours per dollar invested.

ESCO Blades fit all popular makes of dozers, angle-doers, graders and scrapers. If you want to cut *your* operating costs, use ESCO Work-Hardening Cast Manganese Blades on your toughest jobs. For details, see your nearest ESCO dealer, or write direct.

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DEATHS

Earle C. Earle, 66, chief engineer of the Los Angeles Harbor Department, died Sept. 30 at Santa Barbara, Calif., after an illness of several months. He was a member of the department since 1926 and under his direction more than \$50,000,000 of harbor development work was accomplished.

* * *

Howard E. Robbins, 58, a regional director of the Bureau of Reclamation, died Sept. 12. He had been with the Bureau, chiefly as a construction engineer, for the past 35 years, and had been director of Region 5, with headquarters at Amarillo, Tex., since 1947.

* * *

J. Hamp Morgan, assistant construction engineer, with the New Mexico State Highway Department for over 15 years, was killed in Deming in an automobile accident.

* * *

Arthur Ruettgers, 65, former head of the Bureau of Reclamation's Denver laboratories and known for his pioneering work in concrete control techniques, died in Denver Aug. 8 after a long illness. He directed the Denver laboratories through the period of study for such famous structures as Hoover and Grand Coulee dams.

* * *

Denman K. Gemunder, 64, engineer of Salem, Ore., died recently. He had conducted his own engineering business for 20 years, prior to which he was with the Bureau of Public Roads and with the Bureau of Rivers and Harbors.

* * *

Floyd L. Owens died in a Reno, Nev., hospital recently. He owned and operated a contracting business at Sparks for many years.

* * *

Arthur T. Green, foreman of the Nevada State Highway Department, died at his home in Lovelock recently.

CALENDAR

- Nov. 4-6—Associated Equipment Distributors, joint-meeting of Regions 11, 12 and 14, Broadmoor Hotel, Colorado Springs, Colorado.
- Nov. 9-11—American Association of State Highway Officials, annual meeting, Olympic Hotel, Seattle, Washington.
- Jan. 10-13—American Road Builders' Association, annual meeting at Roosevelt Hotel, New Orleans, La.
- Jan. 23-28—Associated Equipment Distributors, annual meeting, Conrad Hilton Hotel, Chicago.
- Feb. 7-9—Association of Asphalt Paving Technologists, annual meeting, Jung Hotel, New Orleans.

NEW CASE "50" Powerloader

**with 65 h.p.
Diesel Engine
Power Steering**

FAST BUCKET ACTION!



Here's a big new loader that moves more yards per day, trims time on every job. It's powered by the completely new 65 h.p. Case diesel engine. Has big tires front and rear for traction and flotation. Double-acting lift and bucket-control rams combine with a unique toggle action that provides automatic crowd. The result is heaping buckets, filled fast . . . and less spillage.

The "50" Powerloader carries a one yd. bucket that raises to clear 10½ feet in just 10 seconds. Bucket dumps in 3½ seconds . . . lowers in 4 . . . has a digging depth of 6 inches. Platform is roomy, safe, free of linkage and power lines. Seat adjusts fully for day-long comfort . . . and it's located in convenient reach of all controls. Visibility is exceptionally good. Hydraulic power steering makes handling exceptionally easy. J. I. Case Co., Racine, Wis.

Superior Equipment Co.	Phoenix, Ariz.
Reynolds Equipment Co.	Fresno, Calif.
Equipment Sales & Service	Sacramento, Calif.
Contractors Machinery Co.	San Francisco, Calif.
Electric Tool & Supply Co.	Los Angeles & San Bernardino, Calif.
Equipment Sales & Service	Stockton, Calif.
Hassard Equipment Co.	Chula Vista, Calif.
Liberty Truck & Parts Co.	Denver, Colo.
Starline Equipment Co.	Boise, Idaho
Jenkins & Albright	Reno, Nevada
Foulger Equipment Co.	Salt Lake City, Utah
Montana Powder & Equipment Co.	Helena and Billings, Mont.
Columbia Equipment Co.	Portland, Oregon
Star Machinery Co.	Seattle and Spokane, Wash.
Wortham Machinery Co.	Cheyenne, Casper, Rock Springs and Sheridan, Wyoming

SUPERVISING the jobs

Joseph Corrales is supervising the construction of an elementary school at Sunnyvale, Calif., a \$278,000 job recently awarded to George Bianci, contractor. Bill Pollard is assisting as carpenter foreman. Work is scheduled for completion by the end of the year. Bert L. Smith is representing the school department as inspector.

* * *

E. S. Roberson, superintendent, and Phil Mirenda and Frank Burroughs, carpenter foremen, are on a state highway job on Freeway 5, Los Gatos, Calif., a \$360,000 project recently awarded to Carl N. Swensen Co., Inc. "Bud" Pond is civil engineer, and Bob Colley is resident engineer for the State.

* * *

Walt Small is general superintendent for J. C. Pomeroy Co. on the construction of an addition to the American Can Co. building at San Francisco, to cost about \$2,500,000. Carpenter foremen are Oscar Bramblett and Harold Bullman. Willis Green is labor foreman, and Marvin Lokkesmoe is detailer. The job office is in charge of Bob Lane. Construction is expected to be finished the middle of 1955.

* * *

A. G. Johnson, general superintendent, assisted by L. E. Olson, head the construction crew completing work on Macy's Department Store at Hillsdale, Calif., for Haas & Haynie, contractor. Working under J. Stone, carpenter superintendent, are

the following foremen: Peter Rudometkin, Joe Reyes, R. W. DeLucchi and Jack Sprague. C. A. McDonald, Ora McKeehan and S. M. Thomas are labor foremen, and Louis Marino is cement finisher foreman. Mike Sigretto is equipment superintendent. Timekeepers are Ralph Siler and Earl Runion. Ross Handy is field engineer.

* * *

Webster F. Mello is superintending a contract for Williams & Burrows, Inc., and Carl N. Swenson, Inc., a joint venture, building a residence hall at a cost of about \$2,000,000 at Santa Barbara for the University of California. Other key men on this work comprise T. R. Estrada, foreman; Joe Froelich, labor foreman; Dave Hunter, engineer, and O. Rudolph, superintendent on sewers. Job will probably end in mid-1955.

* * *

James Wilson, general superintendent; Henry Edwards, structural superintendent, and his assistant Ken Ormsberg, are among the top men supervising a \$2,500,000 highway job between Ventura and Santa Barbara, Calif., for McCammon-Wunderlich Co., which recently received the contract from the State. Other important men on the work are Ralph McCall, carpenter foreman, and Henry Edwards, master mechanic. Joseph Voyer is office manager, and Don Haney, timekeeper. George Dickey is resident engineer representing the highway department.

W. T. Miller, assistant project manager, and Ellis Bunn, crusher superintendent, are two top men for Morrison-Knudsen-J. A. Terteling & Sons on this joint venture firm's contract at Mountain Home AFB in Montana.

* * *

J. Perry Parker, project manager, and Albert C. Parker, general superintendent, head the construction crew working for H. Earl Parker on this contractor's \$644,340 award for 10 mi. of levee work on the west bank of the Feather River in Butte County, Calif. Other contractor men in key positions are: Lincoln F. Moffitt, master mechanic; and superintendents R. W. Higgins (structures); R. E. Mayfield (day); Clifton W. Cotter (night); and Sydney Murray (Tournapull). Job will soon be completed.

* * *

Marvin McCoy is general superintendent and R. E. Price is office engineer for Hindry Construction Co., contractor on a major earth moving job of 6,500,000 cu. yd. at the old



Price

McCoy

Mills Estate in San Mateo County, Calif. The combination of these two men brings together many years of experience to make it a smooth running operation.

* * *

Ray Anderson, superintendent, and his assistants Harry Hall and Vic Apted; John Hart, project engineer; and J. B. Allen, purchasing agent, are among the top personnel of James I. Barnes Construction Co. which is building the \$3,560,000 Kern County High School and Junior College at Bakersfield, Calif. Job is just starting and is expected to take 500 days. The \$1,500,000 addition to the Bakersfield Mercy Hospital also is under construction at this time by the Barnes company.

* * *

Blaine P. Clyde is supervising the construction of a highway relocation job at Wanship Dam in Utah, for W. W. Clyde & Co., which is doing the work at a cost of \$683,743. Other men in key positions are: Ray Corless, Frank Rigtrup, Frank Jensen and Jack Frances, grade foremen; W. O. Graham, bridge foreman; Vern Allen, powder foreman; and John Smith and Sam Fratto, master mechanics.

Down-time By Domagalski



"You're sure that you've run one of these rigs before?"

Western Construction

TOUGH DIRT MOVES FAST ON RAIL SPUR CONTRACT



L. J. "Louie" DIETZ



Wet clay that balled up into 2-foot clumps is the material encountered by Swords and Dietz on their contract for grading a new railroad spur. The new spur will serve a newspaper publishing center to be built on the outskirts of Peoria, Illinois. The gently-rolling terrain was covered with a deep layer of topsoil, beneath which was the sticky yellow clay that had to be moved to make way for drainage culverts. Louie Dietz, of the Swords and Dietz company, brought in dozers and scrapers for the job and the tough dirt was on the move in a hurry.

The Peoria contracting firm has handled every type of earthmoving — from leveling for homes to stripping for gravel. Louie Dietz has been in the business for many years — and for many years his choice of wire rope has been Broderick & Bascom Yellow Strand!

Dietz reports, "We've never found a better rope than Yellow Strand. It gives us outstanding service. It has just the right flexibility for easy handling, yet has a strong body. We always keep extra reels on hand and we get Speedi-Service from our B & B distributor."

You, too, can get outstanding service from Yellow Strand on your equipment. Call your nearby Broderick & Bascom distributor for a sample of Speedi-Service and for longer-lasting Yellow Strand Wire Rope!

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FOR SAVINGS . . . SAFETY . . . SPEEDI-SERVICE



Big scrapers — equipped with quality-built Preformed Yellow Strand Wire Rope — are taking off the deep topsoil, exposing the tough, wet yellow clay below. The new rail spur will be about 1/2 mile long.

A Swords and Dietz dozer brings a blade full of wet clay out of a hole. This dozer has a B & B Dozereel — a mounting device that can save as much as \$60 on each reel. Blueprints for the bracket can be obtained without charge from your B & B distributor or from Broderick & Bascom Rope Co.

Donald D. Whaley is supervising the office and hangar construction for North American Air Lines, Inc., at San Francisco International Airport, a \$1,200,000 project in the hands of George A. Fuller Co., contractor. Desmond B. Epidendio is carpenter foreman. The reinforced concrete and brick office construction and the steel hangar in all cover 31,000 sq. ft. James A. Brent represents the architect, Quenton Engineers.

* * *

Paul C. Helmick, owner, has the assistance of W. H. Ryan, general superintendent, and Earl K. Brown, superintendent, in carrying out the construction contract recently awarded Paul C. Helmick Co. to clear

1,433 ac. behind Timothy Meadows Dam in Clackamas County, Ore., a \$1,146,000 undertaking.

* * *

Clyde Hawken, superintendent; Everett Casper, engineer; and Paul Kendall, job office manager, head up a \$1,276,096 contract recently awarded to Lytle & Green and S. Birch & Sons for 63 mi. of paving on the Glenn Highway, Big Timber to Porcupine, Alaska. Job is scheduled to run till September 1955.

* * *

Bob Long and Don F. Needham, partners, are holding down the jobs of superintendent and office manager, respectively, on their firm's recent award for construction of a \$1,109,200

addition to St. Agnes Hospital, Fresno, Calif. E. C. Dawson is carpenter foreman. This is a 3-story concrete construction, requiring 480 days.

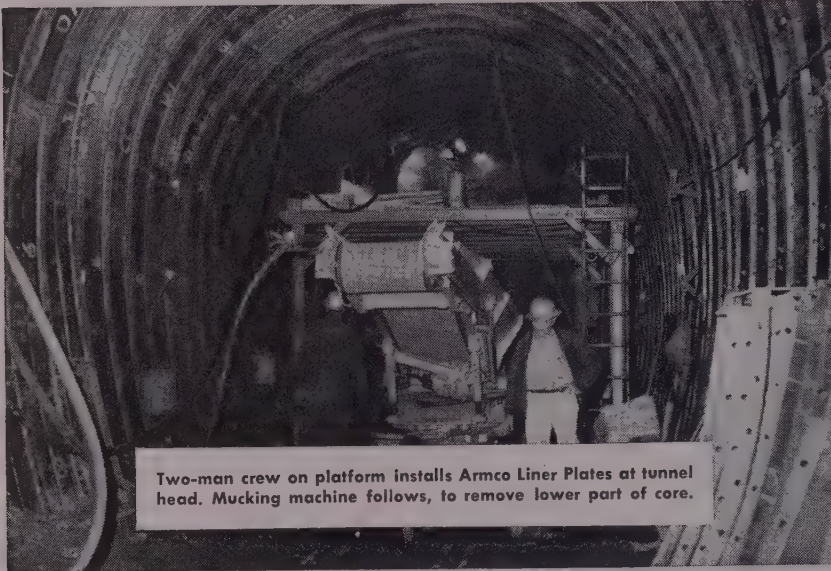
* * *

Bill Mackey, superintendent, with the aid of Don Crego, labor foreman, and Carl Reeves, maintenance foreman, is supervising a \$194,612 contract for 5.5 mi. of miscellaneous work on the Burgess Junction-Lovell road in Sheridan County, Wyo. C. A. Reeves is the contractor.

* * *

The Baldwin Contracting Co. of Marysville has a good superintendent in the person of Peter J. Andersen.

A MILE OF LINER PLATE helps this sewer under roads and rails



Two-man crew on platform installs Armco Liner Plates at tunnel head. Mucking machine follows, to remove lower part of core.

How to install a million dollar sewer job on the West Coast? Open trenching would have disrupted traffic on busy streets and on more than 20 railroad tracks. But by tunneling with the aid of Armco Liner Plates the contractor was able to keep the work underground and out of traffic's way.

The Liner Plates also filled a second need. They were left in place to provide the outside form for the concrete lining.

Armco Liner Plates are 18-inch wide curved plates, flanged along two sides, with the corrugations extending through the longitudinal joints. They

have a high strength-to-weight ratio. Individual plates are light enough for one or two men to carry, hold and bolt in place.

Use Armco Liner Plates for speed and safety on your next tunneling job. They are available in a wide range of sizes and gages. Write for details.

**ARMCO
LINER
PLATES**



ARMCO DRAINAGE & METAL PRODUCTS, INC.

Berkeley • Los Angeles • Seattle • Spokane
Portland • Salt Lake City • Denver



Andersen

He is currently handling the underpinning job at Mare Island Naval Shipyard described on page 64.

* * *

Dennis N. Dillon, project manager; Leo Jones, field superintendent; and Ralph Carlton, general foreman, are top personnel on a \$1,328,367 job recently awarded Peter Kiewit Sons' Co. for grading and surfacing on Highway 1, Skagit River Bridge, north of Mount Vernon in Skagit County, Wash.

* * *

J. E. Ricker, general superintendent, and L. N. Spencer, project engineer; G. S. Van Landingham, master mechanic; W. C. Burns, structure foreman; and Cy Johnson, office manager, are the principal personnel on earthwork construction, concrete lining and structures, Wellton-Mohawk Division, Gila Project, Ariz., for Morrison-Knudsen Co., Inc., which was awarded this contract on a bid of \$1,168,977.

* * *

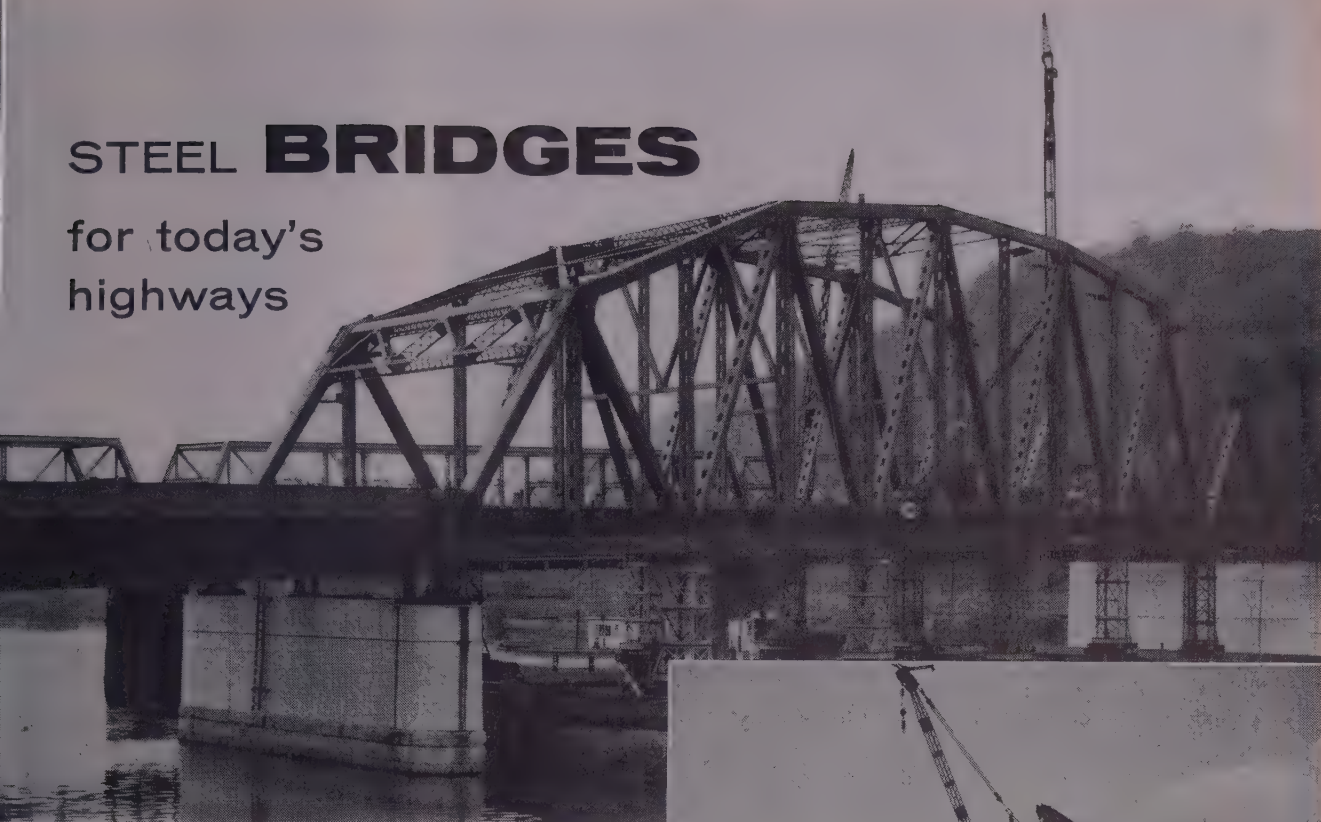
Roy Marker is project manager, and Herb Hendershot is superintendent for A. B. C. Construction Co. which has a pipe line contract at \$1,498,951 between Corona and San Juan Tunnel for Lower Feeder, in Los Angeles County, Calif. Other key men on the work are Bert Howley, job engineer; J. Hunt, supervising the equipment, and W. Violette, a key man on pipe.

* * *

Albert A. Dunn is project manager, and William F. Haecherl is superintendent for Louis C. Dunn, Inc., contractor on the over-\$1,000,-

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highways



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Modern highways demand modern bridges wherever roads must "take to the air." For half-a-century, bridge fabrication and erection have been a vital part of our activities, with every advance in design and method reflected in the dependable structures we build. • The project pictured is the Fleming Park Bridge at Neville Island, Pittsburgh. With an overall length of 804 feet, the bridge has a through-truss channel span of 360 feet, and will accommodate four lanes of traffic, relieving a serious bottleneck in a heavily-travelled area. • Let us consult on your bridge requirements, and submit a quotation.



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CHICAGO (3), 1224 First National Bank Bldg.	SEATTLE,.....528 Lane Street
LOS ANGELES (48),.....6399 Wilshire Blvd.	SANTA CLARA, CAL.,.....627 Alviso Road





SHOWN ABOVE working for the Hitz Construction Co. are, left to right: first row—Chet Comstock, project manager; Harry Knodel, job superintendent; second row—"Swede" Melander, labor foreman; Leonard Keller, Leonard Young and Pat O'Mara, carpenter foremen. The job is a \$2,000,000 contract for erection of the Midland Bank Building at Billings, Mont. Job started in June this year and is expected to finish June 1955. For Holman Erection Co., which is doing the reinforcing steel, Ralph Holman is superintending for his firm. Cletus Holman is superintending for S. L. Espy who has the masonry subcontract.

000 High School construction at Up-land, Calif. Labor foreman is Raymond H. Esparza. James C. Cox is in charge of purchasing.

J. D. Blanton, president; J. Raymond Jones, vice president; and Paul Ullman, chief engineer of the Tower Contracting Co., Inc. of Texas, are

directing the execution of a \$291,218 contract recently awarded their company for work at the Middle Rio Grande Project, New Mex. R. E. McLaughlin and A. R. Monroe are superintending the work, which started the middle of September and is expected to take 825 days for completion.

* * *

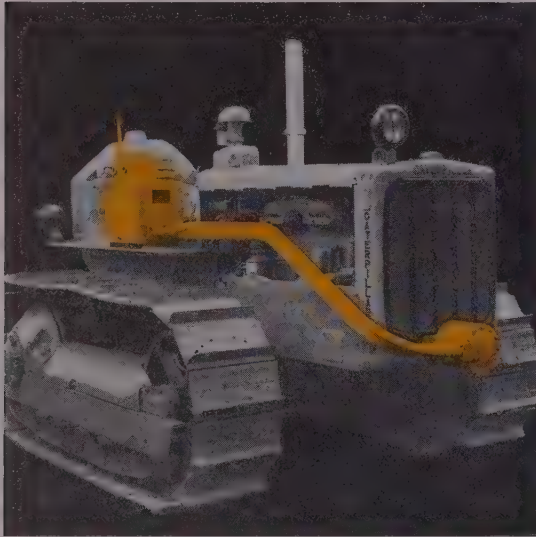
Clarence Glans, superintendent, and Boyd Beagles, general foreman, are top supervisors for L. H. Hansen & Sons who have a 500-day job of erecting a gymnasium at the site of the new high school and junior college in Bakersfield, Calif.

* * *

William Miller is superintendent for H. K. Ferguson Co. on construction of a building for North American Aviation Co. in Downey, Calif. Virgil Sahl is carpenter foreman and "Chuc" Romans is labor foreman. N. W. Erwin is office manager. Representing North American as resident engineer is John J. Flowsy.

* * *

Charles A. Langlais, president; Walter Caldwell, vice president and general superintendent; Charles Terrill, superintendent, and William A. Langlais, vice president, are in overall charge of the work of installing a traffic control system on the lower deck of the San Francisco-Oakland Bay Bridge, a \$505,570 contract re-



Model HSF as shown for Caterpillar D4-U \$476.00
f.o.b. Billings, Montana

A hydraulic power control unit offered with 18 to 55 GPM of 1000 psi hydraulic power for bulldozers, loaders or drawn equipment. Front-mount pump is steel-tube manifolded to the reservoir-valve unit. The control valve features a lock-in float position. Proven by many years of satisfactory service.

Available for all current track-type tractors.
Dealer and distributor inquiries invited.

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Billings, Montana

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. . . new style rip-out post cards appear for the first time this month on pages 103 and 104. Just fill in your change of address or subscription order, drop in "outgoing mail" and we'll do all the rest.

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cently going to the Charles A. Langlais Co. About 225 working days are required for the job. Western Switchboard Co. is furnishing the controls.

* * *

C. V. McBride is foreman for Jack Adams who has a contract for 5.6 mi. of grading and surfacing on Highway SR-75, Penasco-Dixon road in Taos County, New Mex. Adams got the award on a bid of \$130,444.

* * *

Here is a listing of the personnel on the Alaskan \$11,514,007 Elmen-dorf AFB heating and power plant described in this issue.

The lead personnel for the prime contractor, Patti of Kansas City, MacDonald of St. Louis, Wyatt and Kipper of Seattle, and Thorgaard of Seattle, are as follows: **Gayle Lefler**, project manager; **Harold Gall**, general superintendent; **John Williams**, project superintendent; **"Skipper" Smith**, former super, who has been transferred to Patti-Mac's huge Whittier contracts; **Bill Barker**, pinch-hitting project superintendent and carpenter superintendent; **Ken Tierney**, piping manager; **Phil Bell**, piping superintendent; **Jack Foster**, concrete; **Earl Fox**, boilers; **Bill Latrace**, conveyors; **Bill Wickstrom** and **Bill Anderson**, reinforcing steel; **Roy Payne**, labor foreman.

For the subcontractors, the work has been supervised as follows: Federal Roofing—**Roy Hull** on metal roof decking and siding, and **"Slim" Gant** on built-up roofing; City Electric—**Gene Kayton** on electrical; Isaacson Iron Works—"Dutch" and **"Skinney" Jenne** and **Johnny Kelley** on structural steel; Oaks—**Dale Hale**, **"Red" Olson**, and **Jim Beal** on earthwork; Sundberg—**Mickelson** on painting; Vermiculite Constructors—**Bill Culver** on insulation of the underground steam conduits. Two subcontractors have not come in on the job yet—Armstrong Cork on the piping insulation and Virginia Metal on the inside metal partitions.

This power and heating project is being built for the U. S. Air Force, under the administration and inspection of the U. S. Corps of Engineers, Alaska District, with headquarters at Anchorage. Government personnel include **Col. Carl Y. Farrell**, district engineer; **Lt. Col. R. E. Hisle**, resident engineer; **Capt. Horace E. Combs**, project engineer for Elmen-dorf AFB; **John Maciag**, zone engineer; **George Avery**, chief inspector. Other inspectors—**Dick Inglima**, concrete; **Joe Hurley**, structural steel; **Earl Henning**, boilers; **Bob McCreedy**, piping; **Frank Green**, electrical; **Art Derby**, office engineer; and student-aides working in Alaska for the summer—**Raymond Benson** of Harvard and **Charles Stoy** of University of Washington. **Buck Boykin** is chief inspector on the outside utilities, assisted by **Art Peters**.

Bechtel now has the following personnel assigned to the job: **Ib Ibsen**, supervising mechanical engineer, and



Rips materials you never could rip before

Fast penetration in hardest materials

Hydraulic down pressure puts full weight of tractor on standards for fast, full penetration. Rips many materials that formerly required shooting.

Really shatters rock for easy loading

Curved standards provide natural draft to keep points down, produce underground quivering action that seeks out cracks and weak spots. Shatters rock and hard materials to easy-loading condition...you get bigger loads faster, with less scraper wear and damage.

8,800 lbs.* of rugged strength

Takes full power of largest track-type tractors and either rips rock or stalls tractor. ATECO drawbar takes the pull—no strain on tractor case.
*with three standards; 7,500 lbs. with two.

Available for Caterpillar D7 and D8, Allis-Chalmers HD20, and International TD24 tractors. Sold exclusively through your Caterpillar distributor. See for yourself how an ATECO ripper boosts yardage and saves equipment. Call your "Cat" dealer for a demonstration NOW.

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LOWE CONSTRUCTION CO. has a \$1,000,000 contract to erect a bank building for Security Trust & Savings Bank at Billings, Mont. Shown above, left to right, are: **James O. Kimble**, job superintendent; **Leonard Koski**, carpenter foreman; **Vern Hendershot**, labor foreman; **Bob Senitte**, carpenter foreman. Not shown are **Bill Green**, general superintendent, and **Claude Wiesener**, steel foreman.

Bill Beckhorn, electrical inspector. **Dudley Ott** handles the job for Bechtel in San Francisco as project engineer for the power division.

* * *

John J. Morton, project manager; **Joe McNabb**, project engineer, and **Guy Heimsoth**, assistant project manager, key men for **Guy F. Atkinson Co.** and **Ostrander Construction**

Co., are directing the construction of a navigation lock at The Dalles Dam Project on the Columbia River, Washington and Oregon. This is Atkinson's third out of the five major contracts already awarded on this project, and was won by Atkinson on a low bid of \$12,708,180.

* * *

Robert Rouse, project superintendent,

ent, and **Leroy R. Reynolds**, office manager, are two top men for **Grove, Shepherd, Wilson & Kruege, Inc.**, on this contractor's \$1,581,592 contract for construction of a 160,000-sq. ft. warehouse of reinforced and concrete masonry, a railroad spur, and outside utilities at Fort Richardson, Alaska. Work got under way the last half of September and is expected to run till November 1955.

* * *

W. W. White, job superintendent; **B. F. Lockwood, Jr.**, job engineer; **J. D. Brown**, master mechanic; and **J. G. Fuller**, office manager, comprise the top supervisory personnel of **Peter Kiewit Sons' Co.** which holds a \$5,960,241 contract for 3.9 mi. of grading, surfacing and separation structures on **Ramona Freeway** between **Rosemead** and the **San Gabriel River** in **Los Angeles County, Calif.**

* * *

Dave Broswell, superintendent, assisted by **Charlie Gardner**, is directing for **Boswell Construction Co.** a \$127,898 contract for earthwork, clearing and structures for rehabilitation of drains, **Middle Rio Grande Project**, **New Mex.** Job started the middle of September and is expected to finish in 440 days.

* * *

Truman Hart, superintendent, and **H. B. Raun**, engineer, are top personnel for **W. F. Maxwell Co.** which is doing 12 mi. of grading and surfacing work, besides some bridge work,

IF YOUR BLASTING HOOK UPS DEMAND:

Maximum Safety—
Freedom From Electrical Hazards—
Electrical Storms
Simplicity of Hook Up—
Assurance Every Hole is Fired—
Lowest Overall Costs—

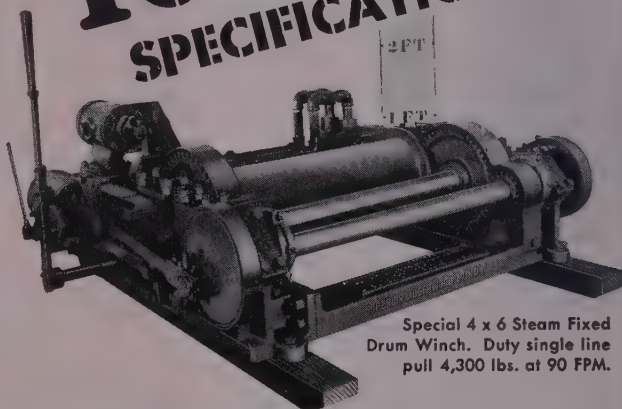
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You SET THE SPECIFICATIONS



Special 4 x 6 Steam Fixed
Drum Winch. Duty single line
pull 4,300 lbs. at 90 FPM.

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lighting and sign installation at Archibald Ave. and Etiwand Ave. in San Bernardino County, Calif., a \$497,782 undertaking.

* * *

Robert C. Reif, superintendent for Cox Brothers Construction Co., is heading a \$265,535 contract for widening and surfacing 14 mi. of Pacific Coast Highway in Newport Beach, Orange County, Calif.

* * *

Paul Cross, superintendent, is supervising a \$145,386 contract for 2.1 mi. of grading and surfacing on US 85, Santa Fe city limits to Airport Junction, New Mex., for Henry Thygesen & Co.

* * *

Ralph A. Blankenbaker, general superintendent, has been working on the 3,000,000-gal. reservoir and pumping station construction for the city



Blankenbaker

Eastlick

of Billings, Mont., about a \$300,000 contract awarded to Hitz Construction Co. Carpenter foreman is H. D. Eastlick. Job is just about finishing.

* * *

E. W. Temple is superintending a state highway job at Sheridan, Wyo., involving grading, paving, sewers, curbs, and gutters, contract for which is handled by Peter Kiewit Sons' Co. Other key personnel on this \$500,000 project are Kermit Galbreath, hot plant foreman; Irvin Freil, street foreman; C. M. Montgomery, carpenter foreman; and Stanley Woinoski, master mechanic. Ray Robertson is in charge of the office.

* * *

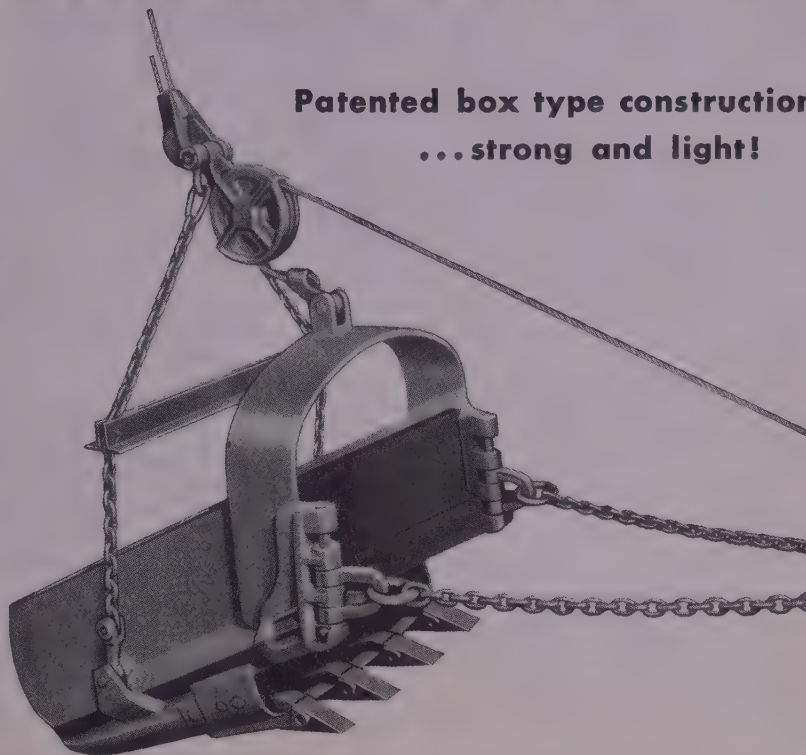
W. S. Kimble is supervising a \$189,802 contract recently awarded to John Delphia, under which 1.5 mi. of road in the heart of Sequoia National Park, Calif., is to be cleared, graded, using crushed rock base, and plant-mix surfacing placed before the coming winter weather. "Woody" LeCount is engineer, and Herman Rosse is foreman.

* * *

Carl M. Harris, project superintendent for Stolte, Inc., heads the job personnel working on a sanitary sewage collection system at Morro Bay, Calif., costing \$875,791. Ray Bateman is office engineer. Slavo Rigisich and Vic MacFarland are spread foremen, and John Wright is carpenter foreman.

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**Patented box type construction
...strong and light!**

THE Wellman-Williams Dragline Bucket is perfectly balanced, light in weight, has a wide digging radius and hitch connections for fast adjustment of digging depths. Alloy steels provide maximum strength with minimum dead weight. Teeth are made of manganese steel and are reversible. Perforated type dragline buckets also available.

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Left to right in the above pictures are, UPPER LEFT—Bruner, Weaver, Reinsch. UPPER RIGHT—Coblentz, Dailey, Copeland. LOWER LEFT—Truitt, Cleary, Misener. LOWER RIGHT—Brown, Clark.

Headed by Dwight K. Bruner, project superintendent; Harry Reinsch, field superintendent (mechanical); and George Weaver, field superintendent (structural); the men listed below are employed in key positions by the Bechtel Corporation on the building of a steam power plant at Castle Gate, Utah. This project is being built for the Utah Power & Light Co. at a cost of about \$11,000,000, and is expected to be finished by the end of this year.

Pipefitter foremen — Lee Mortensen and Lou Penrod (general); Vernon Taylor, Blair Snow, Lynn Houser, Marvil Flom, Ares Gammell, Robert Taylor, Joseph Paystrup, Ober Turner, Don Castleberry and Max Field. Operating engineer foremen—William M. Nellis and Andrew Christiansen. Cement finisher foreman — Spencer Bowles. Warehousing — Jim Monroe, chief material man, assisted by Al Oscar, Bob Bardsley; Lloyd Perigo, (tool room); also Glen Truscott.

Electrical foremen—Glen Palmer, Clifton Adams and Robert Johnson (general); Raymond Stevenson, Edward O'Donnell, Kenneth McEwan, Kenneth Baum, Graham Shaw, Arnold Bochar and Roy Hoover. Millwright foremen—Tom Spencer (general); Walter Wyler and Walden Hurst. Boilermaker foreman—Jack Peer. Ironworker foremen — Dean Reasor (general); Charles Lay (riggers); Robert Ballou, Leslie Robinson and Raymond Sadler (structural). Carpenter foremen — Jesse Brown (general); J. R. Clark (sawyer). Labor foremen—Clyde Truitt (general); Frank Misener, Tom Cleary, Jim Wilcox, and August Wilestead.

Office — Bob Bogan, office manager; Dick Moseley, chief timekeeper, assisted by Heinz Sonnekes, Joe Dudler, Charles Virden, Evan James and Joe Xiras; Ralph Pederson and Earl Peterson, accountants; and the following office assistants: Noel Melvin, Malcolm Beck, Robert Booth, Pete Flemetis and Joe Maglicco.

Chief engineering men in the field are: Charles Copeland, senior civil engineer, assisted by Art Taylor, subcontracts; Austin Mitchell, surveys; Rudolph Larcher, structural; Earl Skillicorn and Jack Braithwaite, field engineers; and Neil Magann, plans. Sam Coblentz, senior mechanical engineer, assisted by Ken Neuschwander and Bob Powell, field engineers; and Don Johnson, piping details, Dan Dailey, senior electrical engineer, assisted by Edw. Gravdahl, test engineer; Silvio Guisti and Ira Smith, field engineers; and Irving Ojala, cost engineer.

SAFETY

Job accidents take their toll

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

Elmer Bolelli, 32, Vallejo, Calif., driver for a contracting company, was recently killed. He was working alone when a tread on his tractor broke. It is thought that he jumped from the driver's seat and tripped a lever, releasing the loading shovel, and was crushed to death by the heavy scoop.

Rudolph Whitley, 30, was hospitalized and several other workers received treatment for injuries sustained when a 25 x 47-ft. section of the Riviera Hotel under construction at Las Vegas, Nev., collapsed when a steel brace buckled.

Wiley Powell, 59, Midland, Tex., was killed Sept. 13 at San Manuel,

Ariz. A steel worker, Powell was riding a beam being hoisted in the construction of a crusher building. The beam twisted throwing him 35 ft. to the concrete floor.

William LeMoigne, 64, Chico, Calif., was killed in early September while repairing a tractor. Apparently he had attached a guy line from a tree limb to the tractor in inspecting the vehicle's treads; the tree snapped and the wire struck him on the head.

STATEMENT REQUIRED BY THE ACT OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND JULY 2, 1946 (Title 39, United States Code, Section 233) SHOWING THE OWNERSHIP, MANAGEMENT, AND CIRCULATION OF WESTERN CONSTRUCTION, PUBLISHED MONTHLY AT LOS ANGELES, CALIFORNIA, FOR OCTOBER 1, 1954.

1. The names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher: James I. Ballard, 609 Mission St., San Francisco, Calif.

Editor: Ralph W. Whitaker, Jr., 609 Mission St., San Francisco, Calif.

Managing Editor: John J. Timmer, Jr., 609 Mission St., San Francisco, Calif.

Business Manager: Luther P. Vrettos, 609 Mission St., San Francisco, Calif.

2. The owner is: (If owned by a corporation, its name and address must be stated and also

immediately thereunder the names and addresses of stockholders owning or holding 1 percent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address, as well as that of each individual member, must be given.)

Arthur F. King, 609 Mission St., San Francisco, Calif.

Louise B. King, 609 Mission St., San Francisco, Calif.

M. K. Lyons, 609 Mission St., San Francisco, Calif.

M. K. Vogel, 609 Mission St., San Francisco, Calif.

3. The known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: (This information is required from daily, weekly, semiweekly, and triweekly newspapers only.)

JAMES I. BALLARD
(Signature of publisher)

Sworn to and subscribed before me this 24th day of September, 1954.

(Seal) (Signed) RUTH POWELL POOL
(My commission expires Sept. 11, 1958)

"They're working rings around the bigger trucks"

—says Ed Kimball, owner of Boylston Construction Co., Boylston, Mass., in telling how Hydra-Matic* GMC's are getting his jobs done quicker—and cutting costs to boot.



EXCAVATING AND MOVING 80,000 YARDS OF BANK GRAVEL IN SEVEN WEEKS calls for a team of eleven trucks and two shovels. Boylston Construction's two new 145 h.p. GMC M470's—equipped with 4-yard dump bodies and sideboards that hike their capacity

to 8 yards—are working with nine trucks of other makes. All nine have greater horsepower—three of them are ten-wheelers. "Those GMC's are hustling more gravel each day than any other rigs on the job," Kimball says.



CLIMBING A STEEP UNPAVED GRADE—without room for a running start—is the only way out of the nearly completed excavation. Recently—when heavy rains made the grade slick and muddy, it proved too tough a pull for the big ten-wheelers when fully loaded. But the GMC's—their Hydra-Matic-controlled flow of power applied through single rear axles—made it every trip with loads heaped to 8 yards—just one less than the other trucks. "We never even had them going all out," driver Jack Whalen boasts.



GMC HYDRA-MATIC FUEL ECONOMIES really add up on the steady diet of one-mile hauls from pit to dumping point. The M470's (22,000 GVW) are each using 17 gallons of gas a day as compared with 27 gallons burned by a comparatively powered truck on the same job. "And I'm looking forward to wiping all clutch-repair costs off my books," Kimball says. "My previous trucks wore out three clutches apiece every two years. To date, the GMC's haven't cost me a dime for any kind of repairs."

*Hydra-Matic standard on many models; optional at extra cost on others.

GMC Truck & Coach—A General Motors Division

TRICKS of the TRADES



P & H truck cranes team up for fast heavy girder lift

IN ONE OF THE HEAVIEST LIFTING jobs ever attempted by truck cranes, four bridge girders weighing 125 tons each were loaded and then erected in a matter of hours. The four girders, each 128 ft. long and 13 ft. 6 in. high, are being used on a portion of the Harbor Freeway in Los Angeles, Calif. Heisler & Woods, subcontractors to Webb and White, arranged for the heavy lifting assignment. The first task was to load the girders onto trucks for moving some 30 mi. to the job site. Lee Wood arranged for the four 35-ton truck cranes to take on this job. They were all P&H Model 555 truck cranes with 40-ft. booms. When the actual loading time came, two cranes took their places at each end of the girders and actually "walked" the structures into position for truck loading.

At the erection site, the same truck cranes raised the girders. Working in harmony, the four machines placed the girders in a record short time. Ten feet more of boom had been added to each crane for the lift at the job site. At this location the cranes again had

to walk their heavy loads, demonstrating the coordination possible with modern truck cranes of this type. Had the girders been lifted by jacking, or by the use of stiff legged derricks, a minimum time of three or four days would have been required.

Safety Council issues statistical year book

THE 1954 EDITION of the National Safety Council's statistical year book, "Accident Facts," is now off the press. Twenty pages of the 96-page book are devoted exclusively to occupational accidents and provide the factual background necessary to give direction to an industrial safety program. Most common accidents of an industry, part of the body most frequently injured, off-the-job accident problems, unsafe acts, and unsafe conditions contributing to permanent impairment and death, and other topics are included. "Accident Facts" is priced at 75c a single copy and less

for quantities. Inquiries should be sent to the National Safety Council, 425 No. Michigan Avenue, Chicago 11, Ill.

CORRECTION

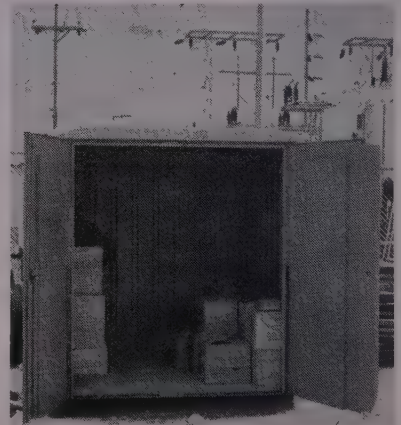
IN OUR SHORT ARTICLE on "Keep the Drills Going" in the September issue, a correction is due. Fred Stuller had been described as responsible for the design of special jigs for bit sharpening that handled both the cross and square type of bit pattern. This should be corrected to read that Gino Brusatori, machinist, and Giliam Stuart, "keeper of the bits," worked in collaboration on this project.

Booklet on asphalt

THE ASPHALT INSTITUTE ANNOUNCES an up-to-date booklet entitled Construction Specifications for Asphalt Protective Coatings for Pipelines. Full specifications are included for the four main types of protective coatings—thin and thick coat wrapped systems, mastic systems, and coatings for interior surfaces. The booklet is available for 50c from the Asphalt Institute, Russ Building, San Francisco 4, California.

Portable storage unit

SAFE STORAGE of explosives, blasting caps, and other construction materials and equipment on utility company projects is the purpose of this portable welded steel container used by the Idaho Power Co. of Boise. The 275-cu. ft. capacity Transportainer, developed by Dravo Corporation, Pittsburgh, is weatherproof and serves both as a storage facility on job sites as well as a shipping container. J. F. Servis, supervisor of mobile line crews, reports the Transportainer is loaded aboard a flatbed truck for transportation between job locations. When not in field use, it is





WHEN PIPELINES CROSS WATER explosives research pays off

The tremendous power of dynamite, skillfully and ingeniously handled, made it economically possible to cross the wide, deep Tennessee River (inset above) with two parallel pipelines, 50 feet apart. Trenches blasted underwater through hard red clay in the shallows, and lime rock in the 40-foot-deep channel, opened the way for speedy dredging operations . . . another example of the efficiency of modern explosives and blasting methods.

Hercules' research in the pioneering and development of explosives and our extensive service facilities are available to help you in solving blasting problems on construction jobs or in mining and quarrying operations.

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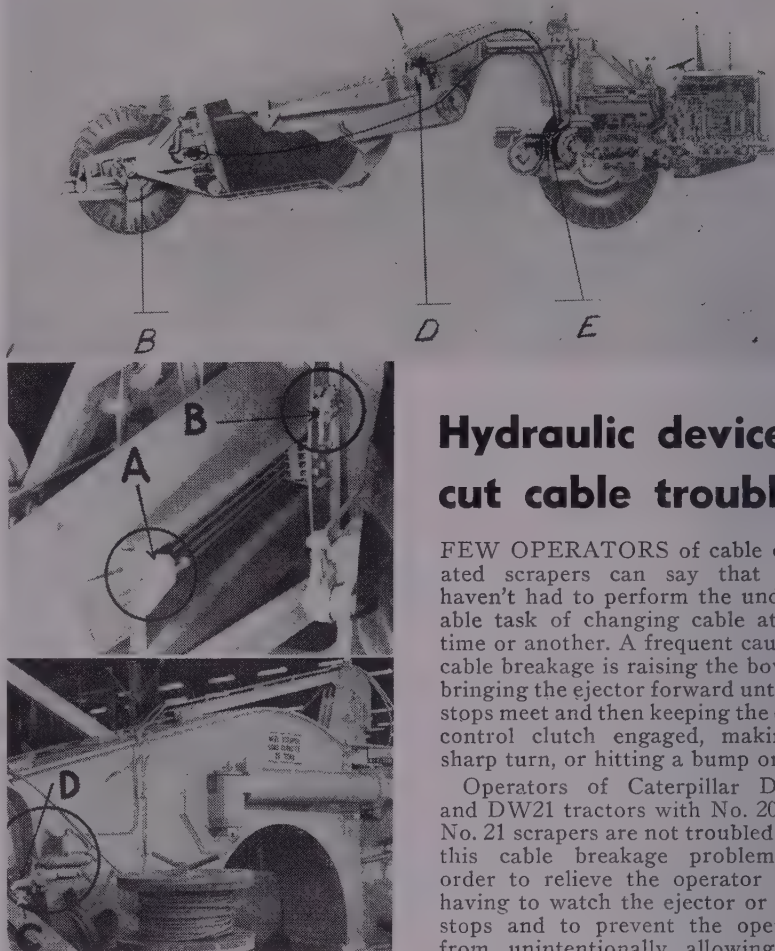
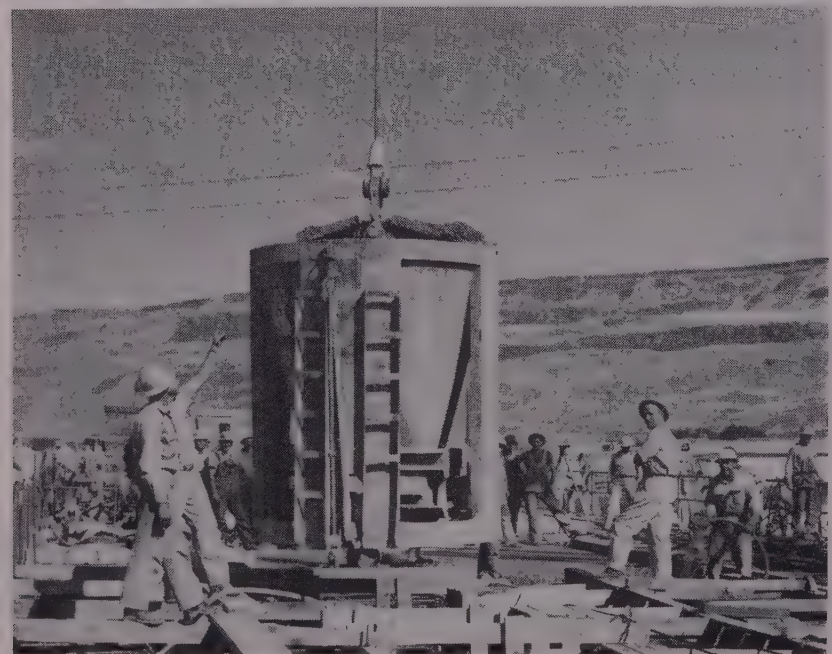
stored at one of the company's substations. In addition to its convenience, the unit protects valuable tools and materials against theft. Outside dimensions of the unit are 7 ft. 9 in. long, 6 ft. 5 in. wide and 6 ft. 10 in. high. It weighs 1,700 lb.

Wire rope won't rotate at Chief Joseph Dam

A SPECIAL WIRE ROPE manufactured for Columbia River Constructors for use at Chief Joseph Dam has established an exceptional service record there. Bethlehem Steel Co. made 800 ft. of 1¾-in. diameter non-rotating rope for use in from 8- to 12-ft. lengths on a huge Bucyrus 450 special Monighan crane at the dam. Using regular lay wire rope of the same diameter, only two to six weeks of use could be made of each section. Bill McGee, rigging superintendent for Columbia River Constructors, reports that the first section of the special Bethlehem rope that was installed on the Monighan was in use for more than 7½ months. Investigation of the rope at the end of this time showed that a loss in breaking strength of less than 1% had occurred. The remaining strength was still well above the catalog rated minimum strength of 228,000 lb. for unused rope.

During the 7½ months-life of the first section of rope, the Monighan handled 136,000 cu. yd. or 270,000 tons of concrete, plus 200,000 tons of forms, steel, clean-up, and other materials.

DESCRIBED ABOVE AND SHOWN BELOW is a special wire rope designed for use at Chief Joseph Dam. The non-rotating rope was manufactured by Bethlehem Steel Co. to be used in lengths up to 12 ft. on Bucyrus 450 Special Monighan crane.



Hydraulic devices cut cable trouble

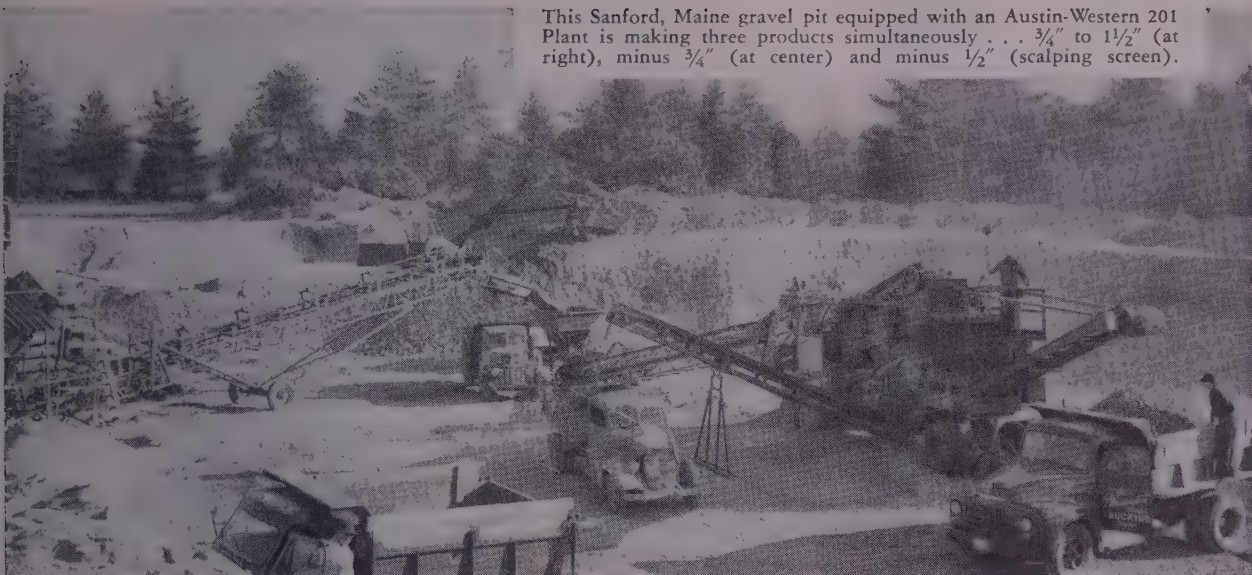
FEW OPERATORS of cable operated scrapers can say that they haven't had to perform the undesirable task of changing cable at one time or another. A frequent cause of cable breakage is raising the bowl or bringing the ejector forward until the stops meet and then keeping the cable control clutch engaged, making a sharp turn, or hitting a bump or dip.

Operators of Caterpillar DW20 and DW21 tractors with No. 20 and No. 21 scrapers are not troubled with this cable breakage problem. In order to relieve the operator from having to watch the ejector or bowl stops and to prevent the operator from unintentionally allowing the stops to meet, Caterpillar equips these tractor-scraper combinations with a hydraulic cable saver.

This cable saver consists of two hydraulic cylinders (B or D) that are actuated by the bowl stop (C) or by an adjustable screw set out from the ejector stop (A), and two slave cylinders (E) that automatically return the cable control lever to the disengaged position when actuated by a master cylinder. As the ejector or bowl approaches the stops, the adjustable screw or bowlstop hits a lever on the master cylinder causing it to hydraulically actuate the slave cylinder. The slave cylinder, thus actuated, pushes on an arm that is connected by mechanical linkage to the cable control lever. This returns the lever to the disengaged position before the stops can meet, thus preventing cable breakage.

The master cylinder for the ejector cable (B) is located at the forward end of the ejector track. The master cylinder for the bowl lift cable (D) is located on the gooseneck near the upper nest of bowl lift sheaves. Both slave cylinders (E) are located on top of the cable control housing.

This Sanford, Maine gravel pit equipped with an Austin-Western 201 Plant is making three products simultaneously . . . $\frac{3}{4}$ " to $1\frac{1}{2}$ " (at right), minus $\frac{3}{4}$ " (at center) and minus $\frac{1}{2}$ " (scalping screen).



Across the country **AW** owners agree:
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Here's proof that it will pay *you*, to *compare* crushing and screening plants before you buy. Study the chart in this ad and you'll see how much more you'll get with an Austin-Western crushing and screening plant. Call your A-W distributor or write us right away for further facts. Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

Why it will pay you to **COMPARE** before you buy

COMPARE . . .	A-W	Make "X"	Make "Y"	Make "Z"
Welded Steel Plate crusher frame for high strength without weight of cast steel frame	Yes	No	Yes	No
Machined steel toggle plate for absolute protection instead of cast iron	Yes	No	No	No
Inclined positive-throw type vibrating screen	Yes	Yes	No	Yes
Dustproof and watertight brakes on outside of wheels	Yes	No	Yes	No
All bearings of anti-friction type	Yes	Yes	Yes	Yes
Single source for wide range of complete stationary or portable plants, crushers, matching screens, elevators, conveyors and bins	Yes	Yes	No	No
Total	100%	50%	50%	33 $\frac{1}{3}$ %

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Western Construction Equipment Company, Great Falls, Montana;
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Construction Equipment Division
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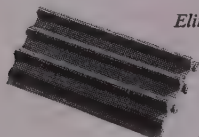
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1
A HARD FACING COMPARISON CHART has been made available by the **Mir-O-Col Alloy Co.** The chart lists the various rods and electrodes produced by 29 different manufacturers. It is set up to provide a quick review of any one particular type of hard-facing rod or electrode. Abrasion and impact qualities of each type rod as well as many of its applications are listed. Another feature of the chart is its listing of individual hardness ratings, both as deposited and work-hardened, or heat treated as the case may be.

2
PORTABLE NAIL DRIVER—**Morgan Machine Co., Inc.**, has announced a portable nail driver with an automatic hopper feed which sinks each nail completely with a single stroke. It operates by compressed air requiring 14.7 cfm. at 80 to 90 psi. Operating speed is 40 to 50 nails per min. The complete driver includes a feeding unit weighing 65 lb., a driving unit weighing 8½ lb., and a length of plastic hose.

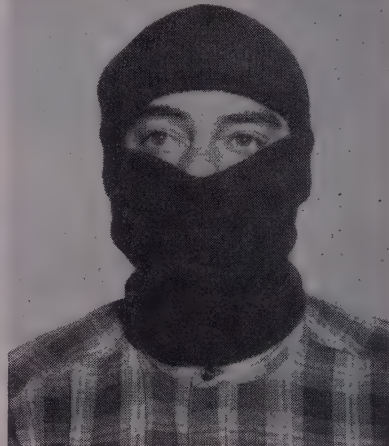
3
A NEW WIRE ROPE ENDING has been marketed by **Electric Steel Foundry Co.** It was designed specifically for the logger handling light or medium sized logs, or using ½-in. and



¾-in. chokers. It will eliminate eye splicing. Called a wedge type choker socket, it grips the wire rope by wedging it. The socket is cast of manganese steel, and can be attached to the choker in just three minutes, as no special tools are required. The choker is cut to the desired length and the end is threaded to the socket and out again forming a loop. The wedge is then dropped and pulled tight. Only 6 to 8 in. of rope are required to attach the socket. There is no eye splice to pull closed, or no wire

jagger to slow down handling. Two wedge type choker sockets and a sling hook will make a complete choker at a rigging cost of \$7.75 and weight of less than 7¼ lb.

4
A NEW WINTERLINER has been added to the **E. D. Bullard Co.** line of cold weather head protection. Called the Arctic, this wool-knit liner protects the head, neck and face. The front portion

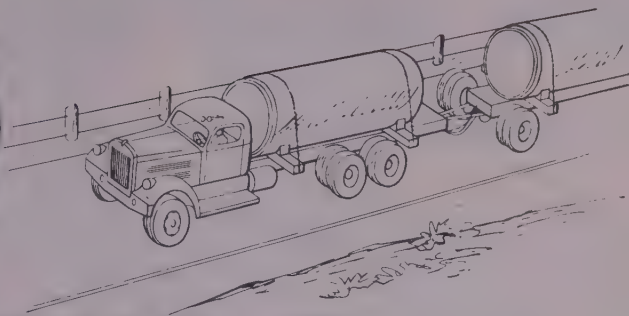


is constructed so that it slips down over the mouth easily when not needed to protect nose and cheeks from freezing weather. This company also makes six other styles of winterliners, constructed to be worn with all makes and models of safety hats or helmets. They may be worn in combination or individually, depending on the amount of cold weather protection needed. The fabric type are rugged, wind resistant, and water repellent with a fleece or wool interior. Complete literature is available.

5
COOLING SYSTEM CARE—**Cummins Engine Co., Inc.**, has published a bulletin entitled "Give the Cooling System a Chance." This bulletin contains many practical suggestions on the best way to care for an engine's cooling system. The information is not only for Cummins engines, but may also be applied to all internal combustion engines. Cartoon illustrations enliven the 14-page handbook. Included is a convenient check sheet for proper cooling system maintenance.

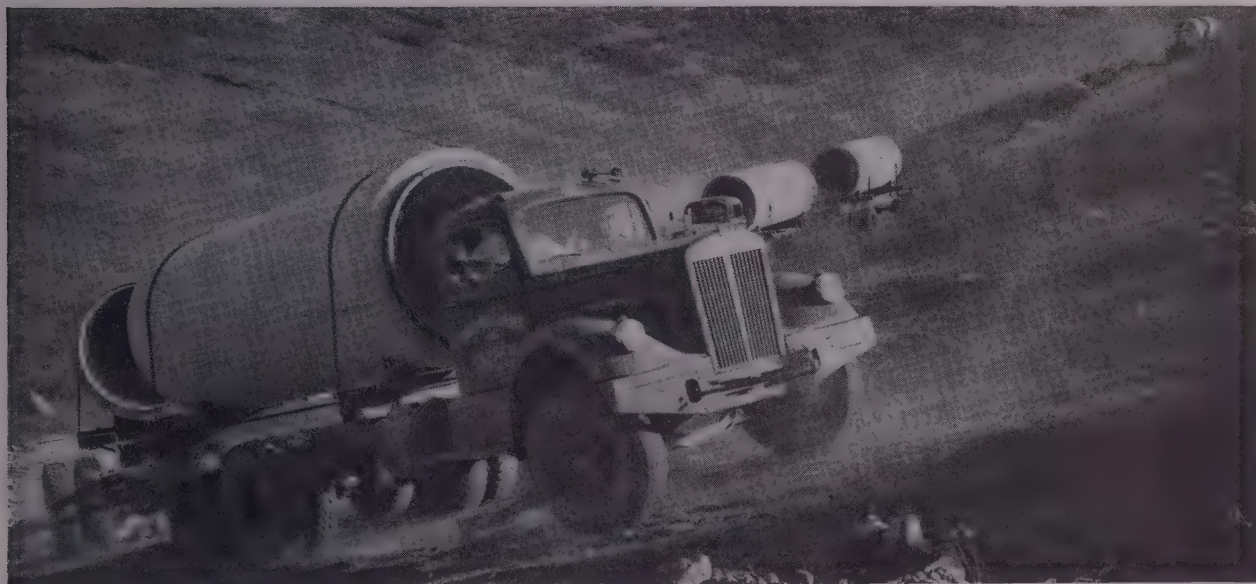
6
OIL FILTERING RISKS—Filtering of lubricating oil is the subject of a new booklet published by **Caterpillar Tractor Co.** The 8-page illustrated booklet discusses the risks in "short cuts" in lubricating oil filter systems and the importance of using a filter made for an engine. A step by step discussion of what a filter must accomplish and a description of how a full-flow filtering system serves the engine are included.

White



"Get-up and go"

Whites, each hauling two 11 ton steel-and-concrete pipes, helped Keith Williams complete his section of the San Diego Aqueduct far ahead of the original estimate. Pipe was hauled from Fontana, over highways and cross-country, directly to the point of joining. Williams' all White fleet was on the job 18 hours a day, six days a week.



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NEW LITERATURE

Free copies of any of the items in this section may be obtained by using coupon on page 117.

7

Backfill soil compaction

Gunderson-Taylor Machinery Co. has announced the publication of an informational booklet entitled "Compaction Handbook." It is a concise compilation of material on soil compaction formerly available only through a great deal of research. Beginning with the principle and evolution of soil compaction and the development of compaction equipment, the handbook includes a background on various types of soils, their identification, classifications, and engineering characteristics. Along with these phases of information is a graphic engineering chart. One chapter deals entirely with soil compaction tests, including formulas and expected results. Another chapter is devoted to the procedure for sound backfill compaction, explaining the need and use of laboratory reports, compaction energy and moisture, and proper control of compaction for successful results. The handbook concludes with a description of the manufacturer's Triplex backfill tamper.

8

Steel shoring equipment

Three types of steel shoring equipment designed to efficiently handle any concrete shoring job are described in a new bulletin, "Modern Shoring for Concrete Construction," available from Patent Scaffold-ing Co. Engineering drawings show how a planned prefabricated shoring can cut costs. Given are flow charts and photos of typical installations. Also described is a shoring used to advantage on high jobs and a single post shore that can be carried and installed by one man.

9

International Harvester line

International Harvester Co. has published a 48-page handbook describing its line of industrial equipment. Extensive specifications are given covering all types of tractors, scrapers and blades, loaders and shovels, and power units. The handbook is in two colors and is fully illustrated.

10

Drill bit pamphlet

Brunner & Lay has issued an 8-page pamphlet describing its line of Rok-Bits. The 17 standard size gauges and the 15 thread types are fully illustrated and described and recommendations are made for their best use. Included is a check list for proper use and care of carbide rock drill bits.

11

Euclid catalog

Euclid Division of General Motors Corp. has issued a 50-page catalog describing its line of equipment for moving earth, rock, coal, and ore. Complete specifications, dimensions, the four types of Euclid equipment, rear-dumps, bottom-dumps, loaders, and scrapers, and these machines are shown in various on-the-job applications. Typical performance charts are given along with cutaways and schematic drawings of certain parts of the machines.

12

Small mover

S-10 Moto-Bug is described in a specification sheet issued by Kwik-Mix Co. The S-10 is a utility mover with 10-cu. ft. capacity hopper. Complete specifications, dimensions and a performance chart are given.

13

Tunneling drill

A double boom drill is described in a folder issued by Thor Power Tool Co. The machine is pictured along with closeups of its important parts. A specification table is given along with a brief description of the company's other products.

14

High speed tractor

LeTourneau - Westinghouse Co. has published a 16-page booklet describing its product, the Tournatractor. Many photos show the piece of equipment in numerous on-the-job uses. Exploded and diagrammatic sketches cover the interior of the machine along with a cutaway drawing of the torque converter. Various accessories are also shown.

15

Combined winch and tackle

Tirfor, a combined winch and tackle, is described in a folder pub-

lished by Griphoist, Inc. The portable lifting and pulling unit is shown in 16 on-the-job pictures. Brief details of its construction are described as well as a list of principal features and important uses. The folder includes a specification table and a brief discussion on proper operation and maintenance.

16

35-ton rear dump

LeTourneau-Westinghouse has issued a folder describing its new 35-ton rear dump. The machine is illustrated with numbered keys to additional closeup and cutaway views. A complete specification table is given.

17

Heavy equipment catalog

Brown-Bevis Industrial Equipment Co. announces publication and release of a new 256-page catalog covering heavy construction equipment and supplies manufactured by over 50 leaders in their field. The catalog, in addition to the illustrations and descriptions, contains a number of pages of useful information. Copies will be supplied without charge to purchasing agents, engineers, contractors, or other interested parties.

18

General construction equipment

A new construction equipment bulletin published by Blaw-Knox Co. is now available. It contains information on the manufacturer's equipment necessary for construction of roads, highways, and airports, or for the production of ready-mixed concrete. Items listed are base pavers, wideners, batching and mixing plants, clamshell buckets, concrete buckets, concrete finishers and spreaders, steel forms, sub-graders, truck mixers, and parts and services. Ask for Bulletin 2463.

19

Bethlehem Steel catalog

Bethlehem Pacific Coast Steel Corp. has announced publication of a new edition of its catalog, entitled "Bethlehem Pacific Rolled Products," which lists all the steel sections that can be rolled on seven roll-

Don't throw away material!

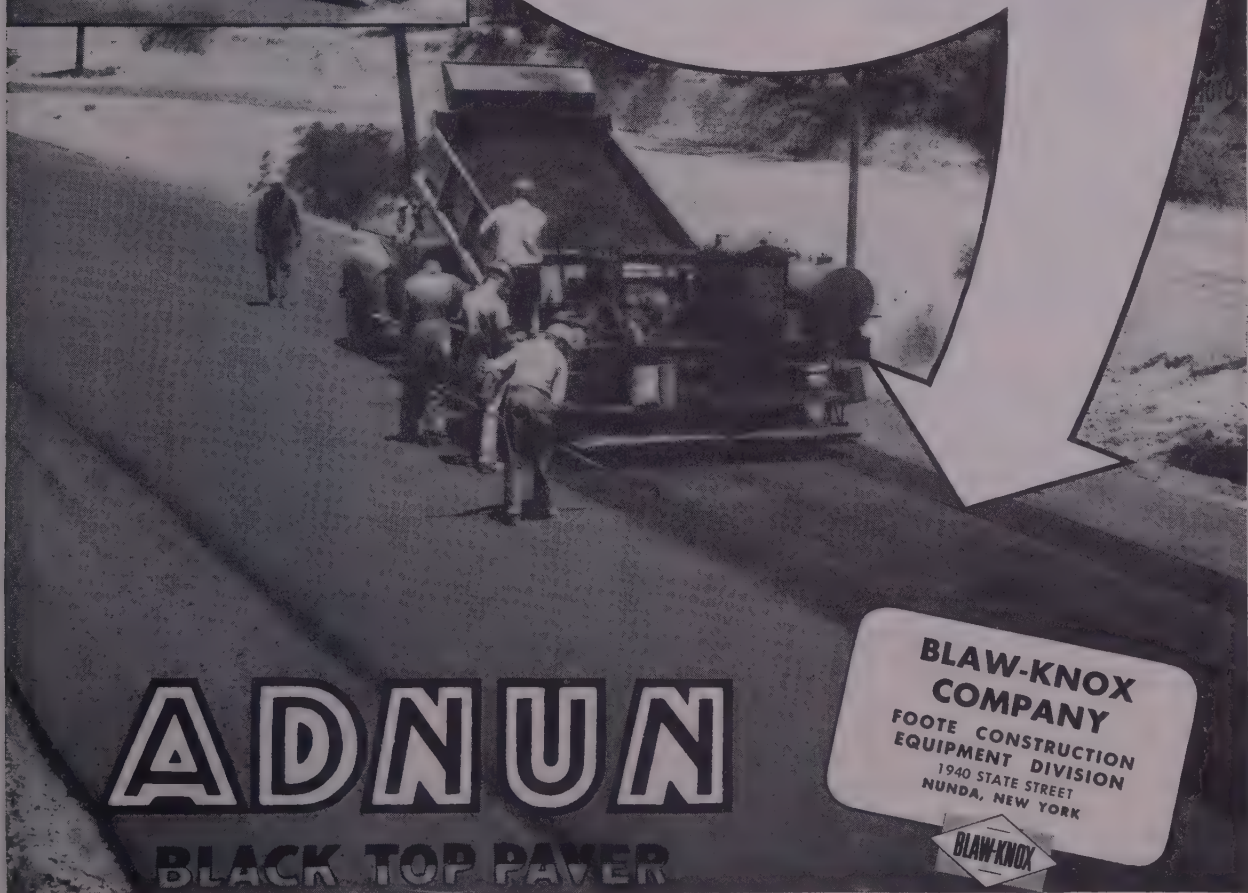
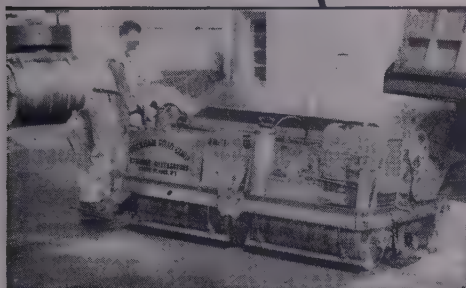
YOU would agree that minus $\frac{1}{2}$ in. deviation on a 9 in. thickness of material would be pretty good accuracy. That's holding to within 5% of grade but even that accuracy means over 175 cu. yds. of *extra* material in every mile of road. Even holding that close to grade can cost you upwards of \$500.00 a mile.

Ask about the Adnun Jr. Model 8. Here's a tow-type rig of advanced design that can handle all non-specification work, patch ahead of your big rig and finish off drive-ways and intersections at low cost.

Don't throw dollars into the Hollows! With the Adnun Fluid Level you supplement the amazing accuracy of the Adnun Continuous Course Correction with gauge control so positive that you can take out the dips that won't show under a straight edge. Continuous Course Correction takes out the short hollows and the Fluid Level makes possible the results ordinarily associated with long wheel base design.

The Fluid Level gives you full control from subgrade to finish course. It makes possible the laying of the road to practically an absolute plane with better density, longer road life and less waste of materials.

Don't throw away material. You can figure more closely with the Adnun and the Fluid Level.



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MALL—the first power trowel that delivers 97% of engine power to the trowel blades. New direct "in-line" transmission does it...no belts or pulleys to steal valuable power.

MALL—the first power trowel with interchangeable ring sizes...36" or 45" rings, with corresponding floating shoes, finishing blades and a 24" disc for dry tamp floors, can be used with one power unit.

MALL—the first power trowel that employs a new, extra sturdy trowel ring and arm design that will not sag. These, plus many other new, exclusive features, make the new **MALL POW'R TROW'L** the finest performing, easiest to handle gasoline driven troweling machine you have ever experienced. **GET DETAILS NOW.**

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CU-112

ing mills at its Western plants. The 44-page catalog is bound in cardboard covers and contains complete tabulations of the properties of the various sections. In addition are photographs of its Western plants.

20

Bucyrus-Erie products catalog

A new edition of **Bucyrus-Erie's** catalog, fully describing the company's complete line of excavating, drilling, and material handling equipment has been released. The 70-page, 2-color catalog features copy, condensed specifications, and over 100 photographs of machines on specific jobs. Several recent additions to the company's line are included in sections entitled: Quarry and Mine Shovels; Stripping Shovels; Walking Draglines; and Railway Cranes (including a 250-ton diesel electric crane). Other sections describe small general purpose machines.

21

Hydrocrane pamphlet

A pocket-size pamphlet entitled "Those Who Use It Choose It Again" describes **Bucyrus-Erie's** truck-mounted, all-hydraulic Hydrocrane from the repeat order angle. The 16-page, 2-color booklet is designed for quick reading and is illustrated with on-the-job photographs. The text points to such practical features as hydraulic control, telescoping boom, self-powered crane, and methods for quick conversion to other attachments for profit-making jobs.

22

Tractor-mounted drilling rig

A drilling rig front-mounted on a crawler tractor is described in Bulletin M-214 published by **Joy Mfg. Co.** Blasthole and pipeline drilling are the primary uses for this piece of equipment as described in the bulletin. The machine, called **Trac-Drill**, is given a general description at the beginning of the bulletin followed by pictures of six field situations. The drill can be mounted on the side as well as the front of the tractor and the drilling radii are shown in a series of side and overhead drawings. A series of factory photos show the installation of the drilling unit on a **Caterpillar D8**.

23

Wagon for Caterpillar tractors

C & D Mfg. Co. has issued a 4-page folder describing its **Sierra Movall** wagon for use with **Caterpillar DW20** and **DW21** tractors. The folder includes 7 on-the-job photographs with accompanying text, a price list, and a table of condensed specifications.

24

Industrial products catalog

American Brake Shoe Co. has published its first complete catalog, with emphasis on industrial products. The 48-page, two-color catalog illustrates representative parts produced by eleven divisions of the company and details physical properties or characteristics where pertinent. Breakdown is by type of product, and the catalog contains sections on ferrous castings, non-ferrous castings, bearing materials, sintered metals, steel forgings, welding products, air compressors, industrial pumps, dredge pumps, and railroad products.

25

Cummins fuel pump

Cummins Engine Co., Inc., has issued a full-color folder describing its **PT fuel pump**. The pump is described in six cutaway views with accompanying text along with a description of the fuel injector. The folder includes a schematic fuel flow diagram showing a pressure regular, throttle, and governor in operating position.

26

General Electric wiring manual

A completely revised, up-to-date edition of **General Electric's** remote-control wiring manual has been announced. The manual includes the new components recently added to the remote-control line, such as the relay gang boxes, motor-driven master switch; new locking switches; and color-coated remote-control wire. The manual contains complete technical and installation data on this modern low-voltage system of wiring, and is intended for use by architects, electrical engineers and contractors, and for building developers. Wiring diagrams, wiring layout, suggested specifications, and much other useful information is included.

27

Packings and gaskets

"**Chempac Packing & Gaskets**" is the title of a new 6-page illustrated folder issued by **Johns-Manville**. The materials are specially designed for chemical and process equipment. The folder gives pertinent information on each of the several types. These include packings in coil, spiral and ring forms which are offered in four styles; a general purpose gasket offered in two styles; a folded gasket for glass lined equipment offered in two styles; and a flange gasket for high pressure service.

gaskets for glass lined equipment offered in two styles; and a flange gasket for high pressure service.

28

Centrifugal thrower unit

Stephens-Adamson Mfg. Co. offers a new bulletin covering their line of fixed and portable "Swiveloaders" for loading or storing bulk materials. The 8-page bulletin shows the unit in correct operation for filling box cars or making unconfined piles. Typical installations are pictured and several detailed drawings are given.

29

Valve bulletin

A 16-page bulletin covering a complete line of standard 4-way hand, foot, power, and solenoid operated valves has just been released by Ledeen Mfg. Co. The bulletin also shows a new line of pilot valves. Dimensions and weights, application diagrams, circuit diagrams, parts list and accessories are included. Ask for Bulletin 1010.

30

Data on manifold design

National Welding Equipment Co. has just issued a series of 9 sheets illustrating and explaining its new compound pressure cylinder manifold design. The sheets are fully il-

lustrated and discuss the problems encountered when designing the pressure cylinder, the difficulties in constructing it and the usefulness of the finished product. Information is given on the proper use of regulators and master control valves.

31

New engineering steel

United States Steel Corp. has published a 46-page brochure describing its new Carilloy T-1 steel. The booklet begins with a discussion of the development of this steel followed by a page of questions and answers concerning it. Tables of mechanical properties, chemical compositions and recommended applications are given. Large photographs and attached copy describe the uses of the new product in construction, industrial equipment, and mining and earthmoving. The book concludes with 6 pages of technical data.

32

Catalog on motor grader

Galion Iron Works & Mfg. Co. has issued a 28-page catalog featur-

ing the operating and construction details of its new heavy-duty grader. Many cutaway drawings and photographs serve to describe the machine's operation and its numerous accessories and attachments. A full page of general specifications is included.

Literature briefs . . .

33

THE USE OF ELECTRIC generating plants in mobile service is described in a pocket size, 2-color, 20-page booklet issued by D. W. Onan & Sons, Inc.

34

A MASONRY SAW and a Jetcreter, a pump for pneumatically applied concrete, are described in literature which has been made available by Construction Machinery Sales Co.

35

A GRAPHICALLY illustrated specification sheet, Bulletin 1241-S2, describing a plaster-mortar mixer, is now being offered by Worthington Corp.

36

TWIN DISC Model PO air-actuated clutch is described in bulletin 304, published by Twin Disc Clutch Co.

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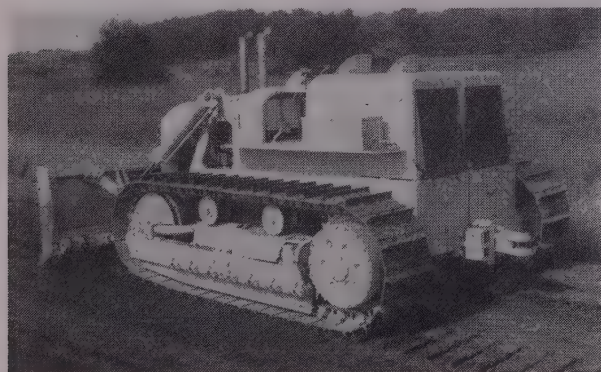
New Euclid line features twin-engine crawler

37

Aimed at a tractor market which has increased 67% in the last five years, Euclid Division of General Motors has introduced a new 53,000-lb. crawler tractor powered by two 190-hp. diesel engines. Use of twin power plants is nothing new in Euclid earth-moving equipment but this principle in a crawler tractor is definitely a new development. The pairing of two engines for locomotive or tractive effort is uncommon and the new tractor, Model TC-12, is the first factory-built crawler with power for each track supplied by a separate engine.

The new model did not require a complete redesigning, however, since the two GM diesel engines and their power trains are the same as used individually in over 750 various kinds of equipment. So no new difficulties were introduced into the interchangeability or accessibility of parts. As a matter of fact, ease of maintenance was of prime consideration throughout the development of the TC-12. It can be dismantled and reassembled with ordinary servicemen's tools. The engines are mounted side-by-side, and drive through universal joints and drive shafts to a torque converter, which is located below and to the rear of the operator location. The converter, transmission reduction gearing, and steering brake form one complete removable assembly. Almost complete dismantling can be carried out without removal of the roller frames. This is a unique feature and permits easy access to all final drive parts.

Euclid designed the TC-12 to provide higher power-to-weight ratios. Drawbar pull, equal to or better than current production crawlers, but at higher ground speeds, will give ability for faster pusher loading or rubber-tired scrapers. Tests indicate that the TC-12 develops about twice the drawbar pull at 2½ mph. (scraper loading speed) as present "big tractors." This speed matches the first gear speed of rubber tired scrapers for more efficient scraper loading.



RADIATORS for the two 6-cylinder diesel engines are mounted in the rear, freeing operator from fan blast. Despite 53,000-lb. weight, maneuvering is easy with separate power on each track.

There are two transmissions each with an integrally mounted torque converter. The crawler tractor transmission, made by Allison, provides three speed ranges forward and three in reverse. All shifting is accomplished under full power. There is no master clutch. The tractor can be shifted from one speed range to the other, without loss of motion, and can be shifted into reverse while still going in the forward direction. The transmission provides

adequate speed selection for all operating conditions. Top speed is 8 mph.

Two independent motors permit a fast, flexible steering system, which increases workability. Normally, when the tractor is operating with light loads, steering can be accomplished in three ways: (1) by applying the brake to either track; (2) by reducing the throttle and applying the brake on either track; and (3) by reducing the throttle to either engine. Under full loads the recommended procedure is the use of the forward and reverse direction selector control on either track.



DOZING LOADS like this seems light work for Euclid's new TC-12. Twin engines totaling 380 hp. make it tops in speed and strength.

All of these steering methods can be utilized in low, intermediate, and high gear operation of the tractor. And fingertip control selection of these gear ranges can be done without interruption of power flow during steering maneuvers.

Even though the TC-12 is very efficient for loading rubber-tired scrapers, it is by no means limited to that one capacity. It can also be used for pushing scrapers, bulldozing and spreading earth, hauling compaction equipment, logging, hauling scraper units of large capacity, and the myriad of smaller uses that arise on every job.

The track gage can be widened without disturbing any precision fits. This is useful in side boom crane mounting for pipe line work. The operator will find himself more comfortable with the rear radiator mounting. This frees him from the blast of forward mounted radiator fans. Rear mounting also makes the radiator much less vulnerable to plugging and damage by dirt and trash from the dozer blade.

Two-section design permits separation where weight or width restrictions are encountered. A free movement of 7 in. is limited by stops welded to each frame half. For applications where oscillation is not desirable, some of the tractors will be field tested with rigid mounting on the cross-shaft.

Although the twin-engine crawler dominates Euclid's new line of products, their engineers also have been busy on other equipment. Three new scrapers, all of the overhung engine type, are now being manufactured: the S-7, 7-cu. yd. capacity; the S-18, 18-cu. yd. capacity; and the TS-18, a further utilization of twin-engine design.

Euclid, which merged with General Motors in 1953 seems to be maintaining the production pace which has seen their plant facilities quadruple in size in the last eight years.

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and doing it on-the-job EVERY DAY!

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Our distributors are authorized to put a Gorman-Rupp Contractors' Pump on any pumping job, any time, anywhere, alongside any other make pump, size for size. The Gorman-Rupp pump is guaranteed to pump more dirty water more hours, using less gasoline and to prime quicker than any other self-priming pump. If it isn't the best all-around pump, our distributor will accept the return of the Gorman-Rupp pump and pay the user any installation expense incurred.

Only the utmost confidence in the product could justify this guarantee.

We can furnish you with any size of self-priming centrifugal pump ranging in capacity from 1½ in., 5,500 G.P.H. to the powerful 10 inch, pumping 240,000 G.P.H.

Ask for Contractors' Pump Bulletin No. 4—CP-11

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MANSFIELD, OHIO

Advertisement

PUMP EXPERTS STUDY CONTRACTORS' PROBLEMS

Contractors who have ever had a pump fail on the job realize the importance of choosing the proper pump.

A pump failure may hold up the job, cause men to be idle, tie up other equipment, or even prevent finishing the contract on time. The best insurance is to have a pump that has proved itself on many tough assignments.

The Gorman-Rupp Company of Mansfield, Ohio claims that their pumps will out-perform any pump of comparable size and type on the market. So states their guarantee. The greater capacity of these pumps when working against high heads is very important to the contractor. They are the simplest of pumps and practically trouble-free. They never quit on the job.

Years of study and research by engineers in the field and the laboratory have made possible these claims and the guarantee.



FIELD NOTES on the BEST DIAPHRAGM PUMP EVER BUILT!

With mud, sludge and water seeping into a 28 foot pit for an industrial sewer installation, W. W. Purdy Construction Company of Mansfield, Ohio put this Gorman-Rupp 3" diaphragm pump 3D-8R6, on this job at the Empire Steel Corporation factory at Mansfield.

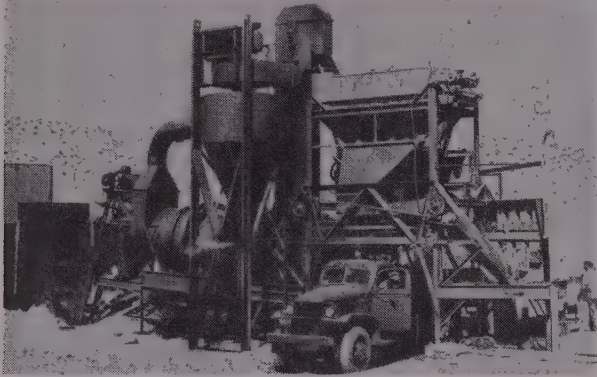
A junction of several six-foot storm sewer tiles was necessary. Rapidly rising water in the 12 x 22 foot pit flooded out workmen and 18 inches of mud and slime accumulated in the pit. The Gorman-Rupp diaphragm pump cleaned out the pit and had the workmen back on the job in 30 minutes. This job involved an 18 foot suction lift, 8 foot discharge elevation and about 35 feet of horizontal 3" hose discharge line into an open manhole. No attention was necessary except fuel supply and starting or stopping when required. The unit is self-priming. It was necessary to operate the unit several minutes every hour.

THE GORMAN-RUPP COMPANY
MANSFIELD, OHIO

Standard Steel's mobile asphalt batch plant can be assembled in one day

Now in production at Standard Steel Corporation is the new Model TM portable asphalt plant. Designed for use in areas where larger plants cannot be erected and operated profitably, and where portability is an important factor, the plant has its welded steel framework heavily braced to withstand stress in transit. The entire unit is mounted on pneumatic tires. Air connections permit the plant to be moved with a semi-type truck tractor.

Ease of erection is an important feature of the Model TM. Equipped with its own self-erecting device, the entire cage, consisting of vibrating screen, mixing unit,



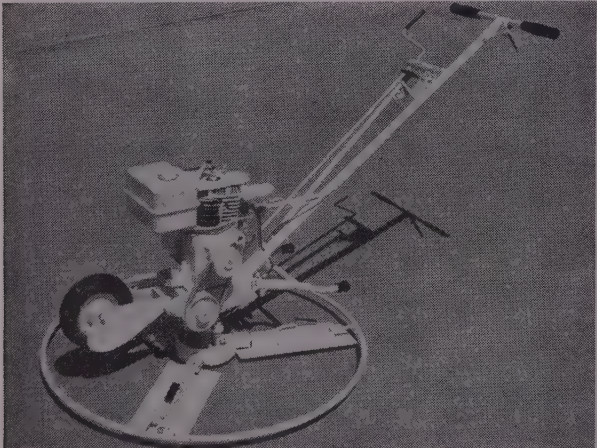
aggregate weight hopper and asphalt bucket, is raised into position by pushing a button. Total time for this operation is 30 min. The hot elevator, a vertical chain and bucket type, is hinged for easy erection by means of a block and tackle. The cold elevator is telescoped for traveling and is simply lowered into position from the trailer. It can be completely removed if a shorter trailer length is desired. Under normal working conditions the complete plant, including all accessories, can be erected in less than one day.

The mixer is in one piece with removable cast alloy liners, which can be replaced without removing the jacket. The dryer, which can be operated with gasoline, electric or diesel power, averages 40 to 50 tons of aggregate per hour. All controls are located on the operating deck enabling one man, in most cases, to run the entire plant from a central location.

39

Power troweler has retractable wheel

White Manufacturing Co. has announced a new Model T-1 concrete finishing machine with a built-in wheel. The rubber tired wheel makes this a one-man troweler, as the machine is fully portable after finishing a concrete floor or slab. Operator moves troweler to side of work,



drops wheel, and thus requires no assistant to help in moving it. With the wheel down, blades and ring are raised about 2 in. above the floor. This permits their easy removal for washing or for changing from float to finishing. The ring can be quickly removed in order to wheel the machine through a doorway. The entire unit, including the steering column, can be disassembled in a few minutes enabling it to be carried in the trunk of an automobile.

The pitch of the blades is controllable during operation by a lever at the top of the steering column. The throttle control is such that if the operator releases the handle, the engine slows down to idling and the troweler does not revolve. Power is supplied by a Briggs & Stratton 2-hp. gasoline engine with automatic clutch. The ring is 36 in. in diameter. Total weight is 130 lb.

40

Dart offers 45-ton crane carrier

Dart Truck Co. is manufacturing a 45-ton crane carrier—one of the largest ever built. Powered by a 240-hp. gasoline engine, the new unit utilizes a 10-speed transmission and 100,000-lb. rear tandem axle. Tires are 14:00 x 24.00, single front and dual rear. The frame is of box



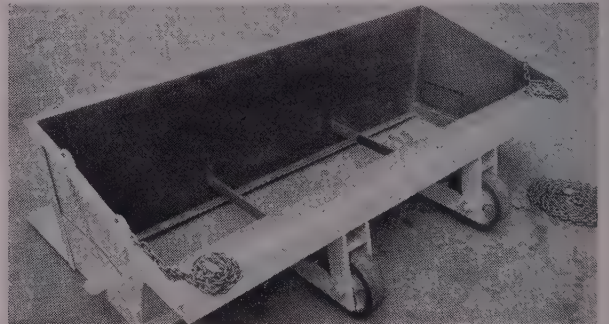
girder design, with single box outriggers and boxed beams extendible to 15½ ft. A one-man cab gives the operator good visibility, and hydraulic steering makes the unit easy to maneuver.

Overall length is 29 ft., width is 10 ft. 6 in., and the gross weight without upperworks is 50,000 lb. An optional wheelbase is provided to meet manufacturers' specifications.

41

New series of asphalt spreader boxes

Rola Paver is the name of a new line of asphalt spreading equipment made by Creative Metals Corp. Illustrated



is the standard unit, available in 8- and 9-ft. widths, with adjustable side gates and cutoff plates. With a capacity of 50 tons per hr., the unit handles controlled thicknesses from 1 in. to 1 ft., and will lay base courses up to 1½ in.

The trench paver is adjustable for any width between 1 ft. and 4 ft. It is designed to lay from 3- to 6-in. depth without compaction, a finishing 2-in. pass with compaction. Trench paver capacity is claimed to be as much as 4,000 ft. per day. Overall dimensions of the new boxes are: width—8 or 9 ft.; length—5½ ft.; height—2 ft. 4 in. Weight is 1,500 lb.

Convenient Controls Speed Production with KOLMAN Conveyor-Screen Plant

KOLMAN Model 101
Portable Conveyor
with Vibrating Screen



Motor-to-ground controls extend throttle control forward to discharge end of conveyor and clutch down to ground level.

Fast, dependable operation is yours with the big-production features and heavy-duty construction of the KOLMAN Model 101 Conveyor-Screen Plant pictured here. These features include:

Head Pulley Clutch

Located at the discharge end of the conveyor, this clutch allows the operator to stop conveyor belt as soon as trucks are loaded and start again as soon as the next truck is in position. Screen continues to operate, clearing screen cloth of lodged rocks and remaining in motion for greatest screening efficiency as soon as belt is started again.

Motor-to-ground Controls

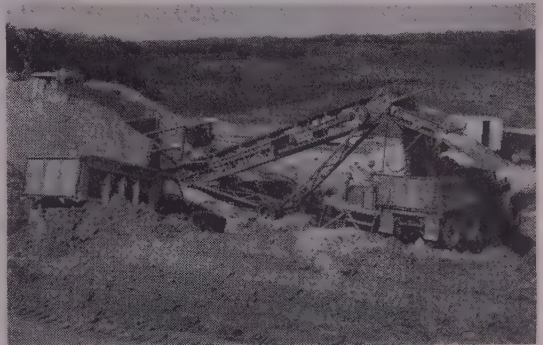
The power unit throttle and clutch controls are extended to a point easily accessible to the operator on the ground. He can throttle back the motor whenever he stops the belt without wasting time going to and from the motor. If he desires to throw out the motor clutch, he can easily do so from the ground.

Gravel Trap for Dozer Loading (With Plate Feeder Installed)

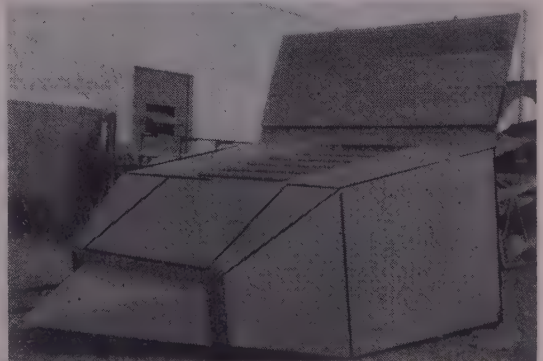
The heavy steel KOLMAN Gravel Trap becomes an integral part of the portable unit, easily moved with the conveyor. It's always ready to move to new locations by simply dozing away material piled around it. Trap has grizzly bars spaced over a wide opening, and a removable door at the rear for easy access to conveyor tail section. Ample room on both sides within the trap allows a man to enter easily to make adjustments. The trap is also available with a plate feeder installed.

Built to Size You Want

Model 101 KOLMAN Portable or Stationary Belt Conveyors are available in 18" to 36" belt widths and in various lengths as desired. KOLMAN Vibrating Screens are designed to be easily attached to any size or make conveyor, and are also available in single, double and triple deck models for many other types of applications.



Heavy production with KOLMAN Conveyor-Screen plant.



KOLMAN Gravel Trap with grizzly bars and removeable door at rear.

Write for Conveyor Bulletin 101 or Screen Bulletin 112 Today!

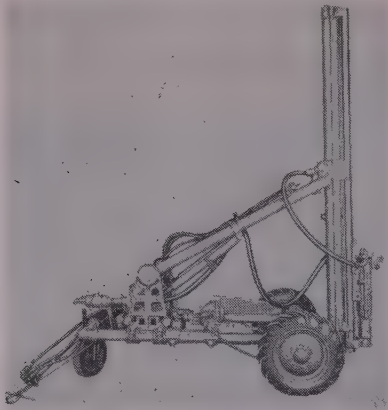
KOLMAN MANUFACTURING CO.

5670 West 12th St.

Sioux Falls, S.D.

Cleveland wagon drill improved

The Cleveland Rock Drill Division of Le Roi Co. has announced the addition of an air motor and special axle to its DR-30 wagon drill, making this



unit self-propelled. This development is intended to meet the demand for more flexibility in deep-hole drilling power, and to save set-up time, according to company officials. A similar air motor is also used for raising and lowering the wagon-drill boom and further speeds the drilling operation. Power is transmitted from motor to wheels by a chain drive. This is shown in the illustration. Actually, the chain drive is fully enclosed.

The air feed has an 8-ft. travel for 6-ft. steel changes. It is claimed that this not only makes drilling faster with both steel and carbide bits, but also increases the footage drilled per bit.

43

New digger for stiff clay

A new clay digger is now in production at **Davey Compressor Co.** Designated as Model DD-30, it was designed for excavating stiff clay and hardpan as well as concrete and shale. Its latch-type chuck retainer permits a quick change of working steels such as clay spades, flat picks, moil points, chisels, asphalt cutters, frost wedges, dirt tampers and others. The tool's chrome-plated cylinder bore is said to more than double effective working life. The manufacturer emphasizes that many of the parts used in DD-30 are the same as used in other Davey tools, resulting in a minimum of spare parts inventory.

A built-in lubricator gives pressure lubrication to all moving parts. Light starting and running are accomplished through use of a metered throttle valve. The DD-30 weighs 31 lb., is 23 in. long, 7 in. wide, and 4½ in. in depth.

44

New line of hard-facing electrodes

Moly-Mang, a new line of electrodes, has been placed on the market

by **Mir-O-Col Alloy Co., Inc.** Good for build-up work on manganese castings, Moly-Mang produces a high tensile strength, making it desirable for many applications including frogs and switches. Hardness of deposit is from 5 to 10 Rockwell C and will harden to 50 Rockwell C when subjected to peening or impact. Application is by AC-DC electric arc with reverse polarity.

The new line is available in a full range of sizes and is packaged in hermetically sealed metal containers to prevent moisture pick-up and rod scuffing. Descriptive literature and free samples are available upon request.

45

Wain-Roy markets hydraulic back hoe

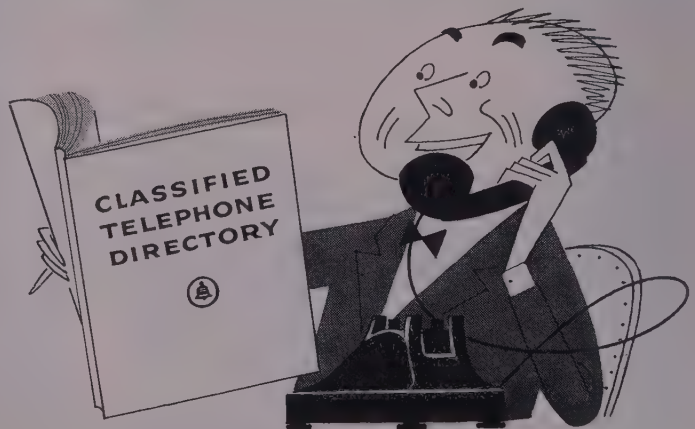
Wain-Roy Corp. has announced a new back hoe, designed specifically for the Hough Payloader. The boom design and bucket action permit digging vertical bell holes, vertical side walls, square corners, and



*Trying to "smoke out"
local dealers?*



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Ever hear of a dealer without a telephone? Of course not. And to increase his telephone orders he advertises in the "Classified" telephone directory. After all, that's where 9 out of 10 people look when they want to find the folks who sell or serve them locally. The Yellow Pages will help you find the product or service you need and the dealer nearest you.

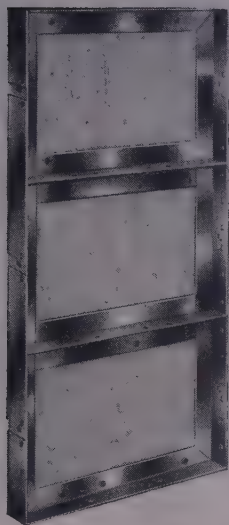
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Pacific Telephone

Simplified Concrete Forming System for Lowest all around Form Costs!

3 BASIC ELEMENTS



UNI-FORM Panels

Prefabricated . . . ready to use when they reach your job.



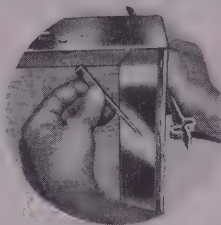
UNI-FORM Tie

Locks, spreads and ties . . . absolutely accurate.

UNI-FORM Tie Key

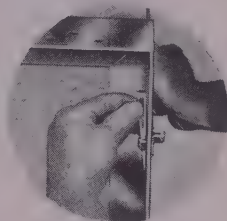
Wedge-Shaped for fast, easy insertion.

3 SIMPLE OPERATIONS



1

Place the Uni-Form Tie Loop into the Tie Hole.



2

Set the Tie Key into the Tie Loop. Panel and Tie are then locked into one integral unit.



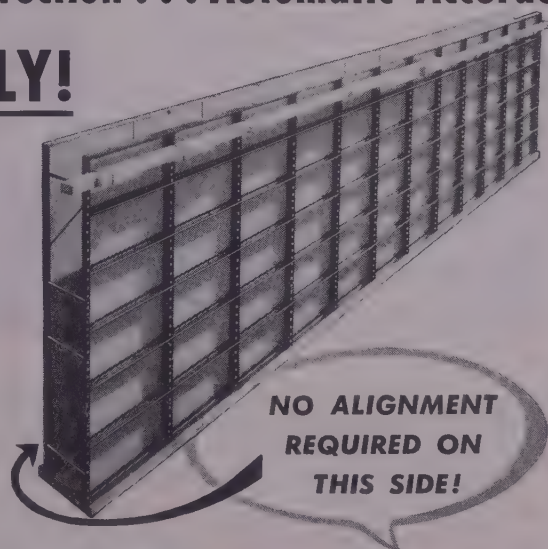
3

Bring the next UNI-FORM Panel into position . . . insert the Tie Key. The assembly is now completed.

**UNI-FORM® Panels Assure Faster Erection . . . Automatic Accuracy
ALIGNMENT ON 1 SIDE ONLY!**

FREE Engineering Service!

Complete job analysis . . . forming recommendations, bills of material supplied by our staff of experienced engineers... **PLUS**... Field Service... anywhere... any-time to insure proper starts and maximum economy on your job. Send us a set of plans for **FREE** estimate. No obligation.



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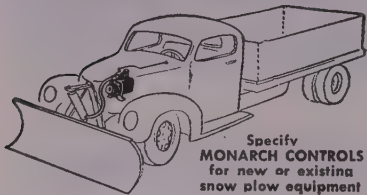


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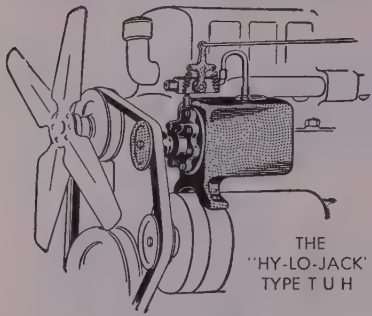
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trenches with level grades at the bottom. It provides an effective digging depth of 12 ft. 6 in. below grade. Trenches can be dug and spoil dumped at any radius up to 190 deg. The hoe itself does not interfere with normal functions such as backfilling, excavating, etc. The hoe can be removed in one-half hour and attached in less than an hour.

46

New swivel saves head room

General Machine & Welding Works, Inc., has added a new Wedge fitting to its Miller swivel line. It is incorporated in the body of the swivel, saving up to 8 in. of head room.

47

Concrete reinforcing bar

U. S. Steel Corp. has announced a concrete reinforcing bar designed to reduce costs in the construction of large concrete jobs. Identified as 23½ in. Round USS Di-Lok, the bar reduces appreciably the concrete yardage requirements in heavy structures. Concrete columns can be designed to carry the same loads with substantial reduction in size. This results in less concrete, lower form costs, and frequently, more usable space in the completed structure. Diamond lock deformations in the steel give maximum bond with minimum loss of area.

48

Back hoe has many uses

Recently introduced by American Tractor Corp. is a hydraulically operated Pippin back hoe developed specifically for use on TerraTrac crawler tractors. With an over-all width of only 5 ft., and height of less than 5 ft., the digger can be operated in close quarters inaccessible to cranes and rubber-tired equipment. Its reach of 16 ft. makes it possible to dig vertical-walled trenches 10 ft. below grade. It has a 9-ft. dumping height for piling dirt or loading



trucks. Bucket widths, 12 to 40 in.

A swivel seat enables the operator to face in either direction to move the tractor as needed or to operate front or rear attachments. The front mounted loader or dozer blade permits backfilling of trenches dug with the same machine. It is possible to force the dozer blade into the ground to securely anchor the digger, making it possible to take bigger bites with each pass of the bucket.

49

More hp. for Galion Model 303 grader

The IHC UD-264 diesel engine with 4-in. bore and 5¼-in. stroke on Model 303 medium-duty motor grader is now rated at 55 hp. at 1,800 rpm, according to the manufacturer, The Galion Iron Works and Manufacturing Co.

50

Improved paving joint filler

Grems Manufacturing Co. has developed a line of low cost rubbery joint filling materials called the Polyloid JFR compounds. They have a greatly increased resistance to the destructive solvent action of jet airplane fuels and gasoline, and are not affected by most acids, salts, alkalies, or corrosive chemicals. The new compounds are waterproof and meet all federal specifications for jet fuel-resistant joint fillers.

Polyloid JFR can be heated in regular kettles and melts at 250 deg. F. The compounds are made for hot-melt pouring, cold-pour placement, coating by brush, trowel, or spray.

51

Small battery charger in production

Universal Motor Co. has designed a 1,000-watt, 32-volt, battery charger called the Model 21-MS. It measures 18 3/16 in. in length, 15½ in. in width,

WISCONSIN-POWERED



KWIK-STEAM GENERATORS

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Construction
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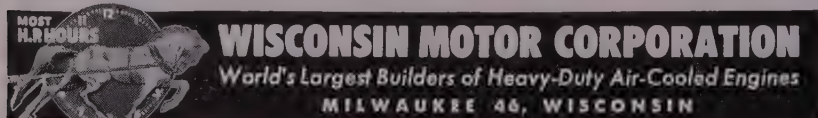


Producing steam as needed, quickly and efficiently, for use on land or on barges; . . . for speeding up pile driving and cutting labor costs; . . . for heating aggregate and water in concrete mixing; for these and many other purposes Littleford Kwik-Steam Vapor generators give good accounts of themselves.

And for the successful, efficient operation of these versatile steam generators, Wisconsin Heavy-Duty Air-Cooled Engines are used as power components for driving blower, fuel pump and water pump.

Littleford Bros., Inc., Cincinnati, Ohio, as the builders of Kwik-Steam Generators, recognize the outstanding dependability and low maintenance cost of Wisconsin Air-Cooled Engines . . . just as many other builders of construction equipment do.

For your money — you can't do better than specify "Wisconsin Power" for your equipment. There is a Wisconsin Engine to meet every power need from 3 to 36 hp.



and 14¼ in. in height. Weight is 95 lb. The new charging set is powered by a single-cylinder, air-cooled, 4-cycle gasoline engine directly coupled to the generator. Mounted in a control box above the generator are the push-button starter switch, reverse current relay, and ammeter for indicating charging rate. There is an adjustable rheostat for regulating the battery-charging current from 15 to 30 amp. This model is priced at \$265.00. Complete information is given in bulletin DME-1.

52

Oil-burning heater has limited height

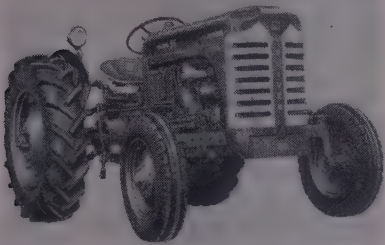
An oil burning heater known as the BJR Model Salamander, designed for use where headroom is limited, has been introduced by Scheu Products Co. It has a shorter stack and larger diffusion hood than Scheu's regular line. The new BJR Model measures 55¾ in. in height. A return gas stack brings consumed gases back to the bowl, producing better combustion and reducing the amount of cleaning required.

The heater uses less than one gallon of any good grade fuel oil, and will produce from 70,000 to 140,000 BTU. It lights with a match and burns from 10 to 20 hr. on one filling. There are no wicks, valves, or jets. It comes equipped with a damper for extinguishing, and carrying clamp handles.

53

New wheel tractor

An all-purpose wheel tractor has been announced by Oliver Corp. Known as the Super 55, it is designed for both industrial and farm service. It is a four-wheel, adjustable tread



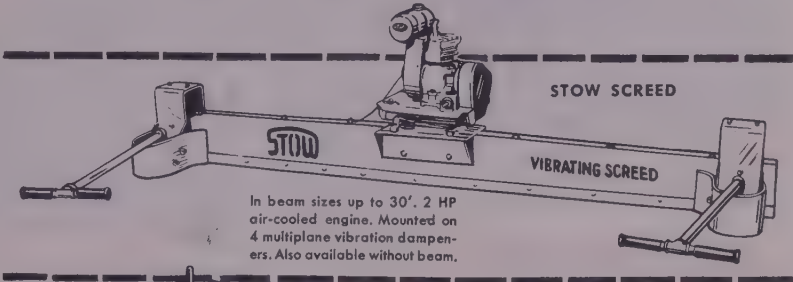
type with low profile and short wheel base. A choice of diesel or gasoline power is offered. Tractor without attachments weighs about 3,000 lb. The Super 55 has six forward speeds, hydraulic control for the three-point hitch, double-disc brakes, and independently controlled power take-off. Literature is available.

54

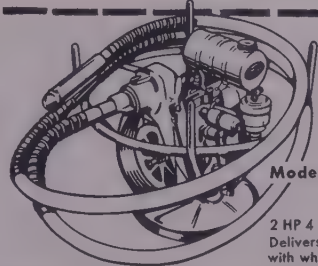
Heavy-duty off-highway truck

A new six-wheel truck, Model RF-230, designed for off-highway service, has been placed in production by International Harvester Co. The vehicle weighs 60,000 lb. and is powered

Concrete facts about Concrete Vibrators and Screeds

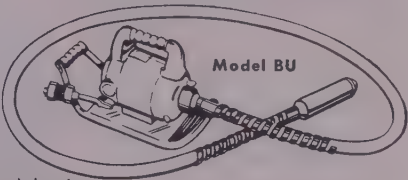


In beam sizes up to 30'. 2 HP air-cooled engine. Mounted on 4 multiplane vibration dampers. Also available without beam.



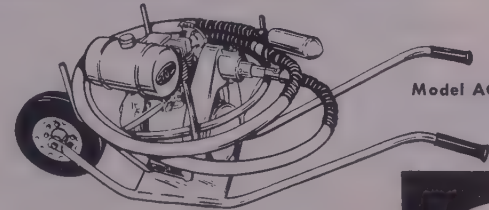
Model BG

2 HP 4 cycle air-cooled engine. Delivers 6000 to 9300 Available with wheelbarrow mount.



Model BU

2 HP at 9000 VPM 115 V. AC or DC



Model AGW

4 ½ HP 4 cycle air-cooled engine. Mounted on wheelbarrow for easy maneuverability. Delivers 6000-9300. Available without wheelbarrow.

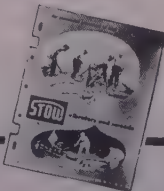


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The high operating speeds of the new STOW line of Concrete Vibrators make possible the use of heavy duty, light weight flexible shafting and lighter, more efficient vibrator heads—which speed operations, cut costs. And, STOW design provides convenient, practical speed control so attachments may be used directly on the vibrator shafts.

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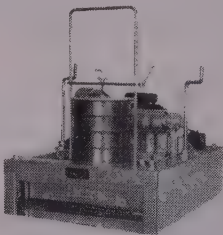
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Failure to meet sizing specifications costs time and money.

The GILSON Mechanical Testing Screen cuts out error and guesswork in meeting sizing specifications for crushed stone, gravel, slag, coal, ores, and similar materials.

A GILSON Test Report is the standard of industry. It is your guarantee that every carload, every truck-load is as-ordered. And GILSON does the job *fast*—five minutes or less per complete test.

A Sand Attachment for handling 8-inch sieves is optional equipment.



Here's Why You Want GILSON —

No more guesswork on sizing
No more tedious screening by hand

1. Makes tests quickly and accurately
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3. Screen trays independently removable
4. Trays balanced to same tare weight
5. Visible separation to refusal
6. Few moving parts
7. Sturdy construction
8. Size range 4" to 200-mesh

Write now for additional information.

GILSON SCREEN CO.
MALINTA, OHIO

by a 201-hp. engine which delivers 430 pt.-lb. of torque at 1,600 rpm. RF-230 is built to withstand shock loads and is suited for use with 8- or 9-yd. concrete mixers, for service in stripping operations, highway and dam construction, earth moving operations, and quarry work.

Standard equipment includes hydraulic, full-power steering; air brakes; 12-volt electrical system, 60-gal. fuel tank, 15-in. clutch, and 175-in. wheelbase. Optional equipment includes high-altitude fittings and tinted safety glass all around.

55

Small scraper easy to service

Euclid Division of General Motors has marketed a 7-cu. yd. scraper, the S-7, which features accessibility of all drive components. Lever type hydraulic operations eliminate all but 11½ ft. of cable. The four cutting blades are reversible and interchangeable, offering maximum digging ability for each type of soil. Complete specifications are given in form No. 503.

56

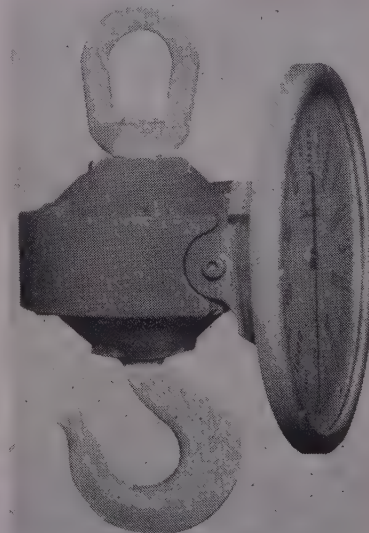
New line of speed tools

Flexible Steel Lacing Co. has announced a new line of speed tools. In this new line are a power tool wrench which speeds up nut tightening, a power tool boring punch for bolt holes, a double purpose templet which assures correct spacing of holes, a wide belt cutter, and a cross arm tool with a pivoted knob for nut tightening. Specifications and list prices are given in bulletin F-110.

57

Hook scale works without friction

A hydraulically operated hook scale, SU-20 Sensater, is being manufactured by Martin-Decker Corp. The scale has a guaranteed accuracy of ¼ of 1% of capacity at any point

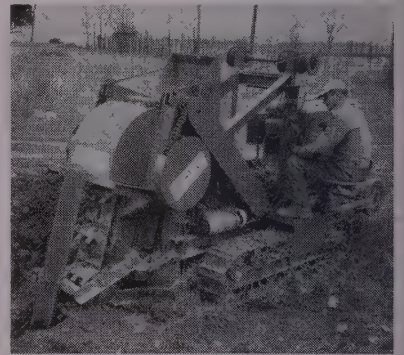


on the dial. The scale uses a new type of mobile diaphragm that develops a piston-like stroke. This transmits an accurate signal to the gage. The Sensater is available in four capacities: 2,500, 5,000, 10,000 and 20,000 lb. The unit weighs 73 lb. and has an ultimate strength of more than 5 times its rated capacity. Full 360-deg. calibration gives larger increments in smaller diameter. The 12-in. scale which has a 25% tare adjustment has bold lines for distant reading and fine lines for close reading.

58

Utility ditcher announced

Gar Wood Industries is producing a crawler-mounted ditcher suitable for house foundation and service line construction for basementless ranch type houses. The new machine, model 403, is a small ladder-type ditcher easily transported from job to job. Its capacity is 5 ft. deep for 8-, 10-, and 12-in. widths of cut and 4 ft. deep for



14- and 16-in. widths of cut. The low ground bearing pressure won't damage lawns or walkways.

The digger has eight speeds forward and digs a straight-sided trench that requires no hand forming. All units are easily accessible and removable for conversion or maintenance without disturbing other components. The discharge chute is self-adjusting, the excavator boom is hydraulically controlled, and conveyor speeds can be varied.

59

Engine has high power rating

Horsepower in the range of 252 to 290 is provided in the new Minneapolis-Moline 1600-12A industrial power unit. The unit operates with 12 volts on either natural or LP gas. Dual 6-cylinder engines of the new engine mounted in parallel are geared to a single power take-off shaft. Displacement is 1,600 cu. in. Horsepower ratings are: 290 at 1,300 rpm.; and 273 at 1,200 rpm. on LP gas; 262 at 1,300 rpm.; and 252 at 1,200 rpm. on natural gas.

The new unit is designed for use with irrigation pumps and other large volume pumping applications, saw mills and cotton gins, generator sets, oil field equipment, and crushers.

Aluminum pistons and counterbalanced crank shaft improve intermittent high-speed performance and give fast acceleration. Counterclockwise rotation of the power take-off shafts is standard in the 1954 production of these units, with clockwise rotation planned for later production. Front power take-off is available. Basing engine speed at 1,200 rpm. and selecting the appropriate gears, power shaft speeds are possible at 600, 800, 1,200 and 1,800 rpm. Twin 14-in. double-disc clutches, oil pressure and water temperature cut-outs are included in this new power unit.

60

Model 35 added to truck mixer line

Concrete Transport Mixer Co. announces the addition of the Model 35, 3½-cu. yd. Rocket truck mixer to

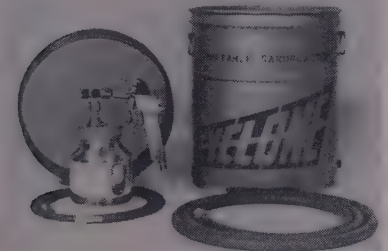


its line of drum-type mixers. This revolving drum mixer features hydraulically-operated chute control, with a permanently attached movable chute and an aluminum detachable extension chute. The new unit has the flexibility of a chain drive and a standard electrically-operated revolution counter.

61

Low cost sandblaster

The Cyclone JR sandblaster manufactured by Safetee Products Co. is a low cost sandblaster which does not need a high powered air compressor for operation. The Cyclone JR re-



moves carbon from cylinder heads, valves, pistons, manifolds and ports. It can be used to clean tire re-cap molds, remove rust, paint or mill scale. It can also be applied to frosting and designing glass or wood. It is available in two models: as a sandblaster only (Model JR) or in kit form. The Model B-50 blast cleaning kit (pictured) gives the user a tool for sandblast cleaning, liquid blast cleaning, or airblast cleaning. Dealer inquiry is invited.

Best way to achieve SPECIFIED DENSITY in

ROCK, SLAG, SOIL-BOUND MACADAM, GRAVEL and SAND BASE COURSES

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On jobs such as this, soil-bound macadam—5 inches thick, the JACKSON MULTIPLE COMPACTOR, now more powerful than ever, achieves specified density in JUST ONE PASS. It is equally efficient on rock, or slag base and all other granular soils.

Quickly adaptable to widening, the JACKSON MULTIPLE COMPACTOR is shown here consolidating slag macadam base course 36 inches wide and 9 inches thick. Using three of the machine's powerful compactor units in tandem, it readily obtains specified density in ONE PASS.

Twin hook-up of manually guided JACKSON COMPACTORS consolidating gravel base for a large pavement repair area. These machines, used singly or in tandem, or side-by-side twin hook-ups, are exceedingly efficient for all types of granular soil base and fill compaction; also for bituminous patching and driveway construction. Operated from a trailer-mounted JACKSON POWER PLANT which may also be used for other power tools and lights.

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62

Crushing plant designed for wet materials

A new two-unit hammermill crushing, screening and loading plant designed for operation in wet, sticky materials and in quarries contaminated by clay balls and mud pockets, has been introduced by **Universal Engineering Corp.** The combination hammermill and screening unit will produce aglime and road rock, aglime and chips, or all aglime as desired.

The hammermill is equipped with a moving breaker plate which prevents build-up of material in the breaking chamber, and a moving cleaning bar which keeps the discharge free at all times.

The unit consists of a 5 x 14-ft. double deck inclined gyrating screen with 70 sq. ft. of screening area in each deck and a ball tray deck under the second deck. It is electrically driven with a convenient control panel located on the operator's platform.

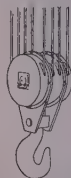
63

All-weather cab for tractor shovels

An all-weather molded steel cab is now available for all models of the Michigan tractor shovel built by the **Clark Equipment Co.** Designed for easy field installation, the heavy duty

cab has good vision through safety glass windows set in rubber molding. The rear section, which has sliding windows, rolls freely on track and can be removed in 5 min. The glass in the overhead window is tinted to elim-

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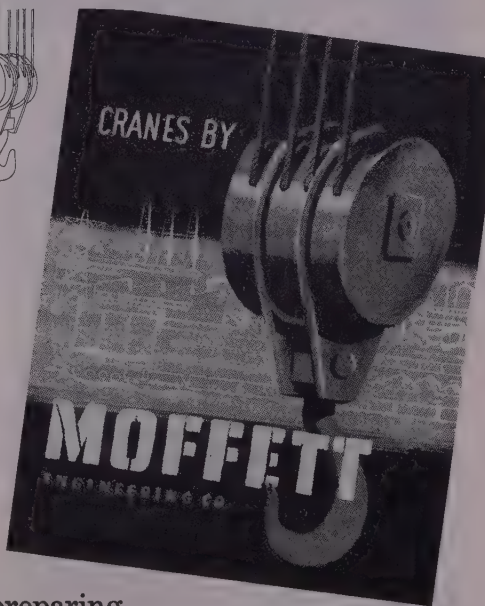


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specifications. Write for your free copy NOW.



64

Lightweight concrete vibrator

A new lightweight high-speed concrete vibrator is being produced by **Stow Manufacturing Co.** Mounted on a lightweight base the JB vibrator can be easily carried around on the job. This machine has a 2-hp., 4-cycle, air-cooled engine. It has a ball bearing eccentric belt tensioner and a special spring lock for fastening the flexible shaft to the countershaft.

Different combinations of 7-ft., 14-ft. or 21-ft. flexible shafts can be fur-

Traveling Cranes · Hoists



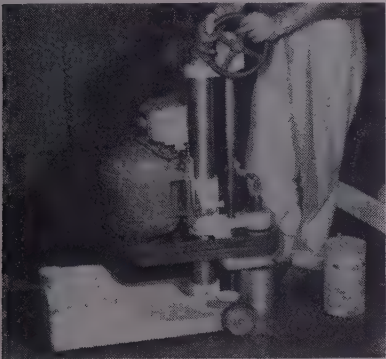
579 Cleveland Ave., Albany, Calif. • Landscape 5-4916
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15 Park Row, New York 38

nished to give total lengths up to 35 ft. The vibrator head can be removed and attachments screwed on for either wet or dry grinding of concrete.

65

Masonry drill can cut reinforcing

Molco Drilling Machines, Inc., is manufacturing the portable drilling machine, the Mechanized Mole, which can cut through hard aggregate and steel reinforcing bars without loss of drilling speed. The new drill will cut a 1- to 6-in. diameter hole in one foot of concrete in less than 2 min. and will drill a 1/2- to 6-in.



diameter hole 18 in. deep in one operation. Deeper holes may be drilled by placing extension shafts on the bit. Vertical or horizontal holes can be drilled through reinforced concrete or any ceramic material. The machine uses self-sharpening diamond drill bits. It can be used for cutting holes for service lines, test cores, and anchoring machinery. It is available in two models, 1 hp., and 2 hp. Weight is about 275 lb.

66

Light-weight paving breaker

Model DB-35, a light-weight paving breaker, is being produced by Davey Compressor Co. It is said to be efficient for light excavation and demolition work on floors, walls, and masonry construction. Because of its lightness, it can be used for horizontal trimming and similar jobs that require breaking to a dimensioned line. The air inlet has a filter screen, and the throttle valve bushing can be replaced without having to repair the handle. The tool weighs 37 lb., and is 23 1/4 in. long.

67

Air filter for backfill tamper

Gunderson-Taylor Machinery Co. is manufacturing a new air filter for its Triplex backfill tamper. The filter is a 48-sq. in. cylinder which needs infrequent cleaning. When cleaning is necessary it is done by removing the plug and turning on the air. Only in extreme cases is it necessary to remove the filter and wash it. The manufacturer emphasizes that the filter can be used only on the Triplex tamper.

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

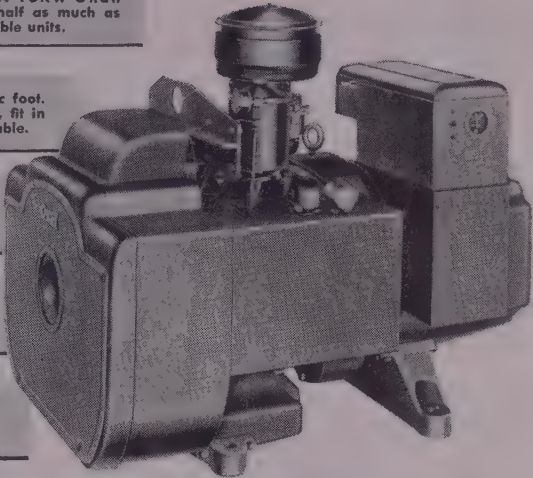
MORE OUTPUT per cubic foot. Onan units are compact, fit in small space, easily movable.

UNIT-BUILT CONSTRUCTION Onan-built plants are direct-connected for permanent alignment, long life.

SPECIAL ELECTRIC PLANT ENGINES. Onan-built engines have massive bearings and other parts to assure durability.

VERSATILITY. A wide variety of accessories such as skids, dollies, trailers, adapt Onan units to more jobs.

48-HOUR SERVICE. Repair parts and factory experts are close to any part of the U.S. Many foreign parts depots.



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

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

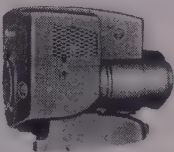
ONAN gives you many advances in electric plant design, plus proved dependability on the job! You pay no premium for these Onan features . . . in fact all the electric plants shown here are priced lower than other plants of similar capacity.

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

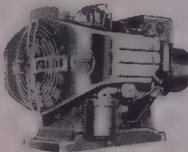
For any job requiring an independent source of electric power, Onan gives you greater all-around service and unequalled value too . . . measured either by first cost or in the long run.

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GASOLINE: Air-cooled—400 to 10,000 watts. Water-cooled—10,000 to 50,000 watts.
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MODEL 305CK—3 1/2 KW A.C., 2-cyl. air-cooled, gasoline engine.



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



MODEL 3DSP—3KW A.C. Diesel one-cylinder air-cooled.

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Selected abstracts for Western projects

IRRIGATION—Supply canal rehabilitation and enlargement in Colorado

Colorado—Bur. of Recl. Emerson S. Ellett, Inc., submitted low bids of \$100,665 and \$124,029 on both Schedules No. 1 and 2 for rehabilitation and enlargement on the Erie section of the South Platte supply canal of the Colorado-Big Thompson project. Unit prices are as follows:

	Schedule No. 1	Schedule No. 2	Total
(1) Emerson S. Ellett, Inc.....	\$100,665	\$124,029	\$224,693
(2) A. S. Horner Construction Co.....	127,181	169,329	296,510
John H. Keller Construction Co.....	161,995	207,700	369,695

SCHEDULE NO. 1

	(1)	(2)
Lump Sum Clearing right-of-way and reconstructing canal, Station 10.30 to Station 68.00.....	\$12,930.00	\$15,000.00
Lump Sum Clearing right-of-way and reconstructing canal, Station 68.00 to Station 142.50.....	19,540.00	15,000.00
Lump Sum Clearing right-of-way and reconstructing canal, Station 142.50 to Station 172.00.....	8,110.00	15,000.00
500 cu. yd. Excavation for drainage channels and ditches.....	.50	1.00
2,350 cu. yd. Excavation for compacted perimeter.....	.20	.50
2,800 cu. yd. Placing compacted perimeter material.....	.30	.90
3,000 cu. yd. Excavation for structures....	1.50	1.50
1,450 cu. yd. Backfill about structures....	.50	1.00
980 cu. yd. Compacting backfill about structures.....	4.00	3.70
1 Detour Constructing and removing roadway detour.....	200.00	700.00
355 cu. yd. Furnishing and placing dry riprap.....	8.00	15.00
120 cu. yd. Furnishing and placing grouted riprap.....	15.00	20.00
14 cu. yd. Furnishing and placing roadway gravel.....	2.50	2.50
5 acre Furnishing and planting grass seed.....	50.00	300.00
410 bbl. Furnishing and handling cement	6.50	6.50
23,300 lb. Reinforcement bars.....	.16	.20
260 cu. yd. Concrete in structures.....	85.00	120.00
1,940 lb. Furnishing and installing metal pipe for flumes.....	.90	.80
70 lin. ft. Furnishing and laying 12-inch diameter corrugated-metal pipe.....	3.50	4.60
28 lin. ft. Furnishing and laying 15-inch diameter corrugated-metal pipe.....	4.00	6.00
64 lin. ft. Furnishing and laying 18-inch diameter corrugated-metal pipe.....	5.00	6.50
42 lin. ft. Furnishing and laying 24-inch diameter corrugated-metal pipe.....	6.25	9.00
9.5 M.b.m. Furnishing and erecting untreated timber in road bridges.....	325.00	370.00
3.7 M.b.m. Furnishing and erecting treated timber in road bridges.....	350.00	430.00
1.7 M.b.m. Furnishing and erecting untreated timber in foot bridges	325.00	390.00
2 post Furnishing and erecting guard posts.....	10.00	8.00
50 lin. ft. Furnishing and erecting beam-type guardrail.....	6.00	7.50
0.2 mi. Removing fences.....	500.00	300.00
1.4 mi. Removing and rebuilding fences	1,000.00	1,150.00
0.1 mi. Furnishing and erecting new fence.....	2,000.00	1,500.00
90 post Replacement and additional posts for rebuilding fence.....	1.50	4.00
144 lin. ft. Furnishing and laying 12-inch precast-concrete pipe with type B joints.....	3.00	4.00
20 lin. ft. Furnishing and laying 30-inch precast-concrete pipe with type B joints.....	10.00	13.50
50 lin. ft. Furnishing and laying HCSO, 72-inch precast-concrete pipe with type R2 joint.....	50.00	60.00
700 lb. Furnishing and installing metal slide gates.....	.70	.90
40 lb. Furnishing and installing metal flap gate.....	.70	1.60
3,120 lb. Furnishing and installing miscellaneous metalwork.....	.70	1.30
26 lin. ft. Furnishing and laying 4-inch diameter cement-asbestos pipe.....	2.00	3.00
Lump Sum Furnishing and installing one (1) 4-inch gate valve with valve box and cover.....	100.00	75.00

SCHEDULE NO. 2

	(1)	(2)
Lump Sum Clearing right-of-way and reconstructing canal, Station 172.00 to Station 221.00.....	\$14,680.00	\$15,000.00
Lump Sum Clearing right-of-way and reconstructing canal, Station 221.00 to Station 286.40.....	16,140.00	15,000.00
Lump Sum Clearing right-of-way and reconstructing canal, Station 289.05.4 to Station 315.00.....	6,450.00	22,000.00
900 cu. yd. Excavation for drainage channels and ditches.....	.50	1.00
4,900 cu. yd. Excavation for compacted perimeter.....	.20	.50
5,900 cu. yd. Placing compacted perimeter material.....	.30	.90
5,050 cu. yd. Excavation for structures....	1.50	1.50
2,530 cu. yd. Backfill about structures....	.50	1.00
1,200 cu. yd. Compacting backfill about structures.....	4.00	3.70
3 Detour Constructing and removing roadway detours.....	350.00	700.00
460 cu. yd. Furnishing and placing riprap	8.00	15.00
150 cu. yd. Furnishing and placing roadway gravel.....	2.50	2.50
6 acre Furnishing and planting grass seed.....	50.00	300.00
430 bbl. Furnishing and handling cement	6.50	6.50
25,000 lb. Furnishing and placing reinforcement bars.....	.16	.20
285 cu. yd. Concrete in structures.....	85.00	120.00
85 sq. ft. Furnishing and placing elastic filler material in joints.....	2.00	5.00
3,100 lb. Furnishing and installing metal pipe for flumes.....	.90	.80
40 lin. ft. Furnishing and laying 12-inch diameter corrugated-metal pipe.....	3.50	4.60
54 lin. ft. Furnishing and laying 15-inch diameter corrugated-metal pipe.....	4.00	6.00
82 lin. ft. Furnishing and laying 18-inch diameter corrugated-metal pipe.....	5.00	6.50
32 lin. ft. Furnishing and laying 24-inch diameter corrugated-metal pipe.....	6.25	9.00
9.8 M.b.m. Furnishing and erecting untreated timber in road bridge	325.00	370.00
14.4 M.b.m. Furnishing and erecting treated timber in road bridges.....	350.00	430.00
1.5 M.b.m. Furnishing and erecting timber in foot bridges.....	325.00	390.00
2 post Furnishing and erecting timber guard posts.....	10.00	8.00
0.2 mi. Removing fences.....	500.00	300.00
0.9 mi. Removing and rebuilding fences	1,000.00	1,150.00
60 post Replacement and additional posts for rebuilding fence.....	1.50	4.00
0.1 mi. Furnishing and erecting new fence.....	2,000.00	1,500.00
43 lin. ft. Furnishing and installing chain-link fence.....	5.00	5.00
34 lin. ft. Furnishing and laying 12-inch precast-concrete pipe with type B joints.....	3.00	4.00
56 lin. ft. Furnishing and laying 18-inch precast-concrete pipe with type B joints.....	6.00	6.00
238 lin. ft. Furnishing and laying HCSO, 72-inch precast-concrete pipe with type R2 joints.....	55.00	60.00
360 lb. Furnishing and installing metal slide gates.....	.70	.90
Lump Sum Furnishing and installing one automatic radial gate.....		
5,500 lb. Furnishing and installing miscellaneous metalwork.....	.70	1.30
50 lin. ft. Furnishing and erecting beam-type guardrail.....	6.00	.50

HIGHWAY—Construction of 0.9 mi. of graded roadbed south of San Francisco

California—San Mateo County—State. Guy F. Atkinson Co. submitted a low bid of \$1,288,816 for building 0.9 mi. of graded roadbed between Sierra and Candlestick points on San Francisco Bay. Unit prices were as follows:

	(1)	(2)
(1) Guy F. Atkinson Co.....	\$1,288,816	
(2) Eaton & Smith.....	1,332,388	
McCammion-Wunderlich Co.....	1,384,321	
Fredrickson & Watson Construction Co. and M & K Corp....	1,440,749	
Macco Corp., Morrison-Knudsen Co., Inc., and River Construction Corp.....	1,488,832	
D & H Construction Co. and M. H. Hasler Construction Co.,	1,493,507	
Western Contracting Corp.....	1,509,170	
Piombo Construction Co.....	1,511,735	
Charles L. Harney, Inc.....	1,665,767	
Peter Kiewit Sons' Co.....	2,043,863	
115 cu. yd. Structure excavation.....	\$ 4.00	\$ 7.00
400 cu. yd. Ditch & channel excavation.....	1.50	3.00
1,765,000 cu. yd. Imported borrow.....	.713	.714
26,500 lb. Explosive (mud shooting).....	.32	.28
15,500 lin. ft. Drilling holes (mud shooting).....	.63	1.80
6,700 M. gal. Dev. wat. sup. & furn. wat. equip..	100.00	3,000.00
300 hr. Applying water.....	1.00	2.40
300 hr. Idle time.....	1.00	33.00
0.7 mi. P.M.S. ditch lining.....	.20	.45
2 cu. yd. Class "A" P.C.P.C. (structures)....	175.00	90.00
0.7 mi. New portenry fence.....	2,000.00	2,000.00
154 lin. ft. 18-m. C.M.P. (16 ga.).....	4.00	4.50

UNIT PRICES . . . CONTINUED

RAILROAD—Grading and draining for railroad and highway in Oregon

Oregon—Sherman County—C. of E. R. A. Heintz Construction Co. of Portland submitted a low bid of \$849,861 for grading and draining about 6.1 mi. of single track Union Pacific Railroad and about 5.4 mi. of U.S. 30 for The Dalles Dam project.

(1) R. A. Heintz Construction Co.	\$ 849,861
(2) Morrison-Knudsen Co., Inc.	871,611
Vernie Jarl.	945,141
Gibbons & Reed Co.	1,041,390
C. R. O'Neill.	1,058,216
Kuckenberg Construction Co.	1,134,940
Fred H. Slate Co. and E. C. Hall Co.	1,168,835
Thayn Construction Co.	1,193,882
Lewis Hopkins Co.	1,297,519
H. Earl Parker, Inc.	1,294,238
D.&H. Construction Co. and M.H. Hasler Construction Co.	1,312,369
John Delphia.	1,343,751
Grove, Shepherd, Wilson & Kruge, Inc.	1,387,469
J. Ira McNutt.	1,569,063

	(1)	(2)
1 job Clearing and grubbing	\$41,000.00	\$5,000.00
1,454,000 cu. yd. Excavation, common	.195	.22
235,500 cu. yd. Excavation, rock	.85	.95
151,500 cu. yd. Embankment foundation excavation	.32	.25
13,500 cu. yd. Granular topping, in place	.95	.60
14,300 cu. yd. Filter blanket, in place	.90	.75
40,300 cu. yd. Rock revetment	.75	1.25
46,600 sq. yd. Wind erosion protection stone, in place	.18	.15
1,400 lin. ft. Rounding of tops of cutbanks	.20	.15
830,700 c.y.m. Yard-mile overhaul	.13	.15
500 hour Rolling, additional roller hours	12.00	5.00
18,000 M gal. Sprinkling	1.00	.75
960 cu. yd. Structural excavation, unclassified	3.50	1.25
2,120 cu. yd. Gravel backfill, in place	2.50	1.25
200 cu. yd. Concrete for revetment rock, in place	35.00	35.00
500 lin. ft. 8" dia. perf. C.M.P., 16 gage, in place	2.50	2.25
70 lin. ft. 12" dia. C.M.P. culv., 16 ga., in place	3.30	3.00
200 lin. ft. 18" dia. C.M.P. culv., 12 ga., in place	6.50	6.25
210 lin. ft. 18" dia. C.M.P. culv., 16 ga. in place	4.60	4.25
310 lin. ft. 24" dia. C.M.P. culv., 10 ga. in place	11.00	9.75
410 lin. ft. 24" dia. C.M.P. culv., 14 ga. in place	6.70	6.50
160 lin. ft. 36" dia. C.M.P. culv., 10 ga. in place	17.00	15.00
190 lin. ft. 36" dia. C.M.P. culv., 12 ga. in place	13.00	12.50
220 lin. ft. 54" dia. C.M.P. culv., 8 ga. in place	33.00	28.00
250 lin. ft. 54" dia. C.M.P. culv., 12 ga. in place	24.00	21.00
10 lin. ft. Jack 36" dia. C.M.P. culv., 8 ga. in pl.	35.00	40.00
55 lin. ft. Jack 54" dia. C.M.P. culv., 8 ga. in pl.	50.00	65.00

2 cu. yd. Concrete	110.00	150.00
5,800 cu. yd. Base course, in place	2.50	.75
1,400 cu. yd. Crushed stone leveling course, in place	2.75	3.25
17 ton MC-2 prime coat, in place	50.00	48.00
23 ton Asphaltic cem. (150-200 penetration), in place	50.00	45.00
260 cu. yd. Mineral aggregate, in place	5.00	4.00
3,600 cu. yd. Loading ballast	.26	.40
2,600 each Ties stockpiled	.20	.50

HIGHWAY—Grading and draining in Arizona

Arizona—State. Lyle Price of Flagstaff submitted a low bid of \$484,890 for about 8 mi. of roadwork consisting of grading and draining. The work begins about 16 mi. south of Ashfork Junction and extends southerly over a new alignment of U.S. 89.

(1) Lyle Price	\$484,890
(2) Fisher Contracting Co.	494,988
Isbell Construction Co.	520,388
Dale F. Payne	556,761
W. J. Henson	568,181
Phoenix-Tempe Stone Co.	579,500
Western Constructors, Inc.	589,650
Peter Kiewit Sons' Co.	641,898

	(1)	(2)
40 Acres Clearing and grubbing	\$ 375.00	\$ 150.00
395,325 cu. yd. Roadway excavation	.70	.67
10,500 cu. yd. Overbreakage	.525	.5025
7,500 cu. yd. Slides	.35	.335
1,660 cu. yd. Drainage excavation	1.29	1.40
26,950 lin. ft. Grader ditches	.07	.07
1,077 cu. yd. Structural excavation	2.74	3.70
23,135 cy. mi. Overhaul	.25	.30
38,130 cu. yd. Borrow (CIP)	.32	.45
1 L. Sum Provide water supply	1,000.00	1,000.00
11,350 M. gal. Apply water	1.50	2.25
2,275 Hour Rolling	7.00	8.00
1,478 cu. yd. Class A concrete (including cement)	46.80	53.00
158,515 lb. Reinforcing steel (bars) (CIP)	.10	.12
488 lin. ft. 24" C.M.P. (CIP except excava.)	5.30	5.00
256 lin. ft. 36" C.M.P. (CIP except excava.)	10.00	10.00
304 lin. ft. 42" C.M.P. (CIP except excava.)	12.75	12.00
318 lin. ft. 48" C.M.P. (CIP except excava.)	14.40	15.00
364 lin. ft. 60" C.M.P. (CIP except excava.)	23.50	25.00
3 Each Cattle guard (2-unit) (std. C-14) (CIP except excava. and concrete)	500.00	530.00
70 each Right of way markers (std. C-1) (type B or C) (CIP)	6.00	7.00
72,090 lin. ft. Line fence (std. C-15 or C-16) (CIP)	.19	.20
12 each Steel fence gates (std. C-15 or C-16) (Type 1) (CIP)	50.00	38.00
12,310 lin. ft. Reconstruct fence (CIP)	.18	.15
2,500 lin. ft. Grader road	.20	.25

BITUMULS®

saves you money on maintenance!

Performance is the Reason



BITUMULS is asphaltic binder in emulsion form.

Applied cold, it bonds well with every type of clean surface; it thoroughly coats all types of aggregates, wet or dry. It can be used in damp weather and even at relatively low temperatures. For the deep penetration required on trench repair (shown in the photo), Bitumuls has no equal.

These features add up to real savings on any maintenance program: you save the time and expense of heating; you eliminate the need of a special prime or tack coat; you work with local aggregate of all kinds, lowering the expense of importing material; you save time lost due to showers; and you can start work-season earlier, keep going later in the year.

There are Bitumuls Engineers who work out of offices near you. Call on them whenever you feel that they can assist on maintenance problems.

AMERICAN
Bitumuls & Asphalt
COMPANY

Oakland 1, California • Seattle, Washington • Portland 7, Ore.

Inglewood, California • Tucson, Arizona

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these cost-reducing
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1. EFCO "Lifetime" Steel Forms

BUY these forms for your: (a) Minimum form requirements. (b) Larger form requirements where reuse of the form equipment and simplicity of the form work seem to make purchase more practical.

2. SPECIAL ECONOMY Forms

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News of DISTRIBUTORS

Gar Wood promotes Whitbread

Announcement of the appointment of B. F. Whitbread as product sales manager for Gar Wood hydraulic hoists and dump bodies was recently made. Whitbread has been manager



B. F.
Whitbread

of Gar Wood's direct factory truck equipment sales branch in Los Angeles since 1950. He will work closely with the company's nation-wide distributor organization and its 14 factory truck equipment sales branches.

Yuba re-enters Hydraulic dredge field

Yuba Manufacturing Co., San Francisco, manufacturer of bucket ladder dredges for nearly 50 years, recently announced its re-entry into the hydraulic dredge field. Yuba will build hydraulic dredges upwards of 6 inches, for such diversified uses as harbor construction, hydraulic fills, channel excavation, levee construction and production of sand and gravel. George Pelton, with more than 30 years' experience in the hydraulic dredge field, will be in charge of the company's dredging program.

LeTourneau-Westinghouse establishes Western depot

A Western parts depot, to handle emergency parts requirements of distributors of LeTourneau-Westinghouse equipment in California, Oregon, Washington, Arizona, Nevada, Utah, Idaho, and in British Columbia, was recently established at Emeryville, Calif. This depot will provide a representative stock of genuine LeTourneau-Westinghouse parts required for providing prompt emergency parts service for all distributors and contractors in the Western area.

Financing firm names field rep.

Forest J. Paulson has been named representative for eastern Washington by C.I.T. Corporation, large industrial financing firm. Paulson will



Forest J.
Paulson

make his headquarters in Spokane. C.I.T. serves business and industry in the installment financing of machinery and equipment.

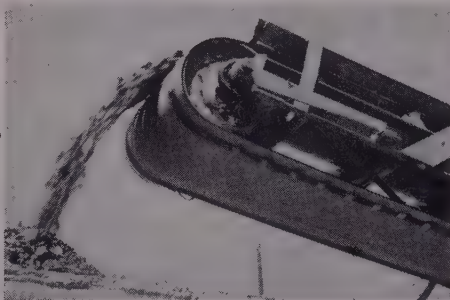
Texas Company revises research organization

Dr. Wayne E. Kuhn was recently named general manager of the newly-created research and technical department of The Texas Company. Since 1938 he had been manager of

YUBA-SCHROCK MOTORIZED HEAD PULLEY For Belt Conveyors and Bucket Elevators

"PULLEY WITH THE
DRIVE INSIDE"

Safe, compact, simple
—no chains, no belts,
no sprockets, no
exposed motors.



Built by YUBA for sale in Arizona, California, Idaho, Montana, Nevada, New Mexico, Oregon, Texas, Utah, Washington.

Built and sold in other states by Iowa Manufacturing Company, Cedar Rapids, Iowa.

Pulley shell of this revolutionary head pulley rotates around electric motor and reduction gears, which are held stationary by torque arm attached to conveyor frame. Quickly in-

stalled — requires no more room than idler pulley. All moving parts protected against weather, grit, dirt. Diameters 10½" to 56". 1/3 to 125 hp. for voltages to 2300. Job proved.

Write TODAY for folder and name of nearest distributor.



YUBA MANUFACTURING CO.

Pulley and Sprocket Dept.

70

Phone 628

Benicia, Calif.

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MEILI — BLUMBERG — GRACE — HOUGH — LULL
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REFILLS — SPECIALISTS

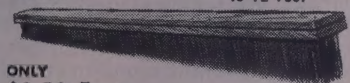
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WIRES AND FIBRES

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ONLY
\$3.50 Foot
Buy in Lengths
Assemble Your Own
In Any Shape Desired.

NAME YOURS
No frame required

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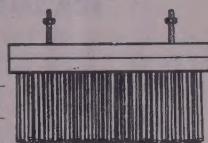
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3" wide—15" Long
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1947 Ingersoll Rand Diesel Compressor HKA-500
model. Recondition motor and in A-1 shape.
Speed 1100 R.P.M. Price \$2500.00

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NEW
MODEL SA BLAW KNOX
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20' SPREAD
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NORTHWEST—Model 80 D Shovel.
Very good condition. Serial No.
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hoe combination Cat. Engine.

QUICKWAY—Model E—Backhoe no
mounting. EXTRA LOW PRICE.

PITMAN — Hydra-Lift — Model B —
Mounted on Ford F-6 Truck—EXCEL-
LENT CONDITION.

REX—16S Mixer—Wisconsin Engine—
4 Pneumatic Tires.

GALION—Model 118 Motor Grader
Demonstrator.

QUICKWAY — Model J Backhoe
mounted.

Arnold Machinery Co., Inc.

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1302 West Broadway • Idaho Falls, Idaho

3 DW 21 Caterpillar Motor Scrapers
Ready to Roll — Excellent Condition
All Modifications

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Caterpillar D7, Model 3T, just completely overhauled, Excellent condition.
Athey Tracks—8 complete tracks—Good as new. Never been used. Model 7D7.
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Well-established manufacturer needs first-class engineer to design and improve construction machinery.
Excellent salary—Good future.

SALES ENGINEER

Also need two or more experienced sales engineers familiar with heavy construction; one for Midwest and one for Pacific Coast.

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Western Construction

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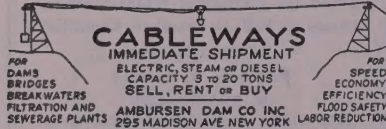
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Every Desirable Length up to 60-ft.

SPECIALLY PRICEDAttractive Savings for
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CABLEWAYS
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CAPACITY 3 TO 20 TONS
SELL, RENT or BUY
AMBURSEN DAM CO. INC.
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BRIDGES
BREAKWATERS
FILTRATION AND
SEWERAGE PLANTS

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SPEED
ECONOMY
EFFICIENCY
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STOP that WATER

With FORMULA No. 640, a clear liquid which penetrates 1" plus in concrete, brick, stucco, plaster, etc. Seals out water, dirt. Holds 20' head. Use outside and in. Preserves all absorbent materials. Sold 14 years. Quick, economical, sure. \$3 in 55's. Free sample. See Sweet's.

HAYNES PRODUCTS CO., OMAHA 3, NEBR.

FOR SALE

Barber-Greene 830-840 Mixer and Dryer Hot-Mix Plant, complete with electric shakers, tunnel, boiler, steam-heated tanks, and all necessary equipment; 1/2-yard Quickway truck-crane; TD 18 International Tractor with carry-all; 2 International dump-trucks; AC blade; Motor roller; Howe truck-scales; Various other pieces of small equipment. MUST BE SOLD IMMEDIATELY, AND AT A SACRIFICE. Mid-Valley Corporation, 414 E. Mill St., Porterville, California. Phone 1440.

FOR SALE**STEEL SHEET PILING**

NEAR BREWSTER, WASHINGTON

Shipped	New	Used	Only One Job	
Carnegie	MP-101	MP-102	MP-102	Tees
Length	Pcs.	Pcs.	Pcs.	Pcs.
72-65 ft.	105	100	2	2
65-60 ft.	210	50	9	9
60-50 ft.	210	5	18	18
50-45 ft.	290	2	7	7
45-40 ft.	120	1	13	13

Also quantity 35 ft. and shorter—Quick Shipment Regardless of job, location. Write, Wire or Phone.

**MISSISSIPPI VALLEY
EQUIPMENT CO.**

511 Locust St., St. Louis 1, Mo., CHestnut 4474

FOR SALE

- 1—Koehring Model 34E, Twin Batch Paver purchased April 1946. Powered by G. M. Diesel. F.O.B. Africa, N. Y. \$5,000.00.
- 1—Ransome 34E. Dual Drum Paver. Powered by Cummins Diesel. F.O.B. Chelsea, Michigan. \$12,000.00.
- 1—1/2-yd. Insley dragline, in good shape.

All in good condition and
reasonably priced.**RUFFRIDGE-JOHNSON
EQUIPMENT CO., INC.**3024 S.E. 4th St. Minneapolis 14, Minn.
Lincoln 7648 — Prior 7147**SPECIAL LOW PRICES—WHILE THEY LAST**

Unused — Pacific General Electric Gear-Motors
Class II Heavy Duty Gears—220 or 440 V.
8—25 H.P.—Slip Ring—100 RPM... \$650.00 ea.
1—50 H.P.—Sq. Cage—84 RPM... \$850.00 ea.

Smith, Lindstrom & Duncan, Inc.

16 Toland St., San Francisco, Calif. AT. 8-1552

the company's technical and research division. Until recently the research organization had functioned as a division of refining. As the research and technical department, it now has departmental status.

Creative Metals expands its line

Creative Metals Corp. of Emeryville, Calif., is adding to its line of industrial materials handling equipment. Asphalt spreader boxes are the first construction industry item to be made. The company's test program includes concrete buggies, buckets, and screeds, and a multi-wheel, self-propelled pneumatic roller.

**Emmett Hughes named
Western sales mgr.**

Emmett N. Hughes, former West Coast division manager for Micro Switch, a division of Minneapolis-Honeywell Regulator Co., has been named Western sales manager in charge of all sales operations on the Coast, including the Rocky Mountain States. His headquarters are in Los Angeles.

Blaw-Knox promotions

Joseph R. Schaeffer has been appointed chief engineer of the Blaw-Knox construction equipment department. R. A. McCullough has been named to Schaeffer's former post of assistant chief engineer.

Aeroil announces new sales mgr.

Aeroil Products Co., Inc., has announced the appointment of Jack W. Weber as its new sales manager, with complete charge of national and export sales.

Ross Miller joins St. Paul Hoist

Ross Miller has been named sales manager of St. Paul Hydraulic Hoist. He has had 35 years experience in the truck equipment field. Immediately prior to his present appointment, Miller was vice president and general manager of National Lift Co.

Byron Jackson takes on new man

Ross Barrett was recently appointed by Byron Jackson Co. to head an expanded department responsible for public relations, advertising, and sales promotion. This department will also supervise market analysis for new BJ products and services.

James Kuppe now sales mgr.

At its recent annual sales meeting, James E. Kuppe was appointed general sales manager of Carver Pump Co., manufacturer of centrifugal pumps for construction, irrigation, and industry. He succeeds Robert E. Tanner in this position, who is also vice president and general manager of the company.

Jack How joins Lupton agency

Jack How, who has been associated with construction advertising for more than 15 years, has joined John Mather Lupton Co., New York advertising agency. How has been in charge of all construction and concrete machinery advertising for Worthington Corporation for the past eight years. He was with Caterpillar from 1936 to 1941, in the advertising and publicity department. For three years before the war he was in public relations work in San Francisco and during the war he did personnel work for the Navy.

Proposed merger

The Dorr Company, with headquarters in Stamford, Conn., and Oliver United Filters, Inc., of Oakland, Calif., announce the execution of an agreement for the merger of the two companies. If approved by stockholders of both companies, the merger will become effective Dec. 31, 1954.

ADVERTISERS in this issue

A

Aetna Life Affiliated Companies... 82
Allis-Chalmers Manufacturing Co.
Tractor Division 22 & 23
American Bitumuls & Asphalt Co. 131
American Hoist & Derrick Co. 75
American Pipe and Construction
Co. Cover 3
American Rubber Manufacturing
Co. 33
American Tractor Equipment
Corp. 101
Armco Drainage & Metal Products,
Inc. 98
Austin-Western Company, Div.
Baldwin-Lima-Hamilton Corp. 48

B

Baldwin-Lima-Hamilton Corp.,
Austin-Western Crusher 111
Barber-Greene Company 26
Basalt Rock Company, Inc. 85
Blaw-Knox Company
Equipment Division 81
Foote Construction Equip. Div. 115
Broderick & Bascom Rope Co. 97
Bucyrus-Erie Company 18 & 19
A. M. Byers Company 21

C

Case, J. I., Company 95
Caterpillar Tractor Co. 27 & 77
Chapman Valve Mfg. Company ... 12
Chicago Bridge & Iron Company.. 46
Chicago Pneumatic Tool
Company 38 & 39
C.I.T. Corp. 71
Coast Manufacturing & Supply Co. 102
Colorado Fuel & Iron Corp., The.. 16
Columbia Geneva Steel Division,
United States Steel Corp. 91
Commercial Shearing and Stamp-
ing Co. 80
Continental Sales & Service Co. 100
Cook Bros. Equipment Co. 44
Cummins Engine Company,
Inc. 14 & 15

D

Dow Chemical Company, The.... 83

E

Economy Forms Corp. 132
Electric Steel Foundry Co. 94
Electric Taper & Equipment Co. 127
Euclid Division, General Motors
Corporation 11

F

Fuller Manufacturing Company.. 45

G

General Electric Company,
Apparatus Div. 79
General Motors Corporation
Chevrolet Motor Division..... 34
Detroit Diesel Engine Div. 13
Truck & Coach Div. 107
Gilson Screen Company 126
Goodrich, B. F., Company, The... 5
Gorman-Rupp Company 119

H

H & L Tooth Company 17
H-S Engine Co. 100
Hercules Powder Company..... 109
Homelite Corp. 20
Huber Manufacturing Company.. 42
Humbolt Chicago Pipeline Project. 128

I

Ingersoll-Rand Company 72 & 73
International Harvester Co.,
Industrial Power 8 & 9

J

Jackson Vibrators 127
Johnson, C. S., Co. 6
Johnston, A. P., Company, Inc. 135
Joy Manufacturing Company.... 10

K

Kaiser Steel Corp. 87
Keasbey & Mattison Company... 40
Kenworth Motor Truck Corporation 93
Koehring Company & Subsidiary
Companies 6, 7 & 30
Kwik-Mix Company 6
Kolman Manufacturing Co. 121

M

Macwhyte Company 41
Mall Tool Company 116
Moffett Engineering Co. 128
Monarch Road Machinery Co. 124

N

Northwest Engineering Co. 3

O

Onan, D. W., & Sons, Inc. 129
Owen Bucket Company 86

P

Pacific Telephone and Telegraph
Company 122
Parsons Company 6 & 30
Pittsburgh-Des Moines Steel
Company 99

R

Raymond Concrete Pile
Company Cover 4
Richfield Oil Corp. 32

S

Screen Equipment Co., Inc. 29
Standard Oil Company
of California 25
Stephens-Adamson Mfg. Company 24
Stow Manufacturing Co. 125
Superior Concrete Accessories, Inc. 28
Superior-Lidgerwood-Mundy Corp.,
Lidgerwood Industries, Inc. 102

T

Texas Company, The Cover 2
Thermoid Co. 37
Thew Shovel Co., The 43
Timken Roller Bearing Co., The
Rock Bit Div. 31

U

Union Oil Co. 35
United States Steel Corp. 36 & 91
United States Steel Supply Division
United States Steel Corp. 36
Universal Form Clamp Co. 123
Universal Manufacturing Corp. 74

V

Victor Equipment Co. 89

W

Water Seals, Inc. 112
Wellman Engineering Company.. 105
White Motor Company, The 113
Wisconsin Motor Corporation 124
Western Construction 30

Y

Yuba Manufacturing Company... 132

Johnston Stainless Welding Rods

Practical, Down-to-Earth Welding Rods
Alloys as they are supposed to be

Corrosion Resistant—
Clean metal

Strong—
Low in cracking

A. P. JOHNSTON CO., INC.
1845 E. 57th St., Los Angeles 58

BACKFILL, uncompacted

You can't store water behind a set of drawings

The passing of 25 years hasn't taken any of the value from the words of Jim Tripp, set forth in a **Western Construction** article of that otherwise far-away year. Tripp had been superintendent on Coolidge Dam in Arizona, and it was on that experience that he drew for his remarks on "construction symmetry of design." Here is some of his text:

"From the constructor's viewpoint, it is not enough that the design be sound—it must also be practicable. In past years when I bent my energies to design work, I would quite often bring forth what I thought to be an intellectual nugget. But, when the field forces dissected my plan, the nugget seemed changed to 'fool's gold.' I asked myself why, and to seek the answer I became a construction man.

"I discovered that a master carpenter's way of laying out work was not my way. Where I needed only a drafting board and quiet, he needed a place to stand or tie himself before he could set up the lines which I so easily drew and indicated. A carpenter has but a plumb and level to do the things which I had a host of good drawing instruments to indicate. Therefore, my plans were not altogether practicable; they were not symmetrical from the constructor's viewpoint.

"I do not maintain that my idiosyncracies are by any means the criterion, but I do want to emphasize that the question 'How is this design of mine going to be built?' is quite as important as 'What is this design to do?'"

A good word for down-time

When the editors of **Western Construction** talk about Down-time, they spell it with a capital letter. And they laugh. Because, to us, Down-time stands for the cartoon series we published two or three years ago.

We still see some of those cartoons, clipped from old copies and tacked up on job office walls—usually with some local names penciled in. Remember the one about the tunnel crew that holed through a good quarter-mile from the band stand and the waiting crowds? "I've got news for you, Hardrock!" was the chucktender's understatement to his partner as they shouldered through their "portal!" That one's at Pit 4 now.

Well, we've got Hank Domagalski back in our pages. Last month he

found a tender spot, to say the least, among the boys who do form carpentry. This month his target is the teamster, and he apparently picked one who hasn't been reading the advertising pages!

The dandy thing about Domagalski's work is that no one will laugh at it who isn't in the know. You can dream up a lot of crazy situations in

Twenty-five years ago in *Western Construction*

"The grading of Denny Hill [Seattle] and improvement of Sixth Avenue and other streets, covering an area of 30 blocks, and involving the excavation and removal of 2,700,000 cu. yd. from city streets and 1,500,000 cu. yd. from private property, will be completed about September 15, 1930. Contract for this work was awarded September 20 to **Geo. Nelson & Co.**, of Seattle, at \$1,516,974, the excavation unit price being 25c per cu. yd."

* * *

"On November 1, the McKiernan-Terry Drill Co., New York, became the **McKiernan-Terry Corp.** and acquired the ownership of the National Hoisting Engine Co., Harrison, New Jersey, and Steele & Condict, Inc., Jersey City."

* * *

"**Force, Curigan & McLeod**, of Oakland, will finish 11 mi. of California state highway construction in Kern County from Bakersfield to Cottonwood Creek about December 1... The job includes one large cut, 70 ft. deep, containing 75,000 cu. yd. of earth. About 60% of this is being moved by pumping water to the top of the cut and washing the material into an adjacent fill. The remainder of the cut is being excavated with shovels and the material hauled by truck."

* * *

"The second annual meeting of the **California Sewage Works Association** was held in conjunction with the 31st annual convention of the League of California Municipalities in Oakland on October 7 to 9... The Association now has 219 members of whom 94 registered for the meeting."

any business, but the best ones are the ones you don't have to share. Hank Domagalski is a construction man himself; and he singles out the laughs that are exclusive among construction men.

Thirty-six years on tracks

The Caterpillar tractor people have been nosing around everyone's yard and farm this year, looking for the oldest rig still in service. Whatever they found was pretty sure to add color to the company's 50th anniversary, being observed throughout 1954.

Naturally, the best possibilities lay in California, for that's where the company originated—as the C. L. Best Tractor Co. and the Holt Manufacturing Co. Also, a farm machine might have been expected to win the laurels, since its service would have been, at least, under fairly constant conditions.

Sure enough, the winner was a 1918 Holt "75," a crawler still operating—pulling a combine—on a grain ranch near Denair, California. Owner of the Holt now, and for the entire 36 years, is Charles Nielson.

It's a safe bet Nielson feels he has gotten his money's worth by now, so this is one case where the winner got no money. Instead, \$1,000 went to the Caterpillar salesman who located the machine and submitted its story. This lucky fellow, singled out from 233 others scattered all over the world, was William Jopes of Valley Tractor & Equipment Co. in Modesto.

We'll have to tie a string around our finger—and remember to find out if any construction crawlers were even entered in the competition. It would be interesting to see just how long, for comparison, a contractor can keep a tractor going.

NEXT MONTH

AWARD WINNER'S STORY

... Arnold Carver is departmental communications engineer for California's Division of Highways. And a man with a sharp comprehension of communication needs in highway maintenance. For the past eight years he has pioneered in the business of highway department short-wave facilities. His work won him the Hewes Award in 1954, and next month he tells the **Western Construction** audience about it. This is no high-brow electronics article. It's the story of meeting a need in highway engineering.

... The Editors