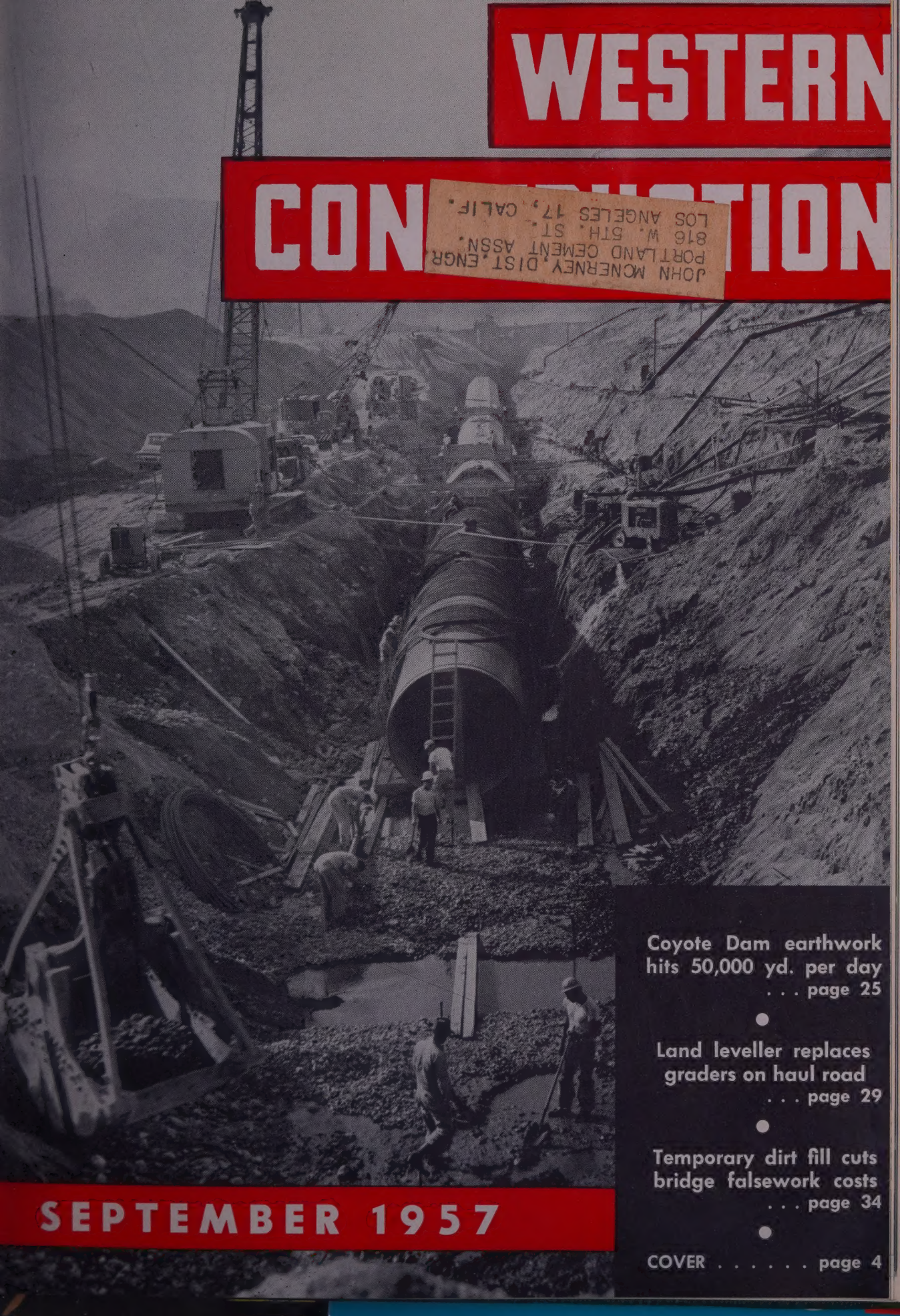


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hits 50,000 yd. per day
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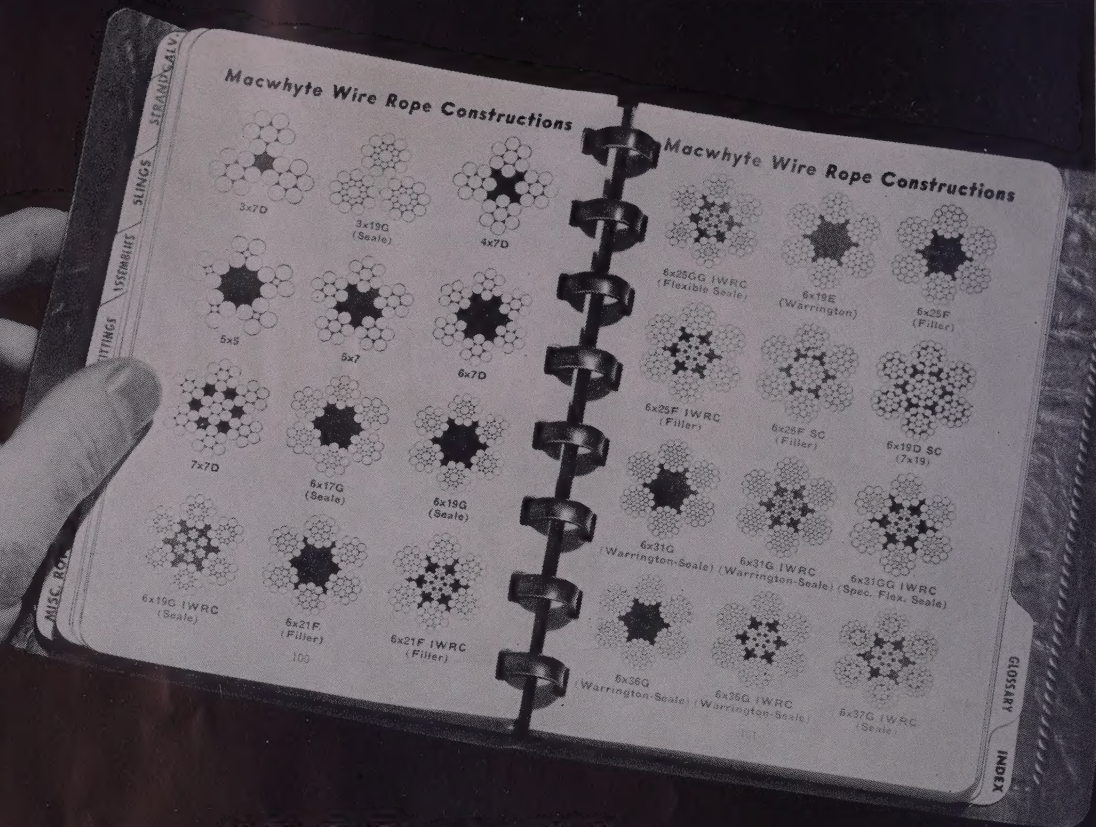


Temporary dirt fill cuts
bridge falsework costs
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SEPTEMBER 1957



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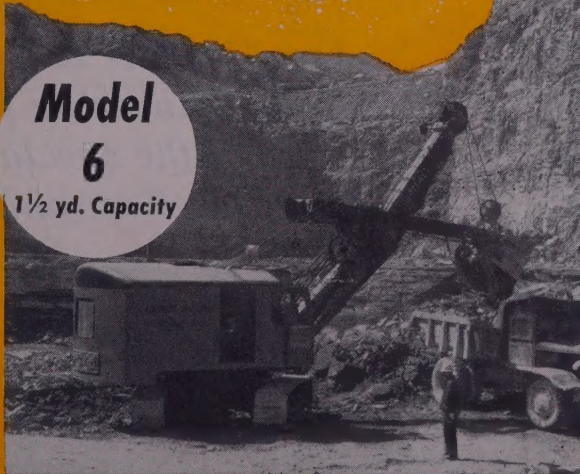


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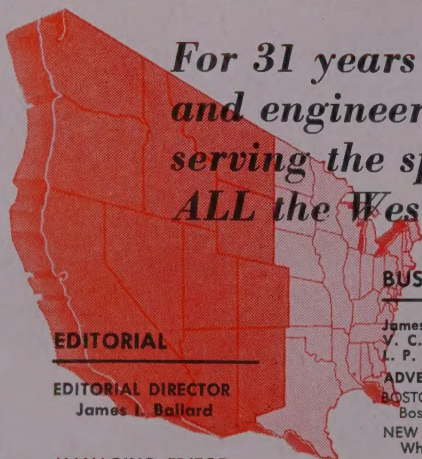
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FRONT COVER

SCENES like this are not unusual in Southern California where the Metropolitan Water District is carrying out a vast expansion program. Second of a two-part article begins on page 62.



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"Haves and "Have-nots" in the West

WATER is the basic factor of Western growth. Our areas and communities are divided into the "Haves" and the "Have-nots" with regard to the supply of this growth factor. The result is unending controversy and struggle.

Such a conflict with its deepening antagonisms is well illustrated in the California fight over water which ended in a draw as the legislature closed its recent session. There was no progress toward a solution; there was little agreement and there was much friction. Today, the areas with surplus water continue to cling to their precious possession and areas with deficiency press demands for the surplus they need and feel they can justify. The situation is an example of this typical Western problem which is with us today and will be exaggerated as the years advance.

Engineering aspects of any water problem, while complex and large, are relatively simple when compared to other factors. Matters of economics are usually next in the sequence and are subject to a factual analysis next to engineering in accuracy. Third is the legal factor with the threat of delaying complications. Finally, there is the factor of plain, old-fashioned politics which presents the highest hurdle and one that can put a stop to a solution which has surmounted the other three with ease.

Tangled in the political aspect of the problem is the unnatural factor of boundary lines which bear no relation to water producing or using areas. The natural unit for development and utilization remains the watershed and its basin area. Such an area's needs will be complicated enough but the introduction of artificial boundaries compounds the problem. This is especially true when the basin area extends beyond a state boundary, bringing federal laws and regulations into the picture.

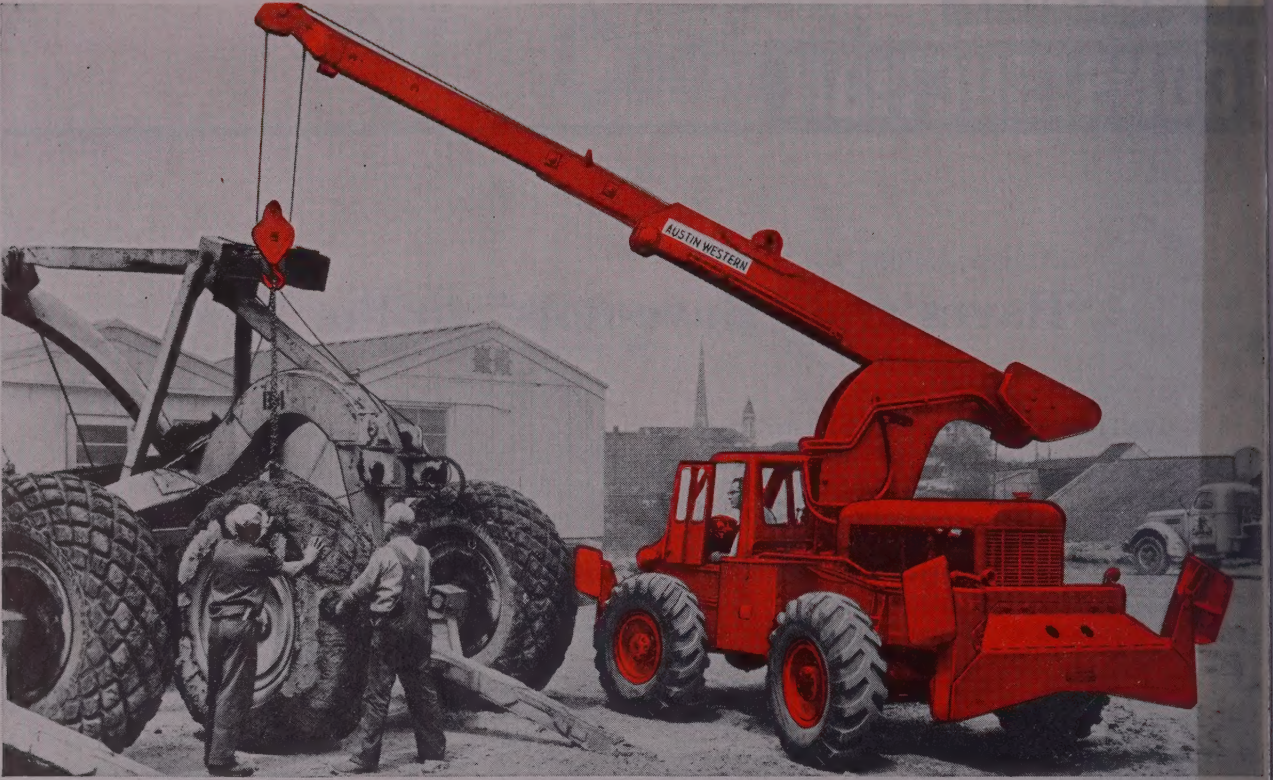
Every approach to the overall question gets back to the basic comparison of the "Haves" to the "Have-nots." The first group will always be inclined to hold on to what they possess being justified by uncertainties of growth and demand. However, they can't escape being classed as stubborn. On the other hand people, industries and communities in areas of deficiency will have just demands which increase year after year. This group in turn will be referred to as grasping and trying to get resources which are not theirs. Name calling will do little to solve the problem and always creates an atmosphere that sharpens the difference rather than aids in a common understanding. If rights and supply could be allocated annually like some commodities, agreements would be easier. However, water programs of today's magnitude represent sums of money and years of work which can only be justified on the basis of permanent acquisitions. This is as frightening to the "Haves" as it is essential to the "Have-nots."

Over the past several years the situation has been gradually worsening in aspects which are not at the engineering level. Even as the legal factors have become better understood, although no simpler, the ultimate hurdle of political demands changes the picture at a dizzy rate.

Rights and needs in any part of a watershed area or political subdivision must be viewed by all with a spirit of mutual trust, understanding and a spirit which contains the element of compromise.

Jim Ballard

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HUNKIN-CONKEY REPORTS: A-W proves versatility, speed and economy on tough contracting jobs

Early in 1956, The Hunkin-Conkey Construction Co., a major contractor with home offices in Cleveland, undertook a reconstruction job at one of that city's large steel plants. Time studies showed that 95% of the lifts were within the 5-ton range, so a diesel-driven Austin-Western unit was purchased. It was equipped with an 18-ft. extensible boom and 6-ft. manual extension, plus 4-wheel drive, 4-wheel power steer and hydraulic outriggers.

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Does many jobs well. "With it we in-

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SEPTEMBER 1957

Fast earthmoving at Coyote Dam

Contractor Guy F. Atkinson Co. is moving over 50,000 cu. yd. per day at Coyote Dam, \$8,000,000 Corps of Engineers project. Fast pace will mean a finish nearly one year ahead of schedule. Variable soil creates problems for both contractor and engineers.



WHEN GOOD management is combined with a big fleet of equipment, good weather, and short hauls you can count on finding a fast-moving, high-production construction project. That's the case near Ukiah, Calif., where contractor Guy F. Atkinson Co., is building the \$8,000,000 Coyote Dam for the San Francisco District of the Army Engineer Corps. After a slow start because of nearly 250,000 cu. yd. of unexpected bad foundation material which had to be removed, the pace on the project has steadily increased until mid-summer 1957, when the contractor began hitting an 18-hr. daily earthmoving average of well over 50,000 cu. yd. At this rate the 6,000,000-cu.

yd. embankment will be completed by November of this year, fully a year ahead of the original schedule. Unfortunately, this doesn't mean that the reservoir will begin filling this year, because a relocation of Highway 20, a job also being done by Atkinson, can't be completed until next year due to a shortage of structural steel.

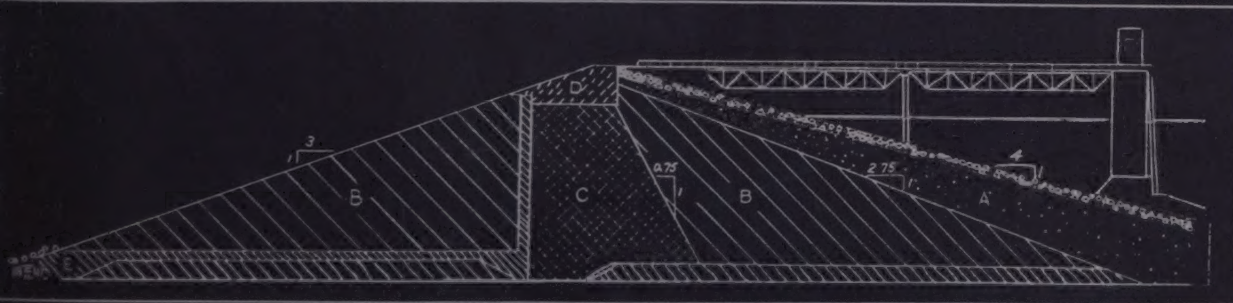
Good weather (hardly a day was lost all through the winter) has been a big help in moving the job ahead of schedule, but there are difficulties too. For example, the old alluvium going into the impervious core zone takes a tremendous amount of work to compact properly. First, two breakdown passes are made with a

double-drum sheepsfoot pulled by a Caterpillar D9, then two or three passes with a water truck, two passes by a D8 pulling a disc harrow, a pass or two by a D8 equipped with a rock rake (referred to as a "scratcher" on the job), and finally, eight more passes by the sheepsfoot.

The work the Cat D8 does in building the impervious core makes it the most versatile piece of equipment on the job. Equipped with a bulldozer in front and the scratcher (made by McCoy Co. of Denver) in back the rig performs the following functions: It pushes scrapers when they have difficulty unloading the dense alluvium, it grades the dump with the bulldozer, it scarifies the

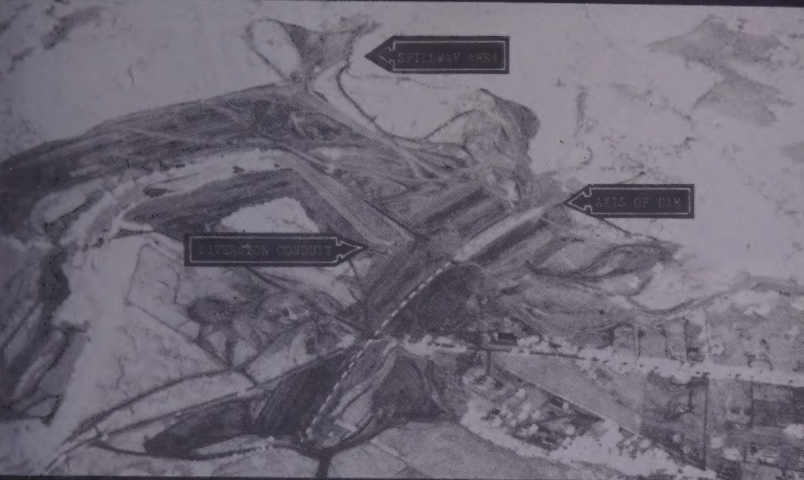
CROSS SECTION shows unusual vertical "chimney," labeled E. Full description of each zone is given on next page. The contractor will

use slip forms for the intake tower, shown at right. Slip forms will be 8 ft. high, instead of the usual 4, with lifting at 2 ft. per hr.

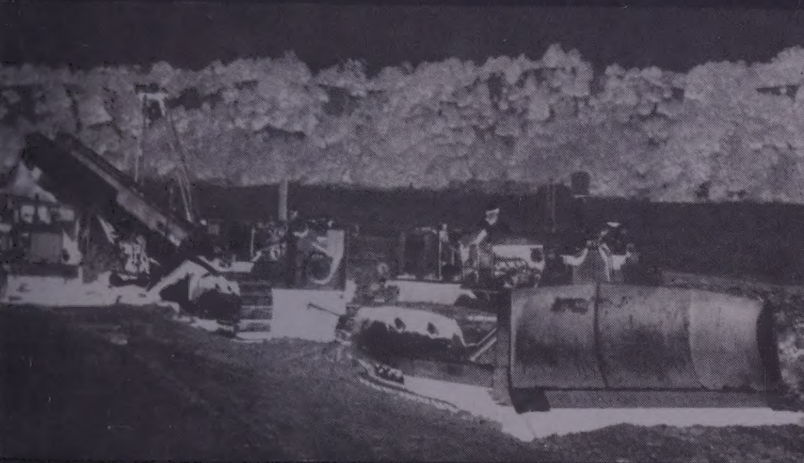


Last earthmoving at Coyote Dam

By the time the last earthmoving was completed at Coyote Dam, the project would have cost \$1.5 million, according to the Corps of Engineers. The dam is located on the Colorado River, about 10 miles from the mouth of the river. The dam is a concrete gravity dam, and it is the largest dam of its kind in the world. The dam is 1,000 feet long and 100 feet high. It is designed to hold back 1.5 million cubic feet of water. The dam is owned by the United States Army Corps of Engineers. The dam is located on the Colorado River, about 10 miles from the mouth of the river. The dam is a concrete gravity dam, and it is the largest dam of its kind in the world. The dam is 1,000 feet long and 100 feet high. It is designed to hold back 1.5 million cubic feet of water. The dam is owned by the United States Army Corps of Engineers.



AERIAL VIEW shows the curve of the dam axis. The curve has no structural significance. The spillway is located upstream as shown to take advantage of a natural saddle.



BULDOZER pulled by two Cat tractors is working a 4-ft. cut. Because of the material a deeper cut would result in large chunks which would lodge in the bottom-dumps.

material and helps mix the water in behind the water truck, it levels the fill with the horizontal bar of the rake attachment, it uproots oversize boulders, it dozes small ditches to assist the engineers in making soils tests, and it provides a small amount of compaction.

A time- and money-saving feature of the job is the fact that the dragline operator, loading trucks with material for a vertical filter zone into trucks from the streambed a short distance away from the embankment, can blend material from several gravel bars. A skillful operator can load the trucks with a gravel that falls within the specifications, thus eliminating the need for running it through a screening plant.

The materials being used in the dam are found in the immediate vicinity of the site and are being placed in zones as indicated on the drawing. Zone A (1,000,026 cu. yd.) is the gravelly phase of an old alluvial

deposit consisting of a variable mixture of clay, sand, silt, gravel and cobbles. Zone B (2,690,000 cu. yd.) is random material found in terrace deposits, recent alluvial deposits, and overburden. Zone C (977,000 cu. yd.) is the impervious core and is the fine phase of old alluvial deposits composed of variable mixtures of clay, silt, and sand. Zone D (219,000 cu. yd.) is a select impervious material similar to that found in Zone B.

The area designated as Zone E on the drawing includes an 8-ft. wide vertical zone, called the "chimney," of pervious-sand and gravel-filter material. This is to control seepage through the embankment. Connected to the "chimney" is a 5-ft. thick horizontal drainage blanket to control seepage through the old alluvial foundation and to receive seepage from the "chimney." A pervious filter drainage trench containing a perforated corrugated metal pipe is located along the downstream

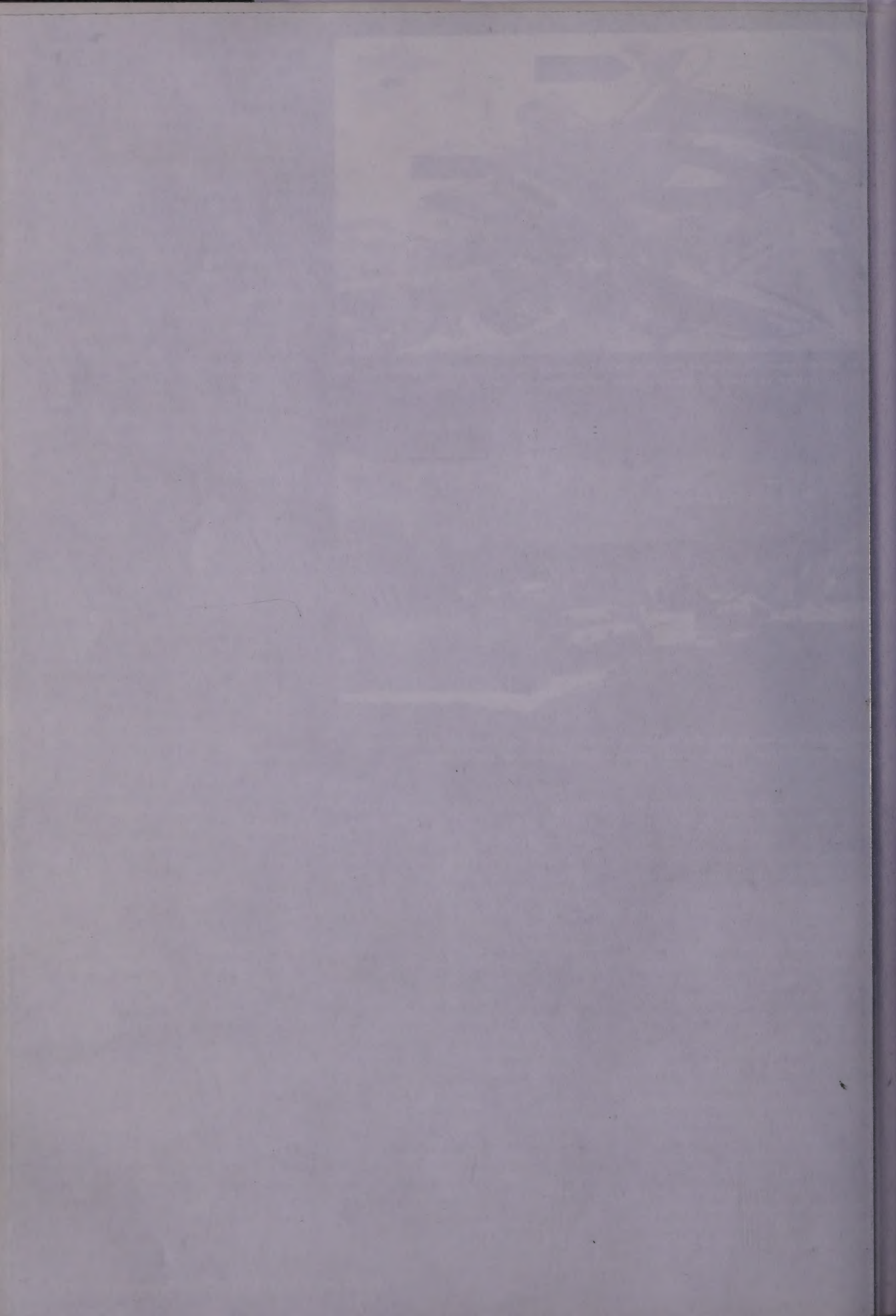
toe, while the upstream side of the dam is riprapped to protect it from erosion. In building up the gravel "chimney," the contractor is required to keep it between 1 and 2 ft. higher than the adjoining zones. The reason for this is that if it were allowed to become higher than 2 ft. above the adjoining zones, it would tend to spill over and become too wide, while if it became less than a foot higher, the adjoining material would encroach into it and make the zone too narrow.

Compaction of the embankment, except the Zone C impervious core, is done by making four passes with a 50-ton rubber tired roller on 8-in. layers of material, dampened to the proper moisture content with water trucks. The procedure for compacting the highly consolidated clayey material from the spillway excavation used for the Zone C impervious fill has already been described. The method was developed by the construction of a test fill prior to the award of the contract.

The wide variation in the composition of the soils used in the various zones creates somewhat of a problem for the engineers' soils testing lab. The specifications state that 90% of the samples must meet 97% of the laboratory optimum density. The problem arises in that whenever the composition of the soil changes even slightly, the optimum density also changes. This means that the lab must continually determine new optimum densities.

Al Fuerstenberg, chief of the soils lab for the Corps of Engineers, keeps on top of the problem by building up a family of curves on a density-moisture content chart for each zone. The family of curves is built up by running a complete analysis on every 6th sample brought in from the field (about 15 samples are taken each day). Every 6th sample is divided into 5 parts. Water is added to two of the parts and two of the parts are slightly dried, with the result that each part has a different moisture content. The optimum density of each part is then found in the standard manner by building up a 6-in. mold in 1½-in. lifts and subjecting each lift to 55 blows of a standard hammer.

When the density test is completed and the values recorded the plus ¾-in. particles are removed and a mechanical sieve analysis is carried out by washing away the 200 material. The 5-point curve is then plotted on the density-moisture content chart and each curve is labeled



to its exact composition. It takes about 12 such curves to build up an adequate family of curves covering the entire range of material ratios in each sample.

The other samples which are brought in from the field are simply run on a 1-point proctor, the results of which can be compared to the family of curves to determine suitability. Even though the contractor is building up the fill at the rate of 10,000 cu. yd. per day, the soils lab can control the fill as it can get its results in about one-half hour after a sample is brought in.

Contractor's job organization

To construct the embankment the contractor is working three shifts, 5 a.m. to 2:30 p.m. and 6 p.m. to 1:30 a.m. Maintenance personnel are working three 8-hr. shifts.

The supervisory organization consists of one project manager, one business manager, one project engineer, one field engineer, two field inspectors, one excavation superintendent aided by a day shift foreman and a night shift foreman and an assistant night shift foreman. In addition, a foreman supervises each of the five borrow pit operations, and a foreman supervises the fill place-

The maintenance section consists of one master mechanic with a shift foreman for each one of the three shifts. Each shift contains eight mechanics and two welders. There is also one lubrication foreman for each shift on the embankment. The maintenance crews avail themselves all the time the equipment is not working. This includes a 1/2-hr. period during each shift and the four hours between shifts. Throughout both shifts, field maintenance trucks with tools and containing two mechanics are on call ready to perform in the field. The contractor has organized an effective preventive maintenance program which is run by a 500-hr. check performed on every piece of equipment on the job, and which requires two mechanics an average of two days to finish.

Organization of equipment

The equipment is organized into "spreads." The quarry, source of riprap and located east of the dam site, contains



ROME DISC HARROWS pulled by Cat D8s are used to break up the material in the impervious core zone. The discs have a diameter of 28 in. Usually two passes are necessary.



ROLLING in the core zone is done with two double-drum sheepfoot rollers pulled by Cat D9s. The D9s are needed because of the heavy material and slopes at ends of fill. As many as 10 passes with the sheepfoot was required to achieve the specified compaction.

one 225 Joy rotary drill, one Cat D8, one 34B Bucyrus-Erie shovel, and 6 to twelve 10-yd. dump trucks which are rented when needed.

The borrow area for Zone B material is being worked by one Euclid loader pulled by a Cat D9 and a Cat D8, twelve 15-yd. Southwest bottom-dump wagons, and one Cat No. 12 motor grader.

The borrow area for Zone A material has one Cat D9 with ripper, two Cat D8s for pushing, and six Cat DW20 scrapers.

Another borrow area which provides material for both Zone A and Zone B has the same equipment as named in the previous paragraph except five Cat DW20 scrapers are used.

The equipment spread in the spillway, which is the source of Zone C material, also has the same equipment, except four DW20 scrapers are used.

The borrow area which provides filter material for the "chimney,"

horizontal gravel blanket, and the toe drain, contains one Northwest D12 working as a dozer, and four 15-cu. yd. Euclid bottom-dump trucks.

Processing the material as it goes into the fill are three Willamette 50-ton pneumatic rollers pulled by Cat DW21 tractors, one Southwest 50-ton roller, two Rome discs with 28-in. diameter blades pulled by Cat D8s, two double-drum sheepfoot rollers, 10 ft. wide and 6 ft. in diameter, weighing 20 tons loaded, pulled by Cat D9, two Cat D8s with scrapers, and a Cat D6 equipped with a rock basket.

Other equipment on the job includes four water trucks, an International R190, 2,500-gal. capacity, a Ford 2,500-gal. capacity and an Autocar, 4,000-gal. capacity, and an International 4,000-gal. capacity, a Michigan Loader, a Gradall, and two Cat No. 12 graders maintaining haul roads.

To supervise the construction the



Land leveller maintains haul road

Land leveller replaces two motor graders maintaining the 7,000-ft. haul road at the Carquinez Big Cut—it's the latest in a long series of construction ideas. Overall project is far ahead of schedule.

CONTRACTOR Ferry & Crow's Big Cut, part of the Carquinez project in Northern California, has been a fountain of construction ideas. Among the innovations which got their first major try-out on this job are two scrapers hauled in tandem, a 17-ton ripper moved by two or three tractors, and a fin-like attachment for ripper teeth to increase ripping efficiency. These and many other features were described in detail in *WESTERN CONSTRUCTION* in October 1956 and April 1957.

The latest development is the use

of an agricultural land leveller to maintain the haul road. Most of the material in the 8,500,000-cu. yd. Big Cut must be moved between 6,000 and 8,000 ft. A smooth surface on the haul road is so important in reducing tire and equipment wear, fuel and oil consumption and downtime that the contractor at one time seriously considered surfacing it with soil cement. The land leveller has made such an elaborate plan unnecessary and has greatly cut down the expense of keeping the road in top shape with motor graders.

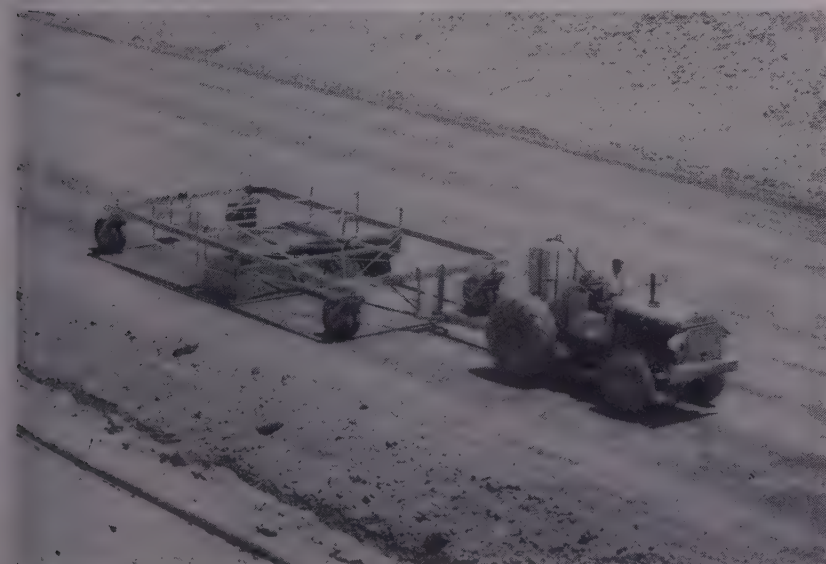
The machine being used is made by Marvin Landplane Co. in Woodland, Calif. The farm model, used for precise levelling of irrigated fields, is 15 ft. wide and 80 ft. long. After a brief job test Marvin's designers came up with a modified rig suited for rough construction use. It's a lot shorter, (30 ft. long) for greater maneuverability, and it's beefed up and strengthened for this unusual application. Pulled by a rubber-tired Euclid tractor the rig travels at 5 to 15 mph.—about twice as fast as a motor grader.

The rig worked so well that Ferry & Crow were able to remove two graders from haul road maintenance, a savings of at least \$10.00 per hr. Another important cost consideration is that the leveller's first cost is only about one third that of a motor grader. Also, being a simpler machine, maintenance is much less.

Works without a windrow

A big advantage of the leveller (in addition to its greater speed) is that it works without leaving a windrow. Such obstacles as rocks are picked up in the leveller's bucket, instead of being rolled along by a blade. The leveller operator can scoop rocks up and carry them to the ditch and dump them with hydraulic controls.

The excellent results obtained with the Landplane on this project will no doubt stimulate the use of this type of equipment in the construction industry.



TRAVELING at about twice the speed of a motor grader the land leveller works without leaving a windrow. Note the concrete blocks to increase traction on the Euclid tractor's driving wheels.



Desert problems with slurry seal

Nevada's Hawthorne Naval Depot has 400 mi. of road which are exposed to desert heat and sun to create a severe maintenance problem. Slurry seal

is the answer and the spreading procedures and selection of local materials are described in detail in this article. Importance of the right emulsion is stressed.

By Lt. Commander C. F. MOBLEY, Public Works Officer

and

ROY L. GARTRELL, Quartermaster, Roads and Grounds

Public Works Department, Naval Ammunition Depot
Hawthorne, Nevada

PROPER SEALING and patching of asphaltic road surfaces has long been a problem to maintenance personnel and engineers. Asphalt hardens with age and exposure to sunlight. The kneading action of pneumatic wheels assists somewhat in prolonging the asphalt pavements by sealing cracks. However, when the asphalt binder becomes brittle from the effects of sunlight the aging asphalt pavement will crack. At that time, something must be done to protect the existing surface.

This problem of proper maintenance has been experienced at the Naval Ammunition Depot, Hawthorne, Nev. The relatively low humidity coupled with constant sunlight magnifies the problem. In the past it had been the practice to accomplish asphalt maintenance using conventional sealing methods.

The depot has nearly 700 mi. of improved and unimproved roads. Maintenance is accomplished by about 20 people using conventional equipment. This maintenance is sup-

plemented by contract work which is predicated on recurring cycles and availability of funds. About 400 mi. of these roads are paved with bituminous mixes from 2 to 12 yr. in age. Since foundation bearing qualities of the native sandy soil at Hawthorne are good much of the roadway was surfaced with 2-in. thick bituminous road mix.

Standard seal coats were, in many ways, insufficient to revive the "dead" asphalt. Hot desert sun and relatively low traffic rate had taken their toll on the pavement and it was apparent that large sums of money would have to be spent to restore it to its original condition. It is no small wonder that maintenance personnel were on the lookout for a cheaper method, and they found it in the development of slurry seal advanced a few years ago by the Los Angeles County Road Department.

Experimental work in slurry sealing conducted by the Los Angeles Road Department was described in

the April 1955 and later issues of WESTERN CONSTRUCTION. The Asphalt Institute was well aware of the potentialities of the new slurry seal method. In June 1955 discussions with representatives of an asphalt emulsion company led Oliver A. Rosebush, master mechanic, and one of the authors to engage in a modest trial at adopting the slurry mix method to the conditions at this desert depot. The mixture as used by Los Angeles County was as follows:

TRANSIT-MIX (3 cu. yd.)

Aggregate—Rock Dust.....	3000 lb.
Aggregate—Plaster Sand....	3000 lb.
Emulsion—SS-2.....	140 gal.
Water (amount variable)...	80 gal.
	base measure.

The April 1955 issue of WESTERN CONSTRUCTION reported that Los Angeles County used rock dust as the aggregate with a screen analysis as follows:

ROCK DUST

Passing	Percentage
20 mesh.....	99
30 mesh.....	91
50 mesh.....	54
100 mesh.....	20
200 mesh.....	3

Later it was found that the batches were improved by addition of plaster sand.

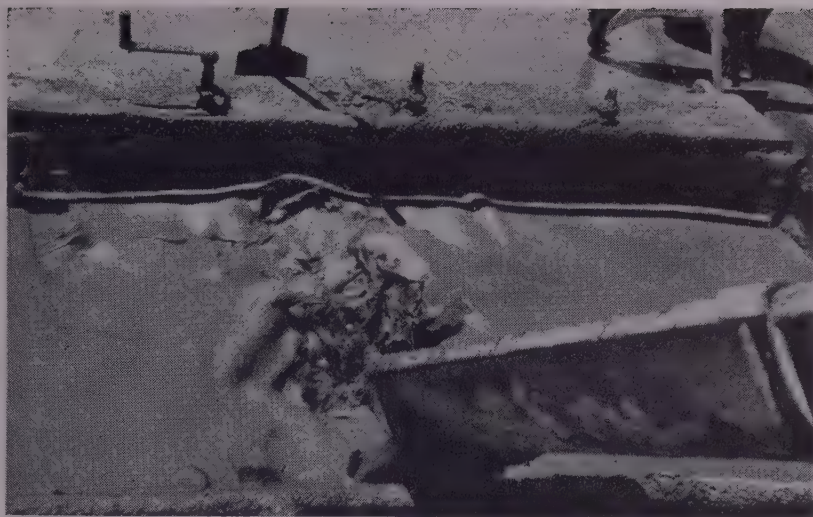
June 1955 saw Public Works road crews busily engaged in trial runs of slurry mix seal. Conditions at Hawthorne, although similar in some respects to Los Angeles, were different in many others because of materials, type of pavement involved and moisture content of the surrounding air. Where Los Angeles has a hot humid air, Hawthorne, Nev., has a hot very dry air in the summer months with moderate temperature changes in the winter months.

Aggregate and sands available at Hawthorne differed considerably from those available in Los Angeles County. Engineering officials of Los Angeles County recently advised the Hawthorne representative that some of their rock was exceedingly hydrophilic. The hydrophilic rock resulted in the problem of proper moisture control. Hawthorne does not have this problem.

Emulsion is important

Perhaps one of the greatest difficulties was obtaining proper asphalt emulsion. Emulsion SSI (100-200 penetration) had been specified. At the time of the adaption difficulty was experienced in obtaining material which would meet Federal Specifications SS-A-6746. Efforts were made through the Navy Purchasing Office to obtain the proper material as it was known that some proprietary products did a satisfactory job. Finally the proper products were obtained after complete rejection of inferior material. It is known that at least three oil companies now are able to meet satisfactorily the exacting specifications necessary for a successful slurry seal job. The reader is warned against use of an inferior emulsion product since troubles develop in water separating from the asphalt resulting in an absolute loss of control. Such was the case at Hawthorne until better emulsion was obtained.

After trial and error during the summer of 1955 successful mixes were finally attained by the use of emulsion SS-2 having a lower penetration (40-90) and more suitable for this location. Successful aggregates used were rejections from crushed lake gravel found in beds bordering Walker Lake. Another successful aggregate was decomposed granite type sand from old lake beds on the depot. The sieve analyses for both products are as follows:



PROPER CONSISTENCY is indicated by this picture of slurry pouring from chute into spreader box. Obtaining the proper asphalt emulsion is an important factor. First attempts were unsatisfactory.

DESERT SAND	
Passing	Percentage
4 mesh	100
8 mesh	88
16 mesh	65
30 mesh	55
50 mesh	29
100 mesh	9
200 mesh	2

ROCK REJECTS	
Passing	Percentage
4 mesh	100
8 mesh	91
16 mesh	80
30 mesh	54
50 mesh	29
100 mesh	12
200 mesh	5

The slurry seal was prepared in a 3½-cu. yd. transit-mix truck. A typical batch has the following composition:

Aggregate	8,000 lb.
Water	80 gal.
Emulsified Asphalt (SS-1 or SS-2)	150 gal.

The amount of water in the mix was 8.3% by weight of the dry aggregate; the amount of emulsion was 14.6%. The amount of water depended on the moisture content of the aggregate. It took several trial runs to determine precisely the amount of water to be added to the mix in order to get the spreader box working properly during application. The order of adding materials together for the mix was found to be important. Water was placed in the truck first, next the aggregate was added and last the emulsion. Under no conditions should dry aggregate and emulsion be mixed before adding the required water. When properly prepared, the mixture has the

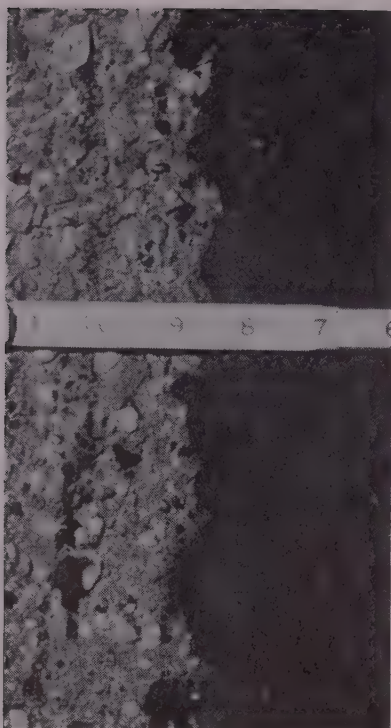
consistency of free flowing mortar (see picture).

Slurry seal is usually applied at thickness of 1/16 to ¼ in., depending on pavement aggregate. Generally speaking, the diameter of the largest stone used for the road governs the thickness of the seal. If it is considered desirable to obtain greater thicknesses than ¼ in., the seal should be applied in two or more applications, since it is impossible to prevent migration of coarse particles to the bottom in applications greater than ¼ in. It is believed that slurry seal should be used in total thicknesses not greater than ½ in.

The slurry is fed directly from the transit-mix truck to specially built drag type bottomless spreader box that is pulled by the truck. Belting is located at the bottom of the inside of the box to prevent the slurry from escaping from the sides and front. The box is equipped at the rear with a squeegee-type strike-off that forces the slurry into cracks and depressions in the pavement. The width of the box can be determined by the width and crown of the streets to be sealed. A means for making vertical adjustments to the strike-off to allow for variations in pavement crowns is desirable.

The surface of the street to be sealed should be thoroughly broomed and cleaned and then lightly sprinkled with water just prior to sealing. This prevents the emulsion from drying too rapidly and also tends to improve the bond between the existing surface and the slurry.

Some locations in California have reported improvement of the bonding by using a tack coat of emulsified asphalt SS-2 diluted in 3 parts of water and applied at the rate of 1/10



COMPARISON between unsealed and slurry sealed roadway is given in these photos. Slurry seal can prevent further deterioration of badly cracked asphaltic course.

gal. per sq. yd. The freshly applied diluted emulsion is then broomed with drag brooms attached to the asphalt distributor. This method has not been tried at Hawthorne as of this writing but it appears to have definite possibilities for improving the bonding.

Lower costs

Highway and road personnel reading this article will no doubt be interested in regard to the cost, since in many instances cost controls the type of seals used. It was found at Hawthorne that the slurry seal was much cheaper than the conventional "shooting and chipping" method which used MC2 asphalt. As an example, it was found that station personnel could do the job for an average cost of \$.04 per sq. yd. This figure includes a theoretical charge for standard equipment retained as well as the result of labor of 5 men including 2 transit-mix truck drivers. It was found that a 5-man crew could cover about 30,000 to 40,000 sq. yd. in an 8-hr. shift. In the beginning, the crews were able to accomplish approximately 30,000 sq. yd. of seal in an 8-hr. shift. Later, as they became more proficient, the truck-loading speed was increased by approximately 25% with an increase in yield to approximately 40,000 sq. yd. of roadway seal. A trained

crew should be able to make 26 loads a day using a round trip haul of 30 mi.

The following is a comparison of cost using the slurry seal method at Hawthorne compared to the conventional method of seal coating obtained from contract data within the past two years:

SLURRY SEAL METHOD

Equipment Rental...	.010
Cleaning	.005
Emulsion	.020
Aggregate	.010
Application.....	.003
*\$0.05/sq. yd.	

CONVENTIONAL SEALING

Equipment Rental...	.010
Cleaning	.005
Asphalt	
0.25 gal/sq. yd.	.050
Aggregate	.060
Application.....	.025
\$0.15/sq. yd.	

*Taken from a typical day's operation. Transit mixers @ \$12.00/hr.; 1 power broom @ \$4.00/hr.; emulsion 0.15c/gal. applied @ 0.13 gal. per sq. yd.; aggregate valued at \$2.00/ton.

Other agencies may experience a cost variation based on contract costs and experience with the method. Costs have been reported in California as low as \$.02/sq. yd. and as high as \$.10/sq. yd. The cost of

seal at Hawthorne by station forces averages \$.04/sq. yd.

It is well to recognize that pre-mixed seal coats do have their limitations. It is wise to use pre-mixed seal coats only as a seal. They are not a substitute for a leveling course although they may be used to some extent as such. Care should be taken in placing the seal. The thinner coats work better and set faster. Pre-mixed seals are not a permanent cure for badly cracked surfaces which move under loads.

There is every reason to expect future developments with a slurry seal mix. No doubt fact-finding will continue throughout the country on this method to assist in adaption to local conditions everywhere. The method has great versatility but care must be used in getting the right mixes before large amounts of money are spent. Some organizations may desire to contract this work because of limited size of station forces. In this case, it is recommended that specifications cover trial batches. It may be expedient to have station forces first adapt the local materials and attainable asphalt emulsion and thus derive a formula for the particular location involved. Contracts may then be let after the trial mixes are perfected and assurance is given that satisfactory results are obtained.

ASPHALT PAVING

reprints available

AS WAS EXPECTED, the two articles which appeared in the July and August issues of WESTERN CONSTRUCTION on what inspectors and construction crews should know about asphalt paving created a large demand for reprints. Within a couple of weeks after the first article appeared requests for hundreds of copies had been received.

The Asphalt Institute, 235 Montgomery St., San Francisco, Calif., has ordered a large number of the 12-page reprints and is now filling requests for them. Copies can also be obtained by writing to WESTERN CONSTRUCTION.

The articles were written by Vaughn Marker, District Engineer, The Asphalt Institute, whose background made him perfectly suited to write on the subject. The articles stress the practical field problems of asphalt paving and how they can be overcome to produce a top quality finished product.



Unloading sheet steel at Port Arthur, Texas



JOB-ENGINEERED FINANCE PLANS



A Lima #703-SCW 50-ton wagon crane lifts aloft a steel plate for use in construction of seagoing craft. Site: Burton Construction & Shipbuilding Company, Port Arthur, Texas.

The wagon crane was sold by McCall-Gardner Machinery Company of Houston, Texas, and financed by C.I.T. Corporation. A long-time user of C.I.T. Corporation equipment financing plans, Mr. O. W. Burton says: "Labor saving equipment is a

prime factor in making money for a company like ours. C.I.T. Corporation financing has helped us repeatedly to put vitally new machinery to work."

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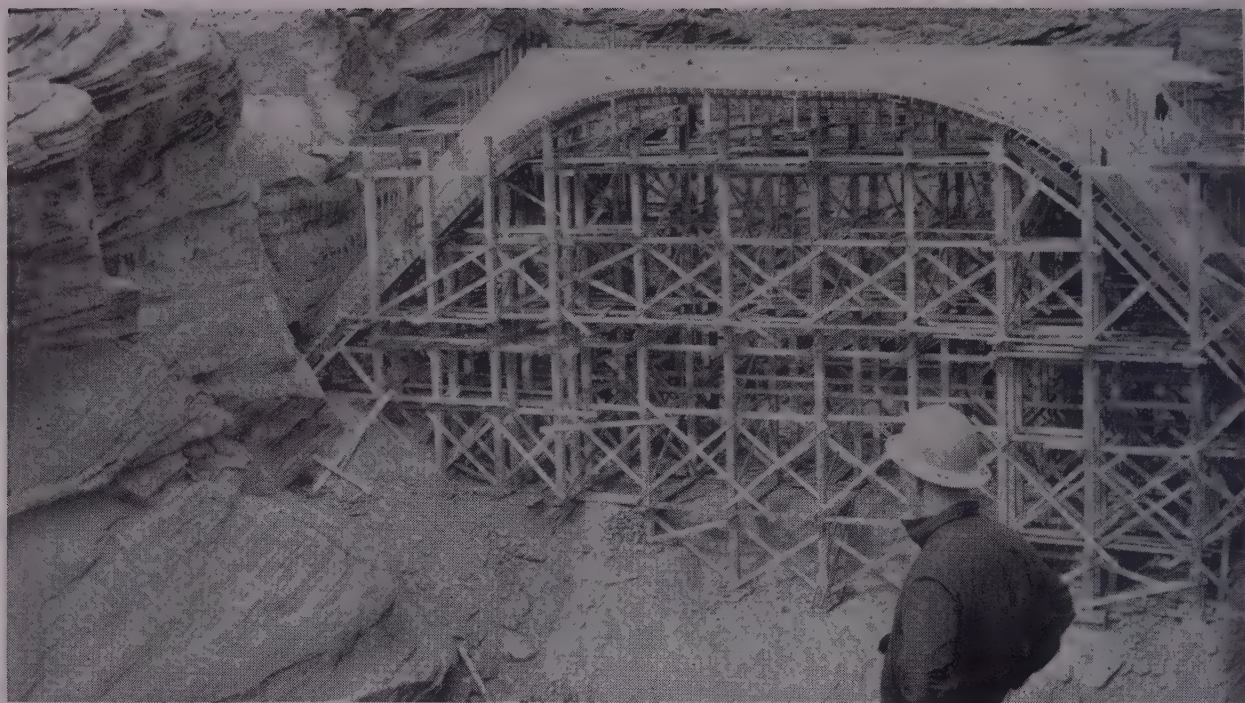
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Temporary dirt fill reduces falsework

Contractor on Glen Canyon Dam access road cuts Waterholes Bridge shoring costs by building a 67-ft. deep temporary fill.

WHEN YOUR CONTRACT calls for building a concrete arch bridge over a gorge 127 ft. deep you might not think of filling the canyon half way up with dirt to reduce the amount of falsework. But that was the successful idea used by W. W. Clyde, Springville, Utah, during the construction of Waterholes Bridge on the access road leading to Glen Canyon Dam in Arizona.

Fill at hand

The method was feasible for several reasons. First, although the canyon is 127 ft. deep, it's only 100 ft. from rim to rim, so that filling up

the bottom 67 ft. of the V-shaped gorge required only about 6,000 cu. yd. of earth. The earth and rock used for the fill were readily available for dozing into the canyon. There is water in the canyon only during flash floods—very rare in the summer months. Removing the fill when the job is completed will be the easiest task of all—the first flash flood will take care of that without a struggle. Allowing the water to wash the fill away is permissible because of the extreme remoteness of the site—there's nothing downstream for many miles which could be affected.

Working area provided

One important advantage the fill provided was a working area. Some very fancy footwork would have been required on the part of the carpenters if the falsework had to be constructed from the steep walls of the canyon. The falsework required about 80,000 board feet of lumber.

The finished structure will be 110 ft. long. The roadway will be carried 127 ft. above the bottom of the gorge by three concrete arches. The ends

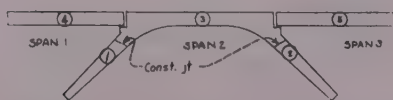
of the arches are set 4 ft. into the canyon wall and are tied in by reinforcing rods grouted into the sandstone. Dowel holes total 150 lin. ft.

Binabatch used

About 650 cu. yd. of concrete went into the bridge. It was mixed using a Binabatch portable batch plant manufactured by the Winslo Scale Co., Terre Haute, Ind., a model H Wagner mobile loader, and a Smith mixer. One-half-yard batches were turned out at the rate of 20 per hr.

Waterholes Canyon is located 5 mi. southeast of the Glen Canyon Dam site in northern Arizona and is the only crossing in the 25-mi. long access road from Bitter Springs, Ariz., on U. S. Highway 89, to the dam. Cost of the bridge is estimated at \$130,000, requiring five months to complete. The bridge is included in a \$1,011,819 contract W. W. Clyde received from the Bureau of Reclamation in January for grading of 20 mi. of roadway from the dam. Construction began February 24.

Superintendent for W. W. Clyde is Otto Graham.



SKETCH shows the design of the bridge. Specs stated that not less than 7 days shall elapse between completion of placements 1 or 2 and beginning of 3. Falsework supporting 1, 2 and 3 was removed when concrete in 3 had a strength of 2,000 psi. Design was based on H-20-S16 and for 75 and 100-ton loads.

A 4-yr. study by the Corps of Engineers shows—

How proper scaffolding cuts costs

Men work faster when protected by scaffolds, but exactly how much faster? At what point does the added expense of scaffolding become offset by the time saved in form and concrete handling, crane work, access, inspection? Answers can now be given, thanks to a 4-yr. study made by the Portland District Corps of Engineers.

By DAVID V. MacCOLLUM

**Safety Engineer
Portland District
U. S. Corps of Engineers**

PROPER SCAFFOLDING on form work for the erection of concrete structures can afford a substantial saving in production time. The staging eliminates the inefficiencies of climbing about the framing of form work and reduces the risk of falls. Tangible savings realized range from \$0.03 to \$0.12 per sq. ft. of form panel surface used.

An opportunity arose to establish the relative value of scaffolding on contract work which was administered by the Portland District, Corps of Engineers. Scaffolding is a known need in the prevention of falls by workmen from form work used in the erection of concrete structures, and the study was made as a supplement to accident prevention research. The investigation indicated that the construction methods for this type of work had not been subject to operational or method analysis, and that the work was hazardous because it was being done in an inefficient manner. Application of the principle of industrial safety—maximum operating efficiency is not obtained until accidents have been reduced to a minimum—has been the basis of this study. Where proper scaffolding had been used, reduced costs resulted, and, in addition, a bonus was realized in a lower accident rate.

Savings computed by square feet

The saving of production time by using scaffolding throughout all elevated areas of form paneling in the erection of concrete structures can be computed on the square foot of working surface. Costs are an average of figures obtained from contractors and those arrived at by

standard estimating procedures. These conservative sources based the savings achieved through use of scaffolding on: (1) reduced time required to handle the attaching she-bolts, (2) quicker access, (3) faster handling of concrete, (4) more efficient structural installation, (5) reduced crane time, and (6) efficient inspection. The three basic types of form panels are of all-wood construction, wood-with-steel-backing, and all-steel, and the following is realized for each group:

An average of 3c per sq. ft. is earned on all-wood panels when scaffolding is used.

An average of 12c per sq. ft. is earned on wooden-steel-backed panels when scaffolding is used.

An average of 11c per sq. ft. is earned on all-steel panels when scaffolding is used.

Savings effected by a reduced accident rate are not computed into the reduced costs earned by the scaffolding. The lower insurance premium is considered only as an additional bonus because every phase of the entire project must have an

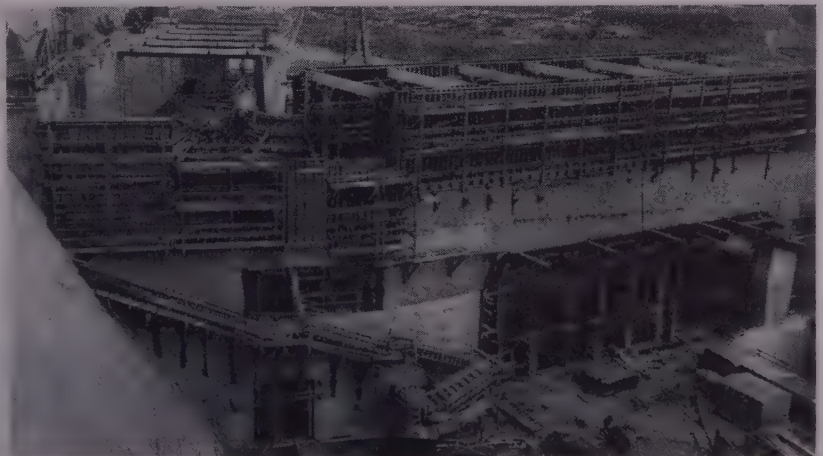
equally effective accident prevention program before any tangible benefit can be realized on injury or property accidents.

Four-year study

The study was made on a non-identifying basis on three major contractors doing similar heavy concrete construction in the Portland District. It was made over a four-year period, January 1953 to January 1957. This period represented a work exposure of over 13,500,000 man-hours and ranged up to nearly 1,000,000 man-hours per month during some instances. Through the entire time it was estimated that 25% of the total man-hours involved work on form paneling.

Protects inexperienced labor

The construction industry is considered the most progressive in the field of production equipment; however, it has been largely free from operational analysis and method-study techniques, which are well known in the manufacturing indus-



PROPER SCAFFOLDS save money after a certain number of re-uses, as shown in the table. These figures do not consider accidents and possible insurance rate reduction.

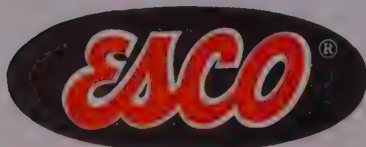
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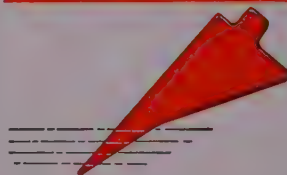
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Savings resulting from the use of form panels equipped with scaffolding (A cantilever form panel 10 x 30 ft. is the basis for computations)

WITHOUT SCAFFOLDING				WITH SCAFFOLDING				
Times used	Cost per sq. ft. surface	Operating labor costs	Total	Cost per sq. ft. surface	Operating labor costs	Total	Diff.	Sav'gs. per form panel
WOOD PANEL FORMS								
1	\$1.50	\$.85	\$2.35	\$1.87	\$.70	\$2.57	\$-.22	
2	.85	.88	1.73	1.05	.68	1.73	even	even
3	.60	.85	1.49	.72	.67	1.39	.06	\$18.00
4	.48	.80	1.28	.57	.66	1.23	.05	15.00
6	.35	.75	1.10	.42	.64	1.06	.04	12.00
8	.29	.75	1.04	.33	.62	.95	.09	27.00
10	.25	.75	1.00	.28	.62	.90	.10	30.00
WOOD STEEL-BACKED PANELS								
1	2.50	.85	3.35	3.13	.70	3.83	-.48	
4	.78	.80	1.58	.93	.66	1.69	-.11	
8	.46	.75	1.21	.54	.62	1.16	.05	15.00
16	.31	.75	1.06	.35	.60	.95	.11	31.00
24	.26	.75	1.01	.28	.60	.88	.13	39.00
32	.23	.75	.98	.25	.60	.85	.13	39.00
40	.21	.75	.96	.23	.60	.83	.13	39.00
ALL-STEEL FORM PANELS								
1	8.00	.85	8.85	10.00	.70	10.70	-1.95	
10	.85	.75	1.60	1.05	.62	1.67	-.07	
20	.45	.75	1.20	.55	.60	1.15	.05	15.00
40	.25	.75	1.00	.30	.60	.90	.10	28.00
60	.19	.75	.94	.22	.60	.82	.12	34.00
80	.15	.75	.90	.17	.60	.78	.13	39.00
100	.13	.75	.88	.15	.60	.75	.13	39.00
				Cum. total sav'gs.				
				156.00				
				15.00				
				250.00				
				530.00				
				830.00				
				1130.00				
				15.00				
				505.00				
				1155.00				
				1915.00				
				2695.00				

tries. It is an industry subject to seasonal operation and building cycles, and is often the first to feel the impact of economic fluctuations. Under these conditions, a problem arises in obtaining skilled labor and leadership capable of "seeing the job through," which includes training men to new tasks, operation of specialized equipment, and the showing of a profit on the bid price in face of rising costs. Individual construction firms are somewhat handicapped in effective training of their supervisory personnel because the spasmodic continuity of work often makes it necessary for the skilled craftsmen and foremen to migrate from job to job in quest of steady employment. Based on this premise and the results of the field study, this article shows that through the use of proper scaffolding, savings in both human life and production costs can be effected.

The usual construction procedure for setting up or resetting the form panels is accomplished by workmen using strong-back and walers of form panels to stand on when removing or inserting the attaching she-bolts. Where heights are encountered, safety belts are sometimes used as the only protection against the hazard of falls. The standard for scaffolding

used as a basis of cost comparison in this study is set forth in Chapter XX, "Safety Requirements," Corps of Engineers, United States Army, which requires that scaffolds, platforms or temporary floors be provided for all work except that which can be done safely from the ground or other substantial footing.

Costs can be cut

The cost of forms is a large item of expense in this type of construction, and a broad range of ingenuity can be exercised to achieve economy. The inclusion of scaffolding creates immediate additional expense and often presents difficult design problems to comply with the standard outlined in the Corps of Engineers' "Safety Requirements." The use of a varying degree of scaffolding has always been the primary means of access to the form work to perform attachment, alignment, placing of concrete, and the necessary inspection. The basic method of attachment and design of form work has remained unchanged since the earlier days of concrete construction.

In recent years cranes and lifting equipment have undergone changes which have afforded the industry more efficient means of placing con-

crete. Use of hand buggies or cars across staging or falsework to transport the concrete into place has been largely eliminated. Cranes are used to swing the concrete buckets right to the pour area. With these changes it has been the trend to reduce the staging to the barest minimum. This approach to job planning does not allow for the vital need for scaffolding to accomplish the work in a safe and expedient manner. The forms still have to be moved up the face of multi-storied structures which requires workmen to set she-bolts, align the forms, set reinforcing steel and mechanical features, properly place the concrete, and perform the necessary functions to lift the form up to the next level.

Many construction projects can be visited, and numerous instances of major concrete buildings can be cited, where a lack of production management exists, as shown by the consistent lack of adequate scaffolding. Where no scaffolding is used, this phase of production is limited to inefficient hand methods and is unnecessarily hobbled to old-fashioned procedures with no opportunity to utilize the advantages of modern mechanized production tools. For efficient production methods, the

(Continued on page 44)



ON THE CONNECTICUT TURNPIKE



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

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

No job's too tough for Gammino

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Want the real pitch on Mack can-do?

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

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

Ask him about the big jobs, where the power of the Mack schedule-meeting dependability of his Macks pays for its entire operation.

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

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

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



ON THE PROVIDENCE RIVER BRIDGE JOB

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

DEPEND ON MACKS

OVER-THE-ROAD HAULING OF CRUSHED STONE AND DIRT

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



MACK
first name for
TRUCKS



ACCIDENT SUMMARY

ITEM	FIRM A	FIRM B	FIRM C
Total man-hours exposure	6,932,330	1,370,836	5,496,845
Accident Causes			
Striking against	0	0	0
Struck by	28	3	20
Caught in	6	0	5
Fall, same level	4	2	3
*Fall, different level	23	2	17
*Fatal results	2	1	4
*Total of this type	25	3	21
Slip or over exertion	15	2	4
Exposure to temporary extremes	0	0	0
Inhalation, absorption, ingestion	0	0	0
Contact with electrically charged objects	0	0	1
Accidents not otherwise classified	0	0	0
Total fatal accidents	7	1	5
Total accidents	78	10	54

*The total of falls to a different level and resulting fatalities are the highlights.

need for scaffolding has not been eliminated, even though misconceptions of this principle do exist.

Accident records of three firms

The humanitarian need for scaffolding cannot be overlooked. A resume of the accident record of the three contractors concerned in this study can be analyzed as follows:

Firm "A" had a good application of the standard scaffolding, and the best accident record of the three.

Firm "B" had a fair application of the standard scaffolding, and a fair accident record.

Firm "C" had a poor application of the standard scaffolding, and the heaviest toll of injuries.

The efficiency of their respective accident prevention programs can be correlated closely to their production methods. (See table.)

Workmen's compensation rates are computed for each classification by taking the claim costs of each class, usually for a five-year period, dividing by the five-year payroll for each class, and multiplying by a loading factor to arrive at the pure premium. The administrative expenses are added to establish a base rate for the particular industry.

The State of Oregon Workmen's Compensation Schedule of Rates, effective July 1950, for heavy concrete construction (composite rate) is 4.8% of wages paid, and is representative of insurance costs in the Northwest. It is reasonable to assume that 25% of the total man-hours for the projects involved work on or about the form panels in some manner during the period of erecting concrete structures. Claim cost to the insurer is based upon a rule of thumb of \$30,000 per fatal and \$1,000 per lost-time injury.

Insurance cost study

The following cost study is restricted only to falls from one level to another as shown in the table. At an average of \$2.50 per hr. wage and 25% of the total man-hours having an exposure to form panel work, with the insurance rate of 4.8% of wages paid, the premium cost for workmen's compensation for these contractors is as follows:

Firm "A"

Approximate premium on form work: \$207,970 (based on 1,733,082 formwork man-hours); approximate expense to insurer: \$83,000 (two fatalities @ \$30,000, twenty-three lost time accidents @ \$1,000). Overage to insurer: \$124,970.

Firm "B"

Approximate premium on form work: \$33,100; expense to insurer: \$32,000. Overage to insurer: \$1,100.

Firm "C"

Premium on form work: \$132,000; expense to insurer: \$137,000. Loss to insurer: \$5,000.

Firm "A" would be the only one able to build a credit in its insurance fund for this work. It is interesting to note that "falls from one level to another" constitute approximately one-third of "A's" accidents, one-third of "B's," and one-half of "C's" personal injury accidents.

Installation of proper scaffolding increases the cost of form paneling by 25% by industry standard estimating procedures. The anticipated reduction in the personal injury rate due to the decreased risk of falls is not a tangible basis to underwrite the increased cost of form paneling equipped with scaffolding. It is the purpose of this study to show that the inclusion of proper scaffolding

will offset the initial increased cost and show a substantial saving.

A series of random checks with a standard watch with a second hand sweep were made over an 18-month period. Interviews with members of the various contractors' supervisory staffs and government engineers assigned to the projects indicated a common consensus that the time savings made by use of scaffolding or form panels are approximately the same as those shown by the series of random checks. The time intervals for the attachment or removal of she-bolt nuts varied considerably. It was observed that it took from 1 min. to 35 min. to perform this simple operation. On an average basis, it took 25% more time to remove one of these nuts when not working from a scaffold. In addition, considerable time and extra effort was expended while gaining access where no scaffolding was provided.

Where scaffolding was provided and easy access was readily available, other time saving practices could be effected which reduced the amount of labor expended. The use of power-impact wrenches was often possible, the workmen were better positioned to perform their work, and the she-bolt assemblies could more easily be kept in condition and were less apt to bind and stick. Many other phases of construction were benefited by the scaffolding, such as:

- Easy access to the form panel.
- Easier access into adjacent work areas.
- More work space from which to pour concrete.
- Easier alignment of the form panels.
- Easier installation of steel and other mechanical features by providing access and work platform.
- More ease in inspection and supervision.
- Reduction in crane and riggers' time.

For computing purposes, a cantilever form panel of average size (10 x 30 ft.), all-wood, wooden-steel-backed, or all-steel, was considered representative for the three contractors. Cost per square foot is consistent with contractor costs and standard estimating procedures. Labor costs are based upon production charts of efficiency for the erecting and removing of forms and the performance of cleaning and repair. The standard crew of a half carpenter foreman, four carpenters, and four helpers at a cost of \$160 per shift is considered the normal. These are the

(Continued on page 80)



Tulloch Dam—a contractor's dream

Careful advance planning on the part of the contractor, made possible by the lack of engineering frills in the design and a set of clearly detailed plans and specs, has made Tulloch Dam one of the fastest and smoothest big jobs in years. Concrete pouring took only 11 months. Here's the story, told by the men in charge.

E. E. SNYDER, Project Manager
and
J. B. GIBSON, Job Engineer
Arundel-Dixon, Contractors

IN 1900 a group of men under the leadership of Charles T. Tulloch labored in the scorching heat of the Stanislaus River gorge above Knights Ferry, Calif., to place a masonry barrier across that stream for the purpose of diverting water to irrigate land as far west as Manteca and to power Mr. Tulloch's 75-kw. electric generating plant, one of the first hydro installations in the West. Knights Ferry. Cement to conduplicate the masonry came from Germany around the Horn by boat to Stockton, and thence overland by some 50 mi. to the jobsite.

Six years later another group prepared to duplicate this cement within a few hundred feet of the still standing original barrier. The comparison ends there, however. Whereas the old dam was 15, or 20 ft. high and 300 ft. long, the new one will be 215 ft. high and 900 ft. long. Where the proposed brute strength, the modifiers use gasoline, electricity and compressed air.

Nevertheless, the primary purpose of the two structures remains the same. Namely, to provide water for irrigating the agricultural land adjacent to the Stanislaus River's lower reaches and to power a hydroelectric plant. Since 1909 beneficial use of the river's water has been the responsibility of the Oakdale and South San Joaquin Irrigation districts, who, in recent years, have planned and brought to the construction stage the well-publicized Tri-Dam Project on the Stanislaus River, of which Tulloch is the farthest downstream of the three dams. It is the most important to the irrigation program as it will stabilize the river flow by storing any excess water passing the two upper dams.

Tulloch is a concrete gravity dam 1,900 ft. long, 200 ft. high and containing 230,000 cu. yd. of concrete. The maximum thickness at the base is 165 ft. tapering to 12 ft. at the roadway on the crest. The spillway is located on the left bank and is a typical gated ogee structure containing seven tainter gates and one skimmer gate and having a total capacity of 162,000 cfs. In addition to the spillway, which will pass the excess flow, there are two 6-ft. diameter steel outlet conduits designed to

maintain the normal downstream flow. The powerhouse located on the downstream face of the dam will house two generating units with a combined capacity of 17,000 kw. The powerhouse is fed with two 114-in. penstocks which are embedded in the gravity dam.

Included in the contract for the construction of Tulloch Dam is the raising of the existing Goodwin Dam, located about 2 mi. downstream. Goodwin Dam is a small concrete arch dam which was built in 1916, and since that time has been used as a diversion dam to feed the two canals of the irrigation districts. The present modification to this structure calls for the addition of 7 ft. in height to the crest and modification to its gate structures. In the future it will serve as an afterbay for the Tulloch Powerhouse and also continue its function as a diversion structure for the canal system.

Bids for the Tulloch Project were called in the fall of 1955. The joint venture combination of the Arundel Corporation of Baltimore, Md., and the L. E. Dixon Company of San Gabriel, Calif., submitted the successful bid of \$8,291,428. This joint venture, known as Arundel-Dixon, is one of long standing. The association of the two firms dates back to the Shasta Dam days. Since then Arundel-Dixon have completed some 15 large concrete dams, totaling in excess of \$150,000,000. In general, the Arundel Corporation sponsors work located in the eastern portion of the United States, while the Dixon Company assumes leadership for the Western work. Tulloch



VIEW of downstream face of dam and powerhouse shows concrete work nearing completion. Initial topping out was scheduled for July, with power available by December.



FIRST CONCRETE was placed in August 1956. The photo shows the use of small wooden panels in the initial forming on rock. Little excavation was needed in the streambed.

is under the sponsorship of the organization.

The first undertaking at Tulloch was the river diversion. After studying various alternate schemes the contractor decided upon the tunnel method with earth and rock dikes for upstream and downstream cofferdams. Consequently, a 14-ft. diameter tunnel, 600 ft. long, was driven through solid rock in the left bank. The tunnel was designed to carry a maximum of 10,000 cfs., provision for floods in excess of that to spill over a low concrete dam. The tunnel work was contracted to the Burlington of Gates & Fox. Under the direction of Kirk Fox the tunnel was holed through successfully in February 1956.

The headworks was pro-

vided at the upstream portal of the diversion tunnel for the closure gate which will eventually be used to shut off the flow through the tunnel while it is being plugged with concrete.

Concurrently with the tunnel driving the contractor rushed construction of a temporary bridge immediately upstream from the damsite in order to get equipment moved in and the keyway excavation started on the north side. The bridge, with a capacity of 75 tons, consisted of a single span of 88 ft. with concrete abutments. Two 60-in. x 90-ft. steel girders were used for the span, and a Joe Magee cableway was rigged between rock anchorages for placing abutment concrete and installing the heavy girders.

Early construction operations were hampered severely by the heavy

rains which drenched Northern California late in 1955 and early in 1956, resulting in a record flow of 70,000 cfs. in the Stanislaus River. The 4-mi. access road from State Highway 120 to the damsite was under construction at that time, and it was necessary to resort solely to crawler and 4-wheel drive vehicles for transporting men and equipment to and from the job during the first six weeks of operations.

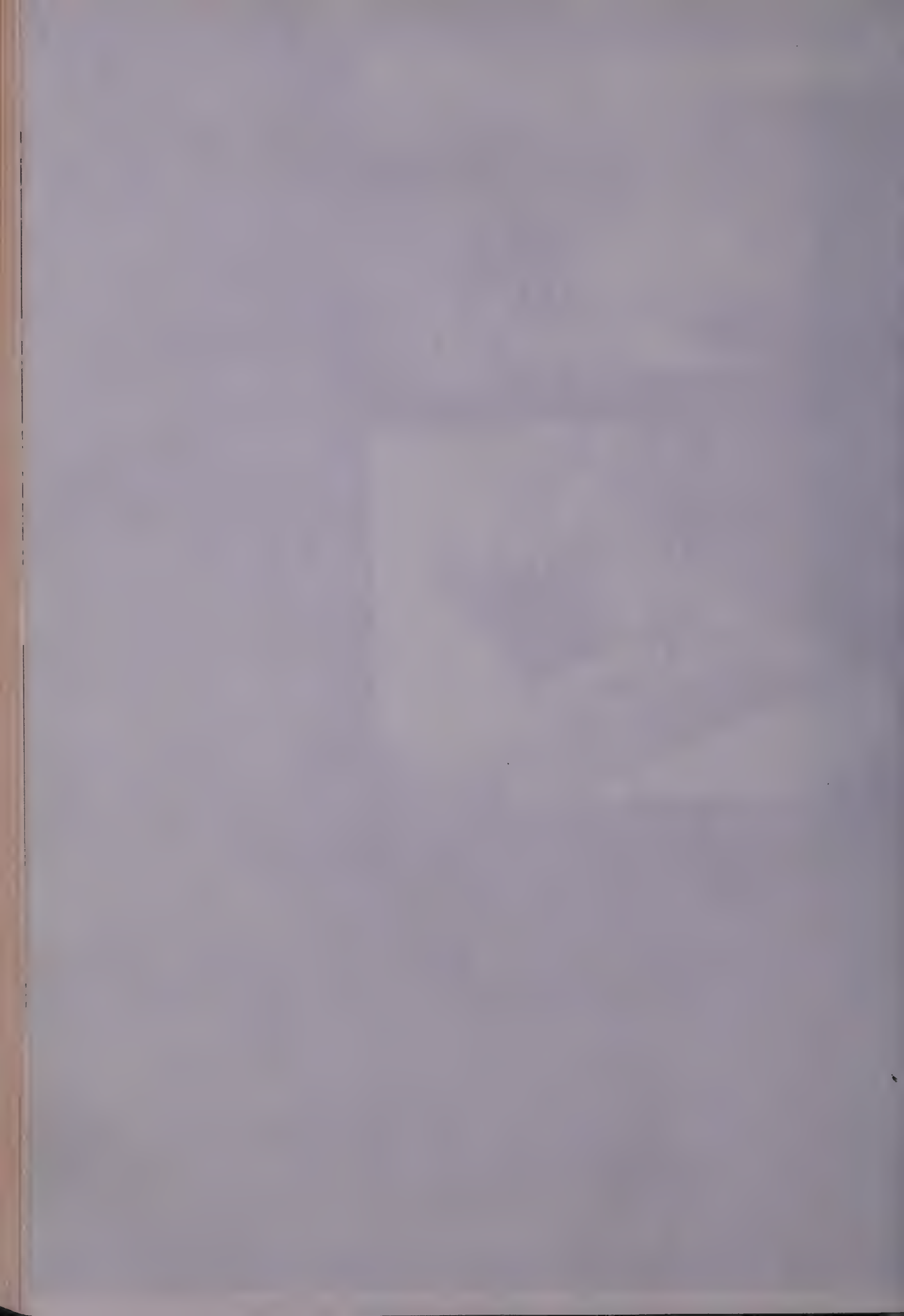
Arundel - Dixon's construction schedule called for the first concrete to be placed in the bottom immediately following the 1956 spring runoff. Consequently, no time was lost in erecting the mixing plant and cableway, and bringing excavation of both keyways down to the river level during the first high water season.

A study of the site for concrete plant layout indicated an ideal use for one of the company-owned cableways just coming off another job. It was decided to set up a radial cableway system using a fixed mast 130 ft. high on the right bank, with the 110-ft. traveling head tower on the opposite bank. The 25-ton cableway is powered with a 500-hp. Washington Iron Works hoist.

Since the principal access into the damsite is from the left bank, all of the offices, shops and other facilities are located on this side. The batching and mixing plant is in the same general area on about the same elevations as the traveling cableway tower. Aggregates are received from bottom-dump trucks in a 5-compartment timber crib hopper and elevated to the batch plant by belt conveyor. The plant itself is a 600-ton, 5-compartment Johnson plant, containing two 4-cu. yd. Koehring mixers. Concrete is transported from the mixing plant to the cableway in 8-cu. yd. Gar-Bro buckets, by means of a conventional concrete car, pulled by a 12-ton diesel-electric locomotive.

As soon as the 1956 runoff dropped to approximately 2,000 cfs. the river was diverted through the tunnel and the river bottom was exposed. Fortunately there was very little excavation to come out from the deep canyon which formed the river bottom. In all a total of 142,000 cu. yd. of rock and 50,000 cu. yd. of common were removed from the foundation of the dam.

Concrete in the dam was placed in regular 5-ft. lifts and a specified 72-hr. minimum time interval between lifts. Steel cantilever forms were used for both faces as well as for the con-



traction joints. Considerable wood forming was necessary, however, in setting off the rock, and this was complicated to some extent by the requirement of a concrete fillet on both the heel and toe of the dam. The fillet projected from 3 to 5 ft. beyond the normal face of the dam and closely followed the profile of the foundation rock. Small wood panels 5 ft. 5 in. high and 4 to 6 ft. wide were used to a very good advantage in forming vertical faces to the height necessary to accommodate the steel cantilever forms. In utilizing these small panels the amount of actual built-in-place forming was held to a minimum.

Concrete in the spillway piers was placed in 5-ft. lifts and the steel cantilever forms from the dam were used for the side forms. Plywood-lined wood forms were used for the semi-circular pier noses.

Powerhouse superstructure concrete was placed in approximately 8-ft. lifts and large wood panel forms were used throughout. The panels were constructed with 2 x 4 studs and 1/2-in. plyform sheathing. Panel dimensions were 8 ft. 4 in. in height to accommodate the 8-ft. lifts and up to 50 ft. in length with the plyform joints forming a specified architectural pattern. The panels were raised with chain hoists attached to the structural steel frame.

Concreting operations were carried out on a two-shift basis, five days a week, for the first eight months. Since April, however, with the milder pours encountered toward the upper portions of the dam, it is difficult to maintain sufficient blocks to carry on the two shift working schedule, and operations are curtailed to a one shift basis.

During the peak pouring period the average monthly production was about 30,000 cu. yd.

It is expected that concrete will top out around the middle of July of this year, or eleven months after the first bucket was placed. The powerhouse equipment setting, however, will stretch out into the fall. The present final completion schedule for power development is December 1, 1957.

Aggregates for the Tulloch job are provided by the Standard Rock Company of Modesto, California. The pit is located on the Stanislaus River approximately 10 mi. downstream from the site, where the Standard Rock Co. has erected a modern and very efficient screening plant. While this plant was erected primarily for the purpose of supplying the Tulloch aggregates, it is understood that Standard expects to maintain it as a commercial producer when the Tulloch work is completed.

Cement is being furnished by the Calaveras Cement Co. The cement is hauled via bulk truck and trailer direct from their mill at San Andreas in Calaveras County. The highway distance is only 90 mi. and, due to the proximity of the cement mill, the contractor was able to reduce his storage facilities at the mixing plant to 900 bbl. of cement.

As previously mentioned, a part of the Tulloch contract included the raising and modification of the existing Goodwin Dam, located some 2 mi. downstream from Tulloch. Since all of Arundel-Dixon's efforts are concentrated on the main work at Tulloch, the Goodwin portion of the contract was subcontracted to John C. Gist of Sacramento. Concrete was

furnished to Gist from Arundel-Dixon's plant at Tulloch, and transported by agitator trucks to the Goodwin site. While the quantities involved were not large, this was a difficult piece of work and was handled very efficiently by the Gist organization.

Because of its simplicity and its lack of inherent problems the Tulloch Project has been described as a "contractors dream." It was designed by the International Engineering Co. of San Francisco. There have been no change-orders of major importance and the bid drawings and documents made available to the contractor at the time of the bidding were complete and clearly detailed, leaving very little room for guesswork as to what was intended. The contractor feels that this feature, along with the lack of "engineering frills," has saved the owners perhaps many hundreds of thousands of dollars.

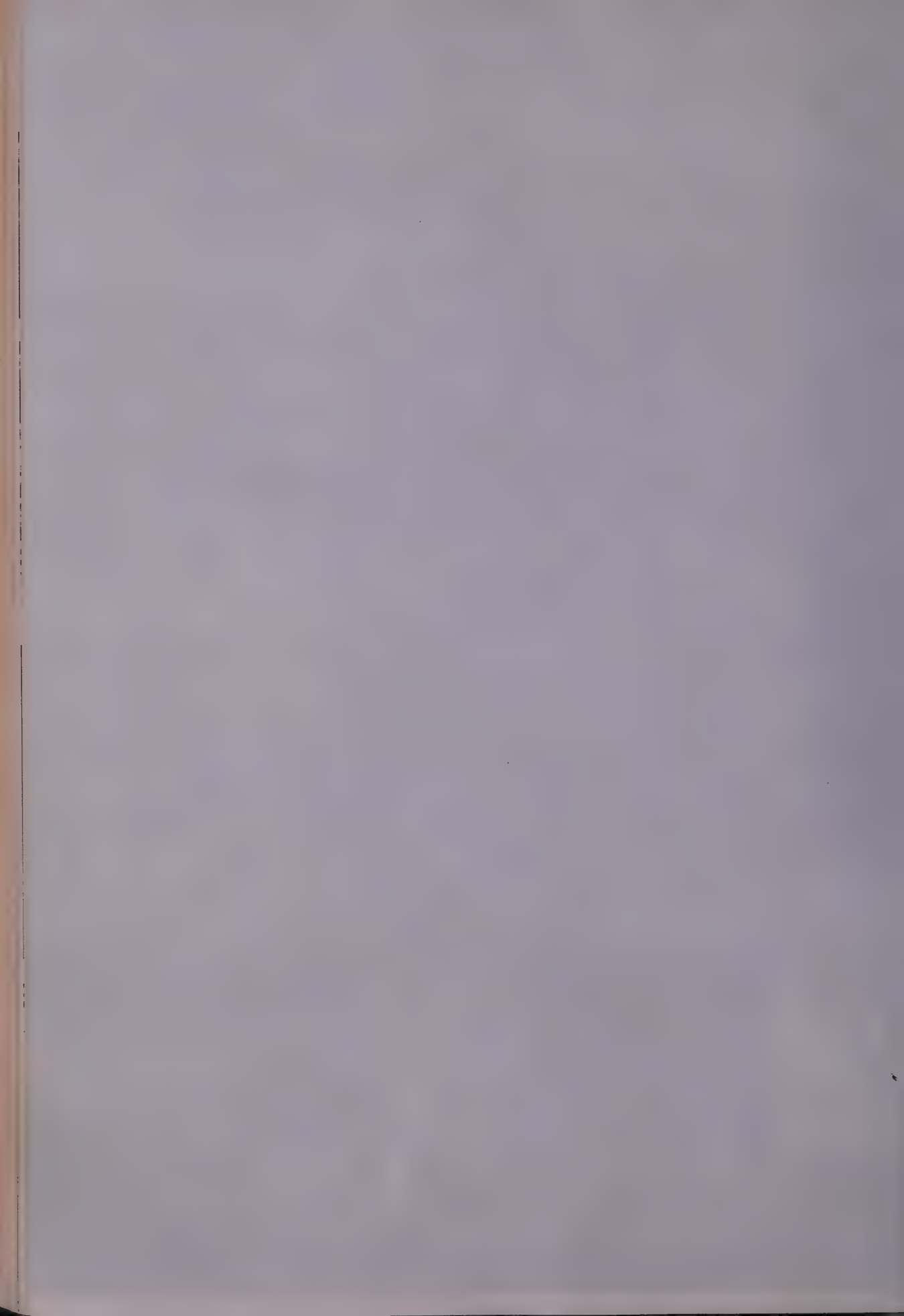
Key personnel

Supervising the work for the two irrigation districts owning the project is the firm of Tudor-Goodenough Engineers. This is a joint venture consisting of the Tudor Engineering Co. and B. W. Goodenough, with Bert Goodenough in direct charge of the entire Tri-Dam Project. In charge of the Tulloch phase is Resident Engineer Neville Long. Field surveys and layout are supervised by R. E. Hartley and John Duff, partners operating as Tri-Dam Surveyors, with Donald Davis as chief of party at Tulloch.

The Arundel-Dixon organization is headed up by E. E. "Ernie" Snyder, the project manager. Prior to coming to Tulloch he supervised the construction of the \$20,000,000 Liberty Dam and the Ashburton Filtration Plant, for the same contractor, in Baltimore. Bruce Gibson is the job engineer, assisted by Omar Finsand. George Henningsgard is office manager, and together with "Jiggs" Schmidgal, cost engineer, Pete Keyes, Herman Snyder and Catherine Doig, this completes the office staff. In the field, Jim Morris, carpenter superintendent, Bill Jones, rigging superintendent, Rube Miller, excavation and concrete superintendent, James Drinnon, plant superintendent, Vic Miller, master mechanic, and H. A. Hoover, electrical superintendent, are other key personnel for the contractor. D. T. "Doc" Adkins handles first aid and safety.



SUPERVISING THE JOB are (left to right) Bruce Gibson, job engineer, E. E. "Ernie" Snyder, project manager, and Neville Long, resident engineer for Tudor-Goodenough Engineers.



Forest bridge moved by helicopter

A helicopter outbids a mule train for moving a bridge piece by piece to a remote mountain site for the Park Service.

HELICOPTERS have found their way onto the construction job in the last few years, but in a rather limited way, being used mostly for site reconnaissance, fast movement of key personnel, and emergency trips for spare parts to reduce downtime. But a job recently completed for the National Park Service indicates that the machine may be more useful to contractors than was suspected.

A 150-ft. long, 5-ft. wide, 35-ton suspension bridge was flown piece by piece 12 mi. into a remote mountain location in California's Sierra Nevada Mountains by Stockton Helicopters, Inc. The firm got the job by outbidding a contractor with a mule train, the usual way to transport materials to a small construction project in a remote site. The bridge formerly carried vehicular traffic over the Trinity River near Hawkin's Bar. It was dismantled, reduced in size, and trucked to Arnold's Meadow, northeast of North Fork in Madera County. At its new location, 12 mi. (as the helicopter flies) from Arnold's Meadow, the bridge will carry hikers and pack trains over a gorge called Miller Crossing, on the Cali-



fornia Hiking and Riding Trail. The bridge has two 20-ft. high towers from which hang 1½-in. cables.

The high altitude (5,100 ft.) and the rugged terrain made the air very unstable and for this reason the helicopters were operated only from dawn until noon. Carrying about 500 lb. of structural bridge members per load, they made the round trip in about 27 min., about one day less per trip than it would take a pack train. Average helicopter speed was about 60 mph.

Arriving at the bridge site, the helicopter would hover above the

ground just long enough to permit a man on the ground to unsnap the load. At the other end of the run, at Arnold's Meadow, the machine would touch down on a small landing mat made of 2 x 12-in. rough sawn lumber. Reloading and refueling took only 3 min. Fuel was kept at the safe minimum so that the maximum load could be carried.

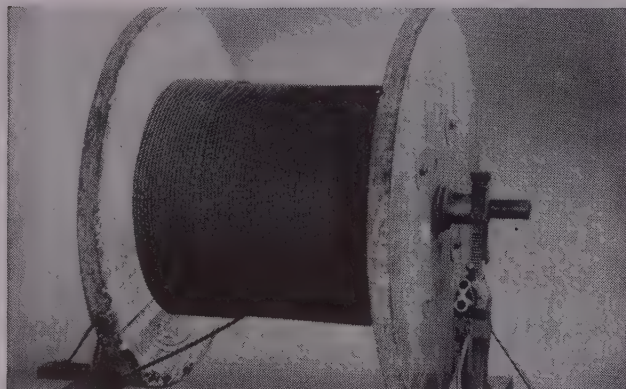
About 14 flights were made each day and the entire project was completed without incident. According to officials of Stockton Helicopters, Inc., such a job can be done for \$80.00 to \$100.00 per flight hour.

LOADS were weighed and assembled for pick-up in a meadow about 12 mi. from the bridge site. The helicopter landed on the two stacks

of 2 x 12s in the background. At the bridge site the craft hovered above the ground, permitting the load to be unhooked.

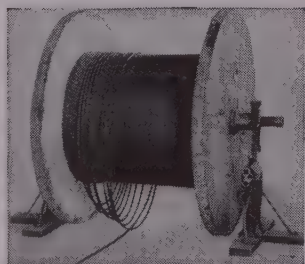


Tuffy[®] Wire Rope Tips



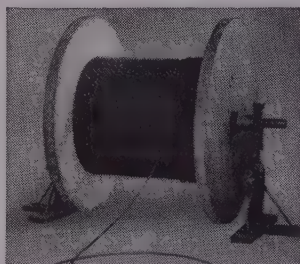
Here's the way to set up reel for unwinding

The stock reel should be set up on jacks, so the rope will come from the under side of the reel as shown in this picture.



This reel is set up right

Unwinding has started, and the reel is spinning faster than the rope is being pulled off. But because it's coming from the under side of the reel, the rope is simply loosening on the reel, with no damage.



This reel is set up wrong

The rope is coming from the top of the reel and forming loops as the reel over-runs. These loops are likely to form kinks and dog-legs, which can be ruinous to rope life.

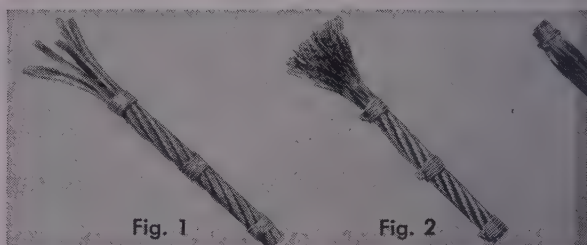


Fig. 1

Fig. 2

Eight steps of correct SOCKETING

1. Securely seize and serve with soft wire ties before cutting and have at least two additional seizings placed at a distance from the end equal to the length of the basket of the socket.
2. When the rope is properly seized, take off the end seizing. Cut the fiber center back to the seizing, as shown in Fig. 1 above. Untwist and broom out the wires. See Fig. 2.
3. Clean the wires for the distance they are to be inserted into the socket. Use benzine, naphtha or gasoline. Then dip wires in commercial muriatic acid, to a depth not greater than $\frac{3}{4}$ of the cleaned length of wire. Keep them immersed for 30 seconds to 1 minute, or until the acid has thoroughly cleaned each wire. Be sure acid does not contact any other portion of the rope.



Follow these steps for PROPER SEIZING

Since practically all wire ropes today are preformed, suggest that when cutting you put only one seizing on each side of the cut.

When cutting ordinary ropes, thoroughly seize (bind, serve or tie) so there will be no misplacement or relative movement of strands. For most ropes, other than preformed, *three* seizings should be used on each side of the cut. *Four* seizings on each side are required for a lang lay rope, any rope having an independent wire rope core or a wire strand core. *Four* seizings are also needed for all 1 1/2" ropes, and all ropes larger than 1" diameter.

Tuffy Special Wire Ropes are tailored to special use. Ordering is



Tuffy Scraper Rope

It's flexible enough to withstand sharp bends, yet stiff enough to resist looping and kinking when slack. Moves more yardage per foot because it's specially built to take the beating of drum-crushing abuse.



Tuffy Dragline Rope

Constructed to give you maximum abrasive resistance with super flexibility. Rides smoothly on grooves, hugs the drum when casting for full load. Consistently dependable in handling any material — wet or dry dirt, sand, gravel, rock, cement or minerals.



Sand and gravel from solid granite

Producing both coarse and fine aggregates from granite was one of the problems faced during the construction on Donnell's Dam, uppermost unit of the Tehama Dam Project. Here is a detailed look at how it was done.

T. W. GROVER, Resident Engineer
and

E. GARST, Materials Engineer
Tudor-Goodenough Engineers
San Francisco, California

DONNELL'S DAM, recently completed for the Oakdale and South Yuba Irrigation districts as the most feature of their vast Tehama Dam Project, is an esthetically thin, concrete arch structure rising in a granite-sided canyon on the Middle Fork of the Yuba River in the High Sierras. The dam is about 40 mi.

high, 384 ft. in height and has a foundation 1,000 ft. below the canyon rim. The lower portion of the dam is a gravity plug section, 317 ft. high and 81 ft. thick at the base. The 317-ft. high arch section has a thickness from 41 ft. at the top to 10 ft. at its 960-ft. long spillway structure adjoining the lower gravity section.

The dam is a concrete arch structure, 317 ft. high and 81 ft. thick at the base. The 317-ft. high arch section has a thickness from 41 ft. at the top to 10 ft. at its 960-ft. long spillway structure adjoining the lower gravity section.

The dam is a concrete arch structure, 317 ft. high and 81 ft. thick at the base. The 317-ft. high arch section has a thickness from 41 ft. at the top to 10 ft. at its 960-ft. long spillway structure adjoining the lower gravity section.



Photo "The Em-Kay"

feature of the construction was the production of both coarse and fine aggregates to specified sizes from quarried rock and combining the aggregates in the manufacture of an exceptionally fine grade of concrete. About 130,000 tons of aggregates were produced for the 20,500 cu. yd. of concrete in the dam and spillway; 21,000 cu. yd. in the 7.2-mi. tunnel and penstock connecting the reservoir to the powerhouse; and 6,500 cu. yd. in the latter structure, manufactured at

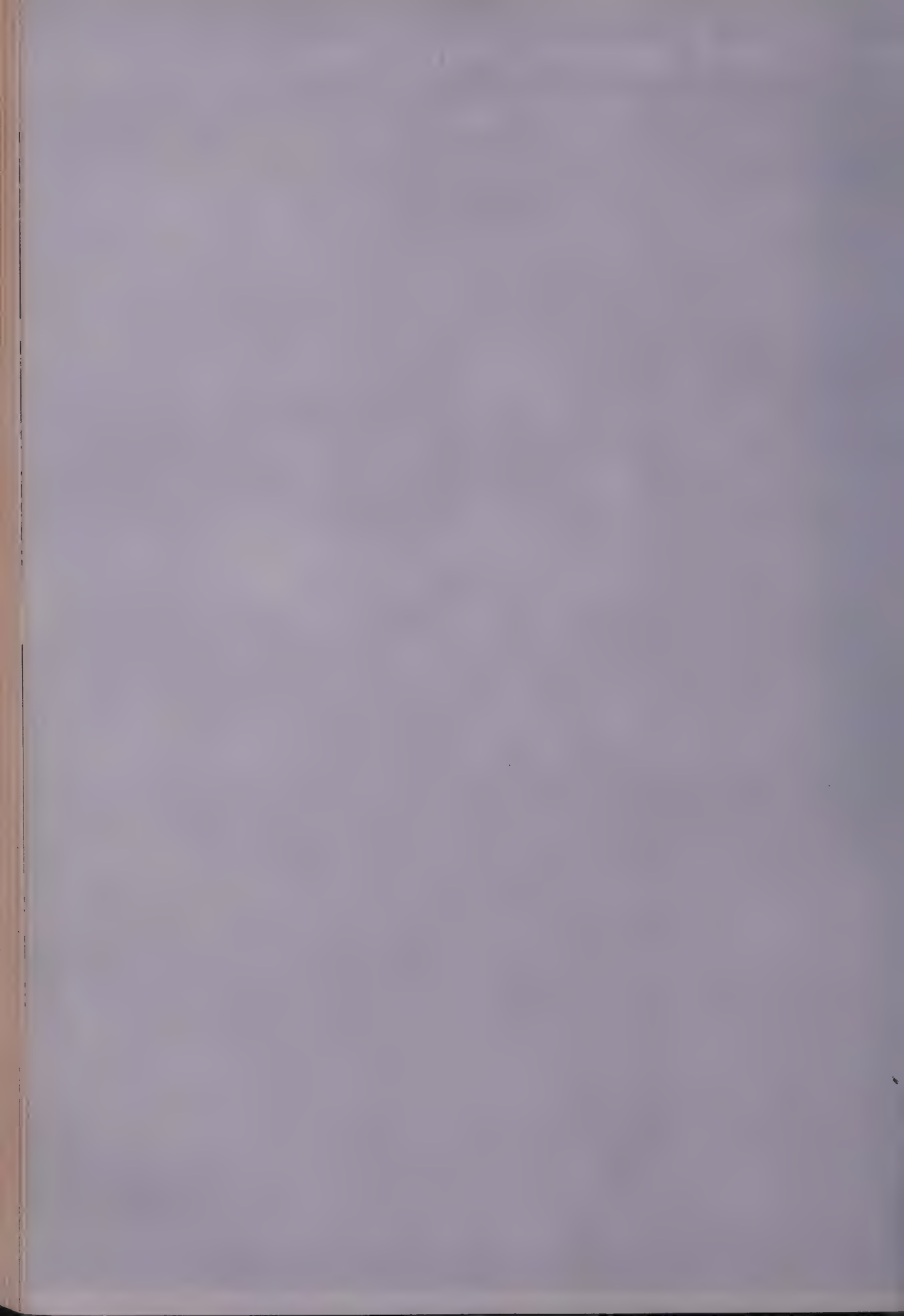
which the rock was generally granite. It classified as

to blocky, well-shaped particles with very little elongated or flat pieces.

to blocky, well-shaped particles with very little elongated or flat pieces.

The rock quarry was located about a half-mile downstream from the dam on the left canyon wall and some 300 ft. higher in elevation. The aggregate processing plant and the batch plant were a short distance below the quarry on respectively lower "shelves" excavated in the canyon side. This set-up allowed advantage to be taken of a gravity flow of aggregates downward from their source. Quarrying was by means of benching, using Ingersoll-Randagon drills and shooting after which the rock was loaded into 5-cu. yd. Koehring dumptrucks and Euclid end-dump trucks by a 11,250-cu. yd. Bucyrus-Erie shovel. The aggregates were transported by road to the dam site.

The road was built on a 12 x 12 ft.





5. JOHNSON mixing plant handled all of the 203,000 cu. yd. of concrete. Greatest 24-hr. batch was 2,485 cu. yd. Best month was March 1957 when 37,000 cu. yd. were batched.



6. Aggregate processing plant and batch plant were located on shell about 300 ft. lower in elevation than the quarry. This arrangement permitted a gravity flow of materials.

a surge pile from which it was carried by belt to a 5 x 12-ft. F-800 Ty-Rock triple-deck screen. Rock larger than 6 in. and any desired portion of the 3-6-in. sized rock was shunted to a 16-B Tel-smith gyratory crusher and then returned to the screens in smaller sizes. The 6-in. and 3-in. rock required was chuted from the triple-deck screens to 4 x 8-ft. Symons dewatering screens and then to their respective 28-ft. diameter x 44-ft. high Armco storage bins. Any portion, or all of the rock retained on the 1 1/2-in. screen could be conveyed to a 4-ft. standard Symons cone crusher after which it was belted to the 3/4-in. screen of a 5 x 14-ft. Ty-Rock F-600 double-decker. The minus 1 1/2-in. rock was belted directly to the F-600, where the 3/4-in. to 1 1/2-in. and No. 4 to 3/4-in. rock was separated from the sand and chuted to their storage bins after going over separate Symons dewatering screens.

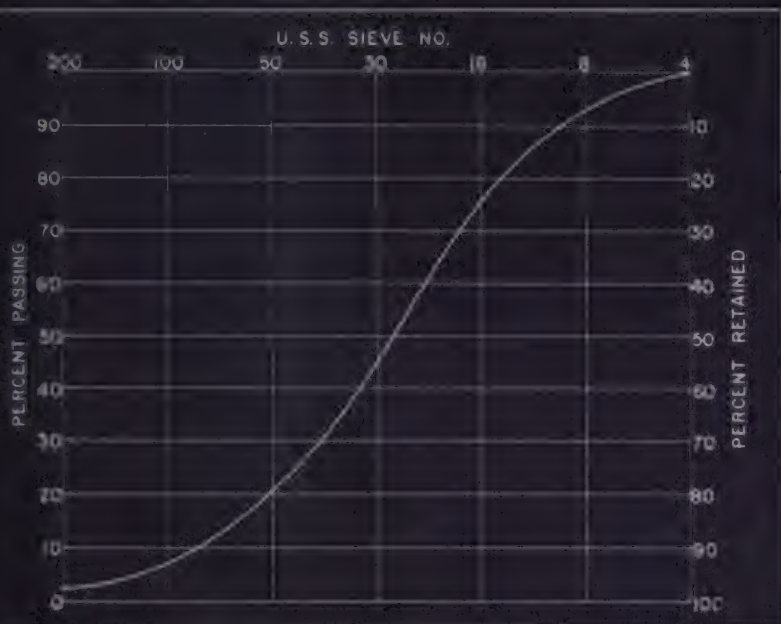
Manufacturing sand

The minus No. 4 material went into the sandplant feeder which consisted of a 28-ft. diameter x 35-ft. high Armco tank and a No. 55 Syntron feeder, and then to an 8 x 12-ft. Marcy rod mill. Discharge from the rod mill was pumped by two 6-in. Wen-co sand pumps to a 5 x 12-ft. double-deck screen of No. 4 and No. 16 mesh cloth, where it was wet screened. The sand retained on the No. 16 screen was fed directly to a conveyor bringing out the minus No. 16 from a 20-in. x 16-ft. Tel-smith twin-screw classifier to the finished sand drying piles. After draining, the manufactured sand was dozed into a collecting hopper and conveyed by belt to the finished sand storage bin, which, like the other four aggregate storage bins was an Armco tank 28 ft. in diameter and 44 ft. high.

Temperature control of mix

The specifications governing the construction required that the concrete materials be within certain temperature ranges before being mixed. During hot weather, four Eclipse compressors of 100-ton capacity were used to force cold air through air ducts leading to the aggregate storage bins. Artificial cooling of the cold mountain water used for mixing was not necessary. The temperature in each of the bins could be determined instantly by means of an electronically controlled temperature recording device located in the





OVERALL GRADATION of the sand produced is shown by this curve. The average fineness modulus varied from 2.38 at the beginning to 2.70 in the later stages of the job.

engine room. When the ambient temperature was below 35° F. two large Cleaver-Brooks boilers of 100 p. each were put into use—one for furnishing hot water to the add-water and the other for supplying steam to the sand.

A C. S. Johnson Company automatic mixing plant adjacent to the main aggregate storage bins received the aggregate by a conveyor belt running underneath the weigh-hoppers at the bottom of each bin. Cement was brought to the overhead 5,000-bbl. tank by an enclosed belt from a truck unloading hopper and feeder located at a somewhat higher elevation above the plant on the canyon side. The mixing plant with two 4-cu. yd. Koehring mixing drums had a rated capacity of 120 cu. yd. per hr. on a 2½-min. mixing cycle.

Ten months to place concrete

The first bucket of the 203,000 cu. yd. of concrete going into the dam was placed at the bottom of the foundation excavation on July 9, 1956. On May 15, 1957—slightly more than ten months later—the last bucket which “topped out” the dam was placed.

Maximum 24-hr. output of the batch plant was made on March 12, 1957, when 2,487 cu. yd. were batched. The month of March was the highest month for the job with a total of 7,000 cu. yd.

Batching of all ingredients was by volume with the weights automatically recorded by stylus on paper rolls. There were seven different mixes

could be pre-set for later selection and automatic batching. Moisture compensators on the weight batchers automatically adjusted the aggregate weights to compensate for the free water contained in them. (It should be mentioned, however, that these compensators did not measure the free moisture but had to be pre-set for the moisture content as determined in the laboratory.)

Fresh concrete was transported from the mixing plant to the dam in two 6-cu. yd. air-operated dump buckets riding on a flatbed rail car pulled by a diesel-electric dinky along the delivery track to where the buckets were hoisted and carried to the forms by cableway. The latter was a Lidgerwood cableway system with a span of 1,090 ft. The movable, self-propelled head tower, which was formerly a tail tower at Shasta and Hungry Horse dams, rode on about 700 ft. of curved, banked rails so that the entire site could be covered by the cableway. The main-line cable was a 3-in. diameter Lang Lay cable and the hoist raised and lowered the bucket by a 3-part hook-up using a ¾-in. load cable.

Forming the concrete arch

Forming of the concrete arch was done with Blaw-Knox cantilever steel forms which were adjusted to the varying slopes by screw jacks bearing against the previous lifts. The concrete blocks constituting a “pour” varied from 41 to 10 ft. in width, and 43 to 72 ft. in length with the 5-ft. lift being placed in three benches. Consolidation of the

fresh concrete was by means of internal vibration. The maximum allowable vertical differential between adjacent monoliths was 20 ft.

During warm weather, the concrete was cured for 14 days by being kept continually moist by sprinklers or by water spray. The fresh concrete was heated during the cold weather by circulation of live steam through perforated steel pipe headers and the surrounding air was warmed by the use of fuel-oil burning fire pots.

Mix design

All concrete entering into the construction of Donnell's Dam was made with Permanente, Type II, low-alkali cement and was, for the most part, of 6-in. maximum size aggregate. To provide durability to the concrete; to lend workability; and to lower the comparatively high water requirement usually associated with crushed aggregates, the specifications called for the entrainment of from 5% to 7% of air to the mix. This was accomplished by the use of Pozzolith, with Protex as the air-entraining agent. This substantial reduction in the water requirement resulted in a considerable economic benefit by reason of the lower cement factor required to maintain a maximum water-cement ratio of 0.49. It was noteworthy that the anticipated strength loss associated with high air content was not exhibited.

A typical mix design with the maximum 6-in. size aggregate proportioned the ingredients by weight as follows: 0.49 : 1.00 : 2.33 : 1.40 : 1.70 : 1.92 : 2.36. This mix, with a cement factor of 0.97 bbl. per cu. yd., allowed placement at a slump of less than one inch and yielded test cylinders molded from the minus 1½-in. fraction that, for the entire job, averaged 4,000 psi. after water-bath curing for 28 days at 72-74-deg. temperature.

Key personnel

Donnell's Dam was designed for the irrigation districts by George E. Goodall Co. of Sacramento, Calif. Representing the owners as supervising engineers was Tudor-Goodenough Engineers, with G. W. Goodenough as project engineer; T. W. Grover, resident engineer, and Richard K. Deming, chief inspector.

Key personnel of the Tri-Dam Constructors included Simon Piedmont as dam project manager; Stanley M. Stearns, project engineer; and Paul Lytle, batch plant superintendent.



Here's your
answer to
high material
handling
costs!

Doubling for dynamite, this TD-9 4-In-1 is digging and loading "unshot" sandstone material for binder and fill. Holland and Woodward Stone-Gravel Trucking Co., Decatur, Alabama, reports this material formerly had to be "shot"—before previously-used equipment could handle it!

Multiply your job range.... by FOUR ***Divide your rig investment by FOUR!***

Instead of sinking your capital in an old-fashioned "single-action" loader, let the same money buy four big-capacity International Drott 4-In-1 machine actions!

Instead of allowing profits to dwindle because an ordinary tractor-loader can't do 'dozer, scraper, or clamshell work, change to a 4-In-1. Move the machine-selector lever right from the foam rubber seat, and watch your material handling production go up and up!

You aren't just getting "another bucket"—but famous and exclusive Skid-Shovel® pry-action break-out. And 41° bucket-heaping, ground-level roll-back. It's the one and only true pry-action! That means full hydraulic power transfer—correct pry-lever length—and exclusive frame-mounted skid-shoes to provide the vital fixed fulcrum!

And you're also getting easily-controlled, earth-rolling bulldozer action. Plus "carry-type scraper" action to tackle any material handling job. Plus super-speedy

clamshell action, with bottom-dumping to eliminate the sticky materials problem. Plus the exclusive performance protection of shock-swallowing Hydro-Spring!

Invest only 15 minutes! Prove to yourself that an International Drott 4-In-1 multiplies your material handling job range, and divides your investment, by four! Prove you can't afford to handicap your material moving schedule with any limited-duty rig—when you can command this versatility unlimited. See your International Drott Distributor for a 4-In-1 demonstration.

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Colorado River Aqueduct expansion

A review of the construction activity now under way on the vast expansion program being carried out by the Metropolitan Water District of Southern California

Part two of two

By R. A. SKINNER

Assistant Chief Engineer
The Metropolitan Water District
of Southern California

TO DATE some \$80,000,000 has been expended on the construction program begun in 1952. To accomplish this the \$35,000,000 of bonds which remained in 1952 from the originally authorized \$220,000,000 bond issue have been sold and other available funds utilized. Exhaustion of these funds by August 1957 requires the start of financing by the sale of 12-yr. bonds which will supply the greater part of the money required for the program up to 1961. The sale of the bonds was authorized by the electors of the District in 1956 by the decisive ratio of 11 to 1.

Pumping plant expansion

Each of the five pumping plants on the main aqueduct was designed to have nine 200-cfs. capacity pumping units, one unit being considered

stand-by. The substructure of each plant was constructed initially to accommodate all nine units, the building superstructures were constructed to house five units, and three units were installed together with the first of three delivery lines. Under the expansion started in 1952 two more units were installed in each plant together with the second pump delivery line, providing a total of 1,000-cfs. installed capacity, or 800-cfs. firm capacity with one stand-by unit. This first expansion of the pumping plants was completed in September 1956 at a total cost of \$12,000,000.

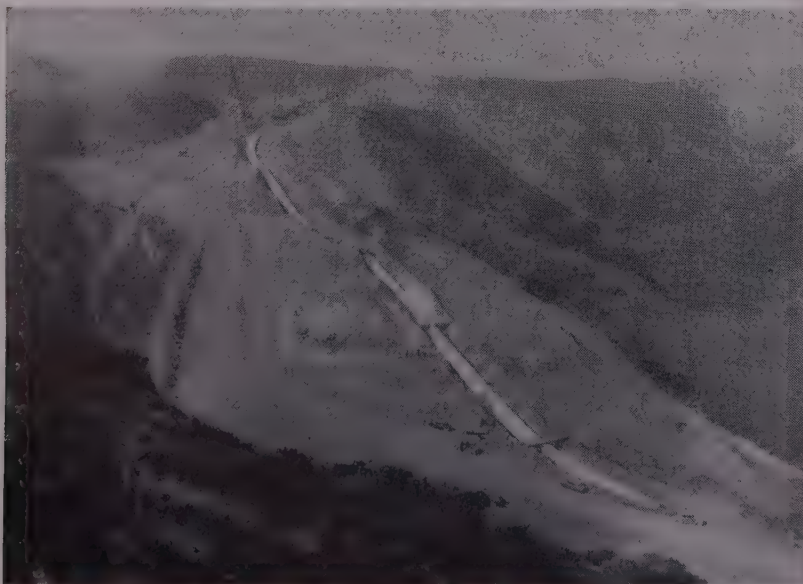
All features of the main aqueduct had been constructed initially to full designed capacity of 1,605 cfs. excepting the pumping plants and some 22 mi. of double-barrel siphons, of which only the first barrel had been included in the first development. However, it appeared that it might be possible to transport a 5-pump flow of 1,000 cfs. through the aqueduct, fairly conservative allowances for hydraulic losses having been provided in the design. Because by 1954 it had become evident that demands were exceeding expectations, installation of the sixth pumping unit

was authorized, necessitating also the enlargement of the pumping plant superstructures. The building extensions have been completed and the installation of unit 6 is scheduled to be completed by the end of March 1958, making a firm capacity of 1,000 cfs. available. It was found necessary to perform a cleaning operation on the 3-mi. long Freda siphon, the longest siphon on the main aqueduct, before a 5-pump flow could be transported, involving removal of $\frac{1}{4}$ - to $\frac{3}{8}$ -in. thick deposit of precipitated calcium carbonate in a matrix of organic material and very fine sediments which had accumulated on the concrete surfaces. Cleaning was accomplished by means of brooms with steel bristles mounted on circular frames attached to a "tunnel jeep" equipped with steering mechanism at each end, several passes being required for complete removal. The work was done in April 1957 during a 3-day shutdown, and a 5-pump flow has been maintained during most of the succeeding period.

As part of the accelerated program to be financed by the short-term borrowing authorized by the voters in 1956, the pumping plants are to be completed by 1960 to the full capacity necessary to transport the District's entire contract allotment of 1,212,000 ac. ft. per year of Colorado River water. Contracts have been awarded for the equipment for pumping units 7, 8, and 9, including the necessary additional power transformers, with delivery scheduled to be completed by October 1958. Contract for the third and final pump delivery line also has been let, with completion scheduled by February 1959. Total cost of the entire pumping plant expansion, including \$12,000,000 previously expended for units 4 and 5 and the second delivery line and including the necessary additional transmission lines to augment the supply of power to the plants, will amount to approximately \$45,000,000.

Pumps are of the single-suction single stage vertical centrifugal type driven by synchronous motors of 4,300-, 9,000-, and 12,500-hp. each for average pumping heads of approximately 145, 300, and 440 ft. Pump delivery lines are 10 ft. in diameter, each with three 6-ft. diameter branches to individual pumps. The first delivery line at each plant

A TYPICAL 108-IN. PRECAST CONCRETE LINE BEFORE BACKFILLING



was constructed of welded steel pipe with riveted field joints and the pipe was lined with coal-tar enamel. Between the concrete anchors at bends the pipe is provided with ring girder and rocker arm supports, with an expansion joint between each pair of anchors. The second delivery line is similar to the first, except that the field joints are welded instead of riveted, using butt welded joints on exposed pipe and lap welded joints on buried portions of the 6-ft. diameter branches which are incased in concrete, and the pipe is lined with mortar $\frac{1}{2}$ in. thick applied in the field by machine methods. The third delivery line will be essentially identical with the second.

Main aqueduct siphons

Fifty-two siphons totaling 22 mi. in length on the main aqueduct are of double-barrel design, with one barrel constructed initially. With a single exception, the first barrel was of monolithic concrete pipe construction throughout, the one exception being Little Morongo siphon with a length of 670 ft. on steep grades, which had been constructed of precast concrete pipe as an experimental project.

In January 1957 contracts were entered into for the second barrel of all the double-barrel siphons, 47 in number and with a total length of 12 mi., on the portion of the aqueduct east of San Jacinto tunnel. The second barrel is designed for a flow of 1,000 cfs., the resulting inside diameter being 13 ft. on 24 siphons totaling 5.26 mi. in length, and 13 ft. 6 in. on 23 siphons totaling 6.80 mi. for which the hydraulic slope is slightly less than for the 13-ft. siphons. Bids were invited for three alternative types of construction, namely, precast concrete pipe with rubber-gasketed steel lock-joints, monolithic concrete pipe with special rubber water-stops at the joints, and mortar-lined gunite-coated welded steel pipe with stiffener rings and rubber-gasketed field joints. Awards were made under two contracts for precast concrete pipe line construction throughout on the basis of the lowest combinations of bids, with specified completion in June 1958 and December 1958, respectively.

The pipe sections are 16 ft. long and the maximum weight per section is 63 tons for the 13-ft. pipe and 68 tons for the 13-ft. 6-in. pipe. The project, which will be constructed by one contractor, American Pipe & Construction Co., spans a distance of



LOWERING A 79-IN. WELDED STEEL PIPE NEAR SOUTH GATE

183 mi. along the aqueduct, with maximum distance of 24 mi. between consecutive siphons. The maximum trench depth is over 40 ft. and the steepest grade is 65%. Special equipment of unique design and proportions has been devised by the contractor in order to transport and lay the heavy pipe sections, one of the controlling factors being the extremely difficult terrain encountered in some of the siphon locations. The maximum operating head, 153 ft., occurs on the Eagle Lift siphon, which also is probably in the most inaccessible location. Cost of the project will be \$17,500,000.

The aqueduct originally was designed for a flow of 1,605 cfs., which was sufficient, with a moderate allowance for outage, to transport the District's then contract allotment of 1,100,000 ac. ft. per year of Colorado River water, or 1,520-cfs. mean annual flow. In 1946 the contract rights of San Diego County Water Authority were merged with those of the District, making the present total of 1,212,000 ac. ft. per year. By providing a nominal capacity of 1,000 cfs. for the second barrel of the siphons, advantage will be taken of any excess capacity in the canals, tunnels, and grade conduits on the aqueduct, the objective being an over-all capacity of about 1,800 cfs. to accommodate the increased allotment of Colorado River water.

With the completion of the 47 siphons now under contract it will be possible to transport all available pumping plant output as far as the point of diversion to the San Diego

aqueduct at the west portal of San Jacinto tunnel. Construction of the second barrel of the 10 mi. of siphons in the portion of the aqueduct between San Jacinto tunnel and Lake Mathews is less critical in respect to time, and it is planned to invite bids later in the year.

Second San Diego Aqueduct

The first barrel of the initial San Diego Aqueduct extending 71 mi. from the west portal of San Jacinto tunnel to San Vicente reservoir near Lakeside, with a designed capacity of 85 cfs. downstream from a regulating reservoir near San Jacinto, was begun by the Navy Department as a military project and completed in December 1947 after contracts covering repayment had been entered into between the Government and the affected local agencies. In the meantime, San Diego County Water Authority annexed to the Metropolitan Water District in December of 1946. Division of the project into two pipe lines downstream from the regulating reservoir near San Jacinto was predicated on providing initially for the emergency resulting in large degree from the demands of the military establishments and war industries, with the expectation of substantial deferment for the second barrel. However, under the prevailing conditions of deficient runoff in San Diego County and the unforeseen influx of population, the first pipe line became inadequate almost immediately. Through successful nego-

(Continued on page 70)



*Job: remove 1,000,000 cobblestones
plus 30,000 square feet of concrete*

Loading costs threaten profits until N.Y. firm buys this 2³/₄ yd Michig

Due to extremely rigid job specifications and unusually rough material, Triboro Asphalt Company, Flushing, New York, faced a substantial loading problem in stripping 31 blocks of six-lane Third Avenue in Manhattan. Recognizing the advantages of a single machine with speed and power to keep costs from getting out of hand, they asked NYC distributor United Tractor & Equipment Corporation to demonstrate a 2³/₄ yd Michigan Tractor Shovel. When they saw, they bought!

Replaces big crawler

The 24 mph Michigan replaced a 3 yard crawler loader. "The crawler was too slow . . . too often blocking traffic . . . and it couldn't get big enough loads to maintain the desired production pace," according to Supt James Magnotta. Smaller crawlers, attempting to load heavy granite-slab

cobblestones, tore out final drives and ended up in the shop. Two big rubber-tire loaders, which had a crack at the job, were sent back to the yard. "They didn't have either the power or the traction needed," said Supt Magnotta.

Does job in 27 days

So the Michigan, working alone, piled and truck-loaded *all the cobblestones*. Over a million of them were handled, according to engineers. Each measured about 8 x 12 inches, weighed about 15 lbs. Individual bucket loads averaged 250 blocks each . . . 3,750 lbs. *The entire job was done in 27 eight-hour days . . . far faster than other stripping contractors doing the same kind of work with power shovels and crawler-loaders elsewhere along Third Avenue.* "Far better too," adds Magnotta. "Our Michigan left the sub-base clean after only one pass. Sensitive controls let the operator



Six-inch concrete slab breaks quickly as Michigan applies its tremendous breakout action. Fast work by the Michigan made job much safer for maintenance of normal highway traffic.

keep just enough down-pressure on the bucket. All we had to do before laying asphalt was fill and level a few spots."

Breaks out concrete

After several days, the Michigan operator became so enthusiastic about the power of his machine, the street foreman tried to tame him down. He gave orders to break out and load some concrete pipe-vault roofs. Even this tough problem had a simple solution. By working bucket edge under the vault and using Michigan's terrific breakout, operator easily broke it loose. Concrete patches and driveway extensions, some 15 to 50 square feet, proved just as easy. "I put in some terrific days—running around the job like a pickup truck," says the operator, Fred Cerbone . . . "did a tremendous amount of work—yet I was *less tired* at the end of a day than on anything else I've operated in my 25 years with Triboro."

How to cut costs

Triboro's Michigan did more than boost operator satisfaction. It helped cut many dollars of expense from the multi-thousand dollar paving project! As every contractor knows, bidding is extremely competitive on this kind of job; by handling loading and clean-up efficiently, the Michigan kept these expense items from eating profits.

With Clark torque converter, power-shift transmission, power steer, and planetary-wheel axles standard on all models, Michigans deliver more usable power, traction, and speed than any other machines of their type. If you're willing to be convinced Michigan is in a class by itself, do what Triboro did: *ask for a demonstration*. You name the job!



Single Michigan pass leaves sub-base clean, smooth, ready for repaving. Note how unobstructed bucket-arm design preserves dumping clearance.

Michigan is a registered trade-mark of

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St. Thomas, Ontario

EARTHMOVING . . .

Second of a series of articles presenting practical methods for improving estimating procedures and job controls. Table shows production and scheduling

By RICHARD BENNETT

Construction Consultant
Saratoga, California

GRADING COST is a high percentage of highway contract cost, therefore a uniform method of estimating and job production control is a must if contractors are to realize maximum profit. All are familiar with the fact that high unit costs are associated with low labor production and low unit costs are generally associated with high labor production—but with earthmoving so much equipment is involved, production largely hinges around operator efficiency, which in turn is mostly influenced by the quality of job supervision provided.

Article 1, of this series, stressed that the "working-rate-per-crew-per-shift" was one of the two most important features of production estimates. Too many use indirect

methods of estimating. They try to convert previous unit costs by means of complicated conversion factors and cost indexes, hoping that all operations will average out, which so seldom happens.

Trying to estimate production on the individual man-hour basis is both unsound and unwieldy. The form presented with this article shows an easy method of estimating production and scheduling. It is based on production per shift-crew, i.e. one crew working one shift. Future articles will show how this method easily and naturally takes into account literally every cost involved and leaves little to that old standby profit-losing item of "contingencies."

This method is easily applicable to all construction operations; it is com-

prehensive, and provides a ready means and basis for cost and production control. There is entirely too much gamble in estimating by applying previous job costs and then hoping that all operations will average out upon completion.

It is easy to analyze a highway earthmoving job with use of the form shown. An 8½ x 11-in. sheet will easily accommodate the 15 required columns. Col. 1—each cut is given an operation number; Cols. 2 and 3 show location; Cols. 4 and 5 show yardage involved in each cut and fill. (Preliminary scheduling is done from contract quantities, but the job manager will secure final pay quantities as soon as the engineer has completed his cross-sectioning and yardage computations. Under no circumstances should the excavating crew begin work on a cut without benefit of a schedule based on the final pay quantities—accurate control would be impossible in many cases); Col. 6 classifies the work as good, average or poor according to the method outlined last month; Col. 7 shows average haul, determined from the mass diagram; Col. 8 shows type of equip-

EARTHWORK PRODUCTION & SCHEDULING														
Job No.					Est. No.					Sht. of				
Owner					Deadline									
Item					Estimated by					Checked by				
Oper. No.	Sta to Sta.		Cubic Yards		Class of Excav.	Ave. Haul Sta.'s	Type of Equipment	Working Rate per Shift 60 min. hr.	Delays & Est. Effic.	Est. prod. per shift per unit	Unit Days Reg.	No. Days Crew	Schedule	
			Excav.	Fill									Start	Finish
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮
					Fills include shrinkage								5 Scrapers	
1	0-0	17-00		14426	Top of	12½	C-Scraper	720	60%	430	34	7	6-14	6-22
	17-00	24-00	32812		Hill -	Poor								
			14426											
			18386											
2	24-00	42-00		18386	Ave.	12½	C-Scraper	720	65%	470	39	8	6-23	7-1
3	42-00	49-00	Borrow	21960	Ave.	16	C-Scraper	620	65%	400	55	11	7-4	7-18
4	49-00	56-00		11831	Rock	7	2½ Shovel	2200	45%	990	12	12	6-16	6-31
	56-00	63-00	22642		Ave.									
			11831											
			10811											
5	63-00	70-40		10811	Rock	7.2	2½ Shovel	2200	45%	990	11	11	7-1	7-15

ment to be used on each cut; Col. 9 shows working rate per shift for the crew selected; Col. 10 shows the estimated efficiency for this crew for this cut, including repairs and weather delays. Any earthmoving contractor who has a file of sound data for Cols. 9 and 10, plus good job supervision, need never worry about competition; they are the crux to assured profit. Col. 11: Multiply 9 by 10; Col. 12: Up to this point we are dealing with one scraper unit only. This column shows the total number of unit-scraper-days required to complete this fill. Col. 13 shows the number of days for a crew of five scrapers to complete this fill; and Cols. 14 and 15 show schedule dates.

Productivity Factors: All contractors should concentrate their research and job historical data on the factors in Columns 9 and 10. Many are not familiar with this estimating and production control tool called "Productivity Factor." It is a simple tool which simplifies work and increases accuracy, giving the job manager better scheduling and cost control; and to the contractor, higher profit.

The earthmoving contractor must evaluate his firm as a productive unit, then determine its efficiency rating for the job against existing elements. Before an accurate production estimate and schedule can be made, each operation (cut) must be analyzed and evaluated and its classification and efficiency determined. The form shows such an evaluation for a 7,040-ft. stretch of highway grading, analyzed in terms of days work required for one 12.1-cu. yd. rubber tired tractor scraper, based upon data in the table and chart presented last month. The crew consists of five scrapers.

Each separate cut or excavation is individually evaluated in terms of production elements. The overall job efficiency is obtained by weighted average.

Within a short time after setting up a classifying system of Productivity Factors, sufficient data can be assembled to plot production curves (such as shown last month) based upon the individual contractor's own actual production data to eliminate future "guesstimating."

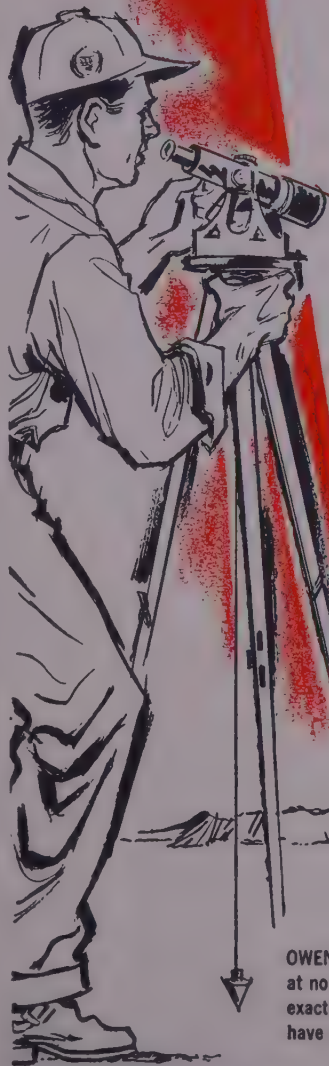
Construction consultants are available for such special tasks.

The method outlined here readily and accurately absorbs the many assumed and variable conditions which are usually absorbed (they hope) in "contingencies" in the old man-hour method, and no highly complicated conversion factors are involved.

You can't set your sights too high

For digging . . . for handling material . . . for any clamshell work — OWEN Buckets perform giant size jobs day in and day out. OWEN'S designing and engineering experience, gained through 50 years of manufacturing Clamshell Buckets exclusively, has developed a product that is guaranteed to out-perform any other make. Remember—the bucket is the working end of the boom and it is of the utmost importance that there is absolute assurance the bucket will do the job.

This experienced "know-how" in design and engineering has contributed to the origination of the only independent line action Grapple to handle rock, scrap metal or pulpwood. The same unequaled quality construction in OWEN Clamshell Buckets is in OWEN Grapples.



OWEN Engineers are at your service any time at no cost to you. Send us your needs, stating exactly what are your requirements. We should have the answer that will "fit the bill to a T".



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AQUEDUCT GROWTH

(Continued from page 65)

tations by the Authority with the Government, construction of the second barrel was started in 1952 and completed in September 1954, providing a total designed capacity of 180 cfs. to Rainbow in northern San Diego County and 165 cfs. to San Vicente reservoir. By means of intermittent chlorination to control organic deposits on the pipe surfaces it has been possible to maintain approximately the initial capacity of these pipe lines, enabling a total flow of 200 cfs. to be conveyed to San Diego County.

As in the case of the first pipe line, with the continued drouth and increased developments in San Diego County the capacity of the second barrel was absorbed almost immediately and a condition of acute shortage remains. To alleviate this condition a second aqueduct to San Diego County has been authorized by the District. This aqueduct will divert from the Colorado River Aqueduct near the west portal of San Jacinto tunnel and will follow a route in the general vicinity of the first aqueduct to a point 6 mi. south of the County line, near the San Luis Rey River. The remainder of the aqueduct in San Diego County will be constructed by San Diego County Water Authority.

The point of termination of the portion of the second aqueduct to be constructed, owned, and operated by the Metropolitan Water District is consistent with previous contractual arrangements between the District and the Authority in which the District agreed to pay the cost of the portion of the first aqueduct northerly of a point near the north side of the San Luis Rey River established as dividing the initial barrel into two parts of equal cost.

The second San Diego aqueduct will consist principally of canal from its junction with the Colorado River Aqueduct to Auld Valley, a distance of 20 mi. There will, however, be a number of siphons at crossings of major highways and watercourses. Capacity of the canal section and interconnecting siphons will be 500 cfs., according to present preliminary plans. From Auld Valley southerly, the remaining 17 mi. of the portion of the aqueduct to be constructed by the District will consist of buried pipe line of 250-cfs. capacity. It is planned to invite bids for the work before the end of the year. Cost of the portion of the second San Diego aqueduct to

be constructed by the District is estimated to be \$22,000,000.

Distribution system

Works completed or under construction to date in the expansion of the distribution system served from Lake Mathews include 120 mi. of pipe lines ranging in size from 36 to 108 in. in diameter, and two 10-ft. diameter tunnels totaling 2.7 mi. Bids are scheduled to be invited in August 1957 for the central portion of the lower feeder, involving construction of 15 mi. of 96-in. pipe line and two major pressure regulating structures.

The pipe lines are of two general types: (1) precast concrete pipe with steel cylinder and bar reinforcement and rubber-gasketed steel lock joints, and (2) welded steel pipe with spun mortar lining and reinforced gunite exterior coating applied directly on the steel surface where the pipe is to be installed in ground with a favorable or mild corrosivity index, and with an exterior coating of coal-tar enamel underneath the gunite for installation in locations where the soil corrosivity is relatively severe. The steel pipe is installed with double welded lap joints. Selection of the type of pipe is on the basis of competitive bidding excepting for lines subjected to pressure in excess of about 550 ft. of head, in which case welded steel pipe is specified without alternative. The total investment in the foregoing distribution system facilities will be \$82,000,000.

The distribution system expansion affords improved service to the older constituent areas of the District in Los Angeles and Orange counties, and provides the principal facilities for service to some of the more recently annexed agencies, including Central Basin Municipal Water District in Los Angeles County, Orange County Municipal Water District, and Western Municipal Water District of Riverside County.

In order to effect further improvements in distribution in the Los Angeles and Long Beach Harbor areas, and enable unsoftened water to be delivered to the south and west coastal areas for ground-water replenishment and injection along the barriers to repel sea water intrusion, it will be necessary to add several auxiliary pipe lines to the system. Among these auxiliary lines, a second lower feeder extending westerly from the Santiago lateral turnout—is included in the plans for facilities to be deferred beyond 1960.

Enlargement of Lake Mathews

A pending feature of the expansion program is the enlargement of Lake Mathews to approximately double its present usable capacity of 104,000 ac. ft., involving raising the existing earth dam and dike about 50 ft., construction of additional outlet works and a new spillway, and relocation of portions of existing County highways. Embankment construction for the enlarged dam and dike, and several auxiliary dikes, may total about 10,000,000 cu. yd. Investigations are in progress for purposes of final design, involving comprehensive testing of materials from the existing embankments and from available borrow areas for use in the additional embankments, and measurement of water pressure in the existing dike embankment and its foundations by means of piezometers installed in drilled holes.

Softening and filtration plants

The F. E. Weymouth Memorial Softening and Filtration Plant near La Verne presently has a designed capacity of 310 cfs., or half the ul-

(Continued on page 80)



Williams Buckets

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McCoy Company
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Warnock-Bancroft Equipment Co.
El Monte, Calif. (Los Angeles)



Montana Power Company project— Cochrane Dam past half-way mark

WORK is being pressed by The Montana Power Co. on six major construction projects in Montana and Canada, according to J. E. Corette, president and general manager.

Cochrane Dam on the Missouri River near Great Falls has been half completed by the 250 men working two shifts a day. The 869-ft. long concrete-gravity dam will develop 60,000 kw. of power and will boost the Utility's system capability to 671,000 kw. Cost is estimated at \$10,000,000. Winston-Green of Great Falls began work on the project in August 1956. A joint venture of Winston Brothers Co., Minneapolis, Minn., and Green Construction Co., Des Moines, Iowa, completion is planned late in 1957. A description of the project appeared in the February issue of **Western Construction**. The company already has 12 hydro plants and a steam generating station.

The Kerr-Rattlesnake, 161,000-volt transmission line is nearly 80% com-

pleted and is due to be finished August 1. The 57-mi. line features wood poles and aluminum wire bringing power from Kerr project to Rattlesnake Substation near Missoula. Next year the line will be extended into Anaconda, 90 mi. eastward. Crews already are busy clearing right-of-way, building access roads and surveying for next year's construction across the rugged country to the smelter city.

Larger insulators are being put on the 48-mi. Drummond-Philipsburg line to permit transmission of electricity at 50,000 volts. At the present time, the line is at 25,000 volts.

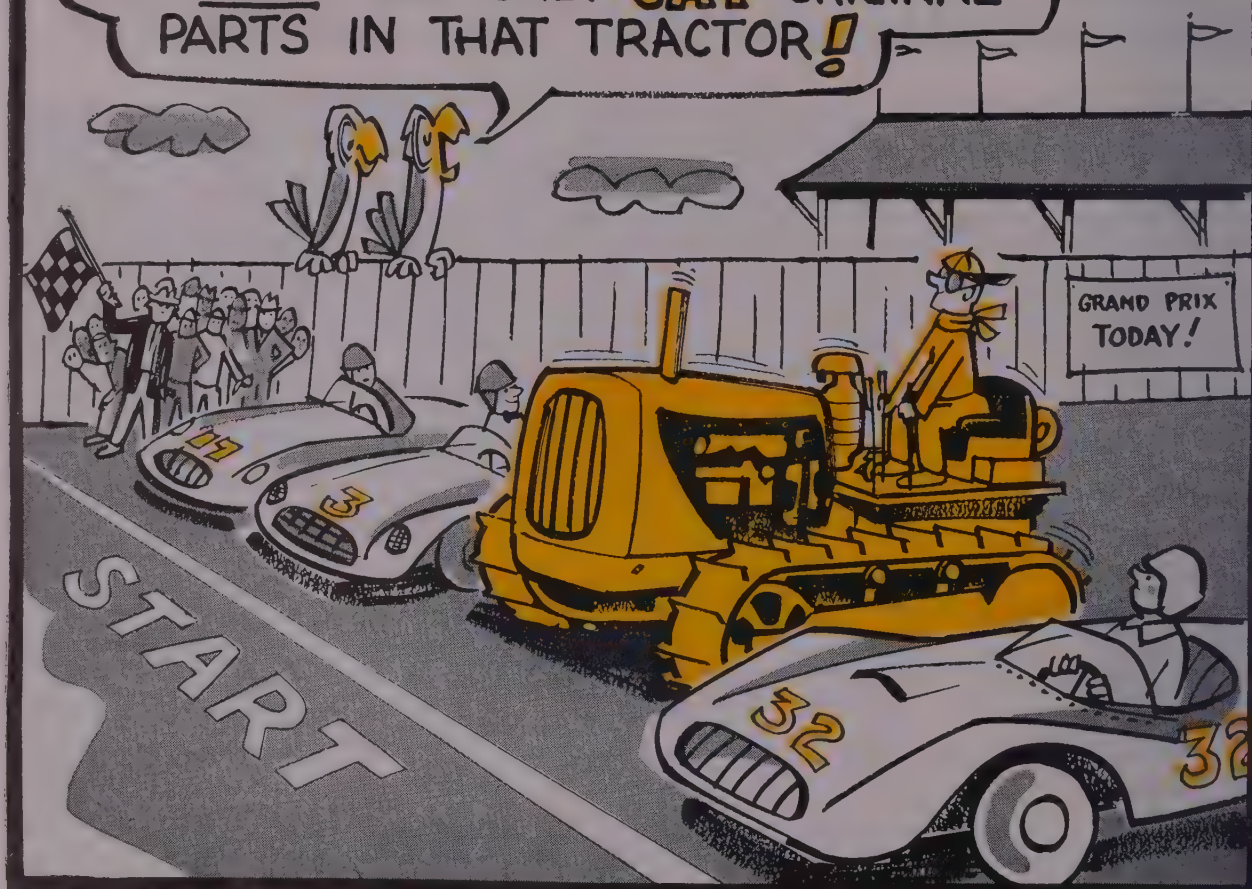
The company's microwave communications system, which will improve electric and natural gas dispatching besides expedite executive and administrative work, is 70% completed. Work now is under way on the west leg, to Hamilton, Missoula and Kerr Dam. The east leg, to Billings, will be started next spring.

The north phase, to Canada and points in between, already is functioning. The system is one of the largest in the nation.

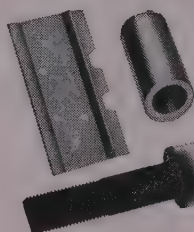
In the natural gas department, work has started on building an extension to the Missoula transmission line to permit service to six communities and the new Waldorf Paper Co. plant 9 mi. west of Missoula. The communities that will receive gas from the 8-in. line are Clinton, Piltzville, Bonner, Milltown, West Riverside and East Missoula. Distribution lines now are being laid in the latter two areas.

The gas department also is placing 26 mi. of various-sized pipe to gather gas at company wells in the Pendant d'Oreille and Comrey Fields of southeastern Alberta for transmission into Montana. In addition 7½ mi. of 8-in. pipe is being added to the transmission system at Telstad, Mont., near Cut Bank.

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TRACK PARTS?



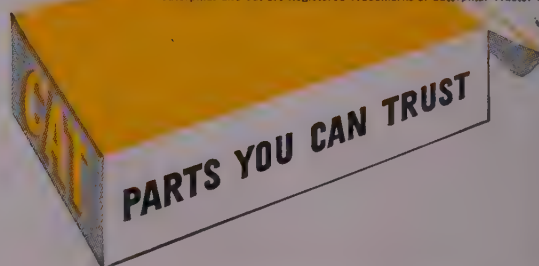
Are they really as much alike as they look? Steel used in industrial standard bolts must withstand 120,000 pounds pull per square inch—CAT* bolts must withstand *at least* 151,000 PSI. Same with other Cat original track parts—higher standards. With “look-alike” track parts, who knows?

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Bureau of Reclamation spending plans

DETAILS of a \$180,000,000 Bureau of Reclamation construction program to be undertaken this fiscal year have been announced by Commissioner of Reclamation W. A. Dexheimer following the conclusion of the annual programming conference in San Francisco.

The construction program, as well as other phases of the Bureau's activities for the year, is subject to Congressional action. The House has completed action on the annual appropriation measure as has the Senate appropriations committee. Pending action by the Senate and acceptance of a conference report by the House and Senate, the Bureau of Reclamation has been functioning by the authority of a concurrent resolution.

Construction contemplated by the Bureau of Reclamation this fiscal year which ends June 30, 1958, will result in a water supply for 150,700 ac. of land not presently irrigated and a supplemental supply for 93,600 ac. now receiving an insufficient supply. An additional 102,700 kilowatts of hydroelectric generating capacity will be placed in operation at multipurpose projects built by the Bureau of Reclamation in the 17 Western states.

Five new starts on projects or units of projects are contemplated although some of these are contingent upon action by the Congress. They are: Little Wood River, Idaho; Crooked River, Ore.; Wapinitia, Juniper Division, Ore.; and the Ainsworth and Farwell units of the Missouri River Basin project in Nebraska.

Major features of the contemplated construction, by regions, follows:

REGION ONE

Michaud Flats Project, Idaho. \$1,206,000; to virtually complete all essential features of this single-purpose 11,240-ac. irrigation project. Water service will become available to approximately 10,000 ac. by next spring.

Minidoka Project, North Side Pumping Division, Idaho. \$1,478,305; will virtually complete this 77,650-ac. irrigation project. Facilities to serve 19,120 new ac. will be completed bringing the total to 70,100 ac.

Palisades Project, Idaho. \$1,900,000; for completing project. The 13,500,000-cu. yd. earth and rockfill Palisades Dam and installation of the last two of four 28,500-kw. generators will be completed this summer and fall. The 1,401,600-ac. ft. reservoir basin will be ready to impound its full capacity by spring 1958.

Crooked River Project, Oregon. \$850,000; to start construction of the

earth and rockfill Prineville Dam—principal feature of this project which will provide full water supply to 9,990 ac. of new land and a supplemental supply to 10,220 ac. of existing privately-developed irrigation land.

Rogue River Basin Project, Talent Division, Oregon. \$6,189,510; to continue work on the Deadwood tunnel, which will be completed this year, the Howard Prairie dam and reservoir, the Howard Prairie delivery canal, and the 16,000-kw. Green Springs power plant. Initiate construction of the Keene Creek Dam and reservoir, the Green Springs power conduit, Emigrant Dam and reservoir, and various canals and laterals. When completed several years hence, the project will serve 23,000 ac. in the vicinity of Medford.

Chief Joseph Dam Project, Foster Creek Division, Washington. \$900,000; to complete the pumping plants, water distribution and other facilities of the 2,733-ac. Brewster Flats Unit, and to construct the 301-ac. townsite area of the Bridgeport Bar Unit. Construction of the 428-ac. Bar area of the Bridgeport Bar unit has just been completed.

Columbia Basin Project, Washington. \$13,850,000; completion of laterals and pumping plants for serving an additional 34,000 ac. in 1958, and continuation or initiation of similar construction to serve 26,000 new ac. in 1959 and an additional increment of new lands in 1960. Spillway lighting facilities at Grand Coulee will be completed. Construction of drainage facilities will continue as needs arise. Construction will begin on the 5,300-cfs. Esquatzel diversion canal, a joint flood control channel and irrigation wasteway near Pasco.

Yakima Project, Roza Division, Washington. \$923,000; for completing 11,250-kw. Roza power plant and for initiating drainage work.

Boise Project, Idaho. \$901,430; principally for construction of program of lining and repairing unsafe portions of 50-yr.-old New York Canal, also to complete raising of railroad grade and construction of a small dike along shore of Black Canyon Dam reservoir, and to complete enlargement of "C" Line Pumping Plant.

REGION TWO

Central Valley Project, California. \$25,454,858. Continue construction of Trinity Dam and Clear Creek Tunnel and relocation of county roads in the

Trinity area. Start work on temporary fish trapping facilities at Lewiston.

Santa Maria Project, California. \$6,995,000 to continue construction of Vaquero Dam and acquire rights-of-way. Completion anticipated by 1959 when this project will supply supplemental irrigation water for 35,700 ac. and a full supply of 3,000 ac.

Solano Project, California. \$5,109,000 to complete Monticello Dam and continue construction of Putah Diversion Dam and Putah South Canal. This project will serve 71,880 ac. with full irrigation water supply and 24,200 ac. with supplemental supply, and will supply 27,200 ac. ft. of water annually for municipal and industrial use.

Ventura River Project, California. \$12,002,148 to continue construction of Casitas Dam and to award contracts for Robles Diversion Dam and Robles-Casitas Diversion Canal. Work will be initiated on water conveyance systems for the Ventura River, Ojai Valley, and Rincon areas. The project will supply 15,600 ac. ft. of water annually for municipal and industrial use as well as supply irrigation water for 13,200 ac.

REGION THREE

Palo Verde Diversion Project, Arizona-California. \$864,080; to complete Palo Verde Diversion Dam. The new dam replaces a temporary rock weir to raise the river level sufficiently for diversion of Colorado River water into the Palo Verde Irrigation District's canal system.

Salt River Project, Arizona. \$1,258,681; for continuation of rehabilitation of the Salt River Project. Includes construction of about 500,000 sq. ft. of canal lining and placing concrete lining in some 29 mi. of laterals, plus the rehabilitation of the sluice gates at Granite Reef Diversion Dam.

REGION FOUR

Collbran Project, Colorado. \$2,250,000; to continue construction of Vega Dam, the access road to Cottonwood No. 1 reservoir, and the Southside canal. When completed, project facilities will provide full water supply for 2,310 ac. of new land and a supplemental supply for 18,380 ac. in the spring of 1960. Generating units at the Upper and Lower Molina powerplants with a rated capacity of 13,000 kw. are scheduled to be placed in service during June 1962.



International scraper



Michigan scraper



Adams grader



Eimco bulldozer



Eimco loader



LeTourneau-Westinghouse bulldozer



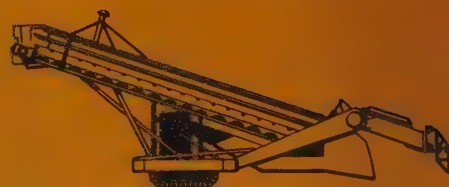
Michigan bulldozer



Michigan loader



LeTourneau-Westinghouse scraper



Euclid loader

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Westfall scraper



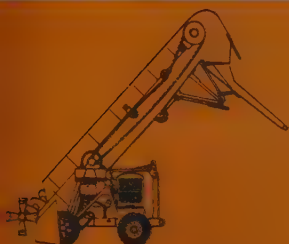
Galion grader



Hough loader



Huber-Warco grader



Pettibone-Haiss loader



Wagner bulldozer



Wagner Scoopmobile loader



M-R-S scraper



Wooldridge scraper

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FINE-GRADING ON SAN BERNARDINO FREEWAY

Fine-grading as a preliminary to concrete pouring is a specialized job requiring accurate control. This view shows the operation on the last section of the San Bernardino Freeway in Southern California. Contract was held by Winston Brothers, with concrete work carried out by Haddock Engineering Co. under a subcontract. The job consisted of 3 lanes 12 mi. long to handle eastbound traffic in the Pomona area.

The 12-ft. width of lane was fine-graded at a depth of 7 1/4 in. with the Standard-Lewis subgrader, and later cut to 8 in. following cement treating operations. A simple cable hoist raises or lowers the subgrader for varying depths of cut, or for passing over obstructions in the subgrade. The belt conveyor which moves material outside the forms is designed so that sections can be added or removed easily.

Weber Basin Project, Utah. \$7,434,735; to start construction of the Willard Dam and reservoir; the Weber aqueduct pumping plant and discharge line; the Woods Cross and West Farmington trunk lines; the Sand Ridge, East Layton, and Val Verda pumping plants and appurtenant electrical equipment to serve areas out of the completed Davis aqueduct; also to start work on the Uintah Bench, West Farmington, and Woods Cross laterals; and the Wanship reservoir basic recreational facilities. Construction will continue on project drains, the Gateway and Wanship power facilities and the Pineview reservoir recreational facilities. Construction will be completed on Weber aqueduct. Irrigation water will be made available this fiscal year to supply supplemental water to 9,500 ac. and to deliver a full supply to 3,000 ac. of new land. There will also be made available 20,000 ac. ft. of water for municipal and industrial uses. The Wanship and Gateway power plants will be completed and placed in operation by early summer of 1958, with 5,400 kw. of power being made available.

Colorado River Storage Project, Arizona, Colorado, Utah, Wyoming and New Mexico; \$27,540,858, as follows: **Glen Canyon Unit, Arizona and Utah.** \$19,418,687; for continuation of construction on the Glen Canyon Dam prime contract and the Colorado River bridge; and for completion of the right diversion tunnel and the Bitter Springs access highway. Award of contract for construction of powerhouse penstocks is contemplated. Construction of the headquarters town of Page, Ariz., will con-

tinue with construction of most of the facilities to be completed this fiscal year. **Flaming Gorge Unit, Utah and Wyoming.** \$4,831,433; award of prime contract for construction of Flaming Gorge Dam as well as the contract for power-plant facilities. Construction of the temporary access road will continue. Construction of the major components of the Flaming Gorge headquarters town will be initiated and well along by end of this fiscal year. **Navajo Unit, New Mexico and Colorado.** \$1,854,964; award of the Navajo Dam prime contract is scheduled. The access road to the Navajo Dam will be completed. Construction of the necessary Navajo Dam community facilities, including 15 temporary housing units, will be initiated and essentially completed this fiscal year. **Advance Planning.** \$1,435,774; for preconstruction activities for the Curecanti unit in Colorado and eleven participating projects as follows: Central Utah, Utah; Emery County, Utah; Florida, Colo.; Hammond, N. Mex.; La Barge, Wyo.; Lyman, Wyo.; Paonia, Colo.; Pine River Extension, Colo.-N. Mex.; Seedskadee, Wyo.; Silt, Colo.; Smith Fork, Colo.

REGION FIVE

Middle Rio Grande Project, New Mexico. \$3,814,000; Channelization improvements will be extended in the Socorro area and preconstruction activities will be undertaken on channel improvements in the Belen and Hot Springs area. Bureau rehabilitation and extension of irrigation facilities will continue. The work completed through fiscal year 1958 will more adequately utilize the water

supply for 48,000 ac. of presently-irrigated land.

REGION SIX

Helena Valley Unit, Missouri River Basin Project, Montana. \$4,770,000 to continue construction of dam and regulating reservoir, pumping plant at Canyon Ferry Dam, 2.8-mi.-long tunnel, and first 8 mi. of canal near Helena, Mont. Start construction of remainder of main canal (23 mi.) and laterals and drains. Irrigation of the first 8,363 ac. of project lands is anticipated in 1959.

Owl Creek Unit, Missouri River Basin Project, Wyoming. \$1,600,000 to continue construction of Anchor Dam, a 220-ft. high concrete dam on south fork of Owl Creek near Thermopolis. Scheduled to be completed in fiscal year 1959.

REGION SEVEN

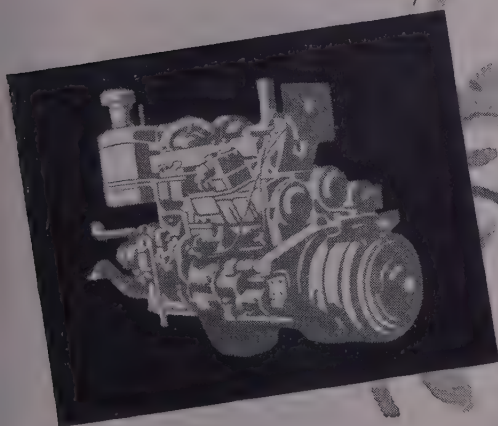
Colorado-Big Thompson Project, Colorado. \$549,000; for continued construction on the Colorado-Big Thompson power plant (4,500-kw. capacity), switchyard and connecting transmission line, which are the last features of the project.

Glendo Unit, Missouri River Basin, Wyoming. \$9,901,000 for completion of the Glendo Dam, reservoir, power plant of 24,000-kw. capacity, and switchyard. Construction will continue on the Fremont power plant and switchyard. Water will be available for an additional 40,000 ac. in 1958.

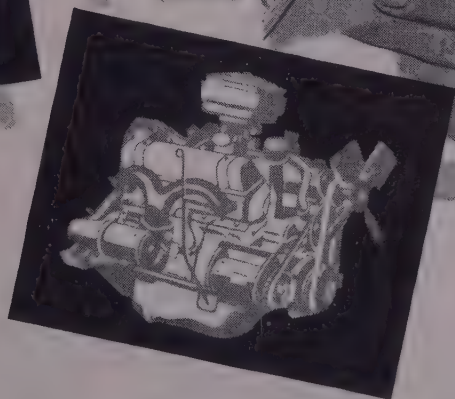


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SCAFFOLDING COSTS

(Continued from page 44)

general standards upon which the accompanying table for different types of form panels was based. Scaffolding on form panels is an integral part of the form, and once it is built onto the form, it remains on throughout the life of the form.

The additional cost of scaffolding on all-wood form panels is hard to justify for a one-time use. One-pour operations are generally from ground level, and hence, the need for scaffolding is lessened because often only a small portion of it is more than 6 ft. above the working surface. Once scaffolding has been adopted as a standard procedure, a change to makeshift devices decreases the efficiency of any planned procedure. Second use of the form panel reaches the break-even point and pays for the additional cost (see table). Without scaffolding, labor time goes up due to the immediately created problems of working at heights and all the common difficulties inherent where lack of good access exists. Use of scaffolding affords a means of improving the operation more continuously; whereas, without scaffolding, production improvement is limited. The use of the all-wood form panel with scaffolding shows a \$42 gain for five uses above the original cost of \$111 for the scaffolding, or \$1.38 returned for every \$1.00 invested in scaffolding (see table).

Cost of scaffolding on steel-backed form panels is not justified until approximately eight uses have been performed. Forms of this type are not made unless many uses are anticipated. After twenty uses, which is half of the normal life of this type of panel, the scaffolding has earned \$380, or, for every dollar invested in scaffolding, a return of \$2.95 is realized (see table).

The cost of scaffolding on all-steel forms is not amortized until after twenty uses. Forms of this type are only used where the re-use of the form is high. After fifty uses, which is half of the normal life of this type of form, for every \$1.00 invested, a return of more than a \$1.35 is realized in net savings. A part-wood scaffolding on these forms would permit a greater rate of return.

Use of scaffolding as an integral part of form paneling has been largely due to the efforts of the Corps of Engineers as an accident prevention measure on its projects. The contractors have often voiced considerable opposition to full com-

pliance due to the high initial cost of scaffolding and the accepted use of safety belts as an adequate safety measure. As these contracts progressed and the working areas became increasingly high, the accident record substantiated the position of the Corp of Engineers, as administering agency, in requiring scaffolding in all instances. Where workmen are exposed to the hazard of falls of 6 ft. or more from one level to another, serious consequences are apt to result should such an incident occur. It can also easily be seen that the higher the fall, the more likely fatal injuries will result.

As is shown in this article, tangible savings can be earned by use of scaffolding, and the management of these contracting firms were also able to see a saving in the labor cost of handling form panels when they were equipped with scaffolding, in addition to a reduced accident rate. Near the completion of this study period, one of the contractor's project engineers stated that he would most certainly include scaffolding on all form work on any future work. The top management of the same organization in its own publication stated that scaffolding should be included in all job planning.

It is without argument that the use of scaffolding affords job economy and substantially reduces the accident risk on construction work.

AQUEDUCT GROWTH

(Continued from page 70)

timite capacity. Completion to full capacity requires the installation of flocculators, settling basins, filters, and softeners, with connecting conduits and auxiliary facilities including principally a filtered water regulating reservoir, salt storage basins, waste brine retention reservoir, and wash water storage tank. The plant enlargement is included in the expansion program for completion by 1960, and is estimated to cost \$8,000,000.

It is planned subsequently to construct a filtration plant, probably including softener units, on the lower feeder west of the Santiago lateral turnout, with capacity about equal to that of the LaVerne plant, the estimated cost being \$20,000,000.

Supplementary storage

Ultimate development of the system will require additional regulatory and emergency storage, including a pumping plant for lifting

aqueduct water into Morris reservoir on the San Gabriel River. Morris reservoir is owned by the District and its outlet works are connected to the upper feeder of the distribution system, but the District has no right to the use of San Gabriel River water and must replace any diversions by an equivalent quantity of imported water. Deferment of these supplementary storage facilities is expected to extend beyond the program now scheduled.

Estimates of cost unavoidably change as time advances because of the rising index of cost and because of increases in the scope of the program. It now appears that the total expansion to be completed by the end of 1960 will involve an expenditure of \$200,000,000, including the program started in 1952 and the accelerated program to be financed by the bonds authorized in 1956. The remainder of the system for distribution of Colorado River water is estimated to cost an additional \$75,000,000.

The scope of this discussion has been confined to the system required for transportation and distribution of the District's contract allotment of Colorado River water. Amplification of the District's system for receiving and distributing, for use in its constituent areas, an appropriate share of water to be imported from Northern California through the proposed Feather River Project Aqueduct, the initial unit of the California Water Plan, will require works of great magnitude, planning for which must await determination of the features of aqueducts from the north.

Robert B. Diemer is general manager and chief engineer of the District, having assumed that office at the beginning of 1952, when the expansion program was started. Henry J. Mills is construction engineer; E. W. Rockwell, chief electrical engineer; and Harris V. Crawshaw, office engineer. The author is assistant chief engineer.

CORRECTIONS

Two errors have been found in Part 1 of the description of the Colorado River Aqueduct expansion, which appeared in the August issue. On page 46, 8th line from the bottom of column 1, the figure should be \$750,000 instead of \$75,000. On page 45, 9th line of column 1, the word should be "basins" instead of "basis."

Low bids and contract awards

ARIZONA

A low bid of \$2,751,984 was submitted by **Rogers Construction Co.** of San Diego, Calif., for Units 1, 2 and 3. The work is located in Yavapai and Coconino counties, northeast of McGuireville on Rte. 79 on the Cordes Jct.-Flagstaff Highway, and consists of grading and draining the roadway. **T. M. K. Construction Co.** of Phoenix submitted a low bid of \$551,845 for 11.6 mi. of grading and surfacing U. S. Rte. 66, the Holbrook-Lupton Highway northeast of Holbrook in Apache County. **Mercer Construction Co.** of Globe submitted a low bid of \$137,679 for 2 mi. of grading and draining the Apache Trail (Roosevelt to Grapevine) in Gila County. A low bid of \$386,527 was submitted by **Mohamed Earthmoving**, contractor of Phoenix, for grading, draining and surfacing the Buckeye-Phoenix Highway on U. S. Rte. 80, crossing of the Agua Fria River in Maricopa County. **W. W. Clyde & Co.** of Springfield, Utah, received a \$1,331,470 contract for access roads, streets and utilities for Page, Ariz., Glen Canyon Unit, Middle River Division of the Colo. River Storage Project. **W. J. Henson**, contractor, Prescott, submitted a low bid of \$323,433 for widening, grading and surfacing 2½ mi. of the Wickenburg-Phoenix Highway, near Wickenburg, Maricopa County.

CALIFORNIA

Transocean Engineering Corp. of Hayward received a \$942,791 contract for 7.8 mi. of grading and surfacing and construction of one bridge east of Martell in Amador County. A \$1,742,222 contract was received by **Fredrickson & Watson Construction Co.** of Oakland for 1.4 mi. of freeway, frontage roads and connections and one bridge to be constructed, Marin County. **Vernon Paving Co.**, Los Angeles, received a \$320,566 contract for widening and surfacing 1.9 mi. of Rte. 107, Hillcrest Blvd. in Hawthorne, Los Angeles County. A \$1,095,170 contract was received by **Tomei Construction Co.**, Van Nuys, for widening and surfacing 2.4 mi. on the Hollywood Freeway and to alter two pedestrian undercrossings and one overcrossing in Los Angeles County. **Eugene G. Alves Construction Co., Inc.**, of Pittsburg, received a \$214,209 contract for 2.4 mi. of grading and surfacing and construction of one bridge on the Alvarado-Niles Road on Rte. 1026 in Alameda County. A \$459,955 contract was received by **Mercer, Fraser Co., Inc.**, and **Mercer, Fraser Gas Co., Inc.**, of Eureka for grading and surfacing approaches and construction of a bridge across the Mad River on U. S. 101 in Humboldt County. **W. F. Maxwell Co.**, Fontana, received a \$872,046 contract for grading

and surfacing a portion of 4-lane highway on U. S. 60 and construction of a bridge near Riverside in Riverside County. **Johnson Western Gunite Co.**, Gardena, received a \$394,999 contract for repairing portion of a bridge across San Francisco Bay, between San Mateo and Hayward in San Mateo and Alameda counties. A \$508,510 contract was received by **Rockport Redwood Co.**, San Francisco, for grading and surfacing 3.9 mi. of sign rtes. 49, 108 and 120 west of Yosemite Junction in Tuolumne County. **C. B. Tuttle** of Los Alamitos received a \$221,478 contract for construction of three bridges and two culverts at various locations in Kern County. A \$6,373,000 contract was received by a joint venture at Stanton, consisting of **Cox Bros. Const. Co.**, **J. E. Haddock, Ltd.**, **The Arundel Corp.** and **L. E. Dixon Co.** for site preparation for new runway and existing pavement repair at the Naval Air Facility, San Clemente Island.

COLORADO

A low bid of \$209,875 was submitted by **Martinson Construction Co.** of Denver for street improvement in the city and county of Denver. **C. L. Hubner Co.** of Denver submitted a low bid of \$2,249,140 for construction of bridges and sewer lines on the Valley Highway between Santa Fe Drive and Logan St., city and county of Denver. **Western Paving and Construction Co.** of Denver submitted two low bids for street improvement in the city and county of Denver: \$178,830 for District No. 1028 and \$136,035 for Proj. No. 10, 13th Ave. to Downing. **Monaghan & Smith** of Plateville submitted a low bid of \$1,530,367 for 20 mi. of grading and structures between Agate and Limon on S. H. No. 8 in Elbert County. A low bid of \$1,154,138 was submitted by **Amis Construction Co.** of Oklahoma City, Okla., for 2.9 mi. of grading, surfacing and structures between Steamboat Springs and Summit of Rabbit Ears Pass on S. H. No. 2, Routt County. **Latimer Construction Co.**, Denver, submitted a low bid of \$330,266 for Project No. 7, 20th St. Viaduct reconstruction in city and county of Denver. **North West Engineering Co.**, Denver, submitted a low bid of \$331,043 for grading and surfacing portions between Lyons and Estes Park in Larimer and Boulder counties. **Peter Kiewit Sons' Co.** of Denver submitted a low bid of \$205,336 for Street Improvement, Dist. 1030 in city and county of Denver. **E. W. Lewan, Inc.**, Denver, submitted a low bid of \$188,882 for Street Improvement Dist. 1029 in city and county of Denver.

IDAHO

Cherf Bros. & Sandkay of Ephrata,

Wash., submitted a low bid of \$334,968 for earthwork and structures, from main canal east, main canal west and wells in area 6, Michaud Flats Proj. **Peter Kiewit Sons' Co.**, Idaho Falls, submitted a low bid of \$520,032 for grading 4.8 mi. of the Lewis & Clark Highway in Clearwater National Forest, Idaho County. **T & S Construction Co.**, Twin Falls, received a \$165,029 contract for 4.9 mi. of grading and surfacing and 4 concrete bridges on the Aberdeen Loop in Bingham County. **Goodfellow Brothers**, Wenatchee, Wash., received a \$165,043 contract for construction of roadway and surfacing on Orofino-Whiskey Creek Road in Clearwater County.

MONTANA

McLaughlin, Inc., Great Falls, received a \$267,622 contract for 3.6 mi. of grading and gravel surfacing the Bozeman-Wilsall Highway, North Route Ave., Bozeman, in Gallatin County. **J. F. England's Sons, Inc.**, Rapid City, South Dakota, received a \$269,588 contract for 9 mi. of grading and gravel surfacing the Miles City-Jordan Highway in Garfield County. **Walling Construction Co.** of Lewistown received a \$172,746 contract for grading and surfacing the Lewistown-Forest Grove Highway in Fergus County. A \$165,147 contract was received by **Richardson Construction Co., Inc.**, of Miles City for 7.3 mi. of plant mix and seal coating the White Sulphur Springs-Harlowton Highway in Meagher County. **Union Credit Co.** of Butte received a \$125,933 contract for 2.8 mi. of grading and gravel surfacing the Hamilton-East Highway in Ravalli County. A \$193,027 contract was received by **Zook Bros. Construction Co.**, Bigfork, for 6.4 mi. of grading and surfacing the Starr School Rte., Browning, in Glacier County. **Naranche & Konda**, Butte, received an \$89,118 contract for 8.8 mi. of roadwork on the Cardwell-Boulder Highway in Jefferson County.

NEVADA

Isbell Construction Co. of Reno received a \$2,631,956 contract for construction of 6.2 mi. of U. S. Highway 40, east of Sparks in Washoe County. **Hoops Construction Co.** of Twin Falls, Idaho, received a \$288,066 contract for roadwork in Ruby Valley, Humboldt National Forest, Elko County. **Thayn Construction Co.** of Salt Lake City, Utah, received a \$592,339 contract for construction of a portion of State Rte. 88, near Minden and Nevada-Calif. State Line in Douglas County.

NEW MEXICO

Armstrong & Armstrong of Roswell received a \$1,834,739 contract for 7 mi. of grading and surfacing U. S. 60-85 north of Socorro-North in Socorro County. **Miller, Smith & Jones** of Albuquerque received two contracts for highway work in Otero and Lea coun-

Utah Construction Company

moves 10,500,000 yds. of sand from bay floor, to build 400-acre coastal development

In an effort to keep up with California Bay Area's fast-expanding population, the Reclamation Bureau of Alameda is creating a new 400-acre coastal tract along the south shore of Alameda, on San Francisco Bay. This monumental reclamation project will provide for much-needed commercial and residential expansion.

Estimated to be completed by 1960, the development will ultimately include 1000 homes... plus multiple dwelling units, shopping centers, a professional and administrative zone, schools, churches and parks. A public beach along the perimeter will add to recreational facilities.

800-acre borrow area — 10,000' off-shore

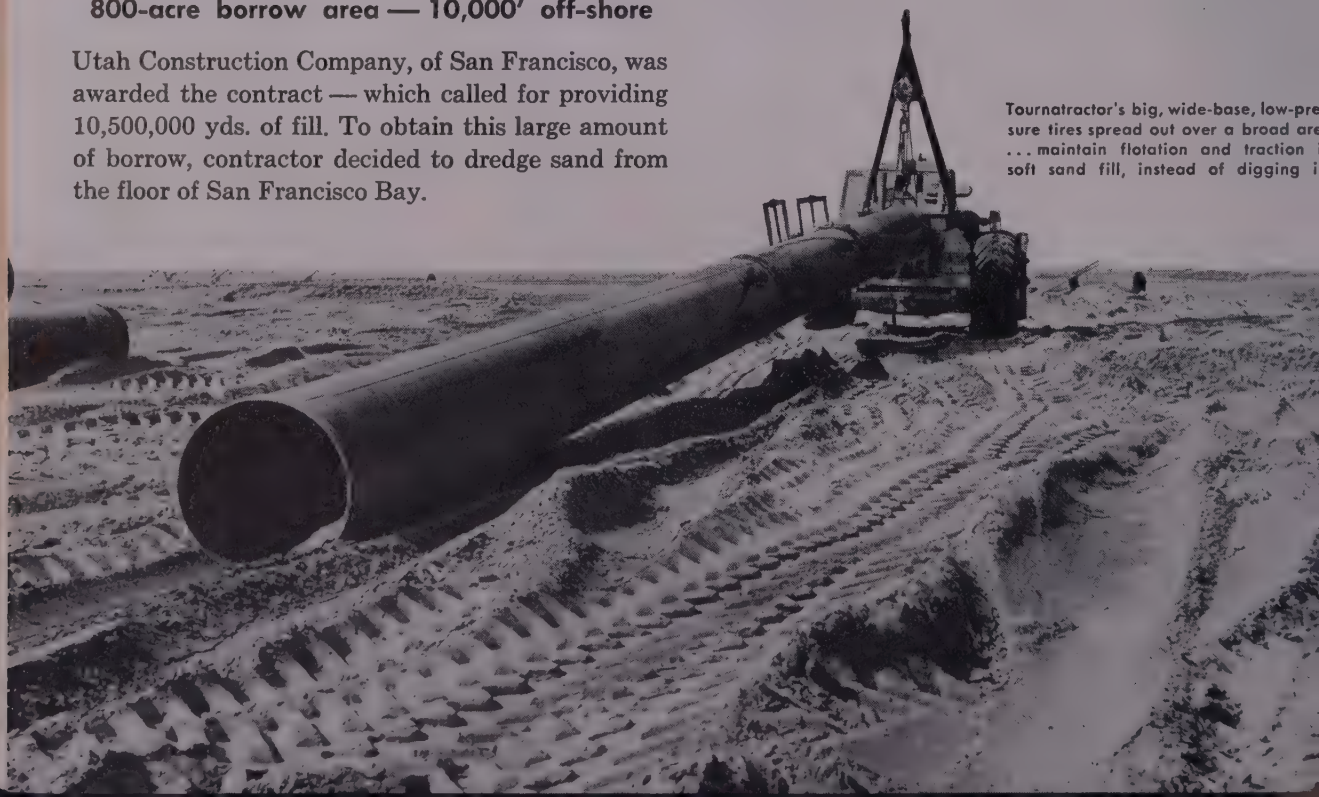
Utah Construction Company, of San Francisco, was awarded the contract — which called for providing 10,500,000 yds. of fill. To obtain this large amount of borrow, contractor decided to dredge sand from the floor of San Francisco Bay.

The borrow area — approximately 800 acres in size — was located in San Francisco Bay, 10,000 ft. from original shore line. Its location was established by soil mechanic engineers, after exhaustive tests to locate material that would best meet fill requirements.

1,850 cu. yds. per hr., 168 hrs. per week

Using one of the largest electrically-powered dredges in the world, Utah's Dredging Company pumped sand to shore — 24 hours a day, 7 days per week. This floating-dirtmover produced an average 1,850 cu. yds. per hour. On shore, a network of 40,000 feet of 30" pipe was continually being moved and changed to assure proper placement of fill.

Tournatractor's big, wide-base, low-pressure tires spread out over a broad area... maintain flotation and traction in soft sand fill, instead of digging.





Tournatractor hauls 2 connected sections of 30" pipe over soft sand fill. Tournatractor often hauled in 4th gear at speeds to 17 mph.

move the 40' long, 3,000-lb. sections of pipe, contractor first tried using a crawler tractor and a crane. This method was soon found to be expensive. Due to continuous operation in loose, abrasive sand, the crawler's tracks deteriorated rapidly, and had to be replaced every 30 days.

Use high-speed, rubber-tired Tournatractor®

LeTourneau Construction then called in their rubber-tired LeTourneau-Westinghouse 17 mph Tournatractor. It has a rear-mounted boom crane — which is operated electrically by Tournatractor's double-motor power-control-unit. This big, high-speed tractor on rubber skidded an average of 12 lengths of pipe per hour.

Handles wide variety of jobs

When not hauling pipe, contractor made good use of Tournatractor's high speed and mobility to handle odd jobs around the construction area. Tournatractor built access roads, levees, and moved mats and draglines. Moving these mats took Tournatractor only 15 minutes.

Get complete facts

Find out for yourself how this LeTourneau-Westinghouse rubber-tired Tournatractor can save you money on a major percentage of your tractor work. Write or phone for complete details.

CT-1334-DC-2

Sling man hooks cable onto pipe. Tournatractor's ease of operation and excellent visibility enable operator to work confidently and efficiently.



At a moment's notice, Tournatractor can be dispatched to handle emergency dozing jobs anywhere in the area. A mile is only a few minutes away for this high-speed rubber-tired tractor. Unit travels over abrasive sand, concrete, blacktop, railroad tracks, without damage.



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**WOULD GUESS THIS DAVIS RIG
HIGHER THAN IT ACTUALLY IS...**

...after you compare what you get!

When you compare all the features of the Davis Loader-Backhoe with all the others, you would just naturally think it would cost more.

The truth is, it actually costs less than most other makes. And now is the time to see your Davis Dealer!



...and look what it does!

Only the Davis 210 Backhoe can dig flush alongside of a building. It has three interchangeable digging positions—from each end, or from the center of the frame. An exclusive rotary hydraulic boom swing cylinder provides 200° continuous arc.

The Davis *DOES* have more to offer. Visibility, for instance. The loader has no braces to mar your vision, and you sit high on the backhoe so you can see exactly where you're digging. The seat moves with the boom, too, so you always face your work.

Consider utility, maneuverability, strength, quick detachability, quality construction, and power (with 7,000 to 10,000 pounds of break-away on the backhoes), and you will come up with the same answer that thousands of users have, "Davis is the best buy, bar none." See your Davis Dealer today.

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

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ties. A \$689,460 contract for 9.2 mi. of grading and surfacing the Hobbs-Lovington Road in Lea County and \$202,312 for 9.2 mi. of grading and surfacing the Alamogordo-Holloman Air Force Base road in Otero County. **Haake Construction Co.**, Santa Fe, received a \$366,740 contract for 2.7 mi. of roadwork on the Lincoln-Otero County Line-East in Lincoln County. **Allison and Haney Inc.**, and **Daniels Construction Co.** of Albuquerque received a \$1,110,088 contract for 5.8 mi. of grading, surfacing and structures on the Farmington-Aztec road in San Juan County. A \$180,630 contract was received by **J. H. Marshall** of Clovis for 13 mi. of grading and surfacing southwest of Portales-West in Roosevelt County. **Richey Construction Co.** of St. Johns, Ariz., submitted a low bid of \$154,392 for earthwork, clearing and structures for irrigation rehabilitations, Helena Unit 3, Middle Rio Grande Proj.

OREGON

A low bid of \$1,802,368 was submitted by **Wisner & Becker & P. S. Lord** of Sacramento, Calif., for construction of Green Springs Powerplant Switchyard and Penstock, Talent Div., Oregon Rogue River Basin Project. **Roy L. Houck & Sons**, Salem, submitted a low bid of \$666,289 for construction of South Unit, SPRR Overcrossing-Santiam Junction Section of the Pacific Highway near Albany in Linn County. **Parke Schram Co.**, Portland, submitted a low bid of \$500,656 for the Highlands Interchange Section of the Sunset Highway west of Portland in Multnomah County. A low bid of \$149,954 was submitted by **A. L. Harding Inc.** of Stayton for 2.9 mi. of grading and surfacing on the Salmon River Highway west of Willamina in Polk County. **Warren Northwest Inc.** of Portland submitted a low bid of \$246,503 for grading and paving the Interstate Bridge-Oregon Slough Section of the Pacific Highway north of Portland in Multnomah County. **G. D. Dennis**, Portland, received a \$365,027 contract for construction of a portion of relocated State Highway No. 58 at Lookout Point Reservoir on the Middle Fork Willamette River. A \$322,935 contract was received by **F. H. McEwen** of Eugene for grading and five undercrossing structures on the North Jefferson Junction of the Pacific Highway in Marion and Linn counties. **Inland Construction Co.**, Milwaukie, received a \$131,940 contract for Ross Island Bridge widening on the Mt. Hood Highway in city of Portland, Multnomah County. A \$153,063 contract was received by **Rogers Construction Co.**, Portland, for grading and paving near Portland in Multnomah County. **Henry H. Miller Contractors, Inc.**, Roseburg, received a \$208,252 contract for construction of overcrossing Santiam Junction Section of Pacific Highway north of Albany in Linn County. **West Coast Steel Works** of Portland received a



35-ton Rear-Dumps move maximum loads in minimum time"

on St. Lawrence Seaway

Building the St. Lawrence Seaway, connecting the Great Lakes and the Atlantic Ocean for sea-going vessels, has presented many tough obstacles to the contractors' construction crews, both in Canada and the United States.

Excellent progress has been achieved at lock Côte Ste. Catherine, across the river from Montreal. This project, too, has been troubled — by weather, icing, lighting problems involved in day-and-night operation, and by the many difficulties inherent in day-to-day problems of a major construction job. In spite of these factors, Canamont & Canit Construction Co. combine of Deschamps & Belanger Inc., Dufresne Engineering Co. Ltd., A. Minin & Compagnie Ltée, the Key Construction Ltd., and Canit Construction



B Rear-Dumps, working on St. Lawrence Seaway lock at Côte Ste. Catherine, carry 33 to 38 tons of shot rock. In earth overburden weighed loads averaged 34.4 tons.

Ltd. — is working successfully on its contract with the St. Lawrence Seaway Authority of Canada. Time schedule has been accomplished satisfactorily although the project is a demanding one.

The lock, turning basin, and related dikes involve the excavation of more than $4\frac{1}{2}$ million cubic yards of earth overburden, and shale-rock — plus the placing of 350,000 yards of concrete.

Excavate below water line

Some excavation is below water level, so cofferdams had to be built, and the areas pumped dry, before work could begin. During the winter of '55-'56, with earthmoving progressing well in the pit behind the cofferdams, slabs of floe ice from the river catapulted over the embankment and into the pit. Removal of the ice was an added expense and delay. In spite of difficulties like this, the job proceeded ahead of schedule.

Maintains roads for best production

Making a major contribution to moving overburden at a faster-than-scheduled rate, are eight 35-ton Model B Tournapull® Rear-Dumps with 27 yards heaped capacity. Says Project Manager M. Kazanovitch, "They move maximum loads in a minimum of time."

He is a firm believer in steady, consistent production rather than speed records, and

has equipped all haul units on the project with governors set at 20 to 25 mph. Although his "B's" with top speed rating of 34.4 mph are cut back approximately one-third, they regularly complete excavation haul cycles in 10.58 minutes over a one-way distance of 4700 ft. A 550 Adams motor grader constantly maintains haul roads, so equipment can always travel at its top governed speed.

Efficient in small space

For all their size (35'10" long), electric-control B Tournapulls can turn around non-stop in just 35' (only 27' in dump position). This is far less space than that required by any other hauler of comparable size. The Superintendent says, "Ability to maneuver in spaces is a great feature of this machine."

90% to 95% mechanically efficient

Because of methodical servicing and quick attention to minor repairs, the 8 Tournapull Rear-Dumps have maintained performance at 90% to 95% mechanical efficiency. Superintendent Kazanovitch believes that the "negligible amount of lay-up time" has also been important to the job's progress.

If you handle BIG yardage earthmoving, you'll want to know more about big B Rear-Dump...how it can speed your work...cut your costs. Write us for more information

Adams—Trademark BRAG-1131-D-b-5



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\$208,100 contract for construction of bridge on relocated Rigdon Road, Hills Creek Reservoir on Middle Fork Willamette River southeast of Oakridge. **Schutt Construction Co.**, Springfield, received a \$124,400 contract for clearing Area "G," 562 acres at Hills Creek reservoir on the Middle Fork Willamette River southeast of Oakridge, Lane County. **Donald M. Drake Co.**, Portland, received a \$1,111,250 contract for stripping and excavating for the Cougar Dam abutments and clearing a portion of the Cougar Dam reservoir area on the South Fork McKenzie River. **Coos Bay Dredging Co., Inc.**, Coos Bay, received a \$189,342 contract for grading and surfacing the North Bank Road in Coos County.

UTAH

Germer, Abbott & Waldron of Tremonton received a \$353,000 contract for 19.2 mi. of grading and surfacing the Vernal-Utah, Wyo. State Line in the Ashley National Forest in Uintah and Daggett counties. **W. W. Clyde & Co.** of Springville received a \$292,452 contract for grading and surfacing Harrison Blvd. and 20th Street in Ogden. **Tolboe & Harlin Construction Co.** of Salt Lake City received a \$2,090,000 contract for construction of Federal Reserve Bank in Salt Lake City. **Fife Construction Co., Inc.**, of Brigham City

received a \$477,352 contract of 3 bridges, Pineview Dam-Huntsville, Huntsville, and Huntsville-Eden, in Weber County. **R. M. Jensen**, contractor, **D. W. Brimhall Construction Co.** and **Nelson Bros. Construction Co.** (joint venturers) of Salt Lake City, received a \$270,101 contract for 7.9 mi of surfacing and grading Manila West to Wyoming State Line in Daggett County. **James Reed** of Salt Lake City received a \$512,837 contract for grading, surfacing and construction of 2 bridges on State Road 95 in San Juan County. **Witt Construction Co.**, Provo, received a \$2,678,031 contract for construction of housing and other camp facilities at the Flaming Gorge dams site in northeastern Utah.

WASHINGTON

Cherf Bros., Inc., of Ephrata, received two contracts for road work in Grant County. A \$509,993 contract for undercrossing and approaches on SSH No. 11-G and \$811,222 for 8.8 mi. of grading and surfacing from Power Line to Moses Lake. A \$212,317 contract was received by **United Paving Co.** of Spokane for 1.3 mi. of grading and surfacing in Clarkston, Asotin County. **Natt McDougall Co.** of Portland, Ore., received a \$279,563 contract for 2 mi. of grading and surfacing Burnt Bridge Cr. to Stockford Road in Clark County. **Concrete Construction Co.** of Tacoma re-

ceived a \$190,533 contract for construction of Bridgeport Way Undercrossing in Pierce County. **F. R. Hewett Co.**, Spokane received a \$122,515 contract for 1.9 mi. of grading and surfacing the Dollar Road to Argonne Road in Spokane County. A \$168,205 contract was received by **Andy Johnson & Co.**, Hoquiam for construction of the Wishkah River Bridge in Grays Harbor County.

WYOMING

Etlin E. Peterson of Casper received two contracts for road work in Carbon and Natrona counties. A \$172,030 award for construction of 3 bridges over Sugar Creek on the Rawlins-Sinclair road in Carbon County and \$177,572 for construction of two separate structures over McKinley Street and 4 spans over Cent Street, Casper Urban system in Natrona County.

ALASKA

Manson-Osberg Co., Seattle, Wash. submitted a low bid of \$1,041,050 for construction of breakwaters and dredging boat basin at Kodiak. **Denali Engineering Co.** and **McCray Marine Construction Co.** of Seattle submitted a low bid of \$1,356,700 for dredging and breakwater construction, Bar Point, Ketchikan.

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Detonating Fuse

Plain • Reinforced • Wire countered • Plastic

SAFE

Complete detonation . . . no unexploded caps or powder. Cannot be set off by friction, sparks, ordinary shock; even a direct hit by lightning did not detonate Primacord.

EFFICIENT

Contacts every cartridge, even in deck loads. Initiates entire charge almost simultaneously. Can be hooked up to fire front line first, giving relief of burden and better fragmentation.

ECONOMICAL

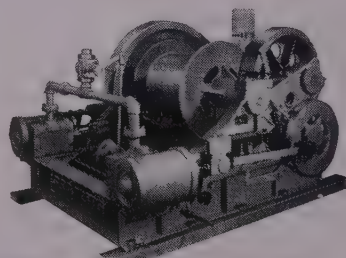
Lowest overall cost because you get full efficiency from the explosive—no waste; and better fragmentation with less powder. Only one cap required—no cap in the hole.

PRIMACORD-BICKFORD
Hot Wire Fuse Lighters
Detonating Fuse
Safety Fuse
Celakap

Ask your explosives supplier
or write to:

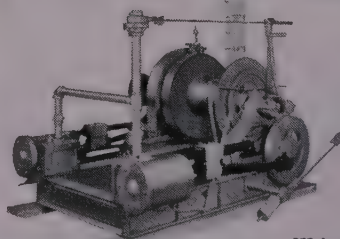


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New Baja California highway reduces travel time by 50%

Although Baja California, Mexico, is rich in minerals, marble, and alabaster; though it contains vast quantities of fertile farm land, and is becoming a popular resort area, its full resources are still relatively undeveloped. Lack of good roads and transportation are major drawbacks to increased prosperity in the area.

One important north-south highway is now being built by Zeus, S.A. of Mexico, D.F. for the Mexican Federal government and the state of Baja California Sur. About 160 miles long, and 40 feet wide, the road will connect the cities of La Paz and Santo Domingo. When completed, it will reduce travel time between these two important cities from 8 hours to 4.

This highway is badly needed to accommodate increasing tourist travel to La Paz (a rapidly expanding resort city). It will also provide better transportation for products of the flourishing farm country near Santo Domingo.

3 graders handle all leveling

Fill needed for the road is brought in by eight 4-cu. yd. trucks. These machines deliver about 40 cubic yards of alluvial loam and shale fill every hour. Three 123 hp Model 550 Adams motor graders move this material into place. They rebuild shoulders, fine-grade, handle all daily surfacing, so that traf-

fic can continue to use the road while work is in progress. These fast-moving, versatile graders do all other leveling work that may be required, in construction of the new highway.

Because Adams graders have a wide range of speeds (15 power-speed combinations, forward and reverse), all of these assignments are accomplished at the fastest, most efficient rate.

When maintaining the fill, Adams graders work in third gear, at speeds to 4.6 mph. Building shoulders, or handling fine grading on the project, graders usually operate in second gear, at a speed of approximately 3.2 mph. Under average conditions, an Adams grader is able to reform about .6 mile of road shoulder in an hour.

Pleased with his graders' performance, Engineer in charge Joaquin Ambia said: "We obtain correct operation and good service."

"Best machine in my charge"

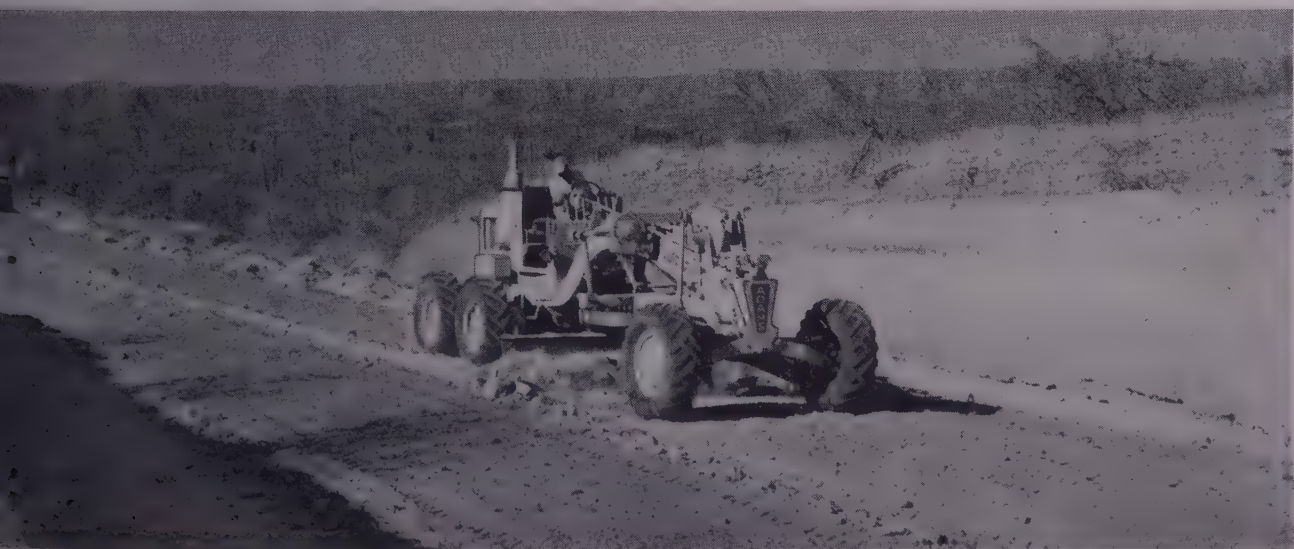
Lubrication and maintenance time on the Adams grader is less than that on ordinary graders. Says Master Mechanic Jorge Vargas, "The Model 550 Adams motor grader is the best machine I have ever had in my charge."

Write us for more information on Adams graders, available in 6 sizes from 60 to 190 hp.



Operator Alberto Jimenes reports that he finds the Adams motor grader is "very easy to steer. We all like the good view we get of the blade when we are operating an Adams motor grader," he says.

Adams—Trademark AG-1385-H-b-5



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ENGINEERS and CONTRACTORS



ELLIS L. ARMSTRONG, newly appointed director of highways for the Utah State Road Commission. In his newly created position, under the recent reorganization of the State Road Commission, he will be responsible for the planning, construction, and administration of Utah's highway program, under the guidance of the new five-man policy-making commission. Armstrong returns to the West following three and a half years on the St. Lawrence Power Project. Prior to that he spent 18 years with the Bureau of Reclamation on design and construction of reclamation projects throughout the West.

Robert W. Griffin was recently appointed chief engineer for the Utah State Road Commission. Acting chief engineer since last November, Griffin has served the Commission in various capacities since 1924. **Theral R. Neilsen**, formerly with the California Division of Highways, is the new assistant chief engineer.

Richard F. Walz, Jr., project engineer for Peter Kiewit Sons' Co., recently transferred from Project 84 storm drain of the Los Angeles County Flood Control District to work on Kiewit's contract for addition to the Hyperion treatment plant under construction at Los Angeles.

B. P. Thomas, Portland, chief of the technical engineering branch of the Corps of Engineers' North Pacific Division, recently retired from government service and is planning to establish his own office in Seattle as consulting engineer. A past president of the American Society of Civil Engineers, Seattle Section, he is a registered civil engineer in both Washington and Oregon.

Promotion of three staff members to associate status is announced by Riemer C. Nielsen and Gene E. Moffatt, Los Angeles architects and engineers. Those advanced are: **John Lander**, licensed civil engineer who has charge of structural and civil engineering and liaison with the various public agencies; **Donald Wolverton**, the firm's chief architectural draftsman; and **Russell M. Ruggs**, who handles mechanical engineering and supervision of field construction for the organization.

R. A. Smith of P. J. Walker Co., Los Angeles, is the newly elected chairman of the Western Chapters Conference of The Associated General Contractors of America, Inc. He was chosen at recent assembly of chapter officers, committee chairmen and secretary-managers at San Francisco, at which several officers from the national headquarters in Washington also were in attendance. Manager **W. D. Shaw** of Southern California Chapter was elected secretary of the Conference for the coming year.

Milton G. Leong has opened offices for the practice of consulting civil and structural engineering, under the name of Milton G. Leong and Associates. The firm's offices will be located at 2140 Shattuck Ave., Berkeley, Calif., and at 333 Maryland St., Vallejo, Calif. Leong, a member of the American Society of Civil Engineers, was formerly senior structural engineer with the California State Division of Architecture in San Francisco.

Elbert C. Brown, California district engineer for the Bureau of Public Roads at Sacramento, has retired following 38 years with the Bureau and 48 years in government service. Brown joined the BPR in 1919 following a period with the Bureau of Reclamation. He became a district engineer in California in 1945. Brown is a member of the American Society of Civil Engineers.

W. Lloyd Gallagher, formerly project engineer with the General Electric Co. in Richland, Wash., and more recently project engineer for the San Francisco office of B. D. Bohna & Co., Inc., has been appointed manager of the firm's new office at Seattle, Wash. He is a member of the American Society of Civil Engineers.

Ellis L. Armstrong, until recently with Uhl, Hall & Rich, consulting engineers

of New York City, has moved to Salt Lake City, Utah, as a member of the Utah State Road Commission. Armstrong's engineering career includes twenty years with the Bureau of Reclamation. Among his professional affiliations is the American Society of Civil Engineers.

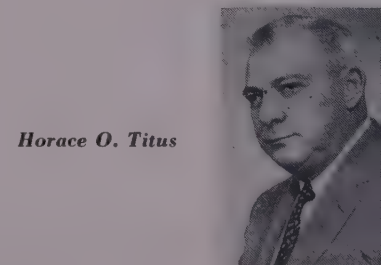
Arthur C. Clark, assistant commissioner of operations, Bureau of Public Roads, Washington, D. C., recently retired after 42 years of service. In early period of his BPR employment he had charge of heavy grading, surfacing and bridge construction in the Pacific Northwest, and from 1924 to 1937 he was responsible for all construction operations on Federal-aid and forest highway projects in Montana. Later he became chief of the construction division of the Washington, D. C., office and this year was appointed assistant commissioner of operations.

Harry E. Gleason, civil engineer with the Portland District, Corps of Engineers, has retired following 24 years of Federal service.

Clair E. Hall is resident engineer for the Oregon State Highway Department on a grading and oiling job at Condon. This is the Butte Creek Pass section of John Day Highway, 4.64 mi. long, 515,000 cu. yd. of excavation; 77 curves over this area being reduced to 6 curves. Natt McDougall Co. is prime contractor.

Chester C. Andrews has joined the Salt River Project at Phoenix, Ariz., as an assistant engineer. He recently served as a civil engineer in the U. S. Navy.

David E. Creighton, Jr., civil engineer with the Bureau of Reclamation, has been transferred to Sacramento, Calif., employed in planning water resource development. Before the closing of the Santa Barbara office by the USB, Creighton was employed there on Ventura County development units.



Horace O. Titus, former chief bridge designer for the Wyoming Highway Department, has been named chief design engineer at Gate City Steel, Inc., Boise, Idaho. He had also previously been associated with American Bridge Co., the U. S. Navy, and the South Dakota Highway Commission.

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Complete
Trailer Line



Athey-Cat PR21-DW21 maneuvers easily in tight quarters, handles big rock.

High-speed production on long hauls with the Athey-Cat PR15-DW15 Rear Dump.

Athey Hydraulic Ejection Trailer gives positive control in dumping and spreading loads.



45-tons to 22-tons — rear dump, hydraulic ejection, side dump, bottom dump — matched trailers for Cat DW21, DW20 and DW15 Tractors — *only* Athey offers you this complete line of capacities and types of high-speed haul units.

Whether it's big rock, clay, ore, mud or earth you have to move, there's an Athey Trailer matched to your off-highway operations.

The most complete materials handling trailer line is built by Athey — the leader in the trailer field for more than 34 years. Each unit is built to the rigid standards of quality construction that mean longest life and low maintenance.

This is why Athey Trailers lead the field in big production, fast dumping, easier loading, more profits. Ask your Athey-Caterpillar Dealer for information on the complete line today. ATHEY PRODUCTS CORPORATION, 5631 West 65th Street, Chicago 38, Illinois.

ATHEY TRAILER FACTS . . .

Trailer-Tractor	Capacity
Athey PR21-Cat DW21	34-tons, 22.5 cu. yds.
Athey PR20-Cat DW20	34-tons, 22.5 cu. yds.
Athey PR15-Cat DW15	22-tons, 15.6 cu. yds.
Athey Hydraulic Ejection-Cat DW21 (or DW20)	31-tons, 22.5 cu. yds.
Athey PD20-Cat DW20	30-tons, 22 cu. yds.
Athey PH20-Cat DW20	45-tons, 62 cu. yds.

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Col. John S. Harnett



Col. John S. Harnett recently assumed command of the San Francisco Army Engineer District, replacing Col. John A. Graf who left for another assignment. Recent former executive to Brig. Gen. William F. Cassidy, Division Engineer, South Pacific, Colonel Harnett in his new command heads a construction program reaching \$30,000,000 in the 1958 fiscal year.

* * *

James S. Mills, assistant deputy state engineer with the Arizona Highway Department, retired in July after 38 years of state service. At a Highway Department gathering in his honor, the veteran engineer revealed that he plans to open a consulting engineering service in Phoenix in the near future.

* * *

The American Society of Civil Engineers have announced the appointment of new members to executive committees of technical divisions. Named to serve in the West are: City Planning—Everett B. Mansur, planning consultant, San Gabriel, Calif. Engineering Mechanics—Egor P. Popov, professor of civil engineering, University of California, Berkeley. Irrigation and Drainage—Kenneth Q. Volk, consulting engineer, Los Angeles. Power—John F. Bonner, assistant to vice president and chief engineer, Pacific Gas and Electric Co., San Francisco. Soil Mechanics and Foundations—Thomas M. Leps, chief civil engineer, Southern California Edison Co., Los Angeles.

* * *

H. Earl Parker, general engineering contractor of Marysville, Calif., has been elected chairman of the Contractors' State License Board for the 1957-58 fiscal year. Parker has served as a board member since January 1952. A past president of Northern California Chapter of Associated General Contractors, Parker has been active in many of its programs for the betterment of the construction industry. Chris D. McKeon, San Francisco general building contractor, was elected vice chairman for the same term.

* * *

Galyn A. Wilkins was appointed to succeed Baird M. French as Bureau of Public Roads Division Engineer for Arizona. For the past eight years Wilkins has served as regional construction and maintenance engineer for the BPR in Fort Worth, Tex. As previously announced, French left to become regional engineer at Portland, Ore.

Appointment of three assistant vice presidents has been announced by Holmes & Narver, Inc., Los Angeles firm of engineers and constructors. Named to the new positions are Russell Field, Wylie "Bill" F. Nance and David L. Narver, Jr.

* * *

The association of Alfred T. Krook with the Bechtel engineering and construction organization and his election as a vice president of Bechtel Corporation is announced in San Francisco by S. D. Bechtel, president. With increased activity in Canadian oil and gas developments, he will concentrate his activities principally in western Canada and northwestern United States areas. A widely known senior engineering executive, Krook has been president of Stone & Webster Canada Limited and a vice president of Stone & Webster Engineering Corp.

* * *

James P. Hawke is now chief engineer with J. H. Pomeroy Co., Inc., Los Angeles, Calif. He was formerly associated with the firm of Stone & Webster Engineering Corp.

* * *

M. F. Thomas, assistant chief of the Engineering Division, Seattle District, has been appointed chief of the Technical Engineering Branch of the North Pacific Division, Corps of Engineers, in Portland, Ore. He succeeds B. P. Thomas (no relation) who resigned to enter private engineering practice. M. F.'s successor at Seattle is G. B. Hunt. Simultaneously, Gen. L. H. Foote, Division



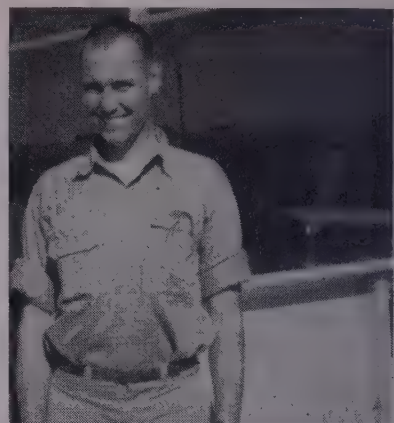
B. P. Thomas

Engineer, announced the appointment of Kenneth Dibblee as assistant chief of the Engineering Division, succeeding David Meldrum who was named head of the Division's military branch. Other appointments are: Merlyn W. Anderson, named assistant chief of the Geology, Soils and Materials Branch, succeeding Miles Bubenik who was transferred to the Pacific Ocean Division in Honolulu. And Gerald D. Clark, formerly head of the tidal hydraulics section of the Portland District, to succeed Sigurd Halverson in the Division planning branch. Halverson also was transferred to Honolulu.

* * *

Marvin A. Larson announces the opening of an office for the practice of structural engineering at 251 Kearny St., San Francisco 8, Calif.

Kenneth E. Greene has joined the Continental Construction Co. at Sacramento, Calif., as estimator on commercial building construction. Until this



new connection Greene was in the employ of Grove, Shepherd, Wilson & Kruge, Inc., as an engineer on construction of new freeway in Oakland, Calif. Prior to that he was assistant editor of Western Construction.

* * *

Clyde E. Barrett, senior structural inspector with Stone & Webster Engineering Corp., recently transferred to the Baker River Dam project at Concrete, Wash., when the Snoqualmie powerhouse job was finished.

* * *

Jay Daly, engineer with Utah Construction Co., who recently transferred from field to office, is now located at Palo Alto, Calif., as structural design engineer of mine plants and facilities. He had previously worked as design engineer on the Poe Tunnel in California contracted to Utah.

* * *

Col. Carlton M. Clifford has been assigned as deputy division engineer for the Army's Corps of Engineers at San Francisco. As deputy to Brig. Gen. William F. Cassidy, Colonel Clifford's primary responsibility will be supervision over all military construction in Arizona, California, Nevada and Utah.

* * *

Oral I. Conyers, former design engineer for two years in Tudor Engineering Co.'s San Francisco office, is now resident engineer for Tudor on the Port Washington Narrows Bridge project at Bremerton, Wash., employed on bridge and approach construction. Conyers had been resident engineer on Umatilla Bridge across the Columbia River prior to his design work in the San Francisco office.

* * *

Robert B. Fish has re-joined Guy F. Atkinson Co. after serving three years on Seattle City Light's Gorge High Dam. Fish's new job is that of party chief on the Trinity Dam project. He had formerly worked for Atkinson on construction of the Ketchikan Pulp Mill in Alaska.

SUPERVISING the jobs

Vernon R. Bradley is project manager for Guy F. Atkinson Co. on Pelton Dam and powerhouse on the Deschutes River near Madras, Ore. This \$8,000,000 project which includes reregulating dam and 3-mi. fish ladder has been under construction for the Portland General Electric Co. since May 1956, and will probably be finished by the beginning of next



Goodier Snider

year. Project engineer is **Jonathan Goodier**. G. E. Snider is business manager. Office engineer is **Kenneth N. Granthem** and other engineers in the office are **Ronald K. Bees**, **William Husemann**, **Joe Missel** and **Richard B. Seelye**. **John L. Doney** is field engineer.

Among the superintendents are **Charles Chamberlin**, drilling; **Arthur Cody**, rigger; **V. J. Davis** and **G. L. Terry**, carpenter; **John H. Kelley**, finisher; **Gene S. Reed**, electrical, assisted by **John V. Leabo**; **William L. Rose**, plant; **Walter L. Reid**, shift. **Jack Keller** is master mechanic. Assisting foremen are **S. B. Cordell**, labor; **Merle J. Cox**, concrete; **P. Johns**, carpenter; **John P. Moore**, lube; **C. H. Nickolisen** and **Ervin W. Wakeman**, mechanic.

* * *

Elmo L. Campbell, project manager, **Ed Martin**, superintendent, and **Bob Hitt** in the office, are key men of **McCammon-Wunderlich Co.** and **Wunderlich Contracting Co.**, the combination which recently won the \$1,291,659 award for expressway work extending from the Skyline Blvd. to the Coast Route in San Mateo County, Calif. About 1,076,000 cu. yd. of grading are involved in 2.2 mi. of divided highway and construction of a bridge and one

equestrial undercrossing between Manor Drive at Edgemar and Route 5. General foremen are: **Norman Hammes**, grading; **Cal Barnett**, drainage; **Emil DeMartini**, surfacing; **Paul DeMartini**, drainage, and "**Red**" **Frederickson**, mechanic. The job started in May and will be finished about November.

* * *

H. E. Weaver, project engineer, and **A. L. Mattson**, superintendent, head the list of personnel on construction of two rubble-mound jetties at the mouth of the Chetco River near Brookings, Ore. **George Grebe** is powder foreman, and **Floyd Prue** is master mechanic on this work which was recently contracted to **F. L. Somers** on a low bid of \$322,600. Construction got under way the first of June and will probably end about mid-November.

* * *

I. H. Poston, superintendent for Stock & Grove, is in charge of a recent award to this contracting firm in the amount of \$578,659 covering grading 5.2 mi. of the Wrangell highway in Alaska. This Bureau of Public Roads job started in June and will probably end about September next year.

* * *

Paul Cross, superintendent for Henry Thygesen & Co., is supervising a \$184,493 recent award for interchange, with



an overpass bridge, west of Thoreau on U. S. 66 in McKinley County, N. Mex. Job will soon finish, having been in progress since May.

William Silvester is superintending a \$245,288 recent award to **Germer, Abbott & Waldron** for grading, surfacing and structure on 3.7 mi. of State Highway 86 in Duchesne County, Utah.

* * *

Frank Ceiderburg, general superintendent, is in charge of a recent award to **J. M. Steinmuller, Jr.**, at \$126,806 for construction of concrete lined channel, Amazon Creek, Eugene, Ore. Assisting **Ceiderburg** as carpenter foremen are **Marvin Thaxton**, **Gaylord Morse** and **Douglas Tweet**, and as cement finish foreman, **Sidney Darnell**. June was the starting date, with the finish scheduled for October.

* * *

William Zwick, Jr., is job superintendent on a \$3,990,000 contract for construction of men's residence halls, central building, and site, which has been under way since March at **Brigham Young University**, Provo, Utah. Other key men on the job for **Oakland Construction Co.** and **Garff, Ryberg & Garff Construction Co.**, are **Ronald B. Adams**, cement finisher foreman, and these foremen on the various structures: **Lawrence Goff**, Bldg. A; **Karl W. Merrell**, F; **Keith Sharp**, E; **Hans Hansen**, C; **Alfred Lupus**, D; **Morris Nelson**, B; **Pauley A. Linford**, sub-foreman, A; and **Stan Nelson**, sub on Buildings B, C & D. Job will be finished in August 1958.

* * *

Charles E. Greenamyer is project manager, and **R. F. Murphy** is superintendent in charge of construction of powerhouse foundations and alteration of control shaft No. 2 at **Fort Peck Dam**, Valley County, Mont. This is a \$2,794,115 contract awarded to **E. V. Lane Corp.**, which started work here April 1 and expects to finish the job by the end of 1958. Other important men for the contractor are **Ralph Fralick**, rigging superintendent; **Manson Bailey, Jr.**, project engineer, and **R. W. Garden**, office manager.

* * *

J. V. Beach, general superintendent for **Silver State Construction Co.**, is supervising 9.9 mi. of grading and surfacing north of **Mason**, Lyon County, Nev. Another key man on this job is **Joe Solaegui**, grade foreman.

* * *

Truman Hart, superintendent, **Bill Martin**, engineer, and **Victor Franks**, steel superintendent, head the list of men working on construction of three bridges and approaches on Route 150 north of **Santa Paula**, Ventura County, Calif. This job is being done by **W. F. Maxwell Co.** who was awarded the contract on a low bid of \$203,300. Under way since June 1, the work is expected to be finished about December 1.

Jose "Little Joe" Trujillo, superintendent, recently took his leave of the West (temporarily, we hope) and is working in the Deep South for the contracting firm of Allen M. Campbell Co., building barracks and mess hall for the



Navy Jet Base at New Iberia, La. Trujillo was formerly with C. H. Leavell Co. on construction of the new office building at Denver for the Colorado Department of Highways.

* * *

Tommie Martin is superintending for Stanley H. Arkwright, Inc., contractor for 6.9 mi. of grading and surfacing a 4-lane divided highway on the Evanston-Fort Bridger road in Uintah County, Wyo. This \$589,743 job started in July and will be finished in October.

* * *

John Buell, job superintendent, aided by **John Hanson**, paving superintendent, is in charge of a \$110,333 recent award to United Paving Co., for resurfacing with asphaltic concrete a stretch of road from Port Gamble to Kingston in Kitsap County, Wash. Under construction since Aug. 5, the work is expected to be finished about mid-September.

* * *

C. M. "Chuck" Loser is general superintendent for C. L. Hubner Co. on contracts valued at \$1,500,000, one at Colorado Springs and one a freeway job in Pueblo, Colo. Important personnel on these projects include the following: **E. E. George Williams** and **Don Probstel**, superintendents; **Jack Burchett**, **George Aldrige**, **Bill Gies** and **John Calkins**, foremen; **Herb McElrath**, master mechanic; and the office managers, **Barney Olson** and **Hal Golden**.

* * *

Charles Nichols, formerly with Bechtel doing purchasing at Vermillion Dam, is Morrison-Knudsen's chief steward at Black Rock Camp on the Kings River, California, a Pacific Gas & Electric Co. project. His camp staff, with **Charley Sharp**, chef, and **Peter Georgeoff**, head bull cook, recently served their 500,000th meal to crews on the Hass underground powerhouse project.

Del Billings marked the start of his sixteenth year with Morrison-Knudsen by opening a new camp for M-K's gold stripping job at Round Mountain, Nev. Billings is superintendent of camps for the Los Angeles District of M-K, an area that includes California, Oregon, Nevada, Utah, and Arizona.

* * *

W. W. Waetje, project superintendent; **Ed Imus**, concrete foreman, and **J. M. Donaldson**, field office manager, are key men for Royden Construction Co., widening a concrete girder bridge, grading and surfacing approaches in Wickenburg, Ariz. Work on this \$179,103 contract started in August and will be finished in December, according to **R. G. Wallace**, vice president and general superintendent for the contracting firm.

* * *

Frank C. Scott is superintending a \$262,201 contract for 1.2 mi. of grading and surfacing from Johnson Creek to Hatchery Creek in Cowlitz County, Wash. **R. A. Heintz Construction Co.** was the successful bidder. **Harry G. Fahlgren** is field office manager.

* * *

Frank J. Pakar, owner and project superintendent of Pakar Construction Co., is directing construction of a concrete girder bridge across Willapa River near Lebam, Wash., and new road construction of 1.19 mi. on Primary State Highway 12 in Pacific County. He is assisted on this \$129,359 job by **Harlen Roberts**, carpenter foreman and **Leroy Gray**, labor foreman. Grading and Armo pipe culvert placing is subcontracted to **Archie Radakovich**, and surfacing will probably be let under a separate contract later. Pakar has been working here since May 10 and expects to be finished about Sept. 20.

* * *

Robert C. Briscoe as project superintendent is in charge of a \$149,013 contract which went to Black Contracting Co., Inc., for grading and surfacing St. Johns school bus route, west city limits of St. John, Apache County, Ariz. Assistant superintendent is **Jack D. Moore**, and foremen are **Tony Baca**, labor, and **Joseph Hancock**, concrete. Work has been under way since May and is now about ended.

* * *

J. W. "Bill" Clark, general superintendent for Thorn Construction Co., Inc., is in charge of 1.2 mi. of grading and surfacing and construction of concrete structure, Springville towards Mapleton, Utah County, Utah. Other key personnel on the \$353,000 job are **Wayne Evans**, concrete superintendent; **Alden Peterson**, concrete foreman; and **France Bradley**, gravel superintendent. Under construction since July, the work is expected to be finished in November.

Marvin Sandlin, general superintendent for Fredericksen & Kasler, is in charge of a \$2,718,100 recent award for work on the Madera Freeway north of Madera in California. Contract is for 3.9 mi. of grading and surfacing, with construction of 9 bridges and 3 pumping plants. Other important men here are **Carl Whetaire**, substructure superintendent, **Chuck Mullens**, superstructure superintendent, **Russ Pinching**, project engineer, **Moris Burke**, office manager, **Frank Tucker**, labor foreman, and **Ceance Buck**, dirt foreman. Under way since March, this job is expected to run until June 1958.

* * *

R. E. Denham, area manager; **Ce F. Amick**, project manager, and **Tom Cushing**, office manager, form the top trio handling a \$4,121,149 recent award to Morrison-Knudsen Co., Inc., for grading, surfacing and structures on 11.4 mi. of grading and surfacing on 17.9 mi. length of all 4-lane divided highway on U. S. 30 (Intrastate system), Rock Springs-Rawlins road from Wamsutter west, in Sweetwater County, Wyo. Work started here in May and will extend till October 1958.

M-K won another contract in the same vicinity, this one at \$661,222 for grading, surfacing and structures on a 6.4 mi. stretch on Rock Springs-Rawlins road and the above mentioned are the key men for this project also. Superintending this job is **Kensul Shotwell**. Job will probably be finished in October.

* * *

Charlie Joy, superintendent, aided by **Bud Cleveland**, general foreman, and **"Johnnie" Blair**, grade foreman, is supervising a \$241,967 recent award to V. J. Henson for grading and surfacing and plant-mix bituminous mix and seal coat northeast of Cordes Junction, on the Cordes Junction-Flagstaff highway, Yavapai County, Ariz. Job started in June and will probably be finished in October.

* * *

Lloyd Leonard, superintendent, **J. Redwine**, assistant superintendent, and **H. A. Topham**, bridge superintendent, form the top trio on a highway job which went to the Griffith Company recently on a low bid of \$1,695,510. Started in May, the work consists of grading, surfacing, and construction of three bridges on 8-lane freeway in the city and county of San Diego, Calif. Contractor figures the job will be finished about August 1958.

* * *

James Abshire is superintending a \$264,648 award to Gardner Construction Co. covering grading and surfacing southeast of Grand Junction on State Highway 6 in Mesa County, Colo.

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

Tom Kelly is supervising a recent award won by Peter Kiewit Sons' Co. on a low bid of \$3,961,230. Project is in Orange County, Calif., and consists of 4.1 mi. of grading, surfacing and construction of 5 bridges south of Trabuco Creek. **Hub Unger** is job engineer, **Bob Witbeck** is structures engineer, and the office is in charge of **Bob Terryberry**. Other key men are **Zelmo Mullican**, structure superintendent; **Fred Welsh**, dirt superintendent, and **Bob Fink**, mechanic foreman. Completion of the work is scheduled for December 1958.

* * *

Jean Cacan, superintendent for Jones Brothers Construction Co., is in charge of a \$466,559 contract for portions of a bridge substructure across the Los Angeles River in Los Angeles. Carpenter foremen are **C. J. "Neil" Walsh** and **F. L. Drake**. Started in June, it is expected the job will be finished in October.

* * *

John B. Tipton, superintendent for Gardner Construction Co., has the aid of the following foremen in the construction of a channel change and bridge on Valley St. in Denver Colo.: **Harold Wilson**, grade; **Lawrence Rovedo**, structure; and **Tracy Hurlburt**, carpenter. Gardner started work on this \$763,763 contract in July and expects to complete the job this coming January.

* * *

Norman F. Meyers is superintendent, **Edgar Crawford** is foreman, and **Jeff Mollenberg** is mechanic on Grant Construction Co.'s \$242,259 contract for 2.3 mi. of clearing, draining, grading and surfacing, Park Rapids to Olsen Creek in Stevens County, Wash. Under way since the first of July, work is scheduled for completion by mid October.

* * *

John R. Lyman is superintending a \$461,226 contract awarded to Davis & Butler Construction Co. for construction of Big Thompson hydroelectric plant and switchyard in Colorado. This is a year-long job which started in July.

* * *

Joe Zupan, superintendent, assisted by **Fred Heimbigner**, foreman, is in charge of a \$161,317 highway job recently awarded to McAtee & Heathe. Work covers 16.1 mi. of surface, pave with asphaltic concrete and shoulders, Winchester Wasteway to Naylor, Douglas and Grant counties, Wash.

* * *

"Slim" Martin, job superintendent, under the direction of **Carl McAmis**, general superintendent for McAmis & Baker, is supervising this company's grading and surfacing contract in El Monte, Los Angeles County, Calif. **Adam Corral** is concrete superintendent, and **Roy McAmis** head mechanic. Work got under way in July and is expected

to end about December. Contract cost \$270,000.

* * *

Elbert Lowdermilk, executive superintendent in the contracting firm of H.-E. Lowdermilk Co., is directing a recent award to the company for a new roadway through position of old riverbed and moving the bed over to make way for a new access road between Gateway and Urovan in Montrose County, Colo. Lowdermilk won this grading and surfacing contract on a low bid of \$999,999, and expects to have the job completed about February next year.

* * *

Floyd Helm, project manager, and **Harold Skeans**, assistant project manager, are at the top of the list of men working for McCammon-Wunderlich Co. and Wunderlich Contracting Co. on relocation of Highway 40-A in Butte County, Calif. Work of grading, surfacing and erection of 4 bridges north of Oroville and Jarbo Gap, costing \$7,292,214, started in June, with August 1958 set as the finish date.

* * *

Harold M. Quam is supervising a \$429,587 award to Ghilotti Bros., Inc., for widening College Ave. and Fourth St., State Highway 12, through the city of Santa Rosa, Calif. **Eugene Snyder** is office manager. **R. M. Windrick** is rock-subgrade foreman; **L. P. Meyers** is excavation foreman; and **Keith Axtell** is concrete foreman. Under construction since June, this job will be finished Nov. 1.

* * *

R. B. Crookston, general superintendent; **Jack Daugherty**, job superintendent, and **James Mathis**, foreman, are Wangsgaard Construction Co.'s key men on contract for earthwork, structures, and surfacing an access road to Flaming Gorge Dam, part of the Colorado River Storage Project in Utah and Wyoming. Wangsgaard won this grading and surfacing contract on a low bid of \$504,642. A year-long project, work started in July.

* * *

R. G. Wallace, project manager; **J. G. Powers**, superintendent; **Dave Tucker**, grade foreman; "Shorty" Skinner, master mechanic, and **J. M. Donaldson**, field office manager, are now finishing up on a Royden Construction Co. job in Navajo County, Ariz. Awarded on a low bid of \$124,694, the work consisted of 7½ mi. of grading and surfacing, placing and oil stabilization of blow sand base on the Holbrook-Keams Canyon highway.

* * *

Charles Wiswell is acting as project manager for Maino Construction Co., Schmid & Wiswell, on a \$564,437 award for construction of additional aviation facilities at Point Mugu (near San Diego), Calif. Carpenter foreman is **Norman Norton, Jr.**

* * *

C. L. Earsley, superintendent, and **Earl Shannon**, assistant, head the con-

struction crew on a grade, drain, surf and hot-mix job for Henry Thygesen Co. Under way since June, this \$789,191.1-mi. grading and surfacing job on Magdalena-West road in New Mexico is expected to be finished by the end of the year.

* * *

Charles F. Engle is superintending \$249,393 contract for Earl L. McN Co. Work consists of 6.2 mi. of grading on the Helena-Fletcher Pass-Lin highway in Lewis and Clark County, Mont. Foreman is **Floyd Faris**. Contractor reports the job will be finished late fall.

* * *

Bill G. Rice, project manager, **Ra Wagle**, general superintendent, and **Rert Younce**, job superintendent, head crew now working on the widening streets in Chico, Butte County, Calif. for the contracting firm of Lester L. Rice & Sons, Inc. This \$176,284 project covers a stretch of 1.1 mi. of grading and surfacing. Work will be finished October.

CALENDAR

Oct. 7-10—Federation of Sewage & Industrial Wastes Associations, Statler Hotel, Boston, Mass.

Oct. 14-18—American Society of Civil Engineers, annual convention, Hotel Statler, New York City.

Oct. 18-19—Professional Engineers of Oregon, convention, Eugene Hotel, Eugene, Ore.

Oct. 21-25—National Safety Congress and Exposition, annual meeting, Chicago, Ill.

Oct. 23-26—Associated Equipment Distributors, tri-regional meeting, Monte Lodge, Carmel, Calif.

Oct. 28-30—American Road Builders Association, annual National Highway Conference for County Engineers and Officials, French Lick-Sheraton Hotel, French Lick, Ind.

Nov. 13-15—American Standards Association, annual meeting, Hotel Francis, San Francisco, Calif.

Nov. 13-15—Eighth National Conference on Standards, Hotel St. Francis, San Francisco, Calif.

1958

Jan. 16—Beavers Award Dinner, Bowers Bowl, Los Angeles, Calif.

Jan. 19-23—National Association of Home Builders Convention-Exposition, Hilton and Sherman hotels and Chicago Coliseum, Chicago, Ill.

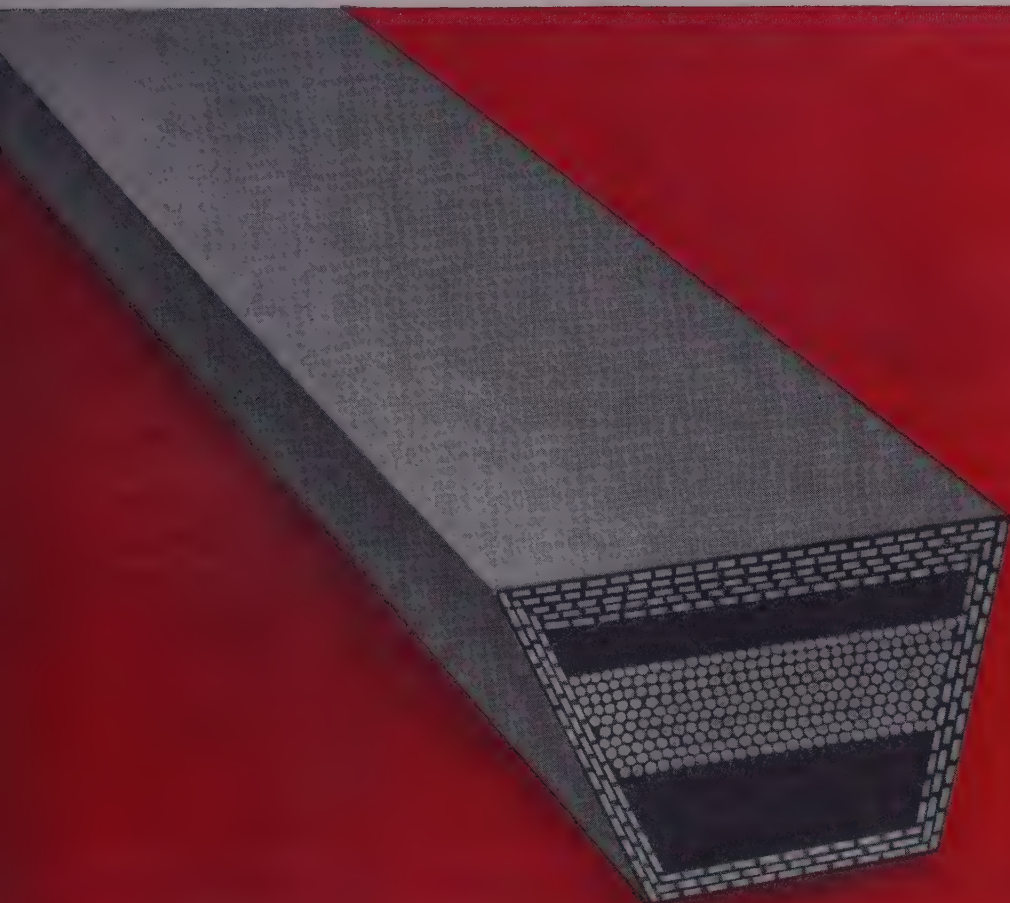
Jan. 20-23—American Road Builders Association, annual convention, Washington, D. C.

Jan. 26-30—Associated Equipment Distributors, annual meeting, Con Hilton Hotel, Chicago, Ill.

Feb. 26-28—American Society of Civil Engineers, annual convention, Chicago, Ill.



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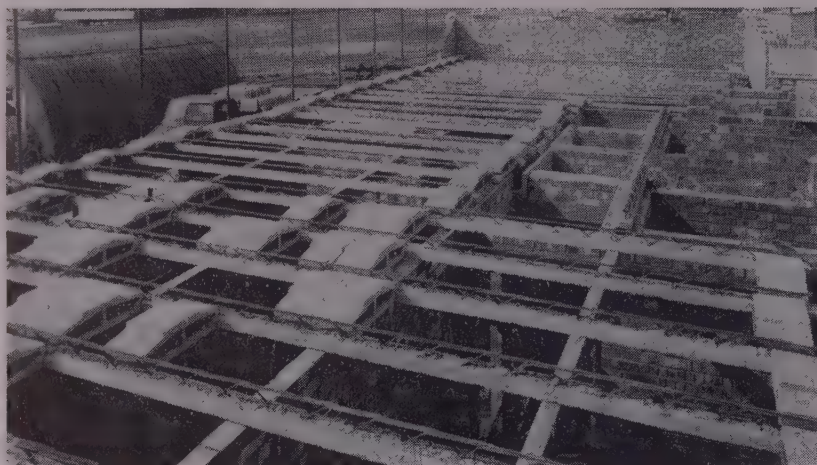
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CONSTRUCTION BRIEFS



Versatile block & beam deck

A NEW TYPE of concrete floor and roof deck is now available. Called the Omnia Floor, the new block and beam deck is adaptable to spans of 30 ft. or more. Monolithic in character, it is particularly suited to mass production methods. In addition, the new floor, unlike conventional block and beam systems, can be cambered during erection to provide a level finished surface over any span.

More than 75,000,000 sq. ft. of Omnia floors and roofs have been erected in Europe since their development in Germany five years ago. The floor consists of three components: the Omnia "plank," filler blocks, and concrete topping. The plank, a reinforced steel lattice girder with a reinforced concrete base provides the support for the floor. Light weight concrete blocks rest between the planks. The planks and blocks provide both support and forming for the concrete topping.

As the steel is adequately covered the Omnia System has fireproof qualities. Cast-in-place concrete girders may be used with Omnia precast floor joists. The Omnia System complies with A.C.I. Code 318-56.

Omnia floors are adaptable to many loads and spans by varying the height of the lattice girder, the amount of reinforcing, the spacing between planks and the topping thickness.

Erection advantages

The light weight and relatively small

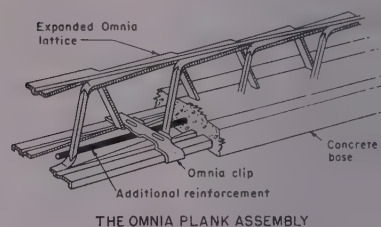
unit size of its mass produced precast components are the primary erection advantages of the Omnia floor. Typical Omnia planks weigh but 11 lb. per ft. compared to about 25 lb. or more per ft. for conventional precast beams. Weight of a typical filler block is 30 lb. or 22½ lb. per sq. ft., although they may be lighter. Thus, the precast members are easily manhandled and require none of the expensive heavy equipment usually necessary for precast erection.

Since the precast members act as the forming for the cast-in-place topping, expensive forms are unnecessary as is the close technical supervision which is normally required for form construction. Forming for roof lights, stairwells and stacks can be provided easily, as can change of direction of beams. The poured concrete of the floor acts as the T-flange of reinforced beams and frames, thus increasing their resistance without additional labor or expense.

Construction

The precast Omnia plank consists of a lattice girder of 15-gage cold rolled steel, additional reinforcement attached to the lattice boom with clips which also act as spacers, and a shallow concrete base. The stamped lattice strip is shipped and stored flat, then cut to length and expanded near the point of use. Its bottom booms provide tensile reinforcement for erection stresses and short cantilevers. Lattice diagonals mechani-

cally bond the precast base and the cast-in-place topping. Additional reinforcement is not required on spans up to 8-ft. or 4-ft. cantilevers. For longer spans it is selected according to job requirements. The shallow concrete base which



forms the soffit is cast in simple mass production molds or produced by machine.

Further information may be obtained from the Omnia Construction Co., 300 South Broadway, Yonkers, N. Y.

New curing process

THE ASSOCIATED Construction and Engineering Co. of San Francisco, Calif., has recently made the new Thompson Concrete (troweling in) Curing Process a standard part of their construction procedure. Specialists in tilt-up and precast concrete construction, the firm has found the new curing process to be the best and simplest way to control shrinkage during hot, windy weather.

It is claimed that other contractors trying the new process are also having success in controlling concrete shrinkage. Although a new approach featuring moisture control instead of water retention, the actual mechanics of the Thompson process are little different from those used for generations by concrete men, when pouring and finishing slabs.

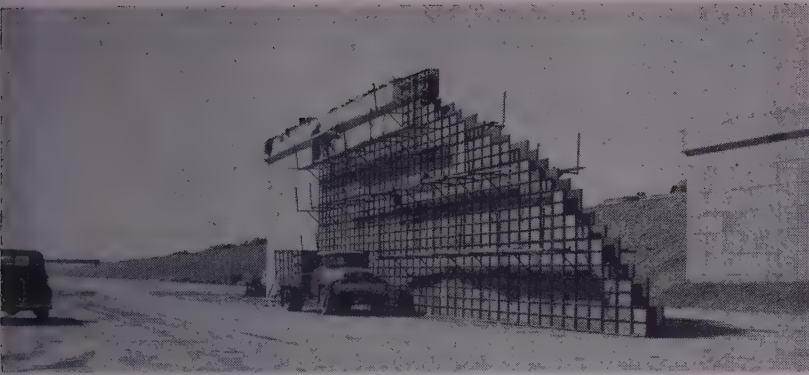
Numerous field tests have shown the new process produces tougher concrete with a harder dust-free surface, as well as far less crackage than with other currently used methods of concrete curing.

E. A. Thompson Company, Inc., Merchandise Mart, San Francisco, manufacturers of Thompson's Water Seal, has offered specifications and assistance to contractors and engineers using the new curing process.

How to avoid shocks

IS YOUR portable electric equipment properly grounded? If not, burns and death-causing shock may result, according to the National Safety Council.

Indirect injuries, too, may arise from use of ungrounded portable electrical equipment if it's defective. For example,



PREFABRICATED PANELS SPEED PIER FORMING

In order to speed concrete work on the piers for the Garfield Ave. bridge in Southern California, contractor John L. Meek used forms manufactured by Universal Form Clamp Co. The three piers were 24 in. thick, an average of 27 ft. high, and 122 ft. long, including wing walls. About 6,000 sq. ft. of Uni-Forms were used for the 16,000 sq. ft. of contact area. The form manufacturer furnished the contractor with a detailed layout of all the forms and helped the contractor's crew become familiar with the product on the job.

a workman received a slight shock from a defective tool and dropped it on his foot—suffering a painful injury. Slight shocks also have caused fatal falls from heights.

Common portable electric equipment—which often is used in homes as well as in industry—includes drills, abrasive tools and saws.

Even equipment that appears to be in safe operating condition may have shorted, broken or exposed wires, the Council said. They may make contact with the metal framework of the equipment, causing it to become energized.

To reduce the danger of electrical shock, it's important that a separate ground wire be provided from the tool to a low-resistance ground connection. Water pipes, metal frameworks of buildings, or other metal structures in direct contact with the earth, may be used to ground equipment.

Here are some suggestions on grounding portable electrical equipment:

1. When wiring is enclosed with metal conduit or protected by armored cable, all couplings and fittings used to make connections between the conduit or cable and the electrical equipment should provide metal-to-metal contact to assure a continuous ground return.

2. If the wiring is nonmetallic sheathed cable or knob and tube work—such as is used in construction work—a third wire must be connected to the grounding terminal on the receptacle to provide a good conducting path to a grounding electrode or water pipe.

3. Grounding wires should be checked to see that the size is correct for the capacity of the nearest fuse or other automatic cutout.

4. No fuses, automatic cutouts or hand-operated switches should be inserted in a grounding line.

To insure automatic use of the ground, a common type of plug with a U-shaped grounding blade and two standard parallel polarized blades now can be used.

The foregoing and additional information is contained in National Safety

Council Data Sheet D-299—"Grounding of Portable Electric Equipment"—and is available from the Council at 425 N. Michigan Ave., Chicago 11, Ill.

Trucks side-by-side carry 80-ton load

TWO TRUCKS were lashed together with chains and operated simultaneously to move an 80-ton load for Tacoma City Light recently. A transformer destined for the Utility's Cowlitz receiving station was purchased from the Westinghouse Corporation's Sharon, Pa., plant. The transformer was shipped on its side by rail across country, a trip that required four weeks since the 20-ft. high load restricted transportation at speeds less than 35 mph.

Unloading at Tacoma's Midland rail station was accomplished without the use of crane. The engineering staff



headed by John D. Ferguson employed skids and rollers to move the heavy load from the rail car to the flatbed trucks. The trucks were driven at equal speeds at 3 mph. and four wiremen were busy atop the transformer, clearing electrical

Complete Line of Homelite Carryable Construction Equipment Now Available



Self-Priming Centrifugal Pumps . . . Carry these lightweight, dependable pumps anywhere. Non-clogging design . . . 28 foot suction lift . . . capacities up to 15,000 g.p.h. . . sizes from 1½" to 3". Diaphragm pump also available.



Chain Saws For Every Job . . . Now you can choose from a full line of lightweight, powerful Homelite chain saws. From 3½ to 7 horsepower . . . 19 to 29 pounds. Brush cutting and clearing attachments are available to handle all your cutting jobs.



Carryable Gasoline Engine-Driven Generators . . . Lightweight Homelite generators can be carried and used anywhere to provide high-cycle and 115 volt power for your electric vibrators, tools, and floodlights. Complete range of sizes up to 5,000 watts . . . all standard voltages.

HOMELITE

a division of Textron Inc.
PORT CHESTER, NEW YORK

wires along the two-mile route over asphalt and oil mat roads. The entire moving job required about eight hours.

The transformer is one of three purchased by the utility for increasing capacity at the receiving station. The Westinghouse unit pictured here was righted at the station and filled with more than 8,000 gal. of oil when finally in place. It will reduce energy from 230,000-volt Bonneville transmission lines to 110,000 volts used in the Tacoma electrical system.

Tubular electrodes cut hardfacing cost

HARDFACING COSTS can be reduced by the use of new tubular wire electrodes developed by the American Manganese Steel Division of American Brake Shoe Co., for open arc semi automatic welding with its Amsco MF welder. Weld metal is deposited up to 200% faster with these Amsco electrodes than with the fastest manual rods. Not only is welding faster, but deposits are more uniform, and the quality of the weld is greatly improved.

A large mining company, plagued by the problem of hardfacing dipper teeth, cut welding time per set of teeth 53% by using the new tubular rod with the MF semi automatic welder. This resulted in labor and overhead savings of \$20.00 to \$25.00 per operating day—a possible yearly saving on teeth alone of \$4,000.

Building up dipper and crusher parts with Amsco's method of tube wire welding is easier and faster than with conventional manual rods and for such difficult tasks as hardfacing the side of a backhoe bucket, this method has the added advantage of being easy to use for vertical welding in cramped quarters.

The new tubular electrodes are 3/32 in. in diameter. Flux and hardfacing alloy, accurately proportioned for the proper weld deposit, are held compactly within the drawn steel tube. Amsco offers two types of tube wire: S/A manganese wire coils, for manganese steel buildup and repair applications, and S/A 53 for hardfacing to resist both wear and impact.

When both abrasion and impact are encountered, for example, in dipper teeth, scraper blades, crusher parts, and hammermill hammers, hardfacing with Amsco S/A 53 rod will increase wear resistance. This high chromium alloy rod can be laid down at 150 to 350 amp. AC or DC, reverse polarity. It can be deposited at the rate of 5 to 15 lb. per hour, depending on the current, on weldable carbon steels or manganese steel. Hardness of the deposit ranges from 425 to 475 Brinell.



CONTRACTOR SERVICE TRUCK GOES ALMOST ANYWHERE

Built especially to provide on-the-job service for large earthmover tires is the B. F. Goodrich Co. contractor service truck, an International four-wheel-drive model rated at 15,000 lb. gv. The "go-anywhere" unit, on 11.00 x 20 tires, has 201-in. wheelbase and can carry up through three 24.00 x 29 or two 37.5 x 3 tires. Equipment includes a 50-cu. ft. capacity air compressor, power tools, flood lights, a 5,000-lb. crane, and hydraulic levelers at the rear which stabilize the unit while lifting or servicing. Four-wheel-drive enables the truck to operate efficiently in sand, loose soil or snow as well as on a firm surface. Thirteen of these service units have been or are scheduled to be placed in service at locations throughout the country.



Job-built drill rig has long reach

MEN of the Chino Mines Division of Kennecott Copper Corp., Hurley, New Mexico, have come up with an interesting piece of drilling equipment. It's a self-contained air unit used from primary drilling where space does not permit the use of large diameter blast holes, and for secondary drilling. A motor and chassis with front and rear wheel steering was purchased from one manufacturer, a hydraulically operated jib from another, and a 4-in. drifter and carriage from a third. These were combined with a used rotary air compressor. The result was a rig with a long reach and high road speed and mobility.

Since the average toe or crest hole

shot for the unit consists of about eight holes, mobility is most important. Drilling assignments for the machine may be two miles apart. The economy lies in the ability to move compressor, drill, water, tool and men as a unit. Since the operator is a combination air driller and powerman, he may be required to blast his own holes if the occasion warrants it, effecting another saving.

During the first month the rig was in operation it drilled 2,950 ft. of 234-in. diameter hole at a rate of 116 ft. per shift worked, with some time spent in blasting included. During the same period conventional machines were producing at the rate of 71.9 ft. per shift.

On Yazoo River Basin Project, Yazoo County, Miss.

PIONEER GETS HIGH PRODUCTION FROM CAT* LOWBOWL SCRAPERS



DW20-NO. 456 LOWBOWL SCRAPER is push-loaded by a giant D9 Tractor. LOWBOWL design loads more material with less resistance clear to the end of the loading cycle for quicker heaped loads.



DW21-NO. 470 LOWBOWL SCRAPER speeds heaped load on haul. Turbocharged 6-cylinder Cat Engine, also in the DW20, delivers 300 HP (maximum output)—power aplenty for working in tough conditions.

At the time these pictures were taken, Pioneer Contracting Co., Inc., Memphis, had completed 100 working days of a schedule calling for 600. The project, involving 2,045,000 cu. yd. of earthmoving on the Yazoo River Basin, covers some 7 miles of work on channels, levees, drainage ditches and road relocation. There's a fleet of Caterpillar-built units on the job, including two DW20-No. 456 LOWBOWL Scrapers, a DW21-No. 470 LOWBOWL Scraper and a giant D9. They work 24 hours a day, 5 days a week. Says Pioneer's Scraper Foreman R. C. Parker: "We prefer Caterpillar-built equipment because of ease of operation. You can also depend on them for a minimum of down time. And wherever we are, Caterpillar Dealer service is always available."

Reports from job after job show that, under identical job conditions, Cat LOWBOWL Scrapers get bigger loads faster than competitive units. Both the four-wheel DW20-No. 456 and the two-wheel DW21-

No. 470 have capacities of 18 cu. yd. struck and 25 cu. yd. heaped. Their LOWBOWL design loads more material with less resistance clear to the end of the loading cycle for quicker heaped loads. And the Turbocharged 6-cylinder Caterpillar Engine delivers 300 HP (maximum output) for fast loading, hauling against adverse grades and dumping in tough going.

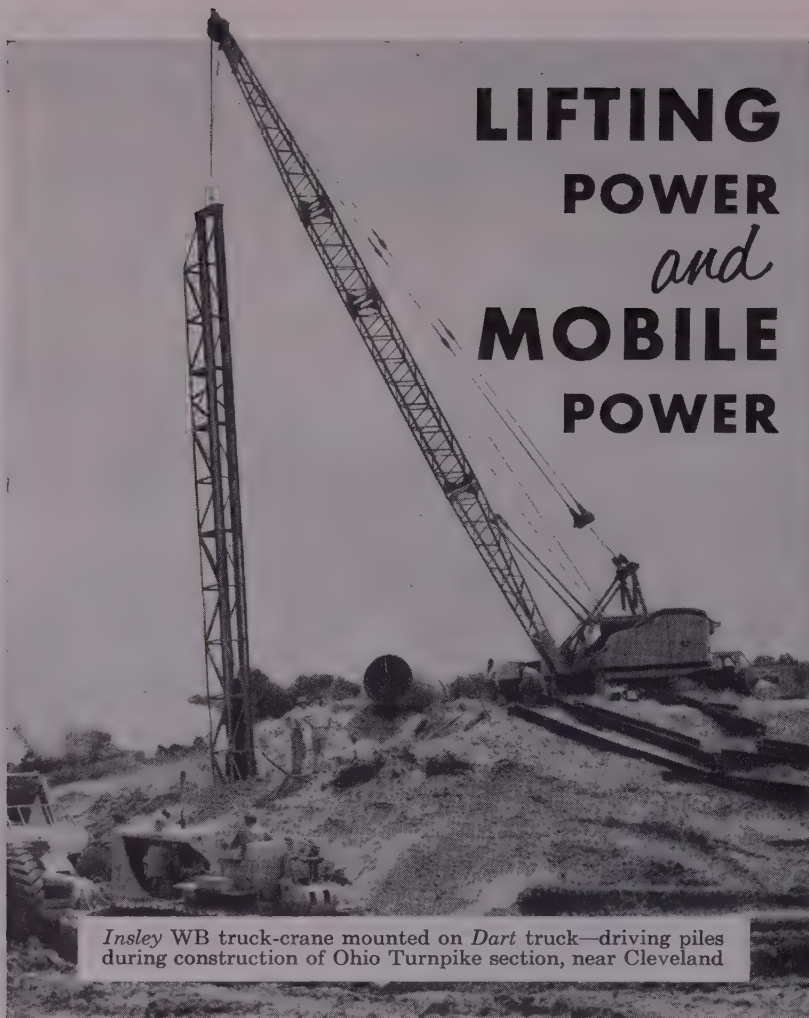
Whether you're a two-wheel or a four-wheel man, you can count on profitable production from LOWBOWL Scrapers. Your Caterpillar Dealer will be glad to show you competitive production facts and figures from actual jobs. Better still, name the date—he'll demonstrate on your job.

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

CATERPILLAR*

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

**WANTED—
THE HARD WORK**



Insley WB truck-crane mounted on Dart truck—driving piles during construction of Ohio Turnpike section, near Cleveland

BOTH Crane and Truck have WAUKESHA ENGINES



348



WAUKESHA MOTOR COMPANY, WAUKESHA, WISCONSIN
NEW YORK TULSA LOS ANGELES

Portable building

A PORTABLE prefab building designed for use as contractors' field or job offices, tool shed, timekeepers' or inspectors' offices, etc., is now available on a nation-wide rental plan for the Porta House Co. of Oakland, Calif.

One man can erect a 6 x 9-ft. Porta House in an hour and can move it again on a pickup truck. It comes prefabricated complete with doors and windows, 3-ft. sections of marine plywood painted, and with or without floors. The basic unit can be added to or reduced in size by 3-ft. multiples and is available in 6 x 9-ft to 12 x 60-ft. sizes. Two or more standard sizes may be put together. Interchangeable panels make it possible to have any number of windows and doors in any position. Its simple, bolted construction means no nail damage, quick erection and 100% salvage on dismantling.

Previously available only by purchase, Porta Houses may now be rented for an average rental of \$25.00 a month for a 9 x 12-ft. Porta House rental service includes delivery, erection, and removal from site.

Up to 75% of rental fees paid in may be applied to the cost of the unit if the renter wishes to purchase it later.

The Porta House Co. is in Oakland, Calif., at 6767 Broadway Terrace.

Booklet questions blasting hazards

RECENT INVESTIGATIONS indicate that the hazard of radio-frequency energy to blasting operations has been greatly exaggerated, according to a report just approved by the Institute of Makers of Explosives. The booklet entitled "Radio Frequency Energy—A Potential Hazard in the Use and Transportation of Electric Blasting Caps," replaces an earlier Institute approved publication on the subject and points out that, "from a practical standpoint, the possibility of a premature explosion due to RF energy is extremely remote."

The concise nine-page pamphlet explains in simple terms the nature of the hazard and offers precautions designed to minimize it. Two tables of recommended distances are presented for the guidance of persons performing electric blasting operations in the vicinity of fixed or mobile AM and FM transmitters. Since many explosives users—especially contractors—operate mobile FM equipment, it is interesting to note that the minimum distance recommended in the pamphlet for conducting electric blasting operations is only 30 ft. from a 250-watt FM transmitter; 5 ft. from a 10-watt FM transmitter.

Identified by the Institute as Pamphlet No. 20, the booklet is available without charge from the Explosives Development Section, Atlas Powder Co., Wilmington 99, Del.

For Every ROLLING JOB

From the start to the finish of a road or street construction job, there is a size or type of GALION Roller for every compaction requirement.

Contractors and public officials all over the world have found GALION Rollers to be most satisfactory and economical.

In compacting a tremendous fill, an ordinary sub-base, miles of smooth finished surface, or just a simple maintenance patching job — you will find GALION Rollers offer you features that have made them the "most used" Rollers in the world.

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ALASKA Newsletter

By CLIFFORD S. CERNICK, Anchorage

DISCRIMINATION REPLY—Larry Moore, Associated General Contractors manager in Anchorage, poured oil on troubled charges of discrimination which erupted in the Anchorage area at the peak of the construction season. Following Moore's statement refuting the charges, the turmoil vanished. This shows the usefulness of an immediate, direct statement on the part of the contractor whenever similar charges arise. Moore pointed out that work opportunities in Alaska have been less this year than in recent seasons, thus making competition for jobs keener and leading, in some cases, to feelings of discrimination. Moore said his office had checked AGC contractors working on 40 projects in Alaska and found colored labor on all jobs. Following wide publicity given to Moore's statements in Alaskan press media, the controversy fizzled out and no further charges were voiced.

EMPLOYMENT LAGGING—Despite the fact that construction in Alaska is at its seasonal maximum, there are indications of substantial unemployment in both Fairbanks and Anchorage, to say nothing of other smaller sections of Alaska. Employment officials in Fairbanks issued a statement recently regarding the reasons for the jobless situation there. The officials declared that in skilled construction crafts, unemployment is running from 5 to 20% of the union membership. In unskilled unions, the rate was much higher. Completion of the Distant Early Warning Line stations in the Arctic was given as one reason for lack of work. Still another accountable factor is the salmon strike which plagued the fishing industry in southeastern Alaska at the beginning of the season. Many prospective workers there came north for jobs instead.

AIRPORT CONSTRUCTION—Allen D. Hulen, CAA regional administrator, has revealed plans for three major CAA airport projects in Alaska totaling more than \$1,500,000. At Nome, a \$778,802 contract for rehabilitation of both Nome runways was awarded to the Central Construction and Engineering Co. of Seattle. Hulen said bids will be called this fall on construction of an airport and CAA communications station at Bethel. More than a quarter of a million dollars will be spent at Cold Bay on a new instrument landing and approach lighting system there.

"OUTSIDER" MENACE—Henry M. Hedberg, legislative representative for the Alaska Federation of Labor, told the Anchorage Chamber of Commerce that local businessmen "are cutting a hole in their own pockets when they try to be a

friend to a friend of a friend by finding employment here for outsiders." The labor leader said the problem of outside workers taking jobs that should go to Alaskans "will be the number one problem facing the Anchorage economy next year." He added that if businessmen persist in obtaining jobs for "outsiders" a depression condition could result. Hedberg said contractors are sympathetic and willing to cooperate in overcoming the problem created by the influx of outside workers.

BIG SURVEY JOB—Continental Engineers, Inc., of Denver will probably supply 18 Alaska survey parties for military construction and civil works surveys in the territory. The Alaska Army Engineer District reported that the Denver firm submitted the low bid of \$445,492 for the services. Some of the survey parties will work near Alaska's major military bases. Others will be detailed to remote sites.

APW IN '58—The governor's office in Juneau has announced that more than \$6,000,000 will be spent on 17 Alaska Public Works projects in the territory during 1958. Biggest fund was for the University of Alaska which will get \$2,696,000 for a new four-story campus building. Projects were also authorized at Anchorage, Kodiak, Kenai, Bethel, Dillingham, Homer, Hoonah, Douglas, Skagway, Haines, Ketchikan and Petersburg.

JOBLESS FUND SLUMP—It looks like a hard winter for Alaska's unemployed. The jobless compensation fund continues to fall, with each month's outgo exceeding the income. For example, total contributions received during the twelve-month period ending July 31, 1957, amounted to \$5,084,000, while benefit payments for the same period totaled \$5,402,000. The excess of benefits paid over contributions received resulted in a net loss of \$318,000 to the fund for the twelve-month period. The balance in the unemployment fund on July 31 was \$1,909,000.

SPECIAL AGREEMENT—A labor-contractor agreement unique in Alaska history was signed late in July covering construction of the new \$50,000,000 pulp processing mill at Sitka. The contract set the wage scales for nine construction crafts for the duration of the Sitka project. The Sitka agreement provides that wage scales paid from March 1958 to March 1959 will prevail through August 1960 if construction continues until that time. Heretofore, unions have been willing to sign contracts only on a year-to-year basis. A statement issued following

the agreement pointed out that financing of the huge project was jeopardized by the fact that labor agreements normally run for only a one-year period in Alaska and because of this, the financing interests could have no definite assurance that total labor cost estimates furnished by the consulting engineers would be reasonable for a project which lasted two or more years. The willingness on the part of unions to sign the longer-term agreement erased this objection. Union crafts which signed the agreement with Alaska Lumber and Pulp Co. include carpenters, pile drivers, operating engineers, teamsters, laborers, bricklayers and ironworkers.

MILL CONSTRUCTION—Construction of the pulp mill at Sitka is being undertaken by the Sitka Pulp Mill Builders, a joint venture of the Howarth S. Wright Co. and the Guy F. Atkins Co. They report that very little work will be done at Sitka this year but that construction crews similar in size to those employed on the big Ketchikan pulp mill will be assembled during the summer of 1958.

MASTER PLAN—Reflecting enlightened construction planning by Alaska municipalities is the decision of the city of Anchorage planning commission to formulate a "master plan" for future construction. The plan will include data concerning the location of future city territorial and federal buildings within the Greater Anchorage area. A special committee is at work on the master plan. Its most important decision will be to determine whether Anchorage should have a civic center with all major public buildings centralized in one area. The civic buildings plan is only one part of the city's master plan. Another citizen committee has started work on a general highway plan which will coordinate highway planning by the city, military territory and federal government.

CONSTRUCTION NEWS NUGGETS—Construction of the largest small boat basin in Alaska at Bar Point near Ketchikan, is now under way. The project will provide facilities for nearly 600 fishing, commercial and other small craft . . . Work on the Sitka pulp mill will eventually require between 800 and 1,000 men. Target date for the mill opening is Jan. 1, 1960. It will employ 400 to 500 workers and turn out an estimated 340 tons a day of dissolving grade pulp . . . Refusal of a homesteader of the Steese highway to grant easement rights for a Bureau of Public Roads highway project has caused cancellation of a regrading and realignment job on a five-mile stretch of roadway on the highway . . . A contract has been let for complete reconstruction of the Alaska Highway between Tok Junction and Johnson River . . . The Dewline chain of radar warning stations constructed in the Arctic regions of Canada and Alaska went into operation July 31.

Leading contractors' say... **K-45 KOMPACTOR** most profitable to own

From all over the nation come new contractor reports that Buffalo-Springfield's K-45 Kompactor is regularly saving 50% or more over normal compaction time and costs. These records show that regardless of widely varied materials—K-45 compaction is faster, better and more efficient than was previously thought possible.

Such outstanding results come from the Kompactor's "Interrupted Pressure" principle of compaction . . . its fast speeds of 5 to 6 mph, self-propelled, in either direction . . . its high maneuverability . . . and its ability to work

right up close to curbs, culverts and abutments to eliminate costly hand-tamping. These are a few of the K-45's superior performance features that *give* more to *get* more than with any other method.

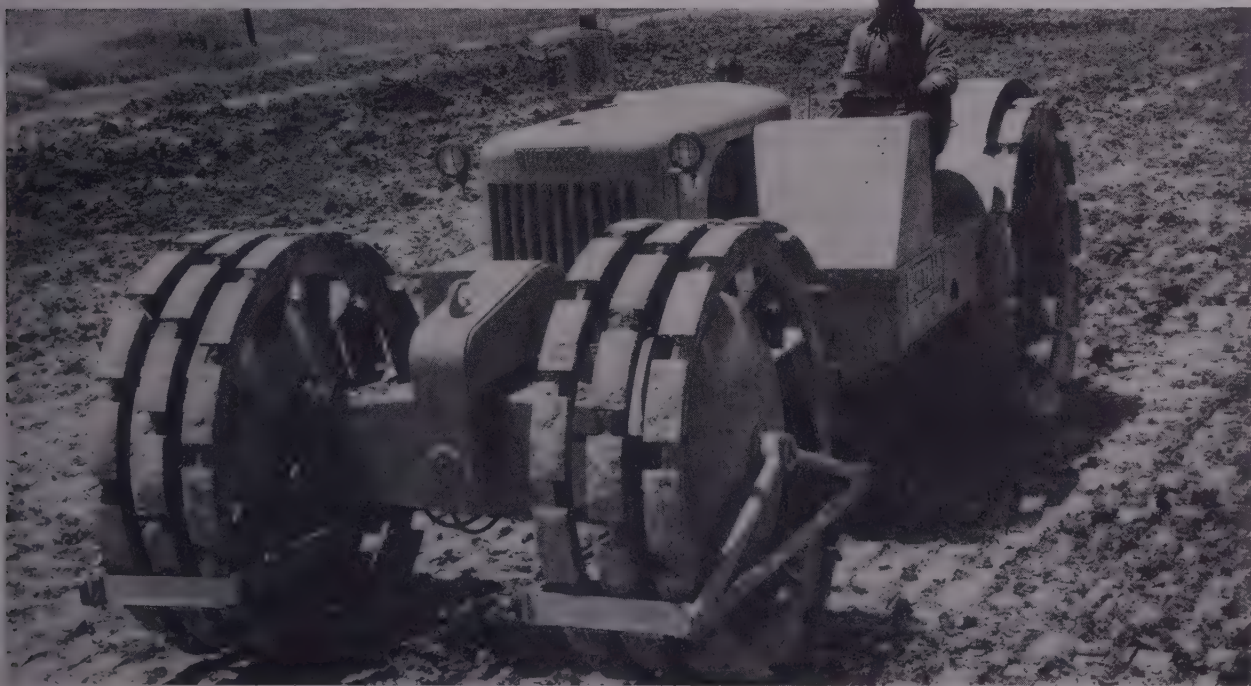
Before you bid another compaction job, check on the K-45 with your nearest Buffalo-Springfield distributor. Let him show you how the K-45 does more work per day per dollar, brings you more profit. Ask him, too, for Bulletin S-67-455, or write today for complete information on this better, exclusive compaction machine. There's nothing else like it available.



Here, the K-45 Kompactor works up close—eliminates hand tamping on this California job.



The K-45 Kompactor meets density specifications in fewer passes, faster, and at less cost.



Compacting adobe on a fill, this K-45 speeds up work for another leading West Coast contractor.



BUFFALO-SPRINGFIELD ROLLER CO.
DIVISION OF KOEHRING COMPANY • SPRINGFIELD, OHIO

NEW LITERATURE

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

Standard Steel asphalt plants

Standard Steel Corp. has released a new 16-page bulletin describing the R-M line of semi-portable asphalt batch plants from 2,000 to 6,000-lb. capacity. Also published is a new four-page bulletin on the TM Mobile Mixer which is completely self-contained on a single trailer frame. Especially designed for on-the-job mixing in rural areas and out-of-the-way locations, the new TM Mobile Mixer in capacities up to 2,000 lb. can be erected in less than 30 min. and is ready to produce asphalt mix in a few hours. Shown in photos and thoroughly discussed in the text are essential parts of the semi-portable and completely portable plants. Specifications of the asphalt plants and accessories are described in the bulletin, available from the Road Machinery Division, **Standard Steel Corp.**, 5001 South Boyle Avenue, Los Angeles 58, Calif.

Automatic concrete bucket

Now available is a two-page illustrated bulletin describing the Tusky automatic concrete bucket, manufactured by **Tusky Hoist Division** of Tubular Structures Corp. of America, 2960 Marsh St., Los Angeles 39, Calif. The Tusky bucket is the only concrete bucket that dumps itself at a controlled pouring rate automatically. Operational data is provided along with schematic drawings of the unit in action.

National Safety Council issues list of equipment building data

Recently published is a list of National Safety Council Detail Sheets containing 148 easy-to-understand tips on how to build equipment such as scaffolds, dollies, racks and bins. The detail sheets, listed in a three-color flyer, provide plans for dozens of safety devices, both general and specialized, and suggest ways for adapting them to specific problems. Copies of the flyer and further information may be obtained from the **National Safety Council**, 425 N. Michigan Ave., Chicago 11, Ill.

Ford tractors on industrial jobs

A new booklet entitled "Ford Tractors and Their Industrial Applications" is available upon request from Industrial Sales Dept., Tractor and Implement Division, **Ford Motor Co.**, 2500 E. Maple Road, Birmingham, Mich. The 12-page booklet shows various applications of Ford tractors and industrial equipment. Abbreviated specifications of all equipment are included.

IH carbureted power units

A new, illustrated 12-page catalog on its line of six new and increased horsepower six-cylinder carbureted power units has just been announced by **International Harvester Co.** This booklet devotes a page of space to each of the six recently-introduced units, which are presented with handy power and fuel consumption curves. Cutaway views of components spotlight various advantageous features of the units. Two pages are reserved for brief specifications of the units, disclosing performances on gasoline, LPG or natural gas. A copy of this free catalog may be obtained by writing for: Catalog CR-511-G, Construction Equipment Division, **International Harvester Co.**, 180 N. Michigan Ave., Chicago 1, Ill.

Sprocket rims for crawler tractors

Durable, wear-resistant manganese steel replacement rims for drive sprockets of crawler tractors are described in new literature just released by **Kensington Steel**, Division of Poor & Company, Chicago 28, Ill. The sprockets are cast from Kenkrome, a superior high alloyed manganese steel which develops even greater surface hardness when in use; the teeth have been re-shaped to provide full, increased bearing against the link. This distributes the stress evenly throughout the root of the tooth. Step-by-step instruction for installation is included.

Bulletin describes design changes on Blaw-Knox concrete paver

Significant design changes in the Blaw-Knox Multifoot concrete paver are described in a six-page bulletin available from the Advertising Dept., Construction Equipment Division of **Blaw-Knox Co.**, Mattoon, Illinois. The refinements to the Multifoot include hydraulic controls, a new low clearance, faster skip operation, improved bucket operation, and lower maintenance. Five small levers conveniently located for the operator hydraulically control the A-frame, skip support bracket, batch transfer, discharge chute and bucket opening.

Rubber in roads—English style

The Natural Rubber Bureau Research Laboratory has just reprinted a 28-page, 4-color booklet on rubber roads, prepared by the Bureau's research associates in London. The booklet delves directly

and graphically into English work on rubber roads. Tests and statistical evidence are illustrated to support each claim for rubber-asphalt surfacing. Leakage, brittleness, improved impact resistance, greater toughness and extensibility, improved resistance to cracking and deformation, reduced temperature susceptibility at high and low ranges and long-wear endurance are all covered in a wide variety of laboratory and field illustrations. Technical information sheets round out these facts with tabular and statistical data showing how rubber and asphalt is handled by the English highway engineer. For a free copy of the booklet on rubber in roads, write **Natural Rubber Bureau Research Laboratory**, 1101 Lee Highway, Arlington 9, Va.

Bituminous application guide

Now available from **Littleford Bros., Inc.**, 457 E. Pearl Street, Cincinnati 2, Ohio, is new **Bituminous Application Guide (Shot Guide)** that is designed to be a quick reference in determining the correct speed of a bituminous distributor when applying a pre-determined amount of bituminous material to a road surface. Other information to be found includes: a conversion chart for trucks not equipped with fifth wheel tachometer, speed is broken down from miles per hour to feet per minute; a chart on heat conversion; application and uses of various grades of tar, asphalt and emulsion; and a guide for finding the correct touch speed.

IH Pyscraper booklet

Latest engineering developments in the Model 55 Pyscraper are described in an 8-page booklet just released by **International Harvester Co.** The pamphlet includes closeup photos of such important features as the improved bow, three-piece reversible cutting blades and "flow system" of positive power steering on this 14-cu. yd. self-propelled scraper. On-the-job photos illustrate the maximum stability of the unit through such things as ground-clinging traction, adequate ground clearance and strain-free turning. An entire page is devoted to brief specifications of the various components of the unit. For a copy, write for Booklet CR-525-G, Construction Equipment Division, **International Harvester Co.**, 180 N. Michigan Ave., Chicago 1, Ill.



204-ft. concrete piers —

To support a 1,040-ft. truss-span bridge, contractor built two piers, towering 204 feet above river-bed. Each pier contains over 2,000 cu. yds. of concrete, and approximately 197,000 lbs. of reinforcing steel. Using slip-form process, the concrete forms were raised up the column by hydraulic jacks as work progressed. Koehring 605 crane with bucket placed most of the concrete. On upper sections, bucket was hoisted from scaffold at the top. Total construction time: 3 months.

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ENGINEERING SALES SERVICE, INC., Boise, Idaho
WESTERN CONSTRUCTION EQUIP. CO., Billings, Montana
WESTERN CONSTRUCTION EQUIP. CO., Great Falls, Montana

Concrete product handling ideas

A wide variety of practical ideas for handling concrete products with industrial trucks and attachments is presented in a 26-page booklet just published by **Hyster Company**, 2902 N.E. Clackamas St., Portland 8, Ore. The booklet, titled "Effective Ideas for Handling Concrete Products," is well illustrated with descriptive pictures which show efficient techniques for handling block, pipe and precast products. Many special attachments used to reduce handling costs are shown in manufacturing processes such as aggregate handling, form handling and concrete pouring.

Features and applications of Rapistan flow track

Application ideas and features of Rapistan Flow Track are described in a new bulletin recently published by **The Rapids-Standard Company, Inc.** Rapistan Flow Track, which is gravity conveyor in its basic form, can be combined with other conveyors or be used in various combinations of itself for a multitude of purposes. The new Flow Track bulletin illustrates many applications of this inexpensive conveyor track. Complete specifications are also included in the new literature. Copies of the new Rapistan Flow Track bulletin, Form No. FT-57, can be obtained by writing **The Rapids-Standard Co., Inc.**, 342 Rapistan Building, Grand Rapids, Mich.

Accessories for IH trucks

A 12-page two-color "Necessaries" catalog describing and illustrating tested and approved accessories for International trucks has been issued by the motor truck division of **International Harvester Co.** The accessories shown were selected as being necessary to the greater comfort, economy, safety or convenience of truck operation. All have been tested and approved by the International truck engineering department. Catalog, form MT-93, can be secured by writing Consumer Relations Department, International Harvester Co., 180 N. Michigan Avenue, Chicago 1, Ill.

McKiernan-Terry bulletin on new diesel pile hammers

A new bulletin, recently made available by the **McKiernan-Terry Corp.**, describes their Models De-20 and De-30 diesel pile hammers. Also contained in Bulletin 67R is the complete line of Universal Drive Caps, developed specifically for use with the new McKiernan-Terry Diesel pile hammers. The complete cycle of operation is described thoroughly, as are design features, and complete technical specifications for both models. For the man in the field, the bulletin contains a chart graphing the solution of The Engineering News formula to determine the static load bearing capacity for both sizes of the hammer when delivering observed blows per inch with observed Ram-Piston stroke. Bulletin 67R is available on request from

the File Hammer Division, McKiernan-Terry Corp., Dover, N. J.

New CF&I wire catalog

A 72-page illustrated catalog describing the complete line of CF&I-Wickwire wire has been made available by **The Colorado Fuel and Iron Corp.**, 575 Madison Ave., New York, N. Y. The new catalog gives complete ordering specifications for all CF&I wire and includes diagrams and descriptions of the various types and grades of wire, and also describes the manufacture of CF&I wire with special emphasis on the rigid testing and quality control of the product. The catalog is available without charge at the company's New York office or at any of the regional offices.

New trencher catalog

Cook Bros. Equipment Co., 3334 San Fernando Road, Los Angeles 65, Calif., has recently released a new eight-page catalog illustrating and describing the Challenge Universal Trencher. The Challenge Trencher is a ladder type machine, and will dig trenches to 5 ft. 3 in. deep and from 12 to 18 in. wide with square or round bottom. The ladder, bucket line, and reversible conveyor are all hydraulically operated. A backfill blade for clearing ahead of the machine, leveling high spots, and refilling trenches, is standard equipment. The new catalog gives complete specifications, and describes the new trencher in detail.

Allis-Chalmers HD-16 crawler tractor

A new fold-out specification sheet (MS-1192) covering the Allis-Chalmers HD-16 diesel powered crawler tractor is now available from the Construction Machinery Division, **Allis-Chalmers Manufacturing Co.**, Milwaukee 1, Wis. It features a cutaway view of the tractor that shows both the gear-type and the hydraulic torque converter drive transmissions, and many of the mechanical, design and construction highlights of the HD-16. The torque converter drive, which Allis-Chalmers introduced into the crawler tractor field in 1940, is also reviewed along with its numerous use advantages.

Caterpillar brochures

"Wanted: Hard Work," a new booklet released by **Caterpillar Tractor Co.**, contains on-the-spot photos of earthmoving equipment at work on rugged jobs in varied industries. The booklet describes working conditions and operations which try men and machines. Showing Caterpillar machines at work on cliff sides, in mines and in swamps, the bulletin also lists component parts of the machines. Also available is a brochure entitled

"Cat Lowbowl Scrapers Keep Costs Low." On-the-job reports and photographs illustrate the effectiveness of the Lowbowl design. For copies of these bulletins request Forms D709 and D717 respectively from the Advertising Division, Caterpillar Tractor Co., Peoria, Ill.

New catalog illustrates new 20-ton payload semi-dump trailer

Cook Bros. Equipment Co., 3334 San Fernando Road, Los Angeles 65, Calif., has recently published an eight-page catalog illustrating and describing the "Stabilift" semi-dump trailer, a frameless type semi-trailer with a legal highway hauling capacity of 20 tons in most states. It is designed for hauling dirt, large rock or crushed stone, sand and similar bulk materials. It is also easily adapted with batch gates and will work with a concrete paver, carrying several full batches per trip. It is also used instead of dump trucks for working with asphalt paving machines, carrying a full 20-ton payload of hot asphalt paving material.

Huber-Warco bulletin on 3-5 ton tandem roller

"Big Roller Features in Huber-Warco's Tandem Roller," is the theme of Bulletin HWT 536 now offered by the **Huber-Warco Co.** of Marion, Ohio. In this eight-page illustrated bulletin, the multi-purpose 3-5 ton tandem roller is explained in detail—including the water-cooled engine with torque converter, adjustable and reinforced guide roll assembly, ease of operation and servicing, and the unit's heavy construction. Special emphasis is given to the available towing attachment which converts the 3-5 into a highly portable roller. On the back cover, Huber-Warco power hydraulic retractable wheel attachment for the 3-5 ton is explained.

Bridge report

Bridge concreting, its problems and solutions, is the theme of a 16-page **Railporter** (MBR—P-11), just published by **The Master Builders Co.**, 7016 Euclid Ave., Cleveland 5, Ohio. Case histories of some 280 bridges are covered in 5 stories illustrated by accompanying photographs. Emphasized is the role played by Pozzololith as a means of controlling concrete quality under a wide variety of weather and placing conditions.

Self-propelled Railporter

An 8-page bulletin featuring the **Railporter**, a self-propelled material handler which consists of a powered unit that runs on a single rail, has been issued by the **Chain Belt Co.**, Milwaukee, Wis. Bulletin 57-47 includes a double page spread of photos emphasizing the versatility of the Railporter and a breakdown of some of its individual features. A copy of the bulletin may be had by writing to the company.

"We cut drilling costs with TIMKEN® carbide insert bits"

... Reports Fisher Contracting Company

**CARBIDE INSERT?
or
MULTI-USE?**

DRILLING through extremely hard and abrasive granite and porphyry, Fisher Contracting Company found that they got the lowest cost per foot-of-hole with Timken® carbide insert bits. Excellent footage and maximum regrinds per bit helped achieve overall economy.

But carbide bits may not always be most advantageous. For extremely deep holes, small diameter blast holes, and constant-gauge holes, carbide insert bits give big economies.

In ordinary ground, however, when full increments of steel can be drilled, and with correct and controlled bit reconditioning, Timken multi-use bits give you the lowest cost per foot-of-hole.

When you use Timken multi-use and carbide insert bits, your drillers save time. Dozens of different bits fit the same drill steel. You can change bits as drilling conditions change; but you use the same drill steel. And the special shoulder union of Timken bits increases bit life because it protects threads from drilling impacts.

Timken rock bits are made from the Timken Company's own electric furnace fine alloy steel. No other rock bit manufacturer goes this extra step to assure you of the highest quality. Why not let us help you select the best bit type for your drilling jobs? Write: The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO".

LOCATION—
Park County, Colorado

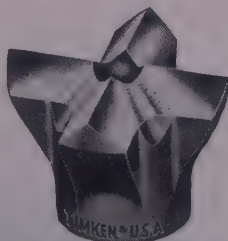
OPERATING CONDITIONS—
Granite and porphyry

See the first Timken Televent hour, in color,
"Eleven against the ice—story of the Antarctica Turnpike".
NBC-TV, Monday night, September 23rd.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

*your best bet for the
best bit for every job*



Timken threaded
multi-use rock bit



Timken threaded
carbide insert rock bit

Basalt concrete products

New literature from the Structural Concrete Products Division of **Basalt Rock Co., Inc.**, describes Basalt light-weight concrete precast panels and pretensioned double tee floor and roof slabs. Construction and installation details are illustrated with fine detail drawings. Features and specifications of the product are cited along with full information on their construction, application and installation. For copies of "Basalt Precast Panels" and "Basalt Pretensioned Double Tee Floor and Roof Slabs," write to Structural Concrete Products Division, Basalt Rock Co., Inc., Napa, Calif.

Telescoping work platform

A large elevating working platform which can be mounted on truck or trailer is described in a four-page brochure released by **Hydro-Point Engineering Co.**, Box 488, Hamilton, Mont. The large 8 x 14-ft. platform, called Stratolift, is made of structural aluminum, requires no scaffold to erect or take down. The brochure lists its various applications, specifications and optional equipment available.

Ways to use self-propelled air compressors

A new six-page bulletin describes and illustrates the versatility of Schramm Inc.'s Pneumatractor, a combination 125-cfm. air compressor and wheel tractor, which can be converted from one service to the other by a button on the instrument panel. Photographs show 18 different ways that contractors can use the Pneumatractor, such as power shoveling, breaking out concrete, trenching, grading, rock drilling, towing, sweeping, tamping, pumping water and plowing snow. Detailed specifications are given for both the standard Pneumatractor and the heavy Pneumatractor, including air delivery, bore and stroke, horsepower, overall dimensions, and weight. Avail-

able accessories are listed. Copies of this bulletin are available from **Schramm, Inc.**, 900 East Virginia Ave., West Chester, Pa.

Fruehauf cable dump trailer

Fruehauf Trailer Co. has just issued a data sheet on the Fruehauf-Schonrock cable dump trailer which gives, in addition to specifications of this unit, information as to its construction and uses. The Fruehauf-Schonrock is unique in that it obtains increased power by means of pulleys, thus greatly simplifying underbody construction as well as eliminating heavy and expensive hydraulic lifting mechanisms. The data sheet is available from the Advertising Department, **Fruehauf Trailer Company**, Detroit 32, Mich.

Clark catalog on Ranger fork trucks

An 8-page catalog describing the construction and operating characteristics of the new "Ranger" line of fork trucks for outdoor handling is now available from the Industrial Truck Division, **Clark Equipment Co.**, Battle Creek, Mich. All three models in the line—of 15,000-, 20,000-, and 30,000-lb. capacity—are treated in the catalog. Schematic drawings illustrate the torque converter, power-shift transmission, non-steering drive axle and steering drive axle designed especially for the equipment. Sketches describe the new brake system and differential locking device used to distribute power equally to all wheels. Tables and charts give full information on operating features and specifications. Color drawings indicate some applications of the machines.

Eveready equipment

Two new pieces of literature have been made available for general distribution by the Eveready BrikSaw Co. These circulars can be obtained from your local Eveready distributor, or by

writing direct to the **Eveready BrikSaw Co.**, 1509 S. Michigan Blvd., Dept. 645, Chicago 5, Ill. One is a 6-page pamphlet which explains the workings of Eveready's new 2-hp. Briksawmatic and standard BrikSaw. A 12-page accordion fold pamphlet is also available, showing complete, up-to-date prices on all Eveready equipment and blades, and a masonry blade recommendation chart for cutting all masonry materials.

Tractor-mounted rotary drill

Davey Compressor Co., Kent, Ohio, announces the availability of two new bulletins describing its new Mode M-8TA tractor-mounted rotary drill. (Bulletins LL-5802 and M-733). One is a single-page leaflet, containing detailed specifications. The other, a 4-page leaflet, describes both tractor and truck-mounted units with rated capacities to 2,000 ft. Bulletin copies may be secured by writing to the company.

Cataphote catalog

Cataphote Corp., Toledo, Ohio, manufacturers of traffic control products, have issued a comprehensive 33-page catalog (No. 65), giving descriptions, illustrations, specifications and prices on their products. Included are street signs, traffic signs, reflective coating kits, reflective beads, reflector buttons and reflective striping. A special section—"Ten Tips on Applying Sataflex '202' Sign Beads" is also in the catalog.

Aluminum air and water line

Flexible-joint aluminum air and water line is the subject of a 4-page leaflet which has been put out by **Major Aluminum Products, Ltd.**, 5 West 2nd Ave., Vancouver 10, B. C., Canada. Included in the bulletin are photographs stressing the quick coupling and the adaptability of Major air and water line for use in mines, mountains and aerial settings. A list of available fittings is also given. Ask for the bulletin by subject matter.

Notice to publisher of CHANGE OF ADDRESS

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Mail to: **WESTERN CONSTRUCTION**
609 Mission St.
San Francisco 5, California
Attn: Circulation Department

A-C heavy-duty lift truck

Engineering, design and construction features, that combine into operating, performance and maintenance advantages for users of the recently introduced Allis-Chalmers FT-100 lift truck, are outlined in a new illustrated piece of literature (BU-334A) now available from the Buda Division, Allis-Chalmers Manufacturing Co., P. O. Box 512, Milwaukee, Wis. Specifications cover the 10,000-lb. lift truck and the 230-cu. in. Allis-Chalmers engines available in gasoline, LP gas, and diesel models.

Case TerraTrac bulldozers

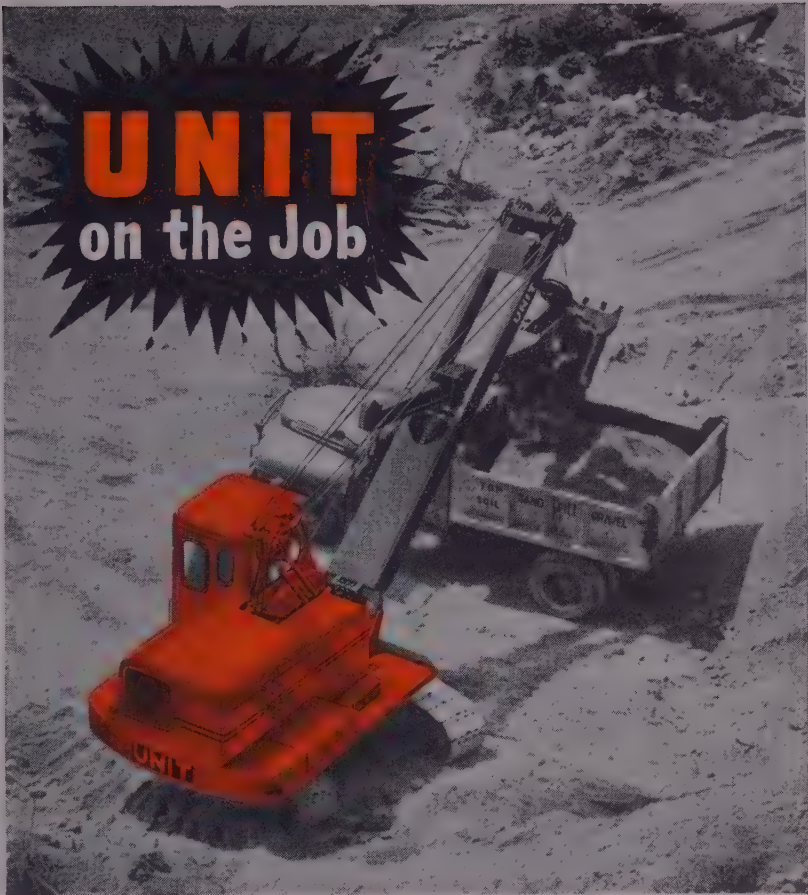
Charts comparing features and performance of Case TerraTrac 80 and 100-hp. bulldozers with competitive makes are contained in a new bulletin, CTS-105, just issued by J. I. Case Co., Racine, Wis. Eight pages of photographs and operational drawings show how new "Tilt-Crown" bulldozers can be tipped and tilted hydraulically from operators seat for ditching, road-crowning, grubbing, ripping hard ground, etc. Advantages of torque converter drive and counter-rotating hydraulic transmission are also shown. Illustrated is the oscillating and load-equalizing action of exclusive torsion-bar track suspension system, which is available on the larger Case TerraTrac dozer and tractor-shovel models.

Bulletin describes Schield Bantam crane carrier-mounted model T-35

An up-to-date 6-page bulletin covering the Bantam Model T-35 crane-excavator is available from Schield Bantam Co., 999 Park St., Waverly, Iowa. The bulletin features application and engineering data on the company's 7- and 8-ton carrier-mounted machines, as well as brief specifications and illustrations of the three crane carriers manufactured by Schield Bantam, Models 100, 200 and 300. Charts and illustrations give dimensions and operating data on the shovel, back hoe, clamshell, dragline and crane attachments and optional equipment. The Bantam T-35 basic unit is covered in detail with photos and specifications. Request Bulletin TCR-202. Similar bulletins are also available on the Bantam C-35 crawler-mounted (Bulletin C-101), and Model CR-35 self-propelled machine (Bulletin CR-502).

Traxvacators on the job

A new booklet, "Time to Consider Traxvacators," has been released by Caterpillar Tractor Co. The publication shows through on-the-job photos and reports the many different tasks that Traxvacators can handle. Describing these machines working in mining, construction, logging and other operations, the booklet also lists some of the available attachments which extend the machine's versatility. "Time to Consider Traxvacators" may be obtained from Caterpillar dealers or by requesting Form No. D724 from the Advertising Division, Caterpillar Tractor Co., Peoria, Ill.



SWING SPEED makes PAY LOADS!

Here's a UNIT ½ Yard Shovel doing a PRODUCTION DIGGING JOB in a gravel pit. UNIT owners like the ease of operation and the FULL VISION CAB for complete visibility. They also like the sturdy construction and the many mechanical features, plus the ECONOMICAL PERFORMANCE and LOW UP-KEEP which all add up to EARNING POWER. Why not investigate what UNIT can do for you — on YOUR next excavating and material handling job?

SEE FOR YOURSELF: *Let us send you our novel TV Brochure. It illustrates the complete UNIT line.*

UNIT CRANE & SHOVEL CORPORATION
6421 WEST BURNHAM STREET • MILWAUKEE 14, WISCONSIN, U. S. A.

½ or ¾ YARD EXCAVATORS...CRANES UP TO 20 TONS CAPACITY
CRAWLER OR MOBILE MODELS . . . GASOLINE OR DIESEL

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All Models Convertible to ALL Attachments!

NEW EQUIPMENT

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

Autocar brings out AP-40 dumper most powerful single-engine truck

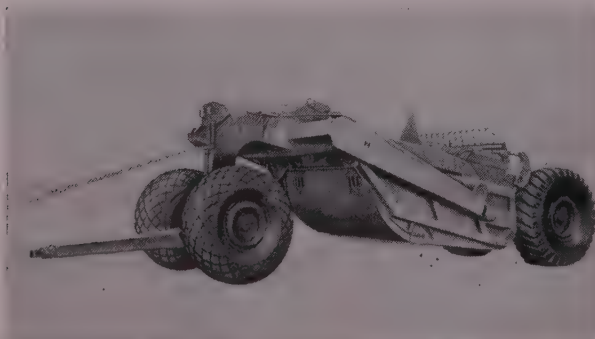
A 600-hp. diesel rear dumper for off-highway use, the most powerful single-engine truck in the industry, has been developed by Autocar Division, The White Motor Co., Exton, Pa. The new dump truck, a tandem-rear vehicle, has speeds up to 33 mph. and is engineered for 40-ton payloads. Planetary-gear drive rear axles reduce torque loads on the differentials and axle shafts. The planetary-gear reduction is accomplished at



the outer ends of the tandem axles. The AP-40, equipped with a 27-cu. yd. body, is powered by a V-type, turbocharged 12-cylinder Cummins diesel. The big 600-hp. engine, which has a 30-hp. starting motor, gives the truck an advantageous horsepower-to-weight ratio of 275 to one. The all-welded, box-construction frame of 1-in. carbon steel is designed to resist the torques encountered under severest off-highway conditions. The AP-40 drives on all four wheels in the tandem rear. If either set of wheels loses traction, an air-powered lock applied on an interaxle differential by the driver from the cab, blocks out torque loss, permitting the other axle to continue driving.

IH introduces two new drawn scrapers

A new, adjustable cutting edge for the bowl is among the many features offered by two new tractor drawn scrapers—the 20-cu. yd. 4S-85 and the 14-cu. yd. 4S-55—announced by International Harvester Co., 180 North Michigan Ave., Chicago



1, Ill. The 4S-85, which carries 16 cu. yd. struck, is matched in weight and capacity for use with the International 200-hp.

TD-24 crawler tractor, or a unit with similar horsepower; the 4S-55, hauling 10 cu. yd. struck, is constructed to team with a machine with the power of the 105-hp. TD-18 crawler tractor. Sideboards boost the material-handling capacity of these new units to 22 cu. yd. heaped and 19 cu. yd. struck for the 4S-85, and 15 cu. yd. heaped and 12 cu. yd. struck for the 4S-55. The new type cutting edge on the scraper blades consists of three interchangeable, reversible segments. These permit the operator to shift to one of three cutting depths to match soil conditions and boost loading efficiency. The ground-hugging feature, low draft arm connections and outside mounted apron arms on the new units insure fast, positive loading action, according to International Harvester. Roll-over ejection assures swift dumping, clean discharge of wet, gummy material and controlled, even spread.

New cement batch body being produced by Anthony

An entirely new truck body capable of hauling and unloading four full batches of cement within legal load limits is now being manufactured by the Anthony Co., Streator, Ill. The body features three batch gates and four cement boxes. Each gate is air-controlled by a double throw switch in the cab. Twelve-volt solenoid valves operate the air cylinders. The moisture resistant cement boxes are firmly anchored, yet can be removed almost instantly. Each is fully enclosed and has



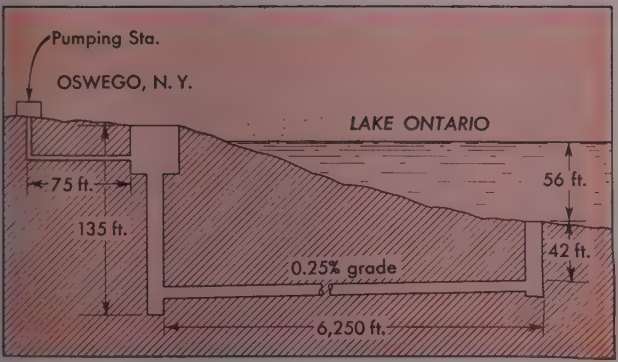
capacity of 12 cu. ft. The body, 11½ ft. long, has a capacity of 8 cu. yd. without the cement boxes. Its high tensile steel construction is strong, yet lightweight. The floor and tailgate are 10 gage, the sides are 12 gage. Full floor support is provided by longitudinal sills of structural steel channel and outrigger type crossmembers. A reinforced front end prevents bulging and supports an anti-spill cab shield. The rugged tailgate, also air-controlled from the cab, has a "boxed" type reinforcement with four-proof down hook latches. Lifting power comes from an Anthony Teleramic head lift hoist with a capacity of 1½ tons. More leverage results from the front end position of the hoist and produces greater power. A lighter weight body and hoist construction and a more even weight distribution over the 10 wheels enable the truck to haul bigger legal payload. More complete information about this new Anthony cement batch body can be had by writing to the company.

It's not just a bit of metal you're buying ...it's FEET OF HOLE!



Three Ingersoll-Rand JR-38B Jackdrills with 1½" Carset Jackbits, drilling through hard sandstone in the 8' diameter Oswego Water Tunnel. Thirty holes were drilled for each round, and two rounds were drilled, blasted and mucked per shift.

CARSET JACKBITS average 500 FEET in Hard Sandstone on the **OSWEGO TUNNEL JOB**



Simplified schematic diagram of the Oswego Water Tunnel project. Drilling started with the 135 ft. access shaft and water riser. The upper 33½ ft. is square, the remainder being circular, 12 ft. in diameter. The 6,250 ft. tunnel, 8 ft. in diameter, was driven on a 0.25% up grade, to a point more than a mile out under the lake, ending 42 ft. below the lake bottom under a 56 ft. depth of water. A riser was driven upwards to within a few feet of the lake bed and the rock plug blasted free after which a strainer and inlet structure were set in place over the riser, a sump below tunnel line catching the muck. A 75 ft. tunnel 30'-0" below ground level carries water from the riser to the pumping station. Roof bolts were set in the main tunnel as a safety measure.

EXTENDING more than a mile out under the waters of Lake Ontario, the Oswego Water Tunnel brings an abundance of off-shore fresh water to the city of Oswego, N. Y.

Driven by Herbert F. Darling, General Contractor, Williamsville, N. Y., this 6,250 ft. long tunnel, 8 ft. diameter, was drilled with Ingersoll-Rand JR-38B Jackdrills and 1½" Carset Jackbits. By sharpening the bits with machine precision on an I-R Jackbit Grinder and maintaining correct cutting angles bit footages were boosted from 300 to 500 feet. Rock was hard gray sandstone.

On-the-job performance like this — comparing *feet of hole per dollar of bit cost* — is the only true test of rock bit economy. Measure Carset Jackbits by this yardstick on any job, in any kind of rock. Compare them with any other bit you've ever used. The results will speak for themselves.

Ingersoll-Rand
15 - 668 11 Broadway, New York 4, N. Y.



ROCK DRILLS • COMPRESSORS • AIR TOOLS • TURBO BLOWERS • CONDENSERS • PUMPS • DIESELS • GAS ENGINES



TECHKOTE

... products for Concrete

CONCRETE CURING COMPOUNDS

Clear — Pigmented — Black

TILT-UP COMPOUNDS

Wax Base — Non-Wax Base

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(YOUTZ-SLUICK METHOD)

Wax Base — Non-Wax Base

SPRAY EQUIPMENT

Hand and Power Operated

JOINT-SEALING COMPOUNDS

(COLD APPLIED IN 3 TYPES)

Ready Mixed Rubber Base Mastic,
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SEALING COMPOUND APPLICATORS

AIR-ENTRAINING AGENT

AIR-ENTRAINING AGENT DISPENSERS

**AIR METERS FOR
CONCRETE ENGINEERING**

- Comply with all leading specifications
- Distributed and stocked in principal cities

DISTRIBUTORS

San Francisco, California, W. J. Burke & Co., Inc.
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Portland, Oregon, W. J. Burke & Co., Inc.
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Billings, Montana, Midland Materials Co.
Casper, Wyoming, Casper Concrete Co.
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Albuquerque, New Mexico, W. J. Burke & Co., Inc.
Salt Lake City, Utah, Intermountain Concrete Specialties
Phoenix, Arizona, Superior Building Materials
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Honolulu, T. H., R. L. Castendyk Company
Vancouver, B. C., Canada, Burrard Construction Supplies, Ltd.

TO BE SURE . . .



USE THE FINEST!

TECHKOTE

INCORPORATED

COMPANY

600 Lairport Street, El Segundo, California

New portable truck mixer plant

A completely packaged portable truck mixer plant, which has a capacity of 160 cu. yd. per hr., is announced by Erie Strayer Co., Geist Rd., Erie, Pa. The Port-O-Matic is made of four sections and can be set up and taken down in 6 to 8 hr. All bin compartments are of 100-yd. capacity. Materials are auto-



matically weighed, requiring one-man operation only. Features include a wheel-mounted conveyor and quick disconnect plug and socket type electric connections. No foundations are needed; it may be set up on any level surface with mud sill and column supports doing the job. Literature on the Port-O-Matic is available from the manufacturer.

New 25-ton Lorain self-propelled crane

A highly maneuverable, easy-to-operate, new 25-ton self-propelled crane has just been added to the Lorain line of power shovels and cranes. This new crane, Model SP-425, needs but one man for operation, as all controls for carrier as well as turntable operations are located at the operator's position in the cab. The newly designed cab on the SP-425 is



larger for increased operator comfort, more inside "move-around" space, and provides for maximum visibility. Many of the new developments in the shovel-crane industry introduced recently by Thew are now incorporated on this newest model. Among these new features are the "Shear-Ball" mounting that eliminates all types of turntable rollers, center pin and centering gudgeons with their constant maintenance and adjustment, and a 30-ft., pin-connected crane boom of alloy steel of the new Lorain square-tubular-chord design for increased lifting capacities and longer ranges at reduced weight. Air controls of the carrier for maximum maneuverability and reduced operator effort provide (1) automotive-type air-power steering, (2) air brakes, (3) air-assist travel, (4) air shift of travel-selector, and (5) air shift of travel gears. Torque converter power take-off is available. The Thew Shovel Co., Lorain, Ohio.



Basic Hydrocrane Design Builds Profits From MANY Angles

The basic advantages you get from the all-hydraulic Hydrocrane design eliminates hundreds of parts necessary in ordinary cranes . . . gives you a compact, lightweight machine that costs less to operate and maintain.

The Hydrocrane offers big capacity and unusual stability along with compactness, because strain and stresses of the working crane and its loads are supported by outriggers. These four steel legs extend, set and level the machine hydraulically.

With outriggers to carry the load, the Hydrocrane mounts on a conventional truck giving you the advantages of mobility, convenient corner-station servicing and standard-truck repair parts. In addition, you can save right at the start by buying a suitable, inexpensive

used truck on which to mount your Hydrocrane.

Unmatched precision control lets you handle loads precisely; telescoping boom reaches out for extra jobs; working boom hoist changes boom angles while swinging . . . at the flick of a lever; and a selection of hydraulically operated attachments are money-making improvements over rope-reeved clamshells, grapples, hoes.

The Hydrocrane's basic design gives you a multi-job speedster that handles jobs ordinary cranes can't touch. Start earning extra returns on your truck-crane investment now. Get the complete profit story on the 5-ton H-3 or the 10-ton H-5. Bucyrus-Erie Company, South Milwaukee, Wis.

181H57

SEE YOUR BUCYRUS-ERIE HYDROCRANE DISTRIBUTOR FOR COMPLETE DETAILS

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El Paso, Texas; Carlsbad, New Mexico
Clyde Equipment Company.....
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Reno, Nevada



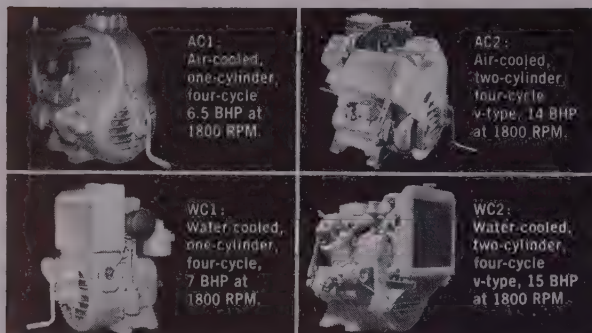
HYDROCRANES

HYDROHOES

H-4

THE BIG 4 IN DIESEL POWER

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



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

INQUIRIES ARE INVITED FROM DISTRIBUTORS AND DEALERS

AMERICAN MARC INC. DIESEL ENGINES

1601 West Florence Ave.
Telephone OR 8-7174



Dept. WC-97
Inglewood, Calif.

AMERICA'S LARGEST MANUFACTURER OF AIR-COOLED DIESELS

—TRAP THAT DUST!

HARCO AIR CLEANERS TRAP 90% TO 99% OF DUST PARTICLES... THAT GENERALLY CLOG OIL BATH AIR CLEANERS

Best guide to the amount of dust being pulled into engine air intake system. Air Cleaner serves as a visual guide for oil bath cleaner servicing.

You can pay more, but you can't buy better Pre-Cleaners.



PRE-CLEANERS ARE NECESSARY FOR ALL ENGINES WORKING IN DUST CONDITIONS

HARCO AIR CLEANER

Also designed for either dash board or under hood installations.

Fits Any Tractor

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Franklin B. Lyons, 4 Sequoia Way, Redwood City, Calif. EMerson 6-1248
Dealer Inquiries Invited

See January Directory Issue of this Magazine for Distributors' Names, Addresses

Manufactured by

HARCO MFG. CO.

2051 S. W. 58th Avenue, Portland 1, Oregon

The **HARCO AIR CLEANER** can be serviced in 30 seconds and therefore requires very little of your time.

It will prolong the life of your engine and will cut your repair costs due to dust and grit getting into your engine.

Jersey spreader lays up to 12 tons per min.

The new Model 90 Jersey Spreader has been announced by the **Tractor Spreader Co.**, of Hasbrouck Heights, N. J. Companion to the larger model, the Model 90 is designed to



handle smaller paving jobs. Tractors equal in size and power to the Cat D4, D6; Allis-Chalmers HD-6, HD-9 and International TD9 and TD14 may be used as a propelling unit. Hooking-up is simple and may be accomplished in approximately 30 min. time. Although only 10 ft. wide, the Model 90 will spread in widths from 9 to 12 ft. It has a maximum spreading depth of 12 in., a minimum of 1 in. and will lay up to 12 tons per min. The basic design has come from actual job experience to fill the need for a low-cost spreading device able to do a faster, better and more accurate job without sacrificing ability due to size.

IT'S NEW!

IT'S FREE!



Contractors Get This!

New idea in "job-applied" pump selection shows ways to speed construction projects—keep "on schedule"—by moving more water more efficiently, *job after job!*

Handy chart inside lists operations you perform regularly—matches them up with pumps that do those jobs better, faster, at lower cost. Get a Barnes Construction Pump Selector from these distributors:



Central Equipment Co., Berkeley, Calif.

The C. H. Jones Equipment Co., Salt Lake City, Utah

Larson Equipment Co., Los Angeles, Calif.

Lowry Equipment Co., Redding, Calif.

The Rix Co., Inc., San Francisco, Calif.

Write Department L-97 for details

TREMENDOUS RIPPING TEAM



GREENVILLE RIPPER and INTERNATIONAL TD14, TD18 or TD24

The tremendous power of the IH TD14, TD18 or TD24, plus the 10,000-pound Greenville tractor-mounted rock ripper shatter rock and packed earth for easy scraper loading. On many jobs explosives, shovels and trucks are eliminated.

LIVE SWIVEL ACTION

Shanks swivel 15° in either direction . . . follow tractor like a trailer. Points have live action that shatters rock like a jack hammer.

RUGGED POWERFUL SHANKS

Scientific contour gives extra strength at strain points and pulls points down deep . . . rocks roll out and clear of headframe. Made of tough, heat-treated, manganese-moly steel. Mount one, two or three shanks as needed.

Put this power-packed team to work for you. Your IH dealer can give you the facts. Let him show you how you can save as much as 25% on any earth or rock moving job.

POSITIVE CONTROL

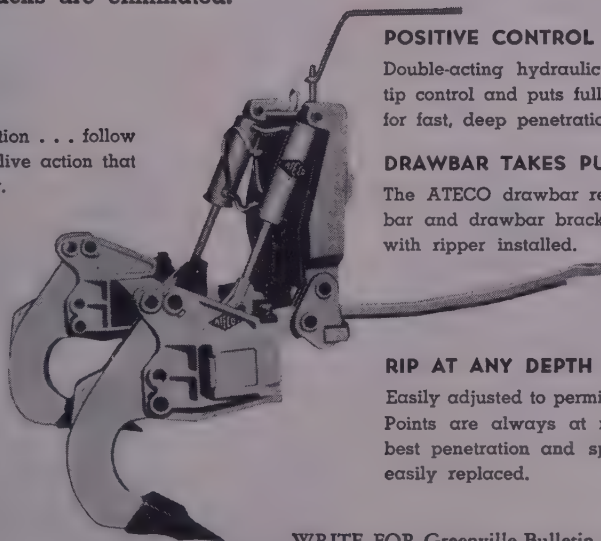
Double-acting hydraulic system provides fingertip control and puts full tractor weight on points for fast, deep penetration.

DRAWBAR TAKES PULL

The ATECO drawbar replaces the tractor drawbar and drawbar brackets. Clevis is accessible with ripper installed.

RIP AT ANY DEPTH

Easily adjusted to permit settings as deep as 24". Points are always at most desirable angle for best penetration and splitting action. Points are easily replaced.



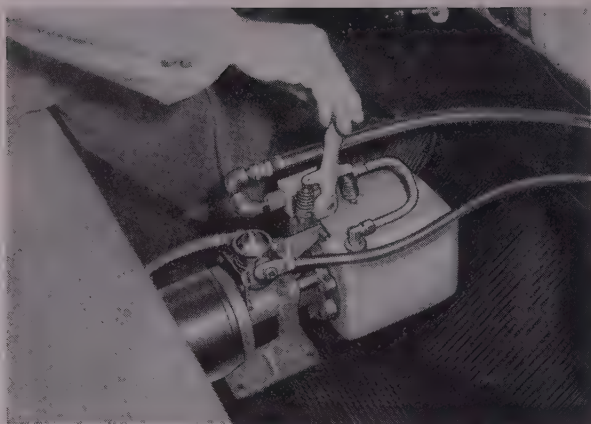
WRITE FOR Greenville Bulletin IH-156. It gives complete data on the Greenville-Ateco ripper.



GREENVILLE

STEEL CAR COMPANY

ATECO DIVISION
Greenville, Pennsylvania



You'd never guess . . . he's clearing snow from a highway!

It's true . . . and it's as simple as it looks, too! Snow removal is fast, dependable and safe with Monarch Power Hydraulic Control Equipment . . . cab-controlled for one-man instant action, the Monarch zips snow plows into operation with ease and speed. Fan-belt driven or Electric models are available for practically all makes of vehicles. Proven in service everywhere, over 50,000 Monarch Controls have been sold. See your dealer or write for full details.

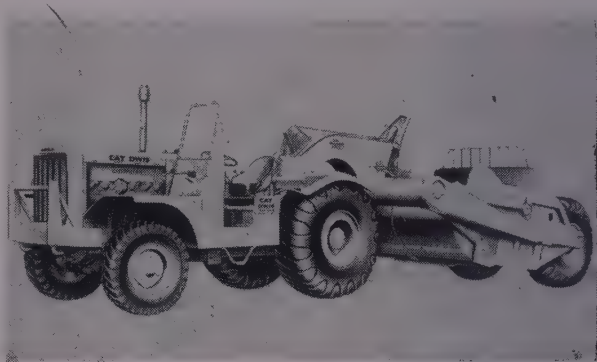


POWER **MONARCH** HYDRAULIC CONTROLS

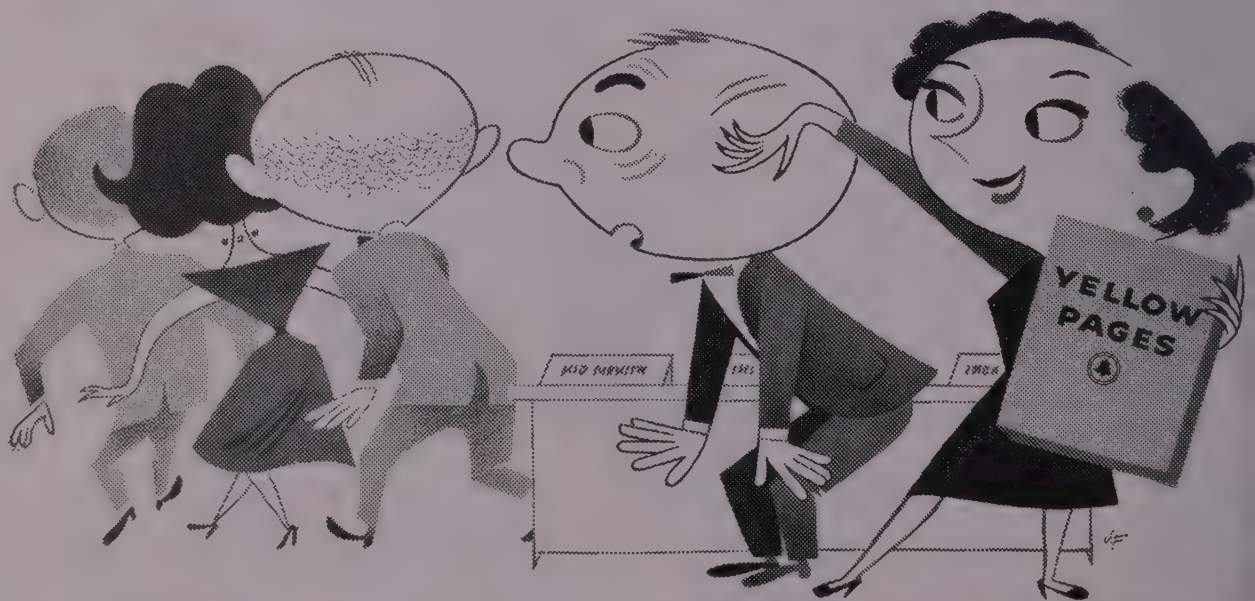
MONARCH ROAD MACHINERY COMPANY
1331 MICHIGAN ST., NE — GRAND RAPIDS 3, MICHIGAN

New prime mover and scraper combination

A new four-wheel prime mover and matching scraper combination, offering increased load capacity, higher speeds and greater tractive ability, has been announced by Caterpillar Tractor Co., Peoria, Ill. The newly-announced rubber-tired unit is the Caterpillar DW15 (Series E) Tractor and No. 428 Lowbowl Scraper. The tractor incorporates design changes in several major components, including the engine and power train. The new matched scraper is designed to utilize fully the tractor's output in obtaining maximum production, and



incorporates Lowbowl design to facilitate fast loading. A new Caterpillar diesel engine has been designed for the DW15 (Series E), and develops 200 (maximum output) hp. at 2,000 rpm. Features incorporated into the engine make use of natural engine lug characteristics, to accomplish a 23% torque rise and high rim-pull over a wide speed range, decreasing the need for gear changes. A ten-speed transmission offers working speeds from 2.7 to 37.2 mph. The new No. 428 Scraper incorporates Lowbowl design, similar to that introduced by Caterpillar on its larger model scrapers. It has a struck capacity of 13 cu. yd. Its heaped capacity is 18 cu. yd.



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Pacific Telephone



36" x 20" Kue-Ken at mercury mine

Self-lubricating **KUE-KEN®** Crusher runs cool all day under full load

Low bearing pressures and enclosed oiling system are your guarantee of lowest operating cost

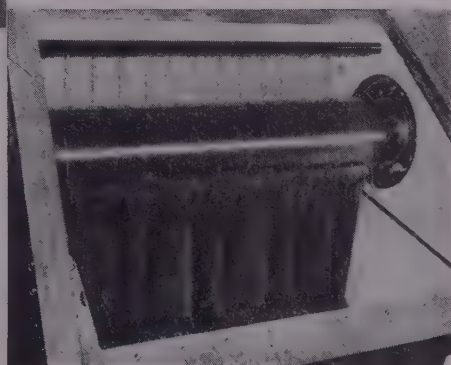
Kue-Ken is the only crusher with a built-in lubrication system complete with pump and filter and sealed to keep dirt and grit out. No grease cups or fittings. This thorough lubrication permits more crushing strokes per minute and makes Kue-Ken the highest capacity crusher size for size. See in the chart below how a Kue-Ken will supply the capacity you need in a smaller size crusher and use less horsepower. Also, you get at least 5 times longer jaw plate life. Automatic flywheel release prevents damage from overload or tramp iron. Kue-Ken is the most economical crusher to maintain and the most profitable to operate.

Write for catalog

Table of tons per hour that will pass through crusher with jaws set at dimensions shown when measured in the closed position.

Table is based on crushing average hard, dry quartz or similar rock weighing at least 100 lbs. per cubic foot when crushed.

Kue-Ken crusher size	3"	1"	1 1/2"	1 1/2"	2"	2 1/2"	3"	3 1/2"	4"	5"	6"	Horsepower range
24" x 12"	22	26	32	36	43	50	56					15 to 30
30" x 12"	32	35	38	42	55	70	76	85	110			20 to 30
36" x 10"	38	47	57	67	80	91	105					25 to 40
36" x 20"					70	82	90	115	135	160		30 to 50
42" x 25"					90	120	150	165	180	215	250	40 to 60



Clean, filtered oil pouring down over shaft, bearing and toggles. With this positive lubrication, machined parts maintain their original micrometer tolerances for the life of the crusher. Only periodic oil changes are required.

KUE-KEN® CRUSHERS

"CRUSHING WITHOUT RUBBING"

STRAUB MFG. CO., INC., 8381 Baldwin, Oakland 21, Calif.

Jaw Crushers Gyratory Crushers Overhead Eccentric Crushers Revolving Screens
Classifiers Feeders Rib Cone Ball Mills Concentrating Tables Vibrating Screens

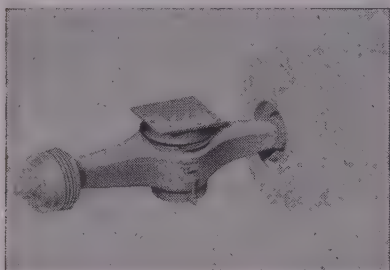
Pennsylvania Crusher Division, Exclusive Licensed Eastern Manufacturer and Distributor, 323 S. Matlack St., West Chester, Penn.
Armstrong Whitworth (Metal Industries) Ltd., Authorized Licensed Manufacturer and Distributor. Close Works, Gateshead-upon-Tyne 8, England

DEALERS:

SEATTLE, WASH. Washington Machinery Co.
SALT LAKE CITY, UTAH Lund Machinery Co.
SAN ANTONIO, TEX. Closner Equipment Co.
PORTLAND, ORE. Contractors Equipment Co.
LOS ANGELES, CALIF. Garlinghouse, Fremont Co.
PHOENIX, ARIZ. Stapley
DENVER, COLO. Union Supply Co.
CASPER, WYO. Moss Equipment & Supply Co.
VANCOUVER, B. C. Universal Equipment Co.

Integral axle 5th wheel eliminates leaf springs on trailer

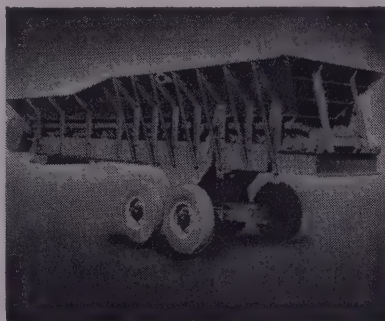
A new concept in over-the-highway trailer "5th wheel" design has been announced by A. O. Smith Corp.'s Pacific Coast Works, 5715 Smithway, Los Angeles, Calif. Expressly designed for front suspension on the rear trailer of a truck train, the new A. O. Smith integral axle 5th wheel eliminates the need for leaf springs on trailer 5th wheel assemblies. Major breakage and maintenance problems have been eliminated by a unique



cushion system-integrated rubber doughnuts floating in a sealed oil bath. The reduced weight and increased payload feature of this new unit was accomplished by integrating the 5th wheel assembly into the axle housing. This has resulted in an operating unit that weighs approximately 550 lb. The unit allows the tractor-trailer train to travel empty with the same ease as a full load.

New pioneer apron feeder line

A newly redesigned line of apron feeders, including more than 50 types and sizes of unit feeders and two sizes of portable apron feeders, has been announced by Pioneer Engineering, Division of Poor & Company, Inc., 3200 Como Ave., Minneapolis 14, Minn. Designed to do specific jobs, Pioneer apron feeders are now available in a type and



size to meet every job application. The basic unit feeder is furnished to include one of three standard drives; (1) driven from feeder-mounted electric motor through torque-arm reducer or from gearmotor or motor reducer; (2) driven from conveyor tailshaft; or (3) driven from crusher shaft or countershaft.

Straight sideboards, flared sideboards or hopper may be added to the basic feeder regardless of type of drive. Unit feeders are available with standard pan widths of 30 in., 36 in., 42 in., and 48 in. and in standard lengths of 4 ft., 6 ft., 8 ft., 10 ft., and 12 ft. (nominal center to center distance between headshaft and tailshaft). The long portable apron feeder, mounted on its own chassis and wheels and with capacious hopper attached, is available in either the 36 in. x 30 ft., 42 in. x 30 ft. sizes. Complete information on the new apron feeders can be obtained from the factory or from any Pioneer distributor. Ask for Form No. 662.

Reserve cable for Cat bulldozers

To provide a reserve supply of cable in operating the Caterpillar Nos. 9A, 9S, 8A, 8S, and 8U Bulldozers, a new cable reel has been announced by Caterpillar Tractor Co., Peoria, Ill. Designed to mount conveniently on the side of the radiator guard, the cable reel provides storage space for 300 ft. of cable. Should cable breakage occur, the reserve cable may be readily reeved through the cable control sheaves, to replace the broken portion. Use of the cable reel eliminates the necessity of discarding the full length of cable required to operate the bulldozer.



Maximum SAFETY plus SAVINGS

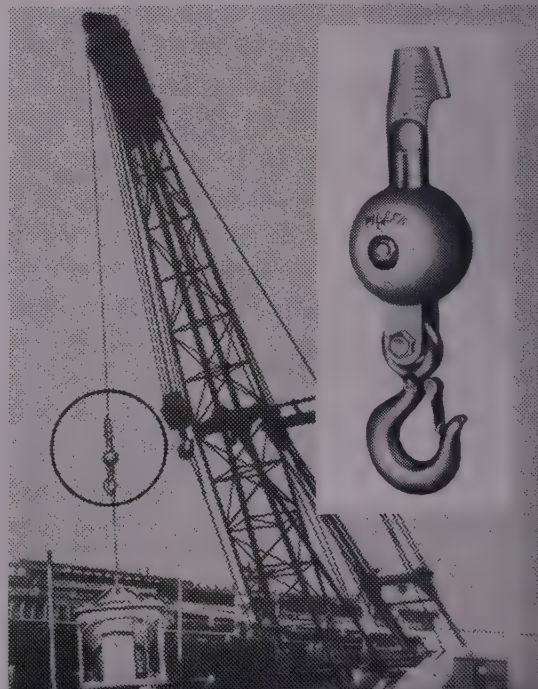
1. Matched set of angular contact bearings.
2. Practically friction free.
3. Seal keeps grease in, foreign matter out.
4. Faster hoisting due to non-spinning loads.
5. Faster load placement due to easy load turning.
6. Faster rigging due to elimination of cranky wire rope performance.
7. Elimination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

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



GENERAL MACHINE & WELDING WORKS inc.

1100 East Second St., Pomona, Calif.

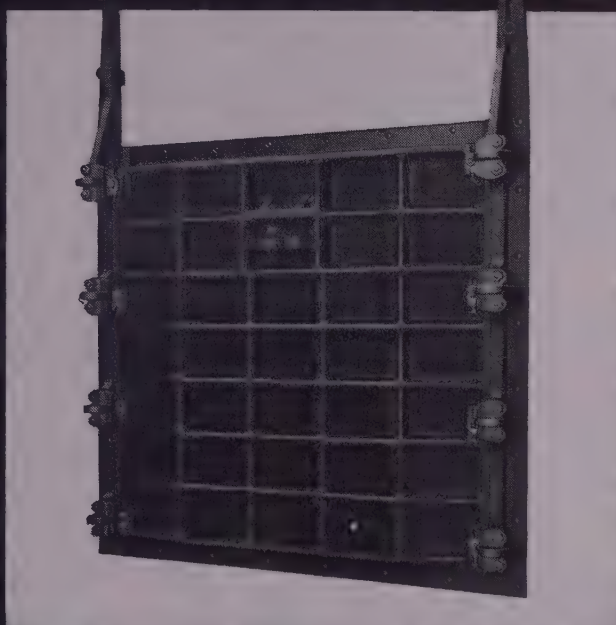


MILLER SWIVELLING HEADACHE BALL

Swivel properly located to absorb twisting effect of wire rope and eliminates spinning loads. Available in four types: Clevis, Eye, Wedge and Thimble. 65-450 pounds; 5-30 Ton Capacity.

The Sum of all the parts

is a
**Faster,
Better,
Lower-Cost
Installation**



CHAPMAN *Standard* SLUICE GATES

Here's the way it works. On Chapman Standard Sluice Gates, all component parts in more than 300 available types and sizes are standardized for each unit. Parts are interchangeable . . . the discs, guides, hooks and wedges. You simply write your specifications and Chapman can give you a perfect fit fast. There are no extensive field alterations. There's no expensive, time consuming match-marking. Your installation costs are cut to the bone.

Also, Chapman standardized, interchangeable parts are easy to replace when necessary. It's easier to keep your sluice gates in best condition. Your maintenance costs go down.

Consider it seriously. For high or low head, seating or unseating pressures, large or small water areas standardize on Chapman Standard Sluice Gates. You'll save money.

They're available with manual, hydraulic or electric motor operation. Consult our Catalog 25-A . . . yours for the asking, of course.

THE CHAPMAN VALVE MANUFACTURING CO.
INDIAN ORCHARD, MASSACHUSETTS



SHOWN IN ACTION is a Perfection all-welded aluminum dump trailer with telescopic hoists. This Perfection body is 22 ft. long with a capacity of 25 yd. The combination of aluminum body with telescopic hoist is saving the owner approximately 2,000 lb. in weight. *The Perfection Steel Body Co., Galion, Ohio.*

Link-Belt Speeder unveils 3-yd. hoe

Link-Belt Speeder has just unveiled what is described as "the only production model 3-yd. hoe attachment available in the shovel crane industry." Developed to answer the need for a more powerful, bigger capacity, deeper digging hoe—the new attachment is designed for use with the Link-Belt Speeder 3-yd. model K-608. With introduction



of the new hoe attachment, the K-608 can now be used as hoe, shovel, crane, clamshell or dragline. This new 3-yd. hoe attachment has a long 30-ft. boom, plus arm and bucket, which provides a maximum reach of 51 ft., 6 in. and a digging depth of 31 ft., 10 in. Cutting width with side cutters is 5 ft. For further information, contact a Link-Belt Speeder distributor or Link-Belt Speeder Corp., Cedar Rapids, Iowa.

Hydraulic hoist for light trucks

A new hydraulic hoist, suitable for conversion installation on ¾- and 1-ton trucks, is announced by **Hercules Steel Products Co., Galion, Ohio.** Designed for use under Hercules light duty dump bodies up to 8 ft. in length, platform bodies up to 10 ft. long, or 6½ to 9½-ft.

pick-up bodies, the new hoist is known as Model 440. According to the manufacturer, the optimum capacity of the hoist is 6 tons. Model 440's dual ram-type 4-in. cylinders are placed ahead of the truck rear axle. This provides peak hoisting efficiency, it is claimed. The new hoist has a dumping angle of 45 deg. and an 8¾-in. mounting height. It has been designed for installation on trucks having a CA dimension of 46 to 60 in., with either kick-up or straight frames. For further information write for Bulletin No. 173.

Stow introduces 42-in. trowel

A big 42-in. troweling machine that is easy to handle has just been put out by **Stow Manufacturing Co., 56 Shear St., Binghamton, N. Y.** With four blades, an extra long handle and a weight of only 150 lb., this G42 Roto Trowel does a



very smooth job of troweling, according to the manufacturer. The G42 has a 3.6-hp. engine and is furnished with four finish blades and four float blades, both of which are reversible for double life. It also has a manual clutch control that holds the blades from rotating the instant the operator lets go of the handle but without stopping the engine.

HEADQUARTERS FOR THE **LORAIN**

**ANDREWS
EQUIPMENT SERVICE**
Spokane, Wash.

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

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

COAST EQUIPMENT CO.
San Francisco 3, California

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

GENERAL EQUIPMENT CO.
Reno, Nevada

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

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

MOUNTAIN TRACTOR CO.
Missoula and Kalispell, Mont.

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

NEW MEXICO EQUIP. CO.
Albuquerque, New Mexico

LEE REDMAN EQUIP. CO.
Phoenix, Arizona

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

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

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

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

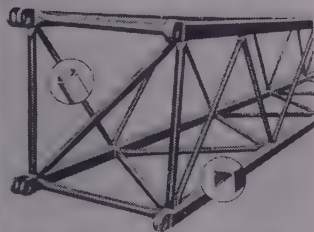
**YUKON EQUIPMENT
INCORPORATED (for Alaska)**
Seattle, Wash., Fairbanks and Anchorage, Alaska

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

At boom tip...and finger tip... Here's NEW PROFIT—PERFORMANCE

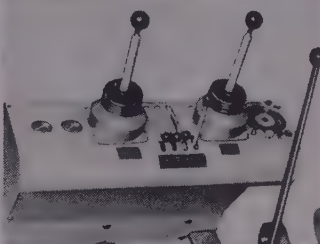
HEAVY-DUTY ¾-YD.
LORAIN-26

A BOOM THAT BOOSTS PRODUCTION



Stronger—yet lighter—the weight-saving design of the LORAIN SQUARE-TUBULAR-CHORD BOOM* increases lifting capacities and permits greater operating ranges. Continuous, round tubular lacing, welded to the square chords at common points gives a "banded" effect for added strength. Pin-connected for easy insertion of center section.

EASY, TWO-LEVER POWER CONTROLS



This new Lorain exclusive—two-lever, "Joy-Stick" power control reduces operator fatigue, provides faster, smoother operation, increases production. Full "feel" of machine is retained.

Send for LORAIN-26 catalog

Yours for the asking is a 24-page catalog, detailing the many profit-making advantages of the heavy-duty ¾-yd. Lorain-26. Ask your Thew-Lorain Distributor for a copy or write direct.

*U.S. and foreign patents applied for.

Feature-packed! That's the heavy-duty ¾-yd. Lorain-26. Hydraulic power control of crawler... hydraulic coupling or torque converter power-take-off available... truss-type turntable bed... and many others. This versatile performer operates profitably as a shovel, dragline, crane, clamshell or hoe. It's a real performer—has the brawn to tackle the toughest digging or lifting jobs. Contact your nearby Thew-Lorain Distributor to "action-test" the Lorain-26.

**THEW
LORAIN**

THE THEW SHOVEL CO.

Lorain, Ohio, U. S. A.

Semi-trailer sprinkler tank has 6,000-gal. capacity

A new, high-capacity, 6,000-gal. semi-trailer sprinkler tank now is available to the construction industry. Developed by the Southwest Welding & Manufacturing Co. of Alhambra, Calif., the all-steel trailer was designed for use with the single-axle Caterpillar DW21 Tractor. The tractor-tanker combination operates on everything from soft fills to hard haul roads quickly and accurately, with a minimum of time and



effort. Large 29.5 x 29 tires afford adequate flotation on the softest materials. Designed the STT-60, the trailer is 10 ft. wide and 11 ft. 10 in. high. The tank section is 18 ft. long, 76 in. deep and 108 in. wide. Wheel base of the trailer is 27 ft. 3 in. and length of both units is 45 ft. Front and rear spray bars are equipped with adjustable nozzles with a spray swath up to 55 ft. The 1,500-gpm. spraying pump is a 6-in., self-priming, centrifugal type powered by a six-cylinder gasoline engine. Detailed specifications and information on the STT-60 and STT-50 5,000-gal. size may be obtained from Construction Machinery Division, Southwest Welding & Manufacturing Co., 3201 West Mission Rd., Alhambra, Calif., or your nearest Caterpillar Tractor Co. dealer.

Angle dozer attachment

A new angle dozer attachment for the Davis Loader is announced by **Midwestern Industries, Inc.**, Wichita, Kan. With this attachment the operator can back fill by "shaving in" the dirt while running parallel to the ditch. The new Davis angle dozer attachment has a unique



angling device as well as three offset adjustments. By pulling two pins, the angle dozer attachment can be offset 7 in. to either side of center. The tilt and "bite" of the blade is hydraulically controlled. The blade has a heat-treated cutting edge. The attachment is ideal for back filling, moving snow from parking lots and also, because of the angular tilt control, for cutting and cleaning ditches. With its 28-in. moldboard height and 72 in. width, the new Davis product is suitable for all ordinary types of ditch back filling.

Durolite blocks and sheaves

Durolite blocks are now available for any job or machine where a top quality block is required. These blocks are used on all Sauerman DragScraper Machines and Cableways for easier handling and to reduce wear on the running ropes. Durolite sheaves are lighter in weight than any other sheaves of the same rated capacity but provide high structural strength and durability for handling heavy loads at high speeds. They start instantly and stop without spinning. The sheaves are available in stock sizes from 6 to 18 in. (alloy steel) and 20 to 24 in. (cast steel). Durolite blocks feature end thrust bearings to prevent side frame wear, free-moving swivels for easy positioning and a cast bead on the side frames prevents fouling of the wire rope. They are available from stock in sizes from 6 to 18 in. with bronze bearings and from 8 to 42 in. in roller bearings. Sizes up to 54 in. or specials can be furnished to specification. **Sauerman Bros., Inc.**, Dept. W-6, 620 S. 28th Ave., Bellwood, Ill.

New Heil telescopic hoist

Lowered costs of bulk hauling through increased legal dump truck payloads are offered by **The Heil Co.**'s new HMT series of single telescopic hoists. Weight savings on the HMT 63-102 and HMT 63-117 have been achieved by the use of special alloy steels, manganese bronze sleeve bearings, and higher designed hydraulic pressure systems. As an added feature, these hoists are the first exam-

ples of truck-mounted hydraulic equipment to incorporate the new SAE "O" ring, plus 37-deg. flare SAE fittings in hydraulic pressure lines. These fittings, which replace old style pipe thread fittings are simpler and quicker to apply, or to uncouple, and provide tighter, drip-proof connection without the use of pipe dope, long wrench extensions and brute force. The Heil Co., Milwaukee 1, Wis.

Improved differential steering for TerraTrac crawlers

An improved type of controlled differential steering for all TerraTrac crawler models with standard-shift transmissions is announced by the **J. I. Case Co.**, Racine, Wis. Increased leverage, plus new heavy-duty brake drum with heavier brake band and lining give greater maneuverability and easier handling, yet keep power and traction on both tracks while turning. Improved differential steering is standard equipment on current production models of the Case TerraTrac "320," "400" and "500" crawlers.

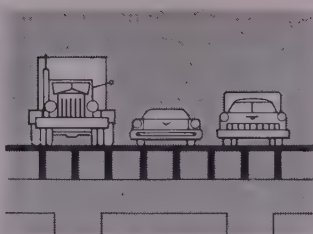
Schramm truck-mounted rotary drill makes hole up to 700% faster

A new truck-mounted rotary drill which features mobility and rapid set-up has been announced by **Schramm, Inc.**, 900 East Virginia Ave., West Chester, Pa. Actual field reports show that this unit, known as the Schramm Truck Mounted Rotadrill, makes hole 600 to 700% faster than is possible with the best churn drilling technique. Rotary air drilling is accomplished with the Rotadrill through a reversible hydraulic motor-driven head, mounted on a carriage that rides tracks mounted on the mast. This hydraulic head plus the special slip holders eliminate the need for a rotary table. This means that casing



can be placed down a water well and hole can be easily inspected. Sticking of the bit will not damage the hydraulic drive. Maximum down pressure is 24,000 lb. and maximum lifting pressure is 19,000 lb. Holes can be drilled to 700 ft. with 4 1/2-in. O.D. drill pipe, and to 1,500 ft. with 2 7/8-in. O.D. drill pipe.

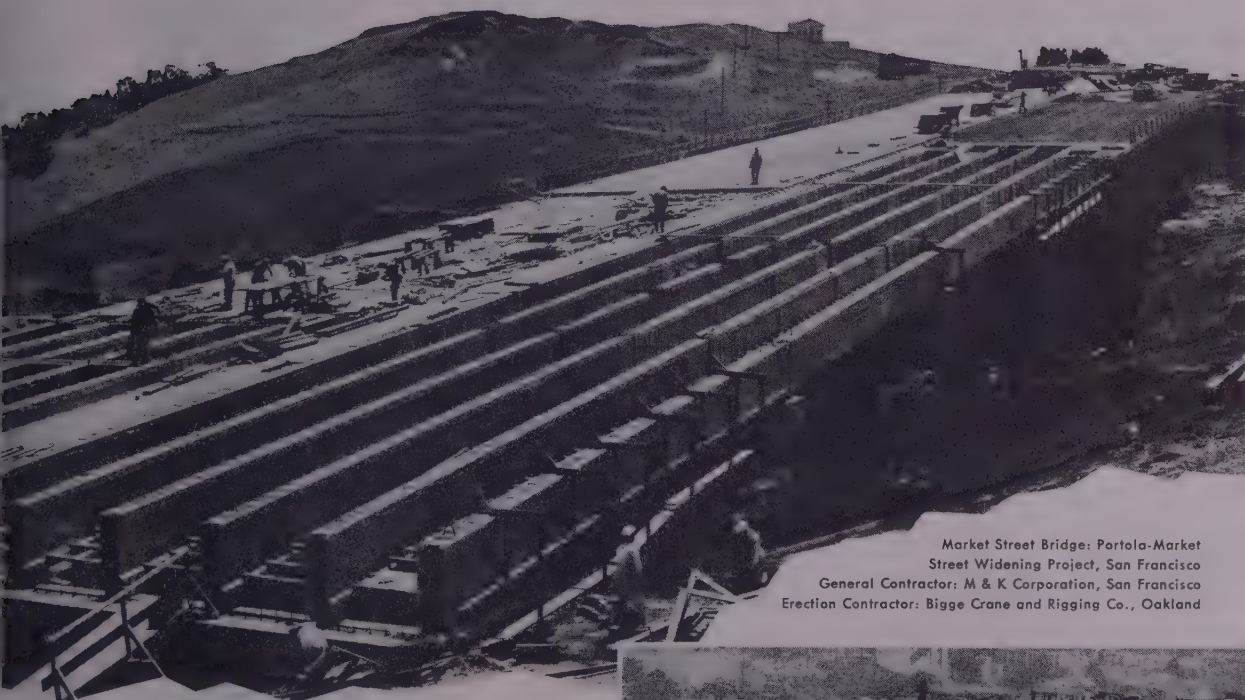
When Construction Speed and Strength Count Heavily...



IT PAYS

to specify **BASALT**

precast, prestressed girders

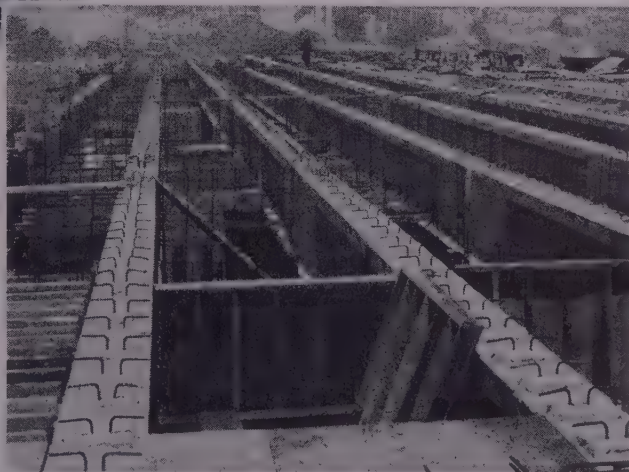


Market Street Bridge: Portola-Market Street Widening Project, San Francisco
General Contractor: M & K Corporation, San Francisco
Erection Contractor: Bigge Crane and Rigging Co., Oakland

Do the job right — and do it fast! Contractors for urban arterial projects must meet tight schedules, while providing maximum structural soundness. BASALT precast, prestressed concrete components, such as the girders used here, provide both speed and strength through precision fabrication at BASALT's plant. On-schedule delivery and quick installation by mobile crane mean dollars to the contractor

AT BASALT's plant, varied lines of structural concrete products* are carefully fabricated, tested and stored. Factory production methods reduce on-the-job costs, and assure uniform standards exceeding Federal and ASTM standards.

* *Lightweight expanded shale, or sand and gravel concrete*



BASALT fabricated 108 concrete bridge girders, 60' long for this bridge project. 90 were "I" sections (4' 2" x 1' 8"), stressed with five 1 1/8" Stressteel rods, and weighing 20 1/2 tons. 18 were rectangular sections (4' 2" x 1' 8") weighing 34 tons, and stressed with six 1 1/8" Stressteel rods. Concrete strength before stressing: 4500 psi (f'ci) ultimate; 5000 psi (f'c).

Our engineering and sales staff will gladly discuss precast, prestressed construction with you. Write or call . .



BASALT ROCK COMPANY, INC.

Structural Concrete Products Division

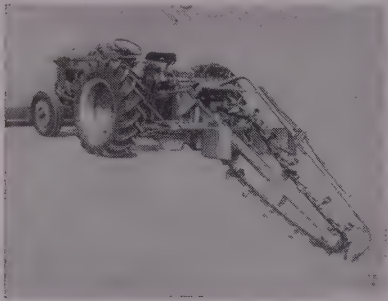
NAPA, CALIFORNIA • TELEPHONE BALDWIN 6-7411

MEMBER PRESTRESSED CONCRETE INSTITUTE

Double Tee Roof and Floor Slabs • Beams • Bridge Girders • Spandrel Panels and Columns • Channel Slabs • Precast Flat Floor and Roof Slabs • Bleachers

Arps trencher IH tractors

The Arps Corporation of New Holstein, Wis., announces that its heavy duty Trench Hog is now available for IHC-300 and 350 utility tractors. The Arps trench hog is a versatile, low cost trencher capable of handling big yardage jobs. The unit trenches at an average of 300 to 400 ft. per hr. under ordinary



conditions, and can dig as fast as 800 ft. per hr. on narrow, shallower trenches. It is available in three boom sizes, furnishing depth capacities up to seven feet. Cutters can be quickly changed to give a range of trench widths from six to twenty inches. Special cutters are also available for rocky and frozen soils.

Vibratory compactor features vibration-free engine

A new self-contained vibratory compactor for use on granular soil, stone sub-bases, asphaltic concrete and soil cement mixtures, is announced by Maginniss Power Tool Co., 154 Distl Ave., Mansfield, Ohio. Called the Powr-Pactor, the new compactor provides variable vibrating frequencies from 2,400 to 7,000 vpm., with compacting forces ranging up to 4,000 lb. This variable frequency and force permits selection of the

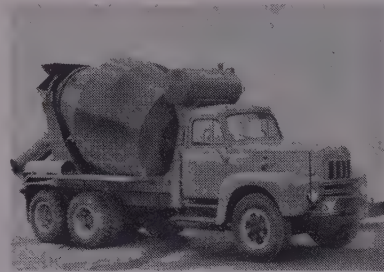


exact degree of compaction necessary to produce uniform Proctor densities on any job. Compacting plate, of 3/4-in. alloy steel, affords 12 x 18 in. of effective compacting area. The unit weighs 230 lb. Power is provided by an air-cooled Wisconsin ACN engine with standard carburetor. The engine is mounted on a vibration-free plate. The engine throttle is located on the operator's handle and a

centrifugal clutch allows the engine to idle without vibrating the compactor. Powr-Pactors are also available with Hi-lectric 180-cycle or standard 60-cycle electric motor drive, in place of the gasoline engine.

Truck mixer has front-engine drive

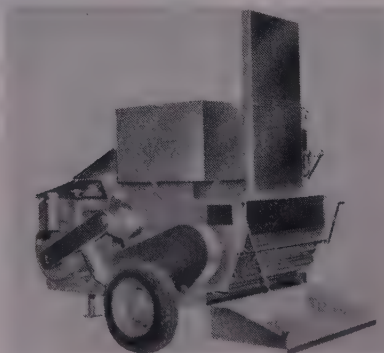
As a result of several years of field testing, Concrete Transport Mixer Co. has introduced its new Rocket truck mixer equipped with front-engine drive. Power is provided from the crank shaft on the front end of the engine. According to the manufacturer, the main objection of power take-off was the interruption by shifting gears and the difficulty in shifting. This has now been overcome by taking the power away



from the engine ahead of the truck transmission. The photo shows a recent installation of a C-70, 7-cu. yd. Rocket on an RF-190 International truck. The V-belt and clutch housing may be seen between the bumper and the grill. This assembly is connected to the mixer transmission by a multiple drive shaft and universal joint group. Concrete Transport Mixer Co., 4985 Fyler Ave., St. Louis 9, Mo.

New asphalt-patching mixer

Designed for use with asphalt cements, cut-backs, emulsions, or tars, this McConnaughay HTD Mixer No. 8 is available with or without a 200-gal. asphalt supply tank. Large enough for many resurfacing jobs as well as for all types of pavement patching, the No. 8 has a mixer capacity of 8 cu. ft.; the aggregate bin is marked for volumetric measuring. The unit features a low pressure burner and power-driven asphalt pump and



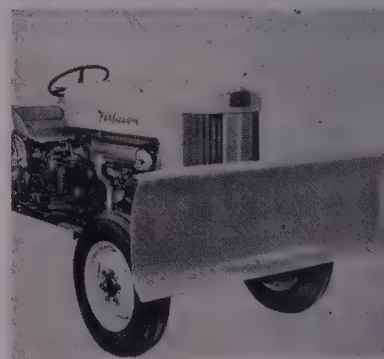
counter. It weighs 3,800 lb., measures 124 in. in length, 82 in. in width, and 114 in. to the top of the stack with extension attached. Complete specifications and proportioning tables are available from McConnaughay Mixers, Inc., Lafayette, Ind., and from the national distributors, Asphalt Equipment Co., Inc., Fort Wayne, Ind.

Automatic concrete bucket

Tusky Hoist Division of Tubular Structures Corp. of America, 296 Marsh St., Los Angeles 39, Calif., announces the availability of the new Tusky automatic concrete bucket. The 13-cu. ft. Tusky concrete bucket is now available as an accessory for the standard Tusky automatic portable hoist and may be used at heights up to 100 ft. The Tusky bucket is the only concrete bucket ever introduced that dumps itself at controlled pouring rate automatically. The Tusky bucket dumps at any preset level, automatically, yet partial dumping is easily controlled when desired.

Heavy-duty dozer

A husky, new, heavy-duty dozer, attached to the main frame of the tractor, not the front axle, has been announced by the Earth Equipment Corp., manufacturer of the Everett trencher. The new Earthco dozer is adapted to International 350 utility tractor, Ferguson 4 tractor, Massey-Harris-Ferguson tractor, Massey-Harris MH-50 tractor, Massey-Harris-Ferguson Work Bull 202 tractor, Ferguson 35 tractor and Ford tractor



(600 and 800 series). The new mode of attachment enables the dozer blade to remain in the same plane with the rear axle of the tractor regardless of the terrain the front wheels pass over. In "up" position for transportation the dozer has a 16-in. ground clearance. In the "down" position it has penetration of 3 in. When not mounted in conjunction with the Everett Trencher, any one of the numerous hydraulic valves now available to tractor dealers may be used to operate this sturdy new dozer. For added information write Earth Equipment Corporation, 2036 Sacramento St., Los Angeles 26, Calif.

REPORT on new shovel-crane standards:
(one in a series)



NEW FEATURES—Link-Belt Speeder shovel-cranes offer many important production-increasing advantages including reversing clutches

for either or both main drums, a third drum and independent rapid boom hoist for power-raising and power-controlled lowering.

Getting bonus power...extra line pull

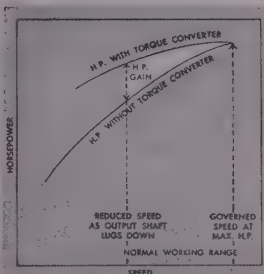
Size for size, Link-Belt Speeder shovel-cranes deliver greater usable horsepower than other machines using the same engines

Engine size alone is not a correct measure of a shovel-crane's actual *usable* horsepower. Thus, it's important to know Link-Belt Speeders deliver more *usable* horsepower or line pull at the drums than other machines using the same engine, yet remain well within engine manufacturers' recommended operating speeds.

Why? A Link-Belt Speeder is designed and built with extra size and strength in shafts, gears, clutches and structural members. It has the strength to fully utilize available engine power.

It's another reason why Link-Belt Speeder shovel-cranes are setting entirely new high standards of efficiency. For complete facts, contact your Link-Belt Speeder distributor or write—Link-Belt Speeder Corporation, Cedar Rapids, Iowa.

14,470-B



TORQUE CONVERTERS are available for all Link-Belt Speeder models, supply power to match the load . . . provide sustained power, increased line pull to maintain high production even with heavy loads and to handle these big loads smoothly, accurately!



POWER HYDRAULIC CONTROLS are operated with the flick of a finger, provide fast, positive response . . . perfect feel of the load for added safety. They're standard equipment on all crawler and rubber-tired models ½ to 3-yd, 8 to 75-ton capacities.

It's time to compare . . . with

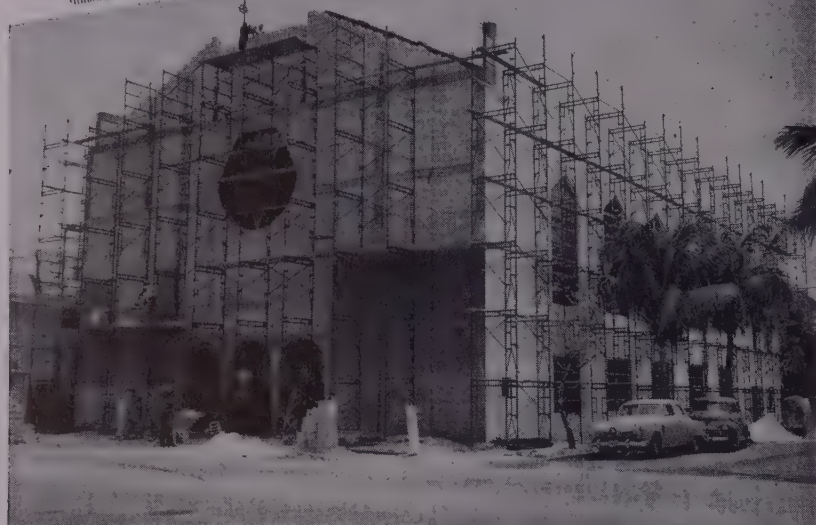
LINK-BELT SPEEDER

builders of a complete line of shovel-cranes . . . with exclusive Speed-o-Matic power hydraulic controls

here's SCAFFOLD.



that eyes right
buys right, too!



Dual use of ADVANCE scaffold as a work stage for masonry and stucco application, new church being constructed at Ft. Lauderdale, Florida.

Clean lines . . . smart new self-locking design . . . ever-lasting usefulness — these are just some of the reasons why more and more building construction and maintenance jobs, everywhere, are being scaffolded with ADVANCE.

To general contractors and building tradesmen, ADVANCE scaffold affords a plus value for speed of erection, safety, durability, long life and ease of dismantling. It's specialized equipment that saves time, money and manpower on a wide range of job applications. Little wonder that ADVANCE continues to capture an ever-growing share of the scaffolding market, and that production schedules have been accelerated to keep pace with the spectacular demand.

Field-experienced BEAVER-ADVANCE engineers are readily available to supply you with working plans, bills of material and job estimates —with scaffold stocks for sale or rental available through 68 ADVANCE distributors conveniently situated in principal construction centers throughout the United States.

For complete details on the scaffold that will both eye and buy right for you, contact your ADVANCE dealer, or write direct.



Beaver-Advance
CORPORATION
Ellwood City, Pennsylvania

Please furnish complete information on the ADVANCE system for shoring structural concrete.

BEAVER-ADVANCE Corporation, Ellwood City, Pa.

Name
Company
Address
City Zone State

New triple tamper has built-in line oiler and handle grip throttle valve

A new triple tamper, with a built-in line oiler to assure positive oil feed while the tamper is in operation, is now being manufactured and marketed by the **Le Roi Division, Westinghouse Air Brake Co., Milwaukee, Wis.** The new tamper, the OT11, has a handle grip throttle valve incorporating a safety snap action which shuts off the air supply when the lever is released. The safety snap shut-off action increases operator safety and reduces lost-time accidents. A plug type throttle is available as optional equipment. The tamper's line oiler is of non-splurging design and has an adjustable oil regulator. It has plates to prevent excessive oil foaming. The 1 1/4-quart capacity of the oiler allows a full 8-hr. day of operation with one filling.

Autocar rebuild kits for wrecked trucks

A new Autocar rebuild kit, consisting of current-model production parts, can be used to rehabilitate any make of truck comparable to Autocar six-wheel diesel models DC 10264 and DC 10264 I (light weight). Providing all parts for a completely new Autocar chassis without power train (engine, clutch, transmission, drive line and front and rear axle assemblies), the kit is produced by Autocar Division of **The White Motor Co., Exton, Pa.** Total cost of rebuilding a typical truck with an Autocar kit averages from \$5,400 to \$6,500. This includes cost of the kit, selected optional parts and labor.

New Gurries 5-cu. yd. scraper

A new scraper built to match the power of Cat D2 and D4 tractors is announced by **Gurries Manufacturing Co., 1720 South First St., San Jose, Calif.** The new Gurries GS-2 Ag Scraper has a 3.60 cu. yd. struck capacity and a 5.0-cu. yd. heaped capacity. A hydraulic cylinder raises and lowers the bowl. A shallow angle blade cuts draft and permits a



heaped load with minimum power. Load is quickly and completely dumped by hydraulic power which raises apron and dumps load. Load can be spread in thin controlled layers or dumped in one spot. The GS-2 takes a 7-ft. cut, and rear wheels track inside cut. It fills a place in the scraper line as low-cost companion equipment for the smaller Caterpillar track-type tractors. It is available from

Put **COST-CONTROL** into **ACTION... go** rugged **AUTOCAR** diesel!



Haul More at Lower Cost—

get more return from your transportation investment! Wonderly Construction Co., Long Beach Calif., does it every day with AUTOCAR.



Start transportation cost control with an analysis of your hauling operation. And let your Autocar representative help you, for that's what he is trained to do. He'll offer you specific answers to your specific problems, and he'll show how Autocar's rugged design and unit options can save you money as they have for so many other Autocar operators.

If you haven't received your free copy of the White-Autocar Cost Analysis Record Book, ask your Autocar man for it now. And let him help you put cost-control into action.



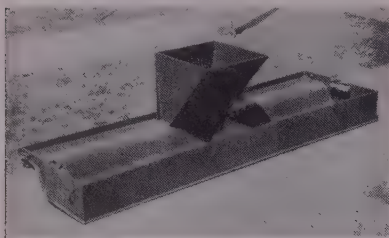
The Wonderly Construction Company, one of the West's leaders in the heavy construction field, keeps costs under control... gets payloads up to 22 tons with Autocar. The unit shown above, one of a fleet of five, is an Autocar DC10264L with heavy duty frame rails, Timken SQDD dual-drive rear axle, 8055A 5-speed main transmission, 8341B 4-speed Aux. transmission, and 200 hp. Cummins Diesel Engine. It's used for off highway as well as over-the-road service.

Sales & Service Facilities Everywhere

THE WHITE MOTOR COMPANY **AUTOCAR DIVISION** Exton, Pa.

Continuous pouring with new "Curb Mule"

A "Curb Mule" that eliminates entirely the need of curb face forms in pouring concrete for curbs and gutters



has been introduced by **Midwest Metal Stamping Co.**, Kellogg, Iowa. The sliding form makes possible continuous

pouring of integral curb on slab or curb and gutter. Of all-steel construction, the form is 86 in. long and 27 in. wide. Adjusting bolts on the cross ribs permit changing the angle of the face sheet to conform with the variation that might occur where the crown of the slab meets the curb line. An angle running lengthwise at the back provides for the proper guiding of the sliding form on the 6-in. curb back form. The forms may be ordered to conform to any special profile the contractor may require. Main supporting members and hopper are made of 1/4-in. thick steel plate. The face member is 1/8-in. thick plate, made in one piece to produce an entirely smooth and unbroken surface and electrically welded for maximum rigidity and durability.



LEFT HAND VIEW

RIGHT HAND VIEW

From Bakersfield to Boston . . . Syracuse to Seattle
St. Paul to Savannah . . . From Paducah to Everywhere . . .

CONTRACTORS TIE RE-BARS WITH IDEAL

. . . the first and only TWO in one tie wire reel!

Across the nation . . . for greater safety and savings, more and more contractors are "speeding up" their wire tying jobs with IDEAL reels. If your job calls for tying and placing re-bars . . . no matter what the tonnage . . . here's why it will pay you to use IDEAL reels.

Only **IDEAL** gives versatile **RIGHT** or **LEFT** hand use without time-consuming, change-over adjustments . . . it's two reels in one.

SAVES TIME—Speeds tying efficiency 25%, often much more . . . up to 6 and 8 more ties per minute.

SAVES MONEY—Stops costly wire waste. Gives 33% more usage per pound of wire on average.

SAVES MEN—Cuts accidents. Prevents lost man-hours. Approved by leading bonding companies.

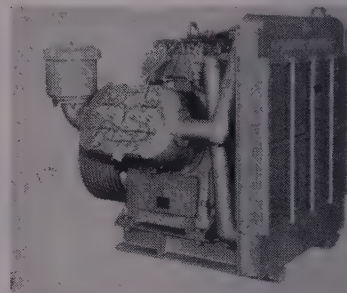
Write or wire for brochure and the name of our distributor in your territory.

IDEAL Reel Company
PADUCAH, KENTUCKY

IDEAL
tie wire reel

New, compact 200-hp. compressor

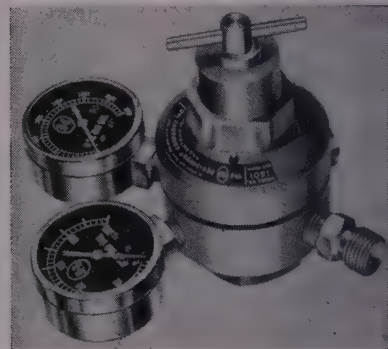
Gardner-Denver Co., recently announced the addition of a new, high capacity unit to its established WB line of air compressors. The new Model WBN was designed to save costly floor space. This 200-hp., two-stage packaged unit occupies only 34 sq. ft. of space. In many instances, this compressor is sufficient to permit retirement of two smaller compressors, with corresponding saving in



space. The WBN needs no special base. All that is required to put it into operation is to bolt it down and hook it up to its source of power. Once installed, it operates on long, steady runs with little attention. The WBN is available with a tube-type intercooler or with a self-contained radiator-intercooler which saves on cooling water. Complete specifications are available from **Gardner-Denver Co.**, Quincy, Ill.

New K-G gas regulator

A small, moderately-priced gas flow regulator, called the "K-G Jeep," has been announced by the **K-G Equipment Co.**, a unit of Air Products, Inc., Allentown, Pa. It is designed for medium- to light-duty service and is for use with mos-



compressed gases. All important construction characteristics of the heavy duty K-G 1200 and 1100 series regulators have been embodied in the new Jeep. The clear anodized body and back cap are made of high-strength forged aluminum, with a tensile strength of 68,000 psi. Stainless steel is used for the liner and all internal working parts. High-pressure gages are graduated to 4,000 psig, adding a 1,000 lb. safety factor. For further information, contact the **K-G Equipment Co., Inc.**, P. O. Box 512 Allentown, Pa.

Blaw-Knox Heavy Steel Forms save J. A. Jones Construction Company 40% over Wood on Power House Project!



Backwall and counterfort form being placed. Handling time is cut to the bone by special form design.
Form at right is ready for stripping and re-setting at new location.

Down along the banks of McKellar Lake at Memphis, one of the world's largest Steam Generating Stations is under construction. The J. A. Jones Construction Company, builder of the huge concrete substructure is using custom-built Blaw-Knox Heavy Steel Forms on a retaining wall that is 1,684 feet long and 41 feet high. They also are using Blaw-Knox Heavy forms for water intake, circulating and discharge tunnels.

Experience with more than 700 feet of wall shows that re-use of two sets of Blaw-Knox Steel Forms has actually saved 40% over the use of wood. Beyond this too, are the indirect advantages—safety, labor cost, uniformity of construction and salvage.

Advantages of custom-built Blaw-Knox Heavy Steel Forms have been proven on many construction projects of world wide interest. Where there is a concreting problem, the speed, flexibility, and salvageability of Blaw-Knox Steel Forms makes them the number one construction tool. They're backed by more than 40 years of experience on wide range of big projects.

Put the Blaw-Knox Steel Forms Consultation Service to work for you, whether your job is a dam, tunnel, sewer, or bridge. You'll get fast, simplified planning, custom-built forms tailored to the exact requirements of your project.



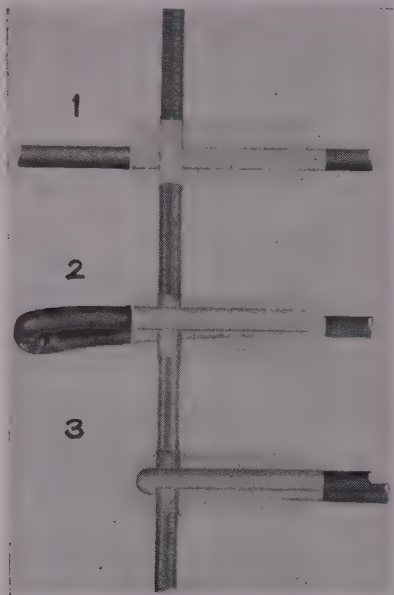
BLAW-KNOX COMPANY

Blaw-Knox Equipment Division

Steel Forms Department, Pittsburgh 38, Pa. • Phone STerling 1-2700

New plastic fuse connector

A plastic connector that is reputed to provide a simple but completely effective method of hooking up detonating fuse preparatory to blasting is announced by **Austin Powder Co.**, Cleveland 13, Ohio. When employed for joining trunk and branch lines, the new connector is said to assure a positive coupling that won't slip, loosen or lose contact in any weather or under any job condition. It also eliminates tying of knots and the



resultant possibility of their becoming untied. According to the manufacturer, detonating fuse is fastened in the connector in an easy 3-step operation. First, the fuse from the shot hole is threaded through the length of the connector. Then, the trunk line is pressed into the grooved slots. Finally, the branch line is passed over the trunk line, returned the length of the connector and pulled tight. For complete details, writer for bulletin LL-5588.

Cummins 450-hp. Turbodiesel engine

Production of a new 450-hp. Turbodiesel engine for use in pumping units, shovels, and electric power generation has been announced by **Cummins Engine Co., Inc.**, Columbus, Ind. The Cummins LRT-6 Turbodiesel broadens the horsepower range of the slow speed, heavy-duty L engines offered by Cummins. A 6-cylinder engine, it has a rating of 450 hp. at 1,100 rpm. and has displacement of 2,477 cu. in. The Cummins Turbodiesel engine utilizes normally wasted energy of exhaust gases by means of a turbocharger, to develop additional horsepower. A turbine, located in the exhaust system, drives a centrifugal blower in the air intake system. By forcing a greater weight of air into the cylinders, more fuel can be burned completely and more power developed. The LRT-6 is equipped with a Cummins T-590 turbocharger and has

the Cummins PT (pressure-time) fuel system. The PT principle of fuel metering utilizes a fixed size opening in a simple injector and variable pressure to meter the fuel charge.

Salsbury "800" series automatic clutch has built-in ventilating system

Rapid heat dissipation by means of built-in ventilating system is the outstanding feature of the new "800" Series automatic clutch now available from the **Salsbury Corp.**, Los Angeles, Calif. The cooling design is ideally suited for loads requiring extended acceleration periods. The "800" Series automatic clutch also boasts an unusually large friction area of 40 sq. in., approximately twice that usually found in automatic clutches in the capacity range, and correspondingly extending the life of the clutch. This new clutch has been engineered for use on both electric motors (2 to 5 hp. @ 1,725 rpm.) and gasoline engines (6 to 9 hp.). Its compact design and rugged construction incorporate relatively few parts which require minimum maintenance yet are easily serviced. It accommodates a broad selection of detachable sheaves for versatile application. Specification and additional information regarding the Salsbury "800" Series may be had by writing to the company. Address: Power Transmission Division, Salsbury Corp., 1161 E. Florence Ave., Los Angeles 1, Calif.

Scoopmobile's Breakout Bucket Action Delivers Bigger Loads

The heaping load on the business end of this Scoopmobile illustrates the unequalled value of 100% breakout bucket action.

Scoopmobile digs into the pile at ground level, and the load falls into the bucket on its way up. Breakout action assures full loads and helps to pull the machine into the pile with less tractive power, less torque on the axles and less spinning of wheels.

Ask for a Scoopmobile demonstration — without obligation — on your own work, and let the actual performance govern your choice of the most profitable loading equipment.



LD-8A Scoopmobile loading rock. Note excellent visibility and ease with which operator reaches his seat from either side.

Other features that give you bigger production from your Scoopmobile loaders are:

- 2-axle oscillation
- 4-wheel power brakes
- 4-wheel power steering
- Center pin coupling
- Full reverse transmission

- Power-shift transmission
- Complete operator safety
- Lateral bucket spotting



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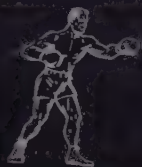
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**LIFT
TRUCK**
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INDUSTRY**



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For record breaking performance in the Construction Industry, CHAMP "TOWABLE" LIFT TRUCKS are TOPS! Contractors and Building Materials Dealers throughout the country are discovering the economy and convenience of Champ's "3 WAY SERVICE"—(1) use in the plant, (2) the exclusive TOWING to the job for unloading and (3) use on the job in placing pallets on scaffolding. You get other advantages with Champ too—smooth powerful operation over rough terrain, high maneuverability... and long trouble-free service. Yes—whatever you require in Lift Trucks you'll find the answer in the broad line of "Job-Engineered" Champs. Why don't you write today for more details and the name of your nearest dealer?

America's 1st Towable Fork-Lift Truck



there is a CHAMP for Every Job—

Construction, Building Materials, Outdoor & Indoor Storage, Truck Loading and Farming. Yes, Champ manufactures a complete line of Fork-Lift Trucks, all "engineered to fit the job" and all with exclusive time and money saving features that are receiving wide and enthusiastic acceptance.



2500 NORTH ROSEMEAD BOULEVARD • EL MONTE • CALIFORNIA

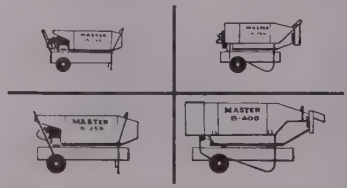


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GET THIS
HEATER !**

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

"We won't be slowed down by cold weather. And we'll be a lot more comfortable, too, with a Master heater on the job."
"It puts out a steady stream of warm air wherever you want it. You can plaster, pour concrete, thaw and dry materials, spot heat outside, etc. It's portable, just wheel it around, plug it in and flip the switch. It'll run for 16

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



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

MASTER

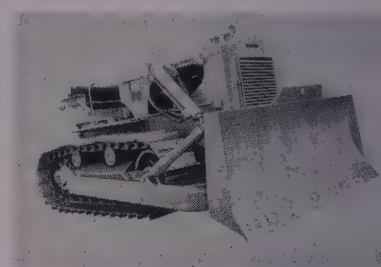
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- POWER EQUIPMENT COMPANY**.....Denver, Colorado
- SHRIVER MACHINERY COMPANY**.....Phoenix, Arizona
- SIERRA INDUSTRIAL CO., INC.**.....Reno, Nevada
- THE SAWTOOTH CO.**.....Boise, Idaho
- WEST COAST MASTER, INC.**.....Los Angeles, California

New bulldozer for Oliver OC-18

Oliver's big model crawler, the 133 drawbar hp. OC-18, is now available with a new engine-frame mounted bulldozer. A strong, simple hookup arrangement is used to anchor the hydraulic cylinders to the engine frame on both sides. Heavy box-section push arms pivot



on the track frame and have far-back mounting point for a 47¾-in. blade lift above ground. The dozer blade has drop below ground of 14¼ in. for a over-all blade travel of 62 in. Blade action is fast with a four-second lift time. The 10-ft. 10-in.-wide blade has reversible cutting edge and end bits and can adjust to 14½-in. maximum tilt. The OC-18 with engine-frame mounted bulldozer has Oliver Power-Turn steering. Clutch steering is integrated into Power-Turn to permit spot turns without locking of the pivot track. Details on the OC-18 crawler with new engine-frame mounted bulldozer may be obtained by writing the manufacturer, **The Oliver Corporation**, 400 West Madison Street, Chicago 6, Ill.

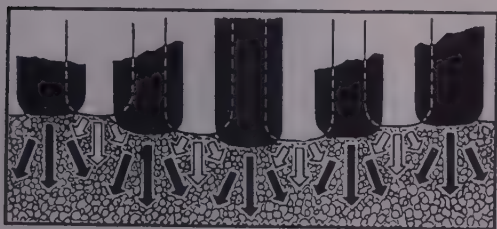
Mobile Work Shop

Called a Mobile Work Shop, this truck-mounted shop on wheels is announced by **Cemco Industries, Inc.**, of Galion, Ohio. A noteworthy feature of this Work Shop is the winch equipped 5-ton crane which can be completely disassembled and stored inside the truck when the vehicle is in transit. The truck also has, according to manufacturer's specifications, a 125-cu. ft. air compressor, 15-kv. generator—300-amp., 40-v. welder. The air compressor and the generator-welder are operated by a Cemco split-shaft power take-off. Compartment and sidewall bins provide ample storage for parts and tools.





How oscillating wheels can save you untold street maintenance costs...



See the flow of compaction effort that the BROS Self-Propelled roller with torque converter drive provides for street seal coating, resurfacing and shallow lift compaction...

Here's how it is helping cities throughout the country make great savings in street maintenance costs:

- With full oscillation of all wheel pairs to provide uniform compaction, the BROS SP-54 helps "key" and "lock" aggregate materials tightly in the base course to prevent various pavement failures.
- Wheel oscillation of this roller also kneads the asphalt into a tight, solid surface, eliminating hairline cracks that would otherwise turn into

surface breaks. Very important, too, rubber tire rolling correctly imbeds the wearing course chips *without* crushing them.

- Besides such proven advantages, the BROS SP-54 offers these time-saving performance features: a torque converter drive provides smooth, easy handling and eliminates "tipping" of chips when starting; it also lessens drive line strain.

- Full-reversing type transmission with shuttle gear permits rolling in either direction without shifting; turn arounds are thus eliminated.

- Infinite speed range from 0 to 18 mph; positive chain drive to both rear wheel pairs; 50 HP engine and smooth, hydraulic steering provide fast, proper compaction results that you can't get from any other roller. See a BROS Distributor or write us for full information and/or a demonstration. BROS INCORPORATED, ROAD MACHINERY DIVISION; 1057 TENTH AVENUE S.E., MINNEAPOLIS 14, MINNESOTA.

Find out, too, about the complete BROS TEAM. With the SP-54, the BROS Preparator and Roto-Mixer make the perfect combination for low cost street construction. The Preparator (in-place materials reducer) reduces native over-size materials and old blacktop to proper roadbed sizes. The Roto-Mixer stabilizes and blends the base and wearing course materials to improve load bearing values.

ROAD MACHINERY DIVISION

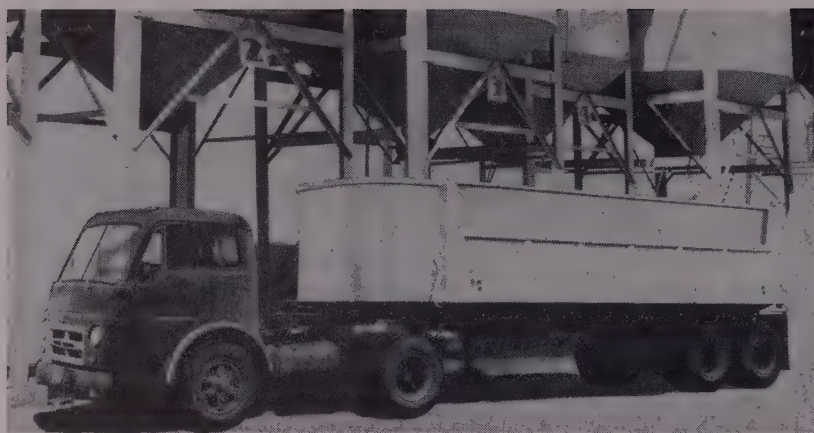
BROS INCORPORATED

(Formerly the WM. BROS BOILER & MFG. CO.)

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Arizona Equipment Sales, Inc., Phoenix, Arizona; Blakemore Equipment Co., Oakland, California; Coast Equipment Company, San Francisco, California; Crook Company, Los Angeles, California; McCoy Manufacturing Company, Denver, Colorado; Western Equipment Company, Boise, Idaho Falls, Idaho; Western Construction Equipment Co., Billings, Great Falls, Montana; The Harry Caraelius Company, Albuquerque, New Mexico; Pioneer Equipment Company, Reno, Nevada; Loggers and Contractors Machinery Co., Portland, Oregon; Totem Equipment Co., Seattle, Washington; Kereml Tractor and Equipment Co., Casper, Cheyenne, Wyoming.



Maximum strength in lightweight trailer dump

A new 30-cu. yd. tandem axle trailer dump, designed for economical bulk materials hauling in areas where highway weight limit laws set a medium gross weight limit and allow credit for only one set of tandem axles, is announced by Galion Allsteel Body Co., Galion, Ohio. Known as Model STMF Transporter, the new trailer dump is intended for use with single rear axle tractors. It is fitted with a front-mounted Uni-scopic single cylinder telescopic hoist which shifts hoist weight forward onto the tractor axles. This permits additional loading of the trailer axles and increased payloads. Matched design of Uni-scopic hoist, chassis and body is said to afford unexcelled stability, both on the highway and when dumping. Model STMF can be used for direct dumping into road

surfacing machines. The chassis, of fabricated steel construction, is supplied with tandem Stabl-ride or center pivot bridge type suspension. A full selection of axle capacities, brake types, tires and optional equipment is offered. Understructure consists of closely spaced 4-in. channel crossmembers gusseted and welded to 6-in. I-beam longitudinals. The compact hoist well, fully welded and reinforced to distribute hoist lifting forces uniformly, is fitted with a removable access cover for hoist cylinder inspection. Ten gage high resistant steel is used throughout the body. Offered in body lengths from 19 to 26 ft., Model STMF Transporters have payload capacities of 10 to 40 cu. yd. Three optional Uni-scopic hoists, with lifting capacities up to 30 tons, are available. For further information, see local Galion Allsteel distributors or write direct to the company. Ask for catalog LL-1234.



Special equipment ready for FC-150

Two special bodies have been approved by Willys Motors, Inc., Toledo, Ohio, for installation on the new Forward Control Jeep FC-150. Either a

dump truck body or a service truck body may be installed by Willys dealers on the FC-150 chassis in lieu of conventional factory installed pick-up or platform stake bodies. With approval of these two bodies and a host of special

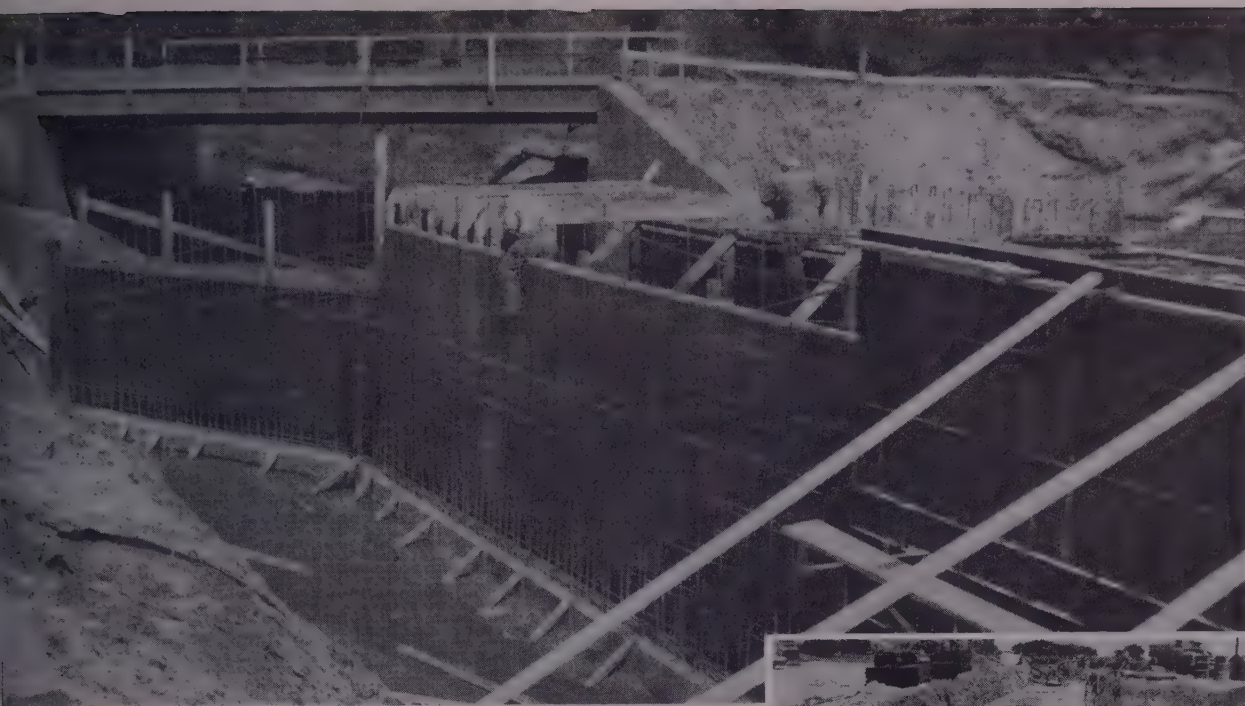
equipment items, the FC-150 can be equipped to do virtually all the jobs other Jeep vehicles perform while at the same time provide its owner with increased carrying capacity on a minimum wheelbase. Besides the two special bodies, the Willys product engineering department has approved winches, snow plow, angle-dozer and towing equipment for use on the FC-150. These items too are available through Willys dealers. The forward control design allows maximum usage of the vehicle's 81-in. wheelbase for cargo space. Cargo length is 74 1/2 in. or, with tail gate extended, 92 in. The FC-150 is powered by the Hurricane F-head engine which was developed by Willys. With 4-wheel drive, the FC-150 can travel anywhere on or off the road. It may be shifted quickly and easily into conventional 2-wheel drive for use on paved streets and highway.

New method of adding water to Blaw-Knox Trukmixers

A new design feature of the Model M series Blaw-Knox Trukmixers provides an auxiliary method for introducing tempering water. The new system permits the operator to introduce mix water through the charging end of the mixer as well as through the drum head. Principal advantage in adding water through



the charging hopper on high discharge mixers is that it eliminates the tendency of concrete to build up on mixer blades at the drum opening, as the tempering and flush water is jetted against the blades. In practice, operators now introduce tempering water from both the front and rear of the drum. Blaw-Knox furnishes an auto-stop meter on all sizes of the Model M which are equipped with both mix and flush water tanks. The meter measures all mix water entering the drum. The flush water system is designed for easy field conversion from transit mix, where water is supplied at the batch plant, to job site mixing, where water is supplied from the mixer's water system. The conversion is made by installing the auxiliary water tank and piping without alterations to the mixer. For further information, write Blaw-Knox Co., 300 Sixth Ave., Pittsburgh 22, Pa.



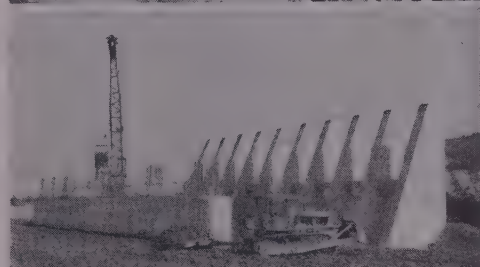
forming Bridges, Culverts, Piers?

UNI-FORM PANELS

Save LABOR, MATERIAL, TIME!

Simple mechanical assembly and pre-engineered techniques for handling virtually any forming condition make UNI-FORM Panels your best bet for fast, low cost forming. Successful contractors everywhere are using the UNI-FORM system to form bridges, overpasses, culverts, piers and abutments, because their experience has shown that UNI-FORM Panels give them the speed, flexibility and economy required to handle this complex type of forming at the lowest possible cost.

Let us prove our point. Send a set of plans for detailed forming specifications, recommendations and cost analysis. There's no obligation, of course.



P1501

UNIVERSAL FORM CLAMP CO.

Concrete Form Specialists Since 1912

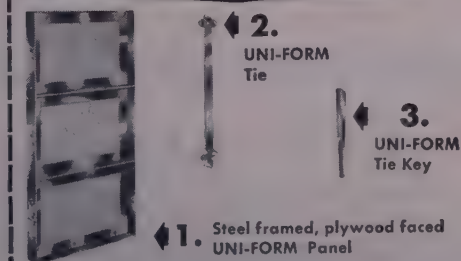
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BRANCH OFFICES AND WAREHOUSES

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Here Are The Basic Elements:



*To Help Your Pumps
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SUCTION AND DISCHARGE HOSE

A GOODALL "Standard of Quality" PRODUCT

Put "NEWTYPE" on your pumps and watch them keep on giving their **best** . . . day-after-day. Why? Because this **quality** hose will not kink, buckle or collapse, and has the great strength and durability to stand up **longer** under severest wear and abuse. Made in sizes 1 1/4" to 4", inclusive, in maximum lengths of 50 feet. Readily identified by a green spiral stripe on the black cover, plus the familiar "Clover-leaf" label.

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Contact Our Nearest Branch for Details and Prices

Standard of Quality—Since 1870



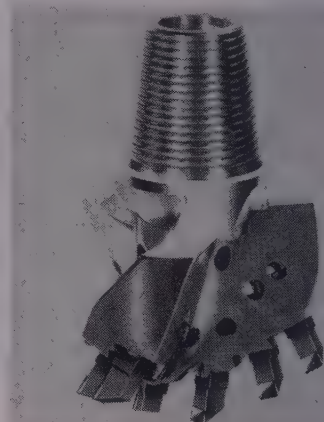
HOSE • BELTING • FOOTWEAR • CLOTHING
AND OTHER INDUSTRIAL RUBBER PRODUCTS

GOODALL Rubber Company

GENERAL OFFICES, MILLS and EXPORT DIVISION, TRENTON, N. J.
Branches and Distributors Throughout the United States and in Canada

Air-blast drilling speeds increased by new drill

Austin Power Co., Cleveland 13, Ohio, announces a new drag bit drill head that is reputed to greatly increase air-blast drilling speeds in soft rock formation. Designated as Model APA, it is said to cut through soft shales, clays, shells, so



limestone, red beds and other rocks having low compressive strength in less than half the time required by ordinary drill heads with rotating bits. Also, the APA contains no independent moving parts to become clogged and requires only moderate weight to achieve full effectiveness. Of 3-wing prop-type design, the APA head is furnished with special painted carbide-tipped bits. The latter have tapered shanks that drive-fit firmly into the drill head so that wedges and set screws are not needed. Bits can be quickly changed with hammer and punch. The manufacturer advises that the APA drill head is available in 5 sizes for cutting holes of from 4 5/8 in. to 8 1/2 in. in diameter. It is also offered with square and hexagonal shanks and can be adapted to any drill rig.

Increased speed is feature of attachment for masonry drill

The new Ideal rotary impact masonry drill attachment makes it possible for anyone with a heavy duty 1/4-in. electric drill to drill holes faster and easier into all types of masonry. The new drill attachment, which is manufactured by Ideal Industries, Inc., Park Ave., Syca more, Ill., inserts in 1/4-in. drill chuck like a bit; then the masonry bit fits into the attachment and is secured with a set screw. That is all that you do before actually drilling. According to the company the bite-twist action of a typical 3/8-in. bit goes through 1 1/4 in. of solid concrete in only 30 sec. The fast drilling speed of this attachment is the result of an inner cam action that gives the bit a hammer-like blow every half revolution. This constantly renews the "bite" taken by the bit and neatly shears off the engaged material, thus giving far longer bit life. The attachment weighs only 20 1/2 ounces and adds only 4 3/4 in. to the length of an electric drill.

FOR UNITED STATES STEEL'S NEW RESEARCH CENTER AT MONROEVILLE, PA.



*Dependable
water service
and protection*

PITTSBURGH -DES MOINES ELEVATED STEEL TANKS

Providing a dependable supply of water at uniform pressure for a wide range of uses found in a great industrial laboratory, this Pittsburgh-Des Moines Elevated Steel Tank also assures ever-ready fire protection for U. S. Steel's extensive central research plant. Of double-ellipsoidal design, the tank is 150,000 gallons in capacity, 34 ft in diameter on a 100 ft tower, and has a headrange of 21 ft 10 in. Write for the descriptive PDM Elevated Tank Catalog, detailing various types and sizes for every water storage requirement.

PITTSBURGH • DES MOINES STEEL CO.

Plants at PITTSBURGH, DES MOINES, SANTA CLARA, FRESNO, and CADIZ, SPAIN

Sales Offices at:

PITTSBURGH (25) 3420 Neville Island	DES MOINES (8), 921 Tuttle Street
NEWARK (2) 219 Industrial Office Bldg.	DALLAS (1) . . . 1225 Praetorian Bldg.
CHICAGO (3), 1224 First National Bank Bldg.	SEATTLE (1) 528 Wall Street
SANTA MONTE, CAL. P. O. Box 2068	SANTA CLARA, CAL., 627 Alviso Road
DENVER (2) 909 17th Street	



News of DISTRIBUTORS



JOHNNY BULLA has joined the sales staff of Cummins Diesel of Arizona. Here he appears at the Cummins plant in Columbus, Ind., with **Paul J. Every** (left), general sales manager. The engine is a 600-hp. VT-12-1 used in the construction industry, a sales field in which Bulla will specialize. He will serve as a sales representative for **Paul Miller**, Cummins distributor in Phoenix, Ariz.

Bucyrus-Erie names Nev.-Calif. rep

Sanford Tractor & Equipment Co., Reno, Nev., has been appointed a distributor for Bucyrus-Erie Co. in western and central Nevada and in northeastern California. The Reno firm now offers sales and service on Bucyrus-Erie's full line of $\frac{3}{8}$ to 4-cu. yd. convertible excavators and cranes; 15-, 25-, and 35-ton capacity transit cranes; 5-ton and 10-ton truck-mounted, all-hydraulic Hydrocranes; and dragline buckets. The new distributor maintains headquarters on North Valley Road in Reno.

C. D. Roeder dies

Charles D. Roeder, president of Roeder Equipment Co., Reno, Nev., died as a result of a heart attack on July 30. Well known in the heavy equipment business where he had been active for 35 years, Roeder would have been 72 in September. The business will continue under name of Roeder Equipment Co., 860 W. Third St., where Fred P. Meagher is manager.

New McCulloch distributorship

M. L. Foss, Inc., of Denver, Colo., has been appointed distributor for the complete line of McCulloch chain saws, parts and accessories in the states of Colorado and Wyoming, Charles D. Allis, general sales manager, McCulloch Motors Corp., Los Angeles, Calif., announces. M. L. Foss, Inc., takes the place of Al Plonkey & Associates in the McCulloch distributor organization. William Aldrup, formerly with the Plonkey organization, has joined Foss as manager of its chain saw division.

Appointments by Schield-Bantam

Three new distributors were recently announced by Schield-Bantam Co., Waverly, Iowa. Appointed as exclusive distributor for the California counties of San Diego and Imperial is Southern Equipment & Supply Co., San Diego. Hanson Equipment Co., Santa Maria, Calif., is given the distributorship for Santa Barbara and San Luis Obispo counties. In Montana, Taber White

Truck Co., Missoula, will distribute Schield-Bantam equipment in nine counties: Lincoln, Flathead, Sanders, Lake, Mineral, Missoula, Powell, Ravalli and Granite. According to Buel Wallis, Schield-Bantam's general sales manager, these three companies will sell and service the complete construction equipment line manufactured Schield-Bantam.

Junction Bit serves Worthington

Junction Bit & Tool Co., Phoenix, Ariz., has joined the construction equipment distributor group of the Worthington Corporation, according to E. West Hammond, district manager for Worthington at Los Angeles. Under the able management of P. H. Bennett, Junction Bit has excellent new quarters in Phoenix, with a complete portable rental compressor fleet and tools to serve Arizona's requirements.

Pitman Mfg. Co. appoints two

Pitman Manufacturing Co., San Mateo, Calif., through its district representative, Steve R. Zorro, announces the appointment of two new distributors: Western Machinery Co., Spokane, Wash., headed by H. A. Myers, branch manager; and Foulger Equipment Co., Salt Lake City, Utah, headed by B. Foulger, president, and H. H. Nielsen, vice president, sales.

New mgr. for Hamilton Engine Sales

Gordon A. Kalk, for seven years in sales with Marshall Wells Co.'s Portland, Ore., branch, recently joined Hamilton Engine Sales, Inc., as manager. Headed by Charles C. Hamilton, this Portland distributor handles such important lines as Buda, Onan, Twin Disc Clutch, and others.

"Matt" Kohlbrly receives promotion

Martin R. Kohlbrly has been promoted to the position of industrial salesman for Shepherd Machinery Co., Los Angeles, Calif. He formerly managed the sales promotion department and brought

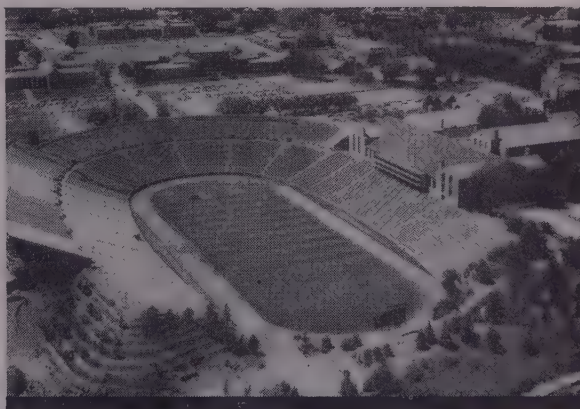


an extensive background into his new position through varied experience with the Shepherd organization which began in the parts department.

Steel saves time and money at University of Colorado in this unique double-duty football stadium addition



THREE ACRES OF CLASSROOMS were built using the stadium seating as a roof! Both the stadium seating addition and the four-floor classroom and shop area (shown above) were constructed for little more than the estimated cost of one of these projects. This economical double-duty structure made wide use of United States Steel Structurals. J. W. Sallada, Denver, was the structural engineer.



FIVE WEEKS AHEAD OF SCHEDULE! Burkhardt Steel Company, A.I.S.C., erected this addition to Folsom Stadium at the University of Colorado, Boulder, in just 11 weeks using one crane. Seating surfaces (see above) were formed by "Z" bent 3/16 inch USS Steel Sheets fabricated at Burkhardt's Denver plant. Hardwood now covers the seat rows.

THE NEW 15,000-SEAT SECTION to Folsom Stadium raises the total seating capacity to 45,000. Steel seat sections were welded together to provide a water-tight seal to prevent leakage into classrooms below. Architectural Department of the University of Colorado designed the addition with Trautwein and Howard of Philadelphia, consulting architects.

Specify USS—One Source for All Steels

United States Steel Corporation • Columbia-Geneva Steel Division
120 Montgomery Street, San Francisco 6



UNITED STATES STEEL



"Super" shoulders revive beach area development



LOOKING NORTH on Route 528 from Ocean City, Maryland.

THE STATE OF MARYLAND recently found a relatively simple solution to a paving problem that had for years retarded the development of beach property along a 7.75 mile stretch of Route 528, from Ocean City to the northern boundary of the state. This solution may be of value in other communities and beach areas.

THE PROBLEM: Only a 24 ft. center section of the 100 ft.-wide state-owned right-of-way was paved. 38 ft. on either side of this pavement consisted of loose beach sand. Access to desirable beach properties was restricted. Property owners complained; and, in many cases, built near the pavement on the right-of-way. State funds would not permit full-width paving. Property development lagged.

In 1953, an attempt was made to stabilize the sand with clay; but the stabilized areas could not withstand the erosive action of wind and water.

THE SOLUTION: "Super" shoulders, 38 ft. wide on each side of the pavement. In 1955, these shoulders were reshaped and recompact; given a Bitumuls Double Surface Treatment. *Cost of this work was within budgetary allowances.* These surfaces have now given more than two full years of service and are still in good condition.

The Bitumuls® Engineers in our office nearest you have on file thousands of similar job reports from all over the nation. *If you have a paving or surfacing problem of any type, Our Engineers will welcome an opportunity to discuss it with you.*



CENTER ARROW indicates asphalt-paved area (24' width); outer arrows show extent of shoulders (38' on each side of pavement).



American Bitumuls & Asphalt Company

200 Bush Street, San Francisco 20, Calif.

DISTRICT
OFFICES:

4525 San Leandro Street
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600 Simpson Street
TUCSON, ARIZONA

1401 W. Florence Avenue
INGLEWOOD 1, CALIFORNIA
5501 N.W. Front Avenue
PORTLAND 7, OREGON

Chip-A-Saw representation in Calif.

Kellogg-Little Co. of San Francisco has been appointed by Cenatron Industries as exclusive California distributor for Chip-A-Saw, Ed Little, company president, recently announced. The product of the Fresno, Calif., firm, Chip-A-Saw, is a new chain saw conversion kit for portable electric circular saws. Kellogg-Little Co. is direct factory representative and exclusive Northern California distributor for Rototiller, McCulloch chain saws, and allied products.

Bob Fox represents Grade-More in S.V.

Hasselbalch & Sons, Omaha, Neb., announces the appointment of R. H. "Bob" Fox of Van Nuys, Calif., as distributor for Grade-More slope graders in California, Nevada, and Arizona. Fox has long been active in the construction equipment field. Starting his career early in the 30s with Euclid, he came to California in 1937 for Southwest. Two years



R. H. Fox

later he joined the Maxi Corporation (then Six Wheels, Inc.) and for many years pioneered Maxi crane carriers.

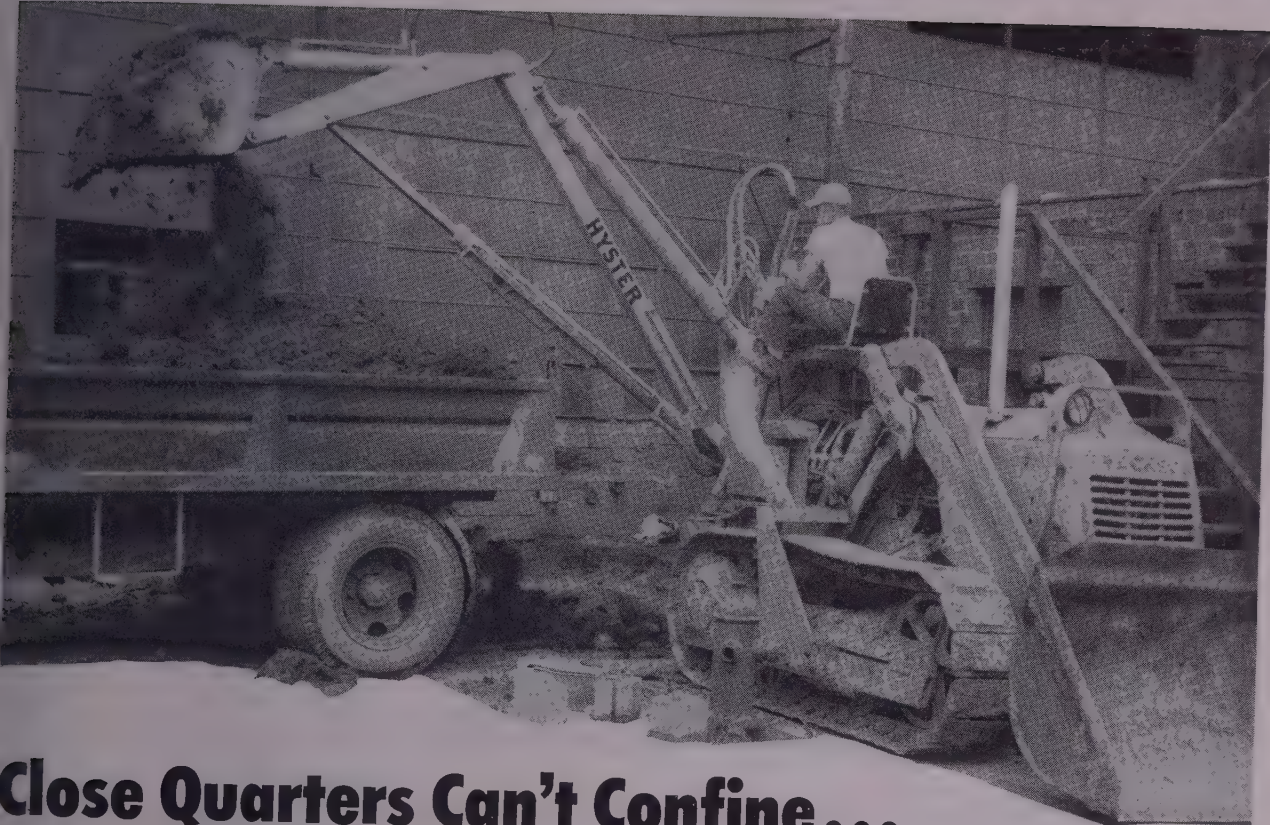
He was in Washington, D. C., in 1940 when Cook Bros. Equipment Co. called him back to the West to head up the Crane Carrier Division. His later retirement didn't set very well with Fox after 25 years on the road, so now he is happy to be back working with his friends, the machinery dealers and the customers. He makes his headquarters at 14730 Vanowen St., Van Nuys.

New manager; new line

Len Pearson is now manager of the Berkeley and East Bay operations of Central Equipment Co., Inc., 1230 Six St., Berkeley, Calif., according to Al Hewett, president of the company. Hewett also announces that his company recently took on the complete line of concrete vibrators, finishing screeds, generators and space heaters manufactured by the Master Vibrator Co. of Dayton, Ohio.

Brose enthusiastic about new mixer

George Brose, president of The Brose Co., Oakland, Calif., feels he has a fine new line in the Smith Turbine-Ty Mixer manufactured by The T. L. Smith Co. of Milwaukee whom Brose represents in the Northern California area. Brose believes this new mixer will be of particular interest to the prestressed concrete industry and concrete construction plants.



Close Quarters Can't Confine... the HYSTER D4 HYDRAULIC BACKHOE

HYSTER COMPANY

**D4 BACKHOE MAKES MORE
JOBS "ONE MACHINE" JOBS**

Portland, Oregon
Peoria, Illinois
Nijmegen, The Netherlands



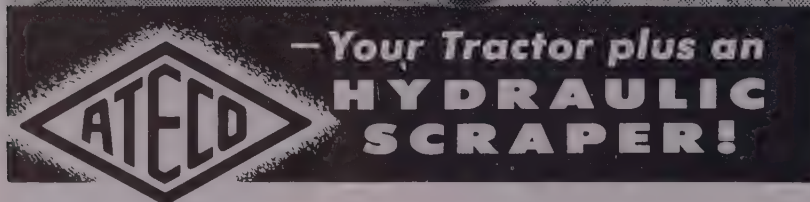
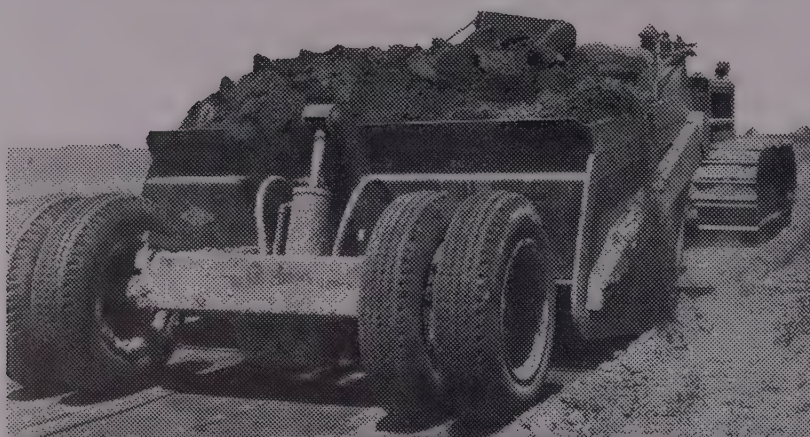
- Simultaneous hoist-and-swing.
- Full digging power anywhere within the 240° swing arc.
- Unobstructed operator visibility.

These **PERFORMANCE FEATURES** make this job "routine" for the backhoe in spite of obstacles restricting operating space at this crowded industrial site.

Match these **ADDITIONAL PERFORMANCE FEATURES** to your own job requirements, and you will understand why more and more contractors are making use of the dependable, low-cost power of the D4 Backhoe to cut operating costs and step up production.

	On D4 Tractor	On 955 Traxcavator	On HT4 Traxcavator
Maximum Reach From Tractor Rear Sprocket . . .	20'4"	20'9"	20'11"
Maximum Digging Depth	13'	12'3"	12'9"
Clearance at Beginning of Dump	9'7"	10'3"	9'9"
Clearance at End of Dump	14'9"	15'5"	14'11"
Dipper Wrist Action	104°	104°	104°
4 Tons of Tooth Force • Track-type Tractor Mobility Combination Hoe and Heavy-duty Bulldozer			

A LOW-COST COMBINATION FOR FAST EARTHMOVING

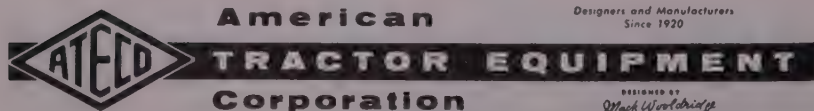


ATECO scrapers with the original open top, "boiling bowl" design, offer advantages on earthmoving and land levelling jobs you can't afford to miss:

- Extra width to finish-level more acres per hour.
- Drop-center cutting edge for faster heaped loading.
- "Boiling Bowl" action means solid loads without voids or fluffiness for more pay dirt per load.
- Extra low center of gravity, high clearance for easy hauling over levees and ditches.
- Properly proportioned and balanced for effortless towing behind wheel or crawler tractors.
- Simple to operate.



ATECO offers six 4-wheel models with heaped capacities from 6.0 to 17.0 cu. yds. (2-wheel models also available). Why not equip now to handle your own earthmoving and levelling? See your dealer or write today for literature, specifications.



9131 SAN LEANDRO BOULEVARD • OAKLAND 3, CALIFORNIA

Expanded facilities; new accounts

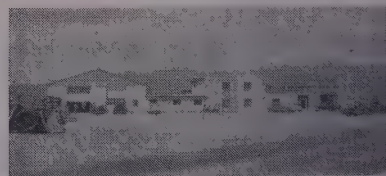
Diesel Construction Equipment Co., in business for many years at 5050 Market St., San Diego, Calif., has completed enlargement of its yard facilities, and has also expanded and complete shop facilities. Engaged in the distribution of construction and related equipment, including diesel engines, the corporation is exclusive franchise dealer for trailers manufactured by Fruehauf Trailer Co. for San Diego County and adjacent territory. Recently Diesel Construction was appointed exclusive dealer for Manitowoc Speedcranes, Speed Shovels, Speed Draglines and Speed Trenchers for San Diego and Imperial counties in California.

Miller expansion covers Montana

Miller Machinery Co., distributor of Michigan tractor shovels and excavators, cranes and Worthington construction equipment in western Montana, has established branches in Billings and Great Falls to distribute these major lines, as well as Diamond crushing equipment, U. S. Electrical Motors, Union Wire Rope, and others on a statewide basis in Montana.

The new Great Falls branch (center) is headed by George F. Flaherty, with A. Torrey in charge of service, and Ray Olsen in charge of office and parts. The new building is located at 1610 River Drive. At Billings, Russell L. Mills is in charge; Stan Giles heads service and Vernon Hoff has charge of the office and parts department. The Billings plant is at 640 Highway 10 East (bottom).

The Miller headquarters plant in Missoula (top) added a 50 x 100-ft. shop

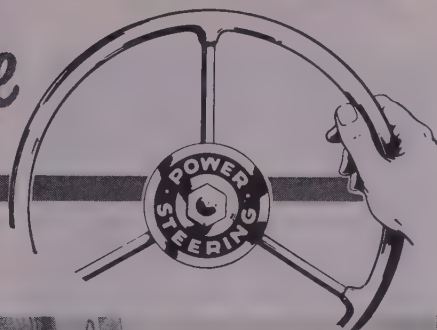


for service and custom fabrication of contractor equipment. Officers of the company are Otis O. Miller, president; D. F. Bartholet, vice president; and D. V. Scott, secretary-treasurer. C. A. "Red" Brown, residing in Kalispell, covers northwest Montana sales, with Tom McMenus in similar capacity for the southwest area. A. E. Richardson heads the shop and service organization and Roger L. Hallingstad is in charge of parts.

Now... **Power Steering**

with All Its Advantages...

for **JOHN DEERE Industrial**
WHEEL-TYPE TRACTORS

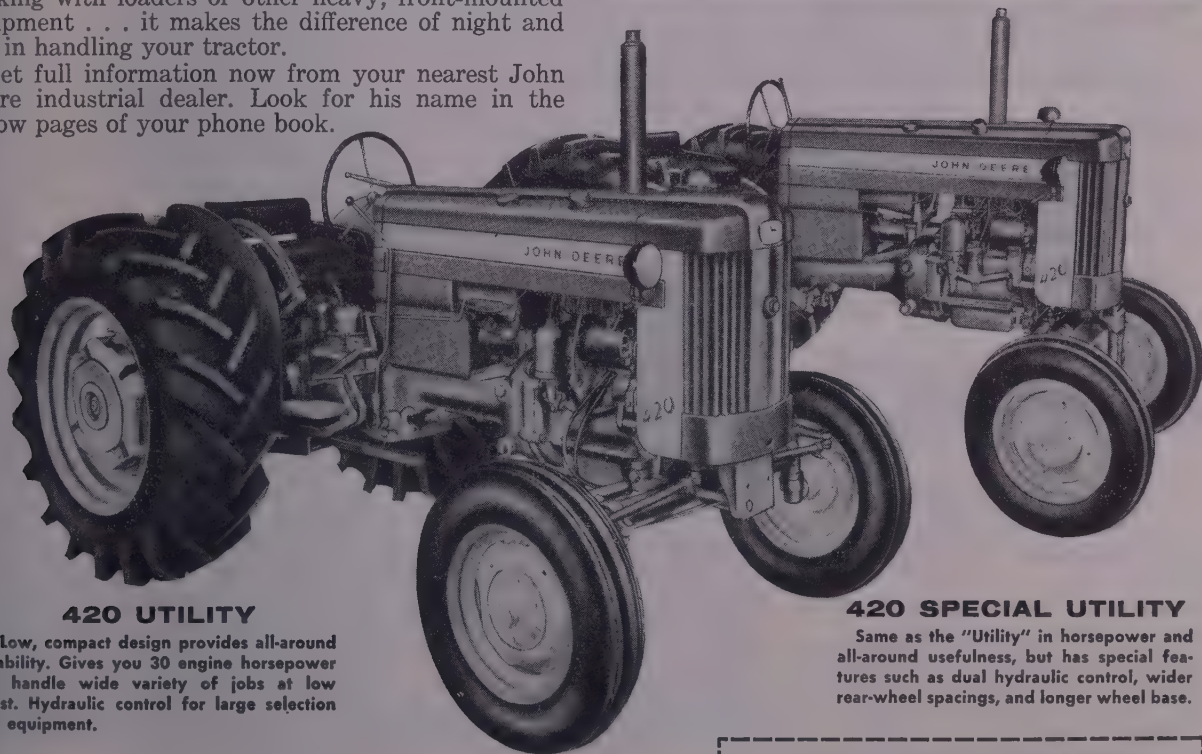
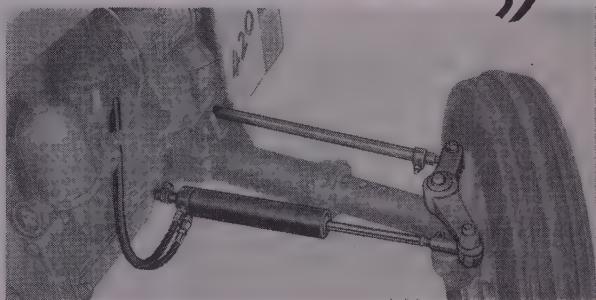


GOOD news for buyers of John Deere "420" Tractors! Now you can get *factory-engineered power steering*. Here is simple, positive, low-cost power steering that means new freedom from driving effort... new freedom from driver fatigue... safer, faster, more convenient operation.

It's good news, too, for present owners of John Deere "420" and "40" Utility Tractors, because the power steering assembly is available for field installation.

Only a test drive can demonstrate fully how John Deere Power Steering will save you time and work, *every time you take the wheel*. In sand or mud... when working over rough ground... and especially when working with loaders or other heavy, front-mounted equipment... it makes the difference of night and day in handling your tractor.

Get full information now from your nearest John Deere industrial dealer. Look for his name in the yellow pages of your phone book.



420 UTILITY

Low, compact design provides all-around stability. Gives you 30 engine horsepower to handle wide variety of jobs at low cost. Hydraulic control for large selection of equipment.

420 SPECIAL UTILITY

Same as the "Utility" in horsepower and all-around usefulness, but has special features such as dual hydraulic control, wider rear-wheel spacings, and longer wheel base.

For More Facts See Your Nearest John Deere Dealer

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Backed by nearly
40 years of tractor
manufacture for
dependable service
and quality.

Send for FREE LITERATURE

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Please send me your latest literature on the
John Deere Utility Tractors.

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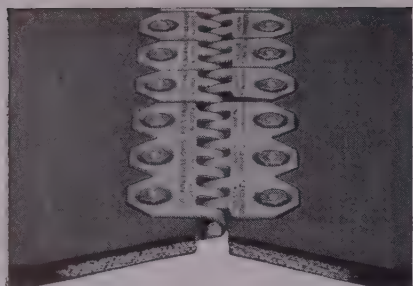
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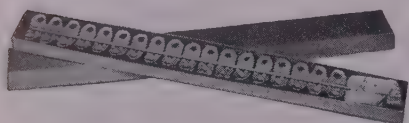
NEW...



500X FLEXCO HINGED BELT FASTENERS

*for ditching, trenching,
grading and other
earth moving equipment*

- ★ Make smoother joints
- ★ New Nylon covered cable pin
- ★ No pin migration
- ★ Complete packaged joints



Standardize on
FLEXCO 500X Fasteners

- ★ Packaged joints — complete, convenient, no waste.
- ★ New Power Tools cut application time.
- ★ Stocked by leading distributors.
- ★ Field engineers are ready to assist you.

(Fasteners also available in bulk — nylon covered cable pin stock in 100 ft. and 200 ft. rolls.)

Ask for Bulletin No. 500X
See Your FLEXCO Distributor

FLEXIBLE STEEL LACING CO.

4704 Lexington Street • Chicago 44, Illinois



EVANS ENGINE & EQUIPMENT CO., INC., Seattle, Wash., made delivery recently of these three Euclid TS-24 Twin-Power Scrapers to N. Fiorito Co., Inc., Seattle contracting firm. The three huge earthmovers, built in Cleveland, Ohio, by the Euclid Division of General Motors Corp., are termed the largest to be used in western Washington. They are being used on a \$700,000, 11-mi. new State highway between Lake Stevens and Arlington in Snohomish County.

Diamond makes Western appointments

Diamond Iron Works, Division of Goodman Manufacturing Co., Chicago, recently made several new appointments in the Western area. Construction Machinery Co., San Diego, Calif., is now distributor for San Diego and Imperial counties. Cal-Ore Machinery Co. of Medford, Ore., is covering the entire state of Oregon for Diamond, with the exception of the three eastern counties: Malheur, Baker and Wallowa, and also covers the southernmost counties of Washington. Hatten Machinery Co., Seattle, received appointment for the western half of the state of Washington. Western Machinery Co., Denver, was named distributor for all of Colorado, and for Wyoming with the exception of a few western counties.

Wm. Eccles made Northwest field rep

The Tractor Equipment Division of Pacific Car & Foundry Co., Renton, Wash., announces the assignment of William Eccles to the Northwest territory as Carco field representative, succeeding H. I. Chatterton. Eccles has been with the Carco Tractor Equipment Division of Pacific Car for the past seven years.

Newly named distributors

William Thatcher, district representative for Turbo Machine Co., San Francisco, Calif., announces three new distributorships: Western Traction Co. San Francisco (branch at 16th and American River, Sacramento); Best Maintenance Supply Co., Los Angeles; and H. B. Brown Co., Los Angeles.

(Advertisement)



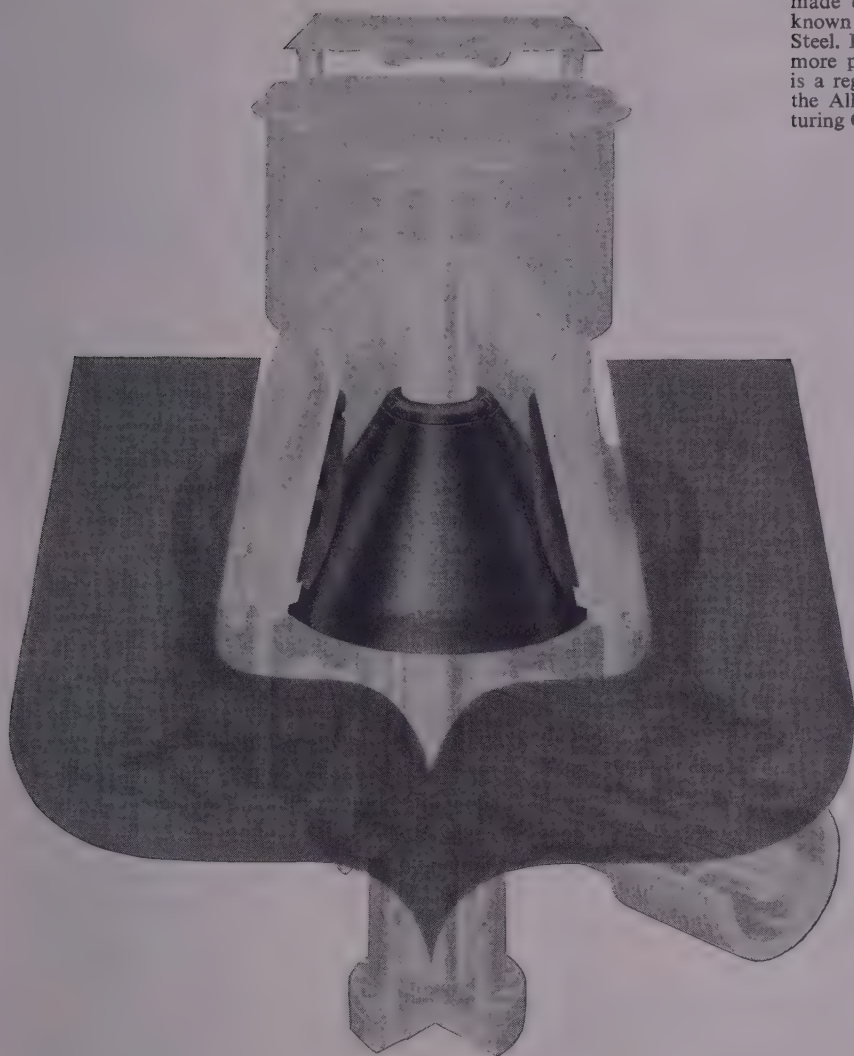
Symons Forms Help Speed College Job

Williams and Burrows, Inc., Belmont, California, contractors for the \$4,000,000 new buildings of the College of Holy Names, selected Symons Forms with steel cross members to help speed construction. Symons Forms were used in many places where ordinary forms were not adaptable. Other important reasons for using Symons Forms are that they can be erected and stripped fast, and can be used again and again.

Let us provide you with further details on how Symons Forms and Service can help you save on your forming costs. Send us the plans for your next job . . . our engineers will prepare a complete form layout, bill of materials, and make recommendations for the most efficient method of forming.

Symons Forms can be rented with purchase option. Symons Clamp & Mfg. Co., 634 Williams Street, San Leandro, California. Phone: Lockhaven 9-9159.

Concave ring and mantle of this *Hydrocone* crusher are made of the toughest steel known... Amsco Manganese Steel. It *gives* a little, to take more punishment. *Hydrocone* is a registered trade-mark of the Allis-Chalmers Manufacturing Company.



How a little give adds a lot of life to AMSCO CRUSHER PARTS

Both mantle and concave ring crush a lot more feed because of certain properties of Amsco® Manganese Steel. The metal *gives* a little under crushing forces, absorbs stresses, resists cracking and chipping. Yet these same forces work-harden the surface of Amsco Manganese Steel to as much as 500 Brinell . . . a high hardness, stubborn to wear.

Amsco Manganese Steel Crusher Parts main-

tain their ductile undersurface and work-hardened surface even when worn thin. That's why Amsco parts endure severe abuse for so many work hours without letup.

To be sure of getting Amsco Manganese Steel, order replacement parts from your crusher manufacturer. Amsco makes manganese steel parts for most manufacturers of crushing, grinding and pulverizing equipment.

Amsco also produces other alloy steels with maximum wear resistance under particular service conditions



AMSCO

American Manganese Steel Division • Chicago Heights, Ill.

OTHER PLANTS IN: DENVER, LOS ANGELES, NEW CASTLE, DEL., OAKLAND, CAL., ST. LOUIS, JOLIETTE, QUEBEC

ERIE STRAYER USED BUCKET LOADS 500 TONS OF SLAG DAILY



ERIE rehandler shown charging hopper of rotary drum dryer unit of the Gregg County Barber-Greene Asphalt plant.

BUCKET CABLE IN USE MORE THAN A YEAR AT ASPHALT PLANT, GREGG COUNTY, TEXAS

W. R. Scroggins, County Engineer for Gregg County, Texas knows just why we can claim that **ERIE BUCKETS WORK BETTER—LAST LONGER.**

In 1951, his Gregg County Highway Department bought an ERIE bucket for their Barber-Greene 840 Asphalt Plant. And it was a **USED** bucket—one that had already seen several years service!

Today, six years later, Mr. Scroggins reports: "For seven months now our Erie bucket has handled 500 tons of slag daily. It's been more than a year since we've even had to change the cable."

Here's one more example of the ERIE bucket's rugged dependability. Whether it be loading sand, moving scrap, or digging clay and gumbo, the ERIE works better—longer!

These features make ERIE the bucket experienced operators prefer:

1. Top closing power from block and tackle, plus lever arm construction, plus precision balancing.
2. Manganese steel teeth and high carbon steel lips that bite up full payloads of even toughest clay and gumbo.
3. Rigid, one-piece, welded head that shrugs off bumps and jars. No shimmy. No wobble.
4. Two-line, continuous reeving. Adds up to 50% to cable life. Less down-time for reeving.
5. Low headroom for fast work in tight quarters; low center of gravity for easy positioning.

For catalogs, write Dept. WC97 Cable Address: EXIMPORT

ERIE STRAYER Co.

3797 GEIST ROAD

ERIE, PENNSYLVANIA



E. H. Hogl elevated

E. H. Hogl has been elected director and vice president of Interstate Tractor & Equipment Co., Portland, Ore., as announced by Collis Johnson, president. A member of the Interstate organization since 1945, Hogl organized the heavy



E. H. Hogl

equipment firm's advertising and sales promotion departments and training program. His new responsibilities will include expanded activity in sales administration. Interstate Tractor & Equipment Co. distributes Thew-Lorain shovels, moto-cranes and log-loaders, Euclid earthmoving equipment, and Chicago Pneumatic air compressors and allied equipment.

Kyle named Marion distributor

Appointment of Kyle Equipment Co. LaPuente, Calif., as a distributor for Marion Power Shovel Co. in the southern California area is announced by Robert Campello, Marion vice president. A branch is located in San Diego to provide service to shovel owners in this area. Kyle Equipment will handle Marion's line of shovels, cranes, draglines and related equipment, both crawler and rubber mounted, up to and including 4-cu. yd. dipper and up to 160 tons lifting capacity.

Denver firm signs up with Kwik-Mix

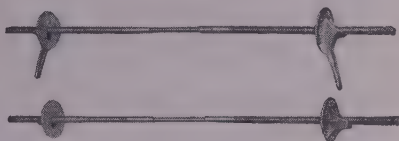
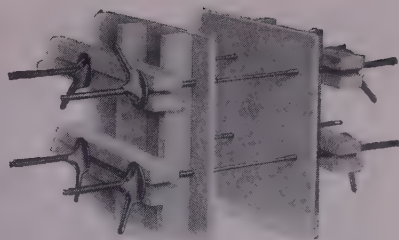
Armstrong Caster Co., Denver, Colo., has been appointed a construction equipment distributor for the full line of products manufactured by Kwik-Mix Co., Port Washington, Wis. A division of Koehring Co., Kwik-Mix makes various sizes of tilting and non-tilting plaster-mortar mixers and concrete mixers, power wheelbarrows, and fork lifts. Sales territory opened up for Armstrong includes the entire state of Colorado and eleven counties of Wyoming.

American Chain names Utah outlet

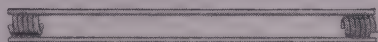
Paul D. Steele, district manager of American Chain & Co., Inc., Denver, Colo., announces appointment of Salt Lake Hardware Co., Salt Lake City, Utah, as master distributor on Acco-Kuplex sling chains. Salt Lake Hardware, with branches at Grand Junction, Colo., and Boise, Idaho, covers the entire state of Utah, all of Idaho, western Colorado and eastern Nevada, and is qualified to take care of any sling chain needs and give prompt service, warehousing complete stocks at Salt Lake City.

SUPERIOR

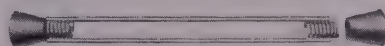
All the Accessories For
Dependable Concrete Forming!



TILT LOCK CLAMPS



STANDARD COIL TIES



CONE-FAST COIL TIES



COIL LOOPS



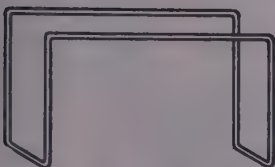
SNAP TIES



ROD CLAMPS



PANEL LOCK BOLTS

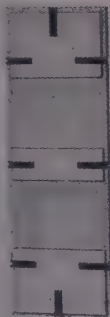


WIRE BEAM SADDLES

ALL-PLY PANEL FORMS

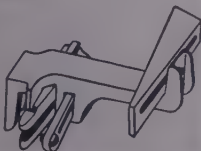
**SIMPLICITY — Only
One Working Part**

The Superior ALL-PLY is an entirely new principle in panel form design. Here for the first time is a form panel without a metal or wooden frame, yet providing great strength and rigidity. The simplicity of this system, employing only one working part, assures lowest labor costs in erecting and stripping. For complete details write for 12-page catalog.

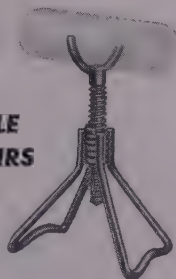


COMBINATION CLAMP

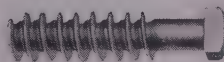
is the only working part. **ALIGNS** and **LOCKS** form, **RECEIVES** tie rod, and **HOLDS** liner. Only tool needed is a hammer.



ADJUSTABLE SCREED CHAIRS



SCREW ANCHORS AND BOLTS



**"PICK-UP" INSERTS
FOR TILT-UP SLABS**

Shown here are some of the many types of Form Ties, Anchors, and other concrete accessories which SUPERIOR'S years of engineering and field experience plus manufacturing dependability have developed and produced.

Every item in the SUPERIOR line is specifically designed to provide the most dependable and efficient forming method for ordinary foundations, engineering structures, watertight walls and architectural concrete.

When you plan form work, SUPERIOR'S experienced engineers are available to prepare suggested layouts of form work as well as complete estimates and quotations.

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of our
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Telephone LOckhaven 2-2830

Main Office and Factory

9301 King St., Franklin Park, Ill.
(A Suburb of Chicago)
Telephone NATIONAL 5-6565

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



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

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

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

Cleveland's exclusive multi-speed transmission has no equal

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

THE CLEVELAND TRENCHER CO.

20100 ST. CLAIR AVENUE • CLEVELAND 17, OHIO



MANUFACTURERS

Master appoints sales manager

Charles Raper, executive with Master Vibrator Co., Dayton, Ohio, for three years, has been appointed sales manager, in direct charge of sales for all Master products. Previously he was in charge of Master branch sales. Charles Roudane, a regional manager, has been made assistant sales manager.

New sales manager appointed

James B. Stokes has been made sales manager for Mobile Drilling, Inc., equipment manufacturer of Indianapolis, Ind. He will be responsible for sales policy, promotion, and training. His



James B.
Stokes

immediate objective is the expansion of Mobile's dealer-distributor network. Prior to joining Mobile Drill in 1954, Stokes was with The Heil Co.

Promotions at CB&I

Fred L. Goldsby, vice president and formerly general sales manager, has been appointed assistant to the president, Chicago Bridge & Iron Co., Chicago, Ill., and S. C. Hamilton has been named to Goldsby's former position. K. W. Lange, in CB&I's San Francisco sales office since 1947, has been appointed district sales manager at Houston, Tex.

Goodyear offers new additive line

Patents and trade-marks for a rubber-mineral powder, widely used for highway and industrial purposes and sold under the name of "Rubarite," have been acquired by the Goodyear Tire & Rubber Co., Akron, Ohio. For production and merchandising purposes, Goodyear has established a Rubarite Manufacturing and Sales Department.

A new line of products will be offered for use as additives in improving the qualities of asphalt and tar for road building and other applications. The new products will be manufactured under the administration of the Research Division and the direction of H. A. Endres. Col. Walter F. Winters, formerly chief engineer of Rubarite, has been retained as consulting engineer and will be concerned chiefly with promotion of Rubarite products in bituminous road construction. Before he joined Rubarite, Winters was chief engineer of The Asphalt Institute.



FOLLOW THE LEADER...TO BETTER SERVICE ON STRUCTURALS!

What puts a supplier of structural shapes up front in his field? In Kaiser Steel's case the answer is dependable service. Our nearby location assures on-time delivery—and on-the-spot attention from our full staff of technical men, production men and sales personnel. Add to this the most complete line of structural shapes produced on the Coast *plus* Kaiser Steel's mine-to-market quality control—and you have some of the reasons so many builders in the growing West have learned to rely on Kaiser Steel.



Kaiser Steel

built to serve the growing West

For specifications WRITE KAISER STEEL CORPORATION • Los Angeles • Oakland • Seattle • Portland • Phoenix • Denver • Tulsa • New York

PORTA HOUSE



YOU CAN TAKE IT WITH YOU!

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

Quickly assembled and disassembled by unskilled labor. 9' x 6' — 9' x 12' — 9' x 15' — almost any size — even to 12' x 60' or larger.

Light, watertight, strong.
Mass produced cheaper than you can build it!
Rental arrangements if you wish.
Write or phone collect.



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RIDGELY K. DODGE
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Olympic 2-7237

Available immediately — but if you don't need a Porta House now, plan to include one in your next job.



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



The ROLATAPE measuring wheel measures and records total as it is rolled along—just the thing for estimating, layout, and other measuring needs. Its fast one-man operation saves time and money

... and accuracy is assured by its scientifically - calibrated counting mechanism. Rugged, yet lightweight, Rolatape comes in three convenient models.

See your dealer or write today for complete information.

1741 Fourteenth Street *Rolatape Inc.* Santa Monica, Calif.

Hough appoints new chief engineer

R. L. Beyerstedt, executive vice president, engineering, of The Frank G. Hough Co., Libertyville, Ill., announces

Jules C. Laegeler



the appointment of Jules C. Laegeler as chief engineer. Laegeler has been manager of the product improvement department. He came to the company in 1951 as an experimental engineer.

Administrative offices to move

The new administrative offices of American Pipe & Construction Co. located on Atlantic Boulevard in Monterey Park, Calif., will be ready for occupancy in December. A leading manufacturer of steel-reinforced concrete pipe for main water supply lines, storm and sanitary sewers, and subaqueous pipelines, American Pipe this year is celebrating its fiftieth anniversary. The company operates several divisional plants in the West, and for many years has had its administrative offices adjacent to its Southern California Division plant in South Gate.

New sales manager of Peerless Pumps

Announcement is made of the appointment of Everett W. Lundy to general sales manager Peerless Pump Division, Food Machinery & Chemical

Everett W. Lundy



Corp., Los Angeles and Indianapolis, Ind. Lundy, previously assistant sales manager for the pump firm, succeeds B. A. Tucker, retired.

A-C promotes Ed Harrison in Northwest

Announcement comes from A. D. Richardson, manager, Allis-Chalmers Manufacturing Co. at Portland, Ore., of the promotion of Edward S. Harrison from construction machinery salesman to assistant construction machinery sales manager at the Portland branch.

Low Cost Loading

**WITH NO SACRIFICE OF
STRENGTH OR CAPACITY**

KOLMAN MODEL 202 CONVEYOR

40' x 24" belt Model 202 conveyor with 6' x 36" Kolman screen.

Rugged Box-Type Construction Permits Amazing Low Price

Here's the answer to low cost materials handling. Prices of the new KOLMAN Model 202 conveyor are so low you'll be amazed—yet the design and operating features are the very finest.

The Model 202 meets the demand for a conveyor in the low price field stout enough to carry a large single or double-deck vibrating screen and loading trap in a completely portable conveyor-screen plant.

"Box-Type" Construction

The rugged "box-type" construction of the Model 202 conveyor gives it unusual strength and rigidity. The sides are fabricated of 3/16" steel plate formed into a channel 16" deep with 2" legs. The steel belt cover reaches completely across the top, completing the box and completely encasing the return belt to prevent materials from working in to cause belt damage.

The under-slung power unit provides easy access for servicing and operation from the

ground. This is an ideal feature for the operator who has to stop and start his plant frequently. The V-belt drive assembly assures positive and efficient transmission of power and the motor mount design provides for quick and easy adjustments to maintain proper belt tension through a turn-buckle arrangement.

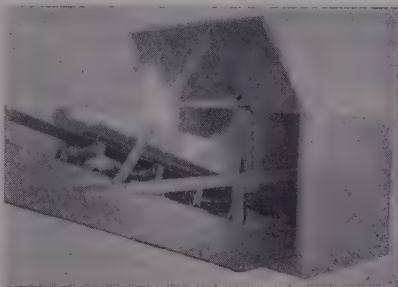
Folding Feature

The 202 is available with the Head Pulley Clutch feature which allows the belt to be stopped and started while the vibrating screen remains in operation. Plants with single-deck screens attached also have the folding feature, which permits the screens to be folded back under the conveyor when towing without removing any of the mounting or drive assemblies.

The KOLMAN Model 202 is rugged enough to carry a loading trap and large vibrating screen without additional support. It will take the kind of punishment that is dished out to a portable outfit—and will cost you far less money to own and operate. Available in 18" or 24" belt widths, in lengths up to 50'. Write for a quotation on sizes you could use.



Rugged construction of Model 202 permits use of double-deck KOLMAN screens to make several sizes of material at once.



Portable feeder-trap combination available as integral part of conveyor. Gives positive constant flow of material.

SEE YOUR NEAREST DEALER NOW

ARIZONA
PHOENIX—Equipment Sales Co., 720 S. 19th Ave.
CALIFORNIA
FRESNO—Allied Equipment Co., 1824 Santa Clara
LOS ANGELES—Brown-Bevis Industrial Equip. Co.,
6550 E. Washington
OAKLAND—Spears-Wells Machinery Co.
COLORADO
DENVER—Faris-Moritz Equipment Co.
IDAHO
BOISE—The Sawtooth Company, 1115 Grove St.
MONTANA
BUTTE, BILLINGS, GREAT FALLS and MISSOULA—
Hall-Perry Machinery Co.
NEW MEXICO
ALBUQUERQUE and FARMINGTON—J. D. Coggins
Company

NEVADA
ELKO—A-D Machinery Co., 251 W. Commercial St.
OREGON
PORTLAND—Contractors Equipment Corporation
UTAH
SALT LAKE—Rasmussen Equipment & Supply Co.
WASHINGTON
SEATTLE—Air-Mac, Inc., 3838 4th Ave. South
WYOMING
CHEYENNE, CASPER, ROCK SPRINGS and SHERIDAN
—Wortham Machinery Co.
ALASKA
FAIRBANKS, ANCHORAGE—The Carrington Co.

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SEND for FREE literature

KOLMAN Manufacturing Co.

4300 West 12th St., Sioux Falls, S. D.

Please send free literature on

- ☐ Model 101 Heavy Duty Conveyor
☐ Model 202 Junior Conveyor
☐ Vibrating Screens ☐ Feeders
☐ Traps

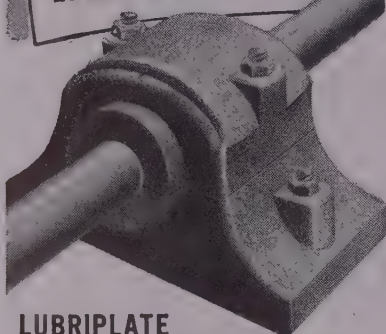
Quote.....size or.....capacity

Name.....

Address.....

City.....

LUBRICANTS ESPECIALLY GOOD FOR HEAVY LOADS



LUBRIPLATE

Nos. 130-AA, 630-AA and 930-AA

are grease type lubricants especially formulated for use in bearings and on other machine parts subject to heavy loads. Have extremely high film strength, marked adhesiveness and water repellence.

LUBRIPLATE

Nos. 4 and 8

are most satisfactory fluid type lubricants over a wide range of temperatures. Due to their high film strength, they are ideal for use where heavy loads are encountered.

**REGARDLESS OF THE
SIZE AND TYPE OF
YOUR MACHINERY,
LUBRIPLATE
LUBRICANTS WILL
IMPROVE ITS OPERA-
TION AND REDUCE
MAINTENANCE**



LUBRIPLATE DIVISION, Fiske Brothers Refining Co.
Newark 5, N. J. or Toledo 5, Ohio

DISTRIBUTED BY

L. A. Rubber & Asbestos Works, Los Angeles, Calif.;
Garlinghouse Brothers, Los Angeles, Calif.; Degen-
Fiege Co., Los Angeles, Calif.; Kenton Equipment Co.,
San Diego, Calif.; Miller & Stern Supply Co., San
Francisco, Calif.; Hendrie & Bolthoff Co., Denver,
Colo.; Sawtooth Company, Boise, Ida.; Paul Roberts
Co., Pocatello, Idaho; Moty & Van Dyke, Inc., Klamath
Falls, Ore.; Goodyear Rubber & Asbestos Co.,
Portland, Ore.; Industrial Supply Co., Billings Mont.;
Utah Bit & Steel Service Co., Midvale, Utah; West-
ern Sales Engineering Co., Salt Lake City, Utah;
Campbell Industrial Supply Co., Seattle, Wash.; Not-
Atwater Company, Spokane, Wash.; Campbell Industrial
Supply Co., Tacoma, Wash.; Dodge-Yakima Supply
Co., Yakima, Wash.; Yukon Equipment Co., Seattle,
Wash.; Fleck Brothers Ltd., Vancouver, B. C., Canada;
Flury Supply, Roseburg, Oregon; George Myrmo & Sons,
Eugene, Oregon; Wilkinson & McClean, Ltd., Calgary,
Alberta, Can.

LUBRIPLATE
THE MODERN LUBRICANT



THE PRIME-MOVER CO., manufacturer of construction materials handling equipment, is now occupying this steel and masonry building one mile east of Muscatine, Iowa, on Highway 61. The new structure provides 40,000 sq. ft. of manufacturing area and 3,000 sq. ft. of office space. The company manufactures both walking and riding types of powered buggies and a powered fork lift for handling packaged masonry materials.

Flynn appoints Western sales manager

Coinciding with the company's westward expansion, Charles R. Malmister has been appointed Western divisional sales manager of The Michael Flynn Manufacturing Co.'s extrusion division, according to announcement by Keith Dodge, general sales manager of the division. Malmister comes to Flynn from B & T Metals. Dodge also announced the appointment of Wesley B. Evens as product manager of bridge railings. He has been a member of the Flynn organization for the past three years.

New Noble office; personnel changes

In order to further extend its services to both customers and distributors, the Noble Company, Oakland, Calif., manufacturer of mobile and stationary cement-aggregate batching plants and related equipment, announces the opening of a new branch office at 2512 West Mockingbird Lane, Dallas, Tex. Robert L. Baxter, formerly of the Los Angeles office will be in charge. Administrative changes at the Noble Company include: appointment of Robert C. Clark, former regional manager at Cleveland, to the post of sales promotion manager at Oakland, Calif.; Arthur B. Kinley from Pacific Northwest regional manager to regional manager at Cleveland; and Frank Quinn as Pacific Northwest regional manager at Seattle, Wash.



Foster's Rental Service provides the steel-sheet piling you need—when you need it for your job. Depend on immediate shipments of the exact sections and exact lengths from Foster's nationwide warehouse and field stocks. Foster's Rental Plan gives you low fixed expense, provides an extra advantage in bidding. Write for catalogs.

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LB FOSTER Co.
3460 Wilshire Blvd., Los Angeles 5, Cal.
PITTSBURGH • NEW YORK • ATLANTA
CHICAGO • HOUSTON • LOS ANGELES

Caterpillar appoints man in Southwest

Joseph M. Johnson has been appointed earthmoving representative for Caterpillar Tractor Co. in its Southwest sales division. He has established a residence at 1922 Martha Lane, Santa Ana, Calif., and will serve as a consultant on earthmoving projects in Nevada, Utah, Arizona, California, and in Hawaii.

Executive appointments

James Mullaney, president of Universal Marion Corp., announces the promotion of Adrien F. Busick, Jr., vice president—engineering, to the position of executive vice president and general manager of Marion Power Shovel Co., Marion, Ohio. Busick will have complete charge of all functions and operations of the plants at Marion. The appointment permits Milton T. Smith, president of the division, to devote his time to furtherance of customer relations and promotion of the company's products. A further announcement was made of the retirement of David E. Risor, vice president, large machine sales, and the appointment of Maurice V. Cornell to succeed him.

(Continued on page 166)



NEW TL-20D TRACTO-LOADER®

2-cu yd • 4-wheel drive
100 hp — 22,100 lb —
diesel

Exclusive *single lever* control of full power-shift transmission. You go into and out of any gear — forward or reverse — while moving, by shifting only *one lever*.



RUGGED TL-12 TRACTO-LOADER®

1½-cu yd • 4-wheel drive
63 hp — 12,100 lb — gasoline
77 hp — 12,300 lb — diesel

Simple, Clutch-Type Transmission — you push a lever to go forward, pull it for reverse.

YOU CAN'T GO WRONG with the RIGHT LOADER — BACKED BY A GOOD DEALER

Choose the loader to fit your job from TRACTOMOTIVE'S complete line . . . sold and serviced exclusively throughout the world by Allis-Chalmers construction machinery dealers.

FIVE MODELS

4-wheel drive and
2-wheel drive
½ to 2-cu yd
gasoline and diesel

LOAD FAST—WORK FAST—EARN MORE with Tip-Back Bucket • Smooth, Hydraulic Torque Converter Drive • Timesaving Lift • Power Steering • Extra-Long Reach • Strong Construction Unit Assembly for easy servicing • Famous Allis-Chalmers engines . . . many other advantages.



ALL-AROUND TL-10 TRACTO-LOADER®

1-cu yd • 2-wheel drive
63 hp — 11,900 lb — gasoline
Clutch-Type Transmission.
An ideal inside and outside machine.

For Confined Areas—

TL-6 TRACTO-LOADER®

½-cu yd • 2-wheel drive
33.7 hp — 6,100 lb — gasoline
38 hp — 6,500 lb — diesel
Clutch-Type Transmission.
Short turning radius —
easily gets around in close
quarters.

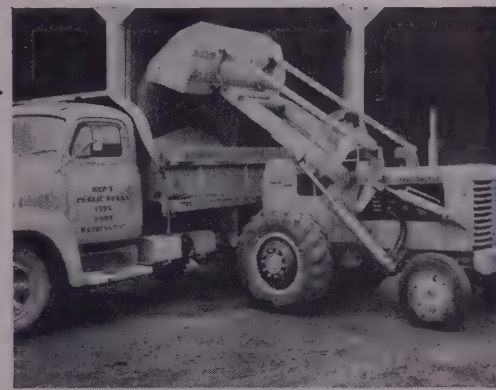


HEAVY-DUTY

TL-11 TRACTO-LOADER®

1½-cu yd • 2-wheel drive
63 hp — 11,300 lb — gasoline
77 hp — 11,500 lb — diesel

Clutch-Type Transmission.
4-wheel drive ruggedness with 2-wheel drive maneuverability.



TRACTO — a sure sign of modern design

SOLD AND SERVICED BY YOUR ALLIS-CHALMERS CONSTRUCTION MACHINERY DEALER

ARIZONA

Nell B. McGinnis Equipment Company—Phoenix

NORTHERN CALIFORNIA

Industrial Tractor Sales—North Sacramento
Shasta Truck & Equipment Sales—Redding
Alkins Tractor Co.—Eureka, Ukiah and Willits
West Coast Engine & Equipment Company—Berkeley

SOUTHERN CALIFORNIA

Construction Machinery Company—San Diego
San Joaquin Tractor Co.—Bakersfield
Shaw Sales & Service Co.—Los Angeles and San Diego

IDAHO

Southern Idaho Equipment Co.—
Idaho Falls and Twin Falls
Southern Idaho Equipment Co. of Boise, Inc.—Boise

MONTANA

Mountain Tractor Company—Missoula and Kalispell
Richland Machinery Company—Sidney
Seitz Machinery Company, Inc.—
Billings and Great Falls

NEVADA

A D Machinery Company, Inc.—Elko and Las Vegas
Reno Equipment Sales Co.—Reno

OREGON

Haupt Tractor Company—
Medford and Klamath Falls
Wood Tractor Company—Portland
Timber Tractor Company—Springfield

UTAH

Cate Equipment Company—Salt Lake City

WASHINGTON

Pacific Hoist & Derrick Company—Seattle
American Machine Company—Spokane

WYOMING

Studer Tractor & Equipment Company—Casper

UNIT PRICES

Selected abstracts for Western projects

HIGHWAY—Grading and plant-mixed surfacing in California

California—Shasta County—State. A low bid of \$224,771 was submitted by B. C. Richter Contracting Co. for about 0.8 mi. of highway to be graded and surfaced with plant-mixed surfacing on untreated base, and a welded steel plate girder and reinforced concrete deck bridge to be constructed.

(1) B. C. Richter Contracting Co.	\$224,771
(2) J. H. Tisdale, Inc.	242,222
Johnson, Drake & Piper, Inc.	242,630
Thomas Construction Co.	248,521

	(1)	(2)
Lump sum	Clearing & grubbing.....	\$14,800.00
Lump sum	Dev. wat. sup. & furn. wat. equip.....	3,160.00
2,240 M gal.	Apply. water.....	1.00
59,000 cu. yd.	Roadway excavation.....	4.95
130 cu. yd.	Struct. excav., Type "A".....	18.00
970 cu. yd.	Struct. excavation.....	3.00
500 cu. yd.	Struct. backfill.....	3.50
3,400 cu. yd.	Ditch & channel excav.....	1.45
8,200 ton	Untreated base.....	2.52
12 ton	Liq. asph. SC-2 (pr. ct.).....	60.00
80 ton	Paving asph. (P.M.S.).....	6.27
1,600 ton	Mineral aggr. (P.M.S.).....	6.27
2,000 lin. ft.	Placing P.M.S. dikes.....	.35
100 sq. yd.	Placing P.M.S. ditches.....	2.00
70 cu. yd.	Class "A" conc. (footing block).....	45.00
10 cu. yd.	Class "A" conc. (struct.).....	100.00
Cont. sum	Class "A" conc. (bridge) (560 cu. yd.).....	41,960.00
1,000 lb.	Bar reinforcing steel.....	.16
250 sq. yd.	Bar reinf. steel (bridge) (90,000 lb.).....	12,200.00
Cont. sum	Mesh reinforcement.....	1.00
Lump sum	Struct. steel (150,000 lb.).....	35,000.00
45 ea.	Clean & paint. struct. steel.....	2,900.00
300 cu. yd.	Right-of-way monuments.....	8.00
28 cu. yd.	Sacked concrete riprap.....	40.00
515 lin. ft.	Class "B" conc. (ditch lining).....	40.00
100 lin. ft.	Metal beam bridge rail.....	7.50
40 ea.	Metal beam guard rail.....	5.88
7,920 lin. ft.	Guide posts & culv. markers.....	8.00
13 ea.	New prop. fence.....	.64
1 ea.	14 ft. prop. fence gates.....	60.00
1 ea.	16 ft. prop. fence gates.....	60.00
60 lin. ft.	Prop. fence walk gate.....	40.00
212 lin. ft.	6 in. C.M.P. (16 ga.).....	2.50
294 lin. ft.	12 in. C.M.P. (16 ga.).....	3.70
46 lin. ft.	18 in. C.M.P. (16 ga.).....	4.75
42 lin. ft.	42 in. C.M.P. (12 ga.).....	14.50
42 lin. ft.	22 in. x 13 in. C.M.P. arch (16 ga.).....	4.76
62 lin. ft.	25 in. x 16 in. C.M.P. arch (14 ga.).....	6.20
80 lin. ft.	29 in. x 18 in. C.M.P. arch (14 ga.).....	7.00
88 lin. ft.	18 in. corr. met. siphon, asph. ctd. & clo. riv. (16 ga.).....	7.00
3 ea.	Flared end sections for 18 in. metal pipe.....	28.58
2 ea.	Flared end sections for 25 in. x 16 in. metal pipe arch.....	30.36
520 lin. ft.	8 in. P.M.P. underdrains.....	2.30
70 cu. yd.	Filter material.....	7.00
3 ea.	Spillway assemblies.....	48.00
160 lin. ft.	8 in. C.M.P. downdrains.....	2.75
3 ea.	Downdrain slip joints.....	27.64
70 cu. yd.	8 in. downdrain pipe anchors, Type "B".....	28.00
1 ea.	24 in. x 18 in. entrance taper.....	83.68
302 lin. ft.	4 in. galv. steel pipe.....	3.50

HIGHWAY—Grading and draining in California

California—El Dorado County—State. A \$243,659 contract was awarded H. Earl Parker, Inc., for 2.4 mi. of grading and construction of drainage facilities near Coloma.

(1) H. Earl Parker, Inc.	\$243,659
(2) Los Gatos Construction Co.	248,955
Lee Steffens	254,301
McCammon-Wunderlich Co. & Wunderlich Construction Co.	257,734

	(1)	(2)
Lump sum	Clearing & grubbing.....	\$25,000.00
Lump sum	Dev. wat. sup. & fur. wat. equip.....	6,000.00
7,000 M gal.	Applying water.....	1.00
223,000 cu. yd.	Roadway excavation.....	.75
980 cu. yd.	Structure excavation.....	3.50
700 cu. yd.	Structure backfill.....	4.00
260 cu. yd.	Ditch and channel excavation.....	1.70

1,277,000 sta. yd.	Overhaul.....	.01
176 lin. ft.	12 in. C.M.P. (16 gal.).....	3.20
714 lin. ft.	18 in. C.M.P. (16 gal.).....	4.30
986 lin. ft.	24 in. C.M.P. (14 gal.).....	6.90
310 lin. ft.	30 in. C.M.P. (14 gal.).....	8.00
232 lin. ft.	36 in. C.M.P. (12 gal.).....	13.10
52 lin. ft.	36 in. x 22 in. C.M.P. arch (12 gal.).....	11.70
5 ea.	Flared end sect. for 18 in. met. pipe.....	37.00
7 ea.	Flared end sect. for 24 in. met. pipe.....	53.00
2 ea.	Flared end sect. for 30 in. met. pipe.....	77.00
2 ea.	Flared end sect. for 36 in. met. pipe.....	124.00
1 ea.	Flared end sect. for 36 in. x 22 in. met. pipe arch.....	65.00
Lump sum	Finishing roadway.....	1,380.00

HIGHWAY—Surfacing and seal coatings in Idaho

Idaho—Butte and Bingham Counties—State. A \$112,216 contract was awarded Holmes Construction Co. for reconditioning shoulders and seal coating 11 mi. of U.S. Highways 20 and 26, constructing a roadmix bituminous surface on 4 mi. and seal coating 33 mi. of U.S. Highway 26.

(1) Holmes Construction Co.	\$112,216
(2) Carl E. Nelson Construction Co.	119,581
Mountain States Construction Co.	120,048
Fife Construction Co.	120,307

	(1)	(2)
240 M gal.	Watering base and surf. courses.....	\$ 1.50
65 hr.	Rolling, power roller.....	6.00
50,800 gal.	MC-1 asph. rd. mat. for prime.....	17.00
4,952 mi.	Mix. finish. & roll. Class "A".....	1,000.00
310 ton	MC-3 asph. rd. mat. for roadmix.....	35.50
249,000 gal.	RC-5 asph. rd. mat. for seal.....	17.00
3,100 ton	Cov. ct. mat. Class 3.....	2.95
9,350 ton	Cov. ct. mat. Class 3.....	3.30
11,172 mi.	Recond. exist. shoulders.....	100.00
4,952 mi.	Tear up exist. bit. surf. & recond. exist. rdbed.....	500.00
3,800 ton	Rejects in stockpile.....	5.00

HIGHWAY—Paving and grading and construction of bridges and pumping plants in California

California—Los Gatos and San Jose—State. A \$5,419,268 contract was awarded to Gordon H. Ball, Gordon H. Ball, Inc., Ball & Simpson, Lew Jones Construction Co. for grading and paving 8.8 mi. of highway and constructing 15 bridges and 3 pumping plants.

(1) Gordon H. Ball	
Gordon H. Ball, Inc.	
Ball & Simpson	
Lew Jones Construction Co.	\$5,419,268
(2) Fredericksen & Kasler	5,444,554
(3) Peter Kiewit Sons' Co.	5,560,010
(4) Granite Construction Co. & Madonna Construction Co.	5,597,697

	(1)	(2)
560 sq. yd.	Remov. temp. base & surfacing.....	\$.20
100 lin. ft.	Removing raised traffic bars.....	.30
5,000 lin. ft.	Removing traffic stripes.....	.15
875 cu. yd.	Removing concrete.....	4.00
1,175 sq. yd.	Removing concrete pavement.....	.70
Lump sum	Clearing and grubbing.....	244,000.00
Lump sum	Dev. wat. sup. & fur. wat. equip.....	41,000.00
43,000 M gal.	Applying water.....	1.50
385,000 sq. yd.	Compacting original ground.....	.05
1,212,000 cu. yd.	Roadway excavation.....	.40
29,660 cu. yd.	Structure excavation.....	4.50
19,545 cu. yd.	Structure backfill.....	3.25
325 cu. yd.	Structure excavation, Type A.....	8.00
2,930 cu. yd.	Ditch and channel excavation.....	1.00
56,000,000 sta. yd.	Overhaul.....	.003
65,500 ton	Imported borrow.....	.50
316,100 ton	Process. selected material.....	.75
Lump sum	Erosion control.....	700.00
10,500 ton	Untreated base.....	3.00

(Continued on page 164)

TORQMATIC brings back steam-engine reversing to road rollers



YOUR roller operator doesn't have to be a gearbox magician to reverse without harmful dwell, spin or stall. With a TORQMATIC DRIVE Converter he focuses his attention on lining up the next pass instead of manipulating levers.

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Indianapolis 6, Indiana.

NO. 6 IN A SERIES
ON SPEEDING AMERICA'S
ROAD-BUILDING PROGRAM



Allison

TORQMATIC DRIVES

(Continued from page 162)

225,000 sq. yd.	Mix., spread, & compact. cem. tr. subgrade.	.25	.25
252,000 sq. yd.	Mix., spread & compact. C.T.B.	.30	.25
19,500 bbl.	Portland cement.	4.30	4.00
202 ton	Asph. emul. (cur. sl., pt. bdr. & seal coat).	55.00	50.00
227 ton	Liq. asph., MC-2 (curing seal).	55.00	45.00
202 ton	Liq. asph., SC-1 (pen. tr. & pr. ct.).	50.00	40.00
2,210 ton	Paving asphalt (P.M.S.).	6.25	5.00
44,100 ton	Mineral aggregate (P.M.S.).	6.25	5.00
1,375 cu. d.	Placing P.M.S. ditch lining & apron paving.	.50	1.00
30,000 lin. ft.	Placing P.M.S. dikes.	.20	.20
202 ton	Screenings (seal coat).	6.00	7.00
50,000 cu. yd.	Class "B" concrete (pavement).	15.00	15.00
34,500 ea.	Pavement tie assemblies.	.55	.50
397 cu. yd.	Class "A" concrete (structures).	55.00	55.00
165 cu. yd.	Class "A" conc. (footing blocks).	40.00	30.00
Cont. sum	Class "A" conc. (bridges) (2,875 cu. yd.).	779,319.00	770,000.00
119 cu. yd.	Class "B" conc. (pipe encasement).	22.00	25.00
225 lin. ft.	Rubber waterstops.	2.00	2.00
112 ea.	Type A ₁ inlets.	220.00	200.00
12 ea.	Type B ₁ inlets.	240.00	200.00
11 ea.	Type C ₁ inlets.	265.00	200.00
27 ea.	Type D ₁ inlets.	265.00	200.00
40 ea.	Type H ₁ inlets.	240.00	200.00
20 ea.	Type J ₁ inlets.	190.00	200.00
3 ea.	Type M inlets.	160.00	100.00
290 lin. ft.	Inlet barrels.	40.00	35.00
63,500 lb.	Bar reinforcing steel.	.14	.12
Cont. sum	Bar reinf. stl. (bridges) (2,464,000 lbs.).	342,495.00	300,000.00
275 sq. yd.	3-ly membrane waterproofing.	4.00	4.00
270 sq. yd.	Protective covering.	2.00	2.00
17,465 lin. ft.	Furnishing concrete piling.	3.25	3.50
612 ea.	Driving concrete piles.	92.00	100.00
Cont. sum	Structural steel (796,000 lbs.).	76,256.00	160,000.00
74,980 lb.	Miscellaneous iron and steel.	.30	.30
Lump sum	Pumping plant metal work.	3,300.00	4,000.00
Lump sum	Cleaning & painting struct. steel.	11,000.00	10,000.00
1.5 M. fbm.	Douglas fir timber.	400.00	1,000.00
5,375 cu. yd.	Class "B" conc. (curbs & gutters).	34.75	35.00
1,025 cu. yd.	Class "B" concrete (sidewalks).	34.00	30.00
450 ea.	Curb dowels.	1.00	1.00
26 ea.	Right-of-way monuments.	9.00	8.00
57 ea.	Survey monuments.	11.50	20.00
4,400 cu. yd.	Sacked concrete riprap.	34.00	30.00
19,500 lin. ft.	Metal plate guard railing.	3.50	4.00
460 lin. ft.	Remov. & reconst. guard railing.	1.30	1.70
6,246 lin. ft.	Steel railing.	8.00	8.00
374 lin. ft.	Salvag. & resetting steel railing.	2.25	5.50
1,230 ea.	Markers, horizontal refl. units and guide posts.	5.95	7.00
25 ea.	Remov. & resett. guide posts & markers.	2.25	2.50
12,400 lin. ft.	New property fence.	.40	.50
73,500 lin. ft.	72 in. chain l k fence.	1.50	1.60
18 ea.	6 ft. chain link gates.	70.00	60.00
445 lin. ft.	Reconstructing property fence.	.25	.25
1,720 lin. ft.	Remov. & reconstr. ch. link fence.	.95	1.00
3,444 lin. ft.	12 in. R.C.P.	2.20	2.40
64 lin. ft.	15 in. R.C.P.	2.60	3.50
8,492 lin. ft.	18 in. R.C.P.	3.30	4.00
4,136 lin. ft.	24 in. R.C.P.	5.00	5.80
1,148 lin. ft.	27 in. R.C.P.	6.50	6.50
3,692 lin. ft.	30 in. R.C.P.	6.70	8.20
248 lin. ft.	48 in. R.C.P.	14.00	15.00
604 lin. ft.	54 in. R.C.P.	18.00	18.00
56 lin. ft.	12 in. C.M.P. (16 gage).	3.25	3.60
256 lin. ft.	18 in. C.M.P. (16 gage).	4.00	4.80
98 lin. ft.	24 in. C.M.P. (14 gage).	6.00	6.20
6 lin. ft.	48 in. C.M.P. (12 gage).	20.00	15.00
9,400 lin. ft.	27 in. casing pipe.	45.00	30.00
10,200 ton	Filter material.	3.00	3.00
34 lin. ft.	12 in. C.M.P. downdrains.	3.50	3.70
7 ea.	Entr. tapers for 12 in. met. pipe.	60.00	70.00
100 lin. ft.	Salvg. & relay. C.M.P. downdr.	2.00	1.50
5,750 lin. ft.	4 in. asbestos-cement pipe.	1.30	1.70
94 lin. ft.	6 in. asbestos-cement pipe.	2.70	3.00
472 lin. ft.	8 in. clay sewer pipe.	5.50	4.00
820 lin. ft.	12 in. clay sewer pipe.	4.00	6.00
856 lin. ft.	15 in. clay sewer pipe.	11.00	8.00
908 lin. ft.	18 in. clay sewer pipe.	14.00	12.00
468 lin. ft.	6 in. cast iron pipe.	6.50	6.00
95 lin. ft.	Type A manhole.	33.00	30.00
66 lin. ft.	Type B manhole.	40.00	3.50
1 ea.	Special brick manhole.	350.00	300.00
1 ea.	Fushing inlet.	27.00	50.00
31 ton	Sand backfill material.	3.80	4.00
6 ea.	Manhole frames & covers.	80.00	60.00
15 ea.	Salvg. & reinstal. manhole frames & covers.	33.00	40.00
12 ea.	Adjusting manholes to grade.	33.00	50.00
50 lin. ft.	4 in. welded steel pipe (14 gage).	1.90	2.00
54 lin. ft.	8 in. welded steel pipe (14 gage).	3.00	2.50
482 lin. ft.	10 in. welded steel pipe (7 gage).	11.00	5.00
190 lin. ft.	12 in. welded steel pipe (12 gage).	5.00	5.00
368 lin. ft.	16 in. welded steel pipe (7 gage).	11.50	7.00
1,010 lin. ft.	1 in. galvanized steel pipe.	4.10	3.50
1 ea.	30 in. automatic drainage gate.	200.00	200.00
1 ea.	30 in. slide gate.	160.00	400.00
1 ea.	48 in. slide gate.	450.00	450.00
1 ea.	6 in. gate valve.	150.00	100.00
2 ea.	Special standpipes.	400.00	250.00
Lump sum	Finishing roadway.	15,000.00	10,000.00
40 lin. ft.	Raised traffic bars.	2.50	2.50
Lump sum	Drainage pumping equipment.	10,000.00	6,000.00
Lump sum	Pump house electrical equipment.	3,300.00	3,000.00
1,150 lin. ft.	Underground conduit & conductors (service).	2.00	2.00
Lump sum	Structures for illuminated signs.	53,000.00	50,000.00
Lump sum	Electrical systems.	97,000.00	160,000.00

HIGHWAY—Grading and surfacing in Utah

Utah—Arches National Park, Grand County—Bureau of Public Roads.
A \$639,114 contract was awarded to the Strong Company for grading and surfacing 9.2 mi. of road.

(1) Strong Company.	\$639,114
(2) W. W. Clyde & Co.	720,954
Germer, Abbott and Waldron.	738,228
James Reed, Contractor.	788,436

	(1)	(2)
Cont. sum	Miscellaneous force account work.	\$5,000.00 \$5,000.00
185,000 cu. yd.	Unclassified excavation.	1.13 1.60
30,000 cu. yd.	Borrow excavation, Case 1.	.50 .40
19,000 lin. ft.	Furrow ditches.	.20 .15
510 cu. yd.	Excavation for structures.	5.00 3.00
350 cu. yd.	Excavation for structures (bridges).	8.00 4.00
141,000 sta. yd.	Overhaul.	.02 .00
850 yd. mi.	Overhaul.	.20 .25
76,500 yd. mi.	Overhaul of borrow, Case 1.	.20 .20
4,300 unit	Watering.	2.50 4.50
Lump sum	Prov. & maint. water plant or plants.	7,500.00 5,000.00
810 hr.	Rolling.	10.00 15.00
55,600 ton	Crushed aggregate base, grading E.	1.85 2.25
161,500 sq. yd.	Processing bituminous base.	.10 .10
219,200 gal.	Asph., gr. MC-0, MC-1, MC-2, or MC-3	.19 .195
370 gal.	Bitu. additive (concentrated grade).	5.00 4.20
705 cu. yd.	Class "A" concrete.	80.00 120.00
54 cu. yd.	Class "B" concrete.	80.00 100.00
116,000 lb.	Reinforcement steel.	.17 .16
432 lin. ft.	Steel bridge railing.	16.00 16.00
112 lin. ft.	6 in. corrugated galvanized metal pipe.	1.85 2.00
1,962 lin. ft.	18 in. corrugated galvanized metal pipe.	4.73 4.30
1,350 lin. ft.	24 in. corrugated galvanized metal pipe.	7.25 6.70
408 lin. ft.	36 in. corrugated galvanized metal pipe.	13.25 12.80
142 lin. ft.	48 in. corrugated galvanized metal pipe.	18.50 17.40
26 ea.	Metal end sections for 18 in. pipe culvert.	37.50 28.00
19 ea.	Metal end sections for 24 in. pipe culvert.	60.00 42.00
2 ea.	Metal end sections for 36 in. pipe culvert.	130.00 100.00
130 cu. yd.	Hand-laid rock embankment.	16.00 25.00
140 cu. yd.	Derrick placed rock.	16.00 20.00
1 ea.	Inlets (18 in. pipe).	375.00 150.00
2 ea.	Inlets (24 in. pipe).	400.00 200.00
3 pair	Metal frames and gratings.	160.00 150.00
3 ea.	Spillway inlet assemblies.	65.00 105.00
1,960 lin. ft.	Concrete curb and gutter, 6 in. depth.	3.75 3.50
905 lin. ft.	Bituminous curb.	1.50 1.50
180 sq. yd.	Concrete sidewalk.	8.00 4.00
135 sq. yd.	Bituminous sidewalk.	7.00 2.50
114 ea.	Guide posts (treated).	12.00 10.00

HIGHWAY—Grading and paving bridge structure in New Mexico

New Mexico—McKinley County—State. A \$156,055 contract was awarded Haake Construction Co., Inc., for 9.538 mi. of grading and paving and construction of one bridge on the Zuni-Ramah Road.

(1) Haake Construction Co.	\$156,055
(2) C. R. Davis Construction Co.	178,777
W. A. Hamilton Jr. Construction Co.	181,044
Henry Thygesen & Co.	181,481

	(1)	(2)
Lump sum	Removal of old structures.	\$2,500.00 \$3,500.00
8,500 cu. yd.	Excavation—unclassified.	.40 .47
697 cu. yd.	Excavation for pipe culverts.	3.00 1.50
1,820 M gal.	Watering.	.50 .50
65 hr.	Rolling (tamping roller).	9.00 13.50
325 hr.	Rolling (pneumatic tired).	5.00 5.00
115 hr.	Rolling (steel tired).	6.00 8.00
290 hr.	Fifty (50) ton roller operation.	8.00 13.50
341,355 ton mi.	Mechanical tamping.	5.00 5.00
5.09 mi.	Ton mile haul.	.05 .035
4,401 mi.	Grading.	2,800.00 3,500.00
21,100 lin. ft.	Blading and reshaping.	300.00 150.00
9 ea.	Galvanized barbed wire fence.	.19 .20
80 ea.	Gates—Texas type.	5.00 10.00
54 ea.	Bracing.	8.00 14.00
85 ea.	Right-of-way markers.	7.00 8.00
14,815 ton	Trtd. tmbr. warn. posts, refl. (6 in. dia.)	8.00 6.00
11,170 ton	Controlled gradation subbase.	.80 1.25
1,285 bbl.	Base course.	1.00 1.46
960 bbl.	Bituminous material, Type MC-1.	7.50 78.00
1,680 ton	Bituminous material, Type 120-150.	8.00 8.00
674 lin. ft.	Cover material.	4.50 5.00
1,298 lin. ft.	Corr. metal culv. pipe—24 in. diam.	5.50 6.50
52 lin. ft.	Corr. metal culv. pipe—30 in. diam.	6.75 8.00
330 lin. ft.	Corr. metal culv. pipe—36 in. diam.	12.00 12.00
320 lin. ft.	Corr. metal culv. pipe—60 in. diam.	25.00 26.00
24 cu. yd.	Excavation for structures (bridges).	8.00 4.00
217 cu. yd.	Wire enclosed riprap.	8.00 12.00
3,829 lb.	Wire fabric for riprap.	.30 .40
175 lin. ft.	Steel stakes for riprap.	2.00 .75
88.40 cu. yd.	Concrete for precast bridge units.	90.00 100.00
35.08 cu. yd.	Class "A" concrete bridge substructure.	85.00 78.00
32,564 lb.	Reinforcement for concrete structures.	.15 .17
13,720 lb.	Structural steel.	.40 .35
697 lin. ft.	Structural steel piles in place.	9.50 9.50
90 lin. ft.	Drilling holes for bearing piles.	7.00 10.00

Small boat basin for Ketchikan Harbor

THE LARGEST small boat basin in Alaska will get under construction this summer. It is in the Ketchikan Harbor with moorage and protection for about 600 fishing boats and other small craft. A contract for \$1,356,700 has been awarded by the U. S. Army Engineer District, Alaska, to two firms as a joint venture: Denali Engineering Co. and McCray Marine Construction Co., Seattle, Wash. The job should be complete in about a year. There is 91,630 cu. yd. of common excavation required along with 20,600 cu. yd. of ledge rock. Required for the breakwater are 87,000 cu. yd. of sand and gravel and 82,000 cu. yd. from borrow. Other quantities include 61,000 cu. yd. of quarry run rock and 21,000 cu. yd. of armor rock. The low bidders have been notified to proceed on the contract.

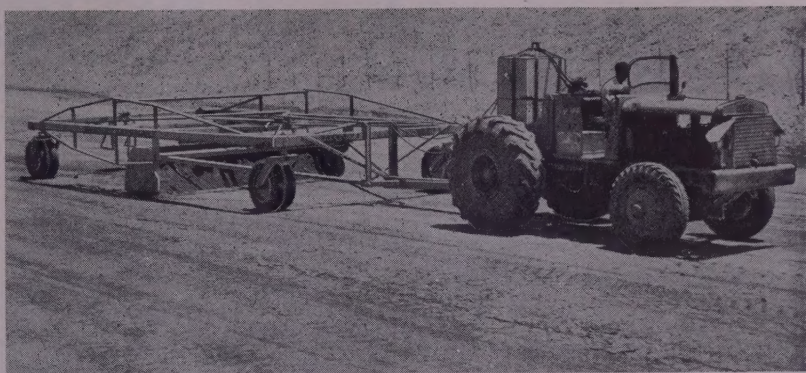
Vashon Island route for Puget Sound bridge

THE VASHON island route for the proposed bridging of Puget Sound has been selected by the Washington State Toll Bridge Authority. State Highway Engineer W. A. Bugge has been authorized to apply to the Army Corps of Engineers for a construction permit. The project could possibly be open for traffic in 1963. The cost would be somewhere in the neighborhood of \$100,000,000. A financial picture as a result of a study will be presented to the 1959 Legislature.

New Highway publication

THE WASHINGTON Highway Department has prepared a new book of standard specifications consisting of about 600 pages. It will supersede the 1948 edition and the supplemental specifications issued in 1953, and it will also embrace practically all of the so-called "boiler plate" which has encumbered the plans for several years.

About a year ago invitations were circulated to all district engineers asking for suggested changes in the new specifications. The result was about 700 separate sheets of suggested changes, many of which were eventually accepted. The new book is about 15% thicker than the previous edition. The first printed edition of standard specifications in Washington was made in 1923. Every following edition has been about 100 pages larger than the preceding one.



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Now road builders can cut haul road maintenance 50% or better by using Marvin LANDPLANE to keep it smooth and free of swells. Smooths a 15 ft. wide swath at a 5 to 15-mile-per-hour clip. Planes off swells and ridges; automatically fills in low spots.

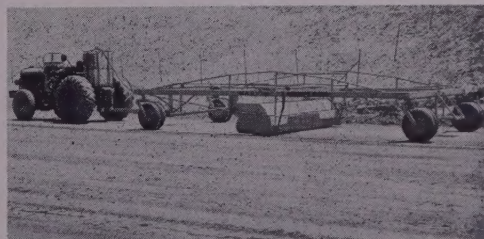
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REPLACES 2 ROAD GRADERS. Ferry and Crow set out to cut haul road maintenance. Here's how LANDPLANE delivered. "Does the work of two road graders . . . better and smoother," declares Jim Ferry. "Picks up the rocks in that big bucket, too!"

SCRAPES AND FILLS AUTOMATICALLY. "LANDPLANE doesn't leave wind rows, like road graders", says partner L. A. Crow. "It does an excellent job of keeping the haul road smooth and free of holes!"

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Bucket capacity: up to 9 yds.
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Available: 8 x 30 ft. to 15 x 80 ft.

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FLOOD SAFETY
LABOR REDUCTION

AMBURSEN DAM CO. INC.
295 MADISON AVE. NEW YORK

(Continued from page 160)

Martin-Decker appoints sales manager

E. L. Decker, president of Martin-Decker Corp., Long Beach, Calif., announces the appointment of Jack W. Knowlton as sales manager of the company's Oiltool Division. Prior to his association with Martin-Decker, early in 1956, Knowlton spent more than three years with Humble Oil & Refining Co., and one and a half years with Richfield Oil Co. as a drilling engineer.

Ottawa Steel appoints Ivan Knight

The appointment of Ivan K. Knight as general sales manager of Ottawa Steel Division of L. A. Young Spring & Wire Corp., Ottawa, Kan., is announced by Edwin L. Johnson, general manager. The division manufactures roadbuilding, materials handling and construction machinery. Knight brings to this new connection a varied background of managerial, sales, and service experience.

Sherman Products appoints two

J. W. Greenis, Western manager for Sherman Products, Inc., at San Francisco, Calif., has announced the appointment of two field sales and service representatives in the Far West: Lauren F. Moore, 1622 Delaware St., Berkeley, and Ralph L. Tennant. Tennant recently moved from Burlington, Wis., to Boise, Idaho, where he makes his headquarters. Robert W. Humes is sales manager for Sherman Products, manufacturer of earthmoving and materials handling equipment for Ford and Fordson Major tractors.

A. C. Lundgren retires from Thew

A. C. Lundgren, an employee of The Thew Shovel Co. for more than 46 years, and vice president and director of purchases, as well as director of the company, and president of Thaw's subsidiary, Byers Machine Co., is retiring from active service. He will continue as a Thew director and consultant.

M. G. Maudlin joins Sherman Products

Appointment of Marvin G. Maudlin as assistant advertising and sales promotion manager for Sherman Products, Inc., Royal Oak, Mich., is announced by W. F. Beckman, vice president and director of marketing. Maudlin brings to his new position a varied background in sales and advertising.

Concut opens office in Sacramento

Concut Sales, Inc., El Monte, Calif., pioneer manufacturer of concrete sawing machines and blades, has opened a new office in Sacramento, Calif. The new office will serve the San Francisco area, Northern California, and Nevada, and will handle the complete line of Concut products. David J. Loudon will be in charge.

Oliver J. Neslage dies

Oliver J. Neslage, 64, vice president, commercial sales, Joy Manufacturing Co., died at his home in Pittsburgh, Pa. recently. His entire business career had been spent with Joy or its predecessor company, Sullivan Machinery Co.

IH elects new executive v. p.

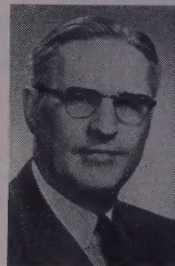
John L. McCaffrey, chairman, International Harvester Co., announces the election of Brooks McCormick as executive vice president, succeeding Christian E. Jarchow, who is retiring after 4 years of distinguished service. McCormick joined IH in 1940 at McCormick Works in Chicago. He served in various important capacities until 1954 when he became director of manufacturing.

Changes in management personnel

Worthington Corporation, Harrison, N. J., announces the election of William A. Meiter, formerly general marketing manager, to the newly created post of vice president—employee relations and organization development. He is succeeded in his former post by A. William Fraser.

John Courtright joins Joy

Joy Manufacturing Co., Pittsburgh, Pa., announces the affiliation of John P. Courtright with the company as a consultant on problems relating to construction, quarrying, etc. Courtright was formerly president of Marion Power Shovel Co.



John P. Courtright

Air Reduction breaks ground

Air Reduction Sales Co. division of Air Reduction Co., Inc., has started construction of its new air separation plant in Acton, Mass. Cost of the plant including related distribution facilities will be in excess of \$9,000,000. Construction of a similar plant is soon to be completed at Los Angeles, Calif.

Falck heads Marion's Western sales

Appointment of Robert Falck as district sales manager for Marion Power Shovel Co.'s Western sales district is announced by Robert Campello, vice president. With headquarters at 326 Shaw Road, South San Francisco, Calif., Falck will be responsible for the sale of all company products in the district, which includes California, Nevada, Arizona, and Utah. He will work closely with the following Marion distributors: George M. Philpott Co., San Francisco; Oakland, Fresno, and Sacramento; Kyle Equipment Co., La Puente and San Diego; and State Tractor & Equipment Co., Phoenix, Ariz.

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Johnston Stainless Welding Rods

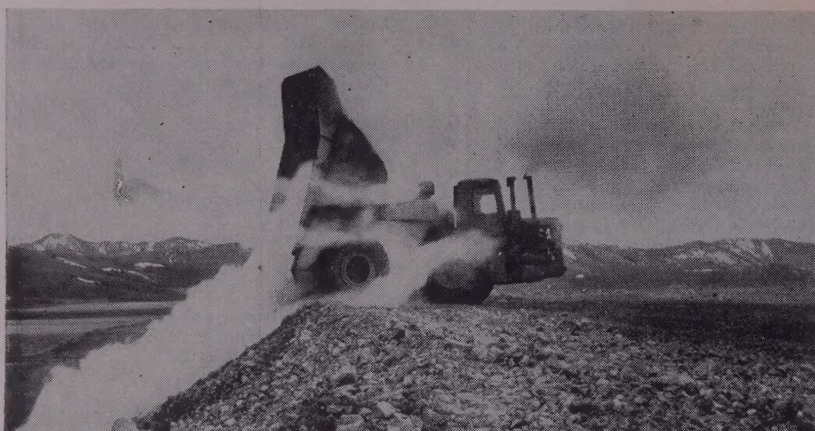
Practical, Down-to-Earth Welding Rods
Alloys as they are supposed to be

Corrosion Resistant—
Clean metal

Strong—
Low in cracking

A. P. JOHNSTON CO., INC.
1845 E. 57th St., Los Angeles 58

BACKFILL, uncompacted



Modern modes for moving ghosts

As far as we know nobody has ever written a textbook on the psychology of engineering. We urge the experts to get to work on the task at once, for such a book could be enormously valuable. Applying rules from the Handbook of Psychological Engineering could solve many problems where T-squares, plumb bobs, and statisticians are useless.

Perhaps the outstanding authority in this field is Crosby G. Holden, agent in charge of the Right of Way Division for the Arizona Highway Department. Western Construction's Bureau of Psychiatry nominates him to receive this year's Merit Button.

Recently Agent Holden was negotiating with a property owner in order to obtain right-of-way for a new highway. This is an odious and thankless chore, as any right-of-way agent will cheerlessly testify. In this particular case the owner, an elderly gentleman, finally agreed to move to a nearby dwelling, on two conditions: (1) that his furniture be moved, and (2) that his ghosts be moved. "What about my ghosts?" he asked. "I've lived here for 60 years. I won't give them up."

Several courses were open to Agent Holden at this juncture. He could have laughed uproariously, hoping that it was a joke. Or, he could have pointed out that since the fingerprints of the ghosts were not on file in the Court House they came under the Alien Act of 1803 which states that tax money can not be used for their transportation. Or, he could have suggested that the ghosts would come along soon enough after the jackhammers arrived.

None of these alternatives was chosen by Agent Holden, who, as we indicated, is well versed in the fundamentals of Psychological Engineering. After studying the man for a moment he assured him that the ghosts would follow the fur-

niture to the new location and that a closed van would be used for the purpose.

When the time came to make the move a van was backed up to the owner's home. A crew from the highway department ran through the house waving and shouting. The van doors were tightly closed and the van was driven to the new location, where the process was repeated in reverse. The oldtimer closely supervised the entire operation and was completely satisfied.

The accompanying picture has nothing to do with this. We present it here because if anybody has a picture of a truck dumping ghosts it probably looks something like this. The picture shows a LeT-Westinghouse D truck dumping hot slag at the Monsanto Chemical Co. plant in Monsanto, Idaho. (Agent Holden has never been in Monsanto, Idaho.)

We realize that few of our readers are interested in hauling hot slag but we would like to point out that a truck like this can be used for other things. For instance it can be used to haul rocks. Or dirt. Have you ever thought of that?

Are engineers really necessary?

A group of cotton farmers from Cibola, Ariz., have dealt a damaging blow to the ego of contractors and engineers, especially those who make such a big fuss about building bridges. It seems that these cotton farmers wanted to get to the other side of the Colorado River. So they built a bridge.

They didn't bother getting permission from the Corps of Engineers, the Bureau of Reclamation, The California Division

of Highways, the Secretary of the Army, The Arizona Highway Department, the Naval Bureau of Yards and Docks, or the California State Toll Bridge Authority. They simply built the bridge. It not only carries the busy cotton farmers back and forth from their fields to the gin and railhead on the California side of the river, it carries about 6,000 cars and trucks every month at the rate of \$1.00 for cars and \$2.00 for trucks. The toll revenues threaten to make cotton farming a waste of time.

No sympathetic soul can help but admire the imagination, initiative, and self-reliance shown by this group of cotton farmers. They're gamblers, pioneers, non-conformists. Their preposterous bridge stands as a monument to the great American tradition of contempt for tradition.

At the beginning, though, they made a perfunctory attempt to stay within the law. They wrote to the Corps of Engineers about a year ago asking how to go about building a bridge. The bale of instructions they received was fearfully complex. It mentioned such discouraging things as traffic studies, hydrological surveys, legislation, navigational rights, economic analyses, and bond elections. The recommended structure would have cost \$250,000—clearly ridiculous.

So they tried another approach. They wrote the County Board of Supervisors at Yuma, Ariz., and asked if it would be OK if they built a little 410-ft. bridge. The Supervisors turned it over to the State Highway Department, which referred it to the state attorney general who referred it back to the Board of Supervisors. At this point the farmers drove a double row of well casings across the river, braced them diagonally, covered them with planks, and there was the bridge.

Little thought was given to navigational rights because of the urgency of getting cotton to the gin. As you might expect, river boaters began to honk and complain about this fantastic obstacle which had sprung up almost overnight. They said a small boy on a paddleboard couldn't get past it, which was a lie because in late summer there is plenty of clearance for a small motor boat.

News of the bridge began to leak out and on July 24 a story was sent all over the nation on Associated Press wires. The bridge has even entered into the dispute about water now raging between Arizona and California. California's attorney said that the cotton was grown with illegal water and that the bridge was built in violation of Arizona's own contention that all Colorado River projects must have congressional approval.

In the meantime, the farmers are interfering with flood control and navigation and are in violation of the River and Harbor Act. Violators are subject to a maximum of a year in jail and a \$5,000 fine. At \$1.00 for cars and \$2.00 for trucks, we think it was worth it.

... The Editors