



New Mexico builds its first prestressed concrete bridge

By **BEN M. LONG**

Project Engineer
New Mexico Highway Department

THE FIRST precast prestressed highway bridge to be built by the New Mexico State Highway Department was recently opened to traffic. It is across the Rio Grande, at Alameda, just north of Albuquerque, and replaces a 40-year-old pin connected truss bridge. The structure was designed by the bridge section of the highway department, and built under contract by Sharp & Fellows Construction Co. of Los Angeles, Calif. Bridge and approaches were finished just under 250 working days.

Foundations

The Alameda Bridge consists of nineteen 49-ft. spans, with a roadway width of 26 ft., and was designed on the basis of an H15-S12 live load. The substructure is made up of shallow reinforced concrete caps supported on 16-in. cast-in-place, reinforced concrete piles. Steel shells of the piles have a wall thickness of 0.188 in. and contain a 44-ft. reinforcing bar

cage. The piling were battered alternately to afford longitudinal stability, end piles being battered transversely to counteract thrust from the river which occasionally carries a considerable amount of debris. In this reach of the Rio Grande substantial bottom movement is experienced to a depth of 25 ft. below normal streambed elevation. Therefore, deep penetration of substructure piling is necessary. Material encountered in the bottom consisted of fine loose sand and silt to a depth of 35 ft., then tight sand and gravel. Piling were driven to practical refusal in the latter material. In attempting to achieve greater penetration, an open-end pile shell was driven at one abutment. It was found, however, that in this particular material, the open tube drove no further than the pile shell with a flat circular plate for a driving point. Difficulty was also experienced in cleaning the open-end pile prior to concreting operations. All remaining pile in the structure were closed-end. Concrete was placed in shells by means of a crane and 1/2-yd. bucket. Tremies were used to prevent segregation during pouring.

Superstructure design

The superstructure of the bridge consists of six lines of precast pre-

stressed T-shaped concrete beams. Design of these beams was based upon the use of high tensile steel bars. However, the contract specifications allowed the contractor to use the type of prestressing element he desired. In this case, the contractor elected to use high strength steel wires supplied by Prestressed, Inc., of San Antonio, Tex.

In detail, the beams had a depth of 32 in., flange width of 53 3/4 in., web thickness of 6 in., and a bottom flange width of 14 in. (see drawing). Each beam had five interior diaphragms and two end diaphragms cast integral with the web and upper flange. The lower flange contained two slightly curved tensioning elements, with the web carrying two more tensioning elements of greater curvature.

Two conduits were placed in each diaphragm for transverse stressing elements which were threaded and tensioned after the entire span was in place on the piers. Precast diaphragm end blocks were placed at the end of each diaphragm on the outside beams during assembly of the span. The end blocks contained the prestressing element bearing plate as well as providing support for the safety curb and the handrail.

Each prestressing element was drawn to an initial stress of 154,000 psi., with the assumption that stress

Camber measurements and comments

Facts to be considered when studying the tabulations:

1. Beams were cast approximately flat. Maximum allowable from true plane was $\frac{3}{8}$ in.
2. Camber was measured as the deviation from a plane passing through the top of the ends of the beams.
3. Camber after tensioning refers

to beam set on blocks at the casting yard.

4. Camber after placing refers to beam after placing on piers, and after concreting, transverse stressing, and grouting were complete.
5. All measurements were made before beams carried any load other than dead load.
6. Beams were selected at random.

SPAN NO.	BEAM NO.	CAMBER AFTER TENSIONING	CAMBER AFTER PLACING	DIFFERENCE
6	18	0.124 ft.	0.139 ft.	0.015 ft.
6	26	0.113	0.145	0.032
7	30	0.129	0.144	0.015
7	29	0.143	0.175	0.032
7	23	0.134	0.175	0.041
7	27	0.099	0.144	0.045
7	22	0.121	0.145	0.024
7	25	0.133	0.152	0.019
9	16	0.067	0.141	0.074
9	31	0.084	0.154	0.070
9	13	0.051	0.140	0.089
9	28	0.037	0.141	0.104
10	20	0.126	0.146	0.020
10	24	0.132	0.151	0.019
10	19	0.112	0.155	0.043
10	34	0.141	0.179	0.038
10	17	0.099	0.144	0.045
10	32	0.115	0.132	0.017
Averages:		0.1088	0.1501	0.0412
Extremes:				
Most camber		Least camber	Difference	
After tensioning		0.143 ft.	0.037 ft.	0.106 ft.
After placing		0.179	0.132	0.047

Observations from table:

1. In all cases the beams increased camber between measurements, to the extent that all beams had greater camber than the most cambered beam of the original measurements. A possible explanation for this behavior is the continuation of creep or flow in the concrete. Creep is a slower process than is the relaxation of the steel tensioning devices. At the time of the original measurements the tensioning tendons should have completed their original relaxation. It is assumed, therefore, that the camber changes occurring between measurements are mainly caused by flow in the concrete. Studies now being conducted by the Civil Engineering Department of the University of New Mexico probably will show the duration of the flow period when they are published.
2. Beams showing least camber after tensioning show the greatest change after placing. Assuming the beam showing the least camber is originally of the

most dense concrete, and the beam having the greatest camber is originally of concrete with the least density, it would appear that during tensioning the "slack" between particles is quickly removed so that immediately after tensioning both beams would have approximately the same density. However the least dense beam, having shortened more, would have less residual tension remaining in the tensioning device, thus having less pressure to produce creep, whereas the other beam would be under a greater stress, producing a greater degree of creep during the period between measurements.

The preceding observations and hypotheses (guesses) are offered more as thought provoking rather than answers to some of the problems confronting the designers and builders of this type of construction. The experience gained in the construction of the Alameda Bridge was invaluable to all concerned, but was far less than that required for one to be the least bit dogmatic in his comments on prestressed concrete.

in the elements would decrease approximately 15% after creep relaxation. The beams were cast some 6 mi. from the bridge site, and hauled in pairs to the point of erection. The beams had an overall length of 50 ft. and weighed 16 tons each.

Casting yard set-up

In setting up the beam casting yard, the contractor poured a number of concrete pads the width of the bottom flange and long enough to include the bearing plate of the beams. Cushion material had to be provided at the inner edge of the exposed bearing plates to allow for shrinkage of the fresh concrete and also to prevent binding against the pads during stressing operation.

Forms consisted of plywood and steel pans, in sections equal in length to each bay between diaphragms. End forms were constructed so as to hold the prestressing elements, bearing plates, tubes, and element conduit in position. Bolts through the pads tied the side forms in position longitudinally, and jacks and braces to the ground aligned the forms vertically. Assembling the forms for a beam consisted of setting a pretied reinforcing bar cage, complete with conduit for prestressing elements, upon the pad, bolting up the side panels and metal end sections, aligning same, and finally positioning the flexible metal conduits to provide the desired curve for the tensioning units.

The contractor constructed a number of pencil rod templates which held the four conduits in the correct relative position and which could be raised or lowered to establish the proper elevation of the conduit within the form. During the final alignment of the forms prior to pouring the pencil rod templates were positioned and tack welded to the reinforcing bar cage to prevent movement during the pour.

Pouring and concrete strength

The pour was made directly from transit-mix trucks into the form. Internal vibrators were used exclusively. The vibrator operator had to work very carefully to obtain complete compaction without disturbing the alignment of the conduit. Upon the initial set of the concrete, curing membrane was sprayed on the exposed surface and the entire assembly covered with a pencil rod and building paper "igloo." Since pouring was done during the winter months, cold weather precautions were taken, and the interior of the "igloos" was heated by conducting hot air along the sides of the forms.

Upon reaching the specific compressive strength the beams were post-tensioned by threading the stressing elements through the conduits, locking one end of the element

and applying tension to the other end by means of a calibrated hydraulic jack. Tension in the element was then measured by the gage reading on the jack and checked by measurement of the elongation of the element. When proper tension was reached the element was locked in its elongated position, and the entire conduit filled with a grout mixture to secure bond between the element and the beam. The locking assemblies at the ends were then protected with a concrete cap.

Handling the beams

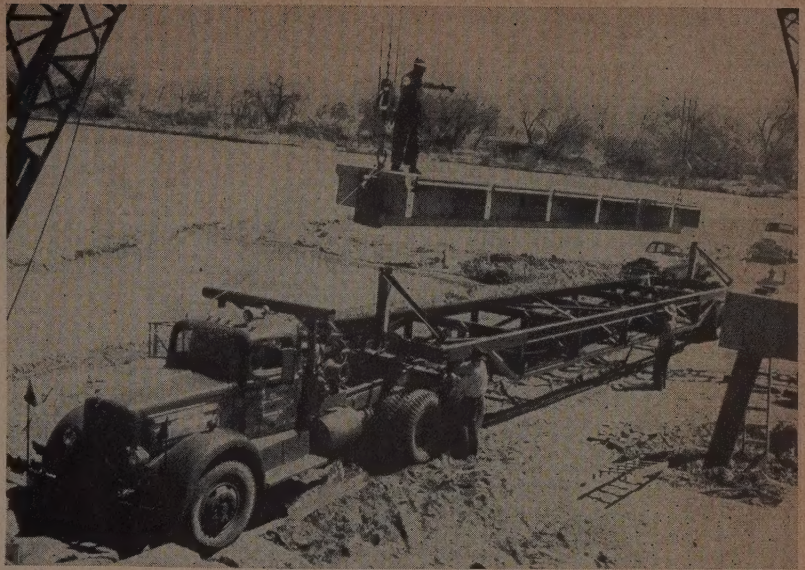
Lifting, loading, hauling, and placing beams on the piers was accomplished in a continuous operation, requiring two cranes at the casting yard and two cranes at the bridge site. Except for some fine teamwork between foremen and rig operators, the placing of the girders was uneventful.

When a span, composed of six beams, was in place, the cast-in-place concrete between diaphragms was poured and allowed to cure to the same compressive strength as the beam concrete. Catwalks were constructed for the stressing crews and transverse stressing was completed using the same equipment as for the longitudinal stressing. Keyways between beam flanges were filled with retempered grout and the span was ready for the asphalt riding surface.

Mixed-in-place mat used

Normal practice of the State Highway Department would call for a pre-mixed surfacing. However, local conditions dictated a different procedure, which added another unusual feature to this structure. The contractor elected to windrow the dry material for the mat directly on the bridge deck. MC-3 was added by Etnyre distributor and the mixture processed and laid by motor patrol. With the aid of an excellent blade man a good surface was secured, and it has held up well.

The most difficult construction feature encountered in this structure was the matter of aligning the beams after they were in place on the piers.



SPECIALLY BUILT trailer hauled two of the 50-ft., 16.1-ton beams the 6 mi. from casting yard to site. Two cranes loaded the 114 beams at the yard and two more put them in position.

Transverse stressing conduits were occasionally offset between beams both horizontally and vertically. Horizontal misalignment was caused by the difficulty in aligning the sectional beam forms in precisely the same relative position for each beam pour. This could be corrected by use of somewhat different forms or by use of aligning pins and dowels between the sections.

The vertical offset was a different matter, being caused by variation in camber between adjacent beams. The beams were poured on flat pads and assumed a camber of from $\frac{3}{4}$ in. to $1\frac{3}{4}$ in. during stressing. In checking records kept on each beam, no one consistent fact appeared to answer the question of varying camber. In several instances, beams poured the same day, stressed the same day, had a 1-in. difference in camber.

Of the several theories advanced concerning this, the author leans to-

ward the possibility that the compaction of the concrete varied with each beam, and thus the inequality of the density of the concrete between beams would cause a greater or lesser degree of arching under the stress of the tensioning elements. A possible solution to this problem would be the use of external vibrators to be operated for the same period of time on each pour. Assuming the slump of the concrete mix to be uniform, the timed vibrating could be presumed to secure uniform compaction throughout the casting of all the beams. Detail measurements of camber are shown in the table, together with some observations.

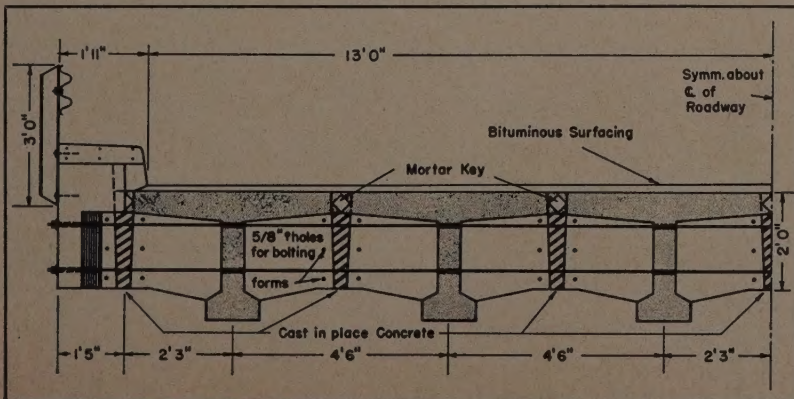
During construction, various testing devices and bench marks were cast into the beams of one span, under the direction of the Civil Engineering Department of the University of New Mexico, and tests are being conducted at present to measure relaxation of tensioning elements, creep in the concrete, and general loss of camber. Those of us involved in the planning and construction of the bridge are watching this investigation closely.

L. D. Wilson is chief engineer of the New Mexico State Highway Commission, and W. E. Strohm is bridge engineer. The author was project engineer.

For Sharp & Fellows Contracting Co., Arnold Dehn was project superintendent, and W. R. Grinnell was assistant project superintendent. Lewie McNeil was concrete foreman, and Herman Voges was office manager. Piles were driven by the Raymond Concrete Pile Co.

The precast, post-tensioned girders were produced by the Albuquerque Gravel Products Co. W. K. Wagner is chief engineer; David B. Pierce, resident engineer on the project, and Don R. Ingle, production.

SECTION of beam and bridge showing the cast-in-place concrete between diaphragms. Keyways were filled after transverse stressing and completed the 26-ft. width of deck.





Ingenuity needed for—

Bell caissons in loose sand

Drilling contractor uses unusual shoring methods to beat tough soil conditions and finish job two months early.

WHEN YOU BUILD a 13-story building on a steep hillside of loose sand you can be sure you'll have plenty of foundation problems. And there are problems aplenty on the structure now being built for the University of California Medical Center in San Francisco. Underground contracting is a risky business anyway, and this job is a real test of the contractor's ingenuity.

Called the Combined Structure, the building when finished will provide quarters for nurses, interns, and resident staff members, as well as a student union and facilities for Physical Education and recreation. The general contractor is James I. Barnes Co. which received the \$3,370,000 award on August 23, 1955. Barnes subbed the bell caisson work to Don H. Mahaffey, an experienced drilling contractor whose headquarters are in Gardena, Calif.

The soil conditions are extremely variable, running from loose sand to

clay. A deep foundation had to be provided so that the building would not be affected by future excavations further down the slope. Driven piles couldn't be used for several reasons. In the first place driving would set up vibrations which would make it necessary to use considerable shoring in the job site to keep the unstable soil in place. The vibrations could also affect the foundations of several other nearby large structures. And the noises of pile-driving would have been objectionable because of the hospital across the street. For these and other reasons bell caissons were specified by the designing engineers Huber & Knapik.

There are 111 caissons to be constructed and at this writing (April 1) 75 are complete with another 10 drilled and ready for concrete. They range from 10 to 58 ft. deep. The smallest one has a shaft diameter of 2 ft. 6 in. and a bell diameter of 4 ft.; the largest is 6 ft. 6 in. in diameter at

the shaft and 18 ft. 8 in. at the bell.

When Mahaffey first started excavating he carried out a few experiments with chemical soil stabilization. A solution of sodium silicate and bicarbonate of soda was injected into the soil at 400 psi. through $\frac{3}{8}$ -in. needles to the desired depths. Setting time for this mixture was about 30 min. It was soon found that because of the varying nature of the soil, plus a high moisture content due to recent heavy rains, the chemicals would not flow far enough from the nozzles, so no further chemical solidification was used.

Drilling is done with a 10-ton rig available from Earth Drill, Inc., capable of going 175 ft. deep with holes from 1 to 8 ft. in diameter.

Belling methods vary with the soil. The belling bucket, which makes a hemispherical bell at the bottom of the shaft, is used wherever the soil is firm enough, in order to reduce the hand labor needed to make the bell sides straight 60-deg. slopes. In very loose sand the shaft is drilled and cased to the top of the bell. Then

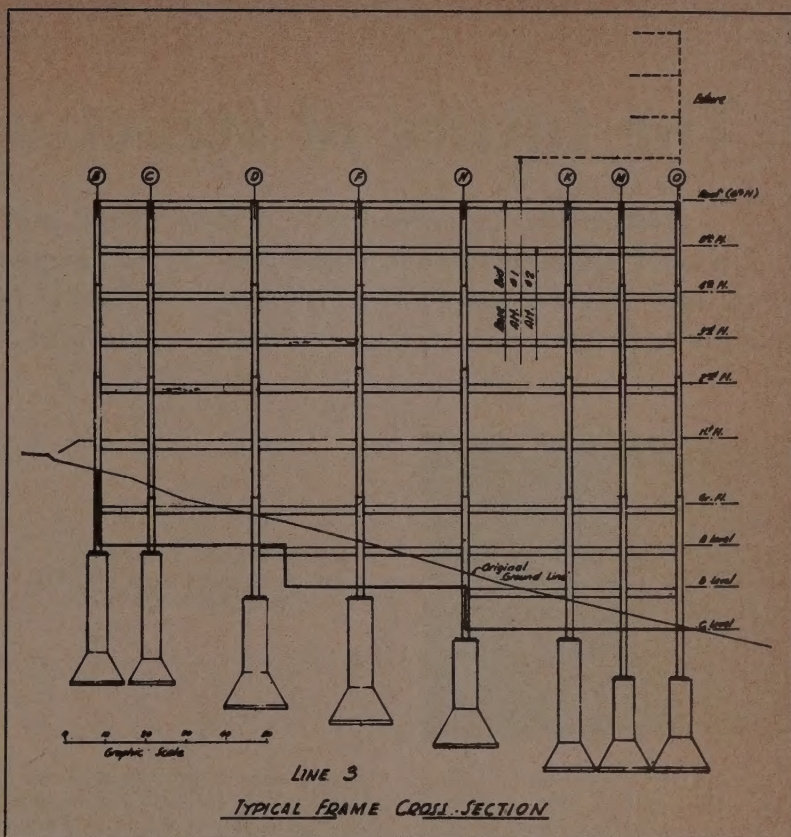
BELOW: Steep site was benched off into three levels. Clearing upper level is under way at the right while drilling is being done in the center. Note the casings used to line the shaft. At the far left is a stockpile of reinforcing cages which will be lowered intact into the caissons.



In cases where the top of the bell is very close to the ground surface a suspension method is used in cribbing the bell. By this method, after the pipe lagging is in place, $\frac{3}{4}$ -in. rods are anchored from a metal ring inside the bell to timbers on the ground surface, which distribute part of the load away from the excavation. As the bell is excavated the suspension rods are kept tight by turning nuts at the top. In this way the soil is kept in its original position and the lagging is not allowed to settle or sag.

To emphasize how difficult this drilling and belling operation is, it might be noted that in 1955 a contractor was faced with a similar situation across the street from the present job. He elected to excavate the entire site, build up the bells and columns with formwork, then replace and compact all the soil.

In solid soil the belling bucket is used first, and just the final straight-



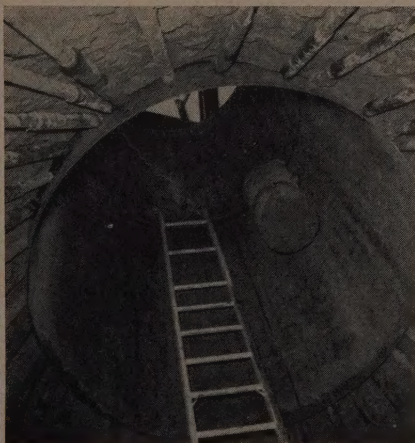
SEVERAL FLOORS can be added in the future. The lower levels will be used for parking facilities. Pile-driving would have required shoring to keep unstable soil in place in the three levels during construction. Caissons vary from 10 to 58 ft. deep; shaft diameters vary from 2 ft. 6 in. to 6 ft. 6 in. There are 111 caissons in all.

To remove the dirt excavated by the belling crew Mahaffey is using a hoist manufactured by the "E-Z" Power Hoist Co., Pasadena, Calif. It is rated at 400 lb. and is run by an 8-hp. gasoline engine.

In one case the casing was binding against the sides of the shaft and the crane was unable to extract it. Mahaffey solved this problem by drilling holes in the casing and forcing compressed air through them. After that treatment it was withdrawn easily.

For the Don H. Mahaffey Drilling Co., A. Austin and J. J. Mahaffey are superintendents. W. Palmer is general superintendent for James I. Barnes Construction Co. (See picture on page 90.)

Milton T. Pflueger is the architect of the building. Blanchard & Maher are supervising architects for the University of California. Huber & Knapik are the structural engineers. G. M. Simonson is mechanical and electrical engineer.



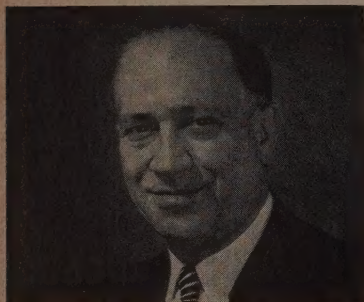
AT THE BOTTOM of one of the largest caissons the shoring technique can be seen clearly. The pipe lagging forms the contour of the bell and rests against the casing at the top. As the pieces of sheet metal are placed behind the lagging dirt is tamped behind them to keep the original soil in place. As concrete is poured the casing is withdrawn.

New methods, new designs, new forms assure —

The future of structural concrete

Precasting, prestressing, and lightweight aggregates have made possible new uses for structural concrete—and the end is not in sight. Here is a look

at the past and future of concrete, with the emphasis on the production and effects of lightweight aggregates as new structural materials are produced.



By **ROBERT F. BLANKS**

Vice President and General Manager
Great Western Aggregates, Inc.

FROM THE VERY beginning of concrete, engineers have worked to extend its usefulness. Concrete is so versatile as a building material that users are prone to misuse it. Thereby, concrete becomes its own worst enemy. It has, inherently, some unlikeable characteristics, such as low strength in tension, heavy weight, and high volume changes with variations in moisture, temperature, and loading conditions.

In order to offset these deficiencies and thereby use concrete for a great many applications for which it was not basically suited, engineers and users have resorted to all kinds of "Yankee ingenuity." To overcome concrete's low tensile strength and excessive cracking tendencies, concrete users devised the idea of combining concrete with steel to make reinforced concrete, and as a result, transform it into a structural building material with greatly expanded applications.

Prestressed concrete

However, concrete and steel in intimate combination are not compatible in several respects, and ordinary reinforced concrete still had structural shortcomings. To further reduce the low tensile strength disadvantages, engineers next came up with prestressed concrete which compresses the concrete before loads are applied. The development of prestressed concrete reached a highly advanced stage in Europe several years ago. Because of high labor and other costs, it was slow in gaining popularity in the United States but at the present time, prestressing is in

a sharp upward climb. Or, to say it differently, structural concrete is retaining its popularity as a building material.

The labor premium

Two developments have been largely responsible for keeping structural concrete in front of the building materials parade. Both have to do primarily with overcoming the high labor premium. First, United States engineers, fabricators, and contractors devised their own prestressing steel; stranded wire cable instead of individual small wires, such as is used exclusively in Europe. Second, to overcome high "in place" forming costs, variable field concrete quality, and uneconomic safety factors, America has been quick to forge ahead in adapting precast, prefabricated, or factory produced concrete members and assemblages to concrete structures. As a consequence of the prestressed, precast developments, building progress records and costs are being shattered. Notable recent examples are the Lake Pontchartrain Bridge near New Orleans and the completely prestressed, precast IKO multistory building in Denver, Colo. These jobs provide a futuristic look into the shape of things to come in the concrete world.

Precast, prestressed concrete developments have served to focus increased attention on one of concrete's other major weaknesses, namely heavy weight. Therefore, lightweight concrete is coming into increasingly urgent demand. In most concrete, some four-fifths of its weight is due to the aggregates which are com-

bined with cement and water to produce the building material. It is logical then that methods for reducing concrete dead weight would lead toward the development of lighter weight aggregates.

Several types of lightweight aggregates have been in more or less limited use for many years. However, it was not until after 1915 that lightweight aggregates and concrete gained a recognized place in the concrete technology record. Three historical developments, other than those briefly mentioned previously, have contributed most toward lightweight aggregate progress: (1) The ship building program of World War I; (2) Stephen J. Hayde's "haydite" patent of 1918; and (3) The concrete ship building program of World War II. From 1920 to the present time, innumerable lightweight aggregate trade names have appeared in the concrete world. Only a few of them will serve to refresh the memory of those who have been most intimately concerned with lightweight concrete developments: Cel-seal, Gravelite, Haydite, Waylite, Airox, Rocklite, Basalite, Idealite, Featherlite, Diatomite, Lelite, Solite, Aglite, La-Lite, Nodulite, etc.

For many years coal cinders were an important source of lighter weight aggregates and were used extensively for making cinder concrete building block. Because of the decline in the use of coal as a fuel, cinders are rapidly becoming extinct. In some parts of the United States, naturally occurring volcanic scoria and pumice are mined, crushed, and sized for use in lightweight concrete. Crushed, foamed slag from steel plants is an artificial material similar in character to the volcanics in nature. Where extremely high insulating values and lightweight are required, expanded vermiculite and perlite are used for such purposes as roof fills and plasters. When crushed perlite rock is heated rapidly, it "pops" to form hollow glassy spheres; and, under heat, vermiculite exfoliates and expands several times. Both of these materials make concretes having very low strengths and therefore, have little place in the structural concrete field.

The most extensively used lightweight aggregate at the present time is a material commonly called haydite. Haydite, originated by the Hayde patent of 1918, is now comparable in the lightweight aggregate field to Aspdin's patent of "portland" type cement in the early part of the 19th Century. The raw materials commonly used for producing Haydite are clays, shales, and slates. These materials are sometimes ground in combination with coal and heated on moving grates to temperatures of 1,800 to 2,100 deg. F. to produce a vesiculated clinker. The more popular method now is to process the raw materials alone in rotary kilns. In either case, the resulting product is processed by a combination of screening and crushing to produce graded and sized lightweight concrete aggregate materials. In steel mill areas, crushed and sized foamed slag is also an acceptable source of lightweight aggregate.

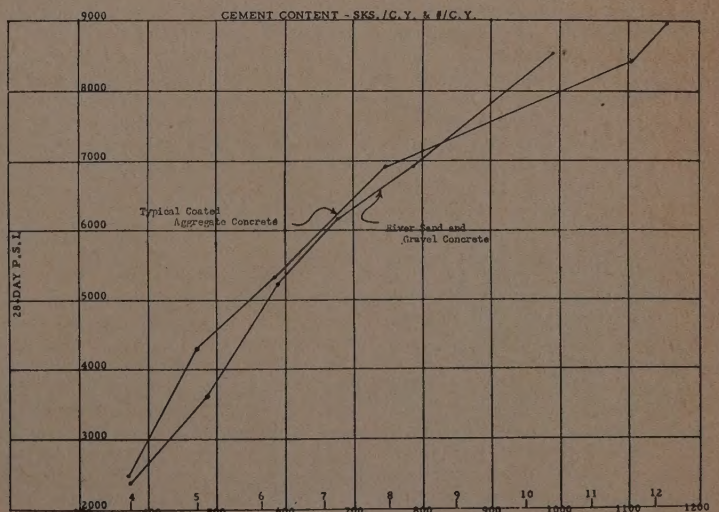
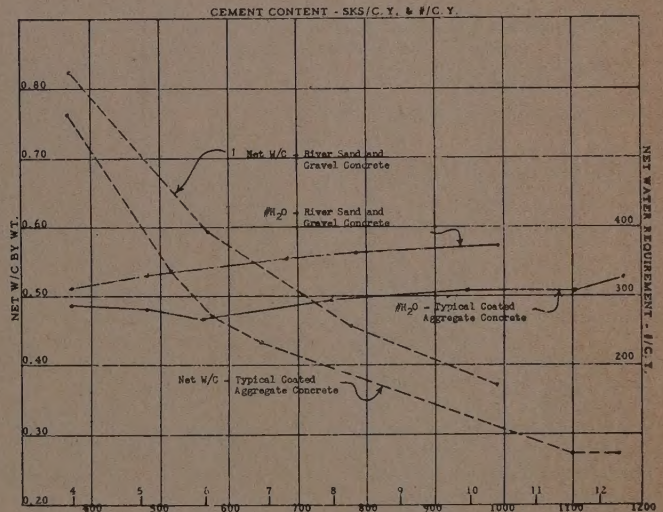
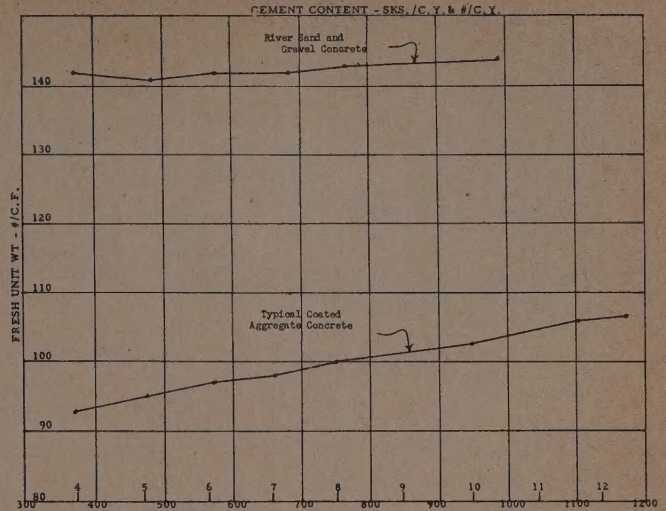
War spurred demand

Tremendous impetus was given the lightweight aggregate industry by the concrete ship building program of World War II. Since that time, there has been a persistently increasing demand for higher quality lightweight concrete aggregate of the expanded shale, clay, and slate type. Some shales, claystones, and slates are of such character that they can be crushed and sized before burning. Such materials when processed in rotary kilns under proper temperature and atmospheric conditions result in discrete individual particles varying in size from a pin point to about one inch in diameter. The particles are fairly well rounded, have vesicular interiors and therefore, lightweight, but most important, have a glazed surface seal skin that resists water absorption and contributes to reduced drying shrinkage and higher strengths. This type of lightweight aggregate is commonly referred to as "coated" aggregate.

Production and properties

Coated aggregate production requires slightly more fuel than the haydite types and the burning operation is extremely critical. Temperatures and atmospheric conditions must be held within very narrow tolerances to avoid kiln logging and improper burning. On the other hand, coated lightweight aggregates make concretes having many distinct advantages in addition to lower absorption, reduced drying shrinkage, and higher strength. Coated aggregate concretes are considerably lower in cement and water requirements than haydite concretes and therefore weigh less for a given strength. In fact, high quality coated type lightweight aggregates make concretes which compare favorably

Comparison of standard and lightweight



Characteristics of coated expanded shale

GRADATION

SIEVE SIZE	FINE		MEDIUM		COARSE	
	% Ret.	Cumul. %	% Ret.	Cumul. %	% Ret.	Cumul. %
3/4"					6	6
3/8"			1	1	80	86
# 4	0	0	41	42	14	100
# 8	9	9	58	100		
# 16	30	39				
# 30	21	60				
# 50	21	81				
# 100	8	89				
Pan	11	100				
F.M.		2.78				

PHYSICAL PROPERTIES

	FINE	MEDIUM	COARSE
Specific Gravity	1.72	1.38	1.20
Absorption, % by wt.	1.00	1.55	2.04
Unit. wt. lb. c.f.	66	46	40
Surface—Fairly smooth, sealed.			
Internal structure—Porous, not interconnected.			
Shape—Rounded.			

Approximate mix proportions, parts by weight, for 2-in. slump concrete (equivalent to 4-in. slump in ordinary concrete):

SKS. CEMENT/ CU. YD.	CEMENT	FINE	MEDIUM	COARSE
4	1	2.30	1.10	1.20
5	1	1.77	0.84	1.02
6	1	1.38	0.72	0.87
7	1	1.12	0.59	0.73

in all respects to many natural concretes as illustrated by the graphs on page 39.

Physical characteristics of a typical coated type expanded shale lightweight aggregate are as follows:

Prefabricated or precast structural members such as panels, slabs, beams, frames, columns, and piles are rapidly coming into wider use. It is predicted that the precast concrete business is destined for a phenomenal increase and that in the not far distant future it will be possible to go to a precasting yard and purchase structural concrete units about as readily as we now buy lumber or metal materials. Prefabrication has also stimulated startlingly new developments in architectural concrete applications. And the surface is only scratched. The possibilities for improvements, reduced costs and new applications in the precast concrete field are almost unlimited. For example, modular units of various sizes and shapes are almost certain to materially supplement concrete and ceramic building blocks.

The big pay-off comes, of course, when these three new concretes, precast, prestressed, and lightweight are combined. Then we have just about everything that can be desired as far as present day knowledge of concrete will permit. The use of premium quality lightweight aggregates in

combination with prestressing, a practice which has now been proven to be not only entirely acceptable but also desirable, reduces fabrication, transportation, erection, and foundation treatment costs through reductions in weight and dimensions of structural members. Precasting in well planned factories places the fabrication of concrete members on a production basis with lower labor costs and other economies. Best of all, the ultimate can be achieved in quality concrete control, uniformity and environmental conditions.

I think we can say that the developments in concretes already discussed together with other evolutions which are currently taking place are pushing concrete continually higher on the competitive structural materials ladder. High strength reinforcing steel with improved deformations are coming on the market. New methods for joining precast members are being developed.

Important changes are taking place in reinforced concrete design. The elasticity concepts, on which the 50-year-old theory of reinforced concrete design is based, are giving way to modern and realistic inelasticity concepts. New structural forms such as shells, flat plate floor slabs, and folded plate structures, are greatly increasing the versatility of structural concrete.

Priest Rapids Dam

... \$91,878,625 contract awarded to a single firm for Northwest dam and powerhouse.

MERRITT, CHAPMAN & SCOTT, New York City, was awarded a \$91,878,625 contract for construction of Priest Rapids Dam and powerhouse for Grant County Public Utility District No. 2. They bid alone in competition with four joint ventures to receive the largest contract ever awarded a single firm. The New York contractor also holds the contract for Seattle's Gorge High Dam in a joint venture with Sabin Construction Co.

Second low bid came from Kaiser Engineers and associates at \$93,128,004. Other bids: Guy F. Atkinson and associates, \$97,494,814; Morrison-Knudsen Co., Inc., and Peter Kiewit Sons' Co. and associates, \$103,996,562; J. T. M. Constructors, Charlotte, N. C., and associates, \$108,889,162. Harza Engineering Co., Chicago, which handled preliminary work at the site and preparation of plans, estimated total cost of the project at \$125,000,000.

The Priest Rapids Dam, 14 mi. downstream from Beverly and 73 mi. upstream from the junction of the Snake and Columbia rivers, will have initially eight generators of 83,000 kw. rated capacity for a total installed capacity of 664,000 kw. The development will be coordinated with the Northwest power pool.

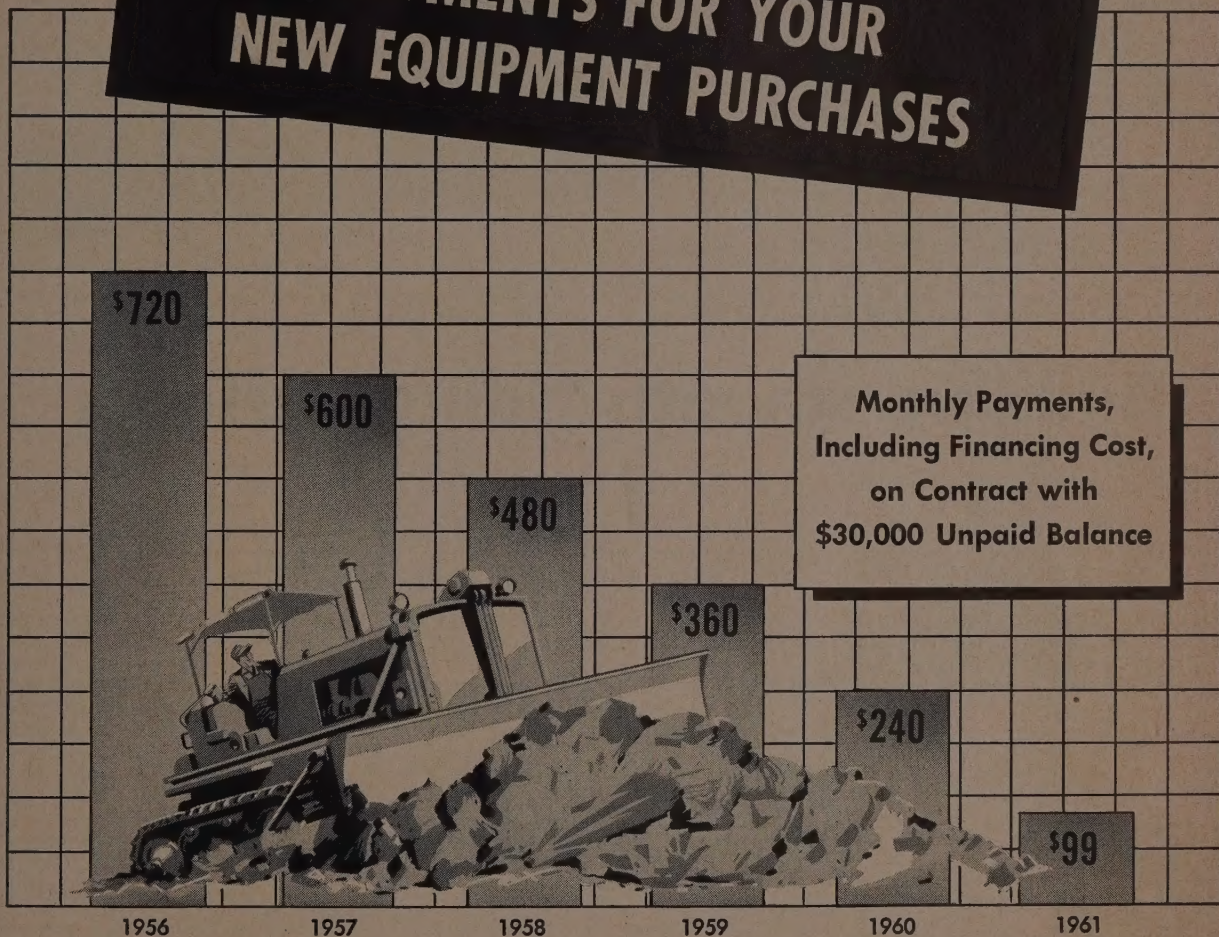
Over-all length of the dam will be 8,835 ft., with a maximum height of 175 ft. from the deepest excavation to the top of the roadway, and a 79-ft. head. It will consist of 6,400 ft. of earth embankment, 260 ft. of concrete gravity section, 1,150 ft. of deep gated concrete spillway and 1,025 ft. of powerhouse section with integral intake.

The spillway will be in the right section, looking downstream, of the present river channel. It will be a concrete structure with ogee crest and bucket type energy dissipation. It will have 22 tainter gates 40 ft. wide by 50 ft. high between concrete piers and will carry a bridge with a 12-ft. roadway.

Tentatively proposed fish handling facilities include a fish ladder adjacent to the right end of the spillway and a power operated lift. Provisions will be made for future navigation locks.

The bid opening drew 250 spectators, some of whom had to stand in the outer lobby. Glenn Smothers, Grant County PUD manager, heard the session by special phone and speaker installed in his hospital room, where he was confined with an appendectomy.

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ROLLING longitudinal joint immediately behind paver to eliminate joint ridge. On all types of asphalt surfacing the combination of transverse

and longitudinal smoothness is a problem requiring the coordinated efforts of a highly skilled and fast-working crew.

Building smooth riding surfaces

"HOW TO BUILD riding quality into plant-mix asphalt paving?" Theory is one thing and actual field practice is quite another. The practical approach is a subject best discussed by a paving contractor. Howard Sievers, president of Associated Sand & Gravel Co., Everett, Wash., has ideas that should be of interest to all engineers and builders of asphalt highways throughout the West. He has this to say:

First of all, since there are many types of asphalt surfacing, let me confine my suggestions to the type

to 4 in. of crushed rock. The first problem, of course, is to secure an unyielding subgrade and then to process the rock surfacing to the required density and to the finished grade. It is almost impossible to build a smooth-riding asphalt surface unless you can lay it on a solid and stable subgrade.

Key to the success of putting down a smooth crushed rock surfacing—aside from having the necessary compacting equipment—is the skill of the motor patrol operator. Probably only five out of 100 so-called motor patrol operators would meet my idea of a finished-grade operator. I don't know whether they are born with a built-in sense of grade or get it from training, but they are few and far between.

Even the best of these skilled operators must be provided with a machine maintained in proper condition. The mold-board circle should be tight. The front mechanism should also be tight so that when the machine is called upon to take off the top of hard spots it will respond and not ride over.

An important accessory is the assistant commonly referred to as a stake jumper, and in some areas known as a guinea chaser. His duty is to move ahead of the finishing patrol, remove the guard stakes so that the operator can see the "blue tops" for judging his final cut. The prompt and effective work of this assistant is of tremendous help to the skilled operator.

With this operation carried out successfully and the surface of the crushed rock at proper grade, the work of the asphalt laying crew becomes a simple operation. The paver can then ride on the established thickness of paving with a minimum amount of screed adjustment.

When asphalt paving is to be placed on a cement-treated base the motor patrol operator again plays a key role. After the cement base has been processed and compacted, the patrol operator must iron out any irregularities left by these operations—and get them done quickly. Because of the limiting factor of time, irregularities cannot all be removed and the asphalt paving machine crew and engineer in charge of setting grade must cooperate fully.

In this situation the engineer and the screed operator must work together in marking these high or low spots from the existing grade stakes and place identifying marks on the surface so that the screed man can be ready to adjust the thickness of the asphalt as the machine moves into either high or low spots. This means that the screed man, if properly qualified, has the opportunity to produce a smooth riding surface. On the other hand, if he is inexperienced or careless he can destroy all of the preceding efforts to secure a good subgrade and base course.

Covering rigid tight pavement

Laying asphalt pavement as a covering course over old rigid type pavement with some dislocations again stresses the importance of the training and skill of the asphalt paving machine screed operator. Of course, paint marks on the old pavement allows the screed man to determine the adjustment required to change the thickness of the asphalt, but considerable skill is required in carrying out this maneuver. For example, let's assume that the asphalt paving machine has been putting down a ½-in. thickness and suddenly comes to a dislocation which may require a 2-in.

(Continued on page 66)



Howard Sievers

usually described as heavy-duty plant-mix asphalt. Next, let's not get into a discussion of technical methods of measuring final smoothness or the instruments which engineers have devised since these are an evaluation of results rather than how to accomplish them.

The material on which the asphalt mix is to be laid represents the key to the paving success and I should like to discuss four different conditions.

Paving a new subgrade

This situation usually includes from 6 to 12 in. of selected borrow material placed on the prepared subgrade and then covered with from 2



Dumptor shuttles back and forth without turning

Shuttling between loading unit and dump area, Koehring 6-yard Dumptor travels round-trip without turning. It operates with equal ease in both directions along narrow haul roads, in tunnels, on overhead trestles. Dumptor gets this no-turn advantage through a constant-mesh transmission that gives the same 3-speed travel in either direction.

Every turn eliminated cuts 15 seconds off your cycle time, and adds up to an important increase in yards hauled per hour. Here's a typical example —



Increases hourly output over 10%

Eliminating just 2 turns saves $\frac{1}{2}$ minute on every round trip. On a typical 1,000-foot haul, where you would get an average of 13.6 trips per hour with 2-turn operation, Dumptor no-turn shuttle hauling gives you 15.4 trips. That's an increase of 1.8 trips an hour on the same 1,000-foot haul.

One-second gravity dumping also helps keep production high. Costs stay low, because with gravity-dump there are no complicated body-hoists—no hoist maintenance. Check what these Dumptor® advantages can mean to you.

Hauling pit-run material for a new expressway, a fleet Koehring Dumptors operates on short shuttle haul between shovel and crushing plant. The shovel is a Koehring 17-yard 605. Combination of Koehring excavators and Dumptors makes a dependable, big-production team.

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Placing fill nears peak at Nacimiento Dam

Eaton and Smith is working 20 hr. per day as earthwork must hit 16,000 cu. yd. per day to beat next winter's floods.

NOW THAT THE winter floods are over earthwork has moved into high gear on Nacimiento Dam, 9 mi. southwest of Bradley, in Central California. There are about 200 working days before the next flood season and in that time over 3,000,000 cu. yd. of embankment must be placed and compacted. This means that the contractor will have to average over 15,000 cu. yd. per day. Crews started working two 10-hr. shifts on March 19, and this rate will be kept up as long as necessary.

The earthfill dam is being built for the Monterey County Flood Control and Water Conservation District at Salinas. Bids were opened on September 19, 1955, and Eaton & Smith came in low on a bid of \$4,178,888. Guy F. Atkinson was close behind at \$4,414,550. The award was made on October 21 to a joint venture of Eaton & Smith and James M. Smith. Plans and specifications were drawn up by Bechtel Corporation which is also supervising construction and doing the engineering and inspection.

The job includes construction of a zone-type rolled earth embankment about 1,500 ft. long at the crest and about 260 ft. maximum height above the lowest part of the foundation; a cut-off trench which averages about 30 ft. deep across the river channel section; foundation grouting for the full length of the dam; a gateless concrete spillway with 150-ft. crest length on the left abutment directly above a high-level gated outlet works; and a low-level outlet works under the embankment on the right abutment.

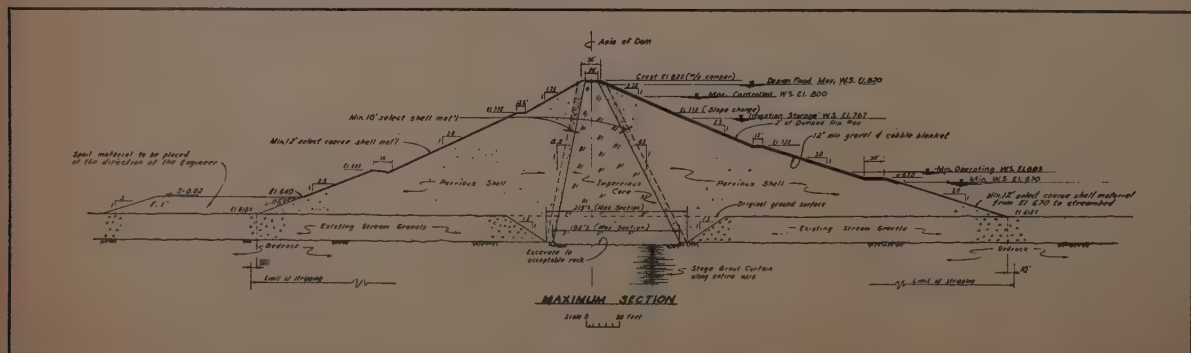
There is no surface flow in the river from July until December in a normal year. Ground water is being controlled by sump pumps which discharge downstream through 15-in. pipes.

When work started, the plan was to divert any surface flow through the excavation for the low-level outlet works at the south abutment until the cut-off trench was excavated and backfilled to streambed. The pervious zones would then be raised to an

elevation about 8 ft. above the streambed, except for a 100-ft. wide channel to handle the flood water. The slope of the in-place fill and the top of the impervious zone were to be protected by riprap and gravel surfacing to protect it from any flooding. These protective measures were being carried out when the record-breaking flood struck on December 20.

The cut-off trench, which is about 190 ft. wide and 40 ft. deep by 300 ft. long, was excavated by Caterpillar D8 tractors, Euclid and Wooldridge scrapers working with a Northwest dragline. Some of the material was wasted and some was used for the downstream pervious zone.

When working space became limited, the dragline changed to a shovel and worked with end-dump Euclid trucks. The shovel assisted in the final cleanup followed by a truck-mounted Gradall and finally hand labor. Drilling and grouting in the bottom of the trench was subcontracted to Fred Cannon Company.





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JIM SHANNON, operator of this odd sprinkler, pauses for a quick engine check. This rig was made from an 18-cu. yd. Euclid belly-dump. A Le Roi engine driving a centrifugal pump can empty the entire 5,000 gal. in 6 min. if operated at top speed.



A CAT D8 pulls a Southwest 50-ton pneumatic compactor over the fill in the upstream pervious zone. Other compaction equipment includes a Southwest sheepsfoot and a Le Tourneau-Westinghouse sheepsfoot. Most of the pervious material is being taken from the upstream river bed. The impervious borrow area is on the south bank of the river.



THE CUT-OFF TRENCH is being excavated again after winter floods filled it before grouting was complete. When it has been taken down to the previous grade it is hoped that some of the original grout pipes can be used without having to drill and set new ones.

About 13,000 cu. yd. of material taken from the cut-off trench was in place in the downstream shell zone before the flood. About 36,000 cu. yd. from a borrow pit 1,000 ft. upstream was placed in the upstream shell zone. First water began flowing in the river on December 8. From the 8th to the 20th, the flow was about 50 sec. ft. and was carried through the low-level outlet channel as planned. On the 20th, the flow increased rapidly until it was estimated to be 5,000 sec. ft. Dikes along the channel through the dam were reinforced with material from the disposal stockpile. The dike was breached at about noon and flooded the area but the contractor had time to remove all of his equipment. The flow subsided on the 22nd, to about 2,000 sec. ft.

There had been little damage and the contractor was ready to repair the dike, pump out the cut-off trench excavation, and continue work. But on the 23rd, the river started rising again. By noon, it was estimated at 40,000 sec. ft., completely flooding the site and flowing across the full streambed. No official figures for the flow could be obtained because the cableway of the U. S. Geological Survey had been washed out by the record flow. Later calculations showed that the flow crested at 58,600 sec. ft., higher than any peaks of all available hydrographs.

By the 27th, it was down to 5,000 sec. ft. About 70% of the placed fill had been eroded away and about 50% of the cut-off trench had been filled in with material. With winter floods started, Eaton & Smith dropped back to one shift per day and concentrated on preparing the abutments, clearing the 4,000 ac. of reservoir, and excavating for the spillway.

About 1,000 ft. upstream a crushing and screening plant and a portable batch plant has been erected. Aggregate for concrete and zone aggregate will be taken from the upstream bed of the river and brought to the plant for processing and batching. The impervious borrow pit is readily accessible on the south bank of the river. It is about 130 ac. in area and will be taken down to about 15 ft. below the original ground line. Pervious material is obtained from the river bed upstream from the dam.

Re-excavation starts

In the middle of March the surface flow in the river had subsided to about 250 se. ft. and Eaton & Smith switched to two 10-hr. shifts per day, pumped out the embankment areas, started re-excavating the cut-off trench, and started building up the previous shell zones. Compaction is being carried out by a Southwest sheepsfoot, a Le Tourneau-Westinghouse sheepsfoot, and a Southwest 50-ton pneumatic compactor. Earthmoving will reach its peak in May or June when twenty DW-20 scrapers

(Continued on page 52)

AS THE VERSATILITY NEEDED FOR ALL KINDS OF JOBS

RE, SMOOTH POWER & TRACTION

300 h.p. engine . . . Torqmatic Drive
27.00 x 33 tires with 33.5 x 33
differential . . . 18 yds. struck capacity
21 yds. heaped at 3:1 slope and
yds. at 1:1 . . . NoSpin differential
full hydraulic steering . . . non-
spin 180° turns in only 36 feet . . .
hydraulically controlled lever action
bowl, apron and ejector . . . four
direction reversible cutting blade . . .
It to work with the biggest push-
tractors on the toughest jobs.



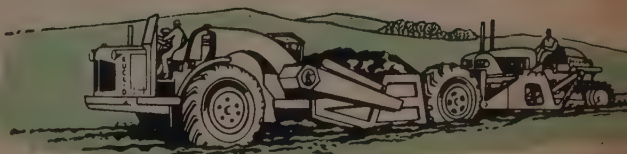
Grading this plant site on the Tennessee River proved the outstanding performance of the S-18 in difficult material. Heaped loads of heavy clay were picked up, hauled and spread in a hurry. The 300 h.p. engine, big tires, Torqmatic Drive and NoSpin differential pay off in better traction, flotation and work-ability.



Coming and going the S-18 cuts cycle time. The Torqmatic Drive and 300 h.p. engine permit shifting under full engine power—provide power and speed to move big loads fast. On this North Carolina highway job top extensions were used to increase bowl capacity—loads of 25 yds. and more were moved from borrow pit to fill at high speed.



COMPARE the cost-cutting features of "Euc" Scrapers with your present equipment. Your Euclid dealer will be glad to supply information on the complete line—from 7 to 18 yd. struck capacities.



Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE



NACIMIENTO DAM

(Continued from page 48)

are added to the five Euclid scrapers, four Euc bottom-dumps and the four Euclid end-dumps already on the job. There are about 160 men now working on the project and this number will go up to about 250 in May.

Concrete work, which will total about 15,000 cu. yd, is expected to start in a few weeks. The major concrete items are the lining of the spillway, the spillway crest and walls, the jacket around the 54-in. conduit pipe which forms the low-level outlet, and a bridge across the spillway at the crest of the dam.

There is no camp on the site as the towns of San Miguel, Bradley, and Paso Robles are within an easy drive of the job.

The maximum height of the dam is 260 ft., not 825 ft. as was given in a newspaper description of the job. The dam height is 825 ft. only if you measure it from mean sea level.

For the Monterey County Flood Control and Water Conservation District, William Redding is chairman of the Board of Supervisors;

Equipment list

- 1 Northwest 80D shovel
- 2 Marion 111 shovels
- 1 International Harvester crane
- 2 Lorain MC 425 truck cranes
- 1 Gradall
- 15 Caterpillar D8 tractors
- 1 Allis-Chalmers HD 21 tractor
- 1 Caterpillar No. 112 motor grader
- 5 Euclid 22TD/21SH scrapers
- 20 DW scrapers
- 5 Wooldridge TCH scrapers
- 4 Euclid 14 TDT end-dumps
- 1 GM water wagon, 5,000 gal.
- 1 Southwest sheepfoot
- 1 LeTourneau-Westinghouse sheepfoot
- 1 Southwest 50-ton pneum. compactor
- 1 LeTourneau-Westinghouse ripper
- 1 Southwest ripper
- 1 Ateco ripper
- 2 Euclid 13-cu. yd. belly dumps

Chester Dudley is engineer and A. Kempkey is engineering consultant. Walter Brown is principal engineer of dams for the State of California, and John W. Keysor is the state's field representative on this project. For Bechtel Corporation, David S. Culver is resident engineer and W. F. Gentry is assistant resident engineer. Jack Eakin is office engineer, Rick Semel is chief inspector, William Long is chief of surveys and Ernie C. Smallin is field engineer in charge of structures.

Contractor's personnel

James F. Seger is the project manager for Eaton & Smith. Andy Cathy is excavating superintendent. Verne E. Cunningham is project engineer, Homer Erickson is office manager, E. R. McIntosh is master mechanic, and Jim Sipe is superintendent on concrete structures. (Personnel pictures on page 92).

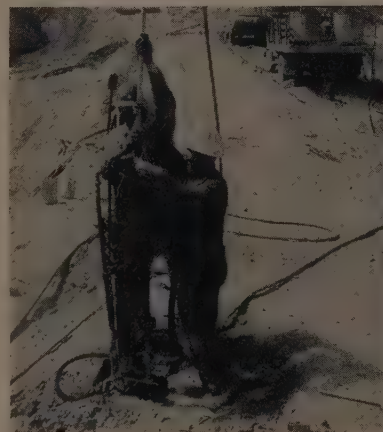
Selected unit bids on Nacimiento Dam

Engineer's estimate	\$4,250,790
Eaton & Smith	4,178,888
Guy F. Atkinson	4,414,550
Wunderlich	5,419,942
Macco Corporation	5,791,325

	QUANTITY	UNIT	ENGINEER'S ESTIMATE	EATON & SMITH	G. F. ATKINSON
Common excavation	455,000	cu. yd.	.60	.38	.28
Rock excavation	115,000	cu. yd.	1.25	1.88	2.88
Impervious core embankment	625,000	cu. yd.	.67	.515	.675
Pervious shell embankment	2,595,000	cu. yd.	.63	.653	.595
Riprap (quarried sandstone)	13,500	cu. yd.	4.00	2.50	2.50
Riprap (conglomerate)	12,500	cu. yd.	3.00	1.75	2.90
Riprap (stream cobbles)	15,000	cu. yd.	2.50	1.75	2.90
Gravel & cobble blanket	21,000	cu. yd.	2.00	3.65	2.90
Concrete in spillway walls and footings	3,350	cu. yd.	46.00	37.00	50.00
Concrete in spillway crest	4,800	cu. yd.	17.50	26.00	25.00
Furnishing and handling cement	20,000	barrels	4.50	5.45	5.00
Furnishing and placing reinforcement steel	950,000	lb.	.125	.10	.11
Clearing reservoir	4,000	ac.	120.00	88.00	125.00



A NORTHWEST DRAGLINE loads scrapers with pervious material from upstream river bed while a Cat D8 in the background heaps up material in preparation for easy scraper loading.



A GROUT CURTAIN is being placed along the axis of the dam. Flood interrupted this work.



THE STREAM flow here was about 50 sec. ft. During flood flow was 58,600 sec. ft.

"Babe, this here's a ree-tort," explained Paul Bunyan to his faithful Blue Ox. "Fer pressure treatin' wood. Them Baxter folks never dunk it, er spray it, er paint it. They got a real fancy process: They stick the wood inside this ree-tort, lock her up fer 20 hours, and when she comes out she's BAXCO pressure treated—chock full o' presarvatives." The great logger scratched his head with a pine tree. "I dunno how they do it, Babe, but them Baxter boys shore treat wood good—they make it last forever." *

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FOREST
PRODUCTS**

* Not quite *forever*, Paul—but wood, properly pressure treated, does last up to ten times longer. For maximum long-life protection against insects and rot, authorities agree that wood preservatives should be applied by pressure treating—and BAXCO Forest Products are *always* pressure treated. As West Coast pioneers in the wood preserving industry, our experienced engineering staff can assist in supplying you with the right preservative, the proper treatment, for any job. For a prompt quotation—inquire today.

Preservative treatments available: Creosote, Creosote-Petroleum solution, Creosote-Penta solution, Penta, Chemonite, Chromated-Zinc-Chloride, and Protexol fire retardants.

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J. H. BAXTER & CO. 120 Montgomery Street, San Francisco 4, California

Want to lift a 3,000-ton bridge? House mover shows how it's done

Taking a 3,000-ton reinforced concrete bridge and jacking it 13 ft. to a new grade is a tricky assignment. The contractor is getting the job done with a combination of experience and imagination.

NOW UNDER WAY is a 13-ft. upward pivoting of a 3,000-ton reinforced concrete bridge in Berkeley, Calif. R. B. Montgomery & Son, house moving contractor, is handling the job on a subcontract from Stolte, Inc., Gallagher & Burk, Inc., a joint venture holding a \$2,260,000 contract for construction on the Eastshore Freeway.

The 330-ft. long section being raised forms the westerly 8 spans of the University Avenue overcrossing of the Southern Pacific railroad tracks. The bridge formerly carried traffic to an intersection with the freeway at grade. By raising it and joining it to an overcrossing extension now under construction across the freeway the full interchange of traffic at that location will be effected.

When the California Division of Highways was designing the University Ave.-Eastshore Freeway interchange, Bridge Department engineers estimated that the cost of demolishing the existing structure and erecting a new one to the new profile on the old foundations would be about \$129,000. The imaginative raising of the existing structure conceived in Bridge Department headquarters by Claude Darby will cost only about \$62,000. Despite this rel-

atively small cost the job requires the planning and coordination characteristic of much larger projects.

As can be seen from the elevation view the bridge is being pivoted around a temporary hinge. This introduces difficulties into the jacking operation because the higher the bridge is raised the more eccentric become the columns.

The contractor's first plan was to do all the jacking at the columns. Notches were cut in each column into which were placed two 50-ton Duff-Norton hydraulic jacks. (The notches greatly reduced the cross-sectional area of the columns and for a short time the structure was actually supported on a column area about one-half the original design.) When all the jacks were bearing against the upper surface of the notch the remainder of the columns were cut away and two more jacks placed. The upper and lower surfaces of the cut column were squared up by grouting in steel bearing plates.

The jacks at each bent were connected by hoses to a master cylinder at which the pumping was done for that bent. The number of strokes required at each master cylinder was determined by the distance each bent was from the hinge point. For in-

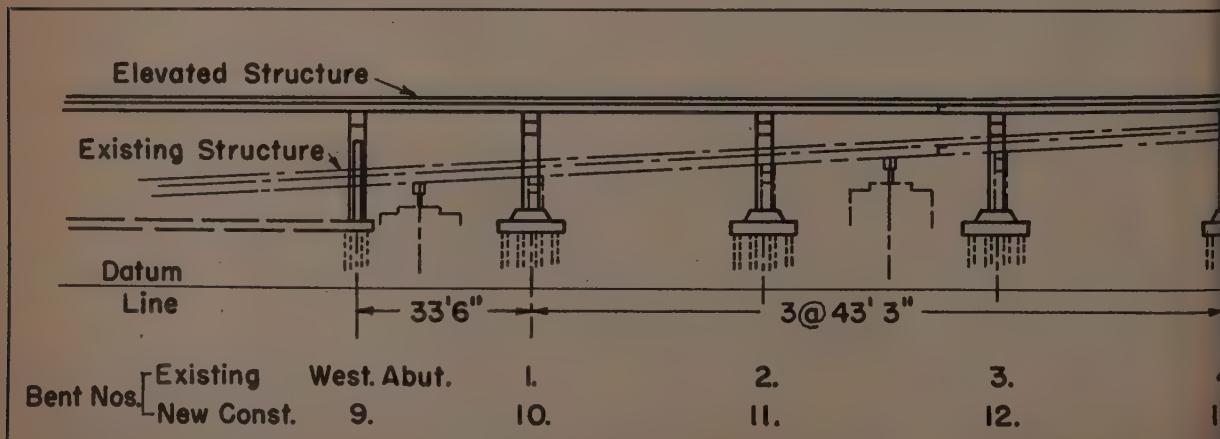
stance, when the cylinder controlling the jacks at bent 12 was stroked 90 times the cylinder for the jacks at bent 16, nearest the hinge, was stroked only 15 times.

When two of the four jacks at a column were extended to their full 6-in. lift the raising was switched to the other two while the first ones were depressed and blocked up to be ready for their next lift.

The jacking started on January 10, 1956, and is being done in two sections. To check on the progress and to control the lifting Bridge Department engineers under the direction of Bridge representative Guy Mancarti have affixed vertical tell-tales along the top of each side of the bridge. By placing transits on the stationary side of the hinge all of the tell-tales along one edge of the bridge can be seen at once. Walkietalkies and field telephones keep the engineers and the contractor in close contact so that the entire 215-ft. length can be raised evenly. When one lift point lags behind the others it is brought up to line by working the individual jacking unit at any given jack. Best lift so far is 8 in. in 8 hr.

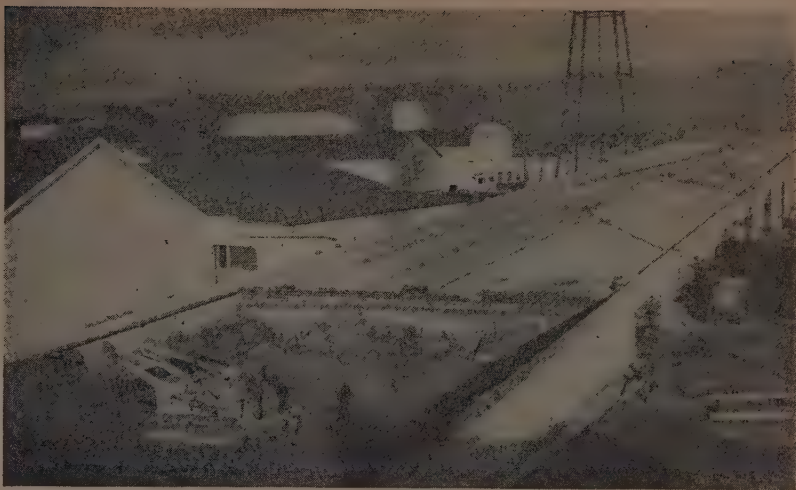
A costly delay was narrowly averted at bent 13 by the quick thinking of foreman Frank Ornellas and assistant resident engineer Ray Glover. On February 20 workmen were ready to change, or fleet, the jacks at bent 13. Just two jacks are flected at one time at any one bent and the pressure on them is released by turning two petcocks at the master cylinder. By mistake six petcocks were opened which released six of the jacks holding up the structure at that point. Immediately the structure began sinking at bent 13. The engineers on top saw the excessive deflection at

ELEVATION shows how existing structure is being pivoted about a temporary hinge cut into the concrete bridge deck near bent 17. At first both mats of reinforcing were left intact at the hinge. Later it was found that tension cracks were appearing on the bottom of the deck near the hinge so the lower reinforcing bars were cut. They will be butt-welded later.



once and relayed the information over their telephones. Instead of getting out from under the structure, the foreman and the assistant resident engineer ran to the jacks at each side of the bent and rapidly worked the jack levers, restoring the pressure and stopping the deflection. If this hadn't been done the bent would have sunk several inches before being stopped by the safety cribbing, in about two minutes. This would have opened large cracks in the bridge superstructure, a condition costly to repair.

During the first few feet of the bridge lift the arrangement shown on the typical blocking brace detail was used at every column. Notice that steel wedges are used to keep the upper surface level. This tilting of the upper column stub as the bridge was



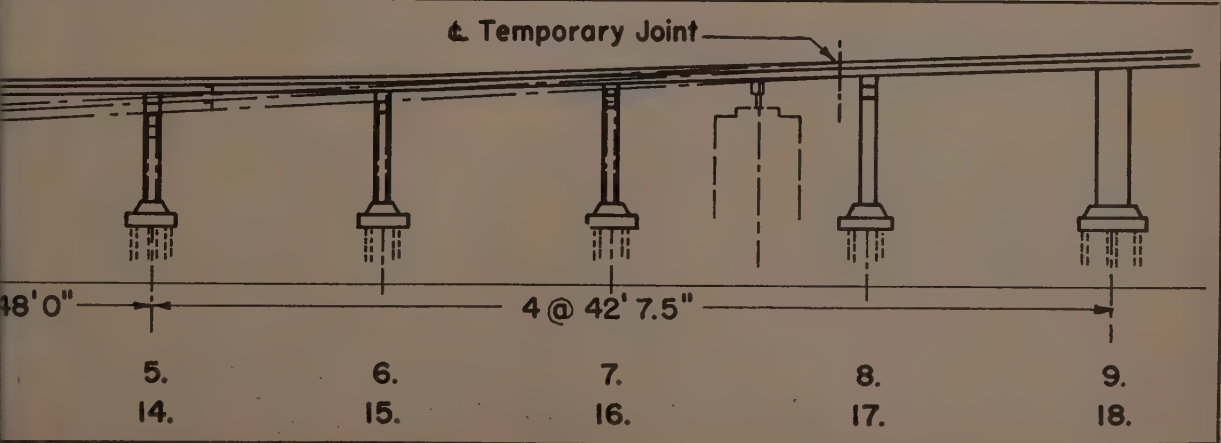
BEFORE: Dirt is being excavated prior to the removal of the box abutment. At the right edge of the picture the notches in columns can be seen into which jacks were placed to begin the lift.



CONTRACTOR R. B. Montgomery pitches in at a master cylinder during a lifting sequence. Jacking is being done from cribs at this point.



AFTER: One section is in place with one more section remaining to be lifted. The edge nearest the camera will be raised 13 ft. The entire low section is on rollers as it was necessary to move it back about 6 in. to disengage an expansion joint.





THE KEY to the job was the way the contractor positioned the jacks on two steel plates with steel rollers in between. This allowed the jacks to adjust to the increasing eccentricity as the lift progressed.

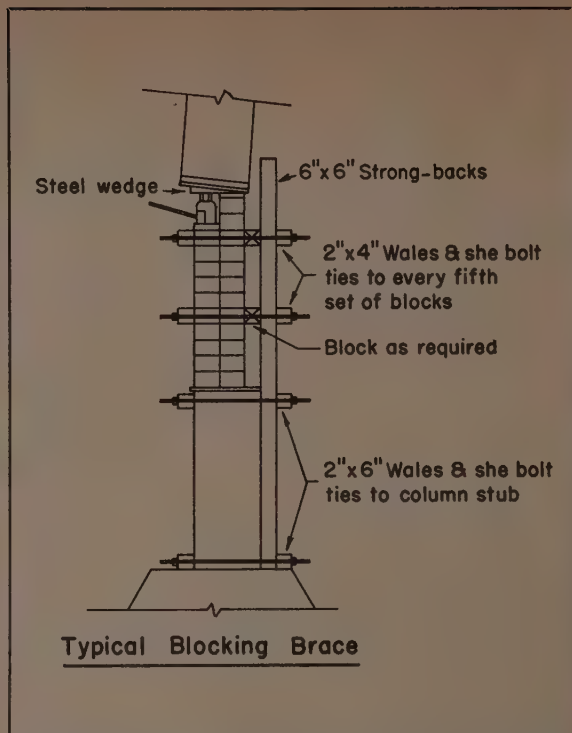
raised, and the consequent use of the wedges, introduced a horizontal component into the reactive force. This caused the jacks to tilt slightly as they expanded, with two effects. (1) The piston would bind against the cylinder, allowing some of the oil to leak out and, (2) all the weight the jacks were carrying would be transmitted to the concrete cribbing blocks at one side which caused some of the blocks to fracture. These effects were anticipated but it was felt they would not be severe enough to interfere with the operation.

The disadvantages, however, have been eliminated by an idea which occurred to contractor R. B. Montgomery. Montgomery, who has been in the house moving and lifting business for 20 yr., now has the jacks

resting on two bearing plates with $\frac{1}{4}$ -in. steel rollers between them. The rollers remove the horizontal force and allow the jacks to adjust to the increasing eccentricity. Also, the jacks were changed from the columns to timber cribbing under the column caps at bents 12, 13, and 14. This requires nearly twice as many jacks but provides much greater stability and control.

By using the revised system the lifting has gone smoothly and the first section was to proper grade on March 23. The second section, which weighs 1,000 tons, is now being lifted by the same method and is expected to be to grade by May 15. The total lift at the lower end of this section will be 13 ft.

The last phase of the project will



THIS SHOWS the system which was intended to be used for the entire lift. After the lift had gone a few feet, however, the jacks were transferred to cribbing under the bent caps for greater stability and control.

be the removal of the column stubs (except for several feet of reinforcing steel which will act as dowels) and the pouring of new columns. This will be done by the general contractor. New columns are in the design partly for aesthetic reasons. It would be disconcerting for motorists to notice that the columns run from the deck to the ground at an angle.

L. A. Anderson is resident engineer for the Division of Highways. Guy D. Mancarti is Bridge Department representative, assisted by David Gee, Harry Sato, Ray Glover and "Smokey" Freeman.

Elof Gustofson is project manager for general contractor Stolte, Inc., Gallagher & Burk, Inc.; and Paul Gotschet is superintendent of structures at University Avenue.

Noxon Rapids contract awarded to Morrison-Knudsen

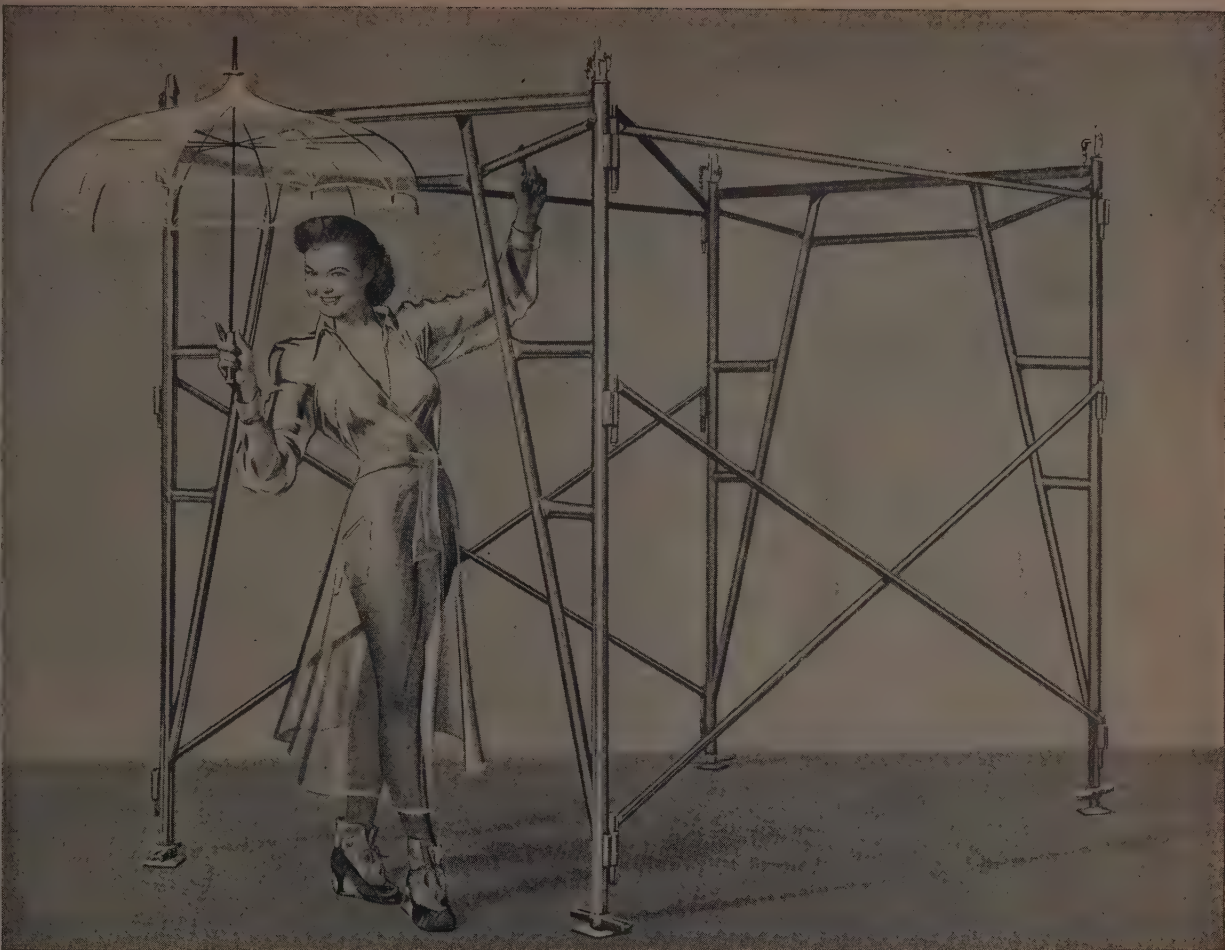
WASHINGTON WATER POWER CO. awarded a contract to Morrison-Knudsen Co., Inc., for construction of Noxon Rapids Dam and powerhouse on the Clark Fork River in western Montana. The utility said the contract, which involves about \$21,000,000, was awarded strictly on a competition basis.

M-K will complete an earthfill and concrete dam more than 4,700 ft. long with maximum height of 190 ft. from bedrock. First power is expected from the 400,000-kw. development by September 1959. The site is about 21 mi. upstream from the Cabinet Gorge installation and some 40 mi. below Thompson Falls, Mont. Work was to

have begun early in April.

Land clearing and railroad relocation have been under way for several months under other contracts. More than 2,000 men will be employed at the project when work reaches its peak.

Other firms bidding for the contract were Peter Kiewit Sons' Co., Omaha; Guy F. Atkinson Co., San Francisco; Walsh Construction Co., San Francisco; and J. A. Jones Construction Co., Inc., of Charlotte, N.C.



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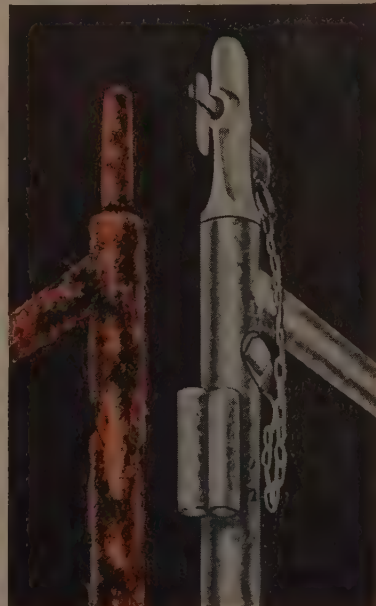
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Stabilizing shoulders with emulsified asphalt

TO PROVIDE greater safety for the motoring public and to reduce maintenance costs, the Oregon State Highway Department is using a new procedure for stabilizing highway shoulders. In place of removing the existing shoulder material and putting in a new oil mat, the operation consists of treating the existing material with a mixing grade of emulsified asphalt, followed by an emulsion seal. The result is a satisfactory shoulder at lower cost.

Safe modern highways require shoulders where traffic can turn out from the regular lanes at relatively high speed in case of emergency. Loose gravel shoulders are hazardous and require an excessive amount of maintenance.

Another important plus value of stabilized shoulders was demonstrated in the WASHO Test Road which confirmed the principle that providing lateral support helps to minimize distortion of the outer wheel track. This value, alone, may justify the cost of stabilizing shoulders on new work and of treating the unstabilized material on many miles of existing bituminous highway.

Methods of carrying out this operation eat heavily into maintenance funds and constant attention is directed toward securing satisfactory results at minimum costs. The relatively new procedure tried successfully in Oregon stabilizes the existing shoulder material with emulsified asphalt at a saving of as much as \$1,500 per mile, compared to replacing the material with a stabilized oil mat.

Problem and previous procedure

The particular highway where this problem was serious enough to require attention was the relatively new water-grade route from Portland to The Dalles up the Columbia

River. This highway, constructed in 1950-51 consisted of two 12-ft. traffic lanes paved with asphaltic concrete, with an 8-ft. graveled shoulder on each side of the pavement. The Oregon Highway Department concluded that the hazards and the maintenance costs justified the stabilizing of these gravel shoulders.

The standard procedure for accomplishing this result would have been as follows: The existing shoulder material would have been removed and replaced with oil aggregates hauled from stockpiles. A shot of hot bituminous binder would have been applied to the $\frac{1}{2}$ - to $\frac{3}{4}$ -in. size oil aggregate which would then have been sealed using smaller aggregate to build up the final shoulder thickness. The final result would have been a regular Oregon State 0-9 oil mat.

The high cost of this treatment, in spite of the satisfactory results, resulted in engineering studies to secure a more economical solution. The key to the economy would be the treatment of the existing shoulder gravel in position. This material was placed when the roadway was built and consisted of suitable $\frac{3}{4}$ -in. maximum crusher run gravel. It was well suited to some type of asphalt stabilization.

In cooperation with the technicians of the American Bitumuls & Asphalt Company the engineers of Division I in 1953 began a series of tests on the various types of asphalt binders to be used on the material in place. An SS-1 (mixing grade) asphalt emulsion was selected because of its ability to mix readily with wet aggregates plus its ease of handling.

The construction equipment required to carry out this work varied with job conditions but generally consisted of two blade graders, one asphalt distributor truck, two tanker trucks to transport the emulsion to

the job and one or two water tank trucks as needed. A dump truck and a scoop loader were used occasionally to haul and load $\frac{3}{4}$ -in. material to those locations along the highway where the material was deficient.

Steps in the process

Steps in the stabilization procedure were adjusted to meet varying conditions but usually began by sprinkling the shoulder with water to hold the fines in position. The next step was to grade the shoulder material away from the pavement to a depth of about 1 in. The emulsified asphalt was then added in several shots, sometimes diluted with about 50% of water. The addition of the water helped disperse the emulsion through the shoulder material.

The applications continued until about from 0.65 to 0.80 gal. of emulsion per sq. yd. was in the material. It was aided in dispersal by occasional blading. Then, the finish grader was equipped with a layout "boot" designed to give a straight shoulder line to the surface. It made the final layout pass followed immediately by rolling with a steel-wheel roller. When rolling was complete a final light shot of mixing grade emulsion was applied and the surface covered with course sand.

A curing period of from seven to ten days was allowed before application of a final seal consisting of 0.25 gal. per sq. yd. of RS-2 Quick-Breaking emulsion covered with $\frac{3}{4}$ -in. to No. 10 oil aggregate.

This final seal was then drag-broomed, the two types of aggregate used for the seal established an excellent line of demarkation separating the shoulder from the regular traffic lane.

After the procedure and to standardize procedure maintenance crews were able to stabilize about $\frac{1}{4}$ mi. of 8-ft. shoulder per day. Average cost for stabilization with emulsions was about \$2,000 for the two 8-ft. shoulders per mile. This compared to about \$3,500 per mile for conventional oil mat construction.

Reports indicate that the new stabilizing process has produced a shoulder giving satisfactory service with minimum maintenance.

Personnel

This emulsified stabilization program was worked out and supervised by A. G. Skelton, division engineer of Division I. He was assisted by the district superintendent of maintenance, D. D. Rohrbough. Field supervision of the work was under J. Claude Moore and Charles Walker.

R. H. Baldock is state highway engineer of Oregon and E. A. Collier is maintenance and equipment engineer.

American Bitumuls & Asphalt Co. is represented in Oregon by R. G. Congdon, sales engineer, with headquarters in Portland.



FIVE WOODEN ISLANDS were built last year in Great Salt Lake by SP in early phases of the railroad's construction of 13-mi. rock fill. While fill took shape at ends of present wooden trestle, tests of lake bottom were made from these platforms. Survey showed 15,000,000 cu. yd. of soft mud must be dredged away before mid-lake part of fill can be dumped. In distance is Promontory Point where new fill material will be quarried.

M-K starts Utah fill

Southern Pacific will replace world's longest railroad trestle over Great Salt Lake with 13-mi. fill, a \$45,000,000 contract and a permanent roadbed for this vital link on the Overland Route—Work camp is building for 600 men.

SOUTHERN PACIFIC Co. has awarded a \$45,000,000 contract to Morrison-Knudsen Co., Inc., for the construction of a 13-mi. long fill across Utah's Great Salt Lake.

The completed project—which will cost the railroad nearly \$49,000,000—will provide a permanent roadbed greatly strengthening the crossing as a vital artery of national defense on the railroad's Overland Route.

Rail operations over the embankment, replacing the world's longest railroad trestle, are expected to begin in early 1960. By then the fill will have made possible a stable roadbed suitable for full-speed operation under normal maintenance without fear of fire, accidental damage, or sabotage.

With several years of work and study behind it, the embankment has already begun to take shape. Great quantities of material have been placed along the alignment diverging from the northerly face of the existing Saline fill. The Saline fill is at the east end of the trestle portion of the 32-mi. Lucin cutoff which SP built half a century ago to save 42 extra mi. originally required to bypass Great Salt Lake.

First steps in actual construction were taken last June, with rock being dumped by Southern Pacific forces in the first of two stages of work on the Saline fill.

Awarding of the Morrison-Knudsen contract accelerates the work on a four-year schedule. A new work

camp for about 600 men, plus their families, is rising on the barren mountainside west of Promontory Point.

This force will operate massive, specially built equipment to accomplish by 1960 an earth-moving project rivaling the West's biggest dam and freeway jobs. From nearby rock quarries and sand and gravel pits a giant conveyor belt will be fed by shovels taking out material at the rate of 6 cu. yd. per bite. Seven barges built at the site will move

3,000 tons per trip; dump trucks will bear 50-ton burdens.

Immense size of the fill is pointed up by the fact that less than \$2,000,000 will be required for installing railroad track and signal equipment. All the rest of the \$49,000,000 price tag on the project represents cost of the 13-mi. embankment itself—at the rate of almost \$4,000,000 per mile.

Millions of tons of material will be needed before the entire fill rises and splits the surface of the lake. At least 10 cu. yd. of material will be under water for each yard that is visible above water.

The present 12-mi. trestle was called one of the wonders of the engineering world when it was opened in 1904. Thorough, but expensive, maintenance over the past 50 years has resulted in its excellent safety record, it never having been the scene of a major fire or accident.

The embankment replacing the trestle part of the cutoff will be constructed by first dredging from 15 to 30 ft. of soft mud—some 15,000,000 cu. yd. of it—from the lake bottom on a line parallel to and 1,500 ft. north of the present trestle.

Extensive tests dating from 1953 were made of the lake bottom to assure the feasibility of this portion of the project. Borings and analyses performed by International Engineering Company, Inc., were double-checked by the leading engineering consultants on soil materials.

Following the dredging, rock and gravel from sites around the lake will be barged into the lake and dumped into the dredged area. The ditch bottom will generally be about 60 ft. beneath the water surface.

When the embankment is 17 ft. above the surface it will be widened and strengthened with heavy rock to protect it against storms which toss 8-ft. waves on the 2,000-sq. mi. lake.

Passageways will be provided in the railroad causeway, SP said, for movement of small boats between the upper and lower ends of the lake.

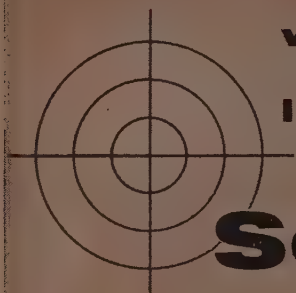


STANDING ON beginnings of fill takeoff from existing Saline Fill at east end of trestle are (l. to r.) O'Dean Anderson, project manager for M-K; Virgil Anderson, superintendent, SP's Salt Lake division, Ogden; J. W. Corbett, vice president, operations, SP; Howard Willard, project engineer for SP. Not pictured are Carl Larson, general superintendent for M-K; R. K. Woodhead, office manager, and Denny Bagley, project engineer.

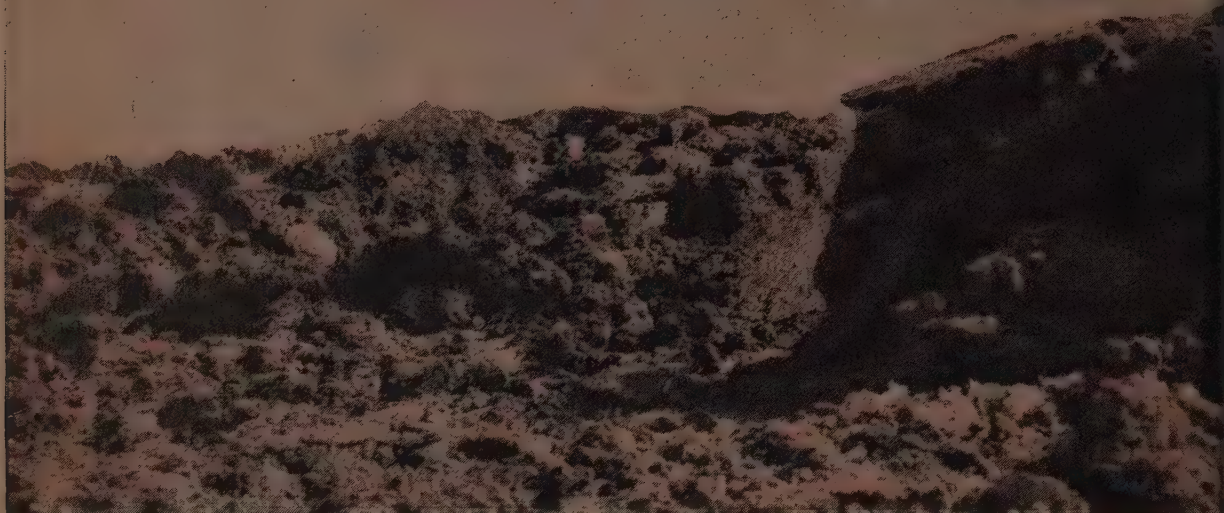
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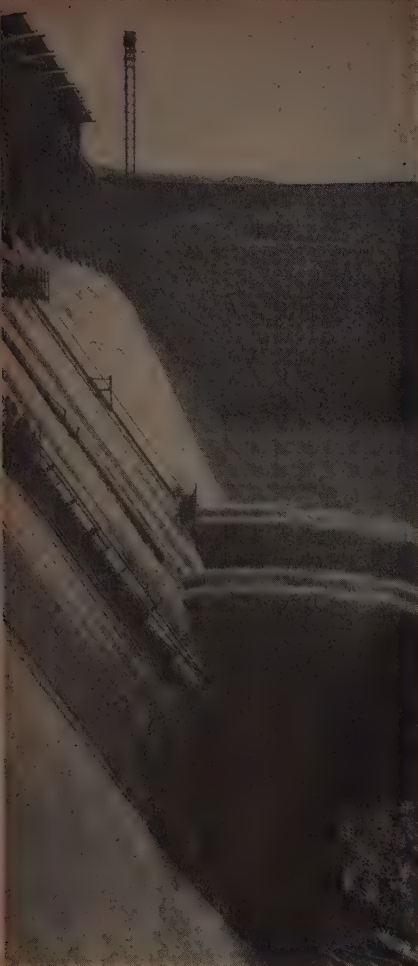
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Closing the sluiceways at Chief Joseph Dam

Requirements for tight plugs and considerations of the fast time schedule resulted in the selection of Pre-pakt concrete—Cooled aggregate placed and mortar-filled, securing tight joints and concrete with 6,430-psi. compressive strength at 90 days.

To obtain effective plugs with conventional concrete, it was considered necessary to place concrete in lifts and cool it by pumping cold water through embedded pipes. The pipes and contact joints between new and old concrete would be pressure grouted to complete the plug. With these various time-consuming operations and a tight construction schedule, several sets of bulkheads would have been necessary so that work could be performed on several sluiceways at the same time.

Prepakt concrete, which is especially adaptable for such placements, was specified for the plugs and proved to be a time saver. By precooling the coarse aggregate, cooling of concrete in place with attendant volume change was eliminated. Because setting shrinkage is also eliminated by admixes in the Prepakt mortar, grouting of joints between new and old concrete was not required. The entire plug was therefore cast monolithically, allowing the upstream gate to be removed 5 days after the concrete was placed.

The sluiceways in each monolith were dewatered and plugged in pairs. Two 90,000-lb. steel gates were available for closing off the upstream ends of the two sluiceways. An open steel

caisson 36 ft. long spanned the two discharge ends and provided access to the sluiceways. Dewatering of a sluiceway required slightly less than 4 hr. Leakage around the gates and caisson was negligible. Surfaces of existing concrete against which Prepakt concrete was to be placed were sand-blasted to provide suitable bond.

Forms were constructed of 12 x 12-in. timbers, except for the spillway surface of the downstream plug which was formed with 2-in. T & G lumber to match existing spillway surfaces. Upstream forms were required on the entrance plugs to permit removal of the steel gates. The 12 x 12-in. timber segments were cut and fitted into position in recesses left in the sides of the sluiceway concrete. These forms were lined with 3/8-in. plywood to make them mortar-tight. Forms for the upstream plug were completely constructed prior to placement of coarse aggregate, except for an access opening near the top which was closed when aggregate placement was completed. Holes were drilled through forms for insertion of mortar intrusion and vent pipes were installed during aggregate placement.

Coarse aggregate was stockpiled in

By C. H. FERGUSON
District Manager
The Prepakt Concrete Co.
Seattle, Wash.

CLOSURE of the 24 sluiceways at Chief Joseph Dam on the Columbia River was a relatively small but important feature in the construction of that major power project. The sluiceways were used to handle river diversion during construction and were 8 ft. wide by 16 ft. high and 135 ft. long between the up- and downstream faces of the dam. When the sluiceways were no longer needed for diversion they were to be closed with a plug 15 ft. long at each end (see drawing).

The schedule for placing sluiceway plugs was governed by progress of construction on the powerhouse intake structure. Flow had to be passed through the sluiceways until construction of the powerhouse intake structure had progressed far enough so that the lake behind the dam could be filled and the water discharged over the spillway without flooding the powerhouse. Plugs were then required to be placed as soon as possible so that storage of water could be started.



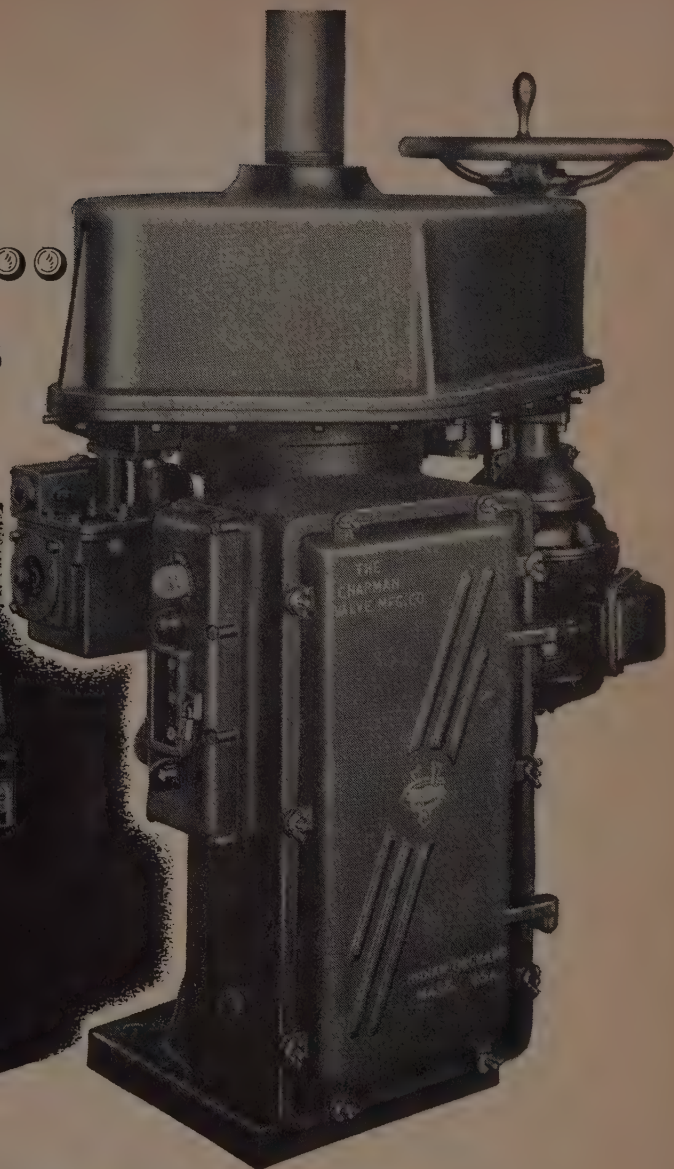
BULKHEAD covers the downstream ends of a pair of sluiceways, while the Columbia River flows at 105,000 sec. ft. through the others. Sandblasting the surfaces of all existing concrete provided for suitable bonding.

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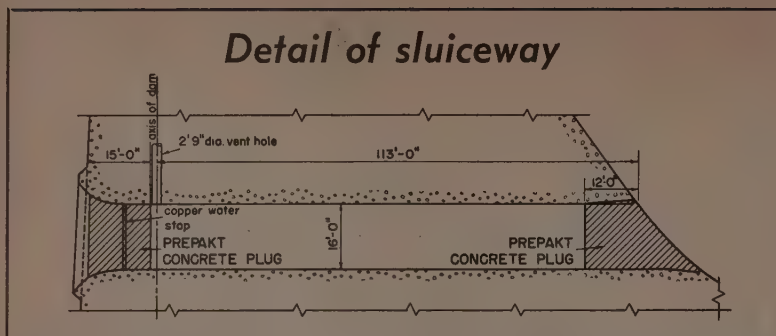
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Detail of sluiceway



SLUICWAY was 8 ft. wide by 16 ft. high. Aggregate for the upstream plug was moved forward along the sluiceway by front end loader to a sloping conveyor belt that deposited it in the form.

two sizes of $\frac{3}{4}$ to $1\frac{1}{2}$ in. and $1\frac{1}{2}$ to 3 in. These two sizes were blended to obtain the lowest void content. Blending was done in the prime contractor's mixing plant and the material was washed at the same time. Pre-cooling prior to placement was done by refrigerated air and water from the refrigeration plant to reduce initial placement temperature, thereby lowering maximum temperature rise. The aggregate was delivered in 8-yd. concrete buckets by the overhead cableway to a hopper mounted on the downstream caisson. (See picture.)

Coarse aggregate for the upstream plug was transported from the downstream end of the sluiceway by a front end loader to 18-in. conveyor belt 40-ft. long that elevated the material through a 3 x 5-ft. opening in the form. It was deposited in 18-in. layers through an elephant trunk. For filling the top of the lift, a high-speed 6-in. conveyor belt was used to toss the aggregate back into the upper bell-mouth of the sluiceway. This eliminated a great deal of hand work and packed the aggregate tightly against the top of the sluiceway. A small amount of hand placing was required, however, when the

opening in the form was closed.

Coarse aggregate in the downstream plug was quickly and easily placed by gravity direct from the storage hopper on the caisson through an elephant trunk into the forms. The downstream face form also contained an opening for filling with coarse aggregate.

The upstream plugs contained 68 cu. yd. of Prepak concrete and the downstream plugs contained 89 cu. yd., making a total of 157 cu. yd. of concrete per sluiceway, or nearly 3,800 cu. yd. total to be placed in all 24.

Voids in the coarse aggregate were completely filled with Intrusion mortar by pumping this material through the previously placed insert pipes. The Intrusion mortar consisted of a mixture of cement, water, sand, Alfesil (a finely-divided siliceous material), and Intrusion Aid (a necessary admixture for the manufacture of Prepak concrete). A small batching and mixing plant was located on the north bank of the river, a short distance downstream from the dam. From here the mortar was pumped a maximum distance of 1,635 ft. through a $1\frac{1}{2}$ -in. diameter steel pipe to an auxiliary mixing tub set

up on the downstream caisson. It was then relayed by two additional pumps directly into the coarse aggregate.

The rate of mortar intrusion was such that the vertical rise of mortar in the forms did not exceed 2 ft. per hour. This placement rate was intended to decrease form pressures. About 5 hr. after completion of initial pumping, vent plugs were removed and a small amount of fresh mortar was injected into the top of the plug to remove such traces of free water as may have collected there.

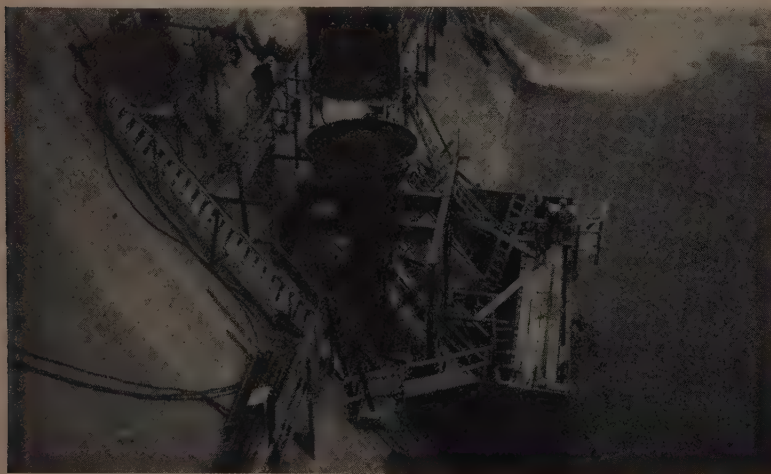
Mortar mix proportions, by volume, were three parts cement to one part Alfesil, to four parts sand. One bag of Intrusion Aid, (2 $\frac{5}{8}$ lb.), was added to each batch. The water-to-cementing-materials ratio was 0.57. Average 90-day compressive strength obtained was 6,430 psi. The portland cement content average for all Prepak concrete was 4.4 sacks per cubic yard. Based on the total volume of mortar used, the calculated average void content of aggregate was 39.8%.

Cores, 10 in. in diameter, were drilled from two upstream plugs at the top construction joint so as to intercept the bond zone between Prepak and conventional concrete. Cores were taken from this location because placement beneath this perfectly flat surface at the top of the sluiceway plug represented the most difficult condition of placement. These cores showed that the plug was tight and that mortar from the Prepak concrete was forced up into the fissures and indentations on the cleaned surface of the old concrete. Inspection of these sluices has shown that there is no leakage of water through or around these plugs even though maximum water pressure against the upstream plugs is 80 psi.

The first pair of sluiceways were placed in the fall of 1953. These two were near the north abutment of the dam. A backfill was to be placed at this location so these two plugs had to be completed a full season before the others were done. The remaining 22 sluiceways were completed during the period September 1954 to February 1955.

Personnel

The work at Chief Joseph Dam was under the jurisdiction of the U. S. Army, Corps of Engineers, with Col. N. A. Matthias, district engineer and Charles Wagner, resident engineer. N. W. Evans was project manager for the prime contractor, Chief Joseph Builders, with K. L. Parker, chief engineer. Placement of Prepak concrete was done by The Prepak Concrete Co. under the direction of J. H. Bowman, Western regional manager.



PRECOOLED AGGREGATE for the downstream plugs could be placed in the forms by gravity. Here the 8-yd. bucket is loading the hopper feeding the elephant trunk into the form. Each downstream plug contained 89 cu. yd.

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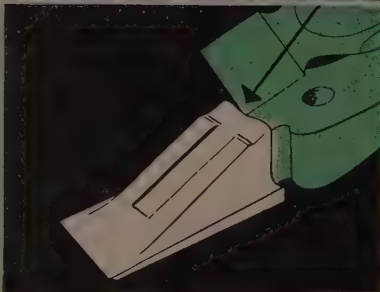
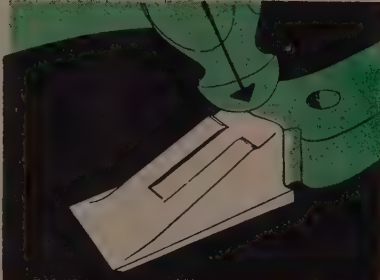
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Smooth surfaces...

(Continued from page 42)

thickness of asphalt. The screed operator must not only compensate for this actual difference in thickness but must also take care of the difference in compaction. These abrupt changes mean that an operator must work accurately and fast. In the situation just mentioned from 1/16 to 3/8 of an inch may represent the compaction in the 1/2 in. of asphalt paving whereas the screed operator must allow for 3/8 to 1/2 in. for the thicker surfacing. Of course, much will depend on the type of mix and materials being used.

It is my opinion that to obtain good riding quality of asphalt paving over this type of base requires the perfect cooperation of an expert crew, with the screed man as the key.

Where the subgrade is a bituminous or seal-coated pavement the problem is relatively easier since the flexible surface probably followed the natural settlement in smooth depressions lacking abrupt breaks.

A good starting operation under these conditions is to use a heater planer to burn off the tops of the corrugations or ripples in the original bituminous surfacing. A few days spent with one of these machines can produce most helpful results in securing a final smooth riding surface. Another preliminary treatment may be to blade on the plant-mixed asphalt with motor patrol to pick up the extremely low spots.

After these preparations of the existing surface the operation becomes very similar to the one just discussed except that it is relatively easier on the machine operator because there is more time available to adjust the asphalt thickness to compensate for the more gradual changes in the grade.

Although I have emphasized the importance of the motor patrol operator and the asphalt laying screed man, they cannot possibly turn out a good job all alone. On all types of asphalt surfacing the combination of transverse and longitudinal smoothness is a problem that requires co-ordinated efforts. Continual supervision is a must not only by the engineers but also by the supervisory staff of the contractor. And don't forget the constant application of the plain old-fashioned straight edge. With this simple device and a few qualified rakers and roller operators, it is many times possible to take out a final bump or jar from the riding surface.

Finally, building the highest type of riding quality into asphalt pavements requires team work and co-operative effort on the part of all engineering and contractor personnel. The actual spirit of cooperation must exist and everybody on the job must be working together as a joint effort to build a better riding highway.

Louvers collect fish in channel

Novel design developed from years of laboratory and field studies directs fish to bypass without use of screens—Millions kept out of Delta-Mendota Canal and returned to San Francisco Bay en route to ocean.

By FORREST RITCHEY
Engineer, Bureau of Reclamation
Denver, Colorado

A NOVEL DESIGN for fish collecting facilities is now under construction at the intake to the Delta-Mendota Canal, a principal irrigation artery on the Bureau of Reclamation's Central Valley Project in California. The facilities are the result of a 4-year period of intensive design, laboratory, and field studies. When completed they will prevent millions of young fish, mostly salmon, bass, shad, and catfish, as small as one-third inch in length, from entering the canal at its intake in the Delta area of the project.

In brief, the facilities divert the fish from the main flow of water by means of a row of vertical louver vanes set 1 in. apart and directed at right angles to the flow in a structure which extends about 340 ft. diagonally across a concrete channel 83½ ft. wide and about 25 ft. deep. As the fish approach the louvers they swim to one side to avoid the disturbing eddies and vibrations created by the louvers, and readily enter bypasses placed at intervals in the louvered barrier. The bypasses carry the fish to holding tanks. From the holding tanks the fish are to be transported by trucks 40 mi. to the Suisun Bay area where they can swim safely to the ocean.

Situation and fish

The Delta region is a maze of tidal channels at the head of San Francisco Bay. The project's Delta Cross Channel carries surplus Sacramento River water from the northern end to the southern end of the Delta for delivery to the intake of the Delta-Mendota Canal. Water from the intake is then conveyed 2½ mi. to the 4,600-sec. ft. capacity Tracy Pumping Plant, which lifts the water 197 ft. into the canal for delivery to irrigable lands 120 mi. to the south. The fish collecting facilities are being built adjacent to the Old River, which serves as a natural link in the Cross Channel.

The Delta area is the most important spawning and rearing region for striped bass and shad on the Pacific coast. Young king salmon are found in great numbers in the waters of the Delta where they loiter on their way to the ocean. Catfish are an important sport fish that spend their life cycle in the Delta waters.

Salmon, bass, and shad are anadromous fish—they spawn in fresh water but spend their adult lives in the ocean. The young fish descend the rivers to the ocean, carried by and following the major flows of water. During periods of low flow in the Old River and when the canal is operated at capacity, the Tracy pumps will take all of the flow of the San Joaquin River entering the Delta from the south and may draw half of the Sacramento River flow. Thus, the major diversion of the Delta-Mendota Canal operating at full capacity would be nearly as great an attraction to these young fish as would the combined river flow of the Sacramento and San Joaquin rivers to the ocean.

How the design works

The principle of the louver scheme is shown in Fig. 1. The fish are carried tail first by the approach flow until they "sense" the disturbance created by the louvers. They then orient themselves approximately normal to the line of louvers and

FISH are a problem. They represent a factor to be considered in the design of many Western dams, resulting in costly and complicated facilities. Keeping them in or out of water conveyance channels has caused many changes in otherwise simple design. They have an economic value, and when this is combined with the growing factor of recreational considerations, their spiny presence is a design headache that will not decrease in this Western region.

This article describes what might be classed as an exceptional problem, requiring a most complex solution. But when a \$988,116 construction contract is required to keep small fish out of an irrigation canal, it does show how big and serious this problem of Western water control can become.

Editor.

swim to avoid the disturbance. The swimming velocity, V_s , together with the approach velocity, V_a , in the channel produces the resulting velocity, V , with which the fish move along the line of louvers and into the bypass.

Experiments have shown that the louvers will divert over 90% of the fish into bypasses and that the louvers are particularly effective in maintaining a low mortality rate because there is no physical contact with the fish and the fish are not exhausted by their swimming efforts.

During a large part of the diversion period there is considerable peat moss in the delta waters and it is carried to the canal intake by the pumping draft of the Tracy Pumping Plant. The moss ranges from small particles more or less evenly distributed in the water to large floating or semi-floating islands. When the fish are collected for hauling, the concentration of moss in the water must be considerably reduced to prevent suffocation of the fish.

A plan of the facilities is shown in Fig. 2, and a section through the structure along the path of the fish is shown in Fig. 3. Fish entering the louver structure are deflected by louvers into bypasses. The bypasses are connected with bypass pipes located beneath the structure. The bypass pipes carry the fish to a secondary louver structure where a double line of louvers is used to further concentrate the fish and to separate them from the moss laden water. Screened water is introduced at the side of the secondary louver channel just ahead of the bypass in such a way that the clean water flows alongside the mossy water and enters the bypass instead of the mossy water. Fish traversing a line of louvers will cross over into the screened water and enter the bypass along with the clean water.

Into the holding tanks

From the secondary louver bypass the fish are carried in a pipe to one of four holding tanks. Flow entering a holding tank will be about 10 sec. ft. when the maximum flow of 4,600 sec. ft. is directed into the Delta-Mendota Canal. Fish are held in the holding tank by an 8-ft. diameter cylindrical wire mesh screen placed on the vertical center line of the tank. Flow passes through the screen and leaves the tank at a sump in the bottom of the tank.

When the fish are to be transferred from a holding tank to a hauling truck, the bypass flow is routed to another tank and the tank containing the fish is drained by the sump pumps of all but 500 gal. of water and fish. A 500-gal. capacity bucket is lowered through the cylindrical screen and

into the holding tank sump, the screen is raised, and the fish and water are deposited into the bucket. The bucket is then raised and the fish transferred to a refrigerator truck which hauls them to the Suisun Bay area beyond the influence of the diversion to the canal.

Control of the water flow

Water surface in the main louver structure, the secondary louver structure, and the holding tanks fluctuates with the tide. The difference in water levels required to move water through the collecting facilities is produced by a pumping plant which has one set of pumps for holding tank flow and another set for secondary louver structure flow.

The quantity of water pumped through the facilities is regulated by the number of pumps in operation and by recirculating flow through

bypass valves. The velocity of flow in the main louver structure will vary about 1 ft. per sec. because of tidal action. Experiments show that the velocity of water entering the fish bypasses should be greater than the velocity of the approach flow but probably can exceed the approach flow velocity by as much as 2.5 ft. per sec. Therefore, the flow through the collecting facilities can remain constant for any particular number of pumps in operation at the Tracy Pumping Plant.

A trashrack having 2-in. clear spacing between bars protects the louver structure. Small debris collecting on the rack is removed by mechanical rake and large debris is hauled by means of a cableway to the end of the trashrack where a ramp is provided for removal of debris. Louvers are divided into panels and a gantry crane is provided on the operating deck to lift the panels so

that fine debris collecting on the louvers can be washed off with water from high pressure hose.

Development of design

Design of the facilities was developed from studies conducted at a pilot structure. Incorporated in the experimental structure (completed in 1951) were stationary screens of wire mesh and perforated plates, conventional traveling water screens, a system of ports and risers for bypassing fish, and a fish holding pond.

In the spring of 1952, when the temporary structure was placed into operation, it soon became evident that it would be impossible to keep the stationary screens free of debris, and some of the stationary screens were later replaced with traveling screens. As the fish did not enter the bypass ports as expected, they were removed from the water by forcing them with high screening velocity against the traveling screens so that they could be lifted bodily from the water along with moss and trash in trays on the screens.

A small test flume was constructed at the pilot structure, and experiments were conducted with filtered water. During this test period the advantages of using a line of louvers to deflect fish into a bypass were realized. Further studies were made on a larger experimental flume, constructed in one of the bays of the pilot structure. Flow straightening vanes were developed for the louvers by the Bureau's Hydraulic Laboratory.

Many tests were made in the flumes to determine the spacing of the louver slats, approach velocity limitations, and the best angle for the line of louvers. As shown in Fig. 1 the maximum approach velocity is a function of the swimming ability of the fish and the louver angle. Theoretically, fish having a normal continuous swimming ability of 1.0 ft. per sec. will traverse an approach velocity of about 4.0 ft per sec. with a louver angle of 15 deg. Tests showed that for a given swimming speed and flow the required area along the line of louvers is the same regardless of the angle.

Experimental studies and development of the louvers for the fish collecting facilities were conducted as a joint effort of the Bureau's regional office at Sacramento, the U. S. Fish and Wildlife Service, and the California State Fish and Game Dept. Designs and specifications for the facilities were prepared in the Denver offices of the Bureau under the general direction of L. N. McClellan, Assistant Commissioner and Chief Engineer.

Essential features of the facilities are being constructed under a \$988,116 contract awarded to Fred J. Early, Inc., and John Delphia of San Francisco. The work is scheduled for completion next month.

Details of louver system

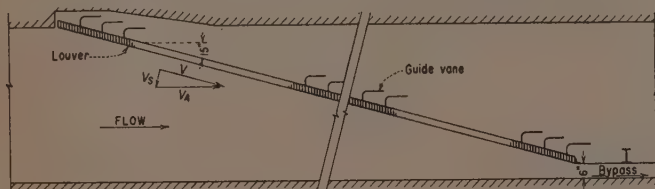


FIGURE 1

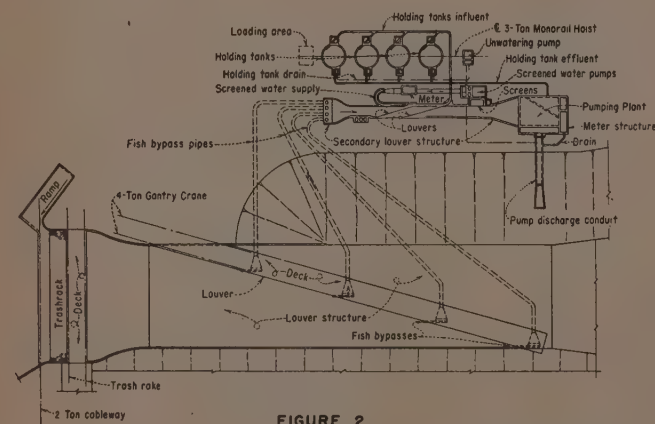


FIGURE 2

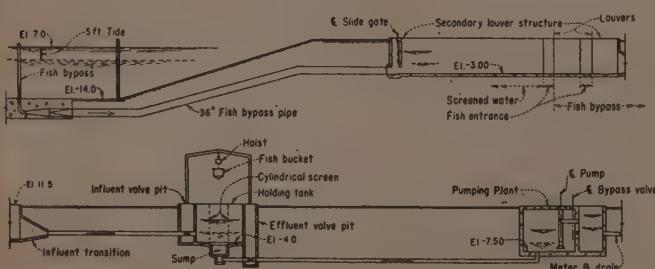


FIGURE 3

The Engineer's Field Report

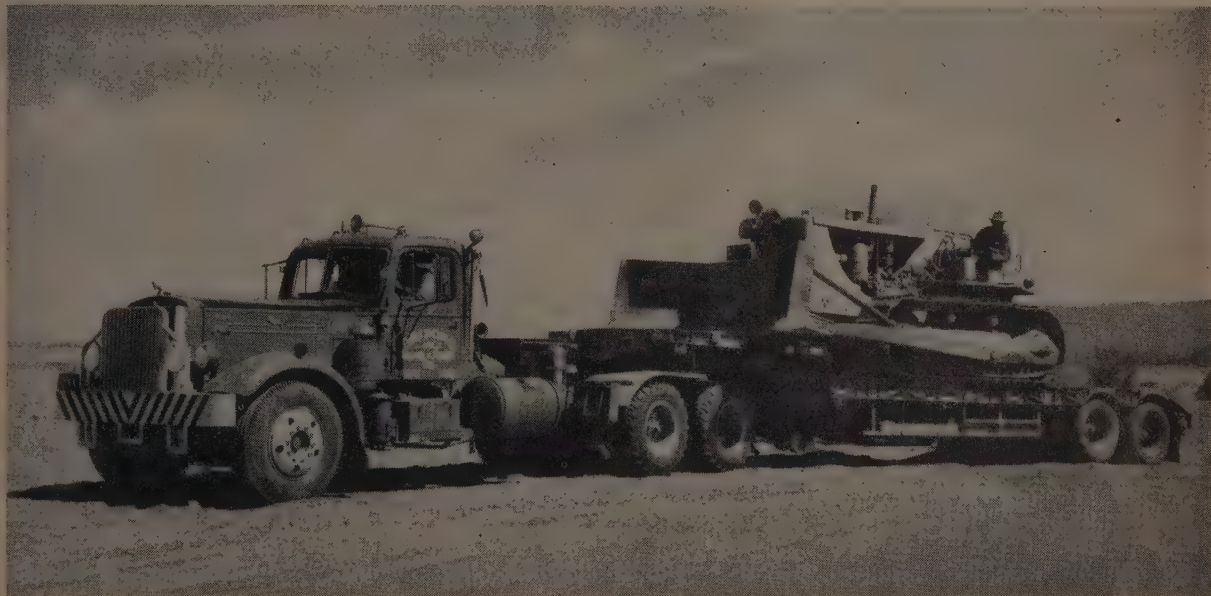
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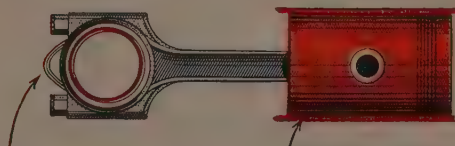


This Mack tractor's 200 h.p. Cummins diesel went in for its first overhaul after four years hauling heavy equipment to and from Arizona construction jobs. The rig hauls loads up to 25½ tons in on-and-off-highway work. Using RPM DELO Special Lubricating Oil since new, inspection after 150,000 miles showed oil return holes clear, all rings free and in good condition, maximum sleeve taper only .0045". Manley Johnston, Shop Foreman, Arizona Sand & Rock Co., reported, "The engine was really clean! It could have gone at least 50,000 more miles." Arizona Sand & Rock, general contractors for road building projects and operators of a large plant,

works its equipment in constant dust and grit...in desert and mountainous terrain. The company depends on RPM DELO Oils to give the protection these heavy-duty engines need under these tough conditions.

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Steel scaffolding cuts shoring costs

Contractor uses steel scaffold frames for shoring formwork on Oakland project—I-beams and angle-irons combined to form concrete columns can be stripped and moved intact to next position.

SCAFFOLD FRAMES are being used for shoring formwork on a large scale on a freeway project now under way in Oakland, Calif. Involved is the construction of a double-deck, reinforced concrete, box girder structure that will be about 2 mi. long. The contractor is Grove, Shepherd, Wilson, and Kruge, Inc., holding two contracts totaling \$8,239,504. The first was awarded in July 1955, the other in January 1956.

When finished, each deck will be 54 ft. wide and will carry four lanes of traffic. The structure is being built down the middle of Cypress St. which now carries over 40,000 vehicles a day. All this traffic has been shifted to each side of the new structure making construction space very scarce. Completion date of the job is about July 1957, with 82,000 cu. yd. of concrete and 26,000,000 lb. of reinforcing steel up to $2\frac{1}{4}$ in. in diameter to be placed before then.

The use of steel scaffolding for shores is not the only unusual feature about this project. An interesting forming method is being used on the concrete columns—most of which are 4 x 6 ft. up to 40 ft. high. I-beams and angle-irons are combined in a 28-ft. high framework that requires no form ties through the concrete column. The framework can be stripped by crane while still intact and moved to the next column.

Cypress St., the existing six-lane street on which the new structure is being built, provides an excellent foundation for formwork of a light nature. Light loading is required because sea level and soft muds lie only a few feet below the street. Beatty scaffolding was chosen and over 12,000 will be in use at one time in heights up to 45 ft. A feature of the Beatty frames is a spring snap-lock

which makes the attachment and removal of diagonal braces an easy matter. The braces can be attached securely without spending any time tightening wing nuts. Although this saves only a few seconds on each operation, it is an important feature since most of the frames will be dismantled and reassembled more than 6 times.

Currently, the contractor has shoring and forming operations under way on three separate sections of the project. Each section covers a 750-ft. length of the bridge.

Frame construction

The frames are 4 ft. wide and are being used in three heights: 6 ft. 4 in., 5 ft., and 3 ft. By using various combinations of these heights, plus the use of jackscrews at the top and bottom, there is plenty of height flexibility and fine adjustments can be made easily. Under a normal 54-ft. wide deck section 8 of the 4-ft. wide frames are placed. When they have been built up to the proper height 6 x 12-in. timbers 5 ft. long are positioned across the top by nailing through small swivel plates at the top of the frames. These timbers support the 6 x 10-in. timber stringers which in turn support the joists and the plywood of the forms.

When the concrete has set and the load is off the frames they are broken down into their basic sizes and moved forward to the next location. It has not been found feasible to move an entire 45-ft. column of frames intact. The distance between the concrete columns is about 80 ft. A 240-ft. section of deck is poured at a time. Pile driving is under subcontract to Macco Corporation, with Vernon Casey supervising. About 4,500 ft. of Armco 12-in. pipe, cast-in-place pile and H-beams, and timber piling are being used.

Techniques out of teamwork

Advanced techniques being used by GSWK are the result of teamwork requiring unusually close coordination between project engineer Bob Brenner's design department and the field supervisors. Ken Morris is project manager.

Supervisory personnel

Job superintendent for GSWK is Robert Overman. Ken Sower is field engineer. Office engineers are Larry Dewey and Ken Greene (former assistant editor of **Western Construction**.) Mike Mitchell is carpenter superintendent. Frank Cozzolino is concrete superintendent and Vincent Hunt is master mechanic.

For the California Division of Highways, Bridge Department, Irwin Black is resident engineer and Bill Baum is office engineer. Field engineers are Fred Barnes and Noble "Casey" Jones.



SUPERVISORY PERSONNEL for GSWK include (l. to r.) sidewalk superintendent Brenner, project manager Ken Morris, assistant project manager Bob Brenner, concrete superintendent Frank Cozzolino, field engineer Ken Sower.

RIGHT—The existing six-lane street provides an excellent foundation and makes small sills possible. Jackscrews on frame legs are used to make fine adjustments.



BELOW—Workmen attach 6- x 12-in. timbers to the top of the frames by nailing them to small swivel plates at the top of the frames. Longitudinal stringers are placed next.



WESTERN RUNOFF FORECAST

Pacific Northwest looks for super-abundant stream-flow after winter of heavy snow; Southwest areas face mild to severe shortage with rising demand on supplies.



SHOWN SECURING a snow core at Alta, Utah, last January are Jack Washchek, left, Ft. Collins, Colo., and George Peak, Casper, Wyo. Result: 140 in. of wet snow. Elevation at this point is 9,300 ft. Snowfall pattern this year assures adequate to more-than-adequate runoff for most Western mountain areas.

HOMER J. STOCKWELL

Snow Survey Supervisor
and

NORMAN S. HALL

Snow Survey Supervisor
Soil Conservation Service

STREAMFLOW from snow melt will be much above average in the northern half of Western United States during 1956. The water supply outlook drops rapidly in the south where summer flow of the Rio Grande in New Mexico, and Colorado river tributaries in Arizona will be only one-quarter normal.

The pattern of 1956 water supply follows that of 1955 in general outline, except that streamflow in most of the Pacific Northwest will be extremely abundant. Supplies will be reasonably adequate in northern parts of Colorado, Utah, Nevada, and most of the Central Valley of California. Critical shortages will again occur in one or two localized areas in Utah, along the Rio Grande, in the Salt River Valley in Arizona and in southern California. These latter three areas will depend largely on stored water, underground pumping and trans-river diversions.

North high, south low

This April 1 West-wide report is based on snow surveys, reservoir storage, soil moisture in mountain and irrigated valley areas, and other factors affecting 1956 supply. Runoff in prospect for irrigation, power generation, and municipal and industrial uses will be more than adequate in

the Northwest. April-September volume flow of the Columbia River, as measured at The Dalles, is expected to equal that of any recent year, including the unforgettable flow of 1948. Mild to severe shortages will be experienced south of a line that stretches from central Colorado, westerly through Great Salt Lake to the southern end of California's Central Valley.

This summary of supply conditions is compiled for **Western Construction** by Soil Conservation Service of the United States Department of Agriculture. It is based on snow surveys made on about 1,250 snow courses in western United States and in the Province of British Columbia in Canada.¹ With this report USDA and Soil Conservation Service complete 21 yr. of snow surveying and water supply forecasting.

Five-year snowfall pattern

The drouth condition in the Southwest is not quite as severe as it was in 1955. However, the 1955-56 snowfall pattern over mountain areas of the West is an extension of one existing for five years. Columbia River

basin has had consistently higher snow packs and runoff than drouth and water short areas in the Southwest. This year's pattern is accentuated by prospect of extremely high flow in many tributaries of the Columbia and in its main stem.

The Southwest's low streamflow pattern has continued so long that the long-term water supply outlook for much of New Mexico, Arizona, and parts of Utah and Nevada is poor. Reservoir storage has declined to a fraction of the normal levels of a few years ago. Underground supplies are being depleted. In extreme cases, crop acreage is being reduced and municipal supplies have been restricted. Adding to the problem is an ever-increasing demand on the available water supply. Over most of the Southwest a series of heavy snow years is much to be desired.

Storage in irrigation reservoirs is generally about normal in the Northwest, but below normal in most of the other states of the West. This is the result of below average streamflow in 1955 and previous years. Deficiency in stored water is most critical in Arizona and New Mexico.

Rio Grande prospects poor

After relatively heavy early winter snow, the water supply prospects in the Rio Grande in Colorado and New Mexico have declined to much less than normal and are only slightly over 1955. Increasing use of underground water must be planned; crop acreage will again be curtailed. Prospective runoff into Salt River Valley

1. The Soil Conservation Service coordinates snow surveys conducted by its staff and many cooperators, including the Bureau of Reclamation, Forest Service, Geological Survey, other Federal bureaus, various departments of the several states, irrigation districts, power companies, and others. The California State Division of Water Resources, which conducts snow surveys in that state, contributed the California figures appearing in this article. The Water Rights Branch, British Columbia Department of Lands and Forests has charge of the snow surveys in that province and likewise contributed the information here for British Columbia.

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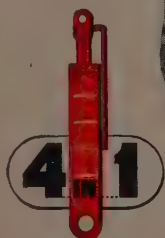
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Western runoff forecasts for 1956

	Runoff, thousand ac. ft.	April-Sept., incl. per cent of normal
RIO GRANDE		
South Fork at South Fork, Colo.	120	90
Rio Grande at Del Norte, Colo.	400	71
Conejos at Mogote, Colo.	165	75
Rio Chama at Park View, N. Mex.	150	65
Rio Grande at Otowi Bridge, N. Mex.	375	45
Pecos River at Pecos, N. Mtx.	30	48
PLATTE RIVER BASIN		
Poudre at Canon, Colo.	250	114
Clear Creek at Golden, Colo.	150	106
No. Platte at Saratoga, Wyo.	775	118
ARKANSAS RIVER BASIN		
Arkansas at Pueblo, Colo.	300	75
MISSOURI		
Yellowstone at Corwin Springs, Mont.	2,434	130
Wind River below Boysen Reserv., Wyo.	1,175	125
Madison nr. West Yellowstone, Mont.	254	128
Jefferson at Sappington, Mont.	1,359	130
Missouri at Toston, Mont.	2,851	126
Clark Fork at Chance, Mont.	729	126
COLUMBIA BASIN		
Columbia at Birchbank, B. C.	50,900	127
Clark Fork nr. Plains, Mont.	13,625	127
Clark Fork at Cabinet Gorge, Mont.	15,275	126
Pend Oreille blw. Z Canyon, Mont.	19,090	130
Flathead nr. Polson, Mont.	8,190	126
So. Fork Flathead nr. Columbia Falls, Mont.	2,580	124
Columbia at The Dalles, Ore.	131,000	135
Umatilla at Pendleton, Ore.	200	119
Powder at Salisbury, Ore.	84	132
Owyhee Res., net inflow, Ore.	460	101
Deschutes at Benham Falls, Ore.	725	142
McKenzie nr. Vida, Ore.	1,630	136
Willamette at Salem, Ore.	6,700	154
COLORADO BASIN		
Salt at Intake, Ariz.	60 *	35
Gila at Virden, Ariz.	2.5*	11
Green at Linwood, Ariz.	1,600	123
Colorado at Glenwood Springs, Colo.	850	123
Roaring Fork at Glenwood Springs, Colo.	825	106
San Juan at Rosa, N. Mex.	550	78
Aimas at Durango, Colo.	390	75
Dolores at Dolores, Colo.	210	73
Colorado at Grand Canyon, Ariz.	10,000	99
Duchesne nr. Tabiona, Utah	122	100
GREAT BASIN		
E. Walker nr. Bridgeport, Calif.	110 **	151
W. Walker nr. Coleville, Calif.	210 ***	131
Carson nr. Carson City, Nev.	311 ***	162
Humboldt at Palisade, Nev.	320 ***	128
Truckee at Farad, Calif.	350 ***	125
Bear at Harer, Idaho	335	119
Weber nr. Oakley, Utah	136	106
Provo at Vivian Park, Utah	160	96
OREGON and CALIFORNIA COASTAL		
Upper Klamath Lake, net infl., Ore.	980	186
Rogue above Prospect, Ore.	400	126
No. Umpqua of Toketee Falls, Ore.	202	124
Sacramento (Shasta Res. infl.) Calif.	2,200	113
Feather nr. Oroville, Calif.	3,200	156
Yuba nr. Smartville, Calif.	1,600	137
American at Fair Oaks, Calif.	1,900	130
Mokelumne nr. Mokelumne Hill, Calif.	620	121
Stanislaus blw. Melones Power House, Calif.	1,000	127
Tuolumne abv. La Grange Dam, Calif.	1,650	128
Merced at Exchequer, Calif.	830	124
San Joaquin blw. Friant, Calif.	1,650	127
Kings River at Piedra, Calif.	1,500	118
Kaweah River nr. Three Rivers, Calif.	280	99
Tule River nr. Porterville, Calif.	30	65
Kern River nr. Bakersfield, Calif.	400	85

¹ Below Lake Creek * April-May ** April-August *** April-July

reservoirs, along with other streams in Arizona, ranges from 10 to 40% of normal. The outlook is similar to a year ago. Nearly all stored water is expected to be used in 1956. Extensive pumping must be continued.

The Central Valley of California will have above normal streamflow in most areas. Local shortages will occur on southern sections of the San Joaquin Valley irrigated areas not served by diversions from the north. Natural runoff in the South Coastal region will be light. To meet requirements, heavy demands will be made on the Colorado River.

Extreme shortage for Sevier River

Adequate supplies will be available to meet demands along Upper Colorado River and its tributaries in Colorado, Wyoming, New Mexico, and northern Utah. In southern Utah some shortages will occur on the Colorado River and Great Basin, with an extreme shortage expected on the Sevier River. Northern Utah will have near-normal supplies. Irrigation supplies are excellent on the eastern slope of the Sierras in Nevada and good along the Humboldt River. Reservoir storage is near normal.

The outlook for the Platte River in Colorado, Wyoming, and Nebraska has improved over the past two years. Total supply is near average and will be adequate to meet requirements in all but those areas with marginal irrigation rights and heaviest demands. The flow of the Missouri River tributaries in northern Wyoming and western Montana will be about 25% above normal, and 50 to 60% above 1955.

Snow pack on the Columbia River basin is extremely high. Many snow courses have record-high measurements as of April 1, 1956. Water supplies will be abundant along all major streams serving irrigated areas in all of Idaho, Oregon, Washington, and northwestern Montana. Carry-over storage in reservoirs is close to normal. Numerous reservoirs have been lowered in anticipation of extremely heavy inflows to come. Mountain soils over the basin are generally wet.

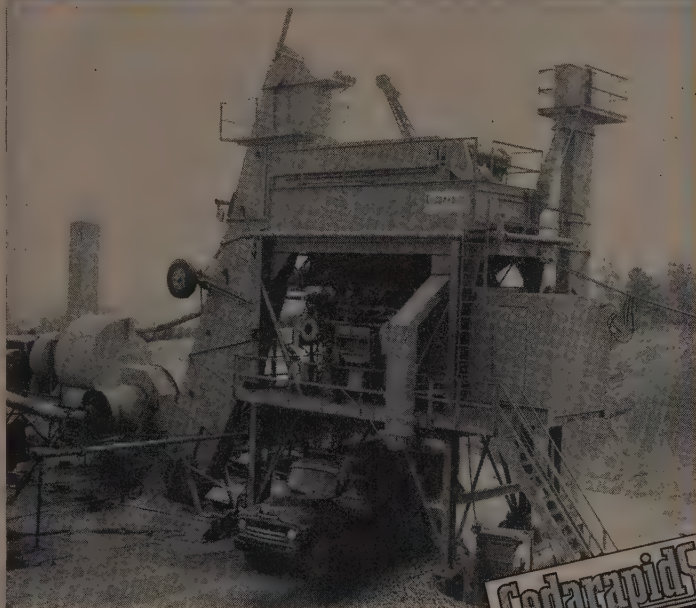
General water outlook

Forecasts for major streams of the West for the April-September 1956 period include the Columbia River at The Dalles at 131,000,000 ac. ft. or 135% of normal; Missouri River at Toston at 2,850,000 ac. ft. or 126% of normal; Colorado River at Grand Canyon at 10,000,000 ac. ft. or 99% of normal, and the Rio Grande at Otowi Bridge at 375,000 ac. ft. or 45% of normal. These forecasts indicate the general water supply outlook for the major streams.

In the accompanying table the forecast for runoff of some important Western rivers is tabulated in acre feet and also as a per cent of the 15-year average.

180 TONS PER HOUR OF BATCH TYPE MIX!

45 TONS PER HOUR OF CONTINUOUS-FLOW MIX!



That's just a sample of
the production range in
the Cedarapids **COMPLETE** line

What will your next bituminous paving contract call for? A 3-ton batch of high type hot mix every minute? From 45 to 200 tons per hour of multiple aggregate continuous-flow mix? Batches for one-time orders? Single aggregate cold mix for patching or "commercial" work?

Whatever production you need . . . whatever specs you have to meet...Cedarapids has the exact plant to meet your requirements, newly designed to make the most money for you.

This MODEL G60 batch type plant, with fully automatic controls, is producing 180 tons per hour for North Carolina owner. Built-in running gear and self-erection equipment assure easy moving and set-up.

The MODEL CM continuous-flow plant (right) is averaging 45 tons per hour for profitable "commercial" jobs . . . surfacing driveways, parking lots, etc.



MORE CEDARAPIDS PRODUCERS

MODEL G40 batch type plant has all the "plus" features of the G60 except size and capacity. Designed for jobs requiring around 120 tons per hour.

MODEL H15 is a batch type plant built for jobs requiring 35 to 60 tons per hour. Stack-up, tower-type design easy to move and erect.

MASTER PLANT continuous-flow twin shaft mixing unit, gradation control unit and drier, produces up to 200 tons of specification mix per hour.

Typical Examples of High Production

Producing surface and binder mix, a continuous-flow type Master Plant met exacting Federal specifications at a 150-ton-per-hour pace.

Owner says 100 tons per hour average of his Model G40 batch type plant could easily be kicked up to over 120 tons per hour if he needed greater production.

A new Model H15 batch type plant in Canada is meeting Ontario Highway Department specs and producing 60 tons per hour.

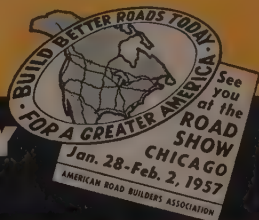
A Model G60 batch type plant, the second purchased by a Baltimore contractor, produced 180 tons per hour for the Garden State Parkway.

See your Cedarapids distributor today.

He'll gladly recommend the plant that will make the most money for you.

IOWA MANUFACTURING COMPANY

Cedar Rapids, Iowa, U. S. A.



REPORTS from the COURTS

By HOWARD S. BURNSIDE, Low and Burnside
Attorneys at Law, San Francisco—Menlo Park

Subcontractor has duty to investigate scope of work

In this case a subcontractor sought compensation from the general contractor for extra work in clearing trees and brush from a reservoir basin. The area to be cleared was not completely set out by flags when he made his bid although the specifications showed the scope of work. He sought declaratory relief and reformation of the subcontract. The court held he was negligent in preparing his bid and determining the work and not entitled to recover even though the general contractor had carelessly represented the work to be done.

"Ordinarily, a contractor who is required by the bidding instructions to determine the actual conditions of the proposed work by a personal examination, is bound by any situation there which is, or should be, obvious to him . . . Where there is no intentional fraud, (by defendant in describing scope of work) and where the evidence discloses that the plaintiff's failure to discover the truth was the result of his own unreasonable neglect, the cases support the conclusion that he will be denied recovery, and we know of no cases compelling a contrary conclusion."

"The clear import of the findings is . . . that the plaintiff in making his investigation, as required by the specifications, failed to use reasonable care in ascertaining the extent of the area to be cleared."

Van Meter v. Bent Construction Co. 286 P. 2d 439

Liability of equipment lessee

Many contractors rent equipment needed for a special or limited purpose. Lease contracts usually contain a covenant or agreement to return the equipment in good condition less reasonable wear and tear. This innocent phrase may result in absolute liability for the full value of the rented article as it did in this case from the State of Washington.

Appellant rented a Scoopmobile on a month to month basis with an option to purchase and apply rentals to the purchase price. The equipment lease provided that appellant "agrees to keep and maintain . . . in good mechanical condition . . . and upon termination thereof to return to First Party the same in good mechanical

condition, save and except the usual wear and depreciation . . ."

Four months later the equipment was destroyed by fire. The option to buy was never exercised. The value of the equipment at that time was \$4,000.00 although by exercising the option, appellant could have purchased for much less than this amount.

Suit was brought against the appellant as lessee on the lease contract and a judgment rendered against him. The key language quoted above controlled. The court held that the lessee had an "insurer's liability." This practically amounts to absolute liability. The appellant as lessee was responsible for the value of the equipment on his agreement to return it in good condition less usual wear and tear.

The fact that the owner had insurance to cover the loss was of no avail because this insurance was not available to the lessee. In addition, the lessee had never exercised his option and could not after judgment complain that he could have purchased for less than the amount of the judgment.

The problem of a bailee's liability for a loss occurring without his fault is unsettled in the law. Various states differ considerably as to the legal results. There was strong dissent in this case.

St. Paul Fire & Marine Ins. Co. v. Chas. H. Lilly Co., 286 P. 2d 107

Three little words

"The total lathing subcontract was for nearly \$140,000 . . . The dispute that finally led to the termination of the contract was over the installation of certain wire hangers (for the suspended ceilings).

"The specifications provided also that . . . the lathing and plastering subcontractor, should furnish 'Runner channels shall be supported . . . with No. 8 galvanized wire or . . . flat bars.' This is the material of which the hangers were to be made."¹ He contended, however, that the cement contractor had to install hangers. The specifications for cement work required "Building into concrete all inserts, anchors, ties, rails, hangers, bolts, nailing blocks, etc., required to secure work of other trades."

The trial court held that the words "building into concrete" did not clearly require the cement contractor to install the wire hangers. Testi-

mony was then admitted into evidence to the effect that custom in the building trades in San Francisco, when this phrase is used, only requires the cement contractor to pour concrete to encase fixtures installed by others.

A judgment rendered in favor of the cement contractor, who was also the general contractor, was affirmed on appeal.

1. Assoc. Lath. & Plast. Co. v. Louis C. Dunn, Inc. 286 P. 2d 825

Outside advice available to arbitrators

A construction contract provided for the erection of certain buildings for defendant by plaintiff on a cost plus and maximum price basis. For various reasons the job was delayed more than a year beyond the contemplated completion date. The contractor sustained damages in excess of \$260,000 and demanded arbitration in accordance with an arbitration clause in the contract. A panel of arbitrators was agreed upon. After nine hearings and the filing of briefs on the law and the facts a majority decision adverse to the contractor was rendered by the panel.

The contractor charged error in that one of the arbitrators privately consulted an attorney and this constituted misconduct such as would justify vacating the award. The reviewing court held that arbitrators may individually seek independent advice. They need not act as a body in all their endeavors to inform themselves as individuals. It was not misconduct for the chairman of the arbitration panel to have talked the matter over with an attorney to check his legal conclusions.

Implicit in the courts' review of the case, however, is the principle that the opinion must be that of the arbitrator and his decision must be based on his own judgment. It is permissible to secure information from disinterested sources so long as the final conclusion represents the independent thinking and judgment of the arbitrator rather than of some other person.

Griffith Co. v. San Diego College for Women, 45 Adv. Cal. 528

Notes

"Every man has the absolute right to use his own name in his own business . . . A person comes naturally by his name from his parents and it is a thing personal to himself, which in truth and justice he has the right to use. Nor is there any logical reason why the general rule should not apply to generally used 'nicknames' or abbreviations of given names. It is the right to use the names by which one is generally known that is entitled to protection."

D & W Food Corp. v. Graham 134 Cal App. 2d 668

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Clinton Welded Wire Fabric provides the backbone that highways need to stand up under today's heavy traffic loads.

Embedded in the concrete, Clinton Welded Wire Fabric distributes the load evenly, effectively controls cracking, materially increases road life and reduces maintenance. And, its firmly welded intersections of steel wire provide a positive anchorage for concrete.

Clinton Welded Wire Fabric is made in a wide range of gauges and mesh spacings to A.S.T.M. and A.A.S.H.O. specifications. For complete information, write the nearest district sales office shown on the back of this page.

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ARIZONA

THE BUREAU OF RECLAMATION authorized award of a contract to Marshall & Haas of Yuma on a low bid of \$1,164,494 for construction of about 15 mi. of reinforced concrete-lined laterals, pumps, and other features of the distribution system of the Wellton-Mohawk Division, Gila Project, in southwestern Arizona. The laterals are part of a system that will ultimately provide irrigation water to some 5,600 ac. of land in the Ralph's Mill area on the south side of the Gila River about 40 mi. east of Yuma. Second low bidder, with an offer of \$1,209,126, was the joint venture of Ukropina-Polich-Kral & Vega of San Gabriel, Calif. Third low, \$1,231,953, was the Los Angeles office of Morrison-Knudsen Co., Inc. Engineer's estimate for the work was \$1,247,797.

RECENT MAJOR CONTRACT AWARDS and low bids in Arizona include a low bid of \$777,004 submitted by Peter Kiewit Sons' Co., Phoenix, for 8.4 mi. of grading and surfacing in the Grand Canyon National Park, Coconino County. Wallace & Wallace of Phoenix submitted a low bid of \$306,911 for 10.8 mi. of grading and surfacing in Tonto National Forest in Gila County. A low bid of \$1,164,494 was submitted by Marshall & Haas of Yuma for earthwork, concrete lining, and structures, Ralph's Mill Area, Wellton-Mohawk Division, Gila Project. W. J. Henson, contractor of Prescott, submitted a low bid of \$615,627 for reshaping and surfacing the highway in Gila and Graham counties. A low bid of \$642,688 was submitted by Martin Construction Co. of Tucson for construction of a 5-girder bridge in Graham County. Ashton Building Co., Tucson, submitted a low bid of \$398,795 for the removal of the existing bridge and the construction of a new 30-span steel girder bridge in Pinal County. San Xavier Rock & Sand Co., Tucson, submitted a low bid of \$153,785 for grading, surfacing, and miscellaneous work in Pima County. A low bid of \$310,052 was submitted by Fisher Contracting Co. of Phoenix for about 7 mi. of grading and surfacing northeast of Holbrook on the Holbrook-Lupton Highway. Heuser & Garnett of Phoenix sub-

mitted a low bid of \$299,855 for grading and surfacing in Yuma County. Mohamed Earthmoving Contractor of Phoenix submitted a low bid of \$64,223 for grading, surfacing, and other work on the Phoenix-Prescott Highway in Maricopa County.

CALIFORNIA

PACIFIC GAS & ELECTRIC CO. will begin construction of tunnels for the Butt Valley and Caribou 2 hydroelectric powerhouses on the North Fork of the Feather River early this summer. The two powerhouses and related works will provide combined generating capacity of 145,000 kw. at an estimated cost of \$32,600,000. Construction of access roads to the tunnel sites will start early in May. Tunnel construction will begin by July 1. Butt Valley Powerhouse will be located at the upstream end of Butt Valley Reservoir. A concrete-lined

pressure tunnel about 2 mi. long and 13 ft. in diameter and a steel penstock pipe about 6,700 ft. long will convey water to the plant from Lake Almanor. Caribou 2 Powerhouse will be adjacent to the existing Caribou Powerhouse on the Feather River 60 mi. by road northeast of Oroville. A pressure tunnel about 1¾ mi. long and 12 ft. in diameter and 2,400 ft. of penstock will carry water from Butt Valley Reservoir. Still to be scheduled is construction of Belden Powerhouse, 113,000 kw., at estimated cost of \$25,800,000, to be located where Yellow Creek flows into the Feather River at Belden.

CONSTRUCTION WILL BEGIN early this summer on a \$5,000,000 shopping center in Garden Grove, Calif., a Los Angeles suburb. Hapsmith Co. of Beverly Hills are developers of the project, which will provide 260,000 sq. ft. of building floor space and parking for 3,500 cars.

THE U.S. ARMY Corps of Engineers awarded a contract for con-



FIRST BID CALL ON COYOTE VALLEY DAM

The first long step toward actual construction of the Coyote Valley Reservoir on Russian River 4 mi. north of Ukiah was taken on March 14 when the Army Engineers issued invitations to bid on three gates that will eventually control the flow of the river through the dam outlet works.

Each complete gate mechanism will weigh 221,800 lb., with the total reaching over 332 tons of metal for all three. When the three gates are open, 6,500 sec-ft. will rush through a bore 12½ ft. in diameter and 967 ft. long.

The dam itself, 160 ft. high and 2,800 ft. long, will contain 5,000,000 cu. yd. of material tapering from a maximum width of 1,000 ft. to a 20-ft. crest. It will create a lake 5 mi. long and a mile wide covering 2,000 ac. and containing 122,500 ac. ft. of water, of which 48,000 ac. ft. will be used for flood control and 70,000 ac. ft. for irrigation and municipal water supplies; 4,500 ac. ft. are reserved for siltation.

Construction of the dam will be a three-year job of which the purchase of the gates is an essential first step.

Out of the total cost of \$18,325,000 for the project, Army Engineers expect about \$200,000 will cover purchase of the gate units.



D9 MOVES BIG YARDAGE

for
**MORRISON-
KNUDSEN**

A CAT* D9 Tractor with No. 9S Bulldozer is the prime earthmoving tool on this Morrison-Knudsen contract in Idaho. The job—relocating 11.37 miles of the Idaho City-Owl Creek road—involves clearing 64 acres and moving 337,000 cubic yards of dirt and rock. One rock cut is 87 feet deep and there are fills up to 30 feet.

With its huge 14-foot 'dozer, capable of handling up to 9 cu. yd. at a blade load, the D9 makes 40 passes, 200 feet long, per hour.

Now that the D9 has proved itself on jobs all over the country, owners recognize it as the top production machine among big tractors. It's the first track-type tractor with Turbocharger. The 286 HP Caterpillar Diesel Engine gives it ample power to match

its weight and traction. You have a choice of torque converter or oil clutch drive. And there is "Live-shaft" drive for rear-mounted equipment.

Operators say this big machine is "as easy to handle as a small tractor." Easy to service, too. The exclusive, trouble-free oil clutch, separately removable power train components and a fuel system that needs no adjustments in the field are among the reasons why.

Your Caterpillar Dealer can give you some eye-opening facts about the economy of the D9 for big yardage jobs. Ask him for a working demonstration today.

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

CATERPILLAR

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

struction of a guided missile launching site to Price-McNemar of Sepulveda on a low bid of \$1,000,100. The project calls for a Nike launching site at Cement Hills near Travis Air Force Base in Solano County.

MERCURY DIVISION of Ford Motor Co. broke ground for a multi-million-dollar assembly plant on a 200-ac. site at Rosemead and Washington boulevards, 14 mi. from downtown Los Angeles. J. H. Pomeroy & Co., San Francisco, is contractor for the project, which will include a main building to cover about 35 ac., standby power plant, compressor station, fire protection facilities and related factory installations. The new plant will replace the present one at Maywood and is scheduled for completion in June 1957. It is designed for peak labor force of 3,100 and will be capable of producing 70,000 cars a year.

GENERAL MOTORS CORP. will construct a 1,500,000-sq. ft. automobile assembly plant in Sunnyvale at an approximate cost of \$37,500,000. The installation, to occupy a 200-ac. site, will employ 5,000 persons at full production and will have annual normal capacity of 100,000 Buick, Oldsmobile, and Pontiac passenger cars. The plant is expected to be in operation for 1958 production.

RECENT MAJOR CONTRACT AWARDS and low bids in California include a low bid of \$5,929,776 submitted by **J. E. Haddock Ltd.** and **R. M. Price** of Pasadena for about 6.5 mi. of grading and paving and construction of 16 bridges in the cities of Buena Park, Fullerton, and Anaheim in Los Angeles and Orange counties. **Mercer Fraser Co., Inc.**, and **Mercer Fraser Gas Co., Inc.**, of Eureka, received a \$629,223 contract for grading and surfacing 2.9 mi. in Humboldt County. **Phoenix Construction Co., Inc.**, of Bakersfield, received a \$241,327 contract award for 2.4 mi. of grading and surfacing in Kern County. **Charles L. Harney, Inc.**, of San Francisco, submitted a low bid of \$1,859,283 for construction of a separation structure and miscellaneous street work between San Francisco-Oakland Bay Bridge at Fremont Street and Howard Street in San Francisco County. A low bid of \$131,722 was submitted by **Thomas Construction Co.**, Fresno, for construction of a bridge in Mendocino County. **Madonna Construction Co.**, San Luis Obispo, submitted a low bid of \$111,625 for 3.6 mi. of grading and surfacing in San Luis Obispo County. **John Delphia** of Patterson received a \$270,106 contract for 3.2 mi. of grading and surfacing in Marin County. A low bid of \$212,582 was submitted by **Westway Excavating Co.** of Los Angeles for 1.1 mi. of grading and surfacing in Los Angeles County. **Granite Construction Co.**

of Watsonville submitted a low bid of \$152,103 for grading and surfacing in Mendocino County. **Arthur B. Siri, Inc.**, of Santa Rosa, submitted a low bid of \$133,058 for grading and surfacing in Mendocino County. A low bid of \$118,476 was submitted by **Matich Construction Co.** of Riverside for 7.3 mi. of grading and surfacing in Riverside County. A \$2,921,750 contract was awarded to **San Francisco Bridge Co.** of San Francisco for dredging, extending seawall, and earthwork at the Alameda Naval Air Station, Alameda County.

COLORADO

RECENT MAJOR CONTRACT AWARDS and low bids in Colorado include a \$569,350 contract award to **Thompson Pipe & Steel Co.** of Denver for a new waterline southeast of Aurora. A low bid of \$267,225 was submitted by **Broderick & Gibbons, Inc.**, of Pueblo, for grading, paving, and structures between Pueblo and Beulah in Pueblo County. A low bid of \$148,439 was submitted by **Peter Kiewit Sons' Co.** of Denver for grading, surfacing, and structures between Englewood and Littleton in Arapahoe County. **M. C. Jacobs Construction Co.**, Denver, submitted a low bid of \$177,470 for grading and a structure across the Spishapa River in Otero County. **Bushman Construction Co.** of Kansas City Mo., submitted a low bid of \$713,771 for grading and concrete pavement between Larkspur Jct. and Monument on State Highway No. 1, in Douglas and El Paso counties.

IDAHO

RECENT MAJOR CONTRACT AWARDS and low bids in Idaho include a \$1,858,000 award to the **Arrington Construction Co., Inc.**, of Idaho Falls, for construction work at the Naval Reactor Facility on the Atomic Energy Commission's National Reactor Testing Station.

MONTANA

THREE BRIDGES are proposed for construction over the Clark Fork River in Missoula. The proposal includes \$3,000,000 worth of bridges to be built at a cost of \$796,000 to the taxpayers of Missoula County. Petitions are being circulated to put the bond issue on the June 5 primary election ballot.

RECENT MAJOR CONTRACT AWARDS and low bids in Montana include a low bid of \$3,027,840 submitted by **Sound Construction & Engineering Co.**, of Seattle, Wash., for construction of 26 buildings, etc., Glasgow Air Force Base, Montana. **Hitz Construction Co.**, of Billings, submitted a low bid of \$1,634,130 for construction of Yellowstone County Court House.

NEVADA

RECENT MAJOR CONTRACT AWARDS and low bids in Nevada include a \$547,049 contract award to **Gibbons & Reed**, of Salt Lake City, Utah, for 9.7 mi. of grading and surfacing in Humboldt County. **Morrison-Knudsen Co., Inc.**, of Salt Lake City, Utah, was awarded a \$1,064,978 contract for grading and surfacing in Elko County.

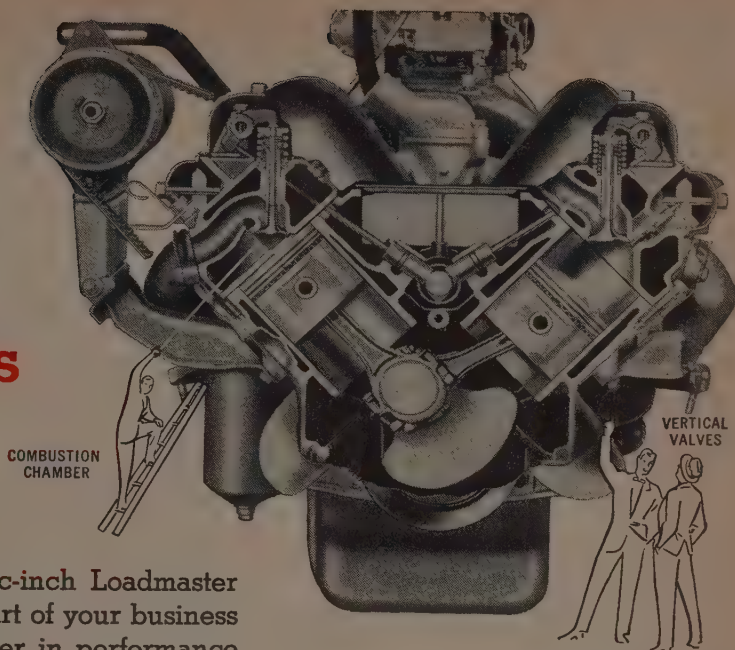
NEW MEXICO

RECENT MAJOR CONTRACT AWARDS and low bids in New Mexico include a \$710,449 contract award to **Wylie Brothers Contracting Co.** of Albuquerque, for 5.2 mi. of grading and surfacing in Torrance County. **Jack Adams** of Santa Fe was awarded a \$239,808 contract for 11.1 mi. of grading and surfacing in Union County. A \$541,039 contract was awarded to **Skousen Construction Co.** of Albuquerque for 9.5 mi. of grading and surfacing in Catron County. **Daniels Construction Co.** of Albuquerque received a \$99,900 contract award for 1.5 mi. of grading and surfacing in San Juan County. **San Luis Valley Construction Co.**, of Saguache, Colo., submitted a low bid of \$89,678 for channelization of the Rio Grande Espanola Area of the Middle Rio Grande Project.

OREGON

A LOW BID OF \$6,534,349 was submitted by **Guy F. Atkinson Co.**, Portland, for construction of an arch dam, spillway, reregulating dam, and fish passing facilities, for Portland General Electric Co.'s Pelton hydroelectric dam on the Deschutes River. Other bidders included **L. E. Dixon Co.** and **Arundel Corp.**, with a joint bid of \$7,716,905, and **C. J. Montag & Sons, Inc.**, **Carl M. Halverson, Inc.**, and **Austin Construction Co.**, with a joint bid of \$8,337,018. The dam is

Take a look inside the truck industry's newest V8!



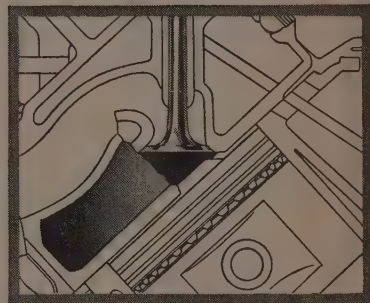
It's Chevrolet's new 322-cubic-inch Loadmaster V8 . . . and if big trucks are part of your business you'll find it has plenty to offer in performance and economy!

What you see inside that new V8 is modern engine design at its best! The new Loadmaster is a true heavy-duty load puller, with 310 ft. lbs. of torque and a fuel-saving compression ratio of 7.7 to 1. Extra-rugged components work together with perfected precision to produce 195 h.p.—plenty of reserve power to ease your toughest pulls!

Evidence of great engineering is everywhere in this most powerful of all Chevy truck engines. It offers the *shortest stroke* of any engine in its class; thus, engine wear is minimized, good economy assured. And it's the most compact of big-truck

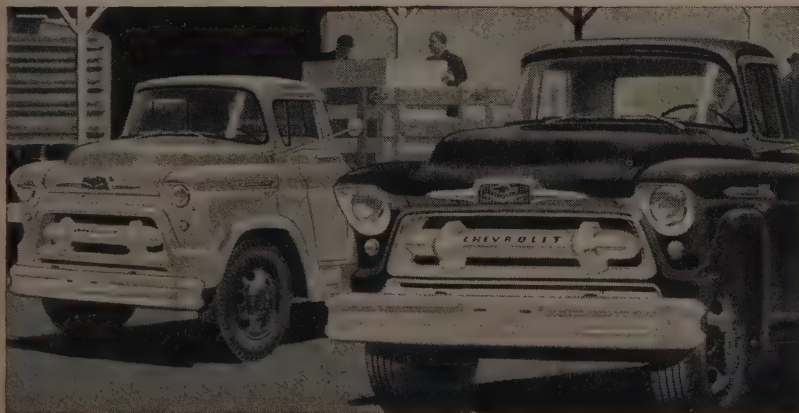
engines—delivers highest horsepower per pound. That's proof of *more efficient* design. Spark plugs are mounted centrally in the inverted "V" combustion chamber to give maximum heavy-duty power on regular fuel. Advanced features such as hydraulic valve lifters, chrome-plated top ring, and full-flow oil filter mean longer engine life with less maintenance expense!

And there are many, *many* such reasons why you'll do better with this new load-pulling champ under the hood! For all the facts, see your Chevrolet dealer. . . . Chevrolet Division of General Motors, Detroit 2, Mich.



Vertically mounted valves give high fuel-air turbulence during the compression stroke . . . you get maximum power from every drop of fuel!

Feature after feature proves why these big new Chevies are the work champs of the heavyweight class! New triple-torque tandem axle option lifts G.V.W.'s to 32,000 lbs. . . . G.C.W.'s to 50,000 lbs.! New frame is 25 percent heavier to stand up to your *tough* jobs. Easy, safe hauling stems from modern Ball-Race steering with bigger, stronger steering assembly. Exclusive new Powermatic transmission saves work, reduces truck wear like nothing else. No other trucks give you so much.



New Chevrolet Task-Force Trucks

Anything less is an old-fashioned truck!



PORTLAND BUILDS WITH HIGH-TENSILE BOLTS

When completed late this year, the eleven-story building of Pacific First Federal Savings and Loan Association of Portland, Ore., will provide a modern, new look to the corner of Yamhill Street and S.W. Sixth Avenue. The bank itself will occupy most of the basement and first floor and the remaining area of about 76,500 sq. ft. will be rented for office space. The two million dollar building was designed by Stanton, Boles, Maguire and Church of Portland. The erection subcontractor

is the Structural Steel Division of Pacific Car and Foundry Company of Seattle.

In construction of the eleven-story building, high tensile bolts are being used to join the steel framing. This type of steel erection is fast and economical and minimizes much of the noise usually associated with steel erection. The structural engineering was done by Cooper and Rose of Portland and the general contractor is the Hoffman Construction Co., also of Portland.

scheduled for completion in about two years.

A \$721,802 CONTRACT for construction of Haystack Dam in Oregon was awarded by the Bureau of Reclamation to R. A. Heintz Construction Co., Portland, on its low bid. The earth and rockfill dam, southwest of Culver, will be one of the principal features of the North Unit of the Deschutes Project in cen-

tral Oregon. Embankment will be about 1,200 ft. long at the crest with maximum height of 81 ft. and will create a reservoir of 6,000 ac.-ft. Second low bidder with an offer of \$750,177 was the Inland Construction Co., Milwaukie, Ore. Third low bid of the 18 submitted was \$767,170 from MacGregor Triangle Co., Boise, Ida.

RECENT MAJOR CONTRACT AWARDS and low bids in Oregon

include a contract award of \$1,163,-686 to **General Construction Co.**, Portland, for construction of a rock fill and a hydraulic fill breakwater from Pitcher Point to Bayocean, west of Tillamook. **R. A. Heintz Construction Co.** of Portland submitted a low bid of \$721,902 for miscellaneous and earth work on the North Unit of the Deschutes Project. A low bid of \$5,504,751 was submitted by **Peter Kiewit Sons' Co.**, Vancouver, Wash., on Alternate A for bridge construction on the Pacific Highway in Multnomah, Oregon, Clark and Washington counties. Tom Lillebo of Reedsport submitted a low bid of \$140,243 for construction of a bridge on the Redwood Highway in Josephine County. **Warren Northwest, Inc.**, of Portland, submitted a low bid of \$125,665 for grading and paving in Multnomah County. A low bid of \$97,142 was submitted by **Arthur Simonsen & Co.** of Baker for pavement sealing and rock production on the Old Oregon Trail in Union and Baker counties. **Hamilton & Thoms** of Eugene submitted a low bid of \$414,891 for grading, paving, and bridge construction on the McKenzie highway in Lane County.

UTAH

RECENT MAJOR CONTRACT AWARDS

and low bids in Utah include a low bid of \$653,759 submitted by **James Reed, Lark**, for 4.3 mi. of grading, surfacing, and construction of two bridges in Washington County. **Dudley, Jensen & Johnson** of Moab submitted a low bid of \$74,000 for 6.4 mi. of grading and surfacing the Temple Mountain and Utex Corporation Mine Access Road in Emery and San Juan counties.

WASHINGTON

THE FEDERAL POWER COM-

MISSION authorized the City of Seattle to construct a high dam at the intake of its Gorge hydroelectric power plant on the Skagit River in Whatcom County to replace an existing low diversion dam. The high dam, which will have an elevation of 880 ft. above sea level, will create a reservoir with storage capacity of about 8,000 ac.-ft. extending to the tailrace of the Diablo powerhouse. License amendment also provides for modification of existing turbines in the Gorge powerhouse to increase their installed horsepower from 133,000 to 192,000.

PIERCE COUNTY commissioners rejected all bids on construction of a
(Continued on page 110)

LOOK at all you can do with a **BLAW-KNOX ROAD WIDENER**

- Spread Base Course for Road Widening
- Pave Road Widening
- Spread Shoulder Material
- Spread and finish concrete without forms
- Pave and finish Asphalt
- Spread any kind of Aggregate



BLAW-KNOX

Dual Compression Trench Roller

Most flexible and economical trench roller available. Can be accurately adjusted to roll from a minimum width of 20" to a maximum of 39". The two 60" high rolls, used either "dogleg" or tracking each other, provide up to 345 pounds per lineal inch per roll. They can be hydraulically adjusted to compact to depths of 24".

• You'll like the Road Widener's ability to handle many different jobs and materials. Its versatility means that you will need a minimum of labor and equipment on any road widening or shoulder job to lower construction costs. Steady high capacity of up to 200 tons per hour keeps jobs on schedule. Tandem drive wheels on all models have power to spare for pushing the heaviest trucks up steep grades. A large hopper, special conveyor belt and hydraulically controlled strike-off gates handle any type of aggregate or asphaltic concrete in widths of 2 to 10 feet. Hydraulic controls permit gradual widening of a strip around curves when laying aggregate or asphalt. Special vibrator attachment available for all models of Road Wideners spreads and finishes concrete without the use of forms.

See your Blaw-Knox distributor . . . he can give you complete details on the models 80, 85 and 95 Road Wideners.



BLAW-KNOX COMPANY

CONSTRUCTION EQUIPMENT DIVISION

45 Charleston Avenue
Mattoon, Illinois

ALASKA Newsletter

By CLIFFORD S. CERNICK, Anchorage

ESKIMO WORKERS—Construction firms in Alaska have found that Eskimos are good workers and more and more contractors are putting contingents of native workers on jobs which happen to be located in the vicinity of Eskimo villages. However, there's the feeling among the natives in Alaska that the jobs aren't being handed out to natives in a sufficient quantity. Following several complaints sent to Bob Bartlett, Alaska's delegate in Congress, Bartlett has contacted the Air Force and asked that Eskimos be hired whenever possible on Air Force projects in the North, particularly the Distant Early Warning radar line. Modern-day Eskimos are not in the least primitive, as the Alaska Railroad has found after hiring groups of them to work as section laborers last summer. Work output and personnel relations were such that the hiring of Eskimo labor will become a regular policy with the railroad. As this column has pointed out many times, it is good public relations for the Alaskan contractor to employ a few natives in his Alaskan work crews, and furthermore it's wise from a standpoint of job efficiency.

GOLDEN AIRFIELD—A unique construction measure in Alaska during the period from 1942 to 1944 was use of crushed rock, gravel, and tailings for vital defense projects in the Juneau area. Gravel from the old Alaska Juneau Gold Mining Co., which still had a small percentage of gold, was used by the government for building airfields and a sub-port of embarkation in the Juneau area. Only recently, the government has got around to paying up this old account with the pioneer Alaska gold mining firm and a Nevada senator has introduced a bill which would give \$80,000 to the gold mining company as final payment for the "golden" construction materials.

APPRENTICESHIP—The Alaska apprenticeship program is bringing lower construction costs to Alaska. The cost per man-hour in construction work is considerably less this year than last, according to Eugene W. Norton, who is in charge of the Territory's apprenticeship program. Norton feels that the apprenticeship program is helping make the working force more stabilized and increasing the skill of Alaska workers. The program by which tradesmen receive both on-the-job training and study under special instructors was instituted in 1949. It is sponsored by

the Bureau of Apprenticeship of the U. S. Department of Labor. Just recently, 36 young apprentices completed the program in Anchorage alone.

CITY SUMMARY—Some interesting notes were presented to the Anchorage city council by the city tax assessor recently—notes which should be of interest to most Alaska construction men. According to a report made by the assessor, materials and labor costs seem to be going up on municipal projects but contract prices are remaining stable. This is because of the high degree of competition between contractors, the availability of competing sub-contractors, better material-purchasing programs, elimination of overtime work of employees, and more prudent management and closer supervision by construction officials.

COST DATA—Referring to costs and prices in the Anchorage area alone, the assessor revealed there has been an average increase of 25% on labor scales. However, all overtime and doubletime working has been restricted or eliminated so far as big city projects are concerned. Average increase in the cost of building materials has been about 4%. Costs have been kept down by planned buying, better transportation facilities, and smaller overhead of suppliers because they do not have to hold as large inventories. In the opinion of financial institutions, they were loaning more on comparable construction in 1955 than they were in 1950.

COST COMPARISON—The assessor did considerable research to compare costs between the years 1950 to 1955. He submitted plans on a typical construction project to architects, contractors, material men, and independent builders asking them to estimate construction costs for 1955. This was compared with costs as shown by a manual for 1950. The cost during the five-year period increased only 3%.

VOLCANIC ISSUE—How a volcano can increase the cost of doing construction in Alaska was illustrated recently by the request from Alaska Delegate Bartlett that the government pay \$3,841 to P. F. Claveau of Anchorage, a paint contractor. In 1953, Claveau entered into a contract to paint 13 frame buildings at the Elmendorf AFB. After starting the work, a volcanic explosion of nearby Mt. Spurr on July 9, 1953, threw ash on the government build-

ings, requiring cleaning at an increase in costs ranging from 32 to 40% above the contract price. Bartlett has asked the White House to reimburse Claveau for the additional costs.

DOG TEAM JOB—The earliest known Alaska method of overland transportation—dog teams—is being used to get men and equipment to remote and almost inaccessible defense projects in the Arctic. Seasoned dog team drivers, Eskimos who know the geography, snowshoes, and all the other paraphernalia of travel in the North are being used in connection with travel to the sites. The district engineer reports that dog teams have been found essential on the "White Alice" communication project.

CONSTRUCTION OUTLOOK—Poor weather and heavy snowfall throughout Alaska during the past winter have caused the 1956 construction season to get off to a rather slow start. However, all quarters report it will be another big year for Alaska construction. First large-scale hiring for defense projects in the Arctic is now in full swing. Most of the jobs are on radar sites on the Northwest coast of Alaska. Construction for military purposes will reach a leveling-off point this season, according to most official sources. The Distant Early Warning line which stretches across northern Alaska and Canada is absorbing hundreds of men as construction activities get into full swing. Before the DEW line is completed, it will have cost about one billion dollars.

HIGHER WAGES—Seven Alaska construction industry crafts have received a five per cent wage increase, with agreements being signed recently and to remain in effect until Feb. 28, 1957. Crafts affected include operating engineers, laborers, iron workers, teamsters, cement masons, plasterers, lathers and bricklayers. Laborers in the lowest bracket will now receive \$3.48 an hour. There probably will be few labor disputes during the 1956 construction season since carpenters already have a carry-over contract from 1955 which gives them a 10 cent an hour wage increase effective March 1 of this year plus a two and a half cent per hour tool allowance.

CONSTRUCTION NEWS CAPSULES—A vast urban redevelopment program in Fairbanks will improve living conditions for about one-fifth of the city's population; Anchorage also is starting planning for slum clearance and civic improvement projects... Sewer construction and rehabilitation projects in Fairbanks will amount to a million dollar slice of business this summer.



Two of the fleet of 28 Euclid 46TD 22-Ton Dump Trucks equipped with Fuller 10-F-1220 Transmissions, and operated by Nello L. Teer Company, Durham, North Carolina.

Fuller 10-Speed Transmissions handle Teer's tough hauling assignments

The Nello L. Teer Company of Durham, North Carolina, handles tough hauling assignments with Euclid 22-Ton Dump Trucks equipped with Fuller 10-F-1220 Transmissions.

On the boulevard construction job shown above, approximately 3,000,000 yards of dirt and rock were removed to add 80 feet to the present highway along Ohio River bluffs so steep that in many places a triple-bench system was necessary.

Says George Walker, Teer's Master Mechanic: "The heavy-duty Fuller Transmissions paid off in much faster work cycles. We get more work time and less downtime through the right gear ratios provided by Fuller to meet load and grade with shorter, easier shifts."

More equipment owners and users specify Fuller than any other transmission. From the 110 models, semi-automatic and full-manual control,

for trucks from 100 to 400 hp, engines from 330 to 1440 cubic inches, select THE Fuller Transmission designed to do your job better and at less cost . . . ready to help you move more for less. Check with your local truck dealer for the *right* Fuller Transmission for your job.



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TRANSMISSION DIVISION • KALAMAZOO, MICH.

Unit Drop Forge Div., Milwaukee 7, Wis. • Shuler Axle Co., Louisville, Ky. (Subsidiary) • Sales & Service, All Products, West. Dist. Branch, Oakland 6, Cal. and Southwest Dist. Office, Tulsa 3, Okla.

SUPERVISING the jobs

Homer Olsen, general superintendent, and Norm Barnes, his assistant, are key men for Peter Kiewit Sons' Co. which has a \$4,661,000 bridge job at Crockett, Calif., for the State. Project engineer is **Arnold Glick**. **Don Davis** is office manager. **Bob Hoyt** is excavation superintendent, and "Saylor" **Harry** is master mechanic. Work started March 1 and will probably be finished by summer 1958.

* * *

William Yarnell, Jr., is project manager for Early-Delphia, joint venture which is building fish collecting facilities on the Delta-Mendota Canal intake for the Bureau of Reclamation. **W. S. Kimble** is superintendent, and **J. W. Murphy** is assistant superintendent, forms. **R. D. Ratzell** is office manager. Master mechanic is **J. M. Parker**. **R. Vincenhale** and **J. A. Hedges** represent the Bureau. **James E. Neill** is on excavation, concrete footing, and walls.

* * *

Earl J. Peters, general superintendent, and **John Ferguson**, assistant, head the construction personnel of **Howard S. Wright & Co.** which is building the new paper mill and

converting plant at Antioch, Calif., for Crown Zellerbach Corp., a \$12,000,000 contract. Project engineer is **Harlan Bixby**. Among subcontractors are: **University Plumbing & Heating Co.**, with **Fred Gould** supervising; **Fischbach & Moore** and **Chas. B. Farrow**, with **Bill Jessup** supervising the electric work for this firm. He is aided by **D. B. Leonard**, assistant superintendent, and **J. H. Coffman** and **Bob Bittenbender**, foremen. **L. F. Maybach** is project engineer for the owner, Crown Zellerbach. Work here got under way Nov. 1, and the new facilities are expected to be operating Sept. 1, 1956.

* * *

Russel G. Cone, project manager, **Fred Rolandi, Jr.**, assistant manager; **John Blondin**, general superintendent, assisted by **Edward K. Bowman**, and **L. L. Snedden**, project engineer, are the top supervisory personnel on the \$5,454,000 award which went to the joint venture of **Mason & Hanger-Silas Mason, Inc.**, and **F. S. Rolandi, Jr., Inc.**, for the substructure of the **Carquinez Bridge** over **Carquinez Strait**, which will add four more lanes of traffic between **Vallejo** and **Crockett, Calif.** Office manager

C. P. Smith is another key contractor man, as are the following field men: **Theodore Brown**, first aid man; **Mark Knight** and **Lewis Pittman**, shift superintendents, and **Haskell Johnston**, mechanical superintendent. This contract got under way the first of the year and is scheduled for completion by the end of 1957.

Resident engineer for the entire project is **O. A. Johnson**. **R. B. Neff** is in charge of substructure; **W. H. Ames**, superstructure, and **L. L. Kruger**, approaches.

* * *

Mike Karr, project manager, **Jim Nygaard**, general superintendent, and **Lee Lebo** are the key supervisors on **Macdonald Engineering Co.'s** \$300,000 award from **Calaveras Cement Co.** for construction of slip-form silos at the company's plant at **San Andreas, Calif.**

* * *

David E. Otis and **Jerry Bothwell**, project manager and general superintendent respectively, head the personnel working for **Parish Bros., Inc.**, **Harms Bros.** and **Gordon H. Ball**, contracting group which is building parking aprons, hardstands, taxiways, etc., at **Travis AFB** in California for the **Corps of Engineers**. **Jack Corbett** is in the assistant superintendent spot. The office is in charge of "Boots" **Smothers**. On concrete paving, **John Vickery** is supervising, and **Henry List** is assistant superintendent. "Slim" **Wentworth** is pouring foreman; **Floyd Davis** is master mechanic. This job is expected to be finished by late November.

* * *

Gary Campagna is acting as project manager for **Rubino & Gullickson** which has a contract from the **School District at Tracy, Calif.**, for additions to the high school, a \$1,200,000 project. General superintendent is **Paul Groomes**. It is anticipated that the work will be complete by mid-July.

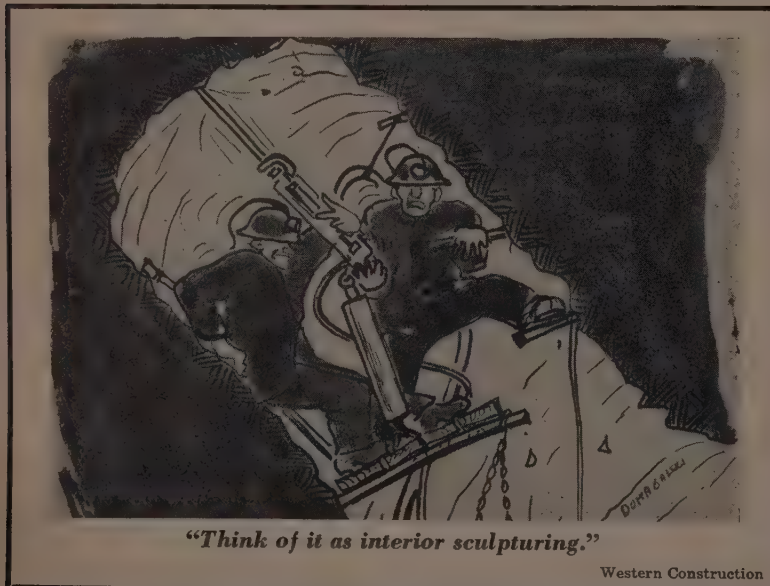
* * *

Fred Petterson is project manager on the **San Antone Dam**, north of **Upland, Calif.**, a flood control job of the **Corps of Engineers**, for which **Jack Maxwell** is project engineer. Excavation superintendent for **Winston Bros. Co.** which has the contract is **R. M. Latham**. **Latham** came to **Southern California** from **Colorado** where he was with **Winston** on the **Big Thompson Project**. Other bosses are **A. Turnbull**, swing shift; **B. Richards**, structure superintendent, "Okie" **Jarnis**, cement foreman; **Tyke Burman**, shop foreman. **Bill Cells** is company engineer. **Jim Renolds** is office manager.

* * *

R. W. Ayersman, general superintendent, heads the **Bechtel Corporation** crew erecting the power plant at **El Segundo, Calif.**, for **Southern California Edison Co.** Superintendents under **Ayersman** are **E. J. Mar-**

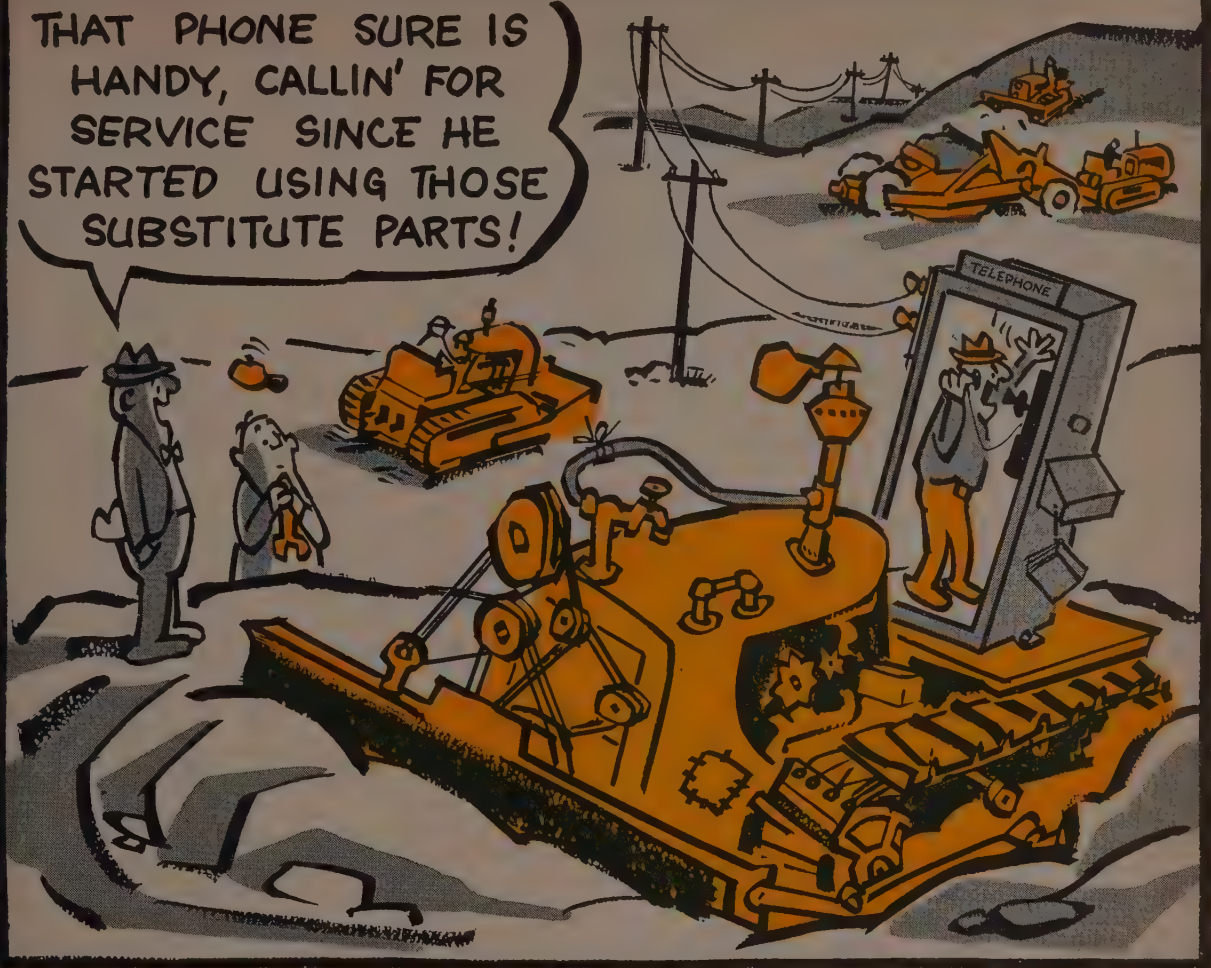
Down-time By Domagalski



"Think of it as interior sculpturing."

Western Construction

THAT PHONE SURE IS
HANDY, CALLIN' FOR
SERVICE SINCE HE
STARTED USING THOSE
SUBSTITUTE PARTS!



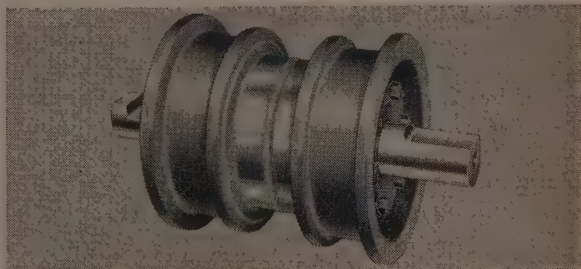
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Take track rollers. You can buy substitutes that look on the outside like Caterpillar originals. But a Cat-built track roller has deep hardened rims of forged steel. Forging keeps rims free from the accidental defects often found in castings. The roller shaft is one-piece and induction-hardened. The seals are self-aligning, of double-tanned leather to *really* keep lubricant in, water and dirt out. You're *sure* of extra wear, extra life —on the toughest jobs.

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See your dealer's Parts Representative —better get Caterpillar original parts every time.

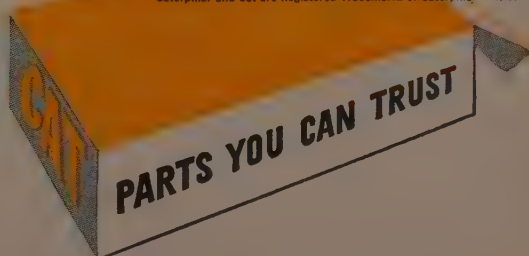
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PERSONNEL on the bell caisson job described on pages 36 and 37 include (l. to r.) **J. Brozman**, inspector for the University of California; **J. Mahaffey**, superintendent; **Don Mahaffey**, contractor, and **A. Austin**, underground superintendent.

tin, mechanical; Stan Sayles, structural; and E. A. Ruth, electrical. General foremen are H. Sammons, pipe; E. Artone, electrical; S. Martin, labor, and Mike Sanders, carpenter.

* * *

Fred W. Maas is supervising an office building at Maywood, Calif., under construction for American Bridge Co. Chotiner & Gumbiner holds the contract.

* * *

N. R. Saunders, vice president, **Ray Beavers**, district manager, and **Don Atkinson**, general superintendent, are in charge of a \$444,555 repairing job on a bridge across San Francisco Bay. Work is being done by Johnson Western Gunite Co., a division of Johnson Western Constructors.

* * *

Howard Woods, project engineer, and **Dave Warnick**, superintendent, are key men for Gibbons & Reed Co. which is doing some work at Hill AFB, Ogden, Utah, at a cost of \$2,248,336. Job started Feb. 20 and will probably be completed by December.

* * *

Tony Crisalli and **Ralph Campbell** are directing construction of storm drains in Burbank and Glendale, Calif., for the Tony Crisalli Corp., which started work on this \$380,213 job in early February and has completion scheduled for Nov. 1.

* * *

Lee Stephens, project manager, and **Forrest Thorpe**, general superintendent, recently finished a highway job stretching from Monticello Dam site to Capell Valley in California for the joint venture firm of Stolte, Gallagher-Burk, Stephens, a \$1,600,000 contract from the Bureau of Reclamation. Other key men on the job: **Jim McMahon**, engineer; **Bill Diehl**, office manager; **Jack Sneed**, master mechanic, assisted by **Bob Meyer**; **John Crockett**, **Tom Staple-**

ton, **Jack Rutherford** and **Jim Clark**, spread bosses; **Lynn Thorpe**, maintenance foreman. Also "Swede" **Ingerson**, general foreman; **Jerry Aldrich**, shop foreman; **Sheldon Vincent**, lub foreman. Superintendent **Thorpe** is now with Harms Bros.

* * *

Tony Mairon is K. E. Parker Co.'s general superintendent on the Standard Oil building going up at Richmond, Calif., a \$1,000,000 laboratory structure. **Carl Dallis** is assistant superintendent on the job, which is scheduled for completion in June. "Pete" **Peterson** is superintending for subcontractor Malino Plumbing & Heating Co.

* * *

L. O. Ashworth, project manager, and **Barney Hedberg**, general superintendent, head the construction crew working for Stolte, Inc.-Gallagher & Burk, on the California Division of Highways freeway construction in Contra Costa County between Oakland Blvd. and 0.3 mi. north of Monument. Other key men on this \$2,638,616 project, which has been under way since October, 1955, are: **Ray Estep**, office manager, and **Bob Meyer**, office engineer, as well as the following foremen: **Carl Burk**, general grade; **John Burk**, truck; **Jack Sneed**, master mechanic; **George Trivitt**, **Bob Chandler**, "Chuck" **Osborne**, **Harold Gustafson**, **Bill Adams**, carpenter foremen; and **Cal Bardine**, and **Nick Anderson**, heavy duty mechanics. Completion date is set for October.

* * *

C. A. McKinney, general superintendent for **Walter A. Hachman**, is in charge of a \$600,000 school erection at Oakdale, Calif. A one-year job, construction has been under way since last June. **Arthur Savor** is engineer for the State; "Bud" **Henley**, inspector. **Stan Schutt** is superintending the work of **Collins Electric**, and **Art Watkins** is in

charge of the work for **Kem Gar Plumbing & Heating Contractors**. **Mayo**, **Johnson** & **DeWolf** are the architects.

* * *

Dave Otis is acting as project manager, and **Forrest Thorpe** is superintending the job of widening and resurfacing 5½ mi. of Highway 12, Suisun-Rio Vista, Calif., a \$300,000 award from the California Highway Department to **Parish Bros.** and **Harms Bros.** Assistant superintendent is **George McFadden**. Other personnel include **Vic Colman**, bridge superintendent, with **Glenn Pearsal** as carpenter foreman; **Bruce Burch**, grade foreman, and **George Ley**, **W. Gutridge**, **Pat Linn**, and **R. Reinke**, equipment operators.

* * *

Elof Gustafson is project manager for another of **Stolte-Gallagher & Burk's** highway contracts in California. This is a 2-mi., 8-lane concrete paved freeway, University Ave. overcrossing and **Gilman St.** undercrossing structures at Berkeley. Master mechanic is **Ernie Patburg**. Superintendents are **Paul Gatschet**, carpenter; **Virgil Welton**, grade; **Frank Contardi**, utility, with **Worth Hawkins** as labor foreman. Engineers are **Art Perez**, office, **L. A. Anderson**, resident, and **Guy Mancarti**, bridge engineer, for the Division of Highways. This job started in late December 1954, with completion scheduled for October 1956. The work probably will be finished June 30, well ahead of schedule. Contract cost is \$2,040,000.

* * *

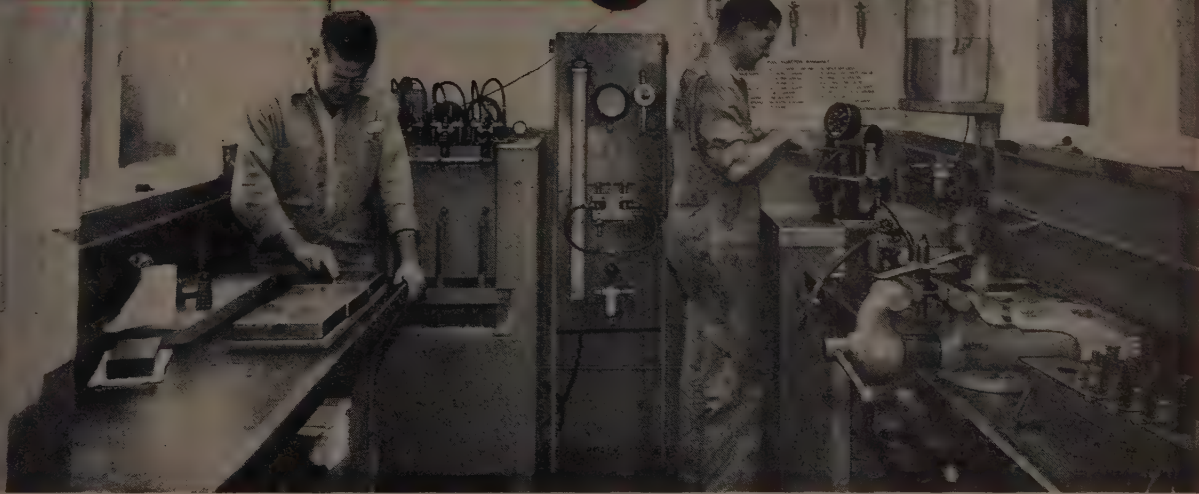
Paul M. Bates, **A. E. McDonald**, **David P. Stovall**, project manager, general superintendent, and assistant superintendent respectively, are top personnel working for **Haas & Haynie Corp.** putting up the **Macy Department Store** at San Jose, Calif., at a cost of approximately \$4,000,000. **Arnold Heidel** is field engineer. Timekeeper is **Earl Runion**; "Connie" **Shore**, master mechanic, and **Glen Morgan**, detailing. Under **John Giordano**, general foreman, are **Jack Phillips** and **Paul Strom**, carpenter foreman, and **George Guthridge**, labor foreman. This job started last July and will probably be finished this August.

* * *

A. Acker is project manager, and **J. H. Cacan** is general superintendent for **P. J. Walker Co.** on construction of a 13-story office building for **Gershon-Scott Corp.**, Los Angeles, Calif. **Dick Lund** and **Charles Gauthery** are carpenter foremen, and **J. Zavala** heads labor on this \$2,225,000 project which has been under way since August and will be completed probably by the first of 1957.

Bethlehem Pacific Coast Steel Corp. has the steel erection under a subcontract, using 1,350 tons of structural steel. **Jess A. Cheely** is doing the superintending, with the fol-

First Class Service FOR AMERICA'S First Choice Diesel



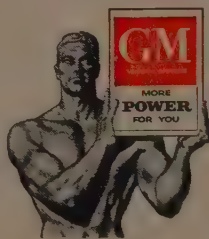
THE "AFTER SALE" service you can count on with a General Motors Detroit Diesel engine is one of the reasons it's America's FIRST CHOICE Diesel.

Typical of the work that Detroit Diesel Distributors do is injector servicing and reconditioning. Injector repair rooms have filtered air to protect vital parts from foreign particles—and proper equipment helps mechanics do a better job. But that's only part of the story:

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DIRECTING THE WORK AT NACIMIENTO DAM

For Eaton and Smith...



Seger



McIntosh



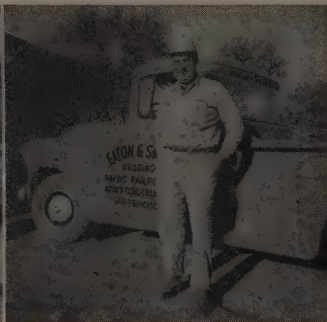
Cunningham



Sipe



Erickson



Cathey

For Bechtel...



Eakin Thompson Smallin Terrell Culver Kempkey

HEADING THE JOB shown on this month's cover and described on pages 46-52 are, for contractor Eaton and Smith, James F. Seger, project manager; Elsie R. McIntosh, master mechanic; Verne E. Cunningham, project engineer; James J. Sipe, concrete superintendent; Homer Erickson, office manager, and Andrew Cathey, excavation superintendent. The Bechtel Corporation field force includes Jack Eakin, office engineer; Miss Enid Thompson, secretary; Ernie C. Smallin, structures engineer; Paul Terrell, field engineer, and D. S. Culver, resident engineer. A. Kempkey is engineering consultant. The strange creature at the very bottom is Sport, tree inspector.

lowing men acting as foremen: Ed Ryan, C. Upton, H. Mousscau and "Champ" Johnson.

* * *

Elmer Cross, general superintendent, has the aid of Ed Kemp and William Mueiting, assistant superintendents on the San Francisco Freeway contract of MacDonald, Young & Nelson, Inc., and Morrison-Knudsen Co., Inc. (Western Construction—February 1956, p. 36, 37, 46, 92). Al Crowl, Lorn Anderson and Jack Hilligoss are engineers, and Bob Russell, Rene Heiling and Ray Van Meter are in the office. Other key supervisors are: Arnold Stavsky, mechanical superintendent; Forest Wilson, concrete superintendent; Tony Tortorici, finish foreman; Don Kerman, Emil Kallio, Emil Kemp, William Bridges, Bob Scott, Eino Sinisalo, Homer Biggs, Lewis Ward, carpenter foremen; William Burke, Harold Farley, Ray Kidder and Emmet Smith, labor foremen.

Lou Pagan is acting as assistant superintendent for Soule Steel Co.'s subcontract, and the following are foremen: Jim Anthony, Mickey Pagan, Jim Pagan and "Ski" Tostanoski.

* * *

John N. Sorbo is construction superintendent for Carl N. Swenson Co., contractor on erection of two additional buildings for the new high school project at Sunnyvale, Calif.

* * *

A. Christensen is general superintendent for Cahill Bros., Inc., on construction of an office building at Pine and Battery Sts., San Francisco. Art Carson is carpenter foreman. Representing the owner, Continental Insurance Co., is Jack Ruin. Construction started last October, with the completion date set for this November.

* * *

Tom Reilly, general superintendent; Ed Cunningham, superintendent, and Lloyd Gadeberg, master mechanic, are key men on construction of railway overcrossings and approaches in Adams County, Wash. Goodfellow Brothers, Inc., is doing the work at a cost of \$230,849. Job got under way Dec. 1, 1955, and is scheduled for completion in August.

* * *

F. Franz, project manager, with Carl A. Beightol in the superintendent spot, has been in charge of construction for McNeil Construction Co. of a hangar and office building at the Los Angeles Airport for Ramo Wooldridge Corp. Bill Taul, carpenter foreman, and Charles C. Becker, labor foreman, are two others who have been on this job.

* * *

Frank Lipis, field superintendent for Pacific Iron & Steel Corp., has been in charge of hangar and office building construction at Los Angeles

New SUPERIOR Heavy-Duty SCREED SUPPORTS

Pat. Applied For

ADJUSTABLE
RE-USABLE

For Use with 1 1/4" and 1 1/2" I.D. Pipe Screeds
and Vibratory Screeding Equipment



ADJUSTABLE SCREED HOLDER

Consists of a 1" threaded rod to which is welded a cradle to hold the pipe screed. This cradle is slotted as shown so that the arms may be bent over to secure the 1 1/4" or 1 1/2" I.D. pipe screed. Threaded onto the rods is a half nut which provides the adjustment.

Especially Designed for Use on Bridges, Underpasses and Overpasses



These Screed Supports are designed to take the heavy loads imposed by traveling vibrating screeding equipment. The Bases for the screed holders are of two types: (1) The Metal Base for use on structural steel members; (2) the Chair-Type Base for use on a plywood deck.

On Structural Steel: As shown above, the Metal Base is tack-welded to the top flange on approximately four foot centers. The Screed Holder is set into the base, and adjusted to height by turning the nut. The threads are fast, three to the inch, and of a contour type, non-clogging and easily cleaned.

On Wood or Plywood Decks: The Chair Base is set on the deck at approximately four foot centers. It is easily secured to the deck by nailing across the upturned legs. If desired, legs can be supplied of galvanized wire. The Chair Base with holder is shown below.

Adjustable Standard SUPERIOR SCREED CHAIRS

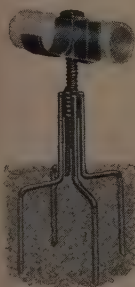
FOR FORMED SLABS 4 1/2" AND GREATER

With re-usable
screed holders
using 1" I.D.
pipe and rectan-
gular bars for
screeds.



FOR SLABS ON FILL

With re-usable
screed holders
using 1" I.D.
pipe and rectan-
gular bars for
screeds.



PERFORMANCE

Superior's Heavy-Duty Adjustable Screed Supports have been used on turn-pike structures and other projects. Results in the field indicate that this method of supporting screeds provides a simple answer to an otherwise expensive and complicated set up. *Write for Bulletin.*

HOLDER INSERTED IN CHAIR BASE

Only the inexpensive bases are left in the concrete. The Adjustable Holders are easily removed, together with the pipe screed, because the holders are set, not screwed into the base. The nut fully covers the base opening and prevents concrete from entering.



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POWER**

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DESIGN FOR
CAPACITY LOADS**

**LOW CENTER
OF GRAVITY**



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"A MOUTHFUL AT EVERY BITE"
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Airport for Air Research Corp. General foreman on this contract has been "Chet" Gietek. Steel foremen: George Boone, Milford Steele, Richard Norgard; sheet metal foreman: Howard Curtis.

* * *

W. K. McLellan, superintendent, assisted by Daryl Doyle, is supervising a Brown-Ely Co. job at Yuba City, Calif. Other key men on the project are W. C. Ivers, plant superintendent; W. S. Smith, office manager; and H. V. Carte, chief operator. This over-\$1,000,000 construction of streets and highways at Yuba City started before the December floods. Work is now expected to be finished in November.

* * *

E. J. Samstead is one man who went east with Coker and Kiewit, joint venture constructing a tunnel for a utility company at New Haven, Conn. Other Westerners also working on this project are Charles Conrad, general superintendent, "Spot" Beasley, walking boss, and Virgil French.

* * *

D. H. Luney is superintending a \$572,763 job for Hall-Atwater, Inc., which recently won the award for construction of Roza power plant, Roza Division of the Yakima Project in Washington. Hall-Atwater started work Feb. 1, 1956, with completion date set for April 1958.

* * *

Don Rodgers, superintendent, Joe Nesbitt, assistant superintendent, Al McCann, job engineer, and Jim Nelson, job office manager, comprise the top supervisory personnel on construction of piers for the lower crossing railway bridge at Noxon Rapids Dam project in western Montana. Peter Kiewit Sons' Co. is doing the job at a cost of \$1,136,000. Work got under way in early January, with Sept. 1 the probable completion date.

* * *

Paul Cross, superintendent, is in charge of a \$272,528 contract recently awarded to Henry Thygesen & Co. for grading and surfacing in Eddy County, N. Mex. Construction has been going on since last Dec. 22, and is scheduled for completion about April 10.

* * *

Lee Clements and Bill Vian, superintendents, are in charge of Tom Lillebo's recent award for grading and concrete structure in Klamath County, Ore., an \$899,964 contract which got under way Feb. 1. Project will probably be complete the summer of 1957.

* * *

Ray Burns, superintendent for Gardner Construction Co., has the assistance of the following foremen in carrying out a job in Sedgwick County, Colo., covering grading and surfacing including four concrete girder bridges totaling in length 1,225 ft.: Bill Hasse, steel; Alex

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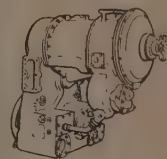
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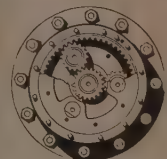
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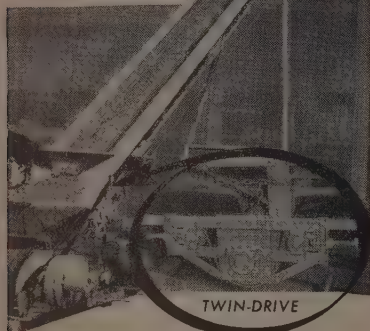
☐ model HO—2 1/4 cu. yd. ☐ model HH—1 1/2 cu. yd.
☐ model HU—1 cu. yd.

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GENERAL MACHINERY CO., Spokane
ARNOLD MACHINERY CO., INC.
Salt Lake City, Boise, Idaho Falls
EQUIPMENT SALES CO., Phoenix
CONTRACTORS EQUIP. & SUPPLY CO.,
Albuquerque
THE UNIVERSAL CO., Denver

Michel, carpenter, and Harold Wilson, labor. Gardner won the award at a cost of \$312,646, started work March 7, and expects to have the job completed about Sept. 1.

* * *

Ben Keller, structure superintendent, and Gene Crandall, excavation superintendent, are directing a job for which Charles M. Smith received the award on a low bid of \$277,748. Part of the Missouri River Basin project, the job calls for earthwork and structures in the Big Horn Basin Division, Owl Creek Unit, Wyo.

* * *

W. E. Koerwitz is job superintendent on a recent award to Sierra Construction Co. for construction of a maintenance building at East Ely, White Pine County, Nev. H. E. Nelson, head of the contracting firm, is in overall charge of the project. A 5-month job, actual construction started Mar. 12.

* * *

Glenn Pickett is superintending a job awarded to Pickett & Nelson for grading and surfacing and construction of a railroad underpass in Twin Falls County, Ida. This is a \$384,223 undertaking which got under way in January, with the finishing date set for mid-October. Concrete work is sublet to Goodwin Construction Co.

* * *

D. R. Lewis, general superintendent for M & K Corporation, is directing construction of a \$3,000,000 junior high school project for the San Francisco Board of Education. Wayne Bering is job engineer. Office manager is Frank Curran. These are the foremen: Herb Miller, Ivan Ross, carpenter; Bill Hunter, labor. This construction is expected to finish about August 1957, having been under way since last December. George F. Casey Co. is subbing foundations, with C. J. O'Neil and L. W. Rathbun superintending.

* * *

R. E. Buckingham and John Powell are named to superintend the recent \$370,976 award which went to Powell & Baltrusch Construction Co. for 11.2 mi. of grading and surfacing in Hill County, Mont. E. E. Powell heads the contracting firm. J. W. Powell acts as superintendent and also does the purchasing. J. W. Comwell manages the office. Bud Stamper is master mechanic. Work was expected to start with the good weather, with completion scheduled for the summer of 1957.

* * *

Robert F. Calou, superintendent, Tom Bond, timekeeper, Walter Thompson, bridge superintendent, and "Tex" Strickland, grade and pave superintendent, comprise the top supervisors on the \$1,856,248 recent contract awarded for grading, paving and construction of five bridges in Alameda County, Calif., on which Fredrickson & Watson Construction

Co. was low bidder. Job got started in January; an October date is anticipated for the finish.

* * *

George White, foreman, Earl Blackburn and Al Winters are key men for Workman & Wilson, constructing a 120-ft. reinforced concrete bridge over the Nehalem River in Tillamook County, Ore. Bid price was \$124,720.

* * *

R. C. Tanner, as general manager, is directing Tanner Bros. Construction Co.'s recent award for grading and surfacing in Cochise County, Ariz. Superintending this \$300,911 job is Lyle Fish. Chester Cooper is foreman. W. L. Paddison is office manager and timekeeper. Work has been going on here since mid-January and is expected to be wound up in early July.

* * *

Wade Stroud, superintendent, and Bob Scott, engineer, are key men for Modern Construction Co. which started work in February on an addition to an elementary school at Holloman AFB in New Mexico. This \$176,300 structure is expected to be completed this coming August.

* * *

N. W. Axline, general superintendent for Tiffany Construction Co., is in charge of this contractor's grading and surfacing job near Yuma, Ariz. Superintending the \$463,325 job is G. M. Gossitt. In the office E. J. Bufka is in charge of personnel and purchasing. Another key man is A. C. Simson, equipment superintendent.

* * *

Oscar K. Kringlen, project manager, and Nils B. Oberg, excavation superintendent, head the men on Oberg Construction Corp.'s \$460,861 grading, paving and bridge construction contract, a part of the San Diego freeway project at Ventura Blvd. and Sepulveda Blvd. in Los Angeles County. Oberg has been working here since last November and expects to finish in September.

* * *

A. M. Willis, superintendent for Peter Kiewit Sons' Co., Inc., is bossing a \$459,395 job in Carbon County, Mont., consisting of 12.9 mi. of grading and surfacing on the Wyoming line-bridger highway. Lyman Tippets is foreman. Actual work started April 1, with the finish slated for Sept. 15. Dirt is subbed to Jones-Hinckley & Jones, Inc., with Frank Hinckley excavating superintendent.

* * *

C. U. Forrest, as vice president and manager for Robert E. McKee, General Contractor, Inc., for the Albuquerque, N. Mex., area, has charge of construction of an engine build-up shop at Kirkland AFB, a \$347,300 project. Fred V. Lillie is superintending the job. John Sanders is office engineer. "Boss" Reynolds is carpenter foreman. Job started Mar. 1; will probably finish this October.

Now, Front-End Power Take-Off for Cal-Rex Moto-Mixers®



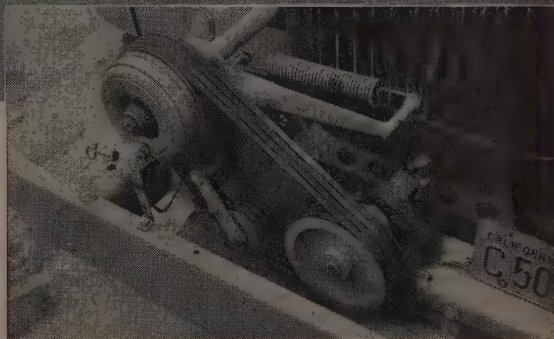
Part of a fleet of 21 Cal-Rex Adjusta-Wate Moto-Mixers with Front-End Power Take-Off owned by San Mateo Feed & Fuel Company.

Large fleet owners, like the San Mateo Feed & Fuel Company, are taking to the new Front-End PTO unit of Cal-Rex Moto-Mixers in a big way. And why not? This new drive unit does away with the need for a separate engine and all the maintenance and fuel costs that go with it. Yet, you sacrifice nothing in mixer control or operation. You get all the advantages of the famous Rex Adjusta-Wate design plus the savings of the finest Front-End PTO in the field. Check these outstanding features:

Constant drum r.p.m.—Insures highest quality concrete. Mixer power comes from the front of the engine crankshaft; therefore, drum rotation is independent of the truck gear train and road speed.

One lever control of drum—With Rex heavy-duty transmission, one lever starts, stops and reverses the drum.

Two-speed attachment to Rex transmission—Adds up to greater operating flexibility. High speed mixing for short hauls, or slow agitation for long hauls and/or agitator duty. High to low speeds available to meet varied discharge requirements.



Electric disconnect clutch—Makes full engine horsepower available to truck when needed for that steep hill or rough terrain by disconnecting the mixer drive with a simple flip of a switch in the cab of the truck. Thus, the need for extra horsepower to drive the mixer is eliminated. A simple flip of a switch starts the drum rotation again by re-engaging the electric clutch.

Automatic throttle—Reduces engine speed to idling when transmission is shifted to neutral. When transmission is engaged, automatic throttle smoothly increases speed to the preset operating speed. You get reduced shock on the PTO unit and clutch...longer engine life...lower operating costs.

No special truck is needed for the Rex FEPTO. Only a Front-End Power Take-Off hookup provided by the truck manufacturer is required. See your Cal-Rex Distributor.

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CHAIN BELT COMPANY



Storm Murdock Simonini McCann
Stone

George Storm as general superintendent, and Al Murdock, assistant, head the crew working on the reinforced concrete department store going up at Stanford, Calif., for I. Magnin & Co. Rothschild, Raffin & Weirick has the contract at a cost of about \$1,000,000. John McCann is in charge of the office. Other supervisors are: Angelo Simonini, general foreman; Jess Stone, carpenter foreman, and Jay Todd, labor foreman. Building is expected to be ready for occupancy towards the end of this year.

Dwight Fowler is supervising construction of a building now being erected at Burlingame, Calif., for the California Teachers Association. Bill Sheldon is carpenter foreman. Contract is held by Moroney Construction Co.

* * *

W. N. Evans, project manager, E. E. Snyder, superintendent, and J. B. Gibson, job engineer, are top personnel working for the Arundel Corp.-L. E. Dixon Co., prime contractor on construction of Tulloch

Dam and powerhouse near Oakdale, Calif.

* * *

Herman Rosse, superintendent, assisted by James A. Briggs, rock superintendent, is directing a \$150,000 contract for John Delphia for grading in connection with a housing project at Corte Madera, Calif. Job engineer is Jim Martindale. Del Combs is master mechanic.

CALENDAR

May 14-15—Society of American Military Engineers, annual meeting, Washington, D. C.

May 21-22—Building Research Institute, annual meeting, Sheraton-Brock Hotel, Niagara Falls, Ont.

May 23-26—National Society of Professional Engineers, Ambassador Hotel, Atlantic City, N. J.

June 5-8—Materials Handling Exposition, Cleveland, Ohio.

June 12-16—World Conference on Earthquake Engineering, University of California, Berkeley, Calif.

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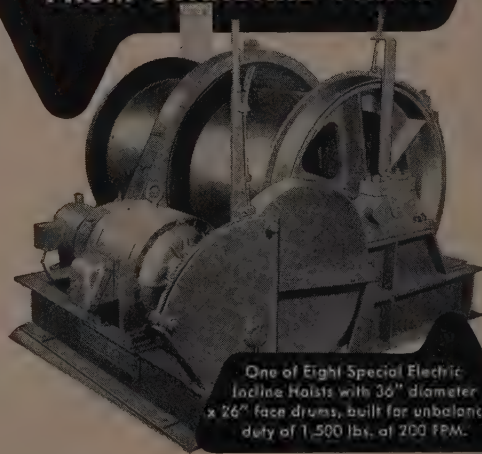
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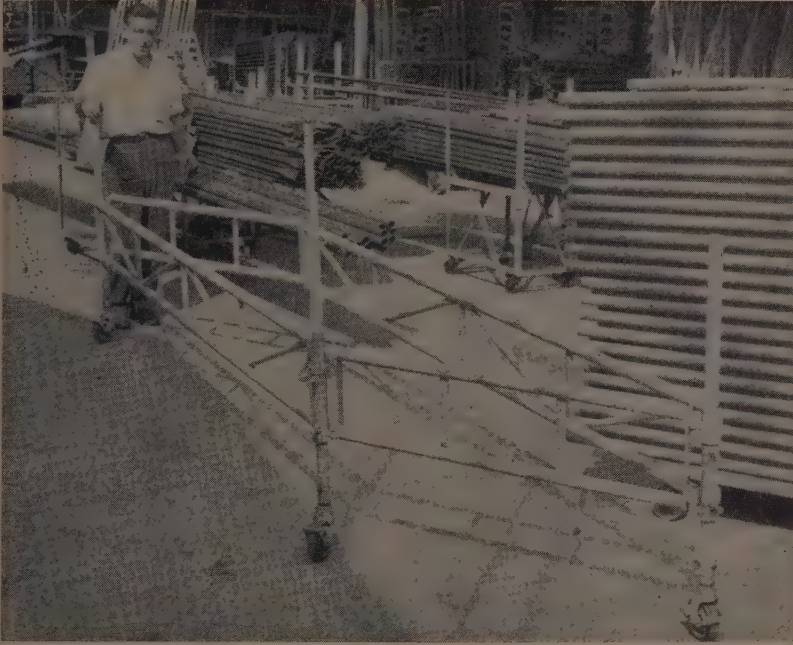
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TRICKS of the TRADES

Action . . .
Camera . . .
Roll 'em!

SO GEORGE WYCKOFF, chief inspector in the Engineering Department of the Salt River Power District (headquartered in Phoenix, Arizona), can make regular progress photos, both still and movie, of the rising Agua Fria steam power plant, he suggested a 40-ft. high tower be constructed from which he could photograph the plant. Besides using the perch for closeup shots of various phases of construction for engineering files, Wyckoff clammers up this high ladder about once a month for an overall shot of the progress of the plant. Wyckoff has about a 4 x 5-ft. operational base in which to maneuver in the crow's nest of the tower.

The new plant, to be built at a cost of \$25,000,000, will have a capacity of 200,000 kw.



Hinged portable scaffolds

HOW CAN YOU get a 5-ft.-wide scaffold through a 2-ft. door—without dismantling the scaffold? The answer to that question, for thousands of plasterers and builders, may be Superior's new line of Lo-Boy rolling scaffolds.

The basic unit, illustrated in photo, is adjustable to any height up to 10 ft. (Greater heights are obtained by placing the unit on top of a standard Superior Auto-Lock frame.) The most important feature, however, of the Lo-Boy line is the fact that all four corner posts are hinged. Standing normally, the unit is 5 ft. wide and 10 ft. long. But, by removing planks and pressing sides together, it can easily slip through a door 2 ft. wide.

Versatility is attained by easy exchange of parts. A 10-ft. truss, for example, may be substituted for the usual 5-ft. truss on larger installations.

Bob Willer, plastering contractor of San Diego, recently stated: "We have six of the new scaffolds on our

Naval Hospital job here and found them to be the handiest rolling scaffolds we ever used."

While these units are available through building material dealers, more information may be obtained by writing Superior Scaffold Co., 5624 Bankfield Ave., Culver City, Calif.

Estimating guide for construction industry

THE 1956-57 EDITION of "National Home Estimator" is now available under the title "National Construction Estimator." In addition to all its former information, the book now contains complete charts and data about general construction and becomes an estimating guide for all types of building. The edition is available through Craftsman Book Co. of America, 221 South La Brea Ave., Los Angeles 36, Calif. \$3.00. For free literature, write Dept. 72.



Versatility and economy expand—

The role of the tractor-shovel

A look at available attachments, work which can be done, reasons for using wheels or tracks, recent improvements, and costs.

By **FRED L. BAUMANN**

Shovel Specialist
Caterpillar Tractor Co.

THE IDEA of combining the abilities to dig, transport, lift, and bulldoze material with the mobility, durability, and low first cost of crawler and wheel type tractors had its inception about 30 yr. ago. The growth of tractor-shovel sales, particularly since the end of World War II, bears out the fact that the early developers of tractor-shovels were striving for a needed tool.

These figures do not include the integrally built wheel type front end loaders such as those manufactured by Frank G. Hough, Clark Equipment Co., Pettibone-Mulliken, and others. These latter machines, as well as more recent track-type tractor-shovel offerings, reflect the growing trend toward specialized design. The importance of this type of machine to construction men and those in allied industries demands that this

trend continue to grow. There is only one valid reason for this sales volume growth: these machines perform more jobs more economically than any other method available.

In sales, tractor-shovels compete with everything from hand shovel-equipped men to power shovels with capacities of two to two-and-one-half cu. yd. The work applications of these versatile machines covers a range as wide as that of the methods and machines with which they compete.

The general description of these machines indicates that hydraulic tractor-shovels incorporate, to some degree, the performance characteristics of such special tools as power shovels, cranes, bulldozers, and to some extent, scrapers and motor graders. Obviously, many attachments other than buckets must be

available to realize the maximum versatility of these machines.

Some of these are: 1. Skeleton rock buckets, 2. Light material buckets, 3. Lift fork with or without hydraulic top clamp, 4. Rear mounted hydraulic ripper, 5. Angling bulldozer, 6. Land clearing rakes, 7. Rear mounted towing winches, 8. Scraper control equipment—hydraulic or cable, 9. Side dumping buckets.

In general there are four classifications of work done by tractor-shovels. The first function is represented by such activities as loading sand and gravel, earth, shot and crushed rock, cinders, slag, and other materials into a hauling unit or hopper with a bucket equipped machine. With a log and lumber fork, very efficient loading performance is obtained with saw logs, pulpwood, ties, poles, and stacked lumber. Palletized loads such as truck or airplane cargo can also be handled with these forks.

A second function of fork or bucket equipped machines is **lifting and hauling**. They find use on building projects carrying and placing bricks, wet concrete, concrete blocks, lumber and other materials from depots to their points of use. Sanitary landfill operators utilize the ability of these machines to lift and carry in obtaining and spreading cover material. Steel mills are turning more and more to tractor-shovels to solve their slag disposal problem around open hearth furnaces.

A third function is **excavation**. Excavating contractors, particularly those who specialize in basement digging to support the current housing boom, find the tractor-shovel an excellent tool. The ability of the bucket to handle more material per pass than a comparable dozer plus its ability to lift and dump over stockpile crowns contributes to more economical operation. Excess material can also be loaded into trucks by the same machine. If ground conditions are adverse the same machine can be used to deliver building materials

TRACTOR-SHOVEL has the capacity to compete with a power shovel up to 2½ yd. in size where once the power shovel reigned supreme for tough digging. Development of low-priced attachments and design improvements have enabled the tractor-shovel to work in such materials as hard clay, hard pan, shale, and glacial till with little loss in efficiency.



until it is needed for backfilling.

The fourth function is **land clearing**. Either bucket or rake equipped machines make excellent land clearing and pioneering tools. Trees and stumps fall easy victims to their high lift and tip back bucket action. Experience with tractor-shovels and comparably sized bulldozer tractors show that the tractor-shovel does the most economical job.

Many general contractors would not be without crawler and wheel mounted tractor-shovels on their operations. The savings realized by using them to clean up the job, place culvert, transport small items such as pumps, bagged cement, concrete and other materials, rehandle aggregate or sub-base material, backfill around structures, and handle de-watering equipment, oftentimes pay for the machines on a single project.

The logger is finding that track-type tractor-shovels are providing the most economical solution to many of his problems. One tractor-shovel with the proper attachments can: Clear land and pioneer haul roads, build haul roads including ditches, dig and load gravel to surface roads, remove snow from roads, and sort and load logs. These jobs represent year round operation; something that specialized machinery cannot realize. Certainly, specialized machinery can do some of the outlined operations somewhat more economically than tractor-shovels. However, no other machine can match the overall economy and ability of the tractor-shovel to users who must have maximum versatility to make their operation profitable or economical.

Choosing a tractor-shovel

An examination of the costs involved may help clarify those areas where more than one machine may be used to accomplish the same ends. One of these is the selection of track-type or wheel-type tractor-shovels. Comparison of approximate capacity, weight, power, and price shows that unit production costs should be and are comparable where both types of machines can operate with equal facility.

The choice of one or the other type will depend on the work to be done, the type of underfoot conditions encountered and, to some extent, on the locations that must be served. Usually, the wheel type tractor-shovel will be used on dry, firm surfaces:

1. Where work points are scattered and self-propulsion over city streets or paved plant areas is desirable.
2. Where materials to be handled are loose or easily loaded into the bucket.
3. Where work surface is one that must not be scuffed.

The track-type tractor shovel will be used:

1. Where ground conditions or grades require good traction and flotation.
2. Where materials are firm and not easily excavated.
3. Where maximum lifting capacity and stability under load are required.
4. Where tight quarters demand maximum maneuverability.

Various special track shoes are available for track-type machines to minimize ground scuffing with some loss of traction. If constant movement is not required, track-type machines of 1½ cu. yd. and smaller are readily transported by a small truck and relatively inexpensive tilt top trailers. One cu. yd. machines and smaller can be carried in dump truck bodies.

Advantages in loading

When comparing tractor shovels with crawler mounted power shovels or clam shell cranes on loading operation, a number of factors other than machine performance enter the picture. The ones that favor use of tractor-shovels are:

1. Frequent moves beyond the distance practical to move a power shovel under its own power.
2. Elimination of one man in crew.
3. Lower initial investment for same cubic yard per hour loading capacity.
4. Lift height requirements within the scope of tractor shovels or too restricted for power shovel.

Conditions favoring the use of crawler mounted power shovels are:

1. Where job situation demands the working of a higher bank or cut than can be handled by a tractor-shovel.
2. Where lift height requirements exceed the limits of tractor shovels.
3. Where the machine is to be operated continuously in heavy, very abrasive rock. Here the continuous movement required of tractor shovels greatly increases maintenance costs.

Contrary to a widely held belief, tractor-shovel loading costs are actually lower than those of power shovels where conditions permit the highest possible production rates. Investment per cu. yd. of capacity has risen sharply since World War II. Tractor shovels currently require from \$8,000 to \$10,000 per cu. yd. in the 2¼ cu. yd. to 1 cu. yd. sizes while crawler mounted power shovels range from \$25,000 to \$30,000 per cu. yd.

in the 1¼ cu. yd. to ¾ cu. yd. sizes. Two-men crew requirements, higher wages plus the added expense of moving of even a small crawler mounted power shovel, have combined with the higher investment to drive excavating and loading costs of power shovels higher than those offered by tractor-shovels. Substantial improvements in the design and manufacture of tractor-shovels have also helped to make this possible. Such improvements are:

1. Better design and use of materials in engines, clutches, transmissions, brakes and track components has resulted in lower weight to horsepower ratios.
2. Application of unit design principles has resulted in better balance and stability. This permits use of larger buckets in relation to machine size and weight.
3. Advance in knowledge of hydraulic components has permitted use of higher pressures. Pumps are more efficient and longer-lived. Full flow filtering of hydraulic systems greatly increases the life of all components in spite of higher pressures and oil flow rates.

All of this adds up to faster, more powerful tractor-shovels with larger buckets and greater lifting capacities. Ownership and operating costs have not kept pace with these advances and lower unit work costs have resulted.

Vies with power shovel

The tractor-shovel has the capacity to compete with a power shovel up to 2½ yd. in size. The power shovel formerly reigned supreme in tough hard-to-dig clay, hard pan, shale, glacial till, etc. However, development of low-priced attachments and design improvements have enabled the tractor-shovel to work in these materials with little loss in efficiency.

These developments were:

1. Rear mounted, hydraulic controlled rippers enabling tractor-shovels to excavate almost any tough material up to solid rock.
2. Design of economical replaceable tip bucket teeth that are usually enough to insure good production in heavy, hard clay soils.
3. Adoption by design engineers of the principle of tipping buckets back 30-40 deg. from the digging position at ground level by the use of hydraulic controls, providing better utilization of bucket capacity. The "fishtail" action of the bucket enables the operator to break up the material, making it easier to load the bucket.



Uniform curb footings for \$100

A **HOMEMADE** excavating blade, attached to an International Drott TD-9 Skid-Shovel, is being used by H. C. Gale, a Harrisburg, Pa., contractor, to dig curb footings.

Costing only \$100 for material and labor, the blade will dig to a uniform cut 22 in. below grade. It is made

from $\frac{3}{4}$ -in. steel plate, 28 in. wide with a 15-deg. angle forward from bottom of bucket level. The plate is supported by 2x2x5/16-in. angle irons, each 47 in. long.

Gale claims the International Drott combination can't be beat on home development projects.

TRIMMING A TRENCH

On the 1,466-mi. pipeline being built from New Mexico to Washington this trick was used to keep loose material from falling into the trench behind the Cleveland 320 ditchers. A pipeframe to which is attached curved blades straddles the trench—towed about 10 ft. behind the ditcher. This serves to turn back loose dirt near the trench edge on both sides which could possibly fall in during the one to two weeks that it is open before pipelaying.



New techniques for steel shoring

CONTRACTORS lately have successfully applied several new techniques which increase the versatility and efficiency of sectional steel shoring.

In one case the contractor rolled prefabricated shoring units from pour to pour on a wheeled dolly and lifted them to the next floor by an electric crane. In another case shoring units were slid on greased wood sills. And in other cases, contractors use 5-ft. wide units to support precast roof planks, to support isolated, exterior spandrel beams, and to support a unique, poured concrete pitched roof.

The techniques, impractical or impossible with built-on-the-job wood shoring, were developed in collaboration with The Patent Scaffolding Co., Inc., which supplied the steel frame-type shoring called "Trouble Saver" sectional steel shoring. In each case the shoring was quickly assembled on the job from base plates, 20-in. adjustable extension legs, welded 5-ft. wide frames and diagonal braces. Fast-acting "Slide-Loks" or wing nuts are used to secure the braces to the frame.

At Anaheim, Calif., a mechanized handling system was devised for moving sectional steel shoring both horizontally and vertically on the multi-storied Broadway-Hale De-

partment Store. Contractor Ford J. Twaits Co. used rubber tired hydraulic lift trucks to transport the sections horizontally to either a stair well or escalator block-out. There the sections were raised to the next floor by means of a monorail-mounted hoist which in turn releases each section to a lift truck working that level.

The assembled sections were

moved quickly into position and joined to existing shoring by cross braces. Construction manager L. E. Douglas reported that the mechanized movement of the shoring permitted unusually big pours. Single pours from 550 to 660 cu. yd. were not uncommon. These pours covered from 16,000 to 18,000 sq. ft. and were made at rates to 93 cu. yd. per hr.



Constructs access roads



Builds interchanges



Backfills around buildings



A place on every dirtmoving job

Every "big" dirtmoving job breaks down into work sections... some suitable for "big" equipment... some for "small" equipment.

The versatile 138 hp D Tournapull fills the need for a fast, flexible, scraper which works economically on both big and small-yardage assignments, on both long and short hauls.

Because the D Tournapull can self-load up to 5 yds., it can be used as a one-man crew for pioneer and clean-up assignments. It frequently handles advance grading of haul roads, stripping, and stockpiling of topsoil, leveling of land, opening preliminary drainage along right-of-way, and similar jobs.

After your production fleet is moved out, "D" stays behind to:

1. fine-grade between forms
2. build access roads
3. connect driveways
4. grade shoulders
5. spread gravel and topsoil
6. backfill around culverts
7. shape backslopes
8. level borrow pits
9. open drainage ditches
10. load and spread top soil — and perform dozens of other odd jobs in addition to those listed above.

Because of "D's" ability to make quick moves, work in any combination of unit assignments, with productive capacity to handle these necessary small and scattered jobs at high-speed... D Tournapull reduces

delays and expense that would otherwise eat into profits.

When "D" runs out of odd-job assignments, it fills in well with any combination of push-loaded production equipment. Its $7\frac{1}{2}$ -cu. yd. capacity plus high-speed cycle makes "D's" production worthwhile. Quick loading and dumping, easy maneuverability, and speeds to 28 mph, enable the "D" to equal and often outperform larger capacity production dirtmovers.

Combining this profitable production capacity with ability to materially cut time and expense on clean-up and odd job assignments makes "D" well worth investigating as a "one-man handyman" on any size project.

Also, remember that the "D" can pick up substantial extra profits for you by doing small hourly-rate or by-the-job contract work between assignments on your major contract.

Ask your LeTourneau-Westinghouse Distributor for owner-verified facts on D Tournapull performance on big and small jobs. Check for yourself how the "D", added to your fleet, will help you make bigger profits.

Tournapull—Trademark Reg. U.S. Pat. Off. DP-972-G-b



Loads boulders, stumps



Cuts drainage ditches



Grades shoulders

LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

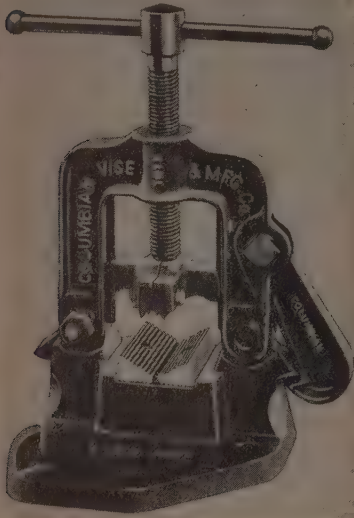
A Subsidiary of Westinghouse Air Brake Company



TOOLS of the TRADES

Use the addresses listed for further information on any of these items

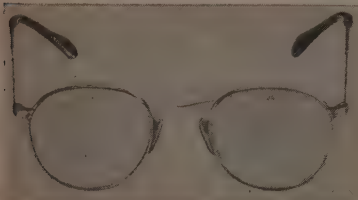
AN IMPROVED PIPE vise has been announced by the **Columbian Vise & Mfg. Co.**, 9018 Besemer Ave., Cleveland, Ohio. The lower jaws are reversible and are milled on both sides and



securely fastened at the top. They can be reversed or replaced without removing the vise from the bench. The vise is also equipped with a handy bender for small pipe. The "Long Jaw" vises are available in four models with a capacity range from $\frac{1}{8}$ -2 in. to $\frac{3}{8}$ -4 $\frac{1}{2}$ in. Weights range from 9 to 26 lb.

A CIRCULAR power saw which weighs only 7 lb. has been announced by **Mall Tool Company**, 7725 S. Chicago Ave., Chicago 19, Ill. It can be used on nearly all building materials for cross cutting, rip cutting, bevel cuts, cutting asbestos siding or flooring, or making preparatory depth cuts for grooving. The blade is 6 $\frac{1}{2}$ in. in diameter and the maximum depth of cut is 2 $\frac{1}{16}$ in. The price of this size is \$29.95. For further information write to the manufacturer.

A METAL SAFETY spectacle frame with modern styling designed for the Styl-Ize safety lens shape has been developed by **United States Safety Service Co.**, 1215 McGee St., Kansas City 6, Mo.



The frame has flexible polyethylene nose pads which may be adjusted without tools. Choice of temple styles is offered. Plastic or metal screen side-shields are optional.

A CHAIN SAW which delivers 5 hp. yet weighs only 20 lb. is now available from **Homelite**, a Division of **Textron American, Inc.**, Riverdale Ave., Port Chester, N. Y. The high compression short stroke engine of the new saw cuts wasteful friction, increases engine life, and reduces gas consumption. The saw can be used for filling, bucking, boring, notching, trimming, or undercutting. Additional features include an automatic clutch, positive action fuel pump, and automatic governor. Available straight blades range in sizes from 14 in. to 16 in. and bow saw attachments are available in 14- and 16-in. sizes.

UTILITY BAR—Now available is a twin-claw Utility Bar designed to supersede wrecking bars and crow bars. It has three major features, preventing splintering and breaking of forms, pulling nails from tight spots and pulling them out straight, and breaking down doors or wall sections in emergencies. It weighs about 4 $\frac{1}{2}$ lb. and is 30 in. long. Retail price is \$4.95. An illustrated brochure is available from the manufacturer **A & F Manufacturing Co.**, 1423 28th St., Sacramento, Calif.

A SIX-FOOT folding wood rule, with special reverse-side markings for laying out rafters, has been put on the market by **Master Rule Manufacturing Co.**, Middletown, N. Y. Angular folds of the tool are manipulated to form triangles, the bases of which are held along the edge of the lumber. Adjustment for the desired triangle is made by placing a



notch in the metal edge of the rule over the proper markings on the reverse side of the rule. This adjustment is held under the thumb while the angular cut is marked. Special markings allow the rule to be used as a square and for laying out any angle from 0 to 90 deg. The tool retails at \$2.95 and is available at hardware stores and lumber yards. Comes with illustrated instruction folder.

TOOL CATALOG—The Goldblatt catalog for 1956 is now available. It is a reference book of equipment for the following trades: brick, block and stone masonry, plastering, cement finishing, ceramic tile setting, lathing, tuck-pointing and dry wall application. More than 1,100 tools are listed in the 80-page catalog including over 50 new items which will be available for the first time, as well as a number of previous

tools which have been redesigned to improve their use. The catalog is completely sectionalized with sections for each of the trowel trades or crafts and features much new power equipment. The catalog is available on request to **Goldblatt Tool Co.**, 1960 Walnut St., Kansas City, Mo.

THE LINE of high speed Guillotine cutters has been redesigned for better performance, with particular emphasis on low maintenance cost. A new valve of greater capacity gives a faster operating cycle. For low maintenance the number of operating parts has been reduced and parts are now hardened and ground. A further innovation is the



interchangeable blade and anvil, so that wear points can be reversed for virtually double blade life. Three blade styles are offered for cutting many types of material. Three models are available, arranging in capacity from $\frac{1}{2}$ in. to 1 $\frac{1}{4}$ in. For complete information and catalog write **Manco Mfg. Co.**, Bradley, Ill.

A NEW VERSION of its $\frac{1}{2}$ -in. square-drive universal electric impact wrench has been developed by **Thor Power Tool Co.**, Aurora, Ill. Designated as No. 56 SpeedWrench, the tool replaces the Model 55 unit but will continue to carry the same retail price of \$89.50 for the basic tool and six hexagon sockets. One of the chief features of the tool is one-hand operation through a finger-tip reverse button located in the handle behind the starting trigger. Single switch efficiency is made possible by concentration of all electrical connections in the handle. The wrench weighs 7 lb. and delivers 1,900 blows per min.

A FUEL SYSTEM PRIMER, applicable to GM Detroit diesel engines, Buda diesel engines, and others has been released by **Kent-Moore Organization, Inc.** The primer insures the fuel supply throughout the system for starting, an important factor after head overhauls, or as an engine starting aid. Use of the fuel injectors, pumps, and nozzles caused by attempts to start without an adequate fuel supply throughout the system. For further information write the manufacturer at 1501 S. Jackson St., Jackson, Mich.

New "B" Rear-Dump offers you big capacity PLUS



High speed

3 Tournapull Rear-Dump has forward speeds from 2 to 34 mph, plus two reverse speeds, 2 and 4 mph. Wide selection of speeds enable "B" to climb steep grades.

Easy loading

Loading of new "B" is made easier by large "target" area of bowl. Its 7'8" length, 10'2" width, and 7'6" depth make it ideal for any size shovel. Rear of body provides wide, low entry for dipper to give extra speed advantage for the excavator. Big 35-ton capacity can make every load a profitable one.

Fast dumping

At the touch of a dashboard switch, body raises to vertical position. Edge of bowl swings behind and below rear wheels so rocks cannot roll forward to lodge against wheels nor can material pile under rear end.

180° turn in 35' space

Two wheel prime-mover turns 90° right or left . . . machine in normal use makes non-stop 180° turn in space only 35' wide. With body in dump position, machine can turn 180° in only 27'. This maneuverability of "B" allows you to work in tight quarters where smaller conventional haulers often cannot go. Jockeying back and forth to get into loading position is eliminated.

7536 square inches of braking surface

Heavy-duty air brakes with 7536 sq. in. of braking surface improve maneuverability . . . add to operator confidence for faster operation on steep grades and narrow winding haul roads.

New "B" also offers these additional features

- Big 7-ft. high 2-ft. wide low pressure tires for better flotation.

- Rugged body construction for longer equipment life.
- Simple, positive electric controls for fast, easy operating.
- Lower maintenance because there are no hydraulics, no long drive-shafts, no springs or spring hangers.

For more information on this big new "B" Rear-Dump see your LeTourneau-Westinghouse Distributor.



Tournapull — Trademark Reg. U. S. Pat. Off. BR-888-G-b

LeTourneau-WESTINGHOUSE Company
Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

ENGINEERS on the move

Roy M. Cami, chief of the engineering division at The Dalles Dam project on the Columbia River, has been named project engineer for the Hills Creek Dam project on the Middle Fork Willamette River, and Frederick E. Drager, chief of The Dalles powerhouse construction section, project engineer for Cougar Dam project on the South Fork McKenzie River. According to Col. Jackson Graham, Portland District Engineer, these appointments are effective May 1. Work is starting soon on both Hills Creek Dam, a \$33,000,000 project, and Cougar Dam, a \$37,000,000 undertaking. Both are units in the Corps of Engineers' Willamette River Basin multiple-purpose project.

* * *

Col. Albert E. McCollam, assistant division engineer, South Pacific Division, San Francisco, has been appointed District Engineer, Sacramento, Calif., succeeding Lt. Col. Alvin D. Wilder, who has been acting district engineer since Col. William J. Ely left last December for an overseas assignment.

In Alaska, Col. Pierre V. Kieffer, Jr., becomes district engineer at Anchorage. He succeeds Col. Carl Y. Farrell, who has a new assignment at Fort Sam Houston, Tex.

* * *

William K. Stockdale was recently elected 1955 president of The Associated Engineers of Spokane, Wash.

Stockdale is traffic engineer for the City of Spokane. New vice presidents elected to serve with him are: Harold A. Halstead, Fred Long, Ivan Shirk,



William K.
Stockdale

J. Byron Barber, Edward E. Ralph, Charles J. Melrose, Ed C. Stephens, Robert Hyslop, William N. Pauley and George Brunzell. Wilbur L. King is secretary-treasurer of the organization.

* * *

Wade Taylor is appointed regional director of the Bureau of Reclamation's Region 3, headquartered at Boulder City, Nev. Since the death in December of Regional Director J. P. Jones, Taylor has been acting director. The promotion of Vaud E. Larson, former regional project development engineer, to assistant regional director is also announced.

* * *

Louis J. Breuner, president of the East Bay Municipal Utility District's board of directors, was recently pre-



THOMAS W. BURTT, who has been named vice president in charge of engineering and construction for Holmes & Narver, Inc., Los Angeles organization of engineers and constructors. His responsibilities include direction of all company engineering and construction projects, both domestic and foreign.

sented with the National Safety Council's Award of Honor. This high national honor is gained only by those organizations which have established outstanding safety records, especially in the reduction of lost time accidents. EBMUD in 1955 had only nine lost time accidents for more than 2,327,000 man-hours worked.

* * *

Fred L. Monroe, engineer in charge of drainage along Southern Pacific's lines since 1942, recently retired after 46 years with the railroad. He made his headquarters in the company's general offices in San Francisco.

* * *

Paul J. McKay, district highway engineer at Vancouver, Wash., since March 1951, was recently made district engineer at Seattle. He is being replaced by William Bailey, who had held the position of construction engineer at Vancouver after McKay's promotion in 1951. These promotions result from the recent retirement of D. D. Forgey from the Washington Department of Highways.

* * *

Col. R. J. B. Page, presently in charge of the Okinawa Engineer District, Corps of Engineers, is expected to succeed Col. N. A. Matthias, Seattle District Engineer, when Colonel Matthias retires from active duty this summer.

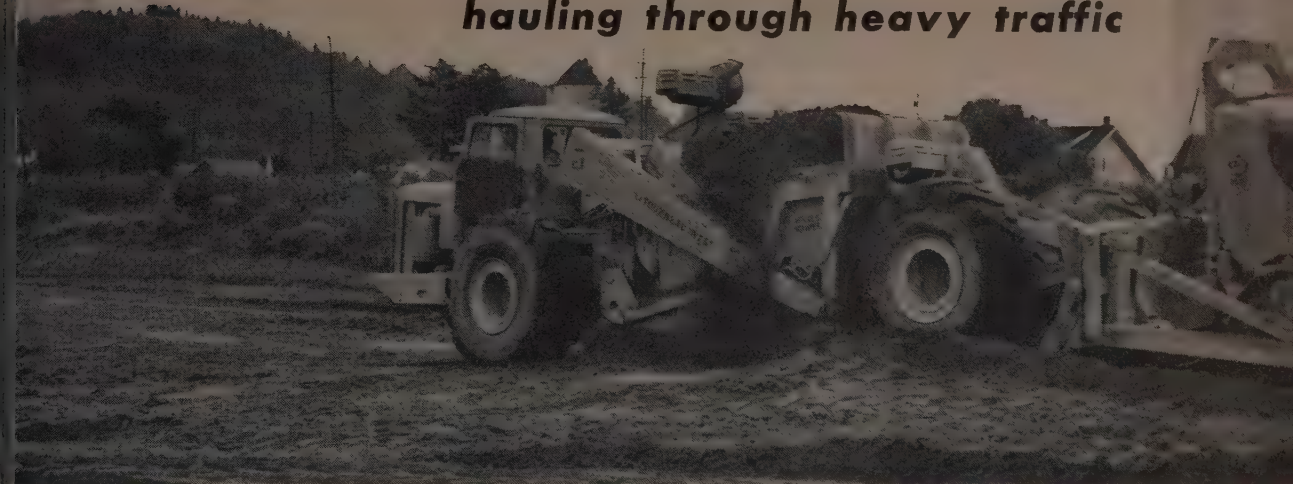
* * *

Col. Wendell P. Trower, who for the past five years has served as a Division Engineer for the Corps of Engineers, was recently appointed as assistant to the vice president of Kaiser Engineers, Oakland, Calif.



HERE ARE THE conferees at this year's Alta Snow Surveyor's Training School. The school is held biennially by the Soil Conservation Service. In addition to SCS personnel there were present this year representatives from power companies, water districts, and irrigation districts, with governmental employees from Australia, Turkey, the USGS, and the Forest Service. The school is concerned with such topics as snow surveying, foot and vehicle travel in snowy, mountainous terrain, survival methods and emergency first aid.

216 loads per day for 3 scrapers hauling through heavy traffic



Here the "C's" are push-loaded by a 204 hp crawler-tractor. Notice how units are heaping the sandy loam. In one day, the 3 "C's" averaged 216 twelve-yd. loads.



Tournapulls worked on wet, rough borrow pit. Units maintained good production, averaged 12 pay-yards per trip.



"C's" were stopped continually by heavy traffic on the county roadway haul. Units crossed 2 main highways enroute to fill... completed .8-mile cycle in 6.7 minutes.

To beat the heavy traffic load in Washington, the State Highway Department awarded a contract to K. L. Goulter & Son, Seattle, to build new U. S. Highway 99, west of Burlington.

"C" completes .8-mile cycle in 6.7 min.

When he got the 408,520-yard Burlington assignment, contractor Goulter sent his 3 C Tournapulls to the job. Working on this 2.46-mile, \$530,000 project, the Tournapulls' job included building the fill for an overpass. Fill for the overpass was 30' high at center, tapering to grade at each end. The Tournapulls hauled wet, sandy loam from a borrow pit. Machines averaged 12 pay yards, loading in about 37 seconds... completed an entire .8-mile cycle in 6.7 minutes. This time included approximately 13 seconds for spreading. Each rig made 9 trips per 50-minute hour... the fleet of three rigs averaged 2,592 pay yards per day!

"C's" haul through heavy traffic

Tournapulls loaded in a rough borrow, traveled over hauls up to .8 mile. Units usually hauled in 3rd gear over the haul road, which was quite rough across the borrow. To and from the fill, Tournapulls crossed a busy highway and the Great Northern RR tracks, then crossed a busy secondary road, traveling in and out among auto and truck travel. Despite these obstacles, the three Tournapulls hauled 216 loads in one 8-hr. day!

"Tournapulls are good rigs"

Goulter's Job Superintendent, Sam Bergstrom, is well satisfied with the

production of his Tournapulls. He said they were "good rigs, keeping jobs on schedule. Tournapulls do all work assigned to them and do it well."

Operator Bob Miller agreed with Bergstrom on the Tournapull's ease of operation. He said, "I think these machines are very easy to control, and easy on the operator." The features that Miller liked particularly were the "C's" fingertip electric controls and their maneuverability in tight places. He said, "I have turned these machines where no other rig could have been turned."

Because of wet weather conditions, Goulter kept his "C's" moving between this job and one in Everett. When rain stopped production at the Everett site, operators drove the Tournapulls to Burlington. When local showers saturated the Burlington area, machines were driven to Everett. Tournapulls' fast, 30 mph speed enabled them to make the 40-mile trip in less than 2 hours. Owner thus "beat the weather!"

Increase your profits with Tournapulls

For big production dirmovers, with fast job-to-job maneuverability, investigate Tournapulls. They'll give you peak performance on any job, big or small. And there is a Tournapull size to fit any dirmoving job: the 7½-yard, 138 hp "D", the 18-yard, 208 hp "Fullpak C", or the 25-yard, 293 hp "B". Look into their profit opportunities for you, on your job... let them show you how to get big output at low cost.

Fullpak—Trademark, Tournapull—Trademark Reg. U.S. Pat. Off. P-895-H-B

LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company



NEWS

(Continued from page 84)

County-City building at Tacoma with expiration of the 30-day period for holding bids open. Lowest bid was \$5,620,627, submitted by Macdonald Bldg. Co., Tacoma. Bids were held by the commissioners until the final day in an effort to raise additional funds to meet the cost, but contribution proposals failed to produce the needed sum for any part of the project as bid.

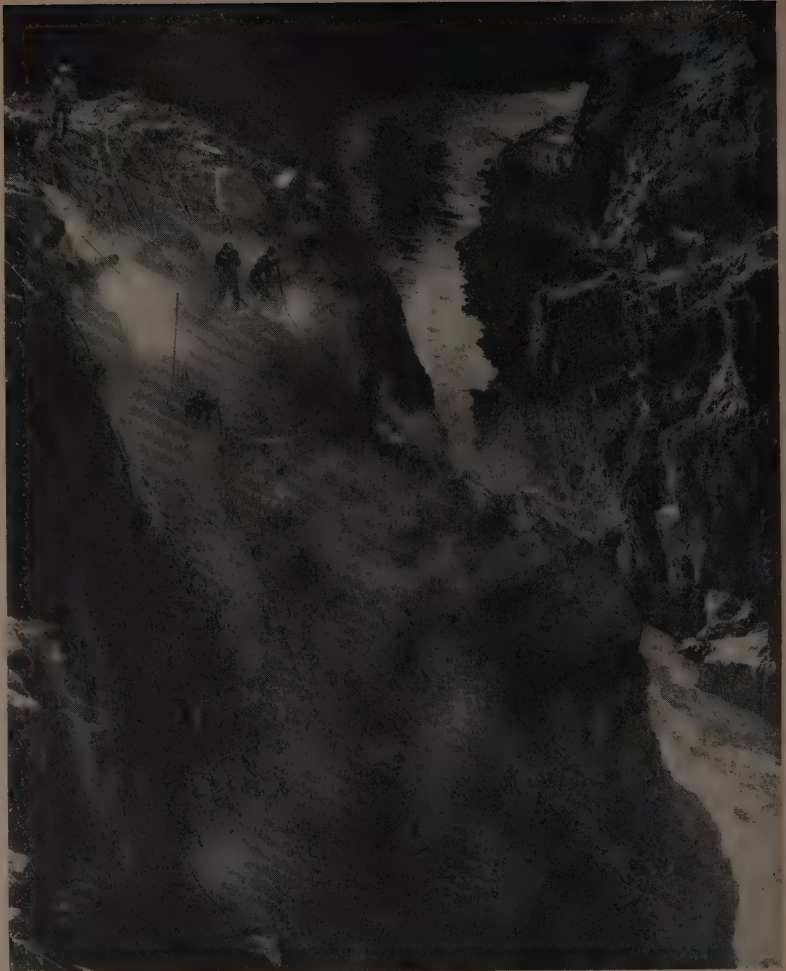
THE WASHINGTON STATE Supreme Court set a hearing June 25 on the appeal of a Thurston County Superior Court order that construction on Tacoma's Cowlitz River hydroelectric project be halted July 1. The Superior Court ruled that the project, as now proposed, is illegal because it violates laws forbidding interference with navigation. E. K. Murray, attorney for the City of Tacoma, had asked the court to set the appeal hearing early in May. He sought an early decision to clear the way for sale of bonds to finance the \$138,000,000 project.

RECENT MAJOR CONTRACT AWARDS and low bids in Washington include a \$277,849 contract award to L. W. Vail Co. of Pasco for 14.3 mi. of grading and surfacing in Adams County. Erickson Paving Co. of Bellevue received a \$578,858 contract for construction of an undercrossing in Thurston County. West Coast Construction Co., Inc., of Seattle, submitted a low bid of \$459,297 for earthwork and structures. Crab Creek lateral extension, Columbia Basin Project. A \$533,306 contract was received by Associated Sand & Gravel Co. of Everett for 4.1 mi. of grading and surfacing in Skagit County. J. P. Surace Construction Co. of Seattle was awarded a \$436,183 contract for 3 mi. of grading and surfacing in Clallam County.

ALASKA

THE JOB OF SUPPLYING 15 survey parties for the Alaska District Corps of Engineers will be handled this year by Karl F. Tuttle Engineering Co. Inc., Arcadia, Calif. The firm was awarded a contract for \$277,296. This is the third consecutive year that Tuttle Engineering, as lowest competitive bidder, has had the contract.

THE FEDERAL POWER COMMISSION issued a 36-month preliminary permit to the town of Wrangell, Alaska, for a proposed hy-



DRILLING THROUGH A MODIFIED INJUNCTION

Workmen suspended by safety ropes drill away at the cliff face to prepare it for the south abutment of Tacoma City Light's \$37,100,000 Mayfield Dam. Below, the Cowlitz River boils through narrow Mayfield canyon. Work is continuing on the project under terms of a modified injunction which prevents the city from blocking the river. Resident engineer is J. Clayton Mundt. Light Division superintendent is Henry A. Cole. Arundel-Dixon Co. has the \$13,000,000 prime contract.

droelectric development in Tongass National Forest. First stage of the development would include a 40-ft. dam at the outlet of Kunk Lake and 3,500 ft. of penstock from the dam to a powerhouse at the mouth of Kunk Creek. The powerhouse would contain a 2,200-hp. turbine connected to a 1,500-kw. generator. Second stage proposes two diversion channels, each about 3,000 ft. long, one extending from Anita Creek and the other from the north arm of Kunk Creek into Kunk Lake. This stage includes proposed installation of an additional 1,500-kw. generating unit in the powerhouse. For the third stage, the town would build a 1,800-ft. tunnel from a point in Anita Lake 50 ft. below its present level of 1,500-ft. elevation to connect with 3,500 ft. of penstock extending to a powerhouse on Kunk Lake with generating ca-

capacity of 4,000 kw. The preliminary permit does not authorize any construction. It merely gives the town priority of application while conducting surveys and investigations necessary to prepare an application for F.P.C. license.

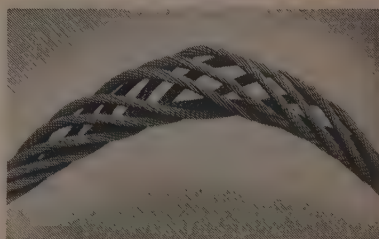
RECENT MAJOR CONTRACT AWARDS and low bids in Alaska include a \$288,315 contract award to S. S. Mullen, Inc., of Seattle, Wash., for site improvement work for the University of Alaska, Unit Three, College. Raber & Kief, of Seattle, Wash., submitted a low bid of \$2,698,950 for constructing family housing and a direction finder facility at Adak. S. S. Mullen, Inc., of Seattle, Wash., submitted a low bid of \$3,477,307 for constructing communications facilities building and utilities at the Kodiak Naval Station.

Broken Rules Break More WIRE ROPE Than Capacity Loads



The photo at the left shows what happens when rope is run over or struck by a hard object and crushed. The damage to the strands greatly reduces the service life so carefully built into the rope.

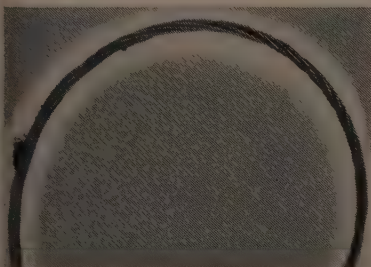
Photo at the right shows how sudden release and rebound from an over-stressed condition may often cause birdcaging. Throwing a loop into the rope is also a major cause of birdcaging. Lang Lay ropes in particular are vulnerable to this abuse.



Here is an example of excessive pinching in the sheave grooves. This rope lasted through only 1-½ hours of service. To prevent pinching, make sure grooves are not worn deep and that the bearing surface is sufficiently large.



Excessive drum crushing like this occurs at points of cross-over or when rope is wound unevenly. Check for even winding of each layer on the drum to prevent crushing of this type.



When a popped core occurs, continued use causes the rope lay to lengthen out considerably. This displacement of the core is usually caused by load tension being suddenly removed from the rope.

Forget Complicated Specifications— Just say Tuffy!



Tuffy Scraper Rope

Mount a reel on your scraper and get full service out of every foot. Specially constructed for scraper service where complex destructive forces overwhelm ordinary rope.



Tuffy Slings & Hoist Line

Slings of the famous Tuffy machine braided, kink-resisting, 9-part construction, cut replacement costs. For balanced performance, team them up with Tuffy Hoist Line.



Tuffy Dragline

Flexible enough for easy casting, tough enough to give you maximum abrasive resistance and service life in handling wet or dry, hard or soft materials.



Tuffy Dozer Rope

Has the stamina needed to stay on the job after ordinary ropes are thrown away. In 1½" or 9/16" size on 150' reels for easy mounting to facilitate cut-off without waste.

Your Tuffy Distributor: Dependable Source of Information.

His job is more than just supplying the wire rope you want—when you want it. Your Tuffy distributor is always on the alert to help make your equipment do the best possible job, at the lowest possible cost. When you have a problem that calls for special knowledge concerning your equipment that uses wire rope, give your Tuffy distributor a call. He'll be glad to furnish the help you need including factory engineers.

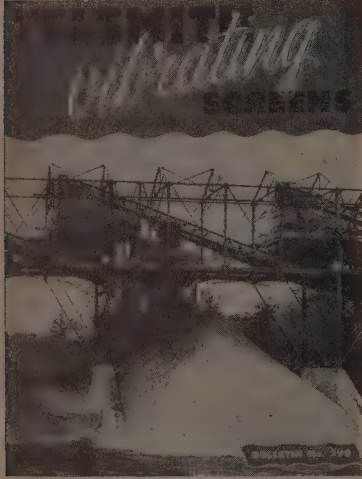
union  **Wire Rope corp.**

2146 Manchester Avenue Kansas City, 26, Missouri
Specialists in high carbon wire, wire rope, braided wire fabric, stress relieved wire and strand

NEW LITERATURE

Telsmith vibrating screens

An illustrated bulletin containing complete specifications for all models of Telsmith vibrating screens has been published by Smith Engineering



Works, Box 723, Milwaukee, Wis. Included in the line are two types of finishing screens, in both two- and four-bearing models, and scalpers.

Change your pickup to an office

A demountable pickup truck cover which may be left at a construction site as a contractor's office can be built at a materials cost of about \$100, according to a plan released by the sales engineering department of **Masonite Corp.** Detailed drawings and building instructions and an approxi-

mate bill of materials are provided. For a copy of the plan, No. AE-321, write Builders Service Bureau, 111 W. Washington St., Chicago 2, Ill. The truck cover is of Masonite Tempered Presdwood bent over ribs of 1/2-in. metal conduit. Nominal dimensions are 8 ft. long, 5 ft. high, 6 ft. 1 1/2 in. maximum width.

Tractor-mounted trencher

Earth Equipment Corp., 2036 Sacramento St., Los Angeles 21, Calif., has released a revised brochure describing the Model 60 Everett Trencher, a tractor-mounted digging mechanism made to operate with Ford, Ferguson, and Massey-Harris MH-50 tractors. The leaflet illustrates operation of the unit and includes precise construction and performance specifications. The machine can dig a 5-ft. deep trench up to 300-ft. an hour.

3-axle tandem roller

Construction features of 3-axle tandem rollers are discussed in the 12-page Bulletin S-71-1255 released by **Buffalo-Springfield Roller Co.**, 1210 Kenton St., Springfield, Ohio. The bulletin gives complete specifications on the 13-20 ton Model KX-25E roller and describes and illustrates 20 features including power roll brakes, synchronized hydraulic steering, 4-speed transmission. All standard and optional equipment is shown. Dimensions, specifications, unballasted and ballasted weights, and compression data are presented in tabular form for quick reference.

Fageol flasher safety light

A flasher safety light said to provide 60 to 90 days of continuous operation without servicing or battery replacement is described in catalog LL-3143, available from **R. D. Fageol Co.**, Kent, Ohio. Designated Model D-2, the warning light produces about 90 neon flashes per min. and is visible for one mile on either side. The unit is designed for mounting on barriers or warning signs. May be sold or rented.

Bar size shapes

"Properties of Bar Size Shapes," a pocket-size booklet listing design, dimensions, and properties of bar size tees, channels, and angles rolled by Bethlehem Pacific, has just been published. Engineering data given for each section are weight per ft., cross-sectional area and detailed dimensions. Moment of inertia, section modulus, and radius of gyration around both axes and center of grav-

High strength bolting

Practical working information on high strength bolts is provided in a 20-page illustrated booklet published by **Russell, Burdsall & Ward Bolt & Nut Co.**, Port Chester, N. Y. The booklet, HS-1, is a working guide for ironworkers in the technique of joining structural steel members.

Sections are given to identification of high strength bolts and proper sizes, comparisons with machine bolts, use of hardened washers and installation practices. Data are provided on proper tightening, calibration of impact wrenches, air supply and inspection techniques. Joint and structure types to be bolted are discussed. Booklet includes tables of recommended torques.

ity location for the section are also listed. Copies obtainable from any sales office of **Bethlehem Pacific Coast Steel Corp.** in Seattle, Spokane, Portland, San Francisco, Los Angeles, or Phoenix.

Speedwalk passenger conveyor

Features of a new type of passenger conveyor based on the principle of a moving belt sidewalk is reviewed in a colorful 8-page bulletin just released by **Stephens-Adamson Manufacturing Co.**, Aurora, Ill. The design would provide for carrying passengers both standing on the moving sidewalk and also seated in small cars as a new development in mass transportation.

Trencher for mounting on tractor

Designed for mounting on Ford or Ferguson tractors the Everett trencher Model 60 is described in a 4-page folder. The mechanism operates from a power take-off on the tractor and is raised and lowered by independent hydraulic system. It is mobile as the tractor itself and can be driven up inclines and over curbs

Portable batching plants

Information concerning aggregate and cement portable batching plants is contained in a bulletin No. 2488 released by **Blaw-Knox**. The 41-page illustrated booklet includes data on features, capacities, and dimensions of portable bulk cement plants, aggregate plants, and one-stop plants. A check list itemizes points to be considered in buying a plant to meet specific requirements. Available upon request to **Blaw-Knox Co.**, Construction Equipment Division, Mattoon, Ill.

Vertical pump motors

Features and applications of various types of Verticlosed vertical turbine pump motors are depicted in a 15-page brochure released by **U. S. Electrical Motors Inc.** The brochure embodies 66 full-color illustrations and technical drawings, describes grease- and oil-lubricated motors in sizes from 1 1/2 to 400 hp.; single phase designs up to 7 1/2 hp.; and totally enclosed types up to 150 hp. Bearing setting arrangements and backstop design are discussed. Graphs show relation of thrust bearing life to contact angle, and starting characteristics of part-winding increment start motors. Request Verticlosed motor bulletin No. 1903. **U. S. Electrical Motors Inc.**, Box 2058, Los Angeles 54, Calif.

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Phone: Richmond 7-6181

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850 Ninety-second Avenue
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**EXACTLY THE RIGHT DESIGN
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right to the job. It moves from job to job under its own power or on trailers. Copies of the folder complete with specifications on the trencher may be secured from **Earth Equipment Corp.**, 2036 Sacramento Street, Los Angeles 21, Calif.

Asphalt emulsions for hot-mix

The use of Laykold asphaltic concrete and Bit-U-Mix paving mixtures for all types of highway construction is reviewed with technical details in a 4-page illustrated bulletin just released by **American Bitumuls & Asphalt Co.** Bit-U-Mix combines bitumuls emulsified asphalt with hot aggregate to eliminate necessity of heating the binder and to improve general workability. The material can be prepared in any standard hot-mix paving plant. Copies of the bulletin which includes specification data on mixes and application may be secured from the company at 200 Bush St., San Francisco, Calif.

Airplaco concrete gunning equipment

Now available is a complete line catalog of concrete gunning equipment offered by **Air Placement Equipment Co.**, 1009-11 W. 24th St., Kansas City 8, Mo. The 16-page catalog gives complete description,

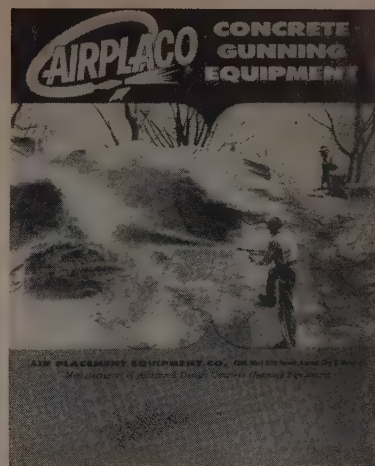
Catalog on wire rope slings and fittings

"Bethlehem Wire Rope Slings and Fittings," a 148-page illustrated catalog, has been released by Bethlehem Pacific.

The catalog illustrates and details all types of sling hitches in common use, including grommets, single-part, double-part, three-leg and four-leg bridle slings and braided slings, and provides tabular data with rated capacities for various rope diameters, lengths, body sizes, weights and loop dimensions, with fitting specifications for each.

One section of the publication is devoted to the swaged fittings and assemblies of both industrial and aviation types; another to wire rope and strand fittings. Two sections show the proper method of attaching wire rope sockets and how wire rope and slings should be lubricated and cleaned. Seizing and cutting wire rope ends, applying wire rope clips and caliper wire rope also are covered.

The catalog includes a detailed index and a numerical listing of slings described. May be obtained from any sales office of **Bethlehem Pacific Coast Steel Corp.** in Seattle, Spokane, Portland, San Francisco, Los Angeles, or Phoenix.



specifications, and operating capacities of the equipment and includes job application photographs.

Hook with a safety gate

The Bullard-Burnham safety type of hook is described in a new 4-page catalog illustrating the latest styles of the hook and its connectors. Full explanation is given for use on hoists and cranes. Sizes range from the No. 1 with a safe working load of 1,000 lb. to No. 16A with a corresponding load of 50,000 lb. The bulletin gives information on the throat opening and other dimensions. The bulletin is available from **E. D. Bullard Co.**, 275 Eighth St., San Francisco or 6719 South Figueroa St., Los Angeles.

New distributor for asphalt

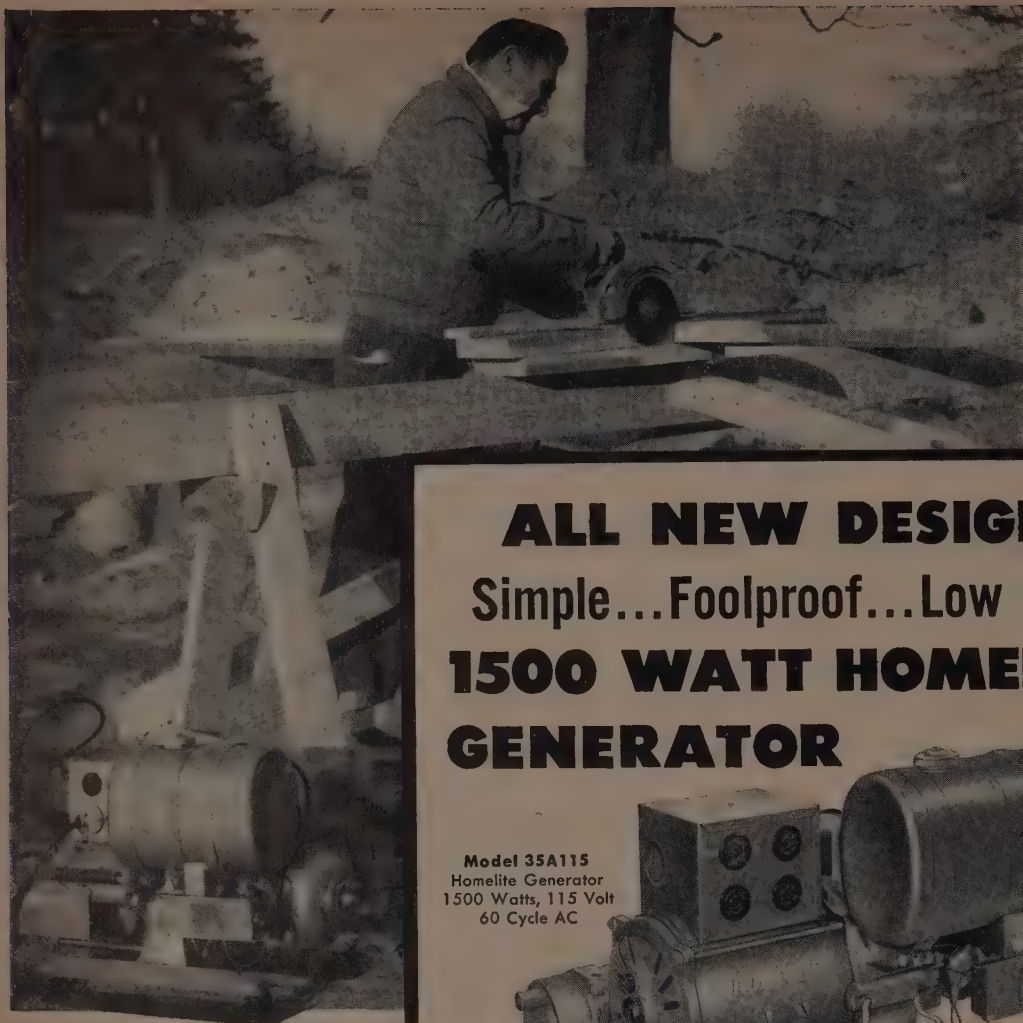
In a 4-page folder **Seaman-Gunnison** pictures and describes its new distributor for applying bituminous materials. Some of the features described include an instant flow and shut-off system activated by compressed air and controlled by the operator, further, every 3-ft. section of the distributor can be controlled independently. The folder describes the truck-mounted tanks from 800 to 1,500-gal. capacity and semi-trailer tanks from 1,500 to 3,000-gal. capacity. The folder also describes street flushers. Write for the folder to **Seaman-Gunnison Corp.**, 201 Lynn Avenue, Baraboo, Wis.

Wayne power sweepers

Wayne power sweepers, Models 605 and 606, are described in a four-page folder which gives full specifications for each. The new models are capable of sweeping 100,000 sq. ft. per hr. in open areas and feature a "Filter-Vac" dust control which eliminates the usual dust bag. For literature, write **Wayne Manufacturing Co.**, 1201 E. Lexington Ave., Pomona, Calif.

900-cfm. Gyro-Flo compressor

Addition of a 900-cfm. size portable rotary compressor to the Gyro-Flo line is announced in a brochure now



**As easy to move as
an electric hand saw!**

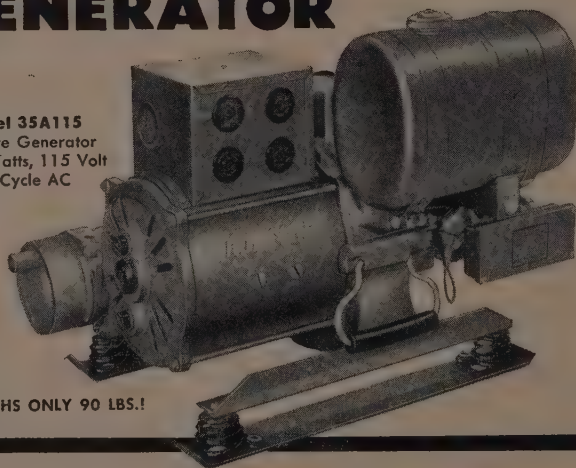
- 1. New Money-Saving features** . . . No DC brushes; just two easy-to-get-at collector ring brushes . . . No commutator or DC windings . . . No intermediate couplings; armature keys directly to shaft. Fewer parts to wear out — longer trouble-free generator service.
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SAVE EVEN MORE! New Homelite idle control unit, available as optional accessory, runs engine at idle speed when no current is drawn . . . automatically brings engine to full speed when load is applied.

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WASHINGTON — Seattle, Spokane

available from **Ingersoll-Rand Co.**, 11 Broadway, New York 4, N. Y. The publication, Form 2313, describes and illustrates the machine's oil injection cooling and oil separation system and capacity control and presents a complete table of weights and dimensions. The new unit weighs 14,340 lb. complete. Delivering full 900 cfm. at 100 psi., it has capacity to operate ten jackhammers, seven wagon-jacks with light drifters or three wagon drills with heavy drifters.

Warshawsky accessories and parts catalog

Now available to garages, service departments, and auto dealers is the new 180-page Warshawsky catalog of auto accessories and parts, largest ever issued by **Warshawsky & Co.**, 1900-P.S. State St., Chicago 16, Ill. Over 75,000 items are included, from 30 models of custom fender skirts to full size hide selections for custom leather trim jobs. Exact replacement parts for all cars dating back to 1920 are offered. Company suggests requests for the catalog be made on company letterhead to assure distribution to legitimate trade sources.

Flamort fire retardants

A four-page leaflet describing the Flamort line of fire retardants has been released by **Flamort Chemical Co.**, 746 Natoma St., San Francisco 3, Calif. The leaflet contains a detailed selection chart describing the purpose and special features of each type of retardant. Another chart gives application directions, coverage per gal., and shipping information. Publication includes partial list of users.

Allis-Chalmers Model D grader

With cut-aways, photos of components and other illustrations a new 16-page catalog (MS-459) has just been made available by **Allis-Chalmers** covering its Model D, 50-hp., motor graders. The illustrations are designed to help the reader visualize special features of both gasoline and diesel engine models. Photos also show features that assure operators comfort and safety. Matched attachments and accessories are also featured. The catalog may be secured from the **Construction Machinery Division, Allis-Chalmers Manufacturing Co.**, Milwaukee, Wis.

Radiant heating installation

An illustrated eight-page bulletin entitled "Radiant Heating Construction" has been prepared as a guide to accepted installation procedures for radiant heating systems by **A. M. Byers Co.**, Box 1076, Pittsburgh 30, Pa. Arranged in logical order of preference are sketches of various types of radiant heating construction, each showing the position of the wrought iron pipe coils in the concrete slab and relation of coils and slab to structural features of both on-grade and

above-grade construction. Contained in a digest of construction recommendations are discussions of floor surfacing, heating slab, radiant heating coils, insulation base or fill, waterproof membrane, and support brackets for heating coils.

Austin-Western crane catalog

A new eight-page standard catalog for Austin-Western hydraulic cranes has been published by Austin-Western Construction Equipment Division of **Baldwin-Lima-Hamilton Corp.**, Aurora, Ill. The catalog, designated AD-2253, contains principal dimensions and performance data for all models and basic equipment, attachments and special equipment. Safe load chart is included.

Also available are Gould Reports No. 5505, 5506, 5507, 5508, and 5509, actual job stories of the cranes in action.

Incinerator design standards

A compilation of data adopted as the best standard practices in incinerator design is contained in Bulletin S, released by the **Incinerator Institute of America**, 420 Lexington Ave., New York 17, N. Y. The institute has substantiated most of the technical requirements through test and research. This is the first distribution of unbiased incinerator industry standards and will serve as a guide to architectural specification and installation and the requirements of building departments.

Rheem-beam brochure

Now available is an illustrated brochure describing the Rheem-beam line of highway guard rails. The publication contains detailed drawings of the line's seven standard mounting brackets and describes their application. Rail construction and end pieces are also detailed. Rheem-beam rails can be mounted on square or round wooden posts, railroad rail, H-beams, steel pipe, concrete posts, spring brackets and curbs, will take a normal radius of 100 deg. without special forming. Address inquiries to attention: **R. Colville, Advertising Manager, Rheem Automotive Co.**, P. O. Box 2475, Terminal Annex, Los Angeles 54.

Jomac work gloves

A new leaflet issued by **Jomac, Inc.**, 6128 N. Woodstock St., Philadelphia 38, Pa., highlights the firm's line of work gloves. Jomac gloves are made of a loop-pile fabric that guards against sharp or abrasive objects and can be reconditioned repeatedly. Many styles are made to fit either hand and need not be paired. Leaflet includes order blank.

Westinghouse transit mixers

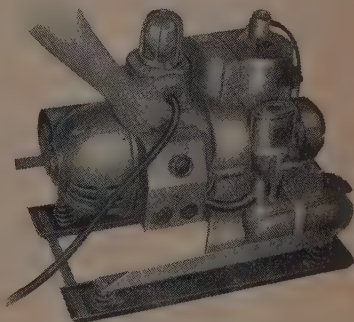
Just released is a 16-page illustrated bulletin No. 256, covering the complete line of 1956 Westinghouse transit mixers. The bulletin lists di-

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SELF-PRIMING CENTRIFUGAL AND DIAPHRAGM PUMPS

Sizes: 1 1/2" to 3" — capacities to 15,000 g.p.h. for dewatering and water supply.



ELECTRIC GENERATOR SETS FOR TOOLS AND LIGHTS

Complete range of sizes and voltages up to 5,000 watts.

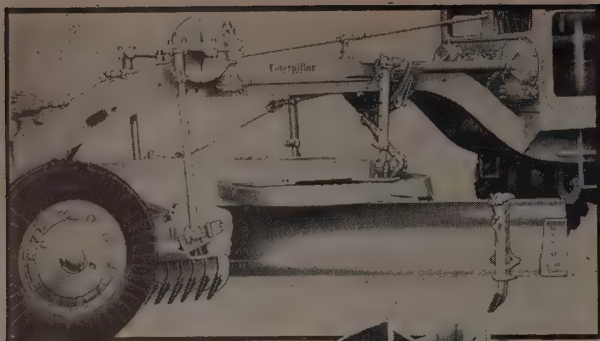


LIGHTWEIGHT POWERFUL ONE-MAN CHAIN SAWS

Complete line of saws with clearing and brushcutter attachments for every woodcutting job.

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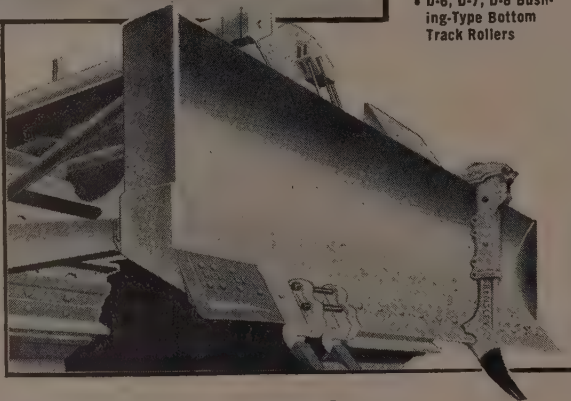


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Sacramento
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COLORADO:

Colorado Road Machine Co., Pueblo
S & M Supply Co., Grand Junction
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IDAHO:

Engineering Sales Service, Boise

IOWA:

Iowa Explosives & Supply Co., Des Moines

KANSAS:

Machinery Outlet, Inc., Wichita
Wenzel Mch. Rental & Sales, Kansas City

MICHIGAN:

Bark River Culvert & Equipment, Bark River,
Ironwood

MINNESOTA:

Stevenson's, St. Cloud

MISSOURI:

Cooke Sales & Service, Chillicothe

MONTANA:

Westate Machinery, Billings

NEVADA:

Elko Blacksmith Shop, Elko
Pioneer Equipment Co., Reno

NEW MEXICO:

Lively Equipment Co., Albuquerque

OKLAHOMA:

R. A. Young & Sons, Tulsa

OREGON:

Cal-Ore Machinery, Medford
Western Equipment Co., Eugene and Portland

TEXAS:

Boehck Engineering Co., Houston
Caprock Machinery, Amarillo
Deal's Machine Shop, Lubbock
Hi-Way Machinery, Dallas and San Antonio
W. L. Johnson Machinery Co., Midland
Lively Equipment Co., El Paso

UTAH:

Holland Equipment Co., Salt Lake City

WASHINGTON:

Pacific Hoist & Derrick Co., Puyallup and
Seattle
Western Machinery Co., Spokane

WISCONSIN:

Bark River Culvert & Equipment, Milwaukee
Madison, Eau Claire, Green Bay

WYOMING:

Keremi Tractor & Equip. Co., Cheyenne and
Casper

ALASKA:

Western Tractor & Equipment Co.,
Anchorage and Fairbanks

CANADA:

Alberta Tractor Parts, Edmonton, Alberta
Columbia Equipment Ltd., Vancouver, B. C.

mension and specification data on the five new models and illustrates and describes such features of the machines as fully enclosed drum gear drive, ball-and-socket front end mounting at the drum, swing-away discharge chute, 32 x 34-in. charging hopper. Complete line of optional equipment shown. Westinghouse Transit Mixer Division, LeTourneau-Westinghouse Co., Indianapolis, Ind.

Wissco-looy space screens

A four-page illustrated booklet describing the new line of Wissco-looy Space Screens has been issued by Wickwire Spencer Steel Division of Colorado Fuel and Iron Corp., 575 Madison Ave., New York 21. The bulletin includes a complete listing of standard specifications as well as recommended applications and ordering suggestions. Wissco-looy screens are fabricated with any specified area separations for standard, special, or non-standard equipment.

Primaleen lubricant

Primaleen, a viscous all-purpose machinery lubricant made by Protecto Lube Co., 2832 E. Grand Blvd., Detroit 11, Mich., is discussed in a new pamphlet released by the producer. It is claimed the lubricant can be applied up to 90 times less frequently than ordinary greases. It fills pores of the lubricated surface to reduce friction at high pressures, high sliding velocities, and close clearances. Will not drip even when afire. Resists water and chemical vapors, oxidation, gumming, and deterioration.

Tectum specifications manual

Uses, benefits, and properties of Tectum wood fiber for roof decks are explained in a new general design manual, A.I.A. 37-B-1. The 16-page booklet provides technical information on all basic properties of the material, describes methods of application to various framing systems, and furnishes design details, specifications, and loading tables. Companion filing folder also available. Obtain copy from Tectum Division, Peoples Research & Manufacturing Co., 152 S. 6th St., Newark, Ohio.

Ramset fastening tool

Two new booklets showing ways in which the Ramset fastening tool can be used are offered by Ramset Fastening System. One booklet shows how Ramset can be used for plant maintenance. It discusses fastening of such structures as conduits, buss ducts, surface raceways, fan and blower mounts, fixtures and frames, sprinkler pipes. The second booklet explains the tool's use in lead lining. Both booklets can be obtained by writing to Ramset Fastening System, Dept. 11, Olin Mathieson Chemical Corp., 12117 Berea Rd., Cleveland 11, Ohio.

HENSLEY
TRADE MARK

EQUIPMENT COMPANY, INC. — MANUFACTURERS
800 PERALTA AVENUE • SAN LEANDRO, CALIF.

"Our 10 GMC Diesels hauled 1 million yards in 2½ years — with engine maintenance of only \$40 a truck!"

Sugden & Sivier have worked some of Detroit's biggest construction projects. One of the toughest was hauling away 400,000 yards of soggy blue clay on the John C. Lodge Expressway job. To keep things moving, every load had to be heaped right up to Michigan's 70,000 GCW limit. And five of the ten miles to the dump point were through fuel-eating city traffic.

Clearly, Sugden & Sivier had to have trucks that could take a lot of punishment—keep rolling—keep costs down. Past experience gave the nod to GMC Diesels. So their bid was based on the expected performance of 10 new tandem tractors they stood ready to order.

"We knew GMC's could handle the oversize loads," says Grant L. Sivier. "We've never seen anything like them for sheer brute-strength. Yet there's not an ounce of 'fat' in their design to waste our allowable road-

weight. And it was GMC Diesels' economy that let us bid as low as we did."

Actually, the 10 new GMC's did even better than expected. Over the entire first year of use, engine repair costs averaged just \$11 per truck. And fuel mileage—despite the 42,000-lb. loads and stop-and-go traffic work—was a smart 4.7 m.p.g.

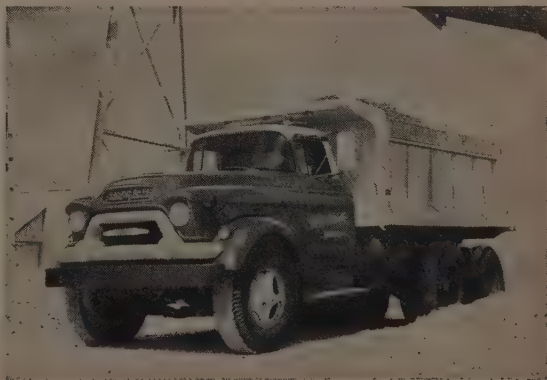
Today—2½ years later—Sugden & Sivier's GMC Diesels *still* deliver 4.7 m.p.g. They've each hauled 97,500 yards of payload—clocked about 100,000 miles apiece. Yet total engine maintenance costs of all 10 trucks still come to less than \$400.

Want economies like these on your jobs? There's a cost-cutting GMC Blue Chip tandem—gasoline or Diesel—engineered for any truck-work up to 59,000 GVW-90,000 GCW. Check your requirements *now*—with your GMC dealer!

GMC TRUCK & COACH—A General Motors Division



TOP TONNAGE AND TIGHT SCHEDULES ARE NO PROBLEM to this fast-stepping GMC Diesel. Its power comes from a new cost-cutting 2-cycle Diesel engine—one of a great new line of Blue Chip power plants engineered to take the toughest truck-work in stride. They include a wide choice of gasoline and Diesel models.



AT WORK ON AMERICA'S TOUGHEST JOBS, Blue Chip GMC's are chalking up standout performance records—and earning record profits—for many a leading contractor. Extra-powered engines—extra-capacity axles—and extra-tough construction throughout—make these GMC's the top choice for punishing jobs.

NEW EQUIPMENT

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

Hydraulic 30,000-lb. straddle carrier

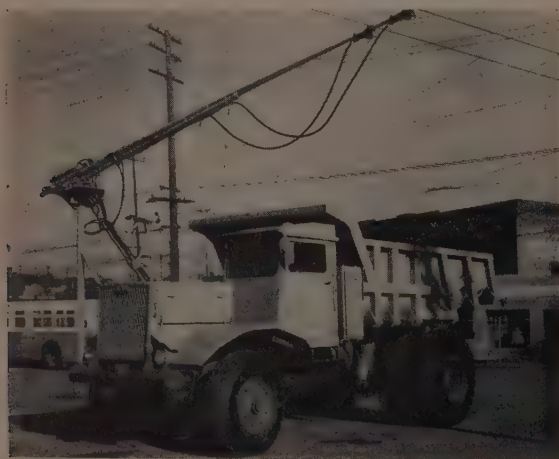
A 5-speed transmission, 15% more horsepower at the wheels, fully hydraulic control of load hooks and 4-wheel steering, are features of a 30,000-lb. capacity straddle carrier introduced by Ross Carrier Division of **Clark Equipment Company**, Benton Harbor, Mich. Named the Series 93, the machine replaces Clark's previous model



Series 91 and 92. Power steering is provided as optional equipment at extra cost. Tubular cross members in the frame are used as fuel and hydraulic tanks, thus increasing operator's visibility. Purchasers may specify either the standard Hercules 131-hp. engine or an optional Hercules 142-hp. engine. Road speed is 38.2 mph. with the standard engine.

Electrically-powered truck for hauling earth

An electrically-powered earthmover truck for underground hauling has been designed by **Kenworth Motor Truck Company**, 8301 E. Marginal Way, Seattle, Wash. The first four units have been delivered to the Riverside Cement Company of Riverside, Calif., where they will



move rock from an underground mine to a crusher on the surface. About 2,000 ft. of the distance is entirely underground on a 10% grade to the surface.

Powered by electric traction motors, the unusual end-dump truck receives current from overhead wires through a trolley. The truck also is equipped with a cable reel so the operator can maneuver away from the overhead

wire. Motive and control electrical equipment for Kenworth's 802-E is manufactured by General Electric Company's locomotive and car equipment department. Capacity of the machine is 16 cu. yd. struck, or 24 tons. The heaped load capacity is 19 cu. yd. Gross vehicle weight rating is 93,000 lb. Maximum speed when empty on a level road is 25 mph.

New machine for base stabilization

Now available is the Pettibone Wood Speed Mixer which incorporates all the features of travel-plant mixing, pulverizing, blending, and material processing for base stabilization. A rotor, chain-driven from both ends, produces balanced power and a positive drive. The rotor blades are uniformly spaced across the full width of the shaft to produce a full-panel mix. One engine drives both the rotor and the pump, thus synchronizing travel speed and mixing. The machine applies bituminous or other binders through a spray bar just ahead of the rotor.



It is equipped with all the necessary power controls, all easily accessible to the operator. For complete details, write **Pettibone Wood Mfg. Co.**, Subsidiary of Pettibone Mulliken Corp., Box 620, 6900 Tujunga Ave., North Hollywood, Calif.

Portable washing and screening plant

A portable sand and gravel washing and screening plant designed for close to roadside operation is being offered by **Pioneer Engineering Works, Inc.**, 1515 Central Ave., Minneapolis 13, Minn. Because of varied field conditions and product specifications encountered in washing and screening operations, the plant, designated the 512-VW, offers only the basic unit as standard equipment. It turns out two sizes and oversize of gravel and one size



of washed sand simultaneously and has capacity of 34 tons per hour. Basic unit consists of a 5 x 12-ft. three-deck gradation screen, 30-in. x 25-ft. double-screw fines m



Ask the man in the iron hat

Truck driver, cat-skinner or crane operator, he knows his engine. Knows when it's purring up-to-par, or when response is slightly off. And who could know it better?

Men like this, throughout the West, will tell you what a difference Richfield CIRCLE C MOTOR OIL makes in their engines. Daily, they *see* and *feel* and *use* the whopping, extra performance this heavy-duty oil develops!

IMPROVES ANY ENGINE

You get this kind of performance...and longer life... from any engine you lubricate with Richfield CIRCLE

C. Diesel, gasoline, natural gas, dual fuel or LPG. Mobile or stationary.

But versatility and extra performance are only *two* of the CIRCLE C virtues! Take base stock, for instance: the very finest Mid-Continent paraffine base oils available. Then additives: new and *special* combinations blended to combat acid corrosion...to resist moisture and foaming...to keep ring grooves, valve stems, oil lines and pump screens clean. All of these rare qualities make Richfield CIRCLE C unquestionably the finest heavy-duty, general-purpose motor oil you can find.

PICK UP YOUR TELEPHONE...

Call the Richfield office nearest you today. The lubrication expert there will show you what the "man in the iron hat" *has proved* about Richfield CIRCLE C MOTOR OIL. Call now!

CONDENSED SPECIFICATIONS
RICHFIELD CIRCLE C
MOTOR OIL

TYPE: Heavy duty, general purpose.
GRADES: SAE 10W, 20, 20W, 30, 40 & 50.
BASE: 95 V.I. Mid-Continent paraffine.
EXCEEDS: Required engine tests
for Supplement 1 oils.

FOR API SERVICES MS, DG, DM.

CIRCLE C © MOTOR OIL

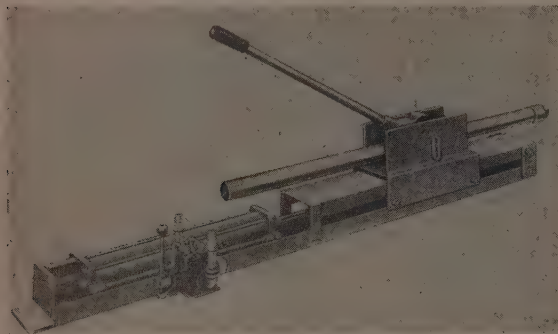
FINE INDUSTRIAL LUBRICANTS FOR EVERY NEED

RICHFIELD

terial dehydrator, 30-in. x 35-ft. on-the-plant feeder conveyor and 18-in. x 25-ft. and 36-in. x 25-ft. side delivery conveyors. Additional information and optional equipment list available from manufacturer.

Push pipe with continuous stroke

A continuous stroke pipe pusher which can be operated with gasoline, electric, or truck power units has been introduced by **Mercury Hydraulics, Inc.**, 2440 Blake St., Denver 5, Colo. When the device, called "Speed-Thru," is



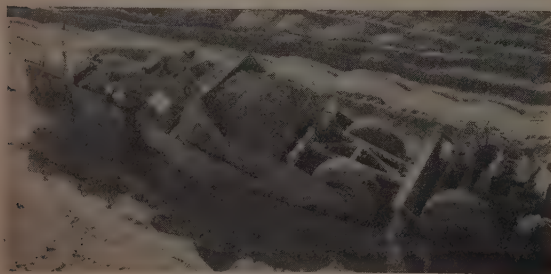
placed in the trench the operation of two control levers by one man pushes the pipe with a continuous 21-in. hydraulic stroke. Defective pipe can be replaced by attaching new pipe to the old and pulling the old line out. Model A-40 handles sizes from $\frac{3}{4}$ in. to 3 in. in diameter. Model A-60 handles sizes from 1 in. to 4 in. in diameter. A 4-page folder available from the manufacturer describes this new product.

Studebaker develops non-slip differential

For the first time Studebaker's half-ton truck will be available with a non-slip differential as factory-installed equipment. Chief advantage is the greater utility of trucks possible because the new differential permits operations when weather and road conditions would not allow efficient operation with a conventional differential. The major engine driving force is transmitted to whichever wheel has the best traction, as compared to a conventional differential which lets the power go to the rear wheel with the least traction. Slipping and spinning is virtually eliminated, as up to 80% of the power is sent to the wheel which has traction. The differential will be offered on all half-ton truck models in the Transtar line as optional original equipment at a factory-installed price of \$26.52. The new differential reduces wheel hopping, useless wheel spinning, and wear on gears in the drive train. **Studebaker-Packard Corp.**, South Bend 27, Ind.

18-cu. yd. scraper

A fast-loading 18-cu. yd. scraper, the Model C Fullpak, has been introduced by **LeTourneau-Westinghouse Co.**,



Peoria, Ill. The machine is built with lower center of gravity and wider wheel gage than the firm's previous Model C scraper to provide stability. The 18-yd. bowl with long, broad design increases heaped capacity 12% over the previous model and retains 12.2-yd. struck capacity. Floor of the scraper stays nearly flat in loading. Quick drop mechanism on the bowl lift is standard equipment. Push block is 36 in. from the ground to match push plate height of tractors now in the field. Scraper load speed may be matched with pusher speeds. When scraper's electric engine turns at full rated 2,000 rpm., first gear provides speed of 2.9 mph.; low range gives 2.2 mph. Transmission options provide complete speed ranges to 30 mph.

Aluminum-capped stud

A stud welded construction fastener with an aluminum cap which permits fast field-assembly and improves the appearance of insulated metal sandwich and other curtain walls has been developed by the Nelson Stud Welding Division of **Gregory Industries, Inc.**, Lorain, Ohio. Identified as the Setlok fastener, the system employs a steel shoulder type stud with serrated tip which is welded to structural girts. When insulation and exterior material are in place, the aluminum cap is placed over the serrated tip of the stud and driven into position with a tool which



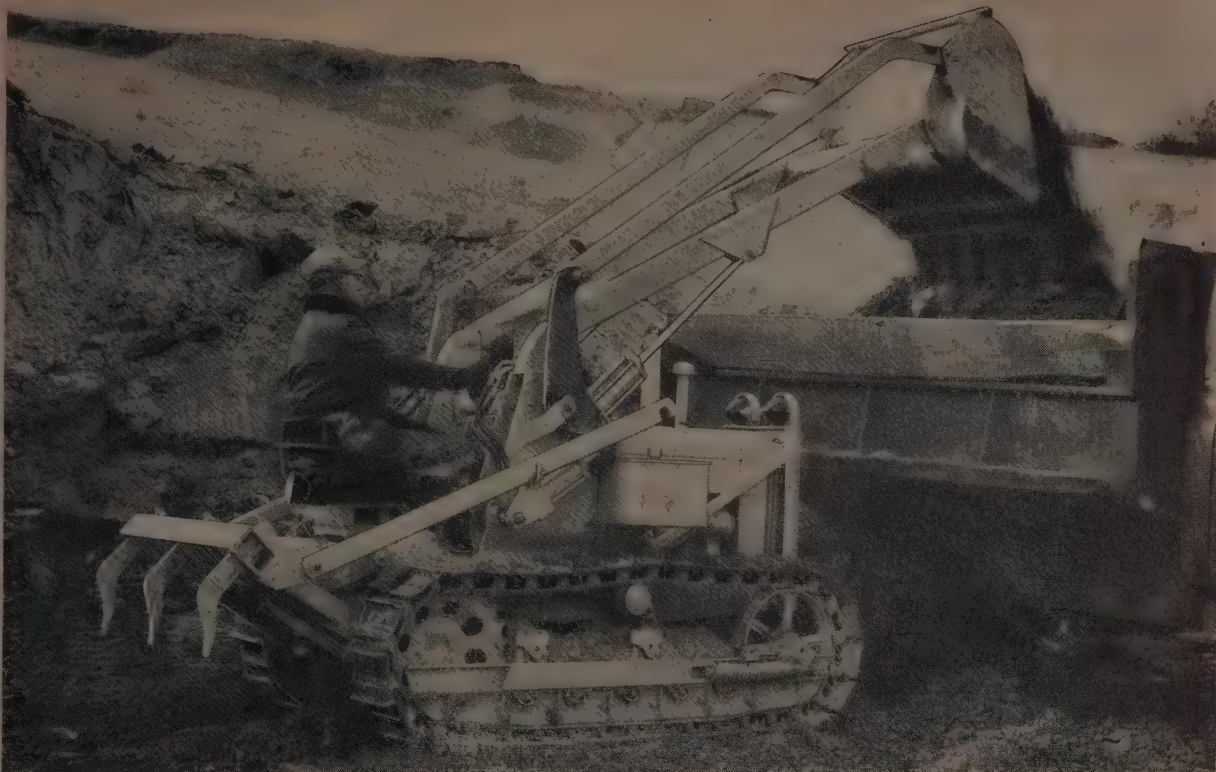
causes the aluminum to flow into and grip the serrations. Tests demonstrate the fastener has a holding power of more than 800 lb. on direct pull. Structural members need not be drilled, and all work is handled from one side.

Retractable scarifier for Traxcavator

A retractable hydraulic scarifier designed especially for Caterpillar Traxcavator models 977, 955, and 933 is now in production by **American Tractor Equipment Corp.**,



9131 San Leandro Blvd., Oakland 3, Calif. A single unit assembly consisting of drawbar and cylinder supports bolts to the rear of the Traxcavator and counterweights



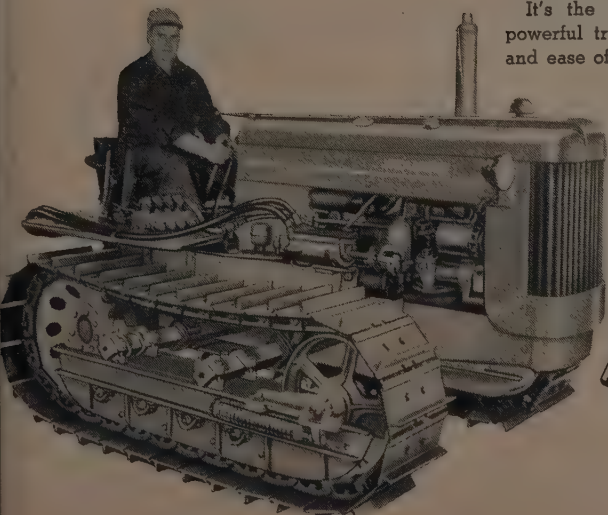
In a John Deere Crawler You Get SO MUCH for SO LITTLE



WHY buy tractors that are bigger than you need? Contractors and builders everywhere are awakening to an important fact—there's a place for this light, economical, track-type tractor to handle a wide range of jobs. And, once they own a John Deere, they wonder how they ever got along without it!

It's the compact, but amazingly powerful tractor with the simplicity and ease of handling that feature all

John Deere Tractors, a tractor that will work and earn for you every month in the year. With approximately 25 h.p. on the drawbar, it makes short work of land-clearing, excavating, backfilling, clean-up and landscaping. It solves material-handling problems, excavates for footings, sewer, gas, and power lines and septic tanks—almost no end to its uses! Get complete information. See your nearest John Deere dealer.



Left: The new "420" Crawler with 4-roller tracks. Also available with 5-roller, above. Both tractors now have 20 per cent more power than previous models.

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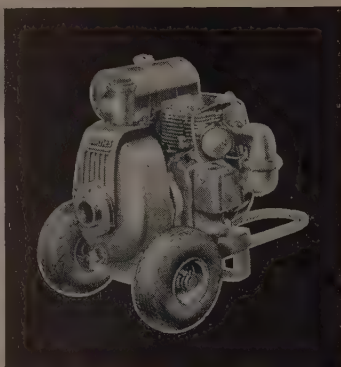
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Gasoline, diesel, electric or pulley drives.

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Larson Equipment Co., Los Angeles, Calif.

Lowry Equipment Co., Redding, Calif.

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

the loader. Two cylinders raise and lower the frame which accommodates up to five curved scarifier shanks. Shank connections may be either rigidly locked for bank ripping or hinged to retract automatically when the head frame is lifted. They are ready to rip instantly to a maximum 14-in. depth when lowered by the bucket dump lever. An added valve diverts action to the scarifier. Information available from manufacturer.

Koehring $\frac{3}{4}$ -yd. excavator

Koehring Co., Milwaukee 16, Wis., has announced production of an excavator in the $\frac{3}{4}$ -cu. yd. class that is similar in basic design to the firm's $\frac{1}{2}$ - and 1-cu. yd. machines. Designated Model 305, it has a rated lift crane capacity of 25 tons on truck chassis and 15 tons on



crawler mounting and can be equipped with a full complement of attachments. Upper machinery contains only two major horizontal shafts. The all-welded turntable is equipped with integral sidestands and main cross shafts



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When people know nothing about the relative merits of two suppliers listed in the Yellow Pages, they are apt to judge them by what they say about themselves in their advertisements.

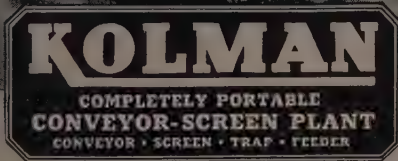
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 **Pacific Telephone**

KOLMAN 101 Conveyor-Screen Plant Does MAN-SIZE Job with Ease!



KOLMAN Model 101 Heavy Duty Conveyor equipped with 31½ h.p. gasoline engine, gravel trap for dozer loading, and KOLMAN Vibrating Screen model SB-80, 8'x48".

Clay Screened and Loaded in RECORD TIME on Healy Construction Co. Job in South Dakota

This KOLMAN Model 101 Portable Conveyor-Screen Plant keeps trucks moving at a fast clip loading and screening clay for road binder material on a J. L. Healy Construction Co. job near Pickstown, S. Dak.

The dozer trap permits fast and efficient loading. It's built onto the conveyor tail section and is fully portable along with the rest of the equipment. The trap is constructed of steel so it can be buried and loaded with a dozer. It is provided with grizzly bars to stop the passage of large rocks, with buckboard planking above the trap, and a steel regulating door to control the flow of material onto the belt. The trap is also available with a plate feeder installed.

Another reason for big production with

this portable conveyor-screen plant is the rugged screening action of the KOLMAN Vibrating Screen. This SB-80 is a big screen, 8'x48", providing over 30 square feet of screening area and every inch of it delivering vigorous vibrating impetus—pushing even such tough materials as clay through at record rates.

Convenience features on the Model 101 Conveyor such as the Head Pulley Clutch and Motor Controls at ground level permit one operator to handle it with speed and ease. Production is at peak efficiency; excessive wear and maintenance costs are reduced to a minimum.

Model 101 KOLMAN Portable or Stationary belt conveyors are available in 18 to 36-inch widths and in lengths as desired.

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1739 32nd Ave., San Francisco 22

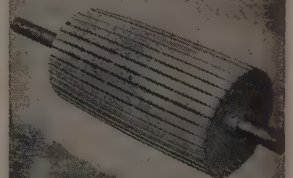
KOLMAN MANUFACTURING CO. 5670 W. 12th St., Sioux Falls, S. D.



Folding feature permits weight of screen to be shifted back under conveyor.



Head pulley clutch permits operation of screen while conveyor belt is idle.



Bar type head pulley eliminates the necessity of lagging. Extended shaft.



Self-cleaning wing type tail pulley protects belt against stone cuts and bruises.

revolve in antifriction bearings. Model features self-cleaning crawlers, automatic traction brakes, and a mechanical cam type booster clutch on the main drum clutches. Additional information available from manufacturer.

GMC "Blue Chip" truck line for 1956

GMC Truck & Coach Division of General Motors Corp., 660 South Boulevard East, Pontiac 11, Mich., has introduced its light and medium-duty "Blue Chip" truck line for 1956. Chief new features of the line are tubeless tires and a one-shift rear axle which allows progressive gear combinations with only one shift of the axle. Other additions include road shock dampers, 12-volt electrical



systems, V-8 and 6-cylinder engines with increased horsepower rating, and either Hydra-Matic or synchromesh transmissions. Power steering is optional. Further information available from manufacturer.

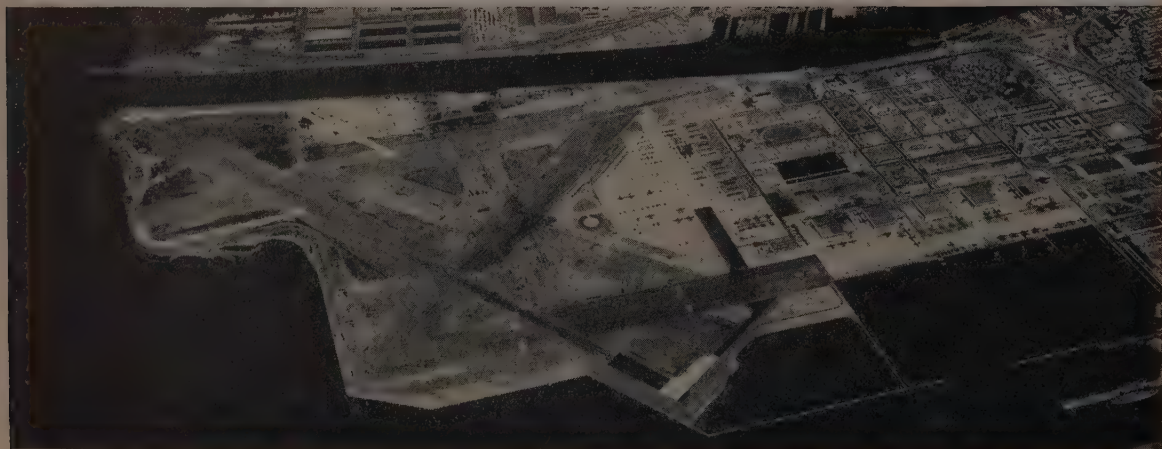
Log loader for Caterpillar D8

A loader capable of handling logs to 42,000 lb. with a lift of 14 ft. and designed for mounting on new or previous model Caterpillar D8 tractors is in production by



American Tractor Equipment Corp., 9131 San Leandro Blvd., Oakland 3, Calif. The loader, built to accommodate logs to 7-ft. 3-in. diameter, is essentially a tilting fork-lift design with two forged hydraulically powered grab arms. Fork tilt back is 10 to 15 deg. in lift position, 50 to 60 deg. in discharge position. Hydraulic metering system to tilt cylinders eliminates piston oscillation and incorporates a large accumulator to absorb shock. Fingertip control is provided by a three-plunger metering valve. Pistons operate at 750 psi., and 1,500 psi. is available for special work.

From Bay-bottom to airport runways



Alameda Naval Air Station—Photo courtesy Clyde Sunderland—Oakland

● More than 15 years ago, Bitumuls-treated sand/clay solved a Navy paving problem at the Alameda, Calif., Naval Air Station.

In 1939, mixtures of sand and clay dredged from the bottom of San Francisco Bay were successfully mixed in place with Bitumuls emulsified asphalt to provide the base for operating runways. This work was done at record low cost. Since that time, a total of 3,000,000 sq. yds. of operational area have been surfaced in the same economical manner.

For complete data on the use of Bitumuls with "in-place" or native sands (even if hydrophylic), call our office near you.

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FIRST IN STEEL FORMS

FOR ALMOST 50 YEARS



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FLEXIBLE RADIUS FORMS for curb, curb and gutter work, serpentine sidewalks, etc., have long been a specialty with Heltzel Form Engineers.



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ROAD FORMS by Heltzel have set the standards for the industry. More leading contractors use Heltzel Forms than any other make. Available in a variety of sizes and styles to suit any application.

HELCO CURB and GUTTER FORMS make this work profitable for the contractor. They can be quickly set and easily aligned even by the inexperienced. They strip fast and clean. One set can be used on a wide variety of applications.



Southern Road Improvement

DUAL DUTY FORMS FOR AIRPORT WORK have found a ready market in those contractors who put down runways and taxiways. The same form can be used for both slab thicknesses. Heltzel developed the Dual Duty and are the leading manufacturer of this form, too.



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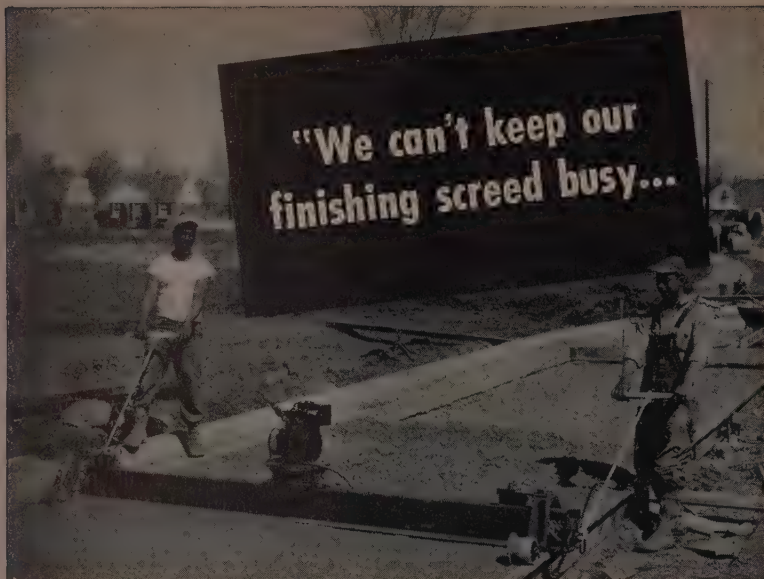
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"... the Master goes faster than the mixers."

"Our Master Screed is a one-man-gang. It does everything at once, faster than we've done it before. We've upped our schedules and really cut our costs."

General contractors and road builders say that, because *in one time over*, the Master Vibrating and Finishing Screed strikes off, vibrates and compacts—from top to bottom—even the lowest slump concrete, making a denser, stronger slab than any other way we know of.

It eliminates honeycomb and form work on bridge decks, molds the concrete in crowns, arcs or flat for roadways and *cuts 'way down on finishing time for any slab*. This cost-cutting, top-quality screed is inexpensive and economical to operate. Available with arc or flat. See your Master distributor today for complete information.

Retractable Wheels Standard Equipment On Vibratory Screed



Screed in operating position. When lever is up, screed rests on work surface, ready to go. Gives high speed strike-off, compaction, and finish.

Lever down, screed beam up, ready to roll easily for another pass. Special retractable lightweight flange wheels increase mobility, step-up operating speed.



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Riverton, Rock Springs, and Sheridan, Wyoming

Concrete cutting machine

Diamond Tool Associates, P. O. Box 85, 940 E. El Segundo Blvd., Hawthorne, Calif., manufacturers of Diamond cutting blades, has announced a concrete cutting machine. It is designed for trenching, joint



cutting, and patching. Solid rubber tired, non-sway ball-bearing wheels give it perfect maneuverability. Twin mounted 14-in. capacity blade guards for either side cutting, handy dashboard controls, positive screw feed, are a few of the many features.

For poison ivy, oak, or sumac

A formula has been developed by the research department of the E. D. Bullard Co., 275 8th St., San Francisco 3, Calif., for the prevention and treatment of poison ivy, oak, and sumac. When applied prior to contacting poisonous plants the formula acts as a preventive, and when applied following contact it will relieve itching, stop spreading, and aid in rapid healing of the rash.

Two air-driven wagon drills

Two air-driven wagon drills, featuring automatic controls grouped conveniently on a motor which can be repositioned along the mast, have been announced by Thor Power Tool Co., 175 N. State St., Aurora, Ill. They are the SW-1, pictured, a general



purpose model, and the BW-2 a heavy duty unit. Mounting either a Thor 75 or 77 sinker rock drill or a Thor 82 or 92 drifter, the SW-1 produces high drilling speeds and has



MARION operators *ride on air*

... well, it's almost like riding a cloud when Marion Air Control takes the heavy push and pull out of shovel running. You control main machine motions with a maximum of only 12 pounds hand pressure. You can inch the load or hold it with simple wrist pressure. Operators stay fresh and fast all shift long. Cycle time is shortened without extra effort. Machinery lasts longer. Marion engineered air control has thoroughly proved its value in the field; requires minimum maintenance. Ask your Marion distributor what it can mean on your work. Your output rises when your operator rides on air.

MARION POWER SHOVEL COMPANY
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The "BABY DIGGER"...

small enough for the tightest quarters
...husky enough for the toughest jobs

WISCONSIN SOUTHERN GAS CO. capitalizes on their Cleveland "Baby Digger's" compactness and maneuverability on this extension job in Lake Geneva, Wisconsin. Cleveland's quick-shift reversible conveyor made it easy to get around trees, poles and water hydrants and keep trenching operations right on schedule in spite of limited working space.

Year after year after year, Clevelands are the first choice on utility company jobs like this because Cleveland-pioneered features are needed to economically satisfy the varied job requirements called for in gas distribution work.

Recognized as supreme in its field for excellence of design, materials and construction, the Cleveland "Baby Digger's" outstanding record of long-lived dependability and economical performance is attributable primarily to Cleveland's unswerving allegiance to this basic characteristic . . .

Quality

Your local distributor will show you how Clevelands do more—for less
THE CLEVELAND TRENCHER COMPANY • 20100 St. Clair Ave., Cleveland 17, Ohio



CLEVELAND

excellent hole cleaning capacity. The BW-2 drill has been redesigned and improved to replace the BW-1. It is built around the model 105 drifter and features improved chain tension adjustments and advanced shock absorbers. The BW-2 can be used with model 82 or 92 drifters as well as with the 105 drifter unit.

Improved power buggy

Creative Metals Corp. has announced the addition of an improved power buggy to its line of cement placing and finishing equipment. The unit incorporates automotive type drive and instantaneous direct shift from forward to reverse. It can back down a ramp when necessary or be safety-lock braked while carrying maximum load. The heaped capacity of the buggy is 13½ cu. ft. and its maximum speed empty is 17 mph. Complete details can be obtained



from the W. J. Burke Company, 2690 Harrison St., San Francisco, Calif., distributor for the entire line.

Electric plant with gasoline engine

An 88-lb. Briggs & Stratton engine-driven electric plant rated 1,000 watts continuous duty, is now available from International Ferment Machinery Co., Inc., Ramapo, N. Y. The engine is equipped with air filter, fuel system, and tank ignition system (radio shielded), lubrication system, governor, and muffler. The entire unit is permanently aligned and mounted on a steel-base-and-carrying-handle combination. The plant design incorporates a 15% overload capacity for emergency service.

Mounting for shovel cranes

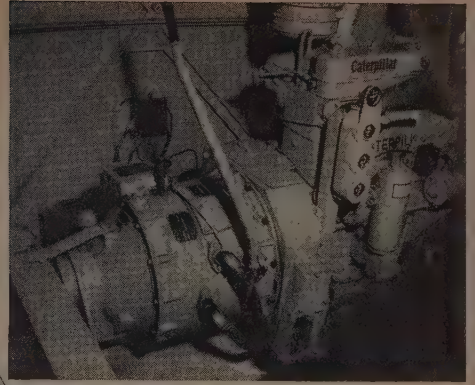
A new method of attaching shovel-crane turntables to crawlers or rubber-tire mountings has been an-



nounced by the Thew Shovel Company, Lorain, Ohio. The mounting

Torque Converter power-packages on three cranes

**save \$60⁰⁰ a day
in fuel costs alone!**



Close-up of Caterpillar D315 Diesel Engine, driving through a Twin Disc Model CF Torque Converter. This powerful combination is used by the Valentine-Clark Corporation of St. Paul, Minn., to power their Link-Belt Crane, shown below.



A Twin Disc Torque Converter, on each of three cranes, is saving the Valentine-Clark Corporation of St. Paul, Minn., \$20 a day in fuel costs alone—or a total of \$60 for all three.

This company chemically treats poles to prevent destruction by weather and insects. Logs are shipped in from the West Coast, debarked and then chemically treated. The three cranes are used to unload the logs into treating pits, and to reload them for shipment.

This equipment includes one Link-Belt and two American Hoist & Derrick Cranes—all of which are equipped with Caterpillar D315 Diesel Engines, driving through Twin

Disc Model CF Torque Converters.

Each of the cranes has been converted from steam power, and since switching to the powerful diesel engine-torque converter combination, several advantages have been realized. According to Lawrence Martin, Superintendent of Valentine-Clark, "In addition to our \$20 a day saving in fuel—*per crane*, we've *increased* production more than 20%. We've also *decreased* labor costs in eliminating time consumed to fire boilers, and to make water stops."

The next time you repower or purchase new equipment—*specify a Twin Disc Torque Converter* for a smoother, easier, more flexible flow

of power (up to 6:1 multiplication) and for longer equipment life through cushioning of shock loads. *Your production will increase . . . your costs will decrease.* Contact your engine dealer for more information. Twin Disc Clutch Company, Racine, Wisconsin, Hydraulic Division, Rockford, Illinois.



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Torque Converters

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STEP UP PRODUCTION with this 1-MAN EARTHMOVING TEAM



Hydraulic-Tilt BULLDOZER-SCARIFIER

...for Allis-Chalmers, Caterpillar, and International
Track-Type Tractors

For fast, big-yardage performance you'd never expect from small to medium-sized crawlers, try this new ATECO team on your next job! Hydraulic-tilt dozer and hydraulically-operated scarifier are controlled from the tractor seat to give your operator instant, finger-tip control of every job condition. Here are some of the money-making features you won't want to do without:

HYDRAULIC TILT lets operator lower either blade corner instantly for faster digging—cuts time 20% or better on pioneering, sidehill cuts, "finegrade" trimming!

HYDRAULIC SCARIFIER is instantly ready to rip up hard materials for easier dozing and full-bowl loads that mean bigger yardages with fewer passes!

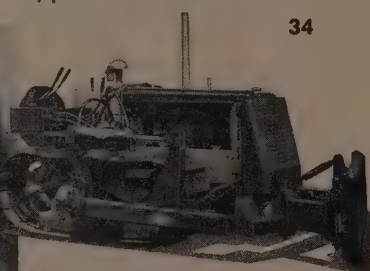
SCARIFIER HELPS BALANCE DOZER WEIGHT—improves handling and traction, puts more horsepower to work, gets more done!

ATECO bulldozers or angling-blade roadbuilders and scarifiers are available for Allis-Chalmers HD5 and HD9, Caterpillar D2, D4 and D6, and International TD6, TD9 and TD14 tractors. No other dozer combination offers ATECO profit-building performance; why pay more and get less? See your tractor dealer today, or write us now for literature, prices.



CONVERTS TO FRONT-END LOADER with an inexpensive ATECO conversion kit. All you need is lift arms and bucket—use same pump, valve and cylinders as dozer!

(not available on HD9, D6 or TD14 models)



ANGLING-BLADE ROADBUILDER also available, with or without scarifier. Roadbuilder can quickly be converted to straight-blade bulldozer or to front end loader.

34

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BULLDOZERS • ROADBUILDERS • RIPPERS • SCRAPERS • LOADERS

eliminates all need for top or hook type turntable rollers, for center pin and nuts, for exposed roller paths, and for centering gudgeons, along with the maintenance and adjustment usually associated with these items. The mounting is at present standard equipment on two models of Lorain cranes and is available as optional equipment on others in the line.

Motor-in-head vibrator

Now available is a universal motor-in-head concrete vibrator which operates off ordinary 115 volt house



current. Designated model EV25. The unit vibrates at frequencies up to 10,000 per min. and does not damage forms. Prices start at \$290. More information can be obtained by writing Mall Tool Co., 7725 S. Chicago Ave., Chicago 19, Ill.

Starting on cold mornings

Quick starting on cold winter mornings is assured with the direct electric starting systems announced by Caterpillar Tractor Co., Peoria, Ill., as attachments for D6, D4, and D2 tractors and No. 977, No. 955 and No. 933 Trax-cavators. Each of the 24-volt systems includes a standard equipment two ether starting aids and the necessary tubing to inject vaporized ether into the air intake manifold.

Colored slide rules

Pickett & Eckel, Inc., 1109 S. Fremont Ave., Alhambra, Calif., are now making light-alloy slide rule in green-yellow eliminating violet and red rays which focus in front of and behind the retina of the eye. The color coincides with the optimum sight point of the spectrum, cuts eyestrain, blurring, and errors in reading calibrations. Mad-



The 201-E is a highly portable plant. The frame is extra strong to hold rigid alignment of all equipment and drives. A rocker beam with full width axles supports most plant weight. Four wheels, each with dual tires, oscillate separately to compensate for rough terrain.

Push-button Controlled, Diesel Electrically Operated, and Portable AUSTIN-WESTERN 201-E high speed crushing plant

Need a high output, mobile crusher to furnish large quantities of accurately sized specification material at low cost? Then check the all new Austin-Western 201-E. . . Diesel electrified, push-button operated, portable, closed circuit crushing and screening plant.

Operation of all plant components is fully electric. Individual electric motors power all operations through short coupled V-belt drives. Mechanical loss through clutches, gears, etc., is eliminated. Constant-top speed operations can be maintained at low cost.

A single, convenient push-button station controls the plant. Standard, interchangeable motors and electrical controls are used on the 201-E to eliminate costly downtime.

Efficiency of the plant is increased by using these electric

drives because all components operate at top efficiency at all times . . . regardless of crusher loads, thereby delivering top production of accurately sized aggregates.

These are just a few of the benefits that are yours with the *electrified* 201-E. Get the full story on the many ways this highly portable plant can boost your output of accurately sized specification material while cutting operating costs. See your nearby Austin-Western distributor . . . or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio, for illustrated booklet.

AUSTIN-WESTERN

CRUSHING, SCREENING AND WASHING EQUIPMENT

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Austin-Western Distributors

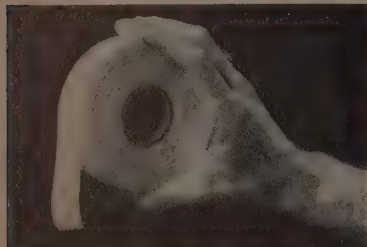
Edward R. Bacon Company San Francisco, California
Columbia Equipment Company Portland, Oregon; Seattle, Washington; Spokane, Washington
Harty Trucks and Parts Company Denver, Colorado
C. Ribble Company Albuquerque, New Mexico
D. Roeder Equipment Company Reno, Nevada
Ever Machinery Company Phoenix, Arizona

Western Machinery Company Salt Lake City 15, Utah
Western Machinery Company San Francisco 7, California
Keremi Tractor and Equipment Company Cheyenne, Wyoming; Casper, Wyoming
Hall-Perry Machinery Company Billings, Montana; Butte, Montana; Great Falls, Montana
Northwestern Equipment, Inc. Fargo, North Dakota
Northwestern Equipment Co. of Minn. Minot, North Dakota

in 6 in. and 10 in., Trig, Log-Log standard rules, or in rules made to special order. Catalog on request.

Embossed surface ribbon flagging

An embossed surface ribbon flagging made of vinyl film manufactured by Monsanto Chemical Company has been introduced by Surveyors Service Co. Their flagging is non-toxic and flame resistant, will not



fade or stiffen upon prolonged exposure to sunlight and is supple at temperatures as low as -35 deg. F. The flagging is available in many colors and 300-ft. rolls. Complete information is available from Surveyors Service Co., 2021 S. Grand Ave., Los Angeles 7, Calif.

Crane travels at 21 mph.

Production of a Cruiser Crane version of the model 205 excavator has been announced by Koehring Company, 3026 W. Concordia Ave., Milwaukee 16, Wis. One-man operated, the crane has a 15-ton lift capacity, 1/2-cu. yd. dipper capacity and a top travel speed of 21 mph. The machine



can negotiate 25% grades in low gear. For special high lifts the standard 25-ft. boom can be lengthened to a maximum of 55 ft. plus straight boom jibs of 15 to 30 ft. Power boom lowering is standard. Total weight of the unit is 29,400 lb., with the rear axle load without counterweight, listed at less than 18,000 lb. to conform with highway regulations. More detailed information and prices are available.

Hose handles hot oil

A hose made of synthetic rubber, steel wire, and glass fiber has been developed by Hewitt-Robins, Inc., Stamford, Conn., to handle hot oil used in the construction of asphalt

and other tarvia type roads. The hose was developed to withstand high temperatures, and chemically-caused decomposition. Depending on the diameter, the price is between \$100 and \$500 per 100 ft.

Automatic buildup wire

Now available is a new automatic buildup wire for use with the submerged arc process. The wire responds to heat treatment and can be applied to all ordinary AISI and SAE steels. It is designed for use prior to final hardfacing on parts such as tractor rollers and idlers, earth moving shovel parts and cable drums. It is recommended for the restoration of tractor track rails and links, large shafts, pulley sheaves, mine car, and crane wheels. For more information write Air Reduction Pacific Co., Division of Air Reduction Company, Inc., 220 Bush St., San Francisco, Calif.

Strike-off blade for tamping rollers

A level blade attachment to fit Bros M2 series tamping rollers has been announced by Wm. Bros Boiler and Mfg. Co., 1057 10th Ave. S. E.,



Minneapolis 14, Minn. By mounting directly in front of the tamping roller, it levels off the high spots and fills in low spots on the road fill resulting in more even compaction over the entire area of the lift covered by the roller. The blade has a 7 1/2-in. vertical adjustment controlled from the operator's seat. An optional hydraulic system is available to supply hydraulic control independently, if desired. Total weight is 1,750 lb.

Complete line of 1956 trucks

A completely new 1956 line of cab-over-engine trucks—12 models featuring four-wheel drive and ranging from 14,500 to 40,000 lb. gross vehicle weight—has been announced by the Four Wheel Drive Auto Co., Clintonville, Wis. The styles are available

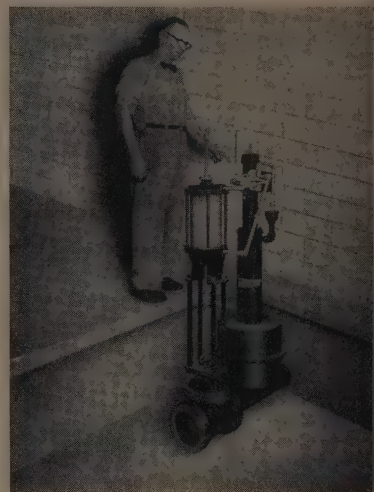


in all 4 x 4 weight classifications and also may be obtained for special six-wheel drive applications. The units range in engine horsepower from 131

to 240 and vary in transmission speeds from 4 to 10. Literature is available.

Hydraulic sewer valve

A hydraulic sewer valve is now available in 6 standard capacities for 4-, 5-, 6-, 8-, 10-, and 12-in. sewers. Other sizes are available on special



order. The valve provides completely automatic protection against main floor, basement, and low level warehouse flooding when storms cause city sewer systems to back up. When the sewer level rises to the danger point, a float in the valve rises and operates an arm which causes city water pressure to close the shut-off valve. Additional information will be supplied by Protection Equipment Co., 2924 Emerson Avenue South Minneapolis, Minn.

Hefti loader for IHC-300

A new and tested Hefti loader for IHC-300 utility tractor is now available. Manufactured by Hendersson Manufacturing Co., 1203 Rockford Rd. S. W., Cedar Rapids, Ia. The



unit has a heavy dozer blade and utility bucket. The blade and the bucket can be mounted interchangeably on either front or rear of the loader. The loader is interchangeable among several makes of tractors. The bucket has a 1/3-cu. yd. struck capacity with a lifting height of 8 3/4 ft. Lifting capacity is 2,000 lb. and depth of cut below ground for both bucket and dozer is 9 1/2 ft. Prices and literature are available from the manufacturer.

Transmissions have 12 speeds

Fuller Manufacturing Co., Kalamazoo, Mich., has announced 2 semi-automatic RoadRanger Transmissions with 10 forward and 2 reverse



These three Mack model B421S concrete mixers are part of the big San Mateo Feed & Fuel Company's fleet. Macks have helped set the pace for their growing operation since 1951.

**compared to all other makes in our fleet . . .
MACK's performance and maintenance records
were outstanding . . . that's why we bought
35 more**

—R. C. Hughes, President
San Mateo Feed & Fuel Company
San Mateo, California

Proof of performance is what Mr. R. C. Hughes, president of San Mateo Feed & Fuel Company, demanded before buying 35 new Macks—21 model B421S mixers, and 14 model B30P dumpers.

"We relied on our records," commented Mr. Hughes, "when the time came to make a major decision for modernizing our fleet. The answer was clear . . . in our mixed fleet Macks were the stand-outs for fuel economy, low maintenance cost, and over-all earning capacity.

"We bought our first six Macks in 1951, and added 14 more in 1952. Now, with the addition of 35 new units, our fleet contains 55 Macks. We consider our big investment in Macks an important factor in building increased profit into our rapidly growing business."

Get the facts on Macks before you buy another truck. See your Mack Branch or Distributor and find out how Mack can give you top performance and economy in every trucking operation.

4014

MACK TRUCKS Los Angeles • Denver • Portland • Seattle • San Francisco • Salt Lake City • Albuquerque

speeds—models R-96 and R-960. The models are 2½ in. shorter and 60 lb. lighter than the units of the preceding series. By replacing only 5 parts, the R-96 can be converted into the overdrive model—not possible with R-95 series. One lever controls all 10 forward speeds—all range shifting, up or down, is actuated by a single lever. Literature is available.

Badger improves Hopto

New design and engineering features on the "360" full swing Hopto Digger have been announced by Badger Machine Co., Winona, Minn. Relocation of the two 5-in. hoist



cylinders has given added power to the machine as well as improving the appearance. A redesigned cab gives the operator better visibility, and a greater variety of power units is now available as standard equipment. The ground reach of the "360" has been extended to 26 ft., the digging depth remains at 17 ft. Both ¾-yd. and ½-yd. capacity backhoe and shovel buckets are available.

Air-operated utility hammer

A newly developed air-operated all-purpose utility hammer featuring "stop rotation" for alternate use as a cement chipping hammer has been announced by Thor Power Tool Co., 175 N. State St., Aurora, Ill., designated the No. 15 utility hammer, the



14-lb. tool will be distributed through contractors' tool distributors. An external cam lever control permits instantaneous change from rotative to straight hammering action. The hammer cuts clean, round holes to diameters up to 1½ in. It will be furnished in two versions, one for use as a dry tool and another for use as a wet tool to meet the problem of dust control. Length overall is 17¼ in. with a ¾-in. air hose and air hose inlet provided for.

Speaker-Mike uses transistors

Motorola has announced a transistorized dynamic microphone for mobile radio applications. The accessory provides quality comparable to that of a base station. A minor modification adapts earlier Motorola equipment to use the new unit. Additional information is available from Motorola Communications and Electronics, Inc., 4501 W. Augusta Blvd., Chicago 51, Ill.

Special 75-ton lifting crane

Production has begun on the newest machine in Marion Power Shovel Company's line of excavating and materials handling equipment. It's the 87-M, a low slung, crawler-mounted unit, designed and built



specifically for crane work. A heavy-duty crane boom, with open throat point section, will handle the maximum rated capacity of the machine. Deep center sections with tapered extensions are available for long boom work. For specific requirements, the boom can be fitted with either a 15-ft. or a 30-ft. primary jib. Full descriptive information is available from the manufacturer, Marion Power Shovel Co., Marion, Ohio.

Hydraulic drilling unit

Newest unit in the Mobile drilling line is an hydraulically powered drill designated model B-40. Engineered to operate as a core or auger drill, the B-40 may be adapted for tractors and vehicles or independently driven by a motor mounted at the rear of any vehicle. The drill cores to 200



ft. and augers to 75 ft. One-man operated, it can be converted easily to drill at any degree in a 360-deg. circle. Further details are available. Mobile Drilling, Inc., 960 N. Pennsylvania St., Indianapolis 4, Ind.

Asphalt distributors

Available from Seaman-Gunnison Corp., Baraboo, Wis., is a complete line of asphalt distributors, both truck-mounted or trailer-mounted. Front-end controls are standard equipment. Though not recommended, the manufacturer will mount controls at the rear if required. A special spray-bar shut-off provides positive, accurate application of tars and bituminous binders. There is no dripping after unit is shut off and no thin spray due to a bar that starts slowly. Complete information on the distributors plus the manufacturer's line of flusher equipment is available on request.

Clark tractor logger

The Michigan Model 175 tractor logger, which features torque converter, power shift transmission and planetary wheel drive, has been introduced by the Construction Machinery Division of Clark Equipment Co., P. O. Box 599, Benton Harbor, Mich. The rubber-tired logger lifts



20,000 lb. at zero mph.; 14,000 lb. at 1 mph. Log clamps can handle a log six ft. in diameter or can be adapted to close entirely. Hydraulically operated, they close to 16 in. Fully raised to a height of 11 ft. 7 in., the 3-ft.-long lifting forks can be tilted downward at 39-deg. angle. Spikes on bottom

CHICAGO

the most IMPORTANT PLACE for the Construction Industry in 1957

The most important date for the
Construction Industry in 1957

**JAN 28
1957**

**A.R.B.A.
ROAD SHOW
and CONVENTION
PLAN NOW!**

1957 will bring with it the first Road Show in
almost 10 years. Tremendous developments have
been made in just two decades. New equipment
has been developed. New methods have upre-
sented old. New contracting ideas have come for-
ward. Here is the time and place to bring your-
self up to date on all the new developments.

Nothing is being spared to make this 1957
Road Show the greatest indoor exhibit of
machinery and materials ever gathered
together. At the same time the A.R.B.A.
convention will give you an oppor-
tunity to learn about new methods
and practice and hear outstanding
authorities discuss the solution of prob-
lems that are bothering you.

Put it down as the most important date for the
construction industry in 1957. Write for data on
reservations. Ask to be put on the list to receive
future information on the 1957 A.R.B.A. Road
Show and Convention.

**AMERICAN
ROAD BUILDERS'
ASSOCIATION**
World Center Building
Washington 6, D. C.

A.R.B.A. ROAD SHOW and CONVENTION, International Amphitheatre, Jan. 28 to Feb. 2, 1957

Here in Chicago everything is being done to make
the coming A.R.B.A. Road Show and Convention
an event that will be remembered for its value as
an instructive conference, a helpful equipment show
and its pleasures. Chicago's vast hotel setup is being
organized to care for the large attendance that will
be present. The International Amphitheatre is the
largest exhibit hall in the Country and will provide
an ideal spot for gathering and viewing the over
1,000 pieces of equipment that will be shown.

The Stock Yards Inn with its many eating places
and cocktail lounges, and the cafeterias in the Amphi-
theatre, assure comfortable restaurant facilities.

Free Bus Service from the main hotels will assure adequate transportation
and permit attending convention sessions regularly and at the same time allow
you to spend time at the show.

Add to all this the many attractions that Chicago always provides.

Remember the place—the date—and make your plans. Ask to be put on the
list to receive future information on the 1957 Road Show and Convention.

AMERICAN ROAD BUILDERS' ASSOCIATION

World Center Building Washington 6, D. C.



"A CARLOAD EVERY 11 MINUTES WITH OUR ERIE STRAYER BUCKET"



REPORTS DEWEY SLOOP . . . SUPERINTENDENT FORREST PLANT, HOLLIDAY SAND & GRAVEL CO.

Eleven minutes to load a 100,000-pound gondola with sand—less than an hour to fill a 215-ton hopper bucket—that's production! Just 34 seconds per bucket load!

Sand and gravel men must have this swift, efficient production to turn a fair profit. And it's this kind of production the Forrest Plant of the Holliday Sand and Gravel Co. gets day after day with their 1½ yard ERIE rehandler.

ERIE buckets are made for speed. This and the other fine ERIE features cause men like Superintendent Dewey Sloop to volunteer: "The ERIE is the best bucket we've ever had."

Check ERIE's features—then compare prices!

- 1. SPEED:** Faster operation from short, powerful closing and opening action.
- 2. DURABILITY:** Rigid, one-piece head shrugs off bumps and jars.
- 3. LOW HEAD ROOM:** Permits higher stock piling—less frequent repositioning.
- 4. LOW MAINTENANCE:** Continuous cable reeving with no reverse-S bends. Less cable to buy.

FOR CATALOGS, WRITE DEPT. WC56

ERIE STRAYER CO.

3756 GEIST ROAD

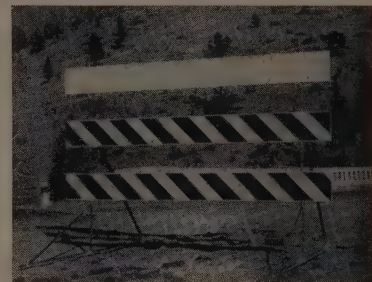
ERIE, PENNSYLVANIA



and top sides of the clamps permit the operator to pull a log in or flip it away.

Sentry All Steel Barricades

A line of Sentry All Steel Barricades including complete range of styles and sizes, and with sign brackets, light brackets, extensions, and flags as accessories, has been announced by Traffic Equipment Corp., 2461 S. Dahlia Lane, Denver 22, Colo.



Panels are formed 16 ga. steel, zinc coated and bonderized, reinforced on the ends. Finish is baked enamel, with Scotchlite optional. Parts are interchangeable. Further information available from manufacturer.

New line of fibre tube forms

The Richkraft Co., 510 N. Dearborn St., Chicago 10, Ill., has introduced a new line of fibre tube forms for pouring round columns. The line will be sold under the name Rich-tubes. A plasticized treatment makes them weather resistant and assures their stripping easily on the job, leaving a smooth-finished concrete surface. They can be obtained in 23 standard inside diameters in lengths up to 50 ft. A line of wax coated tubes is also available at slightly lower cost.

Front mounted telescopic hoists

The Uni-scope series, a line of front mounted single telescopic hoists for use with 8- to 15-ft. bodies claimed to allow substantial payload



increase without violation of highway weight laws, has been announced by Galion Allsteel Body Co.,

Galion, Ohio. Because of front mounting, most hoist weight is moved to the front axle. Lift from the front of the body allows a larger portion of the payload to be shifted forward to load the front axle to its legal limit. Payload capacities range from 3 to 14 cu. yd. and 9 to 20 tons. Hoist cylinders are three stage construction with 5- or 6-in. first stage sleeves, depending on hoist capacity.

Eagle aggregate washer-classifier series

Now in production is the large series of Eagle fine material units for washing and classifying concrete aggregate, equipped with welded steel ribbon type screws which have



replaceable abrasion-resistant Ni-Hard shoes on the wearing edges. Flaring design of the tub provides greater settling pool at feed-in end of washer-classifier. Lower bearings are Hydrotex marine-type, water lubricated under pressure. Information on request to **Eagle Iron Works**, 203 Holcomb Ave., Des Moines, Ia.

Combination automobile-truck

A vehicle with panel truck load capacity and passenger seating has been introduced by **Dodge Division** of Chrysler Corp., 7800 Jos Campau, Detroit 31, Mich. Called the Dodge Town Wagon, the truck is available

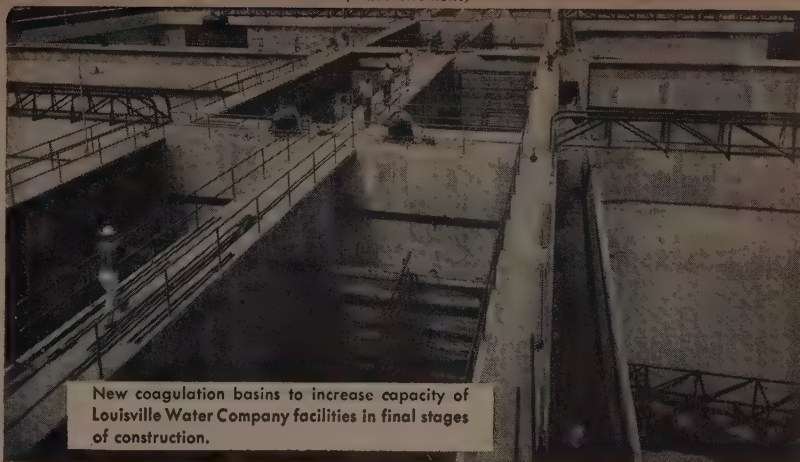


in 8-passenger and 6-passenger models with maximum payload capacity of 1,650 lb. The 8-passenger model has 3-2-3 seating arrangement with center and rear seats removable to carry cargo and permits 90 cu. ft. of load space even when carrying six passengers.

Motorola transmitter-receiver

Motorola Inc., 4501 West Augusta Blvd., Chicago 51, Ill., is now marketing the "Compa-Station" transmitter-receiver, an addition to its line of fixed FM 2-way radio equipment operating in the 25-54 or 144-174 megacycle band. The unit includes a 60-watt transmitter and Sensicon "G" receiver and features a removable control panel with built-in

(Advertisement)



New coagulation basins to increase capacity of Louisville Water Company facilities in final stages of construction.

How Pre-Fab Forms Saved Time, Material on Water Plant Job

When the Henry G. Bickel Company and the Charles A. Connel Company were awarded the contract for the Louisville Water Company coagulation basins at Louisville, Kentucky, they selected the Uni-Form Panel System to form the 200,000 sq. ft. of contact area the job required.

As the job started, it soon became apparent that the Uni-Form Panels, which require minimum alignment and bracing on 1 side only, were going to produce very satisfactory savings in time, labor and material. Form erection went fast because Uni-Form Panels are assembled and locked into a tight rigid form with Uni-Form Ties which were supplied in exact lengths to provide automatically accurate thickness of both battered and straight walls.

One side of the form was erected, permitting easy, unhampered placement of reinforcing. Since specifications did not permit use of chutes or tremies, pouring pockets were provided as the forms were closed.

Fast erection and stripping features of the Uni-Form Panel System enabled the contractor to form the entire 200,000 sq. ft. of contact area with only 14,000 sq. ft. of Uni-Form Panels. Panels were used an average of 14 times without the necessity of maintenance or repair.

Uni-Form Panels are versatile, high speed forming tools. They're used by successful contractors everywhere to form every conceivable type of construction. They are rented or sold through Universal Distributors and Branches located from coast to coast. Call or write your nearby Universal Distributor or Branch for complete details on Uni-Forming—the modern way to form concrete.

UNIVERSAL FORM CLAMP CO.

1238 N. Kostner Avenue • Chicago 51, Ill.

DISTRIBUTED BY:

UNIVERSAL FORM CLAMP CO.

5855 S. Western Ave., Los Angeles, Calif.

McCRACKEN-RIPLEY

2221 N. Albine Ave., Portland 12, Oregon.



Section of exterior battered wall 31' high, showing Uni-Forming nearly complete. Uni-Form Scaffold Brackets replaced costly conventional scaffolding systems.



Pouring pockets permitted specified control of concrete placement.

UNIVERSAL EQUIPMENT CO.

1549 Eastlake Ave., Seattle 2, Washington

UNIVERSAL FORM CLAMP CO.

2051-59 Williams St., San Leandro, Calif.

speaker which can be placed in any one of three positions on the cabinet. The unit is housed in a 22x13½x29-in. cabinet and weighs about 100 lb. It operates from standard 117-volt 60-cycle source.

Lightweight conveyor belting

Conveyor belting of cotton-nylon fabric designed for use where cotton duck is too heavy has been developed by the Republic Rubber Division, Lee Rubber & Tire Corp., Youngstown, Ohio. Load-carrying carcass of the belting is made of plies of frictioned fabric woven from high tension cotton warps and nylon fillers. It is 25% lighter than duck, has less stretch, and will operate over smaller

pulleys at higher speeds. Can be used where 32-oz., 42-oz., and 48-oz. cotton duck would normally be used. Full information available from manufacturer.

Stair climbing truck

A stair climbing truck, the E-Z Climber, has been designed by Precision Equipment Co., 3716 N. Milwaukee Ave., Chicago, Ill., to drag loads over curbs and up and down stairways. The unit features two rubber-edged rocker arms which act like an extra pair of wheels and eliminate friction. Load capacity is 600 lb. Construction is electrically welded tubular steel with curved cross members and reinforced base



plate beam. Semi-pneumatic 10x2.75-in. steel disc wheels. Regular price of the unit is \$44.90. Company will fill orders for Western Construction readers at \$34.90 f.o.b. Illinois.

Caterpillar heater for graders

Caterpillar Tractor Co., Peoria, Ill., has introduced a hot-water heater attachment for Nos. 12, 112, and 212 motor graders. The heater, equipped with two individually controlled blower fans capable of providing air output of 620 cu. ft. per min., has a rated capacity about 2½ times that of single-fan heaters. May be ordered to match either 6- or 24-volt electrical system.

Arnot foldaway drawing board

A drawing board that tucks away in a center drawer beneath a desk or table and slides out for use on the surface has been designed as a space



saver for crowded offices or for executives or supervisors whose jobs require little drawing or drafting. The unit, manufactured by Arnot-Jamestown, 730 Fifth Ave., New York, N. Y., consists of the complete drawer, drawing board, and parallel rule and can be bolted or screwed to any conventional desk or table top. The unit is available with 24 x 24-in.

JETCO JIFFY® HEAVY DUTY EQUIPMENT

FOR ALL TYPES OF TRENCHERS



HEAVY DUTY WHEELS

Fabricated of high alloy steel for long wear. Standard ¾", ⅝", or 1" thicknesses, or to specification.

Standard or specified diameters.

Holes pre-drilled for bucket installation.

Shipped ready for installation.

HEAVY DUTY BUCKETS

Fabricated from high quality steel in ⅝", ¾" and ⅞" thicknesses. • No further welding or hole drilling necessary. • Jetco weld-on pockets give added strength to bucket. • Pre-drilled holes for side-cutters included.

Shipped ready for installation.

HEAVY DUTY TEETH & POCKETS

Drop-forged, weld-on pocket with smooth radius for positive taper fit with Jetco Teeth—no bolts. • Self-sharpening, quick change, reversible teeth of high quality steel for longer wear. • Teeth designed for all types of soils. • Minimum leading edge leverage.

Write for catalog



JETCO, INC.

Dept. C, 1100 Westminster Avenue
Alhambra, California

drawer and 20 x 15-in. board for about \$26.00, and with 30 x 30-in. drawer and 26 x 21-in. board for \$31.25.

Air-powered tubeless tire changer

The Lee Tubeless Truck Tire Changer, an air-powered mechanism capable of mounting or demounting any tubeless truck tire from 17 in. to 1100 x 24.5 on both plain rims and disc wheels without cones or



adapters, has been announced by Automotive Equipment Manufacturing Co., 11000 S. Alameda St., Lynwood, Calif. The machine occupies 40 sq. in. of floor space and operates on about 125 lb. of air pressure by a pair of 2-position control valves. One valve locks the rim in position, the other actuates the pump system. The machine need not be bolted down, can be used anywhere air is available.

Flat-headed studs

Three studs designed to perform construction or maintenance fastening jobs where stud heads should be comparatively flush with the surface have been introduced by Remington Arms Co., Inc., 939 Barnum Ave., Bridgeport 2, Conn. The studs have flat heads, $\frac{3}{8}$ in. in diameter and $\frac{1}{8}$ in. thick, and thin shanks to minimize spalling. When used in Remington's Model 455 stud driver, no extra washer or disc under the stud head is required. Studs can be driven with 22 calibre loads. One stud, $1\frac{3}{8}$ in. long, is used to fasten metal lath, metal ducts, and other light sheet metal to concrete. Another, $2\frac{1}{8}$ in. long, is for furring strips to concrete or blocks. The third, $3\frac{1}{8}$ in. long, is used to fasten wooden 2 x 4s to concrete and for shoring and form work.

Mobile radiotelephone

A small low power industrial radiotelephone for installation on materials handling trucks, messenger vehicles, and transportation units has been developed by Kaar Engineering Corp., 2900 Middlefield Rd., Palo Alto, Calif. Designated the IMP (Industrial Mobile Phone), it serves as base station, mobile unit, and mobile

Drilling blast and line-holes became a one-man job when the Schramm Rotadrill was put on this project.



LARGE EASTERN CONTRACTOR SHATTERS RECORDS:

New cost and time records set for construction excavation

With the development of the Schramm Rotadrill, drillers everywhere gain all the advantages of rotary rock drilling with compressed air. It is believed that this comparatively new technique, with its advantages of clean, fast holes, fast set-up, and longer bit life, will completely replace the use of wagon drills.

The Rotadrill on Pneumatractor is a complete, self-contained unit. It can drill a $4\frac{1}{4}$ " hole to a depth of 500 feet with 10,000 pounds down pressure. Normal drilling pressure of 20-30 psi can be instantly increased for dewatering or breaking out blockages. Rotative head has 75 RPM output and can be throttled down to complete stall while maintaining constant torque. Heavy welded structural steel mast can be operated at various angles for sloping holes.

You will find it worth while to investigate the Schramm Rotadrill on Pneumatractor. Send today for Bulletin PR-55.

Your local Schramm Dealer is listed in the Yellow Pages of your telephone directory.

Schramm, Inc.

MANUFACTURERS OF AIR COMPRESSORS

625 North Garfield Ave. West Chester, Pa.



The Schramm Rotadrill, shown here with mast lowered for traveling, is mounted on the Schramm Heavy Pneumatractor. The Schramm Rotadrill is also available truck mounted.



Convenient, simple drilling controls are mounted in one bank for one-man operation. Output spindle is flanged to take various drill pipe adaptors.

public address system. The unit has a range of one to five miles and operates on 6 volts DC, 12 volts DC or 117 volts AC. Weight is 21 lb., measurements about 12x8x5 in. Price: \$328.00, f.o.b. Palo Alto.

"Shoktrol" water-hammer arrestor

A shock absorber to arrest water hammer in all types of hydraulic systems has been developed by J. A. Zurn Manufacturing Co., Erie, Pa. Now being marketed under the name of "Shoktrol," the device contains a sealed-in air pressure charge in metal bellows to assure full extended position under normal pressures. The case is claimed to be fully corrosion resistant, made of stabilized austenitic stainless steel. Available in six sizes from 1/2- to 2-in. diameter.

Clarklift Line to bow in June

The Clarklift Line of fork-lift trucks will be introduced into the equipment market in June by Clark Equipment Co. According to the manufacturer, the line is "new from the wheels up" and includes 12-volt electrical system, fully automatic transmission, emergency fuel tanks, foam rubber seats, and automobile-like controls as standard equipment. New features are self-adjusting brakes, one-piece hood which swings up to expose the entire engine compartment, solid tire models with drive and steer wheels of the same diam-



New Wooldridge scraper

Wooldridge has introduced a new 143-hp. diesel-powered scraper, the "Cobrette," which is rated at 7.5 cu. yd. struck and 10 cu. yd. heaped. The power train includes fluid coupling, air actuated clutch and transmission, and a gear transfer case which permits interchange of the

two standard gears to provide optional gear ratios. Special tractor design enables the unit to assist in push loading companion units. Additional information is available from **Wooldridge Manufacturing Division, Continental Copper & Steel Industries, Inc., Sunnyvale, Calif.**

eter, combination lift-tilt controls on the steering column, optional radiator screens, and deep-tapered forks. **Industrial Truck Div., Clark Equipment Co., Battle Creek, Mich.**

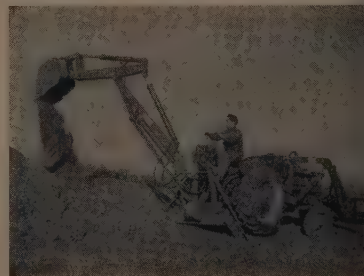
Joy portable compressor

A 600-ft. rotary portable compressor, the Joy Airvane, has been

introduced by **Joy Manufacturing Co., Oliver Bldg., Pittsburgh 22, Pa.** The machine incorporates the Thermal By-Pass temperature control system, a controlled-velocity filter-separator unit with primary and secondary action to remove oil from compressed air, and steel weather-proof housing. Low center of gravity and 13 ft. turning radius increase maneuverability.

Backhoe with hydraulic outriggers

The Henry hydraulic backhoe, Model C-10H, now comes equipped with either hydraulic or manually controlled outriggers to level the machine for straight side ditching on slopes up to a 25% grade. The unit also features a telescopic boom, hydraulically operated, which swings



in a 160-deg. arc and will dig from any point within that radius. Machine will dig 11 ft. and load 8 ft. Main frame grips 6 1/2 sq. ft. of ground and permits 16 lin. ft. of earth penetration. Complete details available from **Henry Manufacturing Co., Inc., 1700 N. Clay St., Topeka, Kan.**

Twin Disc torque converter

Twin Disc Clutch Co. has introduced its new three-stage 13,800 Series torque converter to accommodate every horsepower range from 40



GET MAXIMUM USE OF YOUR 4-WHEEL DRIVE!



New!
**WARN
LOCKOMATIC
HUBS**

New Convenience with AUTOMATIC FREE-WHEELING 2-WHEEL DRIVE and AUTOMATIC 4-WHEEL DRIVE forward and reverse AS YOU SHIFT!

Plus "Locking" controls for 4-wheel drive engine braking control safety.

Stop front-end drag in 2 w. d.!

Your 4-wheel drive with Warn Hubs is the only vehicle you can own that has *all* the advantages and usefulness of *both* a 2 and 4-wheel drive. It has pep, speed, handling ease, economy on the highway in 2-wheel drive—and full-power traction in the rough going in 4-wheel drive. You save on equipment and operation. You get maximum use of your vehicle. Your dealer has Warn Lock-o-matic or Locking Hubs. See him or write us. Willys models sold exclusively by Willys dealers.

WARN MFG. CO.

Riverton Box 6064-WCS
Seattle 88, Washington

Over 75,000 Warn Hubs in use

to 1,000. The series offers four distinct sizes, with a total of 29 capacities through internal blading variations and provides two output arrangements. One standard output shaft assembly, on which an output governor or take-off is available, is designed for side pull loads up to full capacity of the converter, the other, a standard output flange, is designed for universal joint or flexible gear coupling drive. Three input arrangements are provided in the series: a spider drive, which withstands normal misalignment conditions without imposing undue load or stress on the input shaft or engine crankshaft; clutch assembly; and independent mounting.

The 13,800 Series will fit new SAE standard flywheels and accommodates 0 and 00 housing sizes. More information available from **Twin Disc Clutch Co.**, Hydraulic Division, Rockford, Ill.

Diamond Tool masonry saw

Now available for delivery is a new masonry saw for wet or dry cutting manufactured by **Diamond Tool Associates**, P. O. Box 85, 940 E. El Segundo Blvd., Hawthorne, Calif. Designed for blade capacity up



to 14½ in. and for use on all kinds of masonry and ceramic materials, the saw features a self-priming pump, Diamond lock, and water system. Factory-greased bearings require no lubrication. No height adjustments necessary.

7½-kw. electric plant

A 7,500-watt A.C. air-cooled, gasoline-powered electric generating plant has been announced by **D. W. Onan & Sons Inc.**, Minneapolis 14, Minn. Patterned after "CW" Series, this Onan electric plant features the Vacu-Flo cooling system which employs a centrifugal blower that pulls cooling air through the generator and over the engine parts, then expels the heated air through a duct. The unit requires less than 1 cu. yd. of installation space. The plant is powered by a two-cylinder opposed, 4-cycle, 20-hp. engine. For

MODERN, LOW COST HAULAGE EFFICIENCY



with MARION telescopic hoists and trailer dumps

Once you've experienced the all-around efficiencies of Marion Telescopic Hoists and Trailer Dumps, you won't settle for less. Check these features and benefits that make MARION a better buy.

- Rugged, heavy-duty hoists with maximum lifting power. Built to last.
- Jacks made of heavy, seamless steel tubing and polished to controlled surface smoothness for reduced wear.
- Light weight. Compact.
- Design allows proper load distribution.
- Jacks are pin connected to frame so that side motion is allowed to prevent jacks from binding.
- Quiet operation.
- All welded bodies constructed to withstand sagging or twisting with uneven or extra heavy loads.

Get all the job-proven facts and specifications from your nearby MARION distributor . . . or write direct today.

MARION

BODIES AND HOISTS

MARION METAL PRODUCTS CO.
MARION, OHIO

See Your Marion Distributor.
Let Him Solve
Your Dumping Problem More Profitably!

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824 Arno St., N.E.
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Truck Body Company
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Los Angeles 23, California

Ruckstell California Sales Co.
2985 Ford Street
Oakland 1, California

Ruckstell California Sales Co.
410 Broadway
Fresno, California

Woebber Auto Body & Mfg. Co.
4950 Jackson St.
Denver 16, Colorado

Pacific Body Builders, Inc.
1812 N.E. Grand
Portland 12, Oregon

Alloy Manufacturing
Route No. 4 (West on U. S. 10)
Spokane, Washington

Washington Truckstell Sales, Inc.
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Box 1831, 1101 3rd St., N.W.
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"THIS LUBRICANT CUT BEARING REPLACEMENTS OVER 40%"



says—HANOVER BUILDING
SUPPLY CO. of Hanover, Pa.

"Before using LUBRIPLATE, we replaced the wheel bearings in over 50% of our trucks each year. Since using it, bearing replacements have dropped to less than 10%. We have also been able to increase periods between chassis lubrications from 500 to 2000 miles. We are very happy over our change to LUBRIPLATE, and heartily recommend it to fleet operators interested in saving money."

HANOVER BUILDING SUPPLY CO.
C. O. Albright, Pres.

**REGARDLESS OF THE SIZE AND
TYPE OF YOUR MACHINERY,
LUBRIPLATE LUBRICANTS
WILL IMPROVE ITS OPERATION
AND REDUCE MAINTENANCE**



**LUBRIPLATE
LUBRICATION
MAKES CARS AND
TRUCKS RUN
BETTER AND LAST
LONGER**

LUBRIPLATE H. D. S. MOTOR OIL . . . needs no additives

LUBRIPLATE DIVISION, Fiske Brothers Refining Co.
Newark 5, N. J. or Toledo 5, Ohio

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LUBRIPLATE
THE MODERN LUBRICANT

complete information write to manufacturer for Form A-415 for data on the generating plant and Form A-362 for accessories.

Nylon and plastic protective fabric

Herculite, a lightweight nylon and plastic protective fabric claimed to be ten times stronger than canvas, is being marketed by Herculite Protective Fabrics, Inc., 140 Little St., Belleville, N. J. The material will not support combustion, is waterproof, unaffected by acids, grease, oil, or salt water, and will not tear under extreme tension. Samples and information concerning specific uses are available from manufacturer.

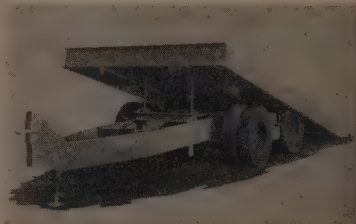
Ni-o-nel electrode and filler wire

Two welding products which make it possible to weld Ni-o-nel nickel-iron-chromium alloy have been developed at the Bayonne Research Laboratory of International Nickel Co., Inc., 67 Wall St., New York 5, N. Y. The "135" Ni-o-nel electrode and "65" filler wire and rod give X-ray quality welds and allow operation in all positions with corrosion resistance and strength equal to that of the base metal. Electrodes come in 14-in. lengths in four diameters: 3/32 in., 1/8 in., 5/32 in., and 3/16 in. The filler wire is available in diameters of .035, .045, and .062 in. on disposable spools for inert gas welding and in

36-in. straightened and cut lengths for tungsten-arc process in five diameters: 3/16, 5/32, 1/8, 3/32, and 1/16 in.

13-ton "Tilt-Top" trailer

A tandem-axle "Tilt Top" trailer with 13-ton capacity and over-all platform height of 33 in. has been introduced by Miller Tilt-Top Trailer Co., 440 S. 92nd St., Milwaukee 14, Wis. The tilting platform trailer, used for loading and hauling machines from one job site to another,



is designated Model "OT"-13 and features an 8 x 16-ft. 8-in. platform decked with 2-in. oak and eight 7.50 x 15 twelve-ply tires. Optional equipment includes twin hydraulic tilt control, electric brakes, lights and safety chains. Price including equipment: \$2,200 plus 8% Federal tax.

"Plan Hold" wall rack

Plan Hold Division of Air Comfort Co., 5204 Chakemco St., South Gate,



PORTABLE ASPHALT PLANT

MODEL L-8, 10-15 TON CAPACITY

A COMPLETE ASPHALT PLANT ON ONE CHASSIS . . . DRYER, MIXER, HEATING KETTLE. Low in cost, small enough to tow, BIG enough to produce HOT mix, (or any other bituminous mix) for driveways, parking lots, street maintenance, etc. Equipped with 50 HP LeRoi engine, air operated gates for one man control, divided compartment, reciprocating feeder for proportioning aggregate. Available as stationary plant with 30 HP electric motor.

Write for catalog and name of nearest dealer.



Stationary Plants L-12 and L-25, 15-30 ton capacity.

White MANUFACTURING COMPANY

ELKHART 15, INDIANA

Some Dealers' Territories Available—Write Today

Calif., has developed a wall rack to support a series of the company's Plan Hold screw clamps for project plans. Brackets pivoted within a wall plate hold clips which slide over the top of the Plan Hold and swing back and forth to permit reference to plans from either side. The construction provides filing for skirted plans. A rolling steel stand with built-in wall plate is also available.

IH S-180 dump body

The International Harvester Model S-180 with dump body and gross vehicle weight rating of 18,500 lb. is available in 130-, 142-, 154-, and 172-in. wheel base. The series is powered



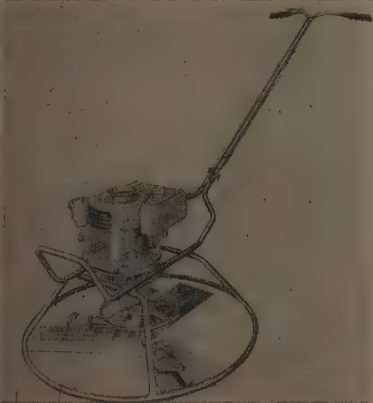
by Harvester's 137-hp. 282 engine. The 150-hp. BD-308 engine, LPG fuel system and power steering are optional. International Harvester Co., 180 North Michigan Ave., Chicago 1, Ill.

Direct drive chain saw

A 5-hp. 19-lb. direct drive chain saw for wood cutting has been announced by Homelite, 75 Riverdale Ave., Port Chester, N. Y. Called the Model EZ, the saw can be used for limbing or undercutting, as well as felling, bucking, notching, and boring. An all-angle diaphragm carburetor allows cutting in any position. The machine is available with 12-, 17-, 21-, 25-, and 30-in. guide bars and will fell trees up to 3 ft. in diameter.

Power troweling machine

A portable power troweling machine for smoothing and finishing poured concrete in commercial buildings and homes under construction



has been announced by the construction equipment division of Thor

BASE COURSE DENSIFICATION at its QUICKEST and BEST



6 COMPACTING UNITS IN WORKHEAD for maximum productivity in straight-away work. Left: Compacting sand fill in a bridge approach . . . another phase of its wide range utility to paving contractors.



Plus UNMATCHED ON-THE-JOB ADAPTABILITY!

For consolidating granular soil sub-bases and the base courses of sand, gravel, rock or slag in waterbound and penetration macadam construction, there is just nothing that compares with the Jackson Vibratory Multiple Compactor. It not only does the straight-away work in only half the time required by equipment of other types, but is so versatile, so easily adaptable on the job that it can be used to great advantage for widening projects of any width and getting into places other equipment can not touch. As may be noted in the illustrations, any number of compacting units may be used in the workhead (up to 6, which covers 13', 3") to exactly fit the job at hand. Units may be towed at the side or fitted with operating handles and used as individual, self-propelling compactors. Quickly interchangeable bases from 12" to 26" are also available for compacting in trenches, etc.

For compacting granular soil fills of all kinds, the Jackson Multiple Compactor is a terrific cost saver and progress expediter. It's the predominant medium of consolidation used on the outstanding paving jobs in the country today. See your Jackson distributor for complete details. We will gladly furnish his name, and literature, on request.

4 COMPACTING UNITS just fit this widening job—change required in only a few minutes.



3 COMPACTING UNITS in tandem and staggered, suits this job ideally—a quick and easy change.



1 COMPACTING UNIT fitted with operating handle and narrow base. Just right for the otherwise unreachable spots.



2 COMPACTING UNITS in twin hook-up—self-propelling. One man readily compacts up to 4000 sq. ft. per hr. in 10" layers.

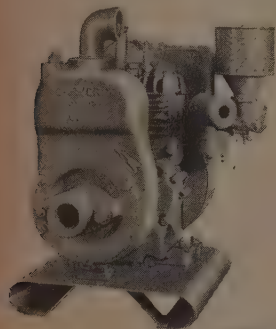
JACKSON VIBRATORS, INC.
LUDINGTON, MICHIGAN

NOW... Quick Shipments on CARVER Contractors Pumps out of San Francisco

Carver's complete line of outstanding Contractor's Self-Priming Pumps is carried in stock in San Francisco ready for immediate shipment.

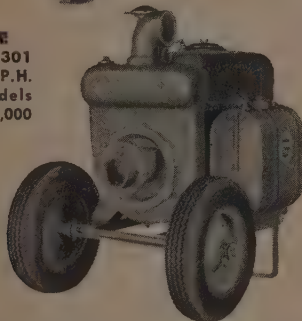
Carver also has excellent facilities in San Francisco for assembling contractors pumps to fit your requirements... **fast!**

Units range in sizes up to 250,000 G.P.H. Sensational modern design gives you enduring values in **Performance, Construction, Economy!**



**CARVER
MODEL K100**
1" Discharge.
2700 G.P.H.
This light-weight champ
has shown
amazing performance.

**CARVER
MODEL K301**
20,000 G.P.H.
Other models
up to 250,000
G.P.H.



DISTRIBUTORS — A few selected territories are still open—inquire today



CARVER PUMP COMPANY
1257 Folsom St.
San Francisco, Calif.

CARVER

the quality name in pumps

Power Tool Co., 175 N. State St., Aurora, Ill. The trowel, designated Thor T-29, is manned by a single workman and duplicates the motion of hand troweling by means of a gang of three trowels moving in a circle from a central shaft. The unit weighs less than 70 lb. and is powered by a 2-hp. engine. Outside diameter of the machine is 29 in. permitting easy portage through a standard 30-in. doorway.

10,000-watt electric plant

United States Motors Corp., Oshkosh, Wis., has introduced an air-cooled electric plant rated at 10,000 watts continuous output. The plant is especially suitable for large jobs where contractors use a number of electric tools and lights simultaneously and for emergency standby service. It uses the 4-cylinder, 4-cycle Wisconsin VF4 V-block 1,800-rpm. engine, weighs 730 lb., is 43 in. long and 29 in. high. Available with standard voltage, single and three phase generators.

Mack Unishift transmission

Unishift, a truck transmission with 10 forward speeds shifted by a single lever, is now in production by **Mack Trucks, Inc.,** 350 Fifth Ave., New York 1. The splitter type transmission is a redesign and development of the Mack Mono-shift series,

and requires only five manual shifts over the entire range. It will be offered in three sizes, each with direct drive in the main gearset either in fourth or fifth, to accommodate the entire range of highway trucks. The transmission combines a five-speed main gearset and a two-speed compound.

Variable weight tandem roller

Shovel Supply Co., P. O. Box 1369, Dallas 21, Tex., has announced a new Ferguson 8- to 12-ton variable weight tandem roller. The roller is



equipped with one-piece steel frame, six-cylinder gasoline or diesel engine and 200-gal. water tank. The two-speed transmission with Allison torque converter gives speed range from 0 to 5½ mph. Rolls are carbon steel plate with edges rounded to prevent marking. Compression roll is 60 in. in diameter, 54-in. wide and provides

(Advertisement)

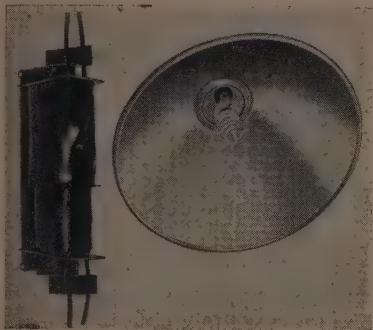


Steel sheet pile stubbornly set in hard rock in constructing the Buggs Island Dam across the Roanoke River in southern Virginia breaks loose under the blows of a McKiernan-Terry E4 Double-Acting Pile Extractor. McKiernan-Terry Corporation, 24-A Mercer St., Dover, New Jersey.

pressure of 287 lb. per in. of width ballasted with water. Further information available from manufacturer.

Gas-vapor signal light

A signal light mechanism designed to counter the problem of incandescent bulb replacement for traffic signals has been introduced by **Neo-Flasher Manufacturing Co.**, 3210 Valhalla Dr., Burbank, Calif. The



device, called the Neo-Converter, is comprised of a gas vapor tube which will not burn out, a reflector and a converter which may be fitted into existing traffic signals. The Neo-Converter has the same brilliance and same color as incandescent signals, and the complete converter can be installed in 10 or 15 min. Price per unit: \$14. Further information available from the manufacturer.

Hydraulic backhoe

Specifically designed for attachment to Fordson-Major tractors, a hydraulic backhoe, the Sherman Major, has been introduced by **Sherman Products, Inc.**, 3200 W. 14 Mile Road, Royal Oak, Mich. The



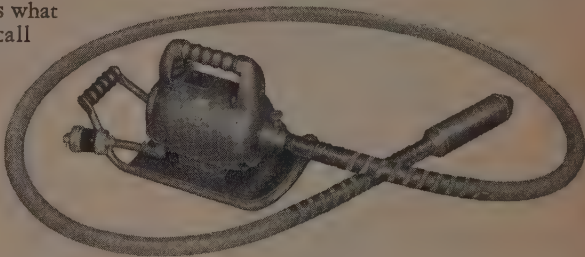
digger will reach as deep as 12½ ft. and with a 180-deg. arc of swing can clear a height of 8 ft. 8 in. for loading trucks. New bucket linkage provides a stroke up to 5,000 lb. effective pressure through about nine feet of bucket lip travel.

Short-stroke gasoline engine

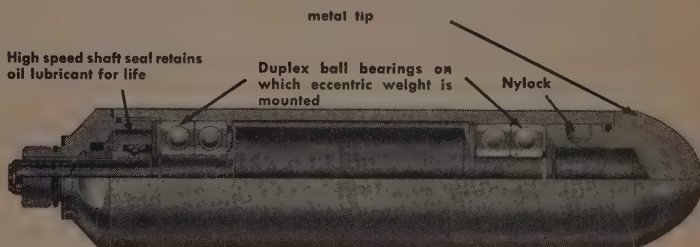
A short-stroke, air-cooled gasoline engine is now in production at **Kohler Company**, Kohler, Wis. Designated the K330, the engine delivers 12.5 hp. at 3,200 rpm. It is a single

In Concrete Vibrators, it's the WALLOP that counts!

"Wallop," which is what many contractors call amplitude, is what it takes to vibrate a stiff mix—quickly and thoroughly. Recent tests prove that the efficiency of vibration increases in proportion to the amplitude. Therefore, **Stow Manufacturing Co.**, Binghamton, N. Y., has developed a lightweight, rugged electric vibrator that packs a *terrific* wallop.



This wallop is achieved by the unique vibrator head, shown below, driven by a powerful 2 HP motor which delivers 9000 vibrations per minute to the mix.



Take a look at this vibrator head. It is 10 inches long, and available in diameters of 1⅝, 2 and 2½ inches, capable of 9000 VPM. Vibrations are achieved by use of an eccentric weight mounted in special high speed duplex ball bearings at each end. The outside of the head is case hardened, for extra long wear, and it has a replaceable tool steel tip. Stow estimates that these two improvements alone will double the life of the heads.

CONSTRUCTION MEN report that they like the light weight, the long life, the low replacement cost, and the terrific wallop of these heads. Weight of the 1⅝" head is about 5 lbs.; the 2" head about 7½ lbs.; the 2½" head about 9 lbs. The cost of this head is less than 1/3 the cost of expensive "motor-built-in" type heads.

For more information about the complete line of **STOW** concrete electric and gasoline vibrators, vibrating screeds and rotary trowels, contact your **STOW** distributor, or write for **STOW** catalog 560.



STOW MANUFACTURING CO.

56 Shear St., Binghamton, New York

When welded
structural designs

Have simpler
details . . . more
usable room

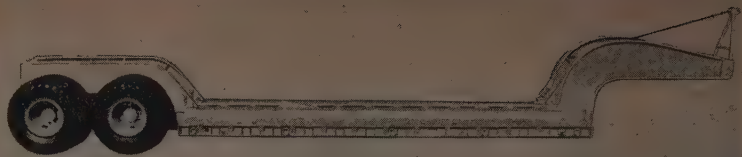
Yet require
less steel . . . fewer
hours to erect

WHY
shouldn't all
your designs
be welded

Ask
**THE
LINCOLN ELECTRIC
COMPANY**

Cleveland 17, Ohio

*The World's Largest Manufacturer of
Arc Welding Equipment*



Trailer has capacity of 100 tons

Talbert Trailers Inc., 7950 W. 47th St., Lyons, Ill., has announced a 100-ton capacity low-bed trailer. It provides over-the-front or over-the-rear loading by means of Talbert's patented removable gooseneck and removable rear axle assembly. Standard specifications call for a deck

length of 24 ft. but additional deck length is available on special order. The addition of a wedge permits road clearance to be raised or lowered depending upon operating conditions. Overall length is 45 ft. 7¾ in., and overall width is 11 ft. Additional specifications are included in Bulletin 106-B.

cylinder, 4-cycle engine, with a fly-weight governor, oil-bath air cleaner, silencer-type muffler and weighs 175 lb. The short stroke cuts engine friction by 30% and increases piston ring life by 50%. The K330 will produce 8.2 hp. at 1,800 rpm. and 12.5 hp. at 3,200 rpm.

Tool for cleaning spark plug holes

Spark plug hole thread cleaning tools designed to clean carbon from all standard spark plug holes have been announced by Owatonna Tool Co., 389 N. Cedar St., Owatonna,

Minn. Two tools are available, each with a different size cleaner at either end. They will fit 10-mm. 18-mm. and ¾-18 thread size holes and will clean the thread area and cut away deposits from the bottom of the holes. Details available from manufacturer.

Bin-box dumping attachment

Yale & Towne Manufacturing Co., 11000 Roosevelt Blvd., Philadelphia 15, Pa., has developed a special attachment for transporting and dumping open bottom bins or boxes. The rotating attachment is a clamp

"The Head Pulley with Motor Inside." Safe, compact, simple—no chains, no belts, no sprockets, no exposed motors.

Built by Yuba for
sale in Arizona,
California, Idaho,
Montana, Nevada,
New Mexico,
Oregon, Texas,
Utah, Washington.

Built and sold
in other states by
Iowa Mfg. Co.,
Cedar Rapids, Iowa.



IF YOU USE BELT CONVEYORS OR BUCKET ELEVATORS **SAVE SPACE, CUT DOWNTIME** with **YUBA-SCHROCK HEAD PULLEY**

All moving parts fit compactly inside pulley shell, protected against weather and dirt, thus practically eliminating pulley troubles. This pulley with motor inside requires no more

room than an idler pulley; can be installed quickly. Diameters 10½" to 56". ½ to 125 hp. for voltages to 2300. Job proved. Write TODAY for folder and name of nearest distributor.



YUBA MANUFACTURING CO.

82

Pulley and Sprocket Dept.

PHONE 628

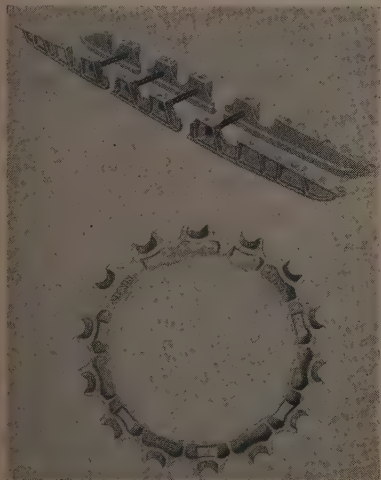
BENICIA, CALIFORNIA

with a single arm which through hydraulic pressure holds the bin or box securely against the forks of the truck on which the attachment is mounted. Any type of container from 15½ to 35 in. in height and equipped with runners can be lifted on the forks of the truck, gripped with the upper arm, and dumped by the rotating motion of the attachment. On a 4,000-lb. capacity lift truck, the mechanism can handle a load of 3,000 lb.

Three new tractor parts

Three tractor parts have been introduced by **Hensley Equipment Co., Inc.**, 800 Peralta Ave., San Leandro, Calif. They are rock guards, weld-on sprocket rims and grouser pads. Hensley rock guards are jig-fitted for easy installation and come in three sections to permit removal of any section instead of the entire guard for servicing rollers.

The sprocket rims allow indefinite use of the same hubs. They are fabri-



cated of moly-manganese-chrome steel which welds easily when pre-heated with any low-hydrogen welding rod.

Grouser pads are designed to fit D-7, D-8, HD-19, HD-20, and TD-24 tractors and are precision jig-drilled to eliminate drift pin fitting. Counter-sunk bolt holes permit use of the original bolts when rails are replaced.

Three new Airco arcwelders

Three new arcwelding machines are now available from **Air Reduction Pacific Co.**, 220 Bush St., San Francisco, Calif. The DC Bumblebee rectifier features a single range of current adjustment, low design to permit stacking for parallel operations, and forced draft ventilation to assure low operating temperature. Available in 200-, 300-, and 400-amp. models.

Airco's AC/DC Bumblebee rectifier is designed specifically for metallic arcwelding and will supply either current by the flick of a 3-position switch.

Available in 200 and 300 amp. models, the AC/DC Heliwelder is

designed for use with various inert-gas arcwelding processes in addition to metallic arcwelding. Machine consists of a single-phase transformer, selenium rectifier, and stabilizer reactor.

Aluminum safety hat

An aluminum safety hat which resists impact in excess of 40 ft.-lb. and will not crack or break when dropped is available from **Davis Emergency Equipment Co.**, 47 Halleck St., Newark, N. J. The company claims lightness and insulating properties of the metal make the hat comfortable in cool or hot weather. Six-point snap-in shock absorber suspension distributes and minimizes

shock. Equipped with an adjustable cradle, one hat fits all head sizes and shapes. For full information, request manufacturer's Bulletin No. 1412.

Lorain square tubular crane booms

New standard equipment on nine models of Lorain crawlers and rubber-tire cranes is an all-welded crane boom featuring main chords of square tubes. The manufacturer, **Thew Shovel Co.**, Lorain, Ohio, claims the new design weighs 20 to 30% less than booms with chords of conventional tubes or angle steel and results in a 15% increase in column strength per lin. ft. over round tubes and a 90% increase over angular cross section. Lacing in the



Contractor is compacting the second course of asphaltic concrete over Armco Bridge Plank installed on this old bridge.

ARMCO BRIDGE PLANK

Simplifies Flooring Job for New or Old Bridges

Armco Bridge Plank is corrugated, all-steel flooring that is quickly installed on new bridges or old structures. It has the same quality that has maintained Armco's reputation as a manufacturer of dependable construction products for 50 years.

Many old bridges are still structurally sound but have floors badly in need of repair. Armco Bridge Plank is the quick, economical solution to this problem. In only a few days you can tear out the old floor, weld or bolt the Armco Bridge Plank to existing stringers, and place asphaltic concrete to make a smooth, silent floor.

Armco Bridge Plank is supplied in lengths to fit any bridge. And you can get prompt shipment from a nearby Armco Plant. Write us for more data.



Easily handled by small crew



Quickly welded to stringers

ARMCO DRAINAGE & METAL PRODUCTS, INC.

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ARMCO BRIDGE PLANK





THE LATEST VINYL PLASTIC WATERSTOP

for "wall-floor" and "between-pour" horizontal concrete construction joints

Water just can't get through joints protected by FLEXTRIP, the all-new, strip-type waterstop. Unique concave shape plus ribbed edges give FLEXTRIP a never ending grip in the concrete . . . is flexible enough to withstand extreme joint-separation (more than 3 inches) yet rigid enough to stand up to the battering effect of pouring concrete. Here's lasting joint-protection unmatched by any other waterstop. What's more, FLEXTRIP will never rust, rot, check or crack and is unaffected by acid, alkalis, petroleum products, chemicals or the most adverse atmospheric conditions . . . lasts as long as the concrete. Write for additional information on FLEXTRIP and other vinyl waterstops.

Distributed for
WATER SEALS, INC.

Chicago 6, Illinois by:
THOMAS CONCRETE ACCESSORY CO.

1219 S. Herbert St.
Los Angeles 23, Calif.

HYDRO PRODUCTS CO.
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CHAS. R. WATTS CO.
4121 Sixth Ave., N.W.
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PLASTI-SPRAY CO.
353 S. State
Orem, Utah

BAKER-THOMAS-WOOLSEY
300 S. Twelfth St.
Phoenix, Ariz.

W. J. BERK & CO.
2344 N.W. 21st St.
Portland 9, Ore.

boom is continuous, of round tubular construction, with all surfaces inside the outer faces of the square chords as protection against damage.

Safety swing stage

A steel safety swing stage for painters and tuck pointers has been announced by **Waco Manufacturing Co.**, 3555 Woodale Ave., Minneapolis 26, Minn. The stage, capable of carrying loads up to 650 lb. per machine, has a self-energizing brake to insure against loads running down, a pawl



on the gear drum which holds working position and a crank which locks against the winch frame. A spur gear drive raises the machine. Drum holds 100 ft. of $\frac{3}{4}$ -in. aeronautical cable. Further information available from manufacturer.

Tamper for narrow ditches

Now on the market is the **Blue Brute WTN-18 Triplex Ditch Tamper** which permits tamping of ditches as narrow as 10 in. The medium weight class machine is mounted on a triplex frame. Adjustable handle-bars on an extension pipe allow operators to tamp ditches to a 48-in. depth while working at ground level. For further information, write to **Worthington Corp.**, Construction Equipment Division, Plainfield, N. J.

Lorain two-lever air controls

Air controls which use only two levers are now available on eight models of Lorain power shovels and cranes manufactured by **Thew Shovel Co.**, Lorain, Ohio. The eight models range from 20- to 30-ton capacity on crawler and rubber tire mountings. The two levers control all the following operations: boom derricking, boom brake, swing, crowd, retract, hoist, clam holding, drag-in, power load lowering, and third drum. Further information available from manufacturer.

It takes POWER to move a mountain



and EDWARDS WIRE ROPE is built to handle that power!

Heavy construction equipment is getting bigger, faster and heavier. You need the "built-in" extra performance of Edwards Wire Rope to keep shovels, scrapers and dozers operating profitably.

Call or write today for the address of your nearest Edwards Distributor.



EDWARDS WIRE ROPE

E. H. EDWARDS COMPANY

General Office: SOUTH SAN FRANCISCO, CALIFORNIA
Seattle • Portland • Los Angeles • Houston

News of DISTRIBUTORS

New Boise branch

Arnold Machinery Co., Salt Lake City, announces the establishment of branch offices in Boise, Ida., at 5024 Gage St. The new building provides 4,000 sq. ft. of space for parts department and offices, as well as a large



Robert
Nichols

equipment yard. Robert Nichols heads the new branch, which will serve the Idaho counties of Owyhee, Canyon, Ada, Payette, Boise, Elmore, Gem, Washington, Adams, Valley; and the Oregon counties of Malheur and Baker.

Bay Cities opens at San Jose

Harold Close is manager of the new branch office in San Jose, Calif., recently established by Bay Cities Equipment, Inc., Oakland. Located at 1178 W. San Carlos St., the new facility has complete sales, service, and parts for all the leading lines as distributed from the headquarters of the company at Oakland, including both industrial and farm equipment of the International Harvester Co.

Sales addition; new lines

Crayden Jones recently joined Western Machinery Co., Phoenix, Ariz., as salesman. He has a background of eight years experience with Arizona Sand & Rock Co. Western Machinery has added three new lines to the many accounts now handled: La Crosse Trailer Corp., Wyllie Manufacturing Co., Inc., and Champ Manufacturing Co., fork lift truck manufacturer.

Redding firm sold in part

Sullivan & Crowe Equipment Co., Redding, Calif., has sold to Howard-Cooper Corp. of California that part of its business covering sales and service of International industrial power products, Hough Payloaders, and Galion graders and rollers. Sullivan & Crowe will continue to operate in the same location at 2637 Angelo St., with all its efforts and facilities devoted to the International motor truck and Insley shovel lines. How-

ard-Cooper is operating, temporarily, at State and Favretto Sts., until larger quarters are available.

Idaho firm adds Moto-Bug

Southern Idaho Equipment Co. of Idaho Falls, Ida., has been ap-

pointed industrial and commercial sales distributor by Kwik-Mix Company for the Moto-Bug, a power wheelbarrow designed for low cost material handling work. Located in Port Washington, Wis., Kwik-Mix is a subsidiary of the Koehring Company.

Construction Equipment expands

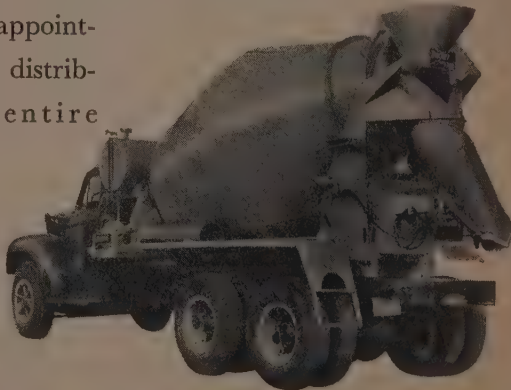
Construction Equipment Co., Spokane, Wash., recently was named distributor by American Hoist & Derrick Co. for the "Econmobile." Headed by Harry H. Ferris, president, and Robert G. Ferris, vice president, the Spokane distributor is in the process of expanding facilities,

Concrete Transport Mixer Co.

is now appointing

**QUALIFIED DISTRIBUTORS in the Western States
for *ROCKET* revolving drum truck mixers!**

Ever-increasing national acceptance and vastly expanded sales of the rugged, dependable **ROCKET** truck mixers has made possible the appointment of *qualified* distributors for the entire **ROCKET** line in the **Western States** area.



as a *ROCKET* distributor, you'll be backed by:

- ① Concentrated National advertising program
- ② Intensive regional direct mail advertising program
- ③ Representation at major concrete conventions
- ④ Fast delivery, assistance in arranging financing
- ⑤ Substantial net profit margin for **you**
- ⑥ A mixer that is considered by **owners** and **operators** as the **best mixer that money can buy.**

Write immediately for complete information

Concrete Transport Mixer Co.

4985 Fyler Avenue

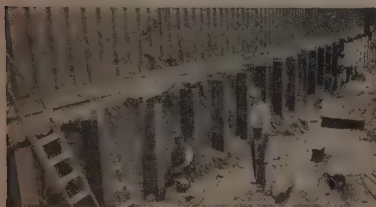
St. Louis 9, Missouri

BIG HEAD START ON DEADLINE WITH FOSTER RENTAL STEEL-SHEET PILING



Checking Foundations with 120-Ton Load on H-Bearing Frames Anchored to Foster Piling Hotel - Department Store - Parking Facility THE DENVER COLORADO PROJECT

Contractors Webb & Knapp got a *Head Start* on this gigantic project by calling Foster for rental steel-sheet Piling, to complete four sumps (that were holding up the major excavation of this 400-foot square foundation). Foster delivered *on time*, the exact sections and exact lengths of steel-sheet Piling needed to get a head start on work schedules.



Foster 12"x 53 lb. H-Bearing Piles driven on average depth of 50 feet, around perimeter of the gigantic 400 foot excavation.

**Whatever You Need in Piling
Call L. B. FOSTER for Service**

- STEEL-SHEET PILING • H-BEARING PILES
- LIGHTWEIGHT PILING • PIPE PILES

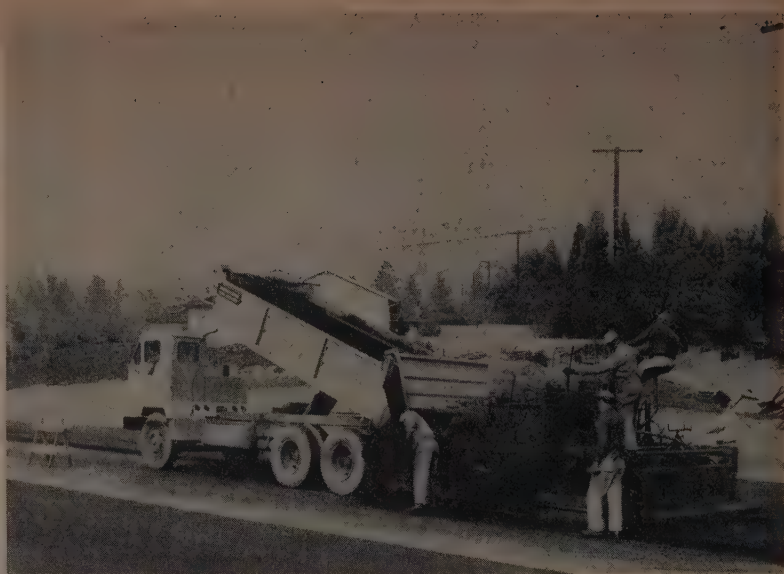


Write for Catalogs W-5

RAILS • TRACK EQUIPMENT • PIPE • FABRICATION

L.B. FOSTER co.

3460 Wilshire Blvd., Los Angeles 5, Calif.



THIS MACHINE, a Pioneer "Vibromatic," has just finished demonstrating what it will do, under the joint sponsorship of Cook Bros. Equipment Co., Los Angeles, and Schroeder & Co., asphalt paving contractor of Sun Valley, Calif. Contractor and equipment distributor cooperated in the paver's first Western appearance by assigning to the new machine part of the bituminous paving on 4.6 mi. of the Foothill Freeway, near La Crescenta, Calif. Production models of the new paver used here are scheduled to appear in March.

and will have a complete new rental department in charge of Jim McCollim, assisted by George Garrison. Jon Funk, Elmer "Van" Ausdler and France Borden are salesmen.

Arizona dealership

Road Machinery Co., of Phoenix, has been appointed by Buffalo-Springfield Roller Co. as its equipment dealer for the entire state of Arizona, according to announcement by Harold R. Bone, president of the distributing company.

Hall-Perry elects and appoints

Hall-Perry Machinery Co. of Butte, Mont., announces the election of new officers. R. M. Bowen, formerly sales manager, is now president, with W. R. Jones, vice president, and N. C. Brouillette, secretary-

treasurer. W. R. Lancaster is the new sales manager. Parts manager is W. D. Rusk.

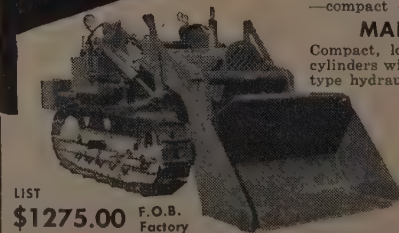
AED committee chairmen

F. L. Jerome, Columbia Equipment Co., Portland, Ore., has been named chairman of the General Advertising Committee of Associated Equipment Distributors, national trade association of the construction equipment industry. Likewise, I. R. Kraemer, Buran Equipment Co., Santa Clara, Calif., has been named chairman of the Contractor Relations Committee of the same organization.

Cramer adds new mixer line

Cramer Machinery Co. of Portland, Ore., recently took on the Challenge truck mixer line manufactured by Cook Bros. Equipment Co.

GET MORE WORK
out of your
JOHN DEERE
40C and 420C 5-Roller
TRACTORS



LIST
\$1275.00 F.O.B.
Factory

Henderson's NEW Hydraulic KRAWLOADER

SAVES TIME ON THE JOB!

The Krawloader loader eliminates many of the costly headaches of big equipment in backfilling around culverts and buildings, clean-ups, digging trenches, grading, etc. .66 yard, struck capacity bucket. Large enough for tough jobs—compact enough for small jobs. Economical, efficient.

MANY PRACTICAL ADVANTAGES

Compact, low clearance unit. Four double-action V-pack cylinders with chromed rods. Powerful front mounted vane type hydraulic pump, auxiliary relief valve, oil filter and control valves. Bucket positioning indicator. Rugged box-section main frame. Ballast box beams, with attached fenders, removable to allow servicing of tractor final drive.

HENDERSON MFG. CO. INC.

DEPT. W

CEDAR RAPIDS, IOWA

MANUFACTURERS

New West Coast manager

New zone manager of Thor electric tool and Thor SpeedTool sales has been appointed by Thor Power Tool Co., Aurora, Ill., according to J. A. Hill, vice president and sales manager. C. B. Baron, former electric tool service engineer in the New



C. B. Baron

York, Chicago, and Los Angeles branches, and a former electric tool division manager, is the new West Coast manager for the company's Los Angeles, San Francisco, and Seattle territories, with headquarters in Los Angeles.

Schramm adds a man

Karl S. Burlie, district manager for Schramm, Inc., at Los Angeles, announces the addition of a new serviceman, W. H. Cox.

R. C. Platow heads new department

A national department to coordinate new-product development and sales has been established by United States Plywood Corp., New York, N. Y. Known as Engineering Sales, the new department is headed by Raymond C. Platow, the company's chief materials engineer since 1952.

Wellman chooses new president

Robert C. McDowell has been elected president of The Wellman Engineering Co., succeeding Dr. J. C.



Robert C. McDowell

Hodge who resigned from both the Wellman presidency and board. McDowell is also president of McDowell Company, Inc.

New asphalt plant

A \$250,000 asphalt plant is being opened at Little Rock, Calif., by Industrial Asphalt of Los Angeles, Inc. The new plant is a full-size 6,000-lb.

GOODALL QUALITY MEANS Belting at its Best!

TO ASSURE *Important Savings* IN OPERATING AND REPLACEMENT COSTS



CONVEYOR BELTING

"SUPER TRIPLE-S"—Goodall's finest Conveyor Belting . . . for super-severe service. Built to handle crushed stone up to 10" and other highly abrasive bulk materials, wet or dry, particularly on long center hauls where tension is high and extreme flexibility is required. Weather-resistant cover. Tensile strength, friction and other details determined by specific requirements.

"TRIPLE-S"—Designed for severe service but where weight of bulk material and length of carry do not demand "Super-S" quality. Recommended for crushed stone up to 6" or 8", abrasive ores, etc.

"LACROSSE"—A perfectly balanced, quality belt for all but the most severe conditions. Used for handling sand, gravel, shells, ashes, etc.



MUCKER BELTS

"Wear King" Brand. Developed especially for use on Conway Mucking Shovels in tunnel excavating, and employed on most of the largest modern tunnel jobs.

GRADER BELTS

"76" Brand. For many years, the Contractor's best assurance of long, trouble-free service on heavy-duty Elevator Road Graders.

"If it's GOODALL, it MUST be Good!"

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

batch Standard Steel Corp. RB model capable of producing 250 tons per hr. This installation is the seventh hot plant purchased by Industrial in Southern California.

Euclid names regional managers

Euclid Division of General Motors Corp., Cleveland, Ohio, announces

CYCLONE

PORTABLE SANDBLASTER

Blast Cleans any surface with any abrasive



We manufacture a complete line of blast cleaning equipment ranging from small hand tools to Blasting Cabinets, Rooms and dust collectors.

Capable of doing any blast cleaning job with any abrasive. Our latest Model TL-200 (illustrated) is the convertible shop sand blaster and highway Traffic-Line Remover.

This profit-making line now available to Distributors in both the Domestic and Export fields. Write for particulars to:



SAFETEE PRODUCTS COMPANY

173 14th Street

San Francisco 2, Calif.

Cool Water Always
with
IGLOO
WATER COOLERS

Working men and construction crews with thirst problems rely on IGLOO water coolers because they know its superior features. They'll tell you that its all-steel constructed and corrugated to last longer, well supported at the bottom, has convenient rolled steel handles and comes in sizes from 2 to 15 gallons.

Let IGLOO strengthen your employee relations, too. Call your supply house.

Bettis
CORPORATION
P. O. DRAWER 9365 • HOUSTON 11, TEXAS

the appointment of M. H. Johnson as Western regional manager, with offices in Oakland, Calif. This region includes seven Western states, Alaska, and western Canada. Wyoming, Colorado, Arizona, and New Mexico are included in the Central region, for which E. C. Dellen has been named regional manager, with offices in Kansas City, Mo.

S. W. regional manager

Appointment of W. M. Steed as regional manager, Southwest region, with offices in Los Angeles, has been announced by L. E. Williams,



W. M. Steed

manager-distributor, Cummins Engine Co., Inc., Columbus, Ind. Steed comes from Chicago where he was a regional representative. In Los Angeles his headquarters are at 1101 Equitable Life Bldg., 411 W. Fifth St.

West Coast sales depot

The appointment of the Fabricating Division of Kaiser Steel Co., Montebello, Calif., as West Coast sales and service depot for Yale Cable King electric hoists is announced by Paul R. Minich, Jr., general sales manager of The Yale & Towne Manufacturing Co.'s materials handling division in Philadelphia.

New division formed

A new industrial division has been established by Massey-Harris-Ferguson, Inc., Racine, Wis., to market a full line of light and medium duty wheel tractors and allied equipment. B. R. Bermann, formerly general service manager of the Ferguson division, has been named sales manager of the new M-H-F industrial division.

Seaman-Gunnison news

Two old names in the road construction and stabilization field recently organized the new firm of Seaman-Gunnison Corp., Baraboo, Wis. The new company, comprising Gunnison Manufacturing Co., Donald J. Seaman (formerly chief engineer of Seaman Motors, Inc.), and



Donald J. Seaman

A. M. Seaman (formerly secretary-treasurer of Seaman Motors, Inc.), will continue the manufacture of the long-established Gunnison asphalt distributors, street flushers, and high pressure pumping units. The line is, however, now augmented by the recently announced Duo-Pactor. According to Donald Seaman, who is in charge of engineering and new product development, the Duo-Pactor has been developed to speed compaction and provide higher densities and maintain grade and surface levels throughout compaction process.

W. K. E. appoints new manager

Warren L. Howes has been appointed manager of Western Knapp Engineering Co., division of Western Machinery Co., San Francisco, according to announcement by J. H.



Warren L. Howes

How, president. Howes has been with Western Machinery Co. since

PREFERRED BY CONTRACTORS

Less initial cost—Lower upkeep

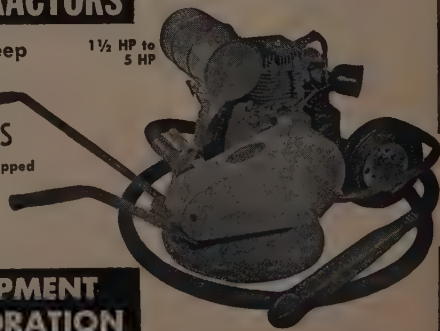
MARVEL CONCRETE VIBRATORS

GV-1, GV-2 & GV-3 Models Now Equipped with Automatic Centrifugal Clutch as Standard Equipment. Interchangeable Flexible Shafts.

Write for full information

MARVEL EQUIPMENT CORPORATION
215-217 EAGLE ST. • B'KLYN 22, N. Y.

1 1/2 HP to 5 HP



1948, progressively serving as chief engineer, district manager, Eastern division manager including the post of project executive.

R. L. Howerton promoted

Hyster Company, Portland, Ore., announces the promotion of Raymond L. Howerton to the position of assistant manager, sales promotion department. Howerton has been with this industrial truck and tractor equipment manufacturer in Portland for six years. Initially, and for



Raymond L. Howerton

four and a half years, he was manager of promotion for the tractor equipment division. In 1954 he was advanced to head the sales training division of the sales promotion department. In his new post he will be involved in all of the activities of the department.

Tom Kennedy buys brush plant

Tom B. Kennedy recently acquired complete ownership of the Van

Brush Manufacturing Co., Inc., Kansas City, Mo. He has been associated with this company for the past 10 yr. in partnership with Van Deventer and had been president in charge of sales promotion and advertising. He will continue in this capacity as executive president and director of the company.

Downey heads Hyster division

William P. "Bill" Downey, Hyster Company, Portland, Ore., has been promoted to the position of supervising engineer of the company's Straddle Truck Division, according to announcement by Al Zwald, chief engineer. H. Noel Dimick, former supervising engineer of this division, retired recently. Downey has been associated with Hyster Company for over 14 yr.

Herron named S. F. manager

B. J. Herron has been appointed manager of the San Francisco branch of Thor Power Tool Co. He succeeds E. C. O'Connell, who is to take on a new assignment. Herron was manager of the Los Angeles branch for 26 yr. and just recently returned from a 3-yr. export mission, taking him around the world.

Allis-Chalmers adds to staff

Keith L. Robertson has been appointed construction machinery salesman for the Los Angeles Tractor Branch of Allis-Chalmers Manu-

Keith L. Robertson



facturing Co. Robertson was formerly employed by Peter Kiewit Sons' Co. as an equipment maintenance supervisor.

Arthur H. Symons dies

Arthur H. Symons, 83, founder of Symons Clamp & Manufacturing Co., died recently at a hospital in Oak Park, Ill., after an illness of six months. He actively participated in the construction equipment firm until his illness.

Novo reopens breaker division

The recently reorganized Novo Pump & Engine Co. of Lansing, Mich., announces another step forward in the plant's expansion plans. Novo is again making available to construction companies and municipalities the Novo Concrete Breaker, which has been widely used in road building and repair on concrete roads, bridge flooring, in trimming cement and in cutting pavements for trenches, water and sewer lines, etc.

THIS ADVANCED DESIGN **POWER BUGGY** operates like an automobile



TELESCOPING VIBRATORY SCREED

No beam overhang. Quickly adjustable length (to nearest fraction of inch), fits any form width. Shoe-plate NEVER rides the forms.

- LESS OPERATOR FATIGUE
- REQUIRES NO OPERATOR TRAINING
- INSTANT FORWARD TO REVERSE
- TRAVELS 17 M.P.H. EMPTY
- DRIVE WHEELS UNDER LOAD
- TURNS IN ITS OWN LENGTH
- SAFETY LATCHED BRAKE PARKING
- MULTI-DISC DOUBLE OIL TYPE CLUTCH
- AUTOMOTIVE TYPE DIFFERENTIAL

UNEQUALED RAMP MANEUVERABILITY

BETTER EQUIPMENT FOR PLACING AND FINISHING CONCRETE

POWER BUGGIES • TELESCOPING VIBRATORY SCREEDS • ECONOMY VIBRATORY SCREEDS • ROLA PAVERS AND TRENCH BOXES • WOOD AND STEEL TILT-UP HARDWARE • BULL FLOATS • HOPPERS • BUCKETS • ELEPHANT TRUNKS AND CHUTES • TAMPERS • HAND CARTS



Pats.
Applied For

13½ CU. FT.
HEAPED LOAD
GROSS WT. EMPTY 850#

EASTERN REPRESENTATIVE

Earl H. Pence
403 Oak Lane
Baltimore, Maryland

NON-STALLING

Can stop, park on safety lock brake, then pick up its load and resume climb.

1450# on 35% grade
2250# on 25% grade

ASK FOR BULLETINS



CM-17

Trade Mark

Distributed By

W. J. BURKE & COMPANY

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UNIT PRICES

Selected abstracts for Western projects

BRIDGE—Construction of Paria Creek Bridge and approaches in Utah

Utah—State—Garfield County. Morrison-Knudsen Co., Inc., submitted a low bid of \$219,549 for construction of 2.5 mi. of a 2-in. road mixed bituminous surfaced road and a concrete bridge over a 20-ft. span.

(1) Morrison-Knudsen Co., Inc.	\$219,549
(2) Wheelwright Construction Co.	225,434
W. W. Clyde & Co.	232,769
L. A. Young Construction Co.	233,437
James Reed	236,120

	(1)	(2)
49,400 gal. Bituminous material, Type MC-3...	\$.17	\$.16
11,600 gal. Bit. mat., Type MC-1 or MC-2...	.17	.16
7,400 gal. Bituminous material, Type RC-4...	.17	.17
74 gal. Bituminous additive...	1.96	2.50
370 ton Cover material, Type "A"...	4.19	3.25
12,600 ton Gravel surface, Type "B"...	.75	.70
10,500 ton Gravel base course...	.70	.68
2,517 mi. Scarifying and mixing...	1,094.80	700.00
75,000 cu. yd. Unclassified roadway excavation...	.26	.28
10,000 cu. yd. Imported borrow...	.23	.25
170,000 sta. yd. Class "A" overhaul...	.013	.015
3,200 yd. mi. Class "B" overhaul...	.19	.15
1,140 1,000 gal. Watering...	2.36	1.50
420 hr. Rolling, tamping roller...	10.16	10.00
70 hr. Rolling, pneuma. tire or pwer. roller...	7.62	6.50
250 lin. ft. 24 in. C.M. Pipe...	6.00	5.20
106 lin. ft. 30 in. C.M. Pipe...	7.35	6.30
192 lin. ft. 36 in. C.M. Pipe...	11.80	9.85
392 lin. ft. C.M. pipe arches 22 in. x 13 in.	4.10	3.80
94 lin. ft. C.M. pipe arches 29 in. x 18 in.	6.35	5.65
48 lin. ft. C.M. pipe arches 36 in. x 22 in.	8.00	6.85
48 lin. ft. C.M. pipe arches 43 in. x 27 in.	15.80	10.80
54 lin. ft. C.M. pipe arches 72 in. x 44 in.	31.60	23.50
60 lin. ft. 84 in. struc. plate pipe, 10 gage paved invert...	49.86	50.20
270 cu. yd. Concrete, Class "A"...	58.10	64.00
44,550 lb. Reinforcing steel...	.155	.14
650 cu. yd. Excavation for structures, unclass.	1.59	1.25
1,000 cu. yd. Small ditch excavation...	.44	1.00
65 hr. Mechanical tamping...	5.65	6.00
130 ea. Guide posts...	6.35	6.00
Lump Sum Clearing and grubbing...	254.00	600.00
32 ea. Right-of-way markers...	6.35	6.00
26,300 lin. ft. Right-of-way fence, Type "A"...	.20	.28
14 ea. 14 ft. gates...	39.20	35.00
1 ea. 16 ft. gate...	42.56	40.00
2 ea. F.P. markers...	23.75	27.50
Lump Sum Furnishing water equipment...	2,000.00	500.00
Lump Sum Furnishing Construction signs...	1,000.00	500.00
(1) Concrete bridge—210.14 ft. 0. to 0., station 26+00		
540 cu. yd. Excavation for structures, unclass.	1.59	5.00
474 cu. yd. Concrete, Class "A"...	59.85	64.00
69,400 lb. Reinforcing steel...	.155	.14
207,000 lb. Structural steel...	.185	.182
407 lin. ft. Steel handrail...	11.00	12.00
2,450 lin. ft. Piles (other than timber)...	8.35	10.40
1 ea. Furnishing pile driving equipment...	3,360.00	3,500.00
70 lin. ft. Test pile (other than timber)...	11.20	11.00

HIGHWAY—Grading and draining roadway in Arizona

Arizona—Yavapai County—State. Johnnie Iben Construction Co. submitted a low bid of \$175,478 for grading and draining 6 mi. on Wickenburg-Kingman highway near Congress.

(1) Johnnie Iben Construction Co.	\$175,478
(2) Copper State Construction Co.	177,885
Flickinger Bros. Construction Co.	181,035
Dale F. Payne, Contractor	182,698
Phoenix-Tempe Stone Co.	182,842

	(1)	(2)
12,725 cu. yd. Roadway excavation...	\$.21	\$.28
15,300 cu. yd. Drainage excavation...	.22	.28
15,830 lin. ft. Grader ditches...	.03	.08
2,980 cu. yd. Structural excavation...	1.30	1.50
121,050 cu. yd. Borrow (CIP)...	.305	.28
1 L. Sum Provide water supply...	1,000.00	1,000.00
6,050 M. gal. Apply water...	2.30	3.00
1,100 hr. Rolling...	7.00	8.00
1,359 cu. yd. Class "A" concrete (including cement)...	44.00	44.00
154,710 lb. Reinforcing steel (bars) (CIP)...	.135	.12
408 lin. ft. 24 in. C.M.P. (CIP except excavation)...	5.80	6.00
354 lin. ft. 30 in. C.M.P. (CIP except excavation)...	6.90	7.25
394 lin. ft. 36 in. C.M.P. (CIP except excavation)...	10.95	11.00
64 lin. ft. 72x44 in. arch type C.M.P. (CIP ex. exca)	25.50	25.00
2 ea. Cattle guard (3-unit) (std. C-14) (CIP except excavation and concrete)...	950.00	900.00
40 ea. Right-of-way markers (std. C-1) (type B or C) (CIP)...	9.00	8.00
59,600 lin. ft. Line fence (std. C-16) (CIP)...	.195	.18
6 ea. Std. fen. gates (std. C-16) (type #1) (CIP)...	46.00	50.00

HIGHWAY—Construction of Carquinez approaches in California

California—Contra Costa County—State. Ferry Bros., John M. Ferry, Peter L. Ferry & Son, and R. S. L. Ferry & Son, and L. A. & R. S. Crow submitted a low bid of \$7,098,690 for about 2.9 miles of highway to be graded and paved with portland cement concrete on cement treated subgrade and three steel girder and two reinforced concrete bridges to be constructed.

(1) Ferry Bros., John M. Ferry, Peter L. Ferry & Son and R. S. L. Ferry & Son and L. A. & R. S. Crow	\$7,098,690
(2) McCammon-Wunderlich Co. and Wunderlich Contracting Co. and D & H Construction Co., John Delphia, Fred J. Early Jr., Co., Inc., and Williams & Burrows, Inc.	7,583,189
Fredrickson & Watson Const. Co. and Ransome Co.	7,891,962
Morrison-Knudsen Co., Inc., Macco Corp., and H. Earl Parker, Inc.	7,933,000
	7,988,531

	(1)	(2)
100 ea. Detour barricades...	\$ 28.00	\$ 30.00
Clearing & grubbing...	177,000.00	96,000.00
Dev. wat. sup. & furn. wat. eq.	180,000.00	148,000.00
340,000 M. gal. Applying water...	.20	.10
95,000 sq. yd. Compacting original ground...	.04	.05
11,200,000 cu. yd. Roadway excavation...	.256	.33
29,000 cu. yd. Structure excavation...	2.50	.85
22,000 cu. yd. Structure backfill...	2.75	2.00
34,000 cu. yd. Ditch & channel excavation...	.81	.65
47,500 cu. yd. Trench excavation...	.65	.40
455,000,000 sta. yd. Overhaul...	.002	.0022
90,000 ton Processing selected material...	.40	.75
31,100 ton Imp. perv. subbase material...	2.65	2.75
124,000 sq. yd. Mix. spread. & compact. cem. treated subgrade...	.23	.20
31,500 sq. yd. Mix., spread. & comp. C.T.B., 8 in. thick...	.35	.20
6,400 sq. yd. Mix., spread. & comp. C.T.B., 6 in. thick...	.30	.18
27,700 sq. yd. Mix., spread. & comp. C.T.B., 5 in. thick...	.25	.16
8,700 bbl. Portland cement...	4.75	4.80
122 ton Asphaltic emulsion (cur. sl., pt. bdr. & sl. ct.)...	35.00	26.00
260 ton Liquid asphalt, MC-2 (cur. sl. & pen. tr.)...	41.40	28.00
750 ton Paving asphalt (P.M.S.)...	6.70	7.50
12,750 ton Min. aggr. (type "B" P.M.S.)...	6.70	7.50
1,240 ton Min. aggr. (open grad. P.M.S.)...	7.00	8.00
30,700 lin. ft. Placing plant-mix surf. dikes...	.25	.20
61 ton Screenings (med. seal coat)...	8.00	7.00
28,500 cu. yd. Class "B" concrete (pave.)...	17.50	15.50
37,000 ea. Pavement tie assemblies...	.55	.54
4,600 cu. yd. Class "A" concrete (struct.)...	52.50	56.00
Class "A" concrete (bridges) (5,350 cu. yd.)...	416,740.00	247,000.00
Concrete railing...	7.50	6.00
537 lin. ft. Rubber waterstops...	2.50	2.00
580,000 lb. Bar reinforcing steel...	.11	.11
Bar reinforcing steel (bridges) (976,000 lbs.)...	100,000.00	110,000.00
3,430 lin. ft. Cast-in-drilled-hole con. piling...	3.60	3.00
6,530 lin. ft. Furnishing concrete piling...	3.20	3.00
98 ea. Driving concrete piles...	135.00	128.00
58,100 lb. Structural steel (755,000 lbs.)...	110,000.00	117,500.00
Miscellaneous iron and steel...	.35	.45
Clean. & paint. structural steel...	13,000.00	12,500.00
3,050 cu. yd. Class "B" concrete (curbs, gutters & island surfacing)...	35.80	28.00
62 ea. Right-of-way monuments...	7.50	8.00
20 ea. Survey monuments...	13.50	18.00
430 cu. yd. Sacked concrete riprap...	33.00	28.00
420 lin. ft. Metal plate guard railing...	2.98	3.30
171 ea. Culvert markers, horiz. reflector units & guide posts...	5.50	6.00
28,000 lin. ft. 72 in. chain link fence...	2.09	1.85
11,300 lin. ft. Chain link fence overhang...	.28	.30
4,900 lin. ft. Salv. & reconstr. ch. link fence...	1.00	1.20
420 lin. ft. 12 in. reinforced concrete pipe...	3.10	3.00
7,180 lin. ft. 18 in. reinforced concrete pipe...	4.00	4.00
1,650 lin. ft. 24 in. reinforced concrete pipe...	5.90	5.25
66 lin. ft. 30 in. reinforced concrete pipe...	7.45	7.00
186 lin. ft. 48 in. reinforced concrete pipe...	14.50	14.00
824 lin. ft. 54 in. reinforced concrete pipe...	18.30	17.50
1,370 lin. ft. 8 in. C.M.P. (16 gage)...	2.30	2.00
930 lin. ft. 12 in. C.M.P. (16 gage)...	3.00	3.00
2,150 lin. ft. 18 in. C.M.P. (16 gage)...	4.30	4.00
186 lin. ft. 24 in. C.M.P. (14 gage)...	6.50	6.00
64 lin. ft. 30 in. C.M.P. (12 gage)...	9.90	9.00
282 lin. ft. 36 in. C.M.P. (10 gage)...	14.40	14.50
920 lin. ft. 42 in. C.M.P. (8 gage)...	19.70	20.00
1,350 lin. ft. 48 in. C.M.P. (8 gage)...	25.15	25.00
532 lin. ft. 54 in. C.M.P. (8 gage)...	29.20	29.00
356 lin. ft. 60 in. C.M.P. (8 gage)...	31.90	32.00
1,010 lin. ft. 84 in. field assem. pl. cul. (1 ga)...	73.60	70.00
800 lin. ft. 96 in. field assem. pl. cul. (1 ga)...	85.05	86.00
24,100 lin. ft. 8 in. perf. mt. pipe underdrains...	2.20	1.75
67,000 ton Filter material...	3.00	2.90
27 ea. Entr. tapers for 8 in. downdra.	34.00	40.00

1,640 lin. ft.	8 in. corr. mtl. pipe downdrains	2.30	2.25
51 ea.	Downdrain slip joints.....	25.00	25.00
62 ea.	Downdrain pipe anchors.....	20.00	19.00
24,000 lin. ft.	Drilling horizontal drains.....	1.50	1.50
20,000 lin. ft.	Install. horizontal drain pipe.....	2.0	.60
	Finishing roadway.....	3,400.00	5,000.00
60 lin. ft.	Raised traffic bars.....	2.60	2.00
	Sign frame and standard.....	1,500.00	1,000.00
	Hwy. light. sys. & sign illum.	24,000.00	27,500.00

HIGHWAY—Grading and draining roadway south of Kingman, Arizona

Arizona—Mohave County—State. Royden Construction Co. submitted a low bid of \$289,619 for grading and draining about 3½ mi. of roadway on the Wickenburg-Kingman highway.

(1) Royden Construction Co.....	\$289,619
(2) Copper State Construction Co.....	292,910
San Xavier Rock & Sand Co.....	296,977
W. J. Henson.....	298,138

	(1)	(2)
167,200 cu. yd. Roadway excavation.....	\$.34	\$.40
13,200 cu. yd. Drainage excavation.....	.35	.32
3,875 lin. ft. Grader ditches.....	.10	.10
450 lin. ft. Crown ditches.....	.25	.30
2,934 cu. yd. Structural excavation.....	2.75	2.00
100 cu. yd. mi. Overhaul.....	.40	.25
44,900 cu. yd. Borrow (CIP).....	.35	.40
1 L. Sum Provide water supply.....	750.00	750.00
8,500 M. gal. Apply water.....	1.60	2.00
1,700 hr. Rolling.....	8.00	9.00
1,814 cu. yd. Class "A" concrete (including cement).....	57.50	48.00
200,750 lb. Reinforcing steel (bars) (CIP).....	.14	.13
694 lin. ft. 24 in. C.M.P. (CIP except excavation).....	7.00	6.00
276 lin. ft. 30 in. C.M.P. (CIP except excavation).....	8.00	7.50
150 lin. ft. 36 in. C.M.P. (CIP except excavation).....	12.00	10.50
528 lin. ft. 42 in. C.M.P. (CIP except excavation).....	14.00	14.00
300 lin. ft. 48 in. C.M.P. (CIP except excavation).....	18.00	16.00
60 lin. ft. 60 in. C.M.P. (CIP except excavation).....	30.00	20.00
1 ea. Reconstruct cattle guard.....	500.00	300.00
100 lin. ft. Road guard (special for bridge railing).....	5.00	5.00
20 ea. Right-of-way markers (std. C-1, Type "B" or "C") (CIP).....	8.00	10.00
37,150 lin. ft. Line fence (std. C-16) (CIP).....	.23	.20
18 ea. Fence gates (14 ft., std. C-16, No. 1) (CIP).....	60.00	60.00
1,025 lin. ft. Bank protec. (std. C-23) (Type "B") (CIP).....	9.00	20.00

CANAL—Earthwork, lining and structures in Washington.

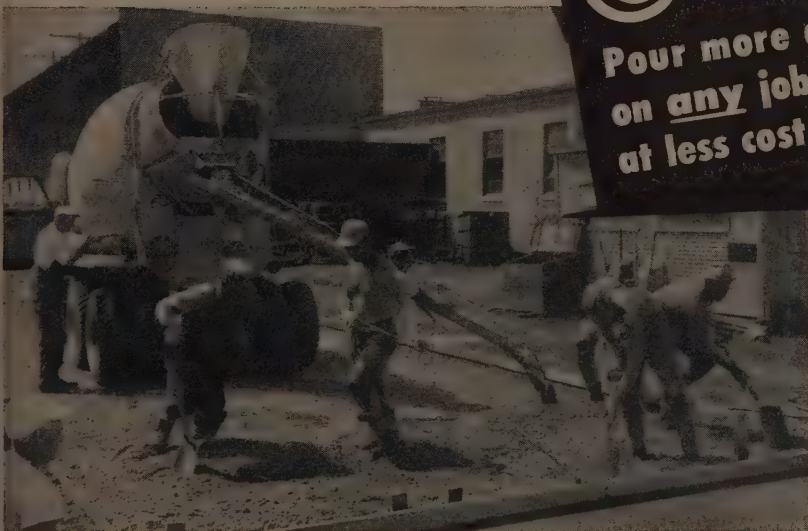
Washington—Columbia Basin Project—Bureau of Reclamation. A low bid of \$416,897 was submitted by Cherf Bros., Inc. and Sandkay Contractors, Inc. for earthwork, concrete lateral lining and structures, Part 3, Block 19.

(1) Cherf Bros., Inc. and Sandkay Contractors, Inc.....	\$416,897
(2) West Coast Construction Co., Inc.....	417,679
Donald M. Drake Co., Inc. (Portland, Ore.).....	419,528
Henry C. Warner and Tauf Charneski (Eugene, Ore.).....	448,133

	(1)	(2)
158,000 cu. yd. Excava. comm. for laterals and wasteways.....	\$.39	\$.45
13,700 cu. yd. Excava. rock, for laterals and wasteways.....	3.12	3.00
1,350 cu. yd. Excavation from borrow.....	.38	1.00
9,200 mi. cu. yd. Overhaul.....	.40	.50
8,000 cu. yd. Excavation, common, for structures.....	1.21	1.00
2,700 cu. yd. Excavation, rock, for structures.....	5.00	4.50
7,000 cu. yd. Compacting embankments.....	.34	.50
500 M gal. Water for embank. mat., first 500 M gal.....	4.00	5.00
1,500 M gal. Water for embank. mat., over 500 M gal.....	3.00	3.00
7,000 cu. yd. Backfill about structures.....	.40	.40
650 cu. yd. Compacting backfill about structures.....	3.70	4.00
950 cu. yd. Puddling backfill about structures.....	2.00	2.00
10,000 sq. yd. Preparing foundations for concrete lining.....	1.24	.90
27,000 sq. yd. Trimming foundations for concrete lining.....	.34	.50
70 cu. yd. Riprap.....	7.50	10.00
35 cu. yd. Sand and gravel bedding for riprap.....	5.00	10.00
300 cu. yd. Coarse gravel protection.....	5.50	6.50
41 acre Furnishing and sowing grass seed.....	35.00	35.00
650 cu. yd. Concrete in structures.....	90.00	75.00
2,100 cu. yd. Concrete in lateral lining.....	29.75	33.00
3,750 bbl. Furnishing and handling cement.....	6.50	6.25
60,000 lb. Furn. and placing reinforcement bars.....	.19	.16
26 lin. ft. Furn. & pl. 9-in. type "A" rubb. waterstop.....	5.00	5.00
18 m. b. m. Furn. & erect. untr. timber in structures.....	250.00	275.00
11 m. b. m. Furn. & erect. treated timber in structures.....	285.00	325.00
4 assemblies Furn. & instal. baffle assem. for weir bxs.....	62.00	50.00
528 lin. ft. Furn. & lay. 15-in. dia. std.-strength, reincon-culvert pipe with type "B" joints.....	5.00	4.50
695 lin. ft. Furn. & lay. 18-in. dia. std.-strength reincon-culvert pipe with type "B" joints.....	6.00	5.10
214 lin. ft. Furn. & lay. 21-in. dia. std.-strength, reincon-culvert pipe with type "B" joints.....	8.50	6.80
282 lin. ft. Furn. & lay. 24-in. dia. std.-strength, reincon-culvert pipe with type "B" joints.....	9.00	8.00
298 lin. ft. Furn. & lay. 30-in. dia. std.-strength, reincon-culvert pipe with type "B" joints.....	13.00	11.00
384 lin. ft. Furn. & lay. 36-in. dia. std.-strength, reincon-culvert pipe with type "B" joints.....	16.00	14.00
85 lin. ft. Furn. & lay. 60-in. dia. std.-strength, reincon-culvert pipe with type "B" joints.....	35.00	31.50
700 lin. ft. Furnishing & laying 42-in. dia. HC50 concrete pressure pipe with type "R" joints.....	26.40	26.00

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509 lin. ft.	Furnishing & laying 42-in. dia. HC125 concrete pressure pipe with type "R" joints.....	32.00	31.00
80 lin. ft.	Furnishing & erecting 6-in. dia. con-irrigation pipe for air vents.....	3.00	2.00
6 lin. ft.	Furnishing & erecting 42-in. dia. concrete pipe for access well.....	26.00	21.00
14 gates	Furnishing & installing 18-in. by 12-in. slide gates, including lifts.....	85.00	66.00
6 gates	Furnishing & installing 24-in. by 18-in. steel slide gates, including lifts.....	106.00	74.00
3 gates	Furnishing & installing 30-in. by 24-in. steel slide gates, including lifts.....	134.00	90.00
1 gate	Furnishing & installing 48-in. by 36-in. steel slide gate, including lift.....	212.00	193.00
21 gates	Furnishing & installing 15-in. dia. cast-iron slide gates, including lifts.....	63.00	67.00
4 gates	Furnishing & installing 28-in. dia. cast-iron slide gates, including lifts.....	90.00	85.00
3 gates	Furnishing & installing 24-in. dia. cast-iron slide gates, including lifts.....	124.00	127.00
1 gate	Furnishing & installing 36-in. dia. cast-iron slide gate, including lift.....	270.00	272.00
5 weirs	Furn. & install. 2-ft. adjustable weirs.....	98.00	65.00
3 weirs	Furn. & install. 3-ft. adjustable weirs.....	122.00	85.00
1 assembly	Furn. & install. pipe dr. assem. for siphon.....	295.00	350.00
5,300 lb.	Furn. & install. miscellaneous metal-work.....	.47	.65

BRIDGE—576-ft. steel and concrete bridge in Montana

Montana—Big Horn County—State. Walter Mackin & Son submitted a low bid of \$275,071 for construction of a 576-ft. steel and concrete bridge on the St. Xavier-Hardin highway.

(1) Walter Mackin & Son.....	\$275,071		
(2) N. A. Nelson Construction Co. (Sheridan, Wyo.).....	279,493		
Hansen & Parr Construction Co. (Spokane, Wash.).....	295,838		
Flechsing & Sons.....	298,454		
	(1)	(2)	
629,914 lb.	Structural steel.....	\$.22	\$.22
81,121 lb.	Reinforcing steel.....	.15	.14
620 cu. yd.	Class "A" concrete.....	60.00	55.00
344.5 cu. yd.	Class "AD" concrete.....	80.00	76.00
1,154.37 lin. ft.	Steel bridge rail.....	8.00	9.00
146,880 lb.	Furnish steel bearing piles.....	.12	.10
3,673 lin. ft.	Driving steel bearing piles.....	1.25	2.00
1,470 cu. yd.	Structure excavation.....	3.00	5.00
All L. Sum	Shoring & cribs.....	20,000.00	60,000.00
All L. Sum	Test Piles.....	2,500.00	6,000.00
20 ea.	Floor drains.....	60.00	50.00

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BACKFILL, uncompacted

A bridge goes back and forth

A steel bridge in Oregon doesn't know whether it belongs to the Corps of Engineers in the Portland District, or the Oregon State Highway Department. It has been handed back and forth too many times to have a well identified ownership. At the present time, the Portland District, Corps of Engineers, having used the bridge for a temporary access road at The Dalles project is going to return it to the State Highway Department which can use it in connection with highway rebuilding after the recent floods.

Going way back in its history, the bridge was originally acquired by the Highway Department as surplus from World War I and was used over Fall Creek on the Alsea Highway. When it became inadequate at that location, it was loaned to the Army Engineers to use as the overpass spanning the Union Pacific Railroad on a temporary access on The Dalles Project. Now it returns to the Highway Department for another round of service.

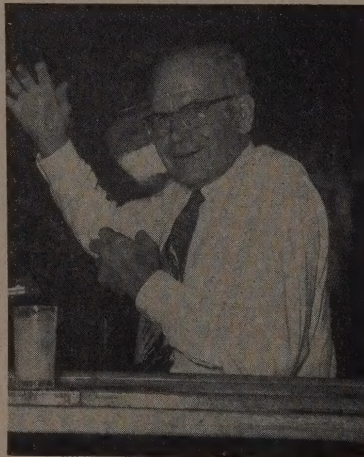
We have auditors, also

In the business of magazine publishing it is necessary to prove that our thousands of copies each month get into hands of people who are directly concerned with construction and civil engineering. Years ago publishers presented such information based on their own statement, and sometimes that was not too factual or accurate.

As a result, the advertisers who use the pages of business publications to

reach specific audiences demanded a more accurate and standardized counting and classifying of subscribers. Two auditing agencies have resulted—Audit Bureau of Circulations and Business Publications Audit—and **Western Construction** pays to have these authorized agencies tally and classify our readers.

True to all types of auditing, the information which is acceptable must be direct. So, every two or three years it is necessary for us to ask you to put a few check marks on a questionnaire and sign it to indicate you are in the construction or engineering field and you are receiving the publication.



REMEMBER this old timer—Ernie Stokes. He was a superintendent on Exchequer, Hoover and Grand Coulee dams and a constant reader of **WESTERN CONSTRUCTION** all those years. Today, you will find him operating **Ernie's Club Cafe** at 1470 W. Santa Barbara in Los Angeles.

Twenty-five years ago in *Western Construction*

"On June 17 the Golden Gate Bridge and Highway District will receive bids for the construction of the Golden Gate Bridge and principal elements of design are illustrated in this issue."

* * *

"T. E. Ferneau is resident engineer on the construction of the Richardson Bay Bridge. The contract is being carried out by Healy-Tibbitts Construction Co."

* * *

"At Hoover Dam the contractor has surveyed a 16-mi. construction railroad leading from the government line to the gravel deposits and into the canyon itself."

* * *

"On May 4 the California State Senate appropriated \$650,000 for preliminary engineering studies on a bridge connecting San Francisco with Oakland."

* * *

"Reno with a population of 18,000 is constructing a second sewage treatment plan designed for an ultimate population of 34,000."

* * *

"B. F. Kelly, a veteran employee of the New Mexico State Highway Department, is now construction superintendent for Armstrong and Armstrong."

* * *

"William R. Eccles has been appointed State Highway Engineer of New Mexico succeeding William D. Davidson, retired."

... The Editors

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5. Members cannot accept fees for advice or consultation.

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Headquarters:

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404 South Bixel Street
Los Angeles, California

No. D 128

NEXT TIME your shovel-runner hears a caustic comment from the sidelines, he should ask the kibitzer to "show his card." Possibly the fellow is qualified to make a few choice remarks because he is a member in good standing of NASS—National Association of Sidewalk Superintendents. He

could belong to the National Headquarters Chapter in Los Angeles, or he may have joined one of the branch chapters.

If your critic has no card, and if he is qualified for this exclusive organization, he should be requested to join up before he starts booing the cat skinner.

Editorials

The West deserves more from the ARBA

The West is not represented on three major task forces of the American Road Builders' Association. Important groups that have been studying the subjects of Planning and Design, Materials and Supplies, and Construction do not have any current representation from the eleven Western states. As a result, the thinking, experience, and needs of this region are not being felt in the councils of this organization that speaks for the entire highway industry. Possibly this again demonstrates that the highway problems of the West are so distinctive and different as to be considered by themselves.

It is difficult to believe that members from the West lack the interest to serve on these important committees, if invited. It is equally hard to believe that the ARBA would conclude nothing could be gained from hearing the voice of the West in its technical deliberations. There is always the argument that Western members of committees are so far removed that they cannot serve properly because of the travel-time involved. That is a horse-and-buggy concept. At least, written comment and opinion can be supplied from the West. And such might even prove to be most stimulating for Western highway engineers and contractors have never been too much concerned with precedent.

Regardless of the reason, and undoubtedly there was no intention to slight the highway profession and industry of the West, the councils and task forces of the ARBA cannot be considered as national without representation from this Western region.

No cost figures; no contractor

Contractors are businessmen. Even casual observation will show that the large, successful contractors are those who understand and apply business principles to their operations. Today, it is not enough to know how to move dirt, or operate equipment efficiently, or how to drive a crew. The key to whether a small contractor will succeed or fail is his knowledge and application of sound business methods.

At the very foundation of all business is the item of COSTS—simple, and yet so often slighted by the non-business contractor. How can any business know where it stands as to real profit without first knowing true costs.

It is not enough to know that there is more money in the bank at the end of the job than there was at the beginning. Contracting, today, is not that simple. Even a small spread of equipment represents a sizable investment. From the day the machines go into the field they are subject to charges for depreciation, repairs, maintenance, obsolescence, and a constantly declining output. Replacement must be considered from that first day.

Possibly a contractor can be so sharp on his maintenance and overhaul program that his machines actually do not decline in unit production. Resting on the financial crutch of depreciation he then moves forward to that goal of the "last payment." But on that very day, when he is caught without replacement reserves and little trade-in value, his competitor may be bidding a job with a new type or model of machine that will move dirt faster and cheaper.

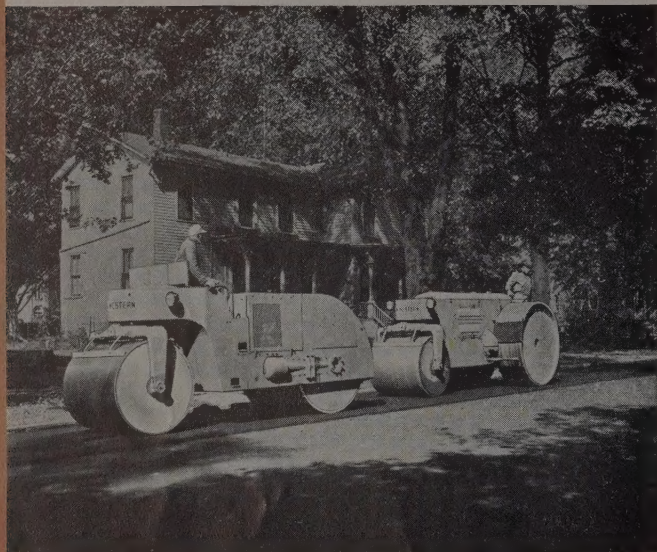
Bidding rests on a foundation of costs. Bidding can only be accurate when costs are true and complete. To bid one job below cost may not be too serious, because minor items of upkeep can be slighted, temporarily. Let that cable fray a little, lengthen the interval for changing oil filters, and delay the replacement of some of those worn parts until the job is over. As a result there are a few dollars left in the pocket at the end of the job—but, are there? What about the deferred this, and the put-off that? What are the true figures that ought to be used in bidding the next job?

The only answer lies in a simple but continuous and painstaking keeping of cost records. Not just the big, obvious items. It is the small, easy-to-forget items that sneak up.

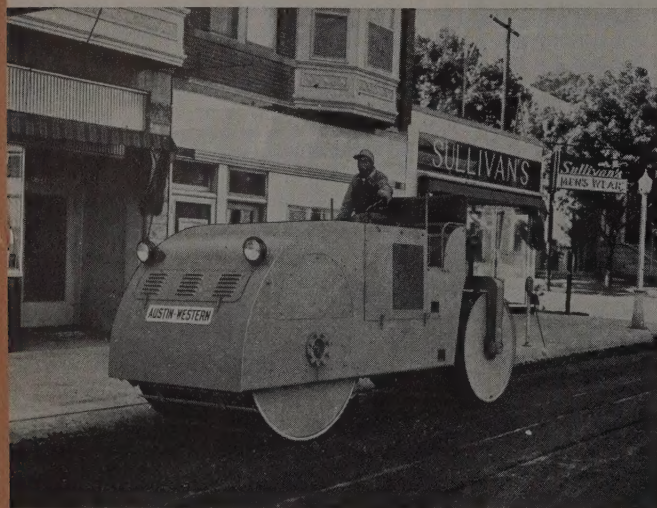
Where does a contractor start to get help with this problem? One of the best places is his equipment distributor or manufacturer. They can provide tested plans for cost keeping. They can help set up a simple but adequate system. True costs will begin to emerge and a foundation will be laid for bidding the next job on a basis that will insure a business future.

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