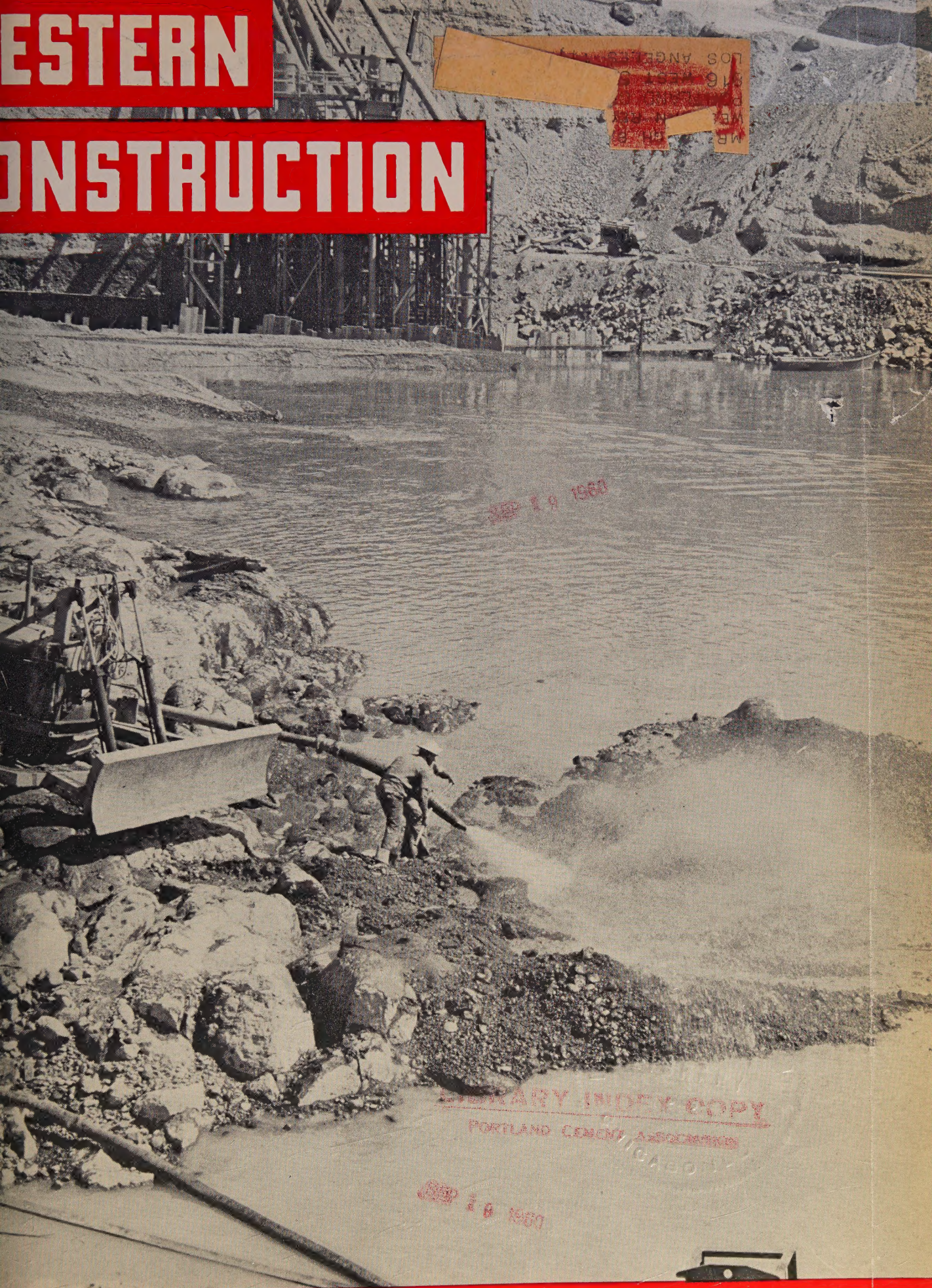
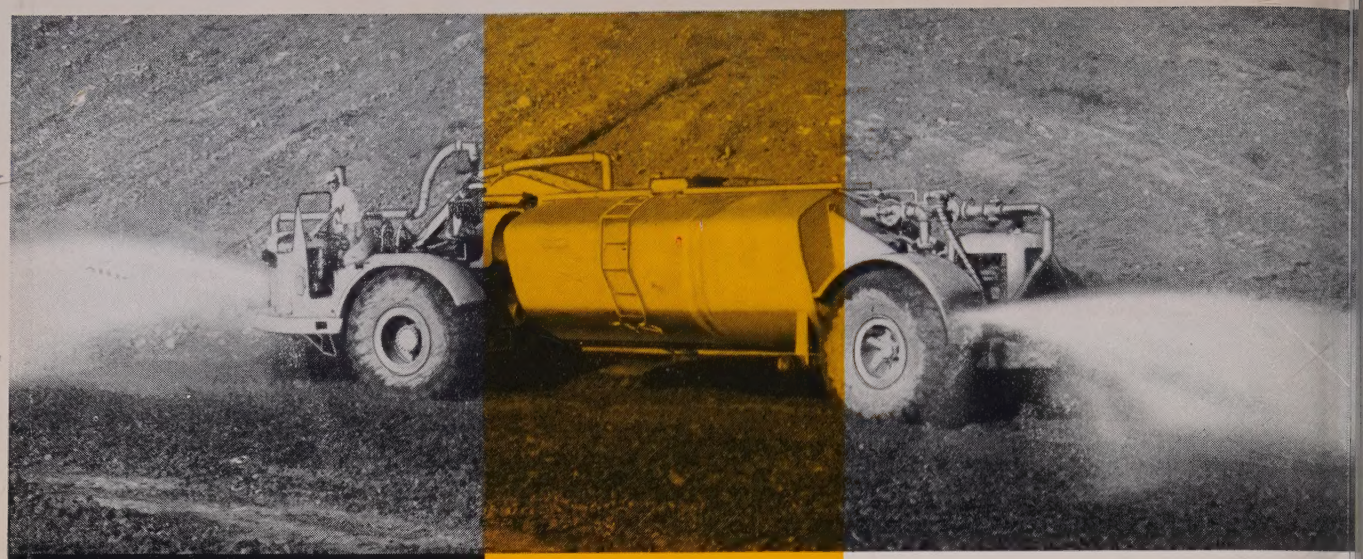
ESTERN
ONSTRUCTION



Fast Start at Wanapum Dam

SEPTEMBER 1960



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Equipped with large, high-flotation, low-pressure tires, these big Southwest Sprinkler Tanks can work way out on deep, soft fill without losing traction or bogging down. With pressure spray bars both front and rear, and gravity bar under the tank, they provide faster area coverage with greatest possible water penetration.

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Valley Construction Company of Seattle, along with Morrison-Knudsen Company of Boise, have been working on one of the largest sewer jobs ever let in one package. The job is in Boise and covers some 135 miles of sewer lines. Problems were many; particularly the problem of the summer irrigation water table which rises close to the surface. Trees, property rights, pole lines, etc. made smooth handling in close quarter work a necessity. To lick the water problem, "Valley" worked straight through one of the coldest, wettest winters in recent history.

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WESTERN CONSTRUCTION

SEPTEMBER
1960
Vol. 35 No. 9

CONTENTS

COVER—High pressure jet cleans gravel off bedrock at Wanapum Dam on the Columbia River. For a review of progress on this mammoth project, see page 35.

Published monthly by

KING PUBLICATIONS
609 Mission Street
San Francisco 5, California
Phone: YUkon 2-4343

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★

Subscription $10.00 per year, $12.50 foreign, single copy $1.00. Cost per single copy of Construction Equipment Directory, published each January, is $5.00. Every regular qualified recipient of Western Construction receives a copy of the Construction Equipment Directory bound in the January issue.

Accepted as Controlled Circulation publication at Portland, Oregon. Postmaster: Please send Notice 3579 to Western Construction, 609 Mission Street, San Francisco 5, California.

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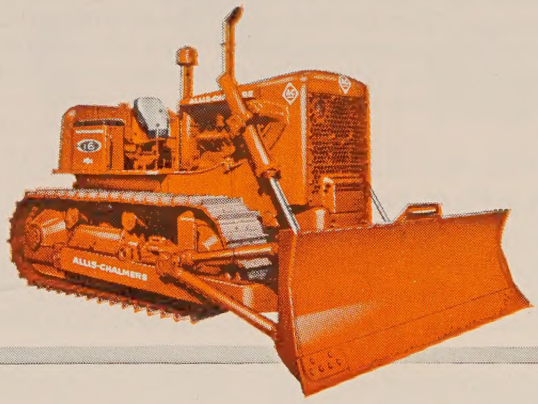

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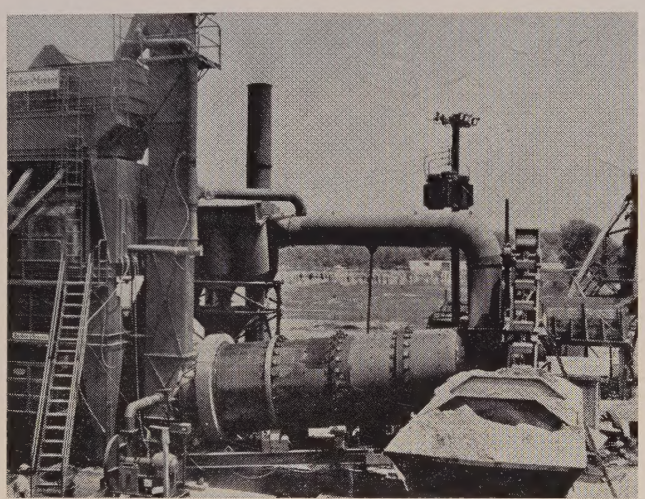
NEW EQUIPMENT

Obtain more information on these new developments in construction equipment by writing the corresponding numbers on reply postcard.

Dryer-dust collector combinations

Two rotary aggregate dryers and cyclone-type dust collectors of matching capacity are announced by **Barber-Greene Co.** The Model DA-55 dryer with its companion DA-65 dust collector serves asphalt plants in the 90 to 125-tph. range. The collector is capable of furnishing exhaust gas capacity in the 18,000-cfm.



range. The Model DA-65 dryer with the CA-55 collector serves plants in the 130 to 220-tph. range with the collector having a capacity of 32,000 cfm. Both dryer models have drums of Man-Ten steel of high strength and corrosion resistance. Other features include a non-clogging rotary inlet chute, self adjusting, articulated dust seals, high discharge rotary elevator, and a complete selection of burner types for fuel oil or natural gas. The dust collectors are available either as portable or stationary units. Portables are mounted on pneumatic-tired chassis providing space for both fan and power unit for the dryer.

. . . Write No. 150

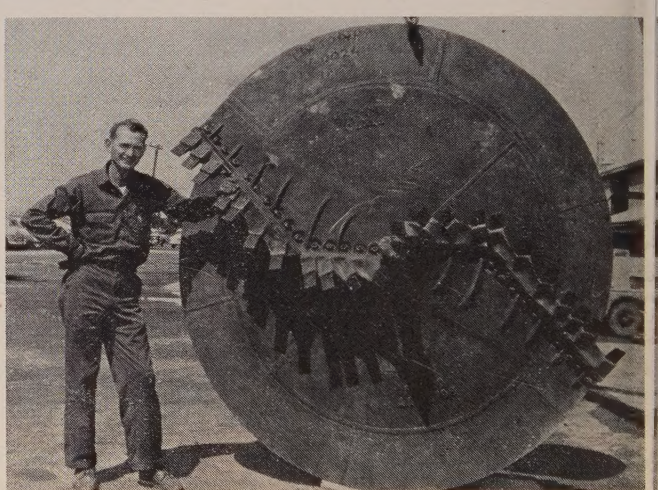
Trailer offers two wheel sizes

A 3-axle low-bed trailer available with either 15 or 20-in. wheels is announced by **LaCrosse Trailer Corp.** The unit features single point suspension which assures equal load distribution on each axle regardless of where the load is placed on the trailer bed. The suspension includes a through axle tandem assembly coupled to the third axle by a walking beam. Two-way oscillation provides uniform distribution of weight even when single wheels are raised or lowered by uneven ground. The new trailer is available in three models of 30, 40, and 50 tons, with flat bed or drop platforms.

. . . Write No. 151

Eight-foot diameter earth auger

An 8-ft. diameter drilling auger, the first in a new series of Pengo super heavy-duty earth drills, is announced by **Petersen Engineering Co.** Designed for use on the most powerful drilling machines available,



the new AA series augers feature extra-duty design throughout. Attachment hubs are designed for 5-in. Kelly bars, but may be adapted to 3½, 4, or 4½-in. bars by means of Pengo bushings. The big drills also feature Pengo replaceable reversible tooth. This is substantially heavier in section, wider and longer than teeth used on the heavy and medium-duty boring heads.

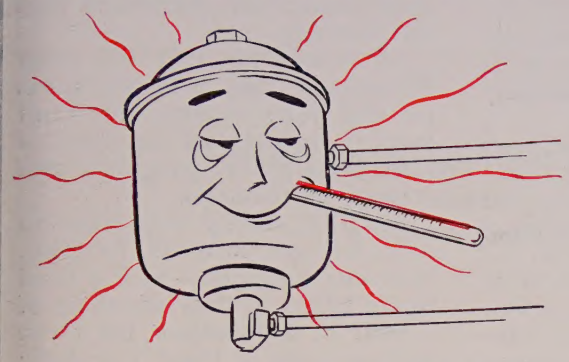
. . . Write No. 152

Paving-forms are self-aligning

Form setting time has been reduced to a minimum with Wedge-Lok, a line of steel forms for pavement slabs made by **Clark Industries.** When the form is placed on the subgrade, no movement will occur during the staking and wedging operation. Further adjustments can be made by use of the double wedge keys in the stake pockets. Elongated holes in stake pockets permit stake deflection without affecting form alignment. Rail width is 2 in. to resist distortion by wheels of paving machines. A brochure with photographs and specifications is available on request.

(Turn to page 122 for more New Equipment. New Literature can be found on page 118.)

trim maintenance costs



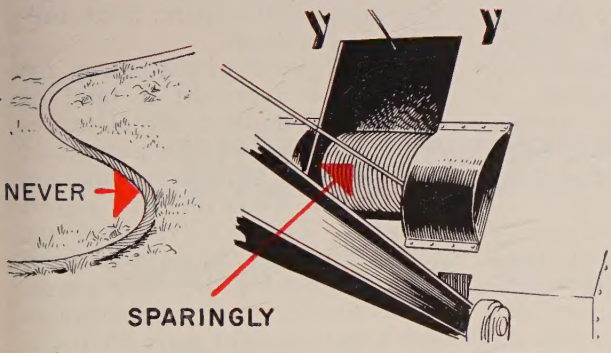
A filter that's working runs a temperature

Oil filters last so long these days it's sometimes hard to say when they were last changed. But they're so important to engine performance that it's essential that you know whether they're too full to filter right. Here's a simple way to find out.

A filter that's working will be as warm as the engine oil. If the filter on a fully warmed-up engine remains cool to the touch, it's a safe bet that it's too clogged up to let any oil through. Just to double-check, tap the filter case sharply. A metallic ringing sound means the cartridge is still in good shape. A soggy thud often means that the filter is loaded. Top mileage for even the best filter is 5,000 miles, never more.

Crawler treads are happier dry

There are few places where good lubrication is more important than in track-roll bearings, but make sure you don't lubricate the crawler treads themselves in a burst of enthusiasm. The pins that connect the links of crawler treads are designed to operate without lubrication, because dirt or other abrasives would act as a lapping compound in service. Result: much shorter service life for the track. Moral: if you don't want to lap your crawler link pins, don't oil them.



How often should you lubricate wire rope?

How much lubrication is good for wire rope and cable depends mainly on how it's used. Cables that are dragged in dirt shouldn't be lubricated at all. Oil simply holds the dirt where it can work into the strands and cause rapid wear. Cables that are wound on drums equipped with clutches should be lubricated sparingly to prevent fouling the clutch faces with lubricant. With other wire ropes, apply Texaco Crater A every 10 to 100 hours as necessary to avoid dryness. Be sure to clean the rope before adding new lubricant.

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The WEST from WASHINGTON

By E. E. HALMOS, JR., Washington, D. C.

Decision by the Corps of Engineers to revamp its Western-based missile construction organization is of major importance to contractors and engineers working in (or hoping to work in) this program. It also represents a considerable departure from the Corps' traditional chain-of-command set-up.

For construction people, it means that they will deal with a new set of "bosses" so far as the Corps is concerned, and those new "bosses" will have a direct line to Washington, and direct authority to make decisions, without going through district or division offices.

Over-all, it is a move to streamline operations in this billion-dollar construction area, and to counter criticism that has been mounting in recent months (some of it from Air Force) over reported delays in construction work. It is considered so important that the Secretary of Defense called in contractors on 18 major ICBM bases—most of them in the West—to a special Pentagon briefing late in July to explain the new set-up, and explore other means of expediting the construction program. (And also to deliver a "pep" talk.)

Here is the essence of the program:

A new Corps of Engineers organization — to be known as the "Corps of Engineers Ballistic Missile Construction Office" (already dubbed CEBMCO in initial-happy Washington), is established at Inglewood, Calif., under command of Brig. Gen. Alvin C. Welling, a career officer who has just finished a three-year term as Engineer-Commissioner of Washington, D. C.

Welling has been given direct authority that eliminates all district and division engineers from any activity concerning the ICBM construction program, except "as called upon" by Welling's office for support. That's taken to mean, in Washington, that the district and division offices will provide support on paperwork for the most part. Area and site engineering personnel, previously reporting to the districts, will now report to the Inglewood office.

Initial complement of the Inglewood office is set at 125 officers and civilians. However, it's not out of the possibilities that the personnel count could reach as high as 2,000 within a reasonably short time.

Before leaving Washington, Welling outlined his organizational plans this way: He'll have five "vice-presidents" (senior officers) under him, who'll be given responsibility for specific areas of ballistic missile site construction (smaller missiles, such as the Nike series and Bomarc, aren't affected by this change), and each of whom will supervise work and make decisions directly and quickly. The staff will be aligned to head up in these five men.

There remain a couple of areas still clouded, as the Defense Department works out details: Simultaneously with the announcement of the Engineer set-up, Air Force announced that it was taking "management responsibility for ballistic missile site activation" away from the Air Force Ballistic Missile Division, and giving it to a special division of the Air Materiel Command, under Maj. Gen. Thomas P. Gerrity (a flying officer), also based at Inglewood.

Just what this outfit's relationship with the engineer group would be hadn't been cleared up in early August. Presumably, it will act as monitor and "owners' representative" for the Air Force, dealing with the engineers at top level.

Further complicating the picture was an Air Force announcement that responsibility for labor relations—including construction labor—would be given to base and site commanders, who are Air Force officers.

In early August, the position of the Air Force's own Civil Engineering officers in this regard was also unclear. Apparently, they would continue largely to be responsible for work at regular air bases and installations, would act only on some sort of consultative basis in connection with ICBM work.

* * *

Convinced that contract control measures imposed for 1960 and 1961 will result in solvency for the Highway Trust Fund, the Department of Commerce has announced full allocations for the 1962 fiscal year. The announcement is expected to give highway departments the "breather" they've been clamoring for in order to get their programs in good order again — it gives them a full year's lead time for planning.

Allocations for 1961 fell about $50 million short of target figures for that year, to allow the Trust Fund to recoup from the effects of 1958 "emergency" programs that drained its resources.

For 1962, here's what Western states will get, in order, for ABC, Interstate programs — with a third figure added to show the share of a total of $33 million for forest highway work in Fiscal Year 1962:

Alaska—$27.5 million (none for Interstate), $2.9 million; Arizona, $7.9 million, $29.6 million, $1.9 million; California, $34.5 million, $220 million, $4.7 million; Colorado, $9.7 million, $16.8 million, $2.4 million; Hawaii, $2.9 million, $12.4 million (none for forest roads); Idaho, $5.8 million, $14.9 million, $3.4 million; Nevada, $5.9 million, $11.3 million, $591,970; New Mexico, $8.3 million, $29.9 million, $1.3 million; Oregon, $9.1 million, $37.5 million, $4.5 million; Texas, $35.7 million, $97.8 million, $104,462; Utah, $6.8 million, $20.2 million, $1.1 million; Washington, $9.9 million, $39.2 million, $2.3 million; Wyoming, $5.9 million, $22.5 million, $1.4 million.

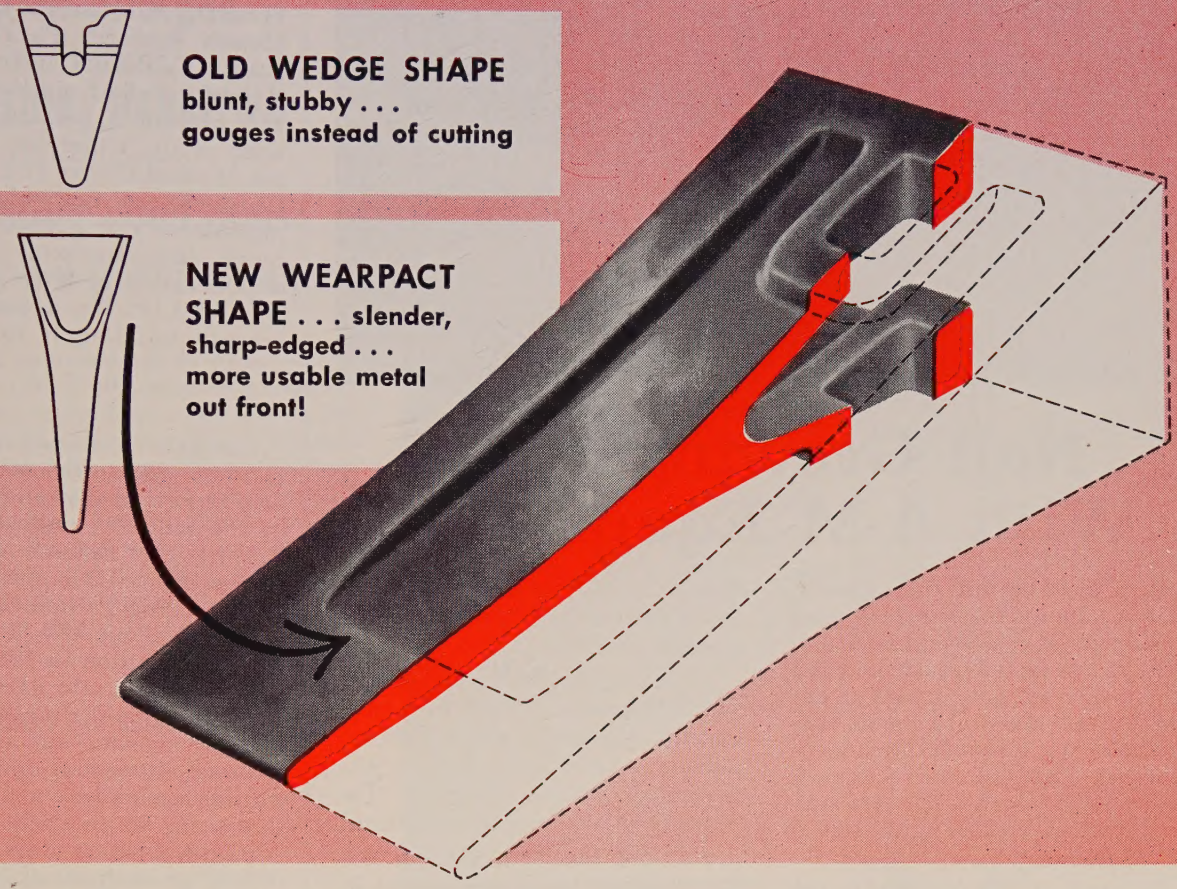
The figures given above for ABC work represent a total of only $693.7 million for all states —three-quarters of the authorized total of $925 million recently approved by Congress and signed into law. The 25% "retained" for the moment is held back until final figures on the 1960 census are available, since one element of the apportionment rests on population totals. The extra $235 million-odd will be parcelled out before the end of the current calendar year, Interior hopes.

* * *

And if you're looking around for construction work, you'll be interested to know that four Western schools have applied for construction loans (for student housing and related facilities) totaling about $12 million. Community Facilities Administration of the Housing and Home Finance Agency hasn't yet acted on the loans.

Seeking funds are: University of Texas, Austin, $7.8 million; Uni-

From WEARPACT... a new Dipper Tooth



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Sharper...Stays Sharper...Digs Faster...Lasts Longer

The best test for steel teeth is in the taconite mines. It's real punishment for any type of dipper tooth.

Most teeth just can't provide the combination of high-hardness and toughness that's required for month-in, month-out heavy duty service. They don't come up to the high standards of longer-wearing Wearpact cast-alloy, self-sharpening steel.

Wearpact quality begins with ultra-sturdy Wearpact steel, which is 500 Brinell. It assures greater operating life. The new Wearpact design is longer, slimmer, trimmer — and sharper. It puts more "bite" into dipper teeth.

It needs less power to slice through rock, slag, ore, taconite than any stubby, wedge-type tooth. *It cuts instead of gouging.* It digs faster . . . and easier . . . with much less wear and tear on the power shovel.

There's a Wearpact tooth to fit almost every standard shank. Try 'em for proof on your toughest jobs. See your Wearpact distributor for a demonstration, or write us today for full information.

Cut your costs with WEARPACT® *Cast Alloy steel*

. . . for more details, write No. 11 on Reader Service Postcard

versity of Dallas, Irving, $500,000; Leland Stanford Junior University, Stanford, $3 million; University of Puget Sound, Tacoma, $700,000.

In the general field of education there's also some new construction money coming into Western states, as a part of a total of $21.9 million in grants (on a matching basis) made under the Department of Health, Education & Welfare's Health Research Facilities Program. California institutions get a total of $1.5 million (biggest, $556,556 for a pediatrics research wing at the University of California Medical Center at Los Angeles; University of Colorado gets $1.2 million for a new medical research center and some remodeling work at Denver; University of Hawaii gets $243,125 for a basic medical research building at Honolulu.

* * *

Construction machinery manufacturers got confirmation of their own reports in that midyear review of the industry, published by the Business and Defense Services Administration. Unhappily, it showed that machinery shipments for 1960 will total about $1.7 billion—down from $1.8 billion in 1959.

That means, said BDSA, that the industry is now running at about 60% of capacity—and the drop-off is worse, in view of optimistic predictions early this year that saw the rate rising to about $2 billion.

BDSA blamed disposal by the federal government of "large quantities" of surplus machines and equipment, which has caused a pileup of inventories at both producer and distributor levels; plus increasing imports—up to $15 million—of certain types of machinery and equipment. The Associated General Contractors, in a parallel statement on the situation, thought the slump in highway construction caused by the stricture in funds, was the principal cause.

* * *

That $1.4 billion authorization bill for the Corps of Engineers' civil works, approved by Congress just before it quit work in July (see August column) includes future construction of a total of 120 flood control, navigation and water conservation projects in 37 states.

It also includes—in a limited way—authority the Corps had requested to make surveys of flood-plain areas, to aid in reducing the

(Continued on page 28)

"FOR PRECISION DRILLING, NO LOST HOLES, WE RELY ON TIMKEN® CARBIDE INSERT BITS"

Special report from Rock of Ages

LOCATION: BARRE, VT.

Operating conditions: dimensional granite quarry

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Which Timken bit should you use?

You get greatest economy in hard, abrasive ground with the Timken carbide insert bit. In softer ground, use the Timken all steel multi-use bit. They're interchangeable in the same thread series; you can switch bits when the ground changes. Bit bodies are made of Timken electric furnace fine alloy steel. Let us help you select the right Timken bit for your job. The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steels and Removable Rock Bits.*

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removable rock bits

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threat of flood damage. The Corps had wanted authority to make such surveys, warn communities against permitting development in areas threatened by flood, but Congress approved the authority only on the request of local governments.

Seven Western states would share a total of $383 million worth of projects. None of the work authorized, of course, can be started until Congress makes specific appropriations, starting with the January session.

* * *

A labor union cannot force a contractor to bargain by picketing before they've attempted to negotiate, or represent a majority of workers, according to a National Labor Relations Board trial examiner's findings.

A contractor in Shelbyville, Tenn., was picketed by members of a local of IBEW, carrying signs which said that the contractor "does not employ union members or have a contract with the local." The trial examiner found that union leaders had never requested the contractor to recognize the union, or bargain with it, and that the union didn't represent a majority of the contractor's workers.

Said the examiner: The only way the contractor could have lifted the picketing would have been to negotiate with the union —thus the purpose of the picketing was to force bargaining, even though the union didn't represent a majority of workers, and no election had been sought." Thus the picketing was illegal.

* * *

Continuing its long-standing study of earth movements near major structures, the Bureau of Reclamation is installing highly sensitive seismographs at Flaming Gorge and Glen Canyon dams. Installation of the instruments — in vaults on the same bedrock on which the dams are founded—will be completed this summer.

* * *

Contractors will be among the 6,000 or more business organizations that will receive copies of a Treasury department survey to fill out, concerning the effects of current tax allowances for depreciation and obsolescence.

WESTERN CONSTRUCTION

Politics confuses construction

EVERY public construction project faces the ultimate hurdle of public approval or disapproval. It may be a local highway by-pass which brings out yells from conflicting interests; it can be public reaction to an engineering plan for a system of rapid transit; here in the West, the most violent expressions of public concern over engineering proposals relate to those of our water resources and their use.

At this time, the proposed bond issue to finance the California State Water Plan represents the best available illustration of the point.

Thoughtful and thorough engineering studies have been going forward for many years to find the best solution to the maladjustment of the state's water supply and water needs. The over-all plan for storing surplus waters and delivering them to deficient areas has long been accepted. Future scientific developments have been given their proper consideration. Engineering opinions appear to differ only as to final cost and proper timing for the elements of the multi-billion dollar undertaking. These items are factual and could be resolved with further study.

The distressing factor relates to the purely political smokescreen that begins to obscure basic demands for this record construction undertaking. Obviously, such a program becomes the child of any state administration in power when the engineering studies arrive at the time for action. Automatically, it is looked upon with disfavor by the opposition. These positions are then reflected by the smaller divisions of such political bodies. They, in turn, can carry forward the struggle as a political feud, often losing contact with the real issue. Next, all types of pressure groups, organizations which cut across political party lines, and well-meaning citizen clubs join in the mounting controversy. Newspapers add their position and power based frequently on political alignment and the local interests, as compared to a broad-gage approach.

During the next two months, the citizens of California will be bombarded and pressured with pros and cons which will leave behind most elements of logic and become purely political. The problem, in all of its seriousness, will not be completely solved by a political victory regardless of which side wins. It could be that the voice of the voters would require engineering plans to be redrawn to satisfy politics, as compared to the problem of available water and the best means of redistribution. The program is caught in a political crossfire.

There is a lesson here for other states of the West with water problems that might develop into state-wide or even inter-state programs of study and solution. Water needs in this Western region require our best engineering and construction talents. Any construction program that becomes the bird in a political badminton game is apt to lose a feather or two.

Jim Ballard

New self-parking garage at Third Avenue and Pine in Seattle. Owner: Sierra Corporation. Architect: George Appelgarth. Structural Engineer: Ellison-Sedgwick. General Contractor: Utah Construction & Mining Company

Re-bars from Ryerson . . . 1900 tons reinforce big new Seattle garage

"Ryerson cooperation again excellent"—contractor

This was a job with a tight time schedule. So tight that the contractor built the elevator shaft first to get machinery installed and running as soon as the structure was completed.

This 10-story concrete structure—reinforced with 1900 tons of re-bars from Ryerson—contains 300,000 sq. ft. of space and provides parking for 1270 cars.

Ryerson's "job-timed" re-bar service played an important role in meeting the tight deadline. In addition to providing on-time delivery, Ryerson fabricated the bars, tagged them for positive identification, and furnished setting plans—exactly as the job required.

On your next job, call Ryerson for re-bars or for any of the products and services listed below.

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KING PUBLICATIONS

WESTERN CONSTRUCTION

SEPTEMBER, 1960

AERIAL VIEW of Wanapum Dam on Columbia River shows spillway concreting well advanced. Superimposed diagonal line is approximate centerline of powerhouse; horizontal line shows future permanent embankment. Powerhouse is parallel to river.

Wanapum Dam is off to a fast start

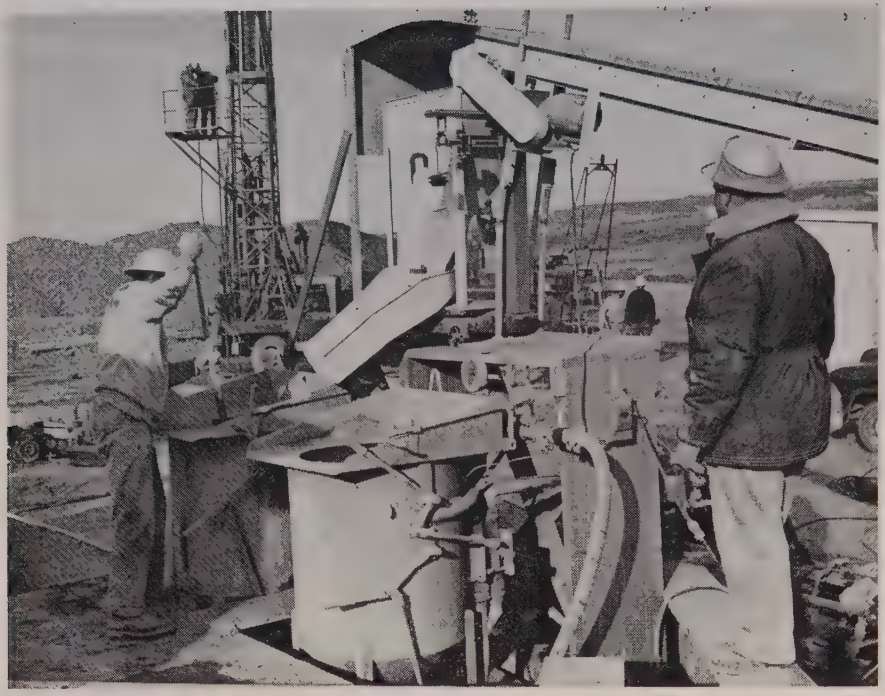
Bentonite slurry trenches speed cofferdam work —Monighan with 17-yd. bucket loads into "walking" bin —cylinders of compressed gas power automatic crane hook —special rig drills 17-in. diameter holes into bedrock for prestressed anchorages—steel faces for draft tube forms.

THANKS TO SKILLED supervisory personnel and full use of the latest construction machines and methods, Wanapum Dam, a Grant County Public Utility District project near Vantage, Washington, on the Columbia River, is well on its way toward a bonus-winning completion. After little more than a year of work, Grant County Constructors, a five-member combine headed by Morrison-Knudsen, has completed a 7,000-ft. long U-shaped cofferdam; most of the 2,300,000-cu. yd. excavation for the spillway and powerhouse; about half of the concrete work on the spillway; and has begun foundation concreting in the powerhouse section. Over 1,000,000 cu. yd. out of a total of 3,400,000 cu. yd. of compacted embankment is in place.

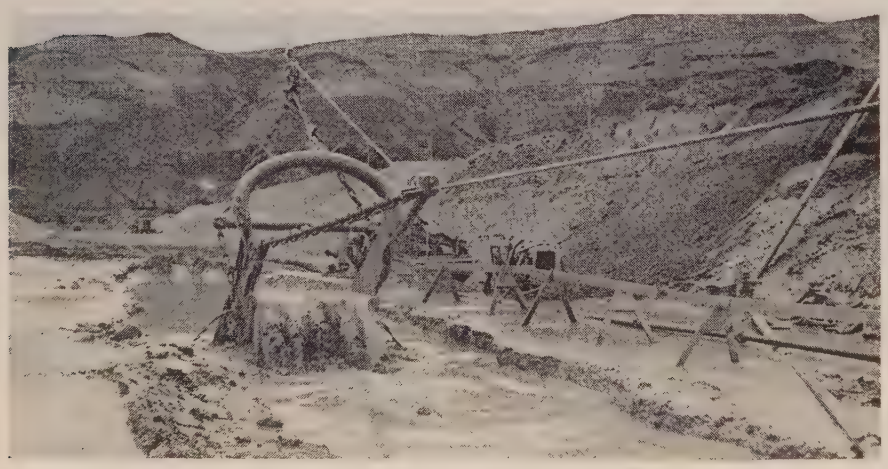
When the bids for the project were opened in May of 1959, there was speculation that the low figure would exceed the $108,000,000 bid on the Glen Canyon Dam project in northern Arizona, thus setting a new record, but the winning bid of $92,723,315 was far below the engineer's estimate.

Specifications state that six powerhouse units must be on the line by September 1964 and the remaining four by January 1965, or the contractor will face a penalty of $3,000 per day per unit. A bonus of $1,200 per unit per day will be awarded if two units are on the line by September 1963.

The dam is roughly Z-shaped in plan, with the spillway and powerhouse located beside the main channel of the river. Because of this design, the river can remain in its natural course until late in the project and will not be closed and diverted to the completed intakes until mid-1962. The section of the dam which will cross the main channel will be an earth embankment with a vertical impervious core. This embankment is already largely completed, except for a 1,200-ft. central gap through which the river now flows. The impervi-



BENTONITE SLURRY was mixed by Cronese Products in special equipment using jetting action. Slurry was pumped to trenches through 8-in. pipes from a 10,000-bbl. reservoir.



DRAGLINE excavates slurry-filled trench 80 ft. deep with vertical walls through gravel. Heavy slurry displaces ground-water. Clamshell bucket and air-lift handled clean-up.

CRAWLER TRACTOR backfills trench with bulldozer using slurry-saturated material which had been excavated. In permanent embankments 3 ft. of tremie concrete was first placed on bedrock.

ous core will be constructed by the bentonite slurry trench method, which was used for the completed abutment embankment at the west end of the dam. The slurry method was also used by the contractor to seal his 7,000-ft. long U-shaped cofferdam. This procedure will be described in detail after a look at the overall project.

The Wanapum development

Wanapum Dam is part of the Priest project, which includes Priest Rapids Dam nearing completion by contractor, Merritt, Chapman & Scott 18 mi. downstream.

Nine public and private electric utilities of the Northwest have signed contracts with the PUD of Grant County for the purchase of 63.5 per cent of the power from Wanapum Dam, the PUD retaining the remainder for its own use. The Harza Engineering Co. is the designing and constructon supervisory agency for both dams. Wanapum is being financed by long term revenue bonds to be retired through the sale of power. No government appropriations are being used, although the Corps of Engineers may later build navigation locks.

Wanapum Dam, which gets its name from a local Indian tribe, is a combination of reinforced concrete and earth fill. The total overall length is 8,320 ft., of which 2,920 ft. are concrete. The maximum height from the deepest point of the excavation to the crest is 185 ft. Rated head is 80 ft. The spillway will be 820 ft. long with twelve 50 x 65-ft. tainter gates. The powerhouse will be 1,540 ft. long, 198 ft. wide and will contain ten Kaplan turbines, each rated at 120,000 hp. The total capacity of the powerhouse will be 831,250 kw. A skeleton structure is being provided for an eventual 16 units.

The Wanapum project involves about 10,000,000 cu. yd. of excavation, 4,000,000 cu. yd. of earth fill and 1,000,000 yd. of concrete.

Bentonite slurry

If it weren't for the bentonite slurry trenching technique, a dam at the Wanapum site probably wouldn't be practicable. The difficulty derives from the fact that bedrock is covered by a layer of porous gravelly material which ranges in thicknesses up to 80 ft., most of which is below the water-table. The cost of making a sloping excavation to bedrock and keeping it dry while impervious fill was placed would be prohibitive. The

slurry method enables an impervious curtain to be placed without dewatering. The practicability of the technique was proved when the contractor adopted it for his earth cofferdam in place of the conventional interlocking sheet pile cells.

The use of the slurry permitted draglines to excavate trenches 10 ft. wide and up to 80 ft. deep through the gravel with vertical walls which kept the amount of material removed at a minimum. This was possible by keeping the trenches filled with the slurry, which consisted of roughly one part bentonite to 12 parts water. Because the slurry has a specific gravity greater than water, ground water is prevented from percolating into the trench. The slurry also coats the walls of the trench with an impervious film and is heavy enough to hold the walls vertical. A clamshell bucket followed by an air lift was used for final clean-up at the bottom of the trench.

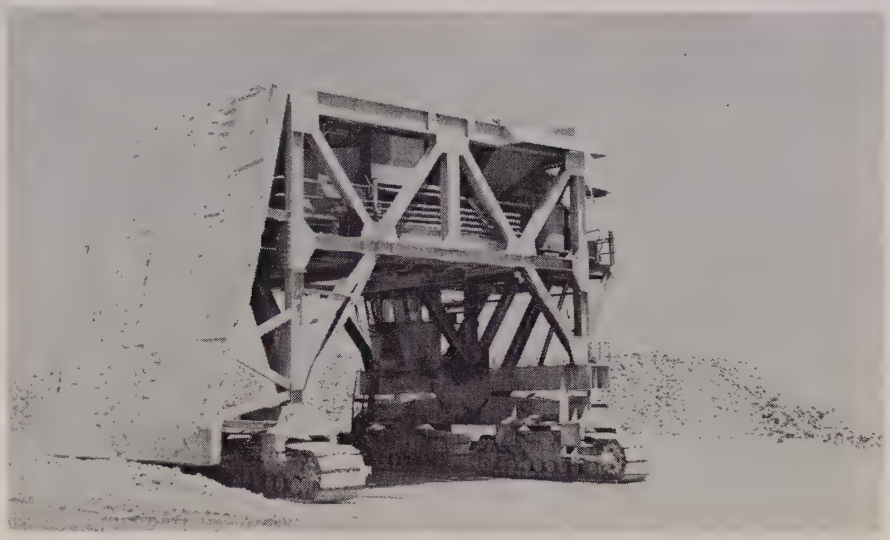
The slurry-saturated material was stockpiled along the trench as it was excavated, mixed with select borrow by a bulldozer, and used as the impervious backfill. In the trenches in the permanent embankment 3 ft. of tremie concrete was first placed on bedrock, a step omitted by the contractor in his temporary cofferdam.

The slurry was mixed in three portable plants manufactured and patented by Cronese Products Inc. of Glendale, California. The plants had a capacity of about 15 bbl. of slurry a minute and the mixing was accomplished by jets of water. Slurry was pumped to the trenches through 8-in. pipes from a 10,000-bbl. sump.

The problem of sand and small particles going into suspension in the slurry and lessening its effectiveness was solved by recirculating it to a settling pond and also passing it through fine screens.

Prestressed anchorages

Another unusual feature of the project is the method the designers have chosen to anchor the skeleton portion of the powerhouse to bedrock. This part of the powerhouse, which will be completed when increased electrical demand warrants it, lacks the width and mass to resist overturning, so it will be fastened to bedrock by a foundation of 78 holes, 70 ft. deep and 16½ in. in diameter. When the holes are drilled, four groups of ninety ¼-in. wires will be lowered to the bottom and held in place by 20 ft. of grout. The wires



WALKING BIN worked with giant Monighan dragline. Bin is mounted on four crawler tracks, can move itself in straight line. Capacity is 75 cu. yd. Operator in cage controls dump gates.

ROBBINS DRILL will be used to sink 17-in. holes 70 ft. into bedrock for anchoring part of powerhouse. In photo, mast is lying over top of machine. At upper right is three-part bit with rubber shield and hose for controlling dust. Rig is crawler-mounted.

Major equipment—*Grant County Constructors*

6	30-yd. Euclid bottom dumps
8	17-yd. Euclid end dumps
1	480W Monighan dragline
2	5½-yd. Manitowoc excavators
1	1½-yd. P&H backhoe
1	Northwest 80D shovel
1	Bucyrus-Erie 3-yd. 71B shovel
2	P&H truck cranes
1	Lorain truck crane
1	Caterpillar #12 grader
1	Caterpillar #14 grader
1	75-cu. yd. walking bin
1	17½-in. Robbins rotary drill
1	American 115-ton electric locomotive
3	M-R-S scrapers
7	Caterpillar D8 tractors
1	Caterpillar D4 tractor
4	Euclid concrete bucket haulers
3	Kenworth concrete bucket haulers
4	Washington Iron Works gantry cranes
6	Chevrolet 4-door sedans
1	Ford 4-door sedan
21	Ford 1½-ton pick-up trucks
1	Willys Jeep
1	GMC Carry-all
1	Dodge Power Wagon
3	Ford 2-ton flatbed trucks
6	Ford 2½-ton flatbed trucks
3	Chevrolet 2-ton flatbed trucks
1	Kenworth grease truck
1	International Harvester grease truck
1	Mack truck tractor
1	Lo-Boy trailer
1	Peerless trailer
2	5000-gal. Euclid water wagons
14	air compressors (various)
15	Ingersoll-Rand wagon drills
6	Gardner-Denver wagon drills
2	International Harvester TD 14 crawler tractors
1	Hough Payloader
27	Gas pumps (2 in.-8 in.)
10	Electric pumps (2 in.-8 in.)
7	Electric pumps (12 in.)
15	Electric pumps (16 in.-30 in.)
1	Hughes-Keenan 6-ton crane
1	50 ton Southwest roller
2	Two-drum McCoy sheepsfoot rollers
1	Two-drum Southwest sheepsfoot roller
4	Kohler light plants
1	Rock rake
4	Onan light plants
2	Palmer-Lister light plants

Hooks powered with bottled gas

For handling the 4-yd. concrete buckets at Wanapum Dam, the contractor is using Gar-Bro 4-C Power Hooks. Operation of the hooks is automatic with power supplied by bottled nitrogen. The two 6-packs (see picture) provide energy storage good for 2,280 cycles or placement of 9,120 yd. of concrete without recharge.

Use of the power hook is a safety aid, eliminating completely the need of a "hook-on-man" at each pouring site. This job has long been recognized as particularly hazardous. The hook itself is fail-safe, as the shape of the jaws precludes accidental unhooking, even though deliberately tripped "in flight."

Operation is automatic. The crane operator lowers the hook onto the bail of the concrete bucket, depressing a trigger within the throat of the hook, actuating a ratched valve controlling movement of the jaws. The jaws then close; the load line is raised, and hook-on is completed.

The unhooking cycle is identical: the jaws opening the next time the hook is lowered onto the bail of the bucket. The total hook-off to hook-on cycle averages about 20 sec.

Power hooks, of course, can be operated with compressed air from a crane-mounted compressor. However, with the long booms at Wanapum the bottled-gas technique seems to be preferred. Nitrogen is used at Wanapum because of availability and price.

will be stressed by four 500-ton hydraulic jacks after which the holes will be completely filled with grout. The prestressing details were worked out by Joseph A. Ryerson & Son, Inc.

At this writing, a pilot hole has been completed and successfully tested.

To drill the holes, the contractor is using a rotary drill made by the Robbins Manufacturing Co. of Oneonta, Ala. The huge crawler-mounted, self-powered rig has a 3 part bit capable of sending 17½-in. diameter holes through solid rock.

The "walking" bin

The backbone of the excavation operation is a Manitowoc Model 480W "Monighan" dragline. This earth-moving monster swings a 17-cu. yd. Esco bucket, large enough to comfortably hold a standard automobile. To enable this expensive but potent piece of equipment to work steadily and without having to wait for earth haulers, the contractor is using a self-propelled surge hopper called a "walking" bin, with a capacity of 75 cu. yd. The bin is mounted on four crawler treads and carries an operator in a small compartment to control the discharge gates. Although the bin is capable of moving slowly backward and forward in a straight line, a crawler tractor usually assists its movements to save time.

The Monighan is supplemented by a Northwest 80D and two 5½-yd. Manitowocs. The earth-moving fleet consists mainly of six 30-yd. Euclid bottom-dumps, and eight 17-yd. Euclid end-dumps.

Concrete system

Conviently, most of the aggregate for concrete is located in the dam site excavation areas, primarily in the spillway approach channel. Aggregate is processed by J. G. Shotwell Co. of Seattle on a subcontract. Shotwell has set up a modern smoothly-working crushing, screening, and stacking plant. All conveyors are covered to reduce dust. Aggregate is excavated with shovels and draglines and brought to the plant by end-dump. Deficiency of fines in the pit-run gravel is made up from a special pit worked by a Wagner 6-yd. Scoopmobile. The plant may have to turn out aggregate for 100,000 cu. yd. of concrete per month when production reaches a maximum.

The concrete plant is a C. S. Johnson with four Koehring 4-cu. yd. tilting mixers. The storage bin at the top of the plant has six compartments and holds 750 cu. yd. The automatic plant recorder keeps a record of all mixes.

Concrete is taken from the plant in buckets carried by seven specially-made haulers pulled by four Euclid tractors and three Kenworths. The trailers, made by E. T. Pybus Co. of Wenatchee, are designed to hold 4-yd. Gar-Bro buckets. After the first trip, trailers carry only three buckets, as one is on the crane.

The bulk of the concrete will be placed by four Washington Iron Works revolving gantry cranes. Two are 60 ft. high, (brought in from Noxen Dam) and two are 85 ft. high. Three are being set up now for the powerhouse construction while the fourth is handling concrete placement in the spillway. When the spillway is finished, all four will work on the powerhouse. Gantry tracks are 28 ft. wide for the 60-ft. high rigs and 36 ft. wide for the 85 footers.

The four gantry cranes will work with Gar-Bro automatic hooks which are activated by bottles of compressed gas carried in a rack

KEY PERSONNEL include D. K. Kime (left), field engineer for Harza Engineering Co., and George "Pete" Piedmont, project manager for Grant County Constructors.

above the hook. Features of these special hooks are described in a box on the opposite page.

Steel forms made by Blaw-Knox for the 5-ft. lifts are being used. In something of a departure from standard practice. the draft tube forms will be faced with steel. The curved surfaces of draft tubes usually dictate the use of wood lagging for the forms, but in this case the possibility of ten re-uses made steel facing feasible.

The contractor is working about 600 men on two 8-hr. shifts five days a week. Three shifts will probably be used when concrete work increases. There is no barracks or messhall on the job and only a small number of homes for top personnel. Most of the workmen live in a trailer camp at Vantage, five miles distant, or in Ellensburg, 30 mi. from the site.

Almost all of the materials for the project are brought in over a 2½-mi. long railroad spur the contractor built to the main line of the Milwaukee Road.

Electric power is brought to the job from outside networks over high tension lines. Air is provided by four Ingersoll-Rand XLE skid-mounted compressors. These are usually in a central compressor house, but the skid mounting permits them to be brought easily to whatever point of the project they are needed. Air and water are carried around the site in underground steel pipes.

Pick-up trucks operated by the key personnel have the names of the drivers in large letters on the back of the cabs to aid identification.

River diversion will be done when the approach channel and spillway bays are finished, probably in 1962, right after high water. Closure will be accomplished by building two parallel rock embankments across the channel and building up the area between with dump material compacted by Vibroflotation until it is above the water level. Then an impervious vertical curtain will be constructed by the bentonite slurry trench method.

Selected Unit Bids—Wanapum Dam

Grant County Constructors

DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
Move in	lump			$2,750,000
Cutoff wall excavation at depths of 50 ft. or less	sq. ft.	191,000	2.60	496,600
Cutoff wall excavation at depths over 50 ft.	sq. ft.	109,000	2.85	310,000
Cutoff wall backfill	sq. ft.	284,000	1.10	312,000
Concrete placed underwater for cutoff wall	cu. yd.	5,850	36.00	210,000
Drilling grout holes	lin. ft.	39,000	11.50	448,500
Diversion and care of water	lump			2,620,145
Embankment excavation	cu. yd.	500,000	.70	350,000
Spillway excavation	cu. yd.	915,000	.30	274,500
Powerhouse excavation	cu. yd.	1,400,000	.80	1,120,000
Tailrace excavation	cu. yd.	2,915,000	.30	874,500
Approach channel excavation	cu. yd.	3,900,000	.35	1,365,000
Rock foundation preparation	sq. yd.	60,800	4.50	273,600
Drilling anchorage holes	lin. ft.	5,760	43.40	249,984
Anchorage cables and fittings	lb.	712,300	.59	420,257
Impervious fill	cu. yd.	590,000	1.10	649,000
Pervious fill	cu. yd.	2,600,000	.25	650,000
Transition fill	cu. yd.	355,000	.92	326,600
Pervious fill placed under water	cu. yd.	220,000	2.90	638,000
Rockfill	cu. yd.	459,000	.90	413,100
Riprap	cu. yd.	122,000	2.50	305,000
Spillway concrete, mass	cu. yd.	185,000	9.50	1,757,500
Powerhouse concrete	cu. yd.	578,500	11.00	6,363,500
Concrete in gravity dam and retaining walls	cu. yd.	201,200	8.50	1,710,200
Concrete in fish facilities	cu. yd.	123,800	10.00	1,238,000
Portland cement	bbl.	1,005,200	4.69	4,714,388
Pozzolan	ton	45,500	16.62	756,210
Forms, straight	sq. ft.	4,702500	1.80	8,464,500
Forms, curved	sq. ft.	489,000	2.60	1,271,400
Reinforcing bars and anchor bars	lb.	60,500,000	0.12	7,260,000

Personnel

For the Public Utility District of Grant County, E. B. Gibbons is manager, and R. R. Ries is superintendent of production.

For Harza Engineers, R. B. Jackson is resident engineer, B. A. Hall is assistant resident engineer, W. L. Scearce is office engineer, and D. K. Kime is field engineer.

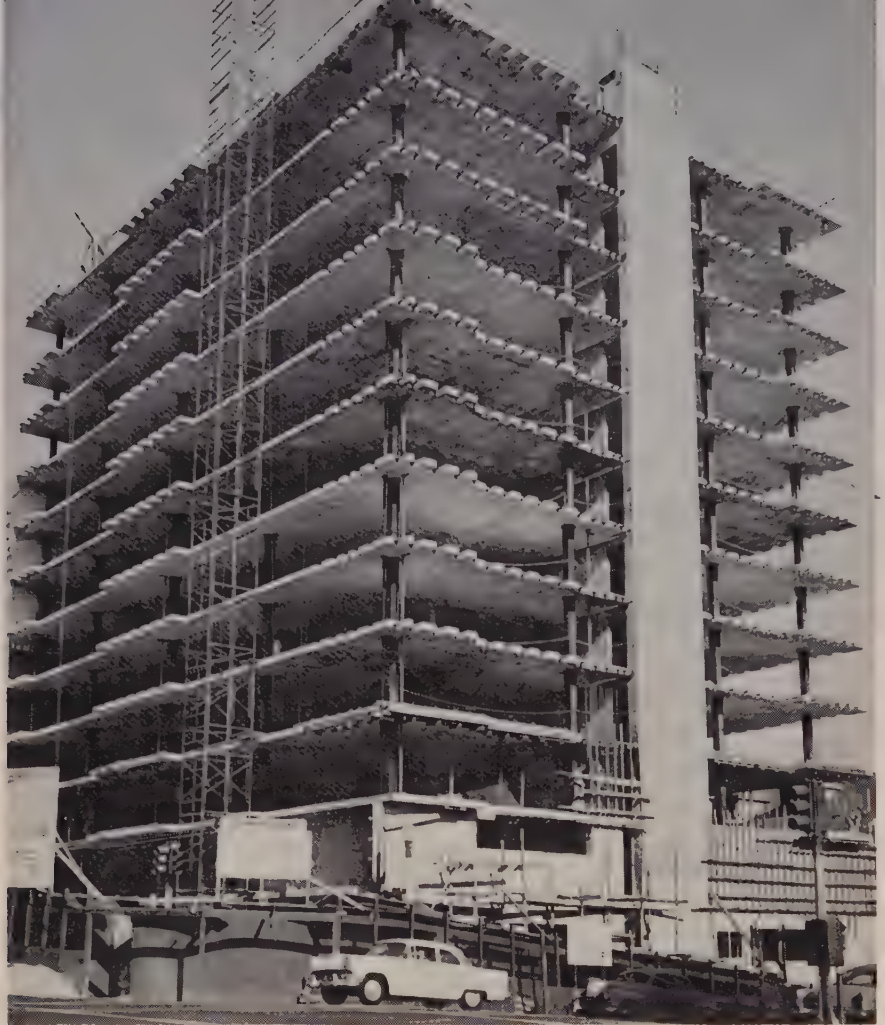
Grant County Constructors is a joint venture sponsored by Morrison-Knudsen, Inc. and including Henry J. Kaiser Co., Macco Corp., Raymond International, Inc. and F&S Contracting Co. Project manager is George "Pete" Piedmont. "Chuck" Peters is project engineer, W. H. Smith is office manager, and Lee True is general superintendent.

More money for missiles bases

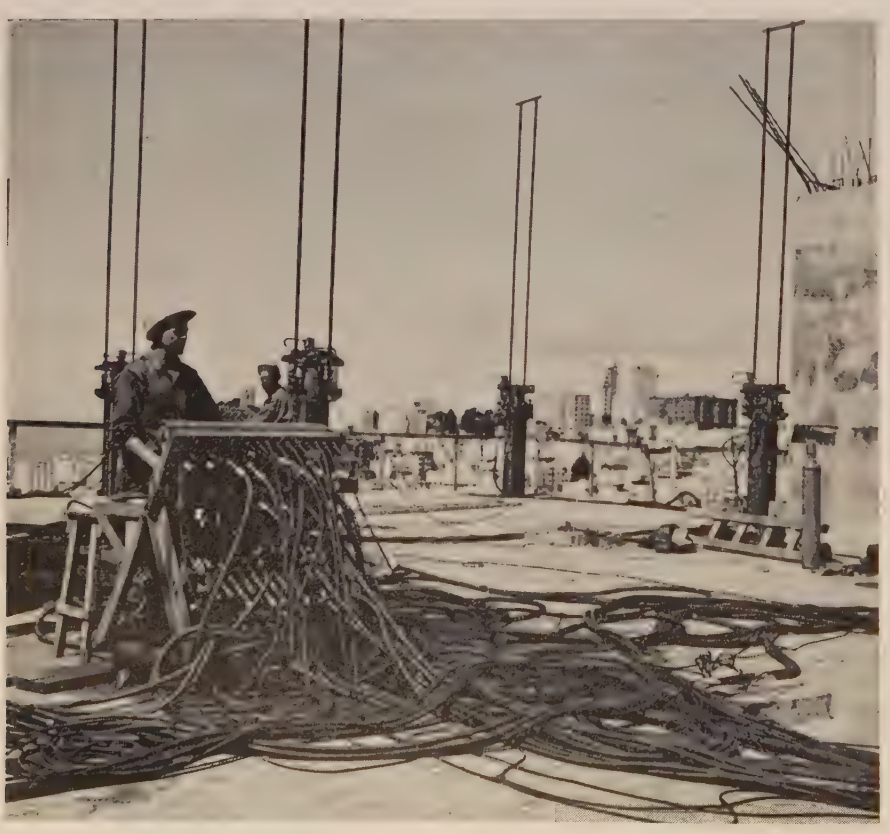
THE U. S. Air Force has released $2,780,000 for military construction work at Nellis Air Force Base, Las Vegas, Nevada, and Davis-Monthan Missile Base, Tucson, Arizona, it has been announced by Col. Edward C. Gill, USAF South Pacific Regional Civil Engineer.

At Nellis Air Force Base, $780,000 will be used for construction of four aircraft maintenance docks. The docks will augment the present hangar facilities and will be used primarily for inspection and repair of fighter type aircraft.

In Arizona, $2,000,000 will be used for construction of roads, waterwells, and utilities at Davis-Monthan Missile Base. The work will consist of paved access roads from existing public roads to the TITAN intercontinental ballistic missile sites to be built in the Tucson area. Also included, is the development of a potable water supply for each site. Where possible, water will be obtained from commercial sources. Where no such supply is available, wells will be drilled and a water treatment facility constructed.



CONCRETE SHAFT at right is one of three towers slip-formed in advance. Floor slabs were tied to towers during lifting, thus eliminating need for guy wires and cross-bracing. Notches in edges of slabs, insets for ends of prestressing tendons, will be filled with concrete.



LIFTING SLABS was done with two central consoles each controlling 10 jacks. In photo, slab is nearing top of columns. Note lifting rods raised above column tops. Operator is Kevin Walsh.

Record apartmen

Combinin

IF YOU OWN a choice lot and you want to build an apartment building with a height limit, what construction technique should you use? George P. Belcher, owner-contractor of the 1800 Pacific Building now nearing completion in San Francisco, believes he has the answer—the lift-slab method. With lift-slabs, the building can occupy every square inch of the lot, because there is no need to make allowances for temporary exterior scaffolding. And, since floor thickness is less than half that of a conventionally reinforced cast-in-place slab, an additional floor is possible for every 50 or 60 ft. of height. The Pacific Building is 113.75 ft. high measuring from the basement and has 13 floors, compared to 11 floors if standard design practice had been followed.

Despite the attractiveness of this logic, most builders would have stuck to cast-in-place methods in this case for the simple reason that nobody in the world had ever tried to erect a 13-story structure with lift-slabs. But that didn't bother George Belcher. Just because it had never been done did not mean it wasn't possible. All you needed was confidence in your ability and a little courage—and he had both. Furthermore, he had the assurance of such experts in the lift-slab field as A. E. Waegemann, consulting civil engineer, and C. H. Vagtborg, president of the Vagtborg Lift-Slab Corporation. So the decision was made.

Right from the start Belcher tempered his confidence by drawing upon the finest brains in the business. In addition to Waegemann, he chose the late H. C. Baumann as Architect, and Professor T. Y. Linn as prestressing consultant. For his project engineer, he hired Herbert Korner, who was deeply involved in the design of the building.

This concentration of construction experience and brain-power resulted in several money-making ideas at the outset. All of the guy-

...ilding goes up fast by—

...ft-slabs and slip-forms

Daring use of modern methods pays off by cutting labor costs and construction time on lift-slab structure of record-breaking height. Giant German crane eliminates scaffolding and material elevators.

ing and cross-bracing customary in lift-slab construction was eliminated by building three concrete elevator and stair towers first and using them to stabilize the slabs during lifting. The towers are heavily reinforced to withstand possible earthquake loads.

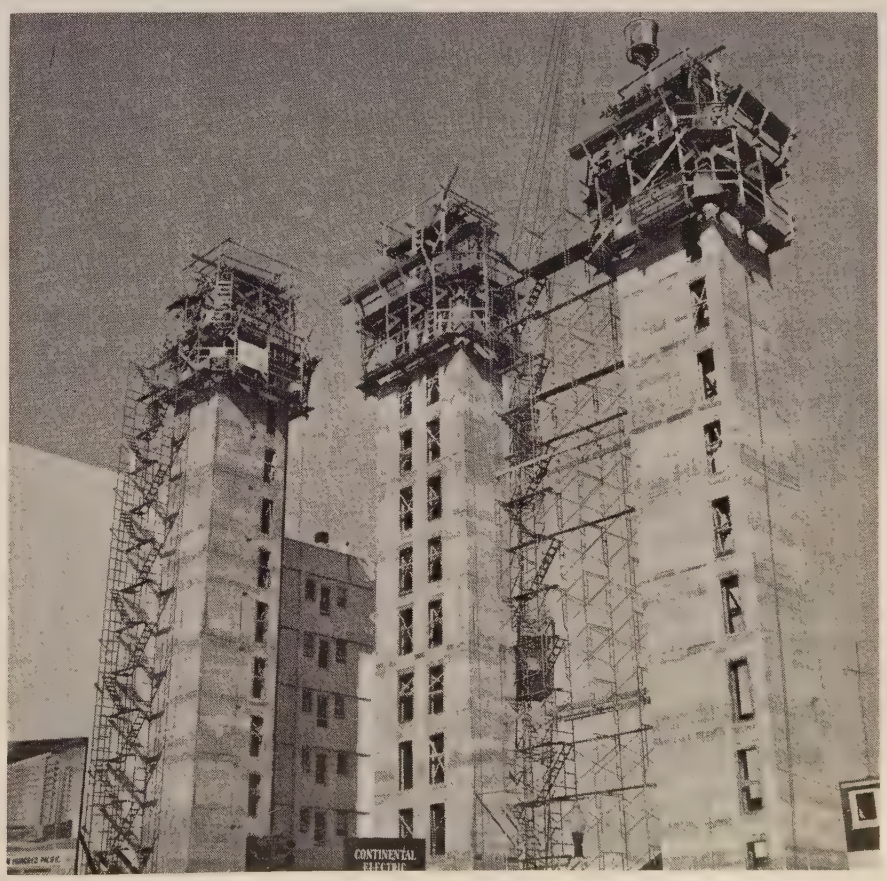
The pioneering spirit was shown again in the way the towers were built. All three towers were slip-formed. A tolerance of 1½ in. in vertical alignment in the 115-ft. high towers was allowed, though only ⅜ in. was finally measured. The small tolerance was established in order to keep the size of openings in the slabs to a minimum and make it easy to anchor the slabs to the towers during lifting. Concrete was supplied to the slip-forms by a 200-ft. high Beatty-Pecco crane, the first of the European tower-type cranes used in Northern California, and one of the first in the West. Without taking a chance on the unfamiliar crane, it would have been necessary to use scaffolding between the towers to support a runway and a material elevator, all of which would have to be raised as the towers grew in height. The crane was mounted on 30-ft. long tracks 14 ft. apart, which enabled it to cover the entire 102.6 x 105 ft. site. The operator has only two controls to manipulate and can position himself at the bottom, middle, or top of the tower. The unorthodox rig worked beautifully and reduced material handling costs by about 20%. When the towers were completed the crane was dismantled and returned to the leasor, as it was not needed for pouring the slabs (a concrete buggy operation at ground level) or lifting the slabs. Details on the operation of the Beatty-Pecco crane on this project were given in *Western Construction* on page 92, January 1960.

The outstanding accuracy of the slip-form operation was achieved by close job supervision. One man worked full time with a surveying instrument checking the positions of the forms on the towers. A system of sighting was used which showed when the vertical alignment was as little as ⅛ in. off. This information was relayed continuously to Belcher, who had telephone connections with the men at the top of each tower. He advised them of their position and told them how to speed up or slow down their individually-operated hydraulic jacks to bring the tower back into plumb.

The combined height of the three towers is 368 ft., which was placed in 123 working hours for an average 18 in. an hour per tower or a total of about 30 ft. per day. A 50-hr. week was worked during slip-forming. Because of the heavy reinforcement in the towers, splice joints were staggered. Cold joints were not allowed at splice joints or where the towers would be subjected to high local stresses.

The forms climbed up 1-in. diameter steel rods using jacks rented from B. M. Heede, Inc.

The slabs rank among the largest ever lifted, measuring 81 x 106 ft., 8-in. thick. Each weigh 630,000 lb. The slabs were cast in the basement, one on top of the other like a stack of pancakes. It was 13 weeks from the time concrete placement started on the first slab until the 13th slab was finished and all were ready for fitting—an average of one slab per week. Concrete placement for a slab usually started at 8:00 in the morning. Concrete was brought to the site in transit-trucks by Consumer Rock and Cement Co., and placed manually with buggies. It took about 3½ hr. to place



SLIP-FORMING of towers was done simultaneously using jacks made by B. M. Heede, Inc., at rate of 18 in. per hr. per tower. Concrete was lifted to forms by giant German tower crane.

the necessary 210 cu. yd. By 4:30 in the afternoon finishing with power trowels was completed and the surface was sprayed with Thompson Water Seal. Next morning the slab was firm enough to walk on (although even the faintest outlines of footprints were transferred to the underside of the next slab and ended up on the ceiling) and workmen began placing reinforcing steel, prestressing cables, blockouts, and mechanical and electrical conduits—which took a week. Just before concreting began the surface of the previous slab was given another spray coat of water seal. There was not the slightest difficulty in separating any of the slabs.

To reduce dead load, lightweight aggregate (Haydite) was used, giving the concrete a weight of 109 lb. per cu. ft. Specifications called for a concrete strength of 3,500 psi. at 14 days and 4,000 psi. at 28 days.

The slabs were lifted in groups of two by hydraulic jacks placed on top of the twenty box-section steel columns. The patented Vagtborg jacks were controlled by two central consoles, each console operated by one man regulating 10 jacks.

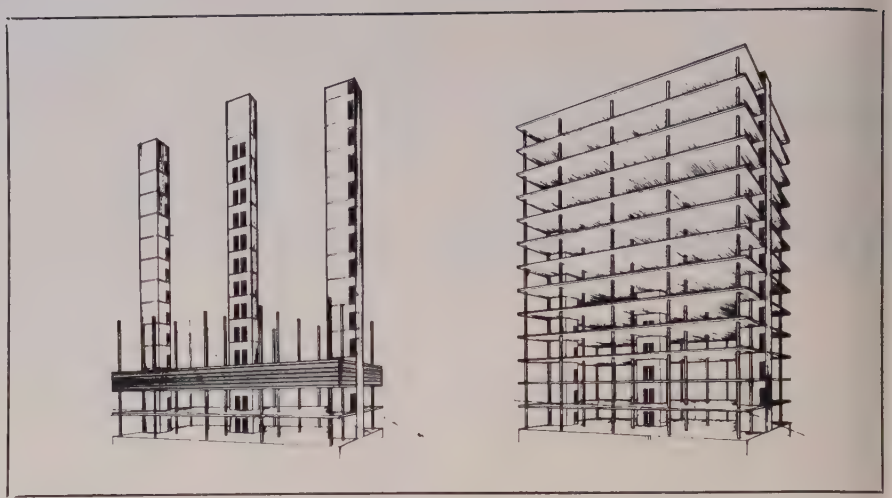
Lifting proceeded according to standard lift-slab practice. Slabs were lifted to the tops of the columns (leaving bottom slabs behind at permanent floor elevations) and temporarily secured. Then jacks were removed, the columns extended, and jacks replaced. On this project there were six "lifts"—32 ft., 18 ft. 9 in., 20 ft. 2 in., 15 ft. 10 in., 18 ft., and 11 ft. 6 in.

Steel collars were cast into the slabs at the columns. The temporary positioning of the slabs while columns were being extended and jacks reset was done by placing steel wedges between the collars and shear plates on the columns and lowering the slabs slightly to grip the wedges. When lifting resumed, the wedges fell out. At permanent locations, the slabs were held in place by welding the wedge to the shear plates and columns.

All the floors were in place 8 ft. 9 in. apart after 44 days of lifting.

In a smaller building all of the column steel is placed on the top slab before lifting starts, but this structure's 13 stories resulted in more steel than could be conveniently stored on the top slab at one time. When the slabs reached the 50-ft. level a crane was used to lift the remaining column sections to the top slab.

Welding was used to join column sections together.



DRAWING made by Vagtborg Lift-Slab Corporation shows design of building. Columns were extended and jacks reset six times. Slabs were lifted two at a time. Columns were welded.

KEY MEN on project were (left) George P. Belcher, contractor-owner, and Herbert Korner, engineer-in-charge. Note maze of reinforcing and utility conduits in floor slab. On columns in background are steel collars which are cast into each slab to facilitate lifting.

Prestressing was done by the post-tensioning method using tendons made of ¼-in. diameter wires in groups of 6 to 14 produced by the Prescon Corp. Each wire was covered with an asphalt emulsion and the cables of wires were wrapped in a tar-coated paper to prevent rusting and bonding with the concrete. Pulling was done from one end of the cables only, when the concrete reached a strength of 3,500 psi. At the stressing end of the cable the wires spread out into a 3-in. diameter washer which is moved about 6½ in. per 100 ft. of slab when the hydraulic jacks introduced tension into the wires. When the wires elongated the proper amount the washer was fixed in position by inserting steel shims between it and a steel plate at the edge of the slab. After several days the elongation is checked and, if correct, the washer, shims, ring, and wire stubs are imbedded in concrete. At the elevator towers, it was necessary to cut slots in the walls to make room for the jacks.

The prestressing, in addition to reducing the necessary thickness of slabs, eliminates deflection, even in one area where there is a distance of 39 ft. between columns.

George P. Belcher is contractor and owner, assisted by Herbert Korner as engineer-in-charge. Architect was the late H. Baumann. A. E. Waegemann is consulting civil engineer. G. L. Gendler and Associates are mechanical and electrical engineers. Reinforcing and structural steel was provided by Yuba Consolidated Industries, Judson-Pacific Murphy Division.

LEVEL SECTION of conveyor shown moving at about 800 fpm. Belt is treated for resistance to damage from abrasion, heat, sun and tension. Total lift is 102 ft.

Moving 3,500 tons per hr. of fill to Abiquiu Dam

ONE of the largest conveyor belt systems in the West is moving excavated material at a peak rate of 3,500 tons per hour a distance of 4,315 ft. over rugged terrain and in blistering heat near Abiquiu, New Mex. The installation is at Abiquiu Dam being built by the Corps of Engineers, and reviewed in *Western Construction,* July 1960.

The conveyor, designed by the Conveyor Co., Los Angeles, in conjunction with the Mechanical Goods Div., U.S. Rubber Co., will enable completion of the project months sooner than forecasted. Approximately 14,000,000 tons will be handled on this belt with a sustained average of about 3,000 tons per hour on a 20-hr. basis.

The 48-in. belt is designed to move at about 800 fpm. and drive power is provided by two sets of General Motors 6-71 series diesel engines developing approximately 900 hp. These units are mounted side by side and are linked to a geared speed reducer that applies power to an output shaft and a single lagged drive pulley. Output shaft speed is approximately 1,020 rpm.

One of the problems involved with extremely long centered conveyor belts, designed for heavy loading, is the length of time allotted for starting the belt. Abrupt starts under full load could cause belt damage from severe tensions.

Starting mechanisms, designed by Conveyor Co., gradually accelerate the fully loaded belt to operational speed in about 30 sec. For stopping, power is gradually throttled down until the belt is traveling at less than 20 fpm., after which an air brake halts its motion.

The belt is designed for maximum operating tension of 46,800 lb. at peak load. U.S. Rubber engineers designed the belt to support more than 1,000 lb. per in. Made of 5-ply Uerex-Nylon fabric, the belt incorporates use of special high density rayon wrap threads and heavy Nylon fill members. To protect this carcass, a cover of high tensile rubber was specially compounded to resist temperature extremes.

A take-up mechanism to adjust the belt during empty operation, start-up tension and temperature expansion-contraction allows for travel of 58 ft.

Special controls prevent overloading and regulate feed rate onto the conveyor to avoid empty spots in declining sections of the system. In all, the belt has three inclining sections, one declining section and two level sections. Total lift from tail to head pulley is 102 ft.

The belt was shipped to the job site in five sections, each roll measuring approximately 11 ft. in diameter.

Footage for each roll was about 1,765 and combined weight of the shipment exceeded 72 tons.

The main contract is held by Mittry Construction, Los Angeles, and was awarded last year on a bid of about $8,500,000.

LOADING STATION of the conveyor is 4,300 ft. from the terminal. Automatic controls govern the feed-rate onto belt. Operator monitors both ends with closed circuit television.

How to get a square deal in court

Contractors often fail to get satisfaction when making justified appeals for additional payment. To improve your chances, here are a few tips from a lawyer who has represented Western contractors for 30 years.

By RALPH BUSHNELL POTTS
Lawyer
Seattle, Washington

THE AVERAGE CONTRACTOR, like other good citizens, would like to trust his fellow man, but when he is dealing with inspectors, engineers or other representatives of a Governmental agency, he does so at his peril. Whether a Government representative would like to be tolerant and helpful to a contractor, red tape and the supervision of the chain of command keeps him from going beyond the written limits of the contract and specifications. He has little discretion in the matter, although he will never admit it. I have listened to several colonels in the Corps of Engineers state they can and will settle claims in favor of the contractor if he is entitled to relief, but somehow they never so concluded. even when their own Board of Contract Appeals decided in favor of the contractor.

". . . the contractor should always protest in writing any unfair order, whether it appears to be serious at the time or not."

From years of experience in counseling contractors on Government projects, I have arrived at some pretty definite conclusions. The first is that the contractor should always protest in writing any unfair order, whether it appears to be serious at the time or not. He may need it badly later on and whether the particular matter assumes importance at the time of negotiation or not, it can always be used for trading purposes.

"The contractor should appeal adverse findings made by the contracting officer . . . to the head of the department. . ."

The contractor should appeal adverse findings made by the contracting officer or his representative to the head of the department with which he is contracting. All hope of recovery for denied claims is lost at this point unless the contractor has made this written protest and appeal.

These written protests need not be lengthy nor made by a lawyer. One good example is in the case of Orino vs. The United States, decided in the United States Court of Claims on June 1, 1948. The contractor in this case was told by one of the engineers of the U. S. Bureau of Reclamation that he must take out a ledge of rock from the Deschutes River, because this ledge prevented the water coming into the headworks of the irrigation canal which the contractor was building. This ledge was beyond the stations set out in the location map and mentioned in the contract and specifications. The Government relied upon a provision in the contract which required the contractor to do everything necessary to carry out the objectives and purposes of the contract. This, by the way, is a stock phrase in most Government contracts and is used frequently by Government representatives when they have nothing else to base their decisions upon.

Mr. Orino became so upset at the unfairness of this demand that he neglected to make any protest in writing. However, his timekeeper wrote one sentence on a note which he mailed to the contracting officer, which read:

"The work we are now required to do we consider outside of the contract and shall treat as force account."

The District Engineer, to whom the note was addressed, testified that he never received the note. However, the court held that it believed that this note was sent and received by the engineer and that it was legally sufficient.

". . . always ask (in writing) for an extension of contract time upon receiving a proposal for a change order of any kind."

Before we leave this subject of the contractor making written protests, it might be well to add a couple of other things that the contractor always should do promptly and put in writing. One of them is to always ask for an extension of contract time upon receiving a proposal for a change order of any kind. This is particularly important where there is a penalty for going over the contract time, but may also be used for bargaining at the conference table. If the request is denied, a simple note taking exception to that fact should always be sent to the contracting officer. There is also another important thing for contractors to remember in this regard. Always address the written letter of protest, or appeal, to the contracting officer and send copies to the inspector or representative on the job. Too many times the Government has successfully maintained that the person to

(Continued on page 52)

RALPH BUSHNELL POTTS brings to these pages a happy combination of skills and knowledge in the fields of construction, law, and writing. Even before his graduation from the University of Oregon Law School in 1929 *he had a great deal of contact with construction, working for contractors on several highway projects in Oregon. His first legal job was with an insurance company specializing in contractors' liability claims. His first case in the Court of Claims arose out of the construction of Grand Coulee Dam, and he has represented construction firms on Government contracts since that time. He has published three books, including a novel, SIR BOSS, the story of Seattle's labor troubles in* 1930's.

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IN THE COURTS

(Continued from page 48)

whom the contractor sent his written protest had no authority under the contract and that the contracting officer never knew of the writing.

It is very important for the contractor at the very beginning of the job to carefully read the general conditions of the specifications so that he knows the time limits within which he has to write his written protests. Usually the time limit is worded something like this:

> *"He shall immediately upon such work being demanded of him ask for written instruction or decision whereupon he shall proceed without delay to perform the work and within ten days after date of the receipt of the written instructions, he shall file a written protest with the contracting officer."*

Another helpful writing is the daily log or record of the job. Very few contractors keep such a record, but even if it is only a pencil scratched memorandum in a cheap diary, it is of invaluable assistance to the contractor when he is confronted with a neatly kept log of the inspectors and engineers. Remember, they put it down every night and no man's memory can fill in all the details several months later. Moreover, the contractor's foreman or superintendent who kept, or should have kept, the log may not be available at the time this information is needed, but if he has written down the important things that happened during the day, the contractor has it for his use and for his attorney's use, if it is necessary to proceed to hearing on the claim.

". . . have a special bookkeeping and accounting made of everything that goes into extra or additional work."

There is still another very important written record that should be kept by the contractor, but this time it is on the bookkeeping side. I don't mean the regular accounting of the job, but a special accounting where the contractor is required to do something which he considers outside of the contract and for which he is going to make a claim for an extra. This additional expense can often be the means of saving the contractor a great deal of money in witness fees and in loss of damages. Remember, the burden is on the contractor to prove damages with exactness.

The Orino case above cited, is a good case in point. The contractor's bookkeeper kept no separate accounting for removing this rock ledge from the Deschutes River, although the work of excavating was altogether different from the dry land excavation for the ditches. The river excavation was all subaqueous and was done at great expense, but the costs of the wagon drill, special equipment for the raft and the dragline operation, the standby time of the trucks waiting for the dragline to fish in the river and pull out the blasted rock, and the time of the drivers and the use of the trucks used for this particular part of the job, were not separated from the rest of the project. When the case got to court it was impossible to prove the exact damages and the writer, as attorney for Orino, had to resort to using expert witnesses, which is a very inadequate and expensive way of proving simple costs. They could have been proved easily by the bookkeeper, if he had kept a separate account for this work. In other words, when you have the exact expense of an extra kept separately, there is no question about the amount involved, but where the contractor cannot say what his exact cost was and has to hire expert engineers to testify what, in their opinion, is the cost of taking out a subaqueous cubic yard of rock and is rebutted by the Government's engineers, who testify to a much smaller cost. The court is faced with deciding between the two and usually comes up with a compromise. Too often the contractor loses a lot of money, not because he can't win his case, but because he can't prove it adequately.

". . . most contractors are only dimly aware that . . . Armed Services have set up . . . Armed Services Board of Contract Appeals."

There has been since the war a new development in the handling of claims on Government contracts. I think most contractors are only dimly aware of it. It used to be that everything had to go to the Court of Claims if over $3,000. Since the war the different Armed Services of the United States have set up what is known as the Armed Services Board of Contract Appeals.

The Armed Services Board of Contract Appeals is the authorized representative of the Secretaries of the Army, Navy, and Air Force in hearing, considering and determining as fully and finally as might each of the Secretaries:

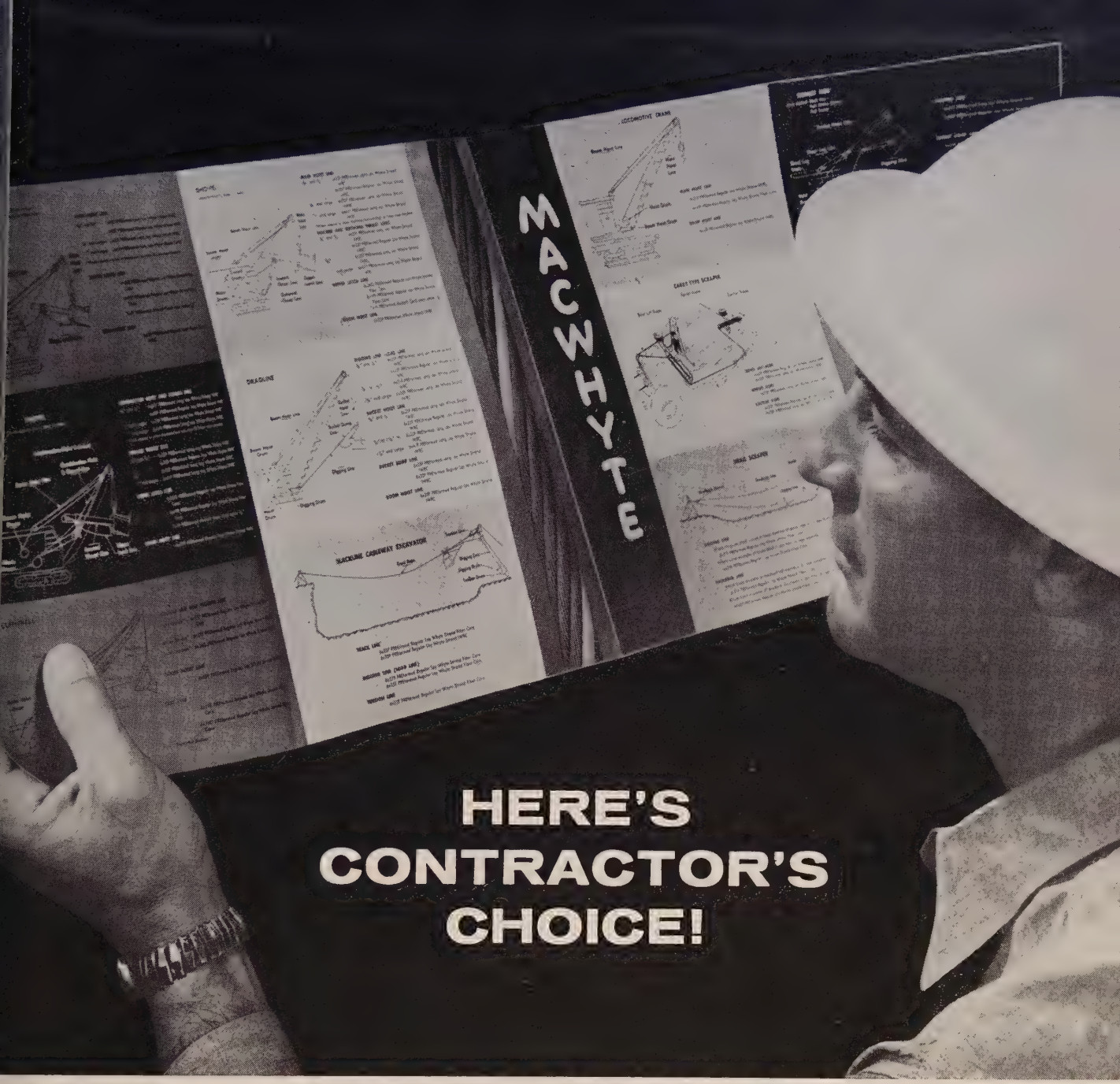
> *Appeals by contractors from decisions on disputed questions by contracting officers or their authorized representatives or by other authorities pursuant to the provisions of Armed Services contracts requiring the determination of appeals by the head of a Department of the Armed Services or by his duly authorized representative or board, or pursuant to the provisions of any directive whereby the Secretary of a Department of the Armed Services has granted a right of appeal not contained in the contract.*

When an appeal is taken pursuant to a disputes clause in a contract which provides only for appeals from decisions on questions of fact, the Board may in its discretion hear, consider and decide all questions of law necessary for the complete adjudication of the issue. Unless the contract provides otherwise, when in the consideration of an appeal it appears that a claim for unliquidated damages is involved therein, the Board, insofar as the evidence permits, makes findings of fact with respect to such claims without expressing opinion on questions of liability.

When a contract requires the Secretary of a Department of the Armed Services personally to render a decision on the matter in dispute, the Board submits its findings and recommendations to the Secretary of the Department.

". . . panels of the Board . . . hold hearings as divisions, a designated member, or authorized examiner."

There are three panels of the Board: the Army, Navy, and Air Force. In general, appeals are assigned for decision to the panel of the Department whose contract or procurement is directly involved. Each of the panels acts in divisions, which normally consist of three or more members. Hearings may be held by a division, by a designated member, or by a duly authorized examiner. The decision of a majority of a division constitutes the decision of the panel and of the Board, provided that all three panel chairman signify that in their opinion a review by the full Board is not required. If a majority of the



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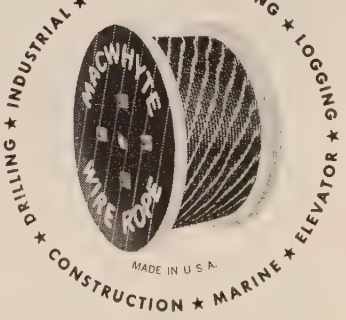

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members of a division do not agree upon a decision, or if one or more panel chairmen do not waive review by the full Board, determination of the appeal is made by a majority of the members of the full Board.

"A word of caution about a hearing before the panel . . ."

A word of caution should be given about hearing before the panel of the department whose contract is directly involved. It is the author's strong feeling that unless this panel has on it the full complement of three persons, that the contractor doesn't stand much of a chance, unless the members of that panel are lawyers or former Judges.

The writer, who has watched dozens and dozens of contractors go through the laborious and futile work of appearing before the contracting officer and his representatives in arguing for claims, which have always been denied, found a great deal of satisfaction on occasion appearing before the Corps of Engineers' division of the Armed Services Board of Contract Appeals. I attended two hearings which were held at Graveley Point, near Washington, D. C. In each hearing the Board consisted of three members, two of them being retired engineers of the Corps of Engineers, and the third independent member being a lawyer and a former Judge. The writer is convinced that his client, the contractor, would have gotten nowhere without the presence of this third independent member, the former Judge.

Everything the other two members of the board said indicated, although they may not have been aware of it, their prejudice against the contractor. It was the impartial, judicial reasoning of the lawyer on the Board that succeeded in getting a majority of the Board to find for the contractor, with the result that in one case the contractor got $120,000 and in the other over $300,000. If the contractor loses before the Board, he may then start his case in the Court of Claims of the United States.

The Armed Services Board of Contract Appeals have now made rules and one of them provides for an election wherein the contractor can stipulate with the Government that the decision of a *single* member of the Board will be the decision of the Board itself. A contractor can readily see the danger in agreeing to a *single* member of the Board. Although a former engineer or retired Government employee, having spent most of his life representing the Government in construction projects, will undoubtedly try to be fair, it is asking too much to expect him to have the judicial attitude of a man trained in the law and having the experience of sitting on the bench. Therefore, it would be a two-to-one gamble that instead of getting the lawyer to hear his appeal, he would probably get one of the two former engineers or retired members of the Corps of Engineers.

The writer, perhaps being prejudiced himself, nevertheless, believes that the contractor might just as well hasten the thing through the Board and get on to the Court of Claims, because he shouldn't expect a favorable result from the one member of the Board. Just how this may be accomplished the writer has yet to find out, for the reason that his clients have always wanted to try to get a favorable decision from the Armed Services Board of Contract Appeals, thinking to save the expense of going through the Court of Claims. However, I believe if the contractor requests the department head or Board to act expeditiously upon the appeal, so that he can proceed to the Court of Claims where he believes the dispute will ultimately be determined, there will be a quick decision sustaining the findings of the contracting officer and then the contractor may at once start his case in the Court of Claims.

The reason the contractor should not try to start his case in the Court of Claims without this going through the motions of making an appeal to the department head, which may be referred by the department head to this Armed Services Board of Contract Appeals, is because our courts, including the Court of Claims, have held, in an almost unbroken line of precedence, that a party to a contract must first exhaust all the remedies provided for in the contract before starting an action in the court.

". . . the State, or School District or City have nine times out of ten appointed an advocate as their arbiter."

So far in this article, I have just mentioned contracts of the United States Government. With respect to State Highway contracts, School District contracts and other public work contracts with either State or Municipal Boards, practically the same caution should be observed. In most State Highway contracts there is a provision for appeal to the State Highway Engineer and a definite number of days within which such protest or appeal in writing must be made. The contractor should read these contracts with a great deal of care, also, and in case there is a provision for an arbitration, the contractor is faced again with a new problem.

"The contractor generally suffers, not the Governmental agency."

In the early '30's a great deal of hope was placed upon voluntary Boards of Arbitration. Many people believed that arbiters, acting intelligently and impartially, could solve a lot of problems and prevent litigation from continuing or starting, as the case might be. However, this provision for arbitration has not worked out that way as far as contractors are concerned. In the first place, the State or School District or City have nine times out of ten appointed an advocate as their arbiter. Too often the contractor has appointed another contractor or friend, instead of his own lawyer, as his member of the Board, with the result that the third arbiter chosen by the first two, taking the line of least resistance, sides with the arbiter who is most willing to give in and effect a compromise. The contractor generally suffers, not the Government agency.

When it is necessary to comply with an arbitration provision in the contract, and this has to be complied with before a court action may be begun, the contractor should appoint his attorney. Then, of course, the Governmental agency will appoint an advocate, either an engineer or an attorney, or someone devoted to the Governmental side of the case, and the two together will choose the third man who, really, becomes the Judge. Peculiarly, an award made by a Board of Arbitration is seldom satisfactory to either of the parties and so within the number of days provided for in the contract, an appeal should be made.

To repeat: Every protest and appeal must be in writing and made and served within the time provided for in the contract; Contractors should also have a log or daily diary kept by someone on the job; and if he is required to do extra work, he should have a special bookkeeping and accounting made of everything that goes into the extra or additional work. These very simple precautions will save money, worry and a great deal of time for the contractor.

17 ARMCO STEEL BUILDINGS SERVE CONTRACTORS AT THE NIAGARA POWER PROJECT

Artist's sketch of completed Niagara Power Plant

New steels are born at Armco

Main Office Building

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Turbine Parts Warehouse

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Compressor House

Tire Service Building

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Armco Steel Buildings, ranging in size from 12 by 16 feet to 100 by 300 feet and totalling 182,486 square feet, serve contractor needs at the gigantic Niagara Power Project of the Power Authority of the State of New York. Some of these applications are pictured here.

While these are job-site installations, contractors also utilize Armco Steel Buildings for their own permanent offices, shops, and warehouses. Low initial cost is an important factor, but these buildings are also preferred for their appearance and high quality.

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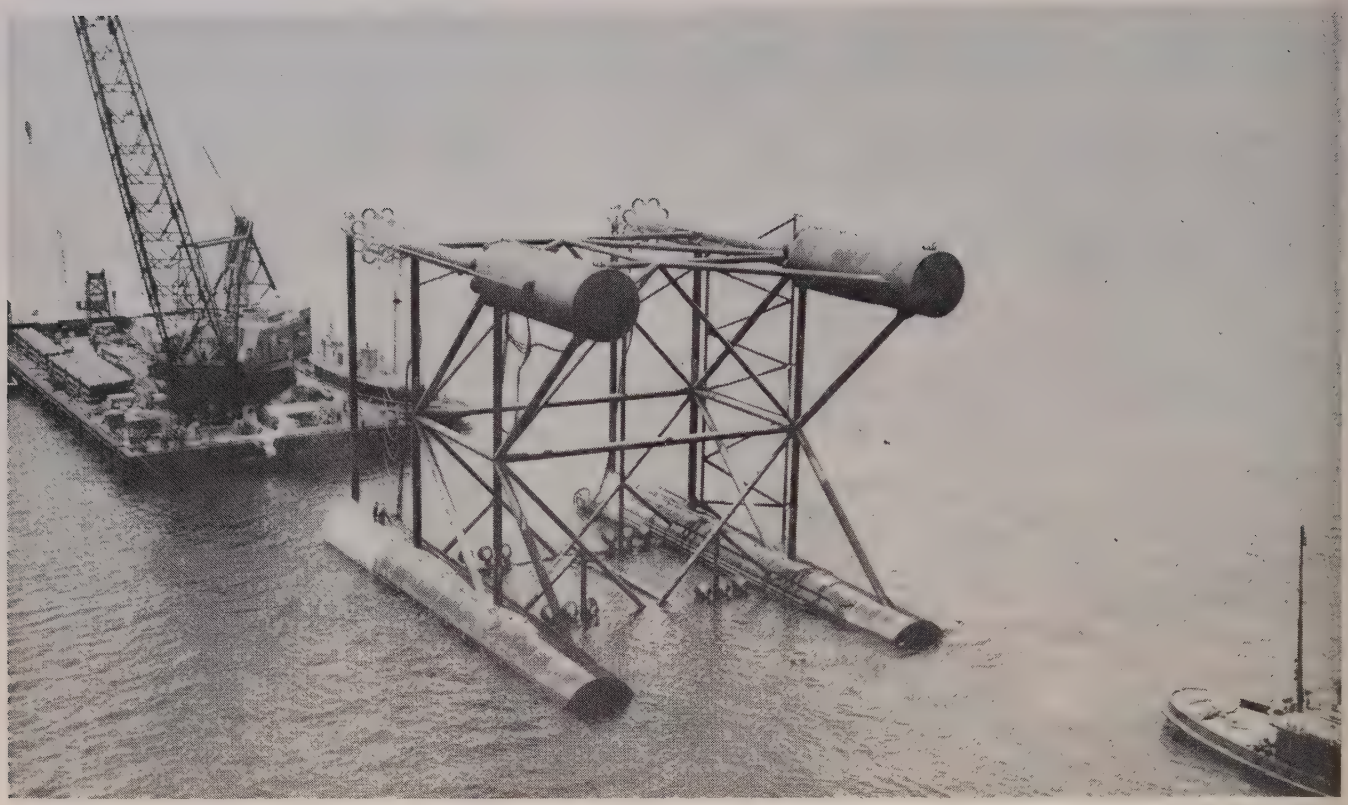
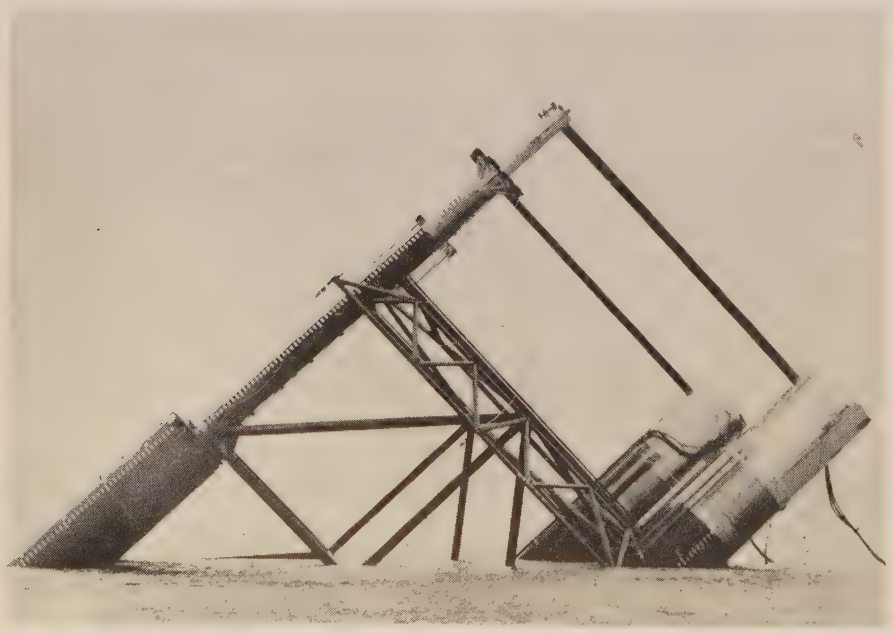


TOWER base is towed to the site on its side, supported by two full-length pontoon legs. Huge derrick barge will be used to place superstructure.

"Tilt-down" method sets drill tower

Pontoon legs of 148-ft. drilling platform base carefully ballasted with water to sink it into vertical position. Lifts of 248 tons featured in construction of $3,000,000 structure.



BALLASTED legs swing downward to bring the top of the tower base out of the water. Hoses, right, carry compressed air from barge to control rate of flooding in compartmented tanks.

A $3,000,000 offshore drilling platform is being completed by Yuba Erectors well ahead of schedule, using a novel "tilt-down" method of placing the tower base, and a giant derrick barge to place preassembled components ranging up to 248 tons.

Located 2 mi. off the coast at Summerland, Calif., about 6 mi. south of Santa Barbara, the drilling platform "Hilda" (officially Summerland platform No. 2) will be operated by Standard Oil of California, Western Operations, Inc., for itself and Humble Oil and Refining Co.

The structure was designed by Standard Oil engineers and manufactured under a number of fabricating contracts. The contract for erecting the tower at its offshore location in 106 ft. of water was awarded to Yuba Erectors.

The speed with which the massive tower has risen out of the Pacific is a tribute to its designers and planners. Components were fabricated and assembled in five ports along the Pacific Coast. They were

moved to the site in 24 days in a masterpiece of logistics.

Placing the tower

The tower, lying on its side, was towed to the site on two compartmented pontoon legs extending the full length of the base. (The two opposite legs have pontoon sections extending only part way up from the bottom.)

It was up-ended in the water by flooding successive compartments of the pontoons in a ticklish 30-minute operation with two engineers manning the console of valve and air pressure controls regulating flooding speed of the compartments and, consequently, speed of the tower's swing toward vertical. The end compartments of the pontoons were opened to start the tilting process. As these sections filled and tipped downwards, succeeding compartments were filled. Rate of ballasting had to be kept equal between the two pontoons to prevent the tower rolling over to one side or the other. When the tower had tipped sufficiently to bring the upper pair of legs down to water level, they were filled with water and the giant structure slowly settled into a vertical position, its legs extending about 95 ft. into the water, but still afloat 10 ft. above the bottom.

The tower was spotted on its site and all tanks ballasted to sink it firmly on the bottom. The ocean floor at this point is nearly level, and the tower was only 8 in. out of plumb. The contractor then drove a 2-ft. diameter pipe pile at each corner of the structure. Using these as anchors, the tower was jacked into true vertical and tied off. A total of 32 pipe piles were driven and grouted to provide a permanent anchor for the structure.

Deck sections

Placement of the succeeding deck sections, superstructure and machinery required a high degree of planning and coordinated scheduling, and involved use of perhaps the largest barge crane on the Pacific Coast, the McDermott derrick barge No. 11, of 250 tons capacity.

The three main deck sections, each weighing well over 200 tons, were fabricated and fitted with machinery and drilling equipment at the National Steel and Ship Corp., San Diego. Biggest of these components, 50x120x12 ft., weighed 248 tons. The other two weighed 234 and 220 tons. These, together with supporting trusses and pilings for the footing, were hauled to the tower site on the deck of the derrick barge at the same time the tower base was being towed out by McDermott tugs. Thus no time was lost in attaching the superstructure elements to the tower as soon as it was in place.

The barge crane shuttled back and forth between the tower and various points along the coast where its big capacity was needed to load the heavy components as well as to lift them into place. These included machinery, pumps, tanks, hoists, and the drilling platform's own 30-ton whirler crane. Additional parts, the heliport which will top out the structure and other deck units, were towed to the job aboard a second barge.

Ahead of schedule

Under the contract, the barge crane was supplied by Standard Oil for a maximum of 35 days. Careful scheduling enabled Yuba Erectors to clip 11 days off this maximum and release the barge crane after 24 days.

The new platform, Hilda, is located about 2 mi. from "Hazel" an earlier offshore drilling rig. When completed the $3,000,000 structure will have facilities for drilling up to 24 wells, two at a time if desired. It rises 217 ft. to the tops of its two derricks. Its main deck is 120 ft. square and 58 ft. above water level.

Electrical power for the drilling operation, personnel quarters and all essential power uses will be supplied by marine cables from shore. The cable also will carry communication lines.

Locating the tower

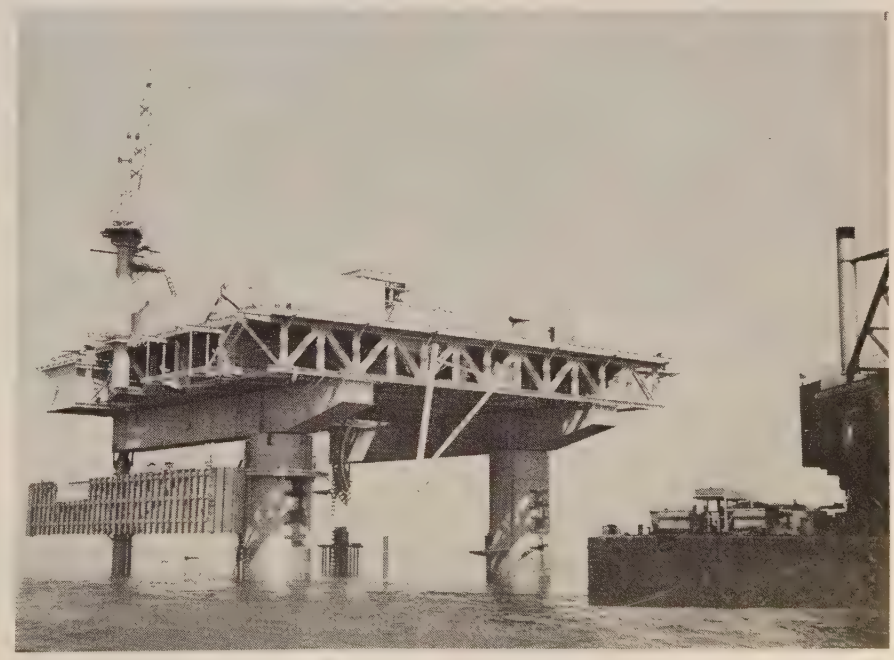
Radio direction finders were set up on the derrick barge and tuned to receive local radio stations to locate the exact site of the tower in the event foggy weather prevented taking visual sights. However the tower base was towed out during clear weather, and Coast Guard triangulation stations were used to obtain the exact position.

Personnel

Yuba Erectors' project manager is A. J. Tokola; job superintendent is Bill Choate. John Darby of Earl & Wright is project engineer for Yuba's consulting engineers on the erection project. Earl & Wright was also Standard Oil's consultant on design of the platform. General foreman of the Yuba erection crew is Lee Boswell.

Standard of California staff is headed by N. B. Shumate, project supervisor. R. L. Smith is resident engineer and G. F. Borrmann, structural engineer.

Sub-contracting to Yuba were Enterprise Electric Works, San Francisco, and the Ventura Pipe Construction Co., Ventura, Calif.



DECK units and supporting trusses in place on tower base. Preassembled deck components weighed up to 248 tons. Completed platform will have heliport and personnel quarters.

CAL-TIE WIRE — For fast tying of rebars or welded wire fabric, equip your workers with this quality wire in the handy, belt-borne reel. Wire can't snag, kink or tangle and there are no loose ends to scratch hands or face.

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Land acquisition policy of C. of E.

A review of the principles and procedures of the Corps of Engineers as demonstrated by the securing of land required for the John Day Lock and Dam project. Partial relocation of the town of Arlington was a special situation.

By COLONEL PAUL H. SYMBOL, DISTRICT ENGINEER
U. S. Army Engineer District, Walla Walla
Walla Walla, Washington

NO Government agency is more cognizant of the hazards and headaches involved in a land acquisition program than is the U. S. Army, Corps of Engineers. A constant objective of the Corps over past years has been the developing and maintaining of public appreciation for the intended fairness of its policies and procedures involving acquisition of land necessary to its vast military and civil works programs.

Setting about to assure fairness and equity in the acquiring of 38,000 ac. along the Columbia River to be affected by the $400,000,000 John Day Dam, the Corps decided upon an open and direct approach to the property owners. The 70-mi. long reservoir to be created by John Day would involve about 2,300 privately-owned property tracts. Involved as well would be several river communities. The Walla Walla District of the Corps, assigned the designing and construction task, was also assigned the land acquisition responsibility.

By means of an informational program, the Corps first sought to establish the intent of the Government to pay a fair market value for property taken and to limit real estate requirements to the minimum acreage. Augmenting this was the Corps pledge to provide full cooperation in solving problems concerning the relocating of publicly-owned facilities and utilities within the river communities affected.

Public hearings and prepared informational brochures were the two principal media utilized to inform property owners of the methods by which their property would be evaluated, as well as the property owner's rights of recourse, protest and appeal.

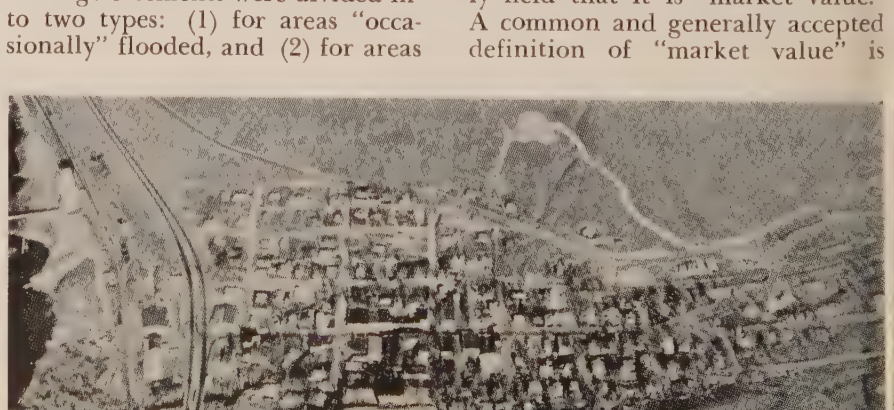
In its land purchase method the Corps further committed itself to acquiring "fee simple title," only on land needed for dam site construction areas, flowage areas, public access to the reservoir, and right-of-way for relocation of utilities, highways and roads.

On lands infrequently flooded or lands not severely eroded or needed for project purposes, "flowage easements" were to be considered for acquisition. This in itself was a marked departure from the land acquisition policy in effect during the building of the several completed multipurpose hydroelectric projects along the Columbia River.

At John Day Lock and Dam a considerable area would qualify for this flowage easement acquisition policy. Flowage easements did not divest the private owners of the underlying fee title. It did, however, prohibit construction of buildings for human habitation or for any purpose that might interfere with the project's operation. Flowage easements were divided into two types: (1) for areas "occasionally" flooded, and (2) for areas "rarely" flooded. Due to the proposed method of operation within the John Day Reservoir, the once-in-five year flood pool elevation and the maximum pool elevation were both nearly identical. This made easy the identification of tracts that might be considered under the flowage easement proposal.

As to personal property acquisition, the Corps was limited by authority of law on the John Day project to real property only, together with improvements thereon. Items of personal property such as readily removable furnishings, business stock and inventory were not included.

By law the taking of private property for public use is an "inherent right of the sovereignty." However, the Fifth Amendment of the Constitution guarantees the payment of "just compensation" for such taking. The Constitution does not define "just compensation" but the Federal Courts have historically held that it is "market value." A common and generally accepted definition of "market value" is



PRESENT — Arlington, Ore., will have its business district inundated by the pool formed by John Day Dam. Residences within the area will be moved to higher ground on the west side of Alkai Creek. Reservoir level will be about 30 ft. above the highway that runs along the river edge. When the change has been completed the town will appear as shown on the opposite page.

"the amount in cash, which in all probability, property would be sold for by an owner willing but not obligated to sell to a purchaser, desirous but not obligated to buy." The Corps in buying land by deed and the Federal Courts in emminent domain proceedings invariably instruct real estate appraisers to evaluate their real estate property on the basis of "market value."

Appraisers, where applicable, use three commonly-accepted approaches to value; namely, (1) the market status or comparable sales approach, (2) the reproduction costs less depreciation approach, and (3) the income approach. Only after every effort has been made by the Corps' land representative and the property owner to come to an agreement on the terms and conditions of the sale, does the Corps revert to the Federal Courts to decide the fair market value of the property through condemnation proceedings.

In arriving at the fair market value for property, the Corps utilizes two qualified appraisers for each parcel or tract of land. These are recognized appraisers experienced in the affairs of real property. Generally, at least one of the appraisers is not an employee of the Corps but is retained as an independent consultant on contract. Experience has shown that more often than not the Corps' staff appraiser has been higher in his estimate than the contract appraiser.

The two appraisals received by the Corps are reviewed by reviewing appraisers as a further precaution and protection to both the property owner and the Government. In addition, a coordinating review board composed of qualified residents of the geographical area of the project, familiar with property values within the vicinity, assists the Corps in reviewing appraisals to assure that offers are fair and reasonable. Generally, the higher appraisal of the two submitted becomes the Corps "offer price."

In its land acquisition policy of acquiring only necessary land, the Corps instructs its appraisers to make an investigation and evaluation of the entire plot ownership. This is to determine how a partial acquisition may affect the value of the remaining property. In cases where the remaining property becomes less valuable than it was before, an allowance for "severance damage" is included in the appraisal and over-all settlement.

In appraising flowage easement estates, techniques must be used which are not commonly used in appraising fee title. In general, the appraiser must estimate the depreciation accruing from imposition of the easement. The estimate is based on the predicted flooding, ranging from once every year at the low elevations near the low pool to once in 50 or 75 years at the high elevations or the maximum pool. The appraiser generally applies a formula ranging from nearly 100% depreciation on the frequently flooded tracts, to perhaps 5% on land flooded only once in a great while. Once the transaction is completed and payment made to the landowner for conveyance of the flowage easement, there are no further payments to or from the Government because of more or less frequent flooding than predicted.

Under current legislation, the Secretary of the Army is authorized to reimburse both property owners and tenants for certain expenses, losses and damages which they may incur in the process and as a result of moving themselves, their families and their possessions because of the acquisition of land for reservoir projects. Under this acquisition phase, the District Engineer notifies the landowner or tenant by letter of his or her right to make application for expense reimbursement, and furnishes the proper forms. The applicant for reimbursement is required to furnish supporting proof by an itemized statement of the expenses and damages incurred. These expenditures in no event can exceed 25% of the appraised "fair value" of the parcel of land involved.

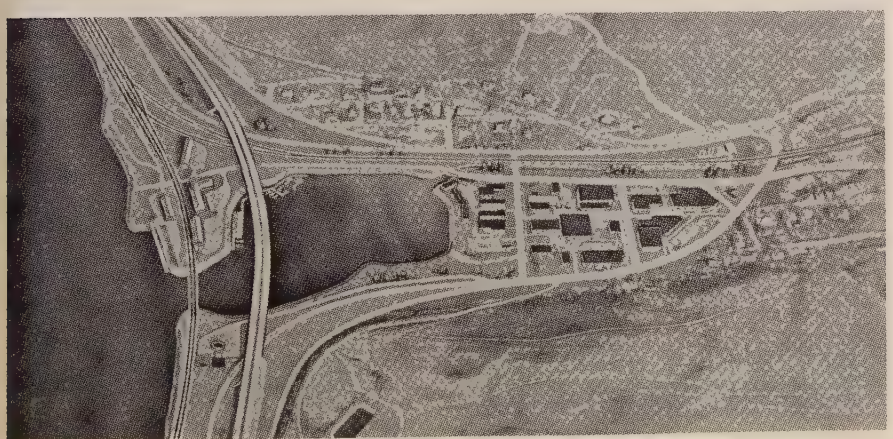
In cases where the title of the property owner is defective and cannot be "cured," the Corps does not pay the property owner immediately but files legal proceedings with the Attorney General to pass upon the adequacy of title. In such cases the estimated fair market value of the tract is deposited with the court, and the court endeavors to clear title at no expense to the property owner.

Under the current policy, the property owner is allowed to remain on the property after the Corps has acquired title, provided such a provision is in the contract and the Corps has no immediate need of the area where the property is located. The rental figure, where involved, is based on the current rental of private property within the area. Each such rental is negotiated on an individual basis.

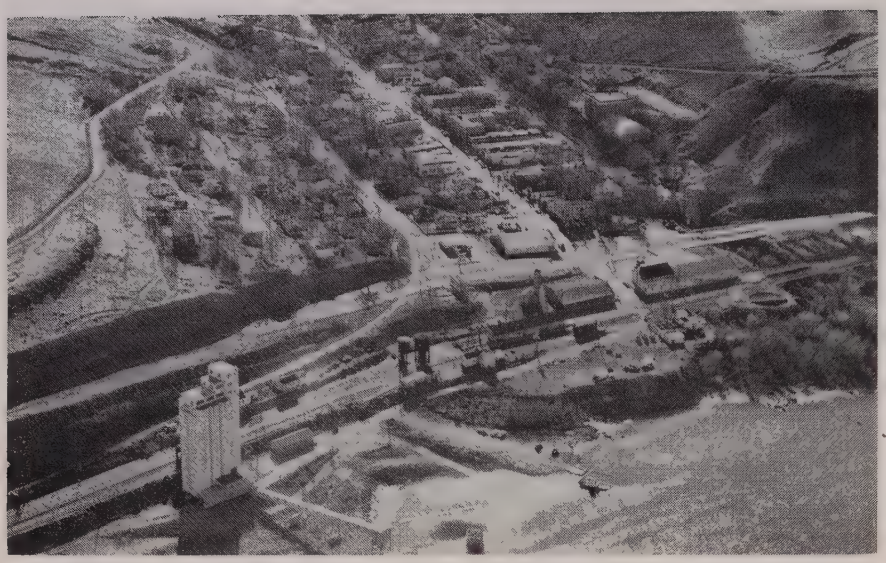
The acquisition of land for the John Day Lock and Dam Reservoir involves several small existing communities and considerable city-owned property, as well as large areas of farm land. In at least one case, planning for the relocation of the community was predicated on the city's securing special legislation from Congress of the United States for reconveyance back to the city of certain lands acquired by the Corps.

At Arlington, Ore., a plan for partial relocation of the city was developed by the city officials and the Corps of Engineers. The property owners of Arlington, by a petition signed by 80.5% of the property owners, favored a plan of relocation calling for the raising of a portion of the disturbed area by fill.

After placement of the fill, the plan called for the area to be con-



PROPOSED — A fill will raise the business section above the pool level. Both the highway and the Union Pacific Railroad will cross the creek valley on new bridges as shown. Arlington is located about 25 mi. upstream from the dam site. A petition signed by 80.5% of the property owners favored the plan of relocation. On the fill the conveyance went from Corps-to-city-to-private ownership.



LAND in Arlington could legally be purchased by the Corps for: (1) flowage, (2) partial relocation of the city, (3) highway and railroad rights-of-way. Also the Corps could relocate or replace municipal facilities. Within this legal framework the changes in the town were effected.

veyed by the Corps back to the City of Arlington for further reconveyance to private ownership for development of a business district, all to be without profit to the Government or the city. A new residential district was also to be established by the city on higher undisturbed ground.

While the Corps could not buy land for this residential area, it could assist legally through contract agreements with the City of Arlington for building streets, water lines, sewers, etc. Schools affected by the Corps' necessary land purchases could be relocated or replaced in an area above the inundation line. The Corps would purchase the land necessary within the disturbed areas for: (1) flowage, (2) partial relocation of the city, and (3) highway and railroad rights-of-way. Public utilities such as electrical power, telephone and municipally-owned utilities such as streets, sidewalks, curbs and buildings, including affected school buildings, would be relocated or replaced according to present standards or equivalent—all in accordance with formal contract agreements made between the owners and the Corps.

The City of Arlington assumed responsibility from the Government for all new residence or commercial areas including the acquisition of the filled area. It also assumed responsibility for determining the property that would govern private acquisition in these areas. This removed the U. S. Government from direct transactions for property after the project work was completed.

The land acquisition program now being carried on within the John Day reservoir is fast nearing the halfway completion mark. Within its legal limits, the Corps has sought to gain and hold the confidence and support of the communities affected. In all transactions it has endeavored to appraise the public and individuals of the purpose for which their property was being acquired. This policy of tact, fairness, patience and sympathetic understanding has been comparatively successful. The efforts of the Corps to work out details of an acquisition in a manner satisfactory to both landowner and Government seem to have been appreciated. The adherence of the Corps to its policy of acquiring only land necessary to the project needs seemingly has aided greatly in maintaining favorable public relations throughout the program.

Corps of Engineers plans for Northwest

BIDS will be opened and contracts let by the Army Corps of Engineers on 38 major (over $100,000) civil works projects totaling approximately $45,000,000 in the Pacific Northwest and Alaska during this fiscal year ending next June 30, according to Brig. Gen. Allen F. Clark, Jr., North Pacific Division Engineer.

Projects range from $100,000 to over $10,000,000 in estimated cost and include work on multiple-purpose dams, channel improvements, embankment protection work, rail and highway relocations, bridge construction, reservoir clearing, constructing buildings and constructing small-boat basins.

The Walla Walla District office of the Army Engineers will consider bids on 17 major projects totaling $37,092,000 in estimated cost. Largest contract, scheduled for bid invitation next March, is in connection with John Day Dam on the Columbia River. In the $10,000,000 bracket, it calls for grading Washington state highway No. 8, Rock Creek to Fountain; relocating S. P. & S. Railway from Rock Creek to Sundale; and Klickitat County road relocation. Six other John Day Dam contracts, each costing over $1,000,000, will be put out for bids between January and April, including three bridge construction projects. The district will call bids in February for construction of roads, parking facilities, launching ramps, and a water supply system at Ice Harbor project on the lower Snake River. Seven other Ice Harbor Dam contracts, ranging up to $2,250,000 in cost, will be invited between April and the year's end.

Portland District will invite bids on 16 major projects totaling $6,181,000 in estimated cost. The largest contract, scheduled for February, is for relocation of the right bank road at Green Peter Dam on the Middle Santiam River at an estimated cost of approximately $2,000,000. Other large contracts for which the Portland District will consider bids between fall and next summer include construction of powerhouse and installation of equipment at Cougar Dam on the South Fork of the McKenzie River, east side road relocation at Cougar Dam, channel dredging in the Rogue River, dredging inner channel at Coos Bay, construction of a small-boat basin in the Columbia at Hood River, dredging 27-ft. channel between Vancouver and The Dalles, and dike construction at several points on the Columbia and lower Willamette Rivers.

Seattle District will consider bids on two major projects aggregating approximately $220,000 in estimated cost.

Use of Sonoprobe system for —

Locating sub-marine fill material

By W. A. KING and J. M. RYLANDER
Senior Resident Engineers
Texas State Highway Department

•

King and Rylander were co-winners of the "Dr. L. I. Hewes Award" for 1960 based on their work reviewed in this article.

Aid of modern science is enlisted by Texas Highway Department to find suitable deposits of sand and shell to be moved by hydraulic dredge into the approach fills for a new crossing, Lavaca Bay. The procedure with the instruments is reviewed. Adequate deposits were located that might have failed to be developed by normal test drilling.

WITH A REQUIREMENT to locate about 1,000,000 cu. yd. of hydraulic fill material to construct approach embankments to a long concrete deck bridge, the selection of a Sonoprobe system proved a successful and modern engineering aid. The success of the equipment for this purpose and the results in locating extensive areas of suitable material represents a new procedure and exploratory tool for highway engineering problems.

Project and problem

Lavaca Bay, Port Lavaca, Texas, is an open body of water spanned by a timber sub-structure and concrete-deck bridge 10,400 ft. long. The west approach is about 5 ft. above low tide and of relatively short length, while the east approach is 5,130 ft. long and at the same elevation. The new project is to construct a concrete structure with center line 350 ft. north of the existing bridge.

This new structure will be 11,900 ft. long with approaches at an elevation of 10 ft., requiring an extensive quantity of hydraulic fill. Since the bottom of the bay includes soft muck with depths up to 30 ft., this fill is required to displace this soft underlying material and bring the embankment up to permanent grade. In addition, the long east approach is subject to tidal action which necessitated a type of material that will withstand such movement in the bay water. This, in turn, required extremely flat slopes for the fill with a minimum of 30 to 1 for the portion of fill above the bay floor. In general, the bay in this vicinity contains available, but scattered deposits of sand, shell and a mixture of sand and shell, and many large areas of deep muck.

One of the first and most important design problems was to locate and evaluate suitable fill material that would be in economic distance to the approaches. Several methods for the sub-surface exploration were investigated. As part of these considerations, it was learned that the Marine Sonoprobe System Survey had been used along the Texas Coast by a shell producer to locate shell reef deposits. To explore this possibility further, the matter was discussed with the Scientific Services Laboratories, Inc. of Dallas, a firm that developed and built the Marine Sonoprobe System, and is affiliated with Fairchild Aerial Surveys, Inc., Los Angeles.

This company agreed to make a Marine Sonoprobe System Survey of the bay area to be designated by the engineers, and to prepare a map showing interpretative results.

The cost for the survey work, on a day basis, was divided into two parts: (1) A field surveying party to establish the triangulation grid system; and (2) A Sonoprobe Unit, consisting of a boat, equipment, and survey party. This unit also prepared records, maps, and the interpretation of results obtained.

WINNERS ACCEPT "DR. L. I. HEWES AWARD"

Every year the Western Association of State Highway Officials presents the "Dr. L. I. Hewes Award" at its annual conference. The award goes to the engineer making the most outstanding contribution to highway progress in the West, selected from official nominees submitted by the state highway departments.

This year, at the conference in Portland, the executive committee of WASHO selected a team of two engineers from the Texas the advance of Western highway building is reviewed by the awardees in this article.

In the picture, D. C. Greer, state highway engineer of Texas, is presenting the certificates and checks to the winners. King is receiving his certificate and Rylander awaits his turn. They divided the $500 cash award.

The "Dr. L. I. Hewes Award" was instituted and is financed by WESTERN CONSTRUCTION.

Rate for the survey party was $135 per ten-hour day when needed, and for the Sonoprobe Unit it was $660 per ten-hour day as used. The time required for the survey was nine days, and the total amount for the service was $6,615.

Large area surveyed

There was little information at hand concerning the availability of acceptable and adequate hydraulic fill material. Therefore, a large area of the bay had to be covered with the Sonoprobe investigation so that no deposits would be overlooked which might be within economical pumping distance. Available information indicated economical pumping distance would be around 4,000 ft.; the feasible range up to 1 mi.; with about a 2-mi pumping distance as the maximum. Therefore, the entire width of the bay was covered.

The entire area (about 2 mi. to the south and 2½ mi. to the north) was laid out on 500-ft. coordinates to make the Sonoprobe survey. To have an accurate record, it was first necessary to make a map on this basis. Following this, triangulation stations were established near the ends of the existing causeway, which was used as a base line in the system. Angles were then computed from these triangulation stations for each coordinate intercept.

For controlling the continuous location of the Sonoprobe boat, an instrument man was stationed on a north-south coordinate line. Another was stationed on a triangulation station. Each man was equipped with radio communications, as was the Sonoprobe boat. With this equipment, each coordinate point could be marked as the boat passed over it. The instrument man remained on the triangulation station until all angles for that particular station had been used, while the instrument man on the north-south coordinate line was required to move the succeeding coordinate lines as the Sonoprobe survey progressed.

Since a portion of these lines crossed the causeway, a portable platform attached to the same bracing of the bridge was used. The instrument man on this platform controlled the course of the boat by transit and radio. The instrument man on the triangulation station advised the boat when each coordinate intercept was crossed. When all three parties were in unison, a survey-line Sonoprobe pi

(Continued on page 72)

Mack performance pays off on everything from rinks to runways

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SONOPROBE

(Continued from page 68)

ture was made. The Sonoprobe equipment made continous pictures of the north-south coordinate lines only. This picture was electrically marked for coordinate intercept stations by the Sonoprobe operator as he was advised that the boat was passing a coordinate point. In this way the picture reflected the true 500-ft. distance between points, even though the boat speed could not be constant.

A picture was started near the causeway and progressed to the end of the line being run. To avoid loss of time, the procedure was reversed and a picture was made on the succeeding line in toward the causeway.

The Marine Sonoprobe System is a reflection seismograph which records continuously and consists of five separate units. There is a power unit which generates 60 cycles driving synchronous motors; a pulser unit which generates the electric power signal; a display unit to receive and control the circuits; a recording unit composed of an electrosensitive paper recorder and timing synchronizers; and transducers composed of a magnetostrictive concentric pulse generator transmitter and crystal receiver.

The motor in the recorder unit drives a synchronizer which fires to the display unit. There the signal is amplified and control circuits are triggered-in, causing a high-power pulse to be fired to the transmitter transducers, which converts the electric pulses into acoustic pulses. The crystal receives echoes which vary depending upon the acoustical impedence of the material and the barrier between material layers. This signal is compressed and amplified in the display unit and sent to the recorder to spark gap the paper. The treated lead-backed paper is burned in varying degrees, corresponding to the impedence of the material encountered. The paper roll is used for interpretations and is retained by the residency as part of the permanent records from the survey.

The Sonoprobe has been successfully used to determine the geologic trends for oil companies in offshore exploration and to locate bedrock for tidal dams in New England. To our knowledge, this is the first attempt to locate and classify suitable sub-marine road-building materials by Sonar. To check the Sonoprobe interpretations with known soil borings, a picture was made along the proposed center line of the new causeway where 33 borings had been drilled in 1957 to depths of around 100 ft. Both soundings and corings are needed to obtain maximum information with the Sonoprobe.

Contour lines of Sonoprobe interpretations for suitable material areas occurring to a depth of at least 15 ft. below the bay floor were then placed on a large-scale map, along with coordinate points. This map, with triangulation information, was part of the records furnished.

Progress of the survey was dependent upon weather conditions. About 24 mi. of continuous picture could be made on a calm, clear day. Rough weather made it impossible to keep the boat on course, and at times high tides flooded the portable-instrument platform. Haze and cloudy weather also cut down survey visibility so that it was neces-

(Continued on page 82)

PLYWOOD sheets are warped over stringers to make skin of form for umbrella section. Forms were built in two halves to facilitate moving.

Concrete umbrellas form roof of Arizona warehouse

Contractor and consulting engineer cooperate on efficient production of hyperbolic paraboloid shells, columns and tilt-up walls with mass-production methods.

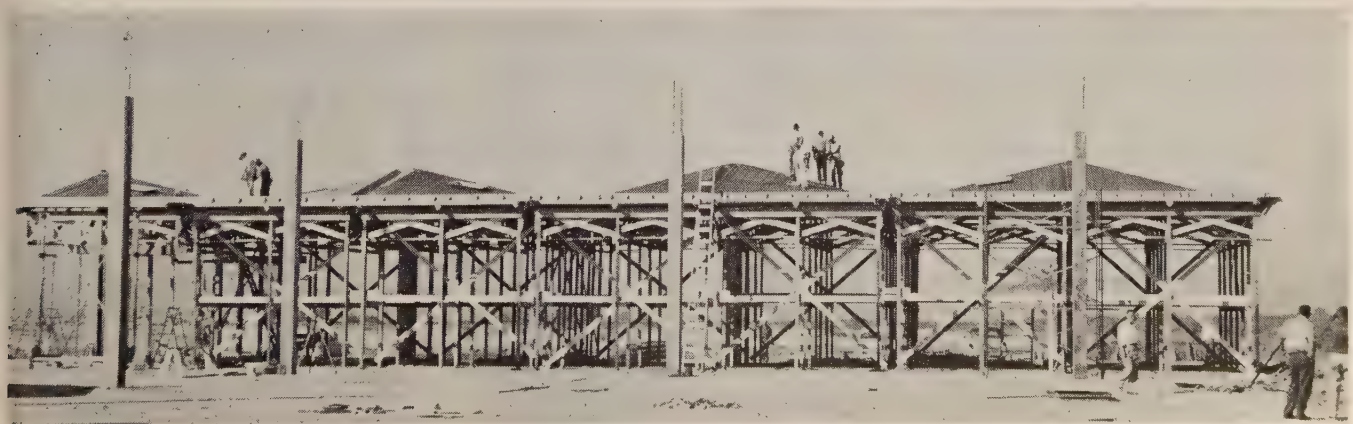
THIRTY-TWO hyperbolic paraboloid pyramids, 35 ft. square, each resting on a single concrete column, make up the roof structure of a concrete warehouse constructed in Phoenix.

The building covers an area of 140 x 280 ft. It is enclosed with tilt-up concrete walls with a concrete slab floor. The roof has a 16-ft. minimum height at the eave lines, and each shell rises 20 ft. 6 in. at the columns. The precast concrete columns are 14 in. square spaced on 35-ft. centers.

The contractor, Gilbert and Dolan Enterprises, Inc., retained Boduroff and Meheen, consulting engineers, at the outset of the project, and the two firms in cooperation developed mass production techniques for fast and efficient construction of this unusual design.

The floor of the building is a 5-in. mesh-reinforced, concrete slab on grade. To eliminate the inevitable curling of the slabs at joints and to reduce finishing costs, a special contraction joint was used. The joint was formed by a piece of 3/16 x 3-in. masonite staked in place and located approximately ½ in. below finished floor grade. In this way the masonite formed a weakened plane and the concrete cracked in a relatively straight line at the desired locations. Blockouts were formed in the slab at colunm footings and were arranged at a 45-deg. angle to the column to prevent corner cracking.

The concrete footings were formed with an 18-in. deep by 16-



FOUR forms in place for pouring. Shoring is not complete at left where mobile gantries still support roof units. Roof is made up of 32 shells each 35 ft. square supported by precast concrete column. Use of hyperbolic parabaloids reduced amount of concrete needed.

THREE BAYS of four shells each are completed and forms, far right, in place for next pour. Walls were tilt-up concrete panels hoisted in place and attached by welding small clips to eave line. Panels easily removed for later additions and alterations to the structure.

in. square pocket to receive the 14-in. precast columns. After the columns were placed in pocket, brought in line, and plumbed, the remaining 1-in. opening was dry packed with an expanding grout. This "column in pocket" connection resulted structurally in a full moment resistant connection.

Roof forming

To form the roof structure, four sets of forms were built. A form consisted of two sections, each 17 ft. 6 in. x 35-ft. covering half of one umbrella shell. Each section of the form was constructed with three wood trusses at 8 ft. 6 in. on center, fabricated at the job site, but using shop methods of layout. Forms were completed with 2 x 6-in. stringers spanning between the trusses and 5/8-in. plywood sheathing warped easily in place providing the finished deck.

The trusses were designed to support the forms during moving operations only. When in place, timber shores 7 ft. on center carried the weight of the concrete.

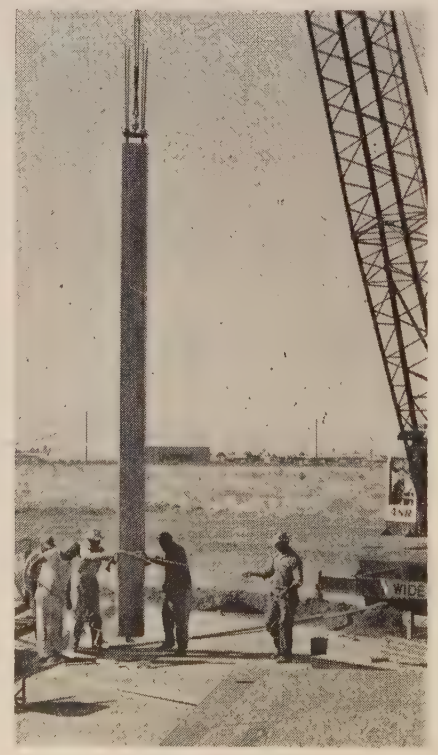
Two specially designed gantries were used to move the forms. Each gantry consisted of two braced columns mounted on a frame on casters. A bracket operated by a 2-ton hand winch moved up and down the column and supported the forms during the moving operations.

The full width of the building or four shells were placed each week. As the shells were being placed, all wall panels were cast on six waste slabs located around the perimeter of the building. Virtually all the panels were equal size which allowed the contractor to use slip-form methods and stack the panels 6 and 8 deep. All panels were 5 in. thick x 17 ft. 6 in. wide and were supported in their final location on small pad footings. A simple welded connection at the top will allow easy removal for future anticipated expansion of the warehouse.

In addition to the economy resulting from the traveling form system, and production line methods of construction, the use of the doubly-curved H-P Shells resulted in considerable economy in material. Each shell, column, and footing required only 2.05 lb. of reinforcement per square foot and only 23 yd. of concrete, appreciably less than normal for spans of this size.

As a result of the construction methods outlined herein, it was possible for this team of Contractor and Engineer to produce this concrete structure for the Owner, Lou Regester, at a cost which was competitive with other systems.

GANTRY on casters supports roof form. Unit rolls into place and is shored for pour.



COLUMN is lowered in "socket" 18 in. deep cast with 1-in. clearance.

Approval of $4,804,000 loan for irrigation work

A $4,804,000 loan applied for by the Browns Valley Irrigation District, Yuba County, Calif., to develop new irrigation facilities and to enlarge and extend existing works, has been approved. The loan now requires an appropriation by Congress.

The district plans to construct a 147-ft. earth and rockfill dam on French Dry Creek, a tributary of the Yuba River, creating a reservoir of 55,000 ac.-ft.

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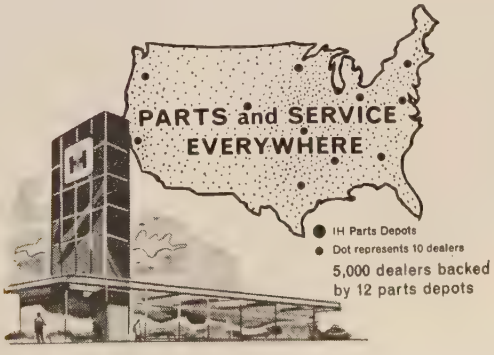


INTERNATIONAL HARVESTER

WESTERN CONSTRUCTION NEWS

Highway cost figures for the West

SEVERAL Western State Highway Departments maintain comprehensive figures on trends in highway construction costs. These are usually reported on a quarterly basis and several reports reaching WESTERN CONSTRUCTION for the second quarter of 1960 are summarized as follows:

Colorado

The second quarter of 1960 has been marked by reduction in the extremely competitive bidding for highway work that was apparent during the last quarter of 1959 and first three months of 1960. One of the factors which has relaxed this competitive bidding is the release of more Federal funds and a corresponding easing of concern among contractors over the decline in contract letting, such as occurred last summer.

Using 1956 costs as a base, the second quarter of 1960 was exactly back to the base figure of 100.0. This was considerably higher than the first quarter of the year which was 94.9, and not much different from the second quarter of 1959 which stood at 99.6. The average figure for 1959 was 100.1. The number of bidders on all Colorado projects awarded during the second quarter of 1960 averaged 6.29 per contract.

Idaho

Using 1950 as a base (100) and representing nine important work items, the Idaho cost index for the second quarter of 1960 stood at 103.6 which is 0.2 points or 0.19% below the previous quarter. This index figure corresponds to 88.4 for the second quarter of 1959.

Of the work items used as a base for the index, five of them increased during the second quarter from 1.37% for unclassified excavation to an increase of 37.2% for water and sprinkling. The general increase probably results from the fact that many Idaho highway contractors had work underway and the reduction in competition put bidding on a more realistic basis. However, none of the prices were considered unreasonable. The slight drop in the cost index resulted from the fact that eight of the 14 projects let during the quarter were of large size, with five being more than $500,000 and three being in excess of $1,000,000.

Nevada

Using 1955 figures as a base, the cost index for the second quarter rose to 111.0 which is 9.8 points above the first quarter of the year. It represents the highest point on the index curve during the past 18 months. However, the current increase is not considered general because out of nine items used in computing the index four showed an increase, four a decrease and one was unchanged. The corre-

(Continued on page 78)

$60,000,000 job to start at Wyoming iron deposit

PLANS to develop a deposit of iron ore in Wyoming by Columbia-Geneva Division of U. S. Steel Corp. (announced last issue) has resulted in a $60,000,000 contract awarded to J. H. Pomeroy & Co., Inc., and Bechtel Corp., both of San Francisco. The work will provide for construction of about 80 mi. of railroad line from the main line of the Union Pacific, starting at Rock Springs, Wyo. Site of the processing works is near Lander. Work will start immediately, and the contract is expected to be completed in 1962. In addition to the railroad work, construction will include the handling of a local stream in the area, with some earthfill dams as well as the building of structures and utilities relating to the processing of the ore.

Bu. of Rec. announces $294,000,000 program

A PROGRAM of construction and engineering totaling $294,000,000 for the present fiscal year has been announced by the U. S. Bureau of Reclamation. This new program, based on the President's budget, is considerably larger than the $206,000,000 program of the previous year.

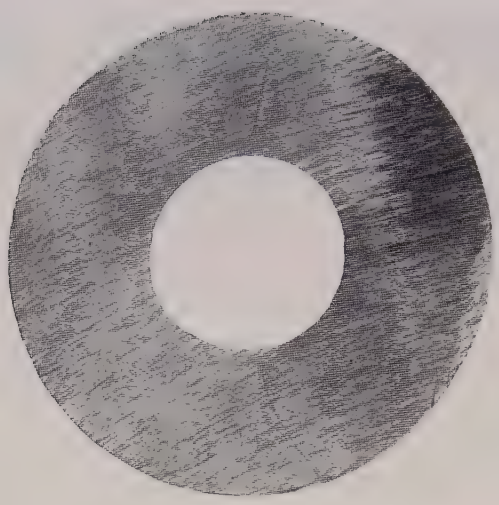
Work to be carried out includes continuing construction on 39 projects, and six new starts will be made during the current year. The program also includes continuing work and starts on many smaller projects carried out under other programs.

Another community planned by Utah Cosntruction Co.

IN a proposal submitted to Palo Alto, Calif., the Utah Construction Co. has offered to reclaim approximately 600 ac. of tidelands in San Francisco Bay as the start of a $36,000,000 industrial community. Under the plan provided by Utah, the property could be developed to provide about 300 ac. of building sites for research and industrial firms, including a 50-ac. commercial-professional area. In addition, the reclamation of the tideland would be designed to provide attractive lagoons, streets, and drainage, not to mention a nine-hole golf course. If the proposal is accepted, the first land could be available in from 12 to 18 months. Additional area would be developed in stages, with the proposal that the entire project would be completed and sold within ten years.

About 3,500,000 cu. yd. of fill would be required and the company agreed to develop a source which would not involve trucking through any of the nearby residential areas.

Cross section of average extension steel, showing distorted center hole.



Cross section of Sandvik Coromant Steel, showing perfectly uniform center hole.

See for yourself why SANDVIK *Coromant Steels last longer on the job!*

Sandvik-originated smooth rope-threads make uncoupling easy.

The completely unretouched photographs above show clearly why Sandvik Coromant large-diameter extension rods last longer! Since Sandvik takes the time—and the trouble—to cold-roll these alloy drill rods, the flushing hole is uniform all the way through—smooth as a gun barrel. And, since the hole is even and perfectly round, you set up fewer strains and stresses **in use**...there's less whipping... and therefore, less breakage. And, with mechanically stronger rods, we can provide larger flushing holes for faster, more complete removal of cuttings.

What's more, the Sandvik-originated rope-thread makes coupling and uncoupling a hand operation—speeds the job—and reduces chance of incipient cracks developing from wrench marks.

All in all, you can't beat Sandvik Coromant Rope-Thread Steels for fast work and long life! Available from 1½″ to 2″ in diameter. To set up a test on **your** job, write to your nearest Atlas Copco office today. Address: Dept. WC-17.

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Appropriation will start work on Yellowtail Dam

WITH the approval of the Bureau of Reclamation construction program, $2,500,000 becomes available for the first construction work on the Yellowtail Dam, which will ultimately represent a cost of more than $100,000,000. This multi-purpose project of the Bureau of Reclamation lies in the Bighorn Canyon in southeastern Montana. Sections of the reservoir will extend across the state boundary into Wyoming. The dam site area lies within the Crow Indian Reservation.

The actual dam site is within Bighorn Canyon, which makes it nearly 50 highway miles from the nearest town of Hardin. With the dam near the mouth of the canyon, the reservoir will continue through Bighorn Canyon and out into a broad valley in the vicinity of Kane, Wyo.

The Bureau of Reclamation has stated that the present appropriation would permit the start of construction, including facilities at the site and access roads. Work would also include excavation for the foundation of the dam, as well as some preliminary work on the power plant.

Plans call for a concrete arch-type of structure with a height about 520 ft. and a crest length of 1,450 ft. The project will be multi-purpose and provide for irrigation, power, flood control, conservation and recreation. Storage capacity will be about 1,400,000 ac. ft. The power plant will probably be located at the tow of the dam and is designed for an initial installation of 200,000 kw. Below the power plant, a low dam, consisting of a concrete section and earthfill wings, will provide for re-regulating the power release.

Bid call for power plant at Trinity Dam project

CONTRACTORS have been invited to bid on construction of the 150,000-kw. Spring Creek Powerplant to be built on the Central Valley Project in northern California. The powerplant is a feature of the project's Trinity River Division. It is to be located about 6 mi. northwest of Redding.

The indoor powerplant, which will house two 75,000-kw. generating units, will be a 75 by 163-ft. building. It will have a reinforced concrete substructure and structural steel frame superstructure with walls of reinforced grouted masonry and metal siding. Work under the invitations will include a penstock valve structure, about 600 ft. of 21-ft. concrete-lined tailrace tunnel, and furnishing and installing penstocks.

The successful bidder will be allowed 800 days to complete construction of the powerplant. Bids will be opened on September 15 at Lewiston, Calif.

California awards several major highway contracts

THE California Division of Highways has recently awarded several important highway contracts in the multi-million dollar classification. Probably the largest is a $16,237,000 contract let to Guy F. Atkinson Co. for construction of 7.4 mi. of 8-lane freeway south of Casiano Road and north of Valley Vista Blvd., south of the Ventura Freeway in Los Angeles. This job will include completion of the Mulholland Summit cut and will resurface portions of Sepulveda Blvd., the present highway.

Peter Kiewit Sons' Co. of San Francisco received a $3,860,000 contract for construction of 1.1 mi. of 8-lane freeway on U. S. 50 extending through an important section of Oakland. This work is part of the MacArthur Freeway and the present job extends between San Pablo Ave., and Broadway, Oakland. The project will include nine traffic separations including bridges which will take the freeway over several important streets.

Guy F. Atkinson Co., South San Francisco, received a contract of $3,993,000 for a large freeway job on U. S. 101 north of Santa Rosa. The project will extend 9.6 mi. from Mendocino Ave. in Santa Rosa to Grant Creek. Several interchange structures are included as well as bridges crossing four creeks.

Two other large contracts have funds provided in the budget. One which is budgeted for a total of $7,850,000 would be a 13.3-mi. freeway job on U. S. 99 south of Bakersfield, providing a 4-lane freeway. Another would be for a freeway by-pass of Fortuna on the Redwood Highway in Humboldt County, providing 3.9 mi. of 4-lane freeway for which a total of $3,235,000 of state highway funds have been made available.

Sales of bonds will start second floating bridge

THE Washington Toll Bridge Authority has approved a bid for almost $30,000,000 in revenue bonds (effective interest rate 4.95%) which will permit construction to begin on the second floating bridge across Lake Washington.

The successful contractor, Guy F. Atkinson Co. of South San Francisco, has permitted the bid to remain effective for a considerable period of time, so that the bond sale could be negotiated. Active construction work can now begin on the floating section of the bridge.

Highway cost figures

(Continued from page 76)

sponding index figures for the second quarter of 1959 was 102.4, and the average for that year was 104.6.

Average number of bidders for the seven contracts awarded during the second quarter of the current year was 6.1, and this compares to an average of 5.7 for the entire first six months of 1960.

California

The California Division of Highways uses 1940 as a base and an expected upturn in the index took place during the second quarter of 1960, standing at 251.6, an increase of 31.8 points or 14.5% over the first quarter of the year. This reflects the actual increase in wages, materials, and costs of financing which have been gradually advancing during the past year. A prime cause for the lifting of the index figure to its present level was the increase in the unit price of roadway excavation, and one bid price for large job in a hard-rock area at $1.70 per yd. had an important effect. However, the index would have stood at 233.6 or 6.3% above the previous quarter even if this exceptionally high excavation figure were eliminated from the index computation.

The number of bidders per project on all sizes of jobs during the second quarter dropped from 7.5 to 5.8. On those projects with contracts over $1,000,000 each, the average number of bidders dropped from 10.5 to 6.5. This is a further factor which accounts for the rise in costs since the keen competition among contractors has slackened and this has permitted the upward trend in bid figures.

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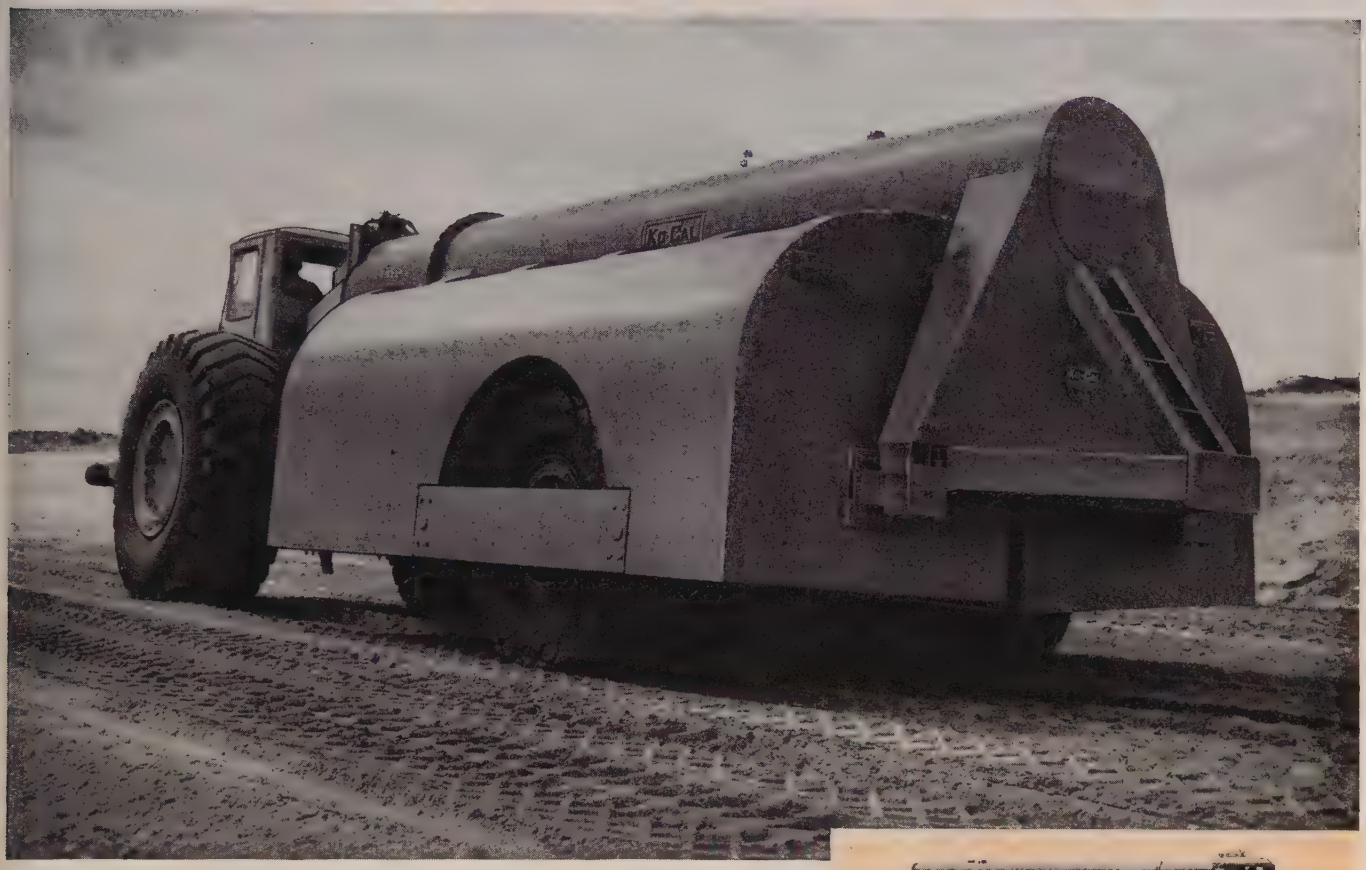
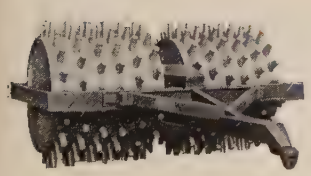
NEW KO-CAL KONSOLIDATOR



New from KO-CAL—a roller that puts 100,000 pounds on the tires, plus 15,000 pounds on the tractor, is perfectly balanced for tractor traction and can roll down a course at speeds up to 10 mph. It's timed to modern day compaction specs—helps meet density requirements with fewer passes and at higher speeds. Konsolidator is easy to fill. Easy to kill weight, too, when you're ready to move on to the next assignment. Get the full facts and quality feature story from your KO-CAL distributor. Do it today. KOC 2

Condensed Specifications
New Ko-Cal Konsolidator

Weight (Empty)	37,000 lbs.
Fully Loaded Weight	115,000 lbs.
Body Volume, 700 cubic feet for Sand Ballast	70,000 lbs.
Towing Frame Volume, 130 cubic feet for Water Ballast	8,000 lbs.
Weight on Tires	100,000 lbs.
Weight per Lineal Inch	1,390 lbs.
Weight on Tractor (for traction)	15,000 lbs.
Tires	18.00 x 25-20 ply
Over-all Dimensions (Approx.)	29' x 12' x 10'



Ko-Cal Tamping Rollers . . .

—have feet shaped to penetrate deep, withdraw from fill with a minimum of disturbance. Self-cleaning in sticky material. KO-CAL'S advanced design greatly reduces drawbar pull, makes compaction faster. 5-Sizes in psi range to 2030 lbs.

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ALASKA Newsletter

By CLIFFORD S. CERNICK, Fairbanks

SPACE AGE CONSTRUCTION—Alaska stands to gain from developments in space technology as indicated by a recent announcement from the National Aeronautics and Space Agency. The agency plans to construct a large satellite tracking antenna near Fairbanks at a cost of $2,970,000. The project will be one of several tracking stations which will receive messages from the Nimbus meteorological satellite which is expected to be launched next year. Nimbus will provide data to aid in meteorological studies. The new tracking station is being built in the Fairbanks area because it can perform more efficiently in Alaska's high latitudes than is true anywhere else in the country.

EIELSON CONSTRUCTION—One of the busiest air bases in the country, construction-wise, is Eielson Air Force Base 26 mi. south of Fairbanks. During the past fiscal year, more than $5,000,000 in projects were initiated there. A breakdown of construction disbursements by the Air Force showed that 75% of the money went to Fairbanks area contractors, with only about 10% to contractors in states other than Alaska.

POWER NEEDED—A rapidly-growing Alaska needs power and the Anchorage area, particularly, faces an almost immediate shortage. Special Senate subcommittee hearings are scheduled during September in Washington to gather information on two proposals now pending before Congress. One of these calls for construction of a $38,000,000 electric power project at the Snettisham-Long Lakes site southeast of Juneau. The other is a plan to raise the Eklutna Dam near Anchorage to increase its output. The Eklutna project will cost an estimated $3,000,000.

The need for a giant power grid system for Alaska was advanced in an Anchorage talk recently by Gus Norwood, executive secretary of the Northwest Public Power Assn. Norwood addressed the Alaska Rural Electric Cooperative Assn. annual meeting and urged the group to present a specific program on Alaska power development to both candidates Kennedy and Nixon. Norwood listed seven public policies required to achieve an ample power supply in Alaska for new industry, national defense and rural electrification.

These included: mass production of low cost power in large generating stations, an integrated 500,000-volt grid system, consumer-owned electric distribution systems, rural electrification under the area-coverage principle, low-cost investment funds on a self-liquidating basis, progressive electrical load forecasting and establishment of a statewide wholesale power marketing agency. Norwood said wise development and use of the tremendous untapped natural resources of Alaska could sustain a population of at least 5,000,000 persons. Present population is about 250,000.

PLUMBERS PROBLEM—About 100 Fairbanks area plumbers, idled for about 10 days because of a working-hour dispute, are now back on the job—and victorious in their fight to force contractors to pay overtime pay rates for 54 instead of 48 hours. The latter number of hours represented the average week worked by plumbers up to the time of the walkout. Charles Cole, attorney for the Plumbing Contractors of Fairbanks, Inc., said contractors had to give in to union demands for a 54-hour work week as a direct result of pressure exercised by the U. S. Army Engineer District. "I cannot see how the Corps of Engineers can further complain about the high cost of construction in Alaska when they have been a party to this episode," Cole commented.

He said an Engineer District official "pressured contractors to knuckle under to union demands for the sake of getting the job done." This was promptly denied in Anchorage by the Engineers. Earlier, protests had been made by two contractors groups who complained that officials of the Plumbers' Union in Fairbanks were deliberately holding up work on defense jobs to force contractors to give them overtime work. The protests were lodged by officials of the Associated Plumbing and Heating Contractors, the Associated General Contractors and individual firms. Protests went to congressional leaders and to the plumbers union international headquarters. At any rate, Alaska's plumbers are claiming a victory, which insures for them weekly paychecks of $374 during the construction season, based on a $5.50 hourly regular time rate and an $11 double-time rate for all hours over 40 hours. Other crafts now are eyeing the plumbers' gains and contractors expect many to demand double-time rates instead of time-and-a-half in subsequent contracts.

BRIDGE TO NOWHERE—The State Division of Highways has inherited a real headache from the old Territorial Highway and Public Works Board—an agency which is no longer in existence. Back in 1957, that agency approved construction of a $92,000 bridge over a slough in the Fairbanks area. The bridge, now a responsibility of the State Division of Highways, was completed in July. It is proving somewhat embarrassing, however, because the roadway which the bridge serves has not been extended beyond one approach.

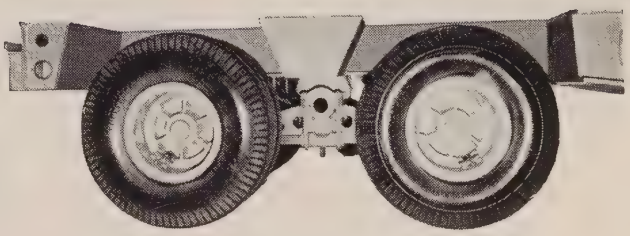
After reaching the bridge over a wide, hard-surfaced highway, the startled motorist is abruptly confronted with an area of brush and trees through which the only access is a trail-like, meandering one-lane roadway, bulldozed out by a real estate developer. So, the new bridge now represents the end of the road. State officials indicate the road extension "will be built," but no date has been set. Meanwhile, the gleaming new structure is virtually unused, except by boys on bicycles for whom the bridge provides easy access to a nearby swimming hole.

PUBLIC RELATIONS—Good public relations on the part of a contractor is reflected in the half-page advertisement the Cheney Construction Co. of Anchorage took out following completion of a paving job on one of the city's busiest thoroughfares. Because the construction necessitated diverting traffic—and business volume—from numerous business firms along the road, the contractor wanted to give all possible publicity to the completion of the job. The ad stated: "Gambell street is now open all the way from Fourth Avenue to Northern Lights Boulevard. We express our appreciation to the business merchants and public for outstanding cooperation during this construction."

New 1960 Fruehauf Carryalls Are Stronger, Weigh Less!

The new 1960 Fruehauf Carryall line offers heavy-equipment haulers a completely new concept in carryall design. Strength is concentrated along two extra-rugged beams on the *outside* where most loads are normally concentrated. This new concept in carryall design completely eliminates two unneeded *interior* beams to reduce weight, increase overall resistance to operational damage. New wide frame design reduces carryall length by 18″, increasing maneuverability in tight spots. Floored loading area forward of drop, on all models, is increased by a full 68 square feet for greater load carrying capacity.

The new 1960 Carryall line is available in 20, 25, and 35 ton capacities, in both level and drop deck models for over-and-off road transport. See the new Fruehauf Carryalls at your Fruehauf Branch today.



Neway Tandem gives greater stability. Combination spring-walking beam gives unloaded carryalls an easier ride. When unit is loaded springs make contact with the beam so that suspension functions as a Walking Beam Tandem.

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World's Largest
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HAWAII Report

By ALAN GOODFADER, Honolulu

TIME FOR A PAUSE?—The Bank of Hawaii suggests a "new evaluation" of Oahu's business boom. "Hawaii can confidently expect substantial advances during the '60's" the bank says. "But unless expansion is geared to the realities of effective demand, the development of excess capacity can create temporary setbacks in some lines." It turns an eye on what it calls the "extraordinary advance of the past five years" in construction activity here. It notes that construction went from $97,000,000 in 1955 to $216,000,000 in 1959 and is now about 19% above last year's comparable figures. But, it continues, "the economy of Oahu is gradually approaching the time when shortages (in building needs) will be overcome (and) demand will return to less urgent levels. Meanwhile if expansion continues to accelerate as it has in recent years, it may well create a temporary period of overcapacity which will require some painful readjustments." The bank stresses that business indicators continue to rise here. Its plea, it says, is for planning to meet needs. In the meantime, it notes that construction completed through April of this year amounted to $82,000,000, or at an annual rate of $247,000,000.

LABOR SHORTAGE—The State Department of Labor and Industrial Relations notes that Statewide employment reached a June record of 225,000, with Oahu jumping 3,800 over the month before to a record 176,150. Although this was largely due to seasonal pineapple canning, the department says there are shortages in skilled building trades workers and in diversified manufacturing. The department estimated a construction work force of 16,260 in the state, compared with 15,700 in May and 14,730 in June, 1959. On Oahu, the state estimated a construction work force of 14,520, compared with 14,010 in May and 13,210 in June, 1959.

HONOLULU FACE-LIFT—Honolulu redevelopment projects move closer to reality as downtown and municipal authorities push multi-million-dollar projects. It has been announced that the Federal government has granted $12,500,000 for the City's $25,000,000 Kukui slum clearance project, which is designed to remake a 75-acre downtown area. Acquisition of property is expected to start about Dec. 1, with the entire project to take about five to six years. Meanwhile, planning consultants have presented plans for rehabilitation of Honolulu's downtown business district. Long-range plans include proposals that portions of downtown be made into pedestrian malls. Through traffic would be handled by elevated arterial highways. The idea is to provide a "shopping center" atmosphere with increased office and retail business space. City officials have the plan under study now.

SOMETHING NEW—Also announced recently were plans for a seven-acre Japanese Shopping Town that would transform part of Honolulu into "a miniature Tokyo transplanted." Ralph C. Honda, prominent Honolulu businessman, said a corporation is being formed to develop the Japanese Town.

ON THE WATERFRONT—The State Board of Harbor Commissioners has awarded Tudor Engineering Co., San Francisco, a $47,000 contract to masterplan Honolulu harbor in time to give February's legislature "a complete picture" of future harbor developments.

PRIVATE PROJECTS—Among major private construction projects announced recently is a $19,000,000, 1,050-unit Ilikai cooperative apartment project to be built in the Ala Moana section of Honolulu near Waikiki. Contractors are to be Hawaiian Dredging and Construction Co., Ltd., and the Perini Corp. Other recently announced projects include a $2,000,000 commercial hotel in downtown Honolulu and a $1,600,000 office building on the fringe of Honolulu's civic center area. Plans also have been announced for a $3,000,000 200-room hotel on the Island of Hawaii.

SONOPROBE

(Continued on page 107)

sary to complete the extreme reaches of the survey in clear weather. An average of 16 mi. of line per day was completed throughout the field operation.

Upon completion of these field investigations it was decided that further study should be made to verify the interpretative results given by the Sonoprobe System Survey. A complete barge-mounted boring rig was assembled to drill holes on each coordinate intercept in exactly the position laid out by triangulation, but only in areas where suitable material was designated on the Sonoprobe map.

Borings were drilled into firm clay, regardless of depth. Samples were taken of each change of material. Soil constants were later determined for each sample taken, to the clay, although the Sonoprobe picture was only read for type of material occurring to a minimum depth of 15 ft. below the bay floor.

On completion of these combined studies we were in accord with the Sonoprobe interpretation that a vast amount of suitable material was available for awarding a contract.

One area was used entirely for the west side approach fill and there is still a large quantity of this material available. Material in this area was of a sand with some silt and shell. The silt being light in weight was easily washed away by the dredging operations and only a small amount entered the fill. This floated to the top and was washed out, being displaced by the heavier sand and shell. Construction of the fill required in excess of 1,000,000 cu. yd. of material. This area has a large capacity for future commercial use. Depths below the bay floor of excellent material removed from these pits ranged from 0 to 38 ft.

The area from which the greatest quantity of material was taken would never have been discovered without the Sonoprobe System Survey. This pit was very close to the project and located within an economical pumping distance of about 3,500 ft.

The success as applied to use of the Sonoprobe System Survey was that the entire area could be mapped below the bay floor and then the promising areas bored for verification as to types of materials and quantities. Shell was discovered at lower depths with the sandy material on top as indicated by the Sonar Survey.

Low bids and contract awards

ALASKA

J. H. Pomeroy & Co., Inc. and **Ben Gerwick, Inc.,** San Francisco, Calif. received a $1,300,000 contract for construction of a deepwater wharf to serve as sea terminus of a 22-mile pipeline from a new oil field on Kenai Peninsula. **S. S. Mullen, Inc.,** Seattle, Wash. received a $1,228,701 contract for installing tramways at Lisburne and Tin City Air Force Stations. Tin City faces the Bering Sea and Lisburne faces the Arctic Ocean. A $860,413 contract was received by **Peter Kiewit Sons' Co.** of Seattle, Wash. for construction of three Rearward Communications facilities and installation of a communications line. The sites are located at Black Rapids, McCallum and Donnelly Dome. The line to be installed between Delta Junction and Donnelly Flats. **Cheney Construction Co.** of Anchorage received a $655,908 contract for approach lighting, runway stabilization and related work at Elmendorf Air Force Base. **B-E-C-K Constructors,** Seattle, Wash. received a $428,694 contract for construction of Rearward Communications facilities at Tahneta Pass and **S. S. Mullen, Inc.,** Seattle, received a $641,099 contract for Rearward Communications facilities at Sawmill Air Force Station. Four contracts were awarded for construction of Rearward Communications facilities at Harding Lake, Paxson, Tolsonna and Sheep Mountain Air Force Stations. The joint venture of **Reed Martin** and **Burgess Construction Co.,** Fairbanks, received a $236,840 contract for Harding Lake; **Pitcher Construction Co.,** Fairbanks, received a $301,336 contract for Paxson, and **American Service, Inc.** and **Pacific General Construction Co., Inc.,** Anchorage, received a $270,890 contract for Tolsonna and Sheep Mountain. **Glacier Construction** of Spenard was awarded a $400,694 contract for Rearward Communication facilities at Glennallen and Aurora. **Inlet Company, Inc.,** Anchorage, received a $561,933 contract for deactivating a heating plant at Elmendorf Air Force Base.

ARIZONA

Korshoj Construction Co., Inc., Blair, Nebraska, received a $988,287 contract for earthwork, channels and relocation of unlined farm ditches, Wellton-Mohawk Division of the Gila Reclamation Project, Yuma County. **Tanner Bros. Contracting Co., Inc.,** Phoenix, submitted a low bid of $533,469 for grading and surfacing on 2.5 mi. on the Cordes Junction-Flagstaff Highway in Coconino County. A low bid of $269,955 was submitted by **L. M. White Contracting Co.,** Tucson, for grading and surfacing on 9 mi. on the Benson-Douglas Highway, near Bisbee in Cochise County. **Isbell Construction Co.,** Phoenix, submitted a low bid of $229,950 for grading and surfacing from interchange on U. S. 66 for 5.7 mi. along the Painted Desert Rim Drive in the Petrified National Forest in Apache County. **M. M. Sundt Construction Co.** and **M. J. Bevanda,** Tucson, in a joint venture, received a $1,249,000 contract for replacement of taxiway, access apron and construction of optical landing system at the Marine Corps Auxiliary Air Station, at Yuma. **Isbell Construction Co.,** Phoenix, submitted a low bid of $1,522,959 for 2.3 mi. of grading, surfacing and related work on the Globe-Show Low Highway in Gila County. **Haumont Contracting Co.,** Phoenix, submitted a low bid of $184,803 for grading, surfacing and stabilizing on the Payson-Show Low Highway in Navajo County. A low bid of $102,135 was submitted by **Tiffany Construction Co.,** Phoenix, for grading and surfacing on the Gila Bend-Casa Grande Highway in Pinal County.

CALIFORNIA

Griffith Co., Los Angeles, received a $9,154,897 contract for construction of 0.1 mi. of viaduct to carry 8-lane Santa Monica Freeway between Harbor Freeway and Main Street, also included in the job is construction of various ramps and distributor roads which will be part of the Santa Monica Harbor Freeway Interchange, in city and county of Los Angeles. **Peter Kiewit Sons' Co.** of Arcadia received a $7,676,933 contract for grading, surfacing and construction of 17 major structures in city and county of Los Angeles. A $7,423,104 contract was awarded to **J. W. Briggs & J. N. Conley** of Redding for grading and surfacing on 7 mi. of the future U. S. 40 freeway east of Soda Springs in Nevada County. **Slate - Hall - Hamilton,** Portland, Ore., received a $7,414,833 contract to construct 5.9 mi. of four-lane freeway on U. S. 99, south of Castella in Shasta County. **Allen M. Campbell Co., General Contractors, Inc.,** Santa Ana, submitted a low bid of $4,934,045 for construction of 7.1 mi. of freeway together with interchanges and frontage roads and three bridges, near San Jose in Santa Clara County. **Fredrickson & Watson Co. & Lew Jones Construction Co.,** Oakland, submitted a low bid of $4,893,755 for 5.5 mi. of a four-lane freeway to be graded and 15 bridges to be constructed near Merced in Merced County. **Daley Corp. & R. M. Price Construction Co.,** San Diego, submitted a low bid of $3,493,413 for structures, grading and surfacing in city and county of San Diego. A $1,794,835 contract was received by **Chas. L. Harney, Inc.,** San Francisco, for grading and paving to construct 1.6 mi. of six-lane freeway on U. S. Highway 40 east of Fairfield in Solano County. **J. E. Haddock, Ltd.,** Pasadena, received a $1,694,007 contract to widen from six lanes to eight lanes 17 bridges on 5.4 mi. on the San Bernardino Freeway, in Monterey Park, Los Angeles County. **Stolte Inc.** of Oakland, submitted a low bid of $1,106,965 for grading, surfacing and construction of one bridge south in Myers Flat, Humboldt County. **Granite Construction Co.,** Watsonville, received a $862,248 contract for grading and surfacing to reconstruct and widen 12.9 mi. of State Sign Route 33, in Mendota, Fresno County. A $825,419 contract was awarded to **R. A. Westbrook, Inc.** and **Morrison-Knudsen Co.,** Sacramento, for grading, surfacing and drainage facilities on 8.9 mi. of U. S. 395, south of Alturas in Modoc County. **R. A. Bianchi & R. A. Bianchi Construction Co.,** Camarillo, received a $674,430 contract for 5.4 mi. of grading and surfacing, west of Independence in Inyo County. **D. H. L. Co.,** Daly City, submitted a low bid of $517,154 for 4.9 mi. of grading, surfacing and drainage facilities and one bridge to be constructed, east of Boonville in Mendocino County. **Madonna Construction Co.,** San Luis Obispo, received a $509,163 contract for grading, paving and construction of a bridge over San Juan Creek and a separation structure on State Sign Route 156 in San Benito County. **Harms Bros.,** Sacramento, submitted a low bid of $491,684 for grading and surfacing at various locations west of Pollock in El Dorado County. **A. Teichert**

& Son, Inc., Sacramento, received two contracts for roadwork in San Joaquin County. $488,334 for reconstructing the southbound lanes on 6.6 mi. of U. S. 99-50, south of Lodi and $389,242 for reconstruction and widening 6 mi. on the Jack Tone Road, including constructing a bridge over Mormon Slough, Potter Creek and Duck Creek, south of Lockeford. **Arthur B. Siri, Inc.** of Santa Rosa, received a $487,048 contract for grading and surfacing to construct 4.2 mi. of two-lane highway on State Route 53 near Middletown in Lake County. A $476,329 contract was received by **Webb & White,** Los Angeles, for widening from six to eight lanes 1.1 mi. in city of Commerce in Los Angeles County. A $446,400 award was received by **Gibbons and Reed Co.,** Salt Lake City, Utah, for grading, drainage facilities and surfacing on 1.4 mi. section on U. S. Highway 199, south of the Oregon border in Del Norte County. A $444,107 contract was awarded to **E. L. Yeager Co.,** Riverside, for shoulder widening and resurfacing on 28.7 mi. east of Amboy in San Bernardino County. **Cox Bros. Construction Co.,** Stanton, submitted a low bid of $331,690 for 1.1 mi. of grading, surfacing and drainage facilities, between Cardiff and Encinitas in San Diego County. A $343,934 contract was awarded to **Slinsen Construction Co.,** Napa, for constructing an interchange and frontage roads and construction of a bridge in and near Napa, Napa County. **Bragato Paving Co.,** Belmont, received a $296,755 contract for grading and surfacing on 31.8 mi. in various sections in San Mateo, Santa Clara and Santa Cruz counties. A $262,752 contract was received by **Ralph B. Slaughter,** Julian, for resurfacing sections of State Sign Route 76, south of Santa Ysabel in San Diego County. **Wright Bros.,** Gridley, received a $238,660 contract to reconstruct and realign on 2.6 mi. of the Marysville Road, north of Browns Valley, Yuba County. A $228,047 contract was received by **C. K. Moseman & Son,** Redwood City, for constructing a four-lane bridge over the Napa River, northeast of Napa, Napa County.

COLORADO

Z. H. Lowdermilk, Inc. of Englewood, received two contracts for roadwork in Summit and Routt counties. A $761,289 contract for

"Shear-Ball" connection eliminates adjustments, boosts output

In this unique design a single row of balls holds turntable to mounting — allows it to revolve smoothly, freely, steadily, year after year. There are no center pins, center pin nuts, centering gudgeons, rollers, bushings, exposed roller paths to be lubricated and adjusted frequently. Even in constant rock digging there is no bounce or wobble.

10-year warranty. "Shear-Ball®" has proven so reliable in ten years of field use on many hundreds of machines that Lorain now warrants the "Shear-Ball" for 10 years against failure to function in normal use and service.

Contractors report: "During two years of operation we never touched 'Shear-Ball' mountings except to lubricate them. Yet our other hook roller and center-pin types have been in the shop for new rollers, bushings and pins."

"As far as maintenance is concerned, there is no comparison between 'Shear-Ball' and any other type of mountings . . . before 'Shear-Ball' we spent $7,000 to $8,000 for rollers, bushings and cracked frames."

"The single ball race design gives us a more compact machine to get under lower bridges."

You too can have this kind of performance. See your Lorain shovel and crane distributor or write direct and ask for the "Shear-Ball" booklet that gives a full explanation of this unique feature.

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MOUNTAIN TRACTOR CO.
Missoula and Kalispell, Mont.

LEE REDMAN EQUIPMENT CO.
Phoenix, Arizona

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

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

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

YUKON EQUIPMENT INCORPORATED
(For Alaska) Seattle, Wash.
Fairbanks, Anchorage and Ketchikan, Alaska

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grading, surfacing and structures on 7.7 mi. of State Highway 9, south of Green Mountain Dam in Summit County and $1,297,073 for 4.5 mi. of grading, structures and asphalt surfacing on Rabbit Ears Pass-West in Routt County. **Hunt Construction Co.,** Steamboat Springs, received a $273,802 contract for grading, surfacing and structures on 1.7 mi., east of Beulah in Pueblo County. **Schmidt Construction Co.,** Arvada, submitted a low bid of $313,747 for grading, structures and surfacing on 4.9 mi., north of Byers, Adams and Arapahoe counties. A $191,015 contract was received by **Siegrist Construction Co.,** Denver, for 5.4 mi. of grading, surfacing and structures, between Wyoming line and Kings Canyon in Jackson County. **Bailey Construction Co.,** Littleton, received a $145,393 contract for 6.6 mi. of grading, structures and stabilization, east of Cheyenne Wells in Cheyenne County. **Leon K. Suhm, Inc.** of Reliance, submitted a low bid of $129,552 for 16th Street Viaduct in city and county of Denver. **Shore Construction Co.,** Denver, submitted a low bid of $126,918 for structures and approaches in city and county of Denver. **Peter Kiewit Sons' Co.,** Denver, submitted two low bids for work in Denver, Adams and Weld counties: $605,911 for grading, structures and surfacing on 3.6 mi., between Dahlia and Havana, in Denver and Adams counties and $132,464 for grading, structures and surfacing on 5 mi., north of Nunn in Weld County. **L. H. Kilgroe Construction Co.** of Denver, submitted a low bid of $124,306 for grading, structures and surfacing on State Highway 72, in and near Arvada, Jefferson County.

IDAHO

Morrison-Knudsen, Boise, submitted a low bid of $1,215,903 for drainage structures and surfacing in Canyon County. **Arrington Construction Co.,** Idaho Falls, received a $197,763 contract for miscellaneous construction work at the National Reactor Testing Station. **Carl E. Nelson,** Logan, Utah, submitted a low bid of $199,795 for surfacing and seal coating shoulders on portion of U. S. Highway 191 in Fremont County. **Carl Carbon & United Paving Co.,** Spokane, Wash., submitted a low bid of $103,637 for reconditioning the existing roadbed and a portion of the Cottonwood-Winona road in Idaho County. **L. W. Vail** of Coeur d' Alene, received a $218,805 contract for grading and surfacing city streets of Sandpoint.

MONTANA

Sletten Construction Co., Great Falls, received a $1,725,000 contract for construction of the Parkdale low rent housing. **Stanley H. Arkwright, Inc.,** Billings, received a $984,257 contract for grading and surfacing on the Ovando-Rogers Pass Road in Powell County. An $800,519 contract was received by **Naranche & Konda,** of Butte, for 6 mi. of grading and surfacing on the Anaconda-East road in Deer Lodge County. **Albert LaLonde Co.** of Sidney, received a $351,184 contract for 9.7 mi. of grading and surfacing on the Circle-Sidney and Circle-Northwest Road in McCone and Dawson counties. **Nilson-Smith Construction Co.,** Great Falls, received a $137,854 contract for 7.7 mi. of grading and surfacing on the Red Lodge-Columbus Road in Carbon and Stillwater counties. A $136,557 contract was received by **Billings Construction Co.,** Billings, for grading, surfacing and structure on the Babb-Piegan Road in Glacier County.

KOLMAN 303 Loader Handles 17 Cu. Yd. Loading Cycles in Twenty Seconds!

To supply dirt for a $1.3-million resurfacing and paving project, A. J. Baltes Co., Norwalk, O., put a Kolman Model 303 60-inch Loader to work on a hill two miles away. The contract involved 2.21 miles of Ohio Rte. 73 at the west edge of Portsmouth, O.

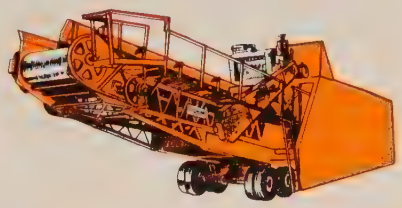
Using 15 to 20 Euclid bottom dumps, Baltes was able to make as many as 1006 loads in a ten-hour day. The 60-inch belt of the 25-ton portable loader handled 15 and 17 cu. yd. loading cycles in as little as 20 seconds. Actual loading time ran 10 to 15 seconds, or better than a yard a second.

Eight bulldozers, three of which had rippers and scarifiers mounted on them, broke loose the dirt and charged the 303 feeder-trap.

The photo above shows one load barely underway, another (extreme upper left) just twenty seconds ahead of it. An empty bottom dump (lower left) is ready to move in the moment the unit under the loader pulls out.

In the right foreground is the huge surge pile that covers the loader's entire feeder-trap and tunnel. The tunnel extends almost halfway up the length of the belt. Baltes moved the loader occasionally to keep it flush with the hill as it was eaten away. He reported moving the 303 in as little as 30 minutes. A dual tandem undercarriage with 10.00 x 20.00 tires and air brakes simplifies movement of the 303 both on and between jobs.

The Kolman 303 moves earth, sand, gravel, rock and similar materials on a gigantic scale by combining the economy of conveyor belt loading with the speed of dozer charging. The loader handles material at rates over 3600 yards per hour.



The 303 is available as completely portable unit or as a skid-mounted unit. Write for literature and prices today. You'll soon see how this Kolman loader can make bigger profits for you, too.

SEE YOUR NEAREST KOLMAN DEALER

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PHOENIX—Arizona Cedar Rapids Co.

CALIFORNIA
LOS ANGELES, BAKERSFIELD, SAN DIEGO, RIVERSIDE, SANTA BARBARA—Brown-Bevis Industrial Equip. Co.
OAKLAND—Spears-Wells Machinery Co.

COLORADO
DENVER—Faris-Moritz Equipment Co.

IDAHO
BOISE, POCATELLO—Intermountain Equip. Co.

MONTANA
BILLINGS, GREAT FALLS, MISSOULA—Miller Machinery Co.

NEVADA
LAS VEGAS—Clark County Wholesale Mercantile Co.
RENO—Reno Equipment Sales Co.

OREGON
PORTLAND—Balzer Machinery Co.

UTAH
SALT LAKE—Rasmussen Equipment & Supply Co.

WASHINGTON
SEATTLE—Sahlberg Equip., Inc.
SPOKANE—Intermountain Equip. Co.

WYOMING
CHEYENNE, CASPER, ROCK SPRINGS and SHERIDAN—Wortham Machinery Co.

KOLMAN MANUFACTURING COMPANY
5670 West Twelfth St., Sioux Falls, S. D.

. . . for more details, write No. 40 on Reader Service Postcard

NEW MEXICO

Allison - Haney, Inc., of Albuquerque, submitted a low bid of $932,081 for 10.7 mi. of grading, surfacing and related work on State Highway 17, Dulce-South in Rio Arriba County. Two low bids were submitted by **Brown Construction Co.,** Albuquerque, for work in Sierra and Bona Ana counties. $718,758 for grading and surfacing on 7 mi. of State Highway 180, Hillsboro-Kingston, in Sierra County and $690,245 for 8 mi. of grading and surfacing north of Anthony-North in Bona Ana County. **C. R. Davis Contracting Co.,** Albuquerque, submitted a low bid of $374,154 for grading and surfacing on 7 mi. of State Highway 38, Agua Fria-Black Lakes in Colfax County. A low bid of $153,077 was submitted by **Leslie Wheeler,** Albuquerque, for grading, sealing and related work in Roosevelt, Debaca, Chavez and Lincoln counties. **Jack Adams Construction Co.,** Santa Fe, submitted two low bids for work in Union and Harding counties. $633,537 for 8.5 mi. of grading and surfacing on U. S. 87, Clayton-Texline in Union County and $288,496 for grading and surfacing 8.1 mi. on State Highway 120, Roy - Northeast in Harding County. **Riverside Corp.** of Farmington received a $487,968 contract for earthwork, structures and related work for the Hammond Project of the Colorado River Storage Project in San Juan County.

NEVADA

Ready-Mix Concrete Co., Reno, received a $565,248 contract for construction of a portion of State Highway, U. S. 95, north of Orovada in Humboldt County. A $320,925 contract was received by **Nacon Co., Inc.,** of Las Vegas, for grading, surfacing and related work on 3.8 mi. on U. S. 50, southeast of Eureka in Eureka County.

OREGON

Peter Kiewit Sons' Co., Vancouver, Wash., submitted a low bid of $1,826,728 for construction of the East Bank Freeway Section of the Pacific Highway in city of Portland, Multnomah County. **Donald M. Drake Co.,** Portland, received a $903,018 contract for construction of the Upper End Modoc Creek Section of the Eastside Road at Hills Creek Reservoir on the Middle Fork Willamette River.

Warren Northwest, Inc., Portland, submitted two low bids for road work in Washington and Clatsop counties. $563,825 for grading, paving and one structure on the Hillsboro-Reedville Section of the Tualatin Valley Highway in Washington County and $102,138 for grading and surfacing on the Sunset Highway in Clatsop County. **S. and D. Construction Co.,** Portland, submitted a low bid of $424,000 for construction of three bridges on Peripheral Road in Lane County. **Roy L. Houck Sons' Corp.,** Salem, submitted a low bid of $266,020 for grading and three structures on the Goshen - Coast Fork Willamette River Section of Pacific Highway in Lane County. **Johnston & Bryant,** Newberg, submitted a low bid of $238,666 for construction of Beaver Creek Bridge, grading and surfacing approaches in Coos County. A low bid of $224,778 was submitted by **Geo. E. Blaisdell & Son** and **Shirley G. Stone Co.,** Oswego, for grading and surfacing northwest of Diamond Lake in Douglas County. **George E. Berry,** Portland, submitted a low bid of $180,272 for construction of bridge, grading and paving on the Schools Highway in Washington County. **S. and D. Construction Co.,** Portland, submitted a low bid of $174,000 for construction of two bridges on the Rogue River Bridge Section of the Laurelhurst Road and Butte Falls Highway in Jackson County. **Tom Lillebo Construction Co.,** Reedsport, submitted a low bid of $162,325 for construction of one bridge on the Pacific Highway in Lane County.

UTAH

L. A. Young Sons Construction Co., Richfield, submitted a low bid of $361,449 for grading, structure and surfacing on 7.5 mi. between Elsinore and Josepa in Sevier County. **L. T. Johnson Construction Co.** of Ogden, submitted a low bid of $226,759 for grading, surfacing and related work on 1.4 mi. in city of Ogden, Weber County. **D. W. Brimhall Construction Corp.** and **The Johnson Co.,** Murray, submitted a low bid of $279,970 for grading, surfacing and structures on 9.7 mi. between Pigeon Hollow Junction and Mt. Pleasant in Sanpete County. **Germer, Abbot & Waldron Construction Co.,** Tremonton, submitted a low bid of $219,623 for grading and surfacing on 6 mi. on State Route 39, west of Woodruff in Rich

County. **Strong Co.,** Springville, submitted a low bid of $166,737 for grading and surfacing from Nephi to Levan, U. S. 91, in Juab County. A low bid of $101,697 was submitted by **Fife Construction Co., Inc.,** Brigham City, for 8.5 mi. of grading and surfacing east of Wendover in Tooele County. **James Reed** of Salt Lake City, submitted a low bid of $479,456 for grading and surfacing on 5.4 mi. between Wilson Wash and Hatch Wash in San Juan County. **L. A. Young Sons Co.,** Richfield, submitted a low bid of $361,449 for grading and surfacing in Sevier County. **Wheelwright Construction Co.,** Ogden, submitted two low bids for road work in Sanpete and Daggett counties. $290,000 for 5.2 mi. of grading and surfacing on the Greendale Jct.-Manila Route in the Ashley National Forest, Daggett County and $286,920 for grading and widening concrete culvert and related work in Sanpete County. **L. T. Johnson,** Ogden, submitted a low bid of $226,759 for grading and surfacing in Weber County. **Thorn Construction Co.,** Springville, submitted a low bid of $414,591 for grading and surfacing on 7.5 mi. of county road in Box Elder County.

WASHINGTON

Manson Construction & Engineering Co., Seattle, received a $1,525,380 contract for construction of substructure for Columbia River Bridge at Vantage, Kittitas and Grant counties. **Fiorito Bros.** of Seattle received two contracts for road work in Yakima and Snohomish counties: $773,708 for grading and surfacing from Selah Junction to Cascade Pond in Yakima County and $247,065 for 1.1 mi. of grading and surfacing in city of Arlington, Snohomish County. **N. A. Degerstrom, Inc.,** Spokane, received two contracts for roadwork in Adams and Garfield counties: $592,771 for 9.5 mi. of grading and surfacing in Adams County and $309,506 for grading and surfacing on 3.9 mi. in Garfield County. A $423,255 contract was received by **S. D. Spencer & Son,** Vancouver, for 1.6 mi. of grading and surfacing in the Knappton vicinity in Pacific County. **Grant Construction Co.** and **Grant Co.,** Coeur d'Alene, Idaho, received a $379,596 contract for 5.5 mi. of grading and surfacing in Walla Walla County. A contract of $312,518 was received by **D. A. Sullivan,** Spokane, for 5.8 mi. of grading and surfacing, Valleyview

Farms to Harrington in Lincoln County. **Lake City Gravel and Materials, Inc.,** Seattle, received a $290,310 contract for 4.7 mi. of grading and surfacing in Pacific County. **Allen R. Anderson,** Seattle, received a $248,257 contract for construction of undercrossing and approaches in Pierce County. **Scarsella Bros., Inc.,** Seattle, received a $469,243 contract for 4.1 mi. of grading and surfacing on the Hobart road in King County. **F. R. Hewett Co.,** a joint venture received a $235,090 contract for grading and surfacing on 2.1 mi. east of Spokane, Spokane County. **Woodworth & Co., Inc.,** Tacoma, received a $212,269 contract for Thompson Avenue Undercrossing, city of Tacoma, Pierce County. **Goodfellow Bros., Inc.,** Wenatchee, received a $162,228 contract for 1.9 mi. of grading and surfacing in Franklin County.

WYOMING

Forgey Bros. Co., Casper, received a $697,361 contract for grading, structures and surfacing on four-lane divided highway on Buffalo-Gillette Road west of Gillette in Campbell County. **Lamb Construction Co.** of Lusk received two contracts for highway work in Crook and Park counties: $235,437 for 4.9 mi. of grading, two structures and surfacing, west of Aladdin in Crook County and $153,641 for 4 mi. of grading and surfacing south of the Wyoming-Montana State Line on the Cody Clarks Fork Road in Park County. **Wilbur Christensen Construction Co.,** Rapid City, South Dakota, received a $208,949 contract for grading and related work on four-lane divided highway between Laramie and Cheyenne in Laramie County. A $205,125 contract was received by **Boatright-Smith,** Casper, for grading and miscellaneous work on various farm roads in Laramie County. **Mullinax Engineering Co.,** Sheridan, received a $144,314 contract for stockpiling in Natrona, Johnson and Campbell counties. **Schmidt Construction, Inc.,** Arvada, Colo. received a $137,713 contract for grading and surfacing east of Carpenter in Laramie County. **L. H. Weber,** Contractor of Rawlins received a $123,851 contract for grading and related work on the Filmore-Albany road in Albany County. **Taggart Construction Co.,** Cody, received a $519,000 contract for grading and surfacing on the Grand Loop and West Entrance of the Yellowstone National Park.

Cost of sign replacement high for Oregon highways

HIGHWAY HOOLIGANS are costing Oregon one mile of average four-lane rural freeway each year, according to W. C. Williams, state highway engineer. "Vandalism of highway signs cost the state $50,000 a year for the material and labor required to repair and replace the damaged units," Williams said. "This amount would provide the state funds necessary to match the Federal money used to build one mile of freeway."

The destruction of highway signs has reached alarming proportions, Williams pointed out. Vandalism not only costs the public in terms of money but in service as well. Without guiding signs, travel would be confused and ineffective. Signs are not cheap. They cost the state of Oregon an average of $2.00 per square foot. The state has more than 100,000 signs of every description marking everything from curves to deer crossings.

Upper Colorado projects win approval of Navajo

A COORDINATED report on the proposed San Juan-Chama Project, Colorado-New Mexico, and the Navajo Indian Irrigation Project in New Mexico, as participating projects of the Colorado River Storage Project, has been transmitted to the Congress. Indians would be the sole users of water supplied by the Navajo Indian Irrigation Project and would use it on a potential irrigable area of 110,630 ac. The project would cost an estimated $135,000,000 at 1959 prices.

A feature of the project would be a gravity canal which would divert water from the Navajo Reservoir, now under construction, to the Gallegos powerplant. At that point, about 75 mi. from the reservoir, the water would be dropped through the powerplant to develop seasonal electrical energy for three pumping plants to supply water to the Navajo lands.

tural gas pipeline is proved for Wyoming-Utah

PROVAL by the Federal Power mmission has been secured for ilding a 155-mi., 34-in. natural s pipeline from Rock Springs, yo., to Provo, Utah. At this int. it would connect with a 4-mi. line of the same size to be ilt by El Paso Natural Gas Co., extend to the California-Nevada rder near Las Vegas. At this lo- tion, the natural gas, at a volume 470 million cu. ft. per day would delivered to a proposed 92-mi. ie that would deliver it to mar- t areas around Los Angeles.

timate of water needs r Southern California

OW MUCH WATER will outhern California need 30 years ence? Where will population ins be the greatest?

Answers to these and other ques- ons on future water needs in outhern California are detailed in ie Department of Water Re- urces' newly-published "Appen- x D", a statistical supplement to ulletin 78. The previously pub- shed bulletin contains analyses of arious proposed aqueduct systems transport surplus Northern Cali- rnia water southward and ex- lains why the chosen route was lected.

A solid mass of humanity is des- ned to live along the coast from entura to San Diego, with the opulation overflow spilling into ern County and the desert hinter- nds — the Antelope, Mojave, Whitewater and Coachella valleys. anta Barbara, San Luis Obispo nd Riverside counties also will ain hundreds of thousands of new esidents within the next few ecades.

The report, completed before ie recent proposed decision affect- ng California's share of Colorado River water, spotlights the narrow- ng gap between water reserves and ater needs in Southern California.

After 1970 — which is only to- morrow in water project develop- ment—the water needs of Southern California's expanding population nd industry will be using fully the ntire claimed right of the Metro- olitan Water District to Colorado River water. And now that it ap- ears likely that this assumed sup- ly may be cut back by federal ourt action, the need for pushing orward with the State water de- elopment program is all the more rgent.

ENGINEERS and CONTRACTORS

Carl Wilder, Portland Cement Association conservation engineer with headquarters in Denver since 1948, has been assigned to the Western regional office in Los Angeles. Here he will assist three PCA districts in Los Angeles, Seattle, and Phoenix in matters pertaining to flood control, irrigation, sewage works and water conservation.

Wilder

Hansen

Also announced is the appointment of **Kenneth D. Hansen** as a field engineer in the New Mexico District office. For the past three years Hansen has been serving as a project engineer for the engineering firm of Ketchum, Konkel and Hastings, Denver. His new headquarters are at the Association's offices in Albuquerque.

* * *

For the first time in the 43-year history of the Nevada Highway Department there will be a sixth highway division in the state. With headquarters in Winnemucca, the new administrative and maintenance district will be under the supervision of **Dale Rose,** former assistant engineer in Division III. The new division is formed from the northeastern portion of Division II and the western part of Division III.

* * *

Major Roy L. Kackley, Jr., has completed his tour of duty in Seattle, where he had been deputy to the district engineer, **Col. R. P. Young.** Kackley has been transferred to the Army's Command and General Staff College at Fort Leavenworth, Kans.

* * *

Announcement is made by Cornell, Howland, Hayes & Merryfield, Consulting Engineers, with headquarters at Corvallis, Ore., that **Earl C. Reynolds, Jr.,** has been named a partner. Reynolds has managed the Boise, Idaho, office since it opened in 1950. On Aug. 1 the firm opened an office at Seattle, in the Logan Building, with **Holly A. Cornell** in charge.

* * *

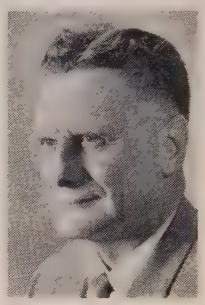
Raymond E. Davis, Professor Emeritus of Civil Engineering at the University of California, has received the Frank E. Richart Award from the American Society of Testing Materials. During his long professional career Professor Davis has served as a consultant in the field of concrete to many government agencies and to private corporations.

COL. JOHN A. MORRISON who recently assumed command of the San Francisco Army Engineer District. He replaces *Col. John S. Harnett* who will become executive secretary to the San Francisco Bay Area Council on his retirement in October. Col. Morrison will have responsibility for a civil and military construction program covering central and north coastal area of California, the atomic testing grounds in Nevada and Utah.

* * *

Walter G. Schulz, chief of the division of design and construction, California State Department of Water Resources, is retiring from state service on Nov. 15. This service dates back to 1930. He plans to join the engineering consulting firm of Leeds, Hill, and Jewett, Inc., of Los Angeles, becoming a vice president in charge of a new office in San Francisco.

* * *



Schulz

Ketchum

Verne L. Ketchum, internationally known in the engineering profession, retired from active service Aug. 1. Head of the engineering department of Timber Structures, Inc., for 20 years, Ketchum originated many of the techniques and procedures now used in designing structural timbers. He has contributed to many engineering textbooks and has authored articles for *Western Construction* and other publications on matters pertaining to engineering of timber.

* * *

G. Glen Gage of San Francisco announces the formation of Construction Consultants Inc. in association with **Mike Heller** of Sacramento. Gage is an international figure in heavy construction, with interests in many parts of the world. Heller is well known in California construction as head of Continental Construction Co., and vice president of Delta Prestress Concrete Co. The new firm has its offices at Sacramento.

* * *

Assigned to various road jobs by the Utah State Road Commission are the following resident engineers: **Stanley Van Orman** to W. W. Clyde & Co.'s project on Interstate 80 near Silver Creek; **Ben Lee** to general improvement construc-

tion on State Road 59 near Hurricane, by Stout Construction and Hall & Hall Construction; **Ernest Wilson,** representing the State on a 100-day contract for highway improvement being done by L. C. Stevenson and Grant Hansen; **Carl M. Fonnesbeck,** in charge of project on U.S. 91 covering surfacing work near Brigham City, by Jack B. Parson Construction Co.; **Karl Jones,** assigned as resident at Vivian Park where a prestressed concrete structure over the Provo River is under way by Weyher Construction Co.; and **William M. Marsden,** in charge of construction of 3 mi. of plant-mix bituminous surfacing on State Road 79, near West Ogden.

* * *

Two prominent Western engineers have been named honorary members of the American Society of Civil Engineers, the highest honor bestowed by the 45,000-member society, the oldest national engineering organization in the nation. Those selected were **Guy F. Atkinson,** chairman of the board of Guy F. Atkinson Co., South San Francisco, Calif., and **Fred C. Scobey,** construction hydraulic engineer, Berkeley, Calif.

CALENDAR

Sept. 27-30 — Prestressed Concrete Institute, annual convention, Statler-Hilton Hotel, New York City.

Oct. 10-13—American Mining Congress Mining Show, Convention Center, Las Vegas, Nev.

Oct. 10-14 — American Society of Civil Engineers, annual convention, Hotel Statler, Boston, Mass.

Oct. 14-16 — California Association of Engineering Geologists, annual meeting, University of California, Berkeley.

Oct. 31-Nov. 2—American Concrete Institute, regional meeting, Pioneer Hotel, Tucson, Ariz.

Nov. 28 - Dec. 2 — American Association of State Highway Officials, annual convention, Detroit, Mich.

1961

Mar. 5-8—American Road Builders Association, annual convention, Chalfonte-Haddon Hall, Atlantic City, N. J.

Southeastern Highway Contracting Company...

Schedule: 8000' of Road

...C.I.T. Is On the Job, too

The Southeastern Highway Contracting Company of Gainesville, Georgia, is setting a stiff production schedule for themselves on a section of U. S. Highway 80 between Macon and Columbus. The job schedule: lay 8000′ of road base daily to improve and widen a 25-mile strip between these two southern cities. Southeastern Highway is using almost 100 pieces of C.I.T.-financed equipment to push this job along on schedule. Completion will see the elimination of a rough, narrow section of this vital roadway serving heavy commercial traffic.

Asked if he would recommend C.I.T. Corporation financing, Mr. Ed Samples, President of Southeastern, said, "Yes, indeed, I've done business with C.I.T. for some time now. When a company can borrow operating capital to take advantage of discounts on material . . . and pay for equipment as it depreciates . . . it must be a good deal."

How Job-Engineered Finance Plans Help Contractors

Payd Plan equipment financing terms to 6 years with payment schedules related to depreciation, or equal monthly payments over 36 months, or skip-payment plans are just a few of the helpful financing tools offered by C.I.T. Corporation.

In addition to equipment purchase financing, C.I.T. can help improve contractors' bid and bond capacity, meet current operating expenses or other business needs by arranging capital loans. C.I.T. representatives know how to lay out "job-engineered" finance plans carefully devised to fit the needs. Why not call or write today. No obligation, of course.

Ed Samples and Harry Gay, C.I.T. representative, talk over financing details in temporary construction shack near the job site.

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120 Montgomery Street, San Francisco 4, Calif.
Equitable Building, Portland 4, Oregon
655 Broadway, Denver 3, Colorado
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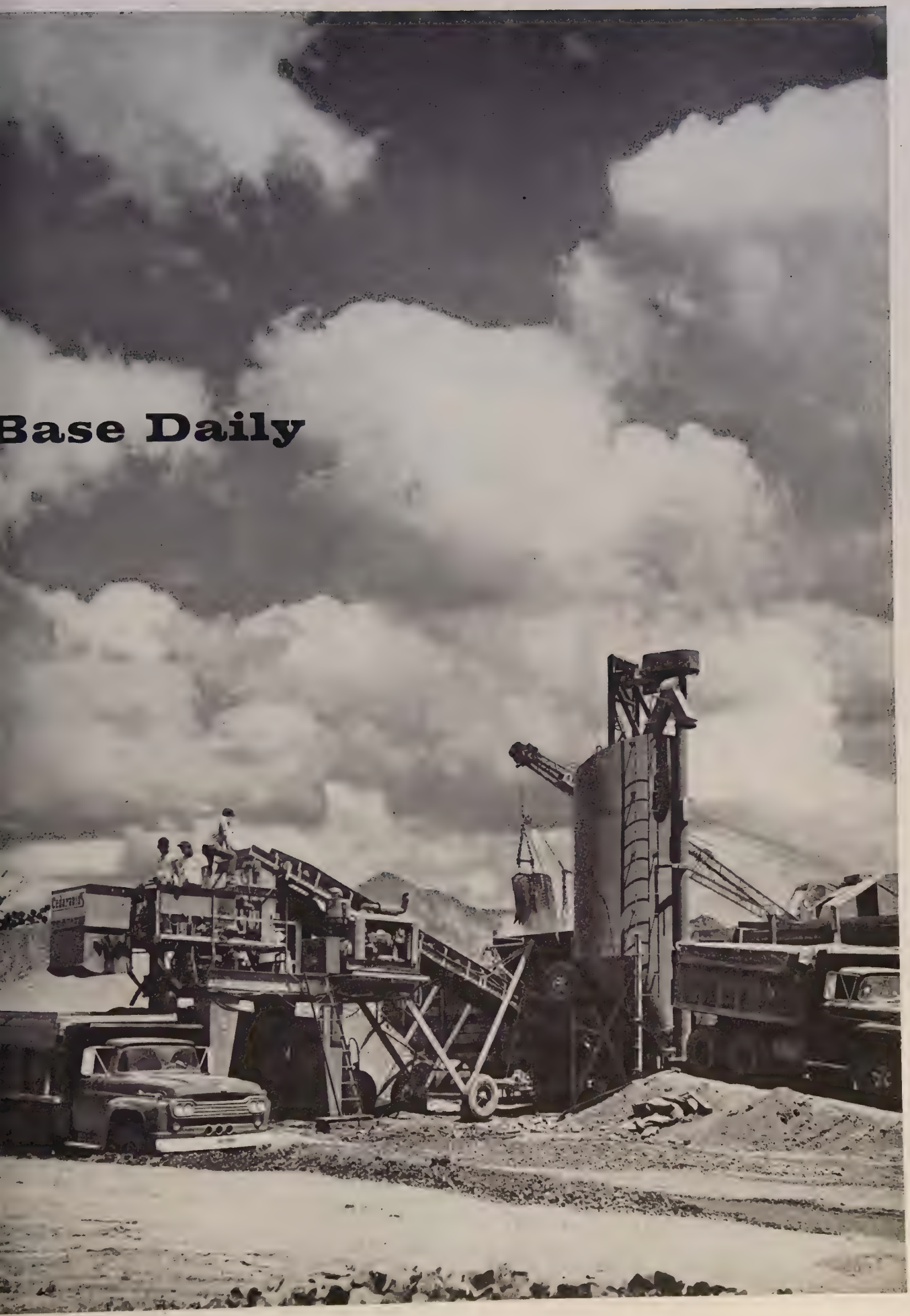


Base Daily

SUPERVISING the jobs

R. G. "Andy" Webster, superintendent for Ball & Simpson, is in charge of a $2,122,412 recent award covering grading, surfacing and related work on 4.2 mi. to provide 4-lane expressway on U.S. 395 north of Mono Lake, Calif. Other key personnel are: **Art Ostrum, W. Phillips,** and **A. Covey,** foremen; **R. Button,** master mechanic; **John Sutton,** company engineer; **Don Hamilton,** purchasing agent, and **Thelma Webster,** office manager. Under way since June, work will be finished in October 1961.

* * *

L. H. Weber is acting as superintendent on his own contract from the Wyoming State Highway Department for 5.5 mi. of grading and surfacing and 4 structures on the Kemmerer-Sage Junction road in Lincoln County. Shift foremen on the $523,814 job are **Donald R. Carson** and **Leslie R. Tanner.** Work here started in April and will soon finish.

* * *

Guy Scott is supervising a $907,-087 award to Peter Kiewit Sons' Co. covering grading, surfacing and structure on a 3.1-mi. section of the Oregon Coast Highway south of Gold Beach, Ore. Other key contractor men are: **Bill Allen,** office manager; **Fred Nieman** and **John Sharp,** grade foremen; **Ed Thiel,** master mechanic, and **Frank Marly,** oiler foreman. Set for November completion, work started last June.

* * *

Roscoe P. Downs, managing partner; **Richard Fedrick,** alternate managing partner, together with **Robert L. Oliver,** project engineer, **Joe Muscolo,** superintendent, **Banks Bourgeous,** master mechanic, and **Ralph Maroney,** office manager, comprise the key men on a $4,489,113 contract recently awarded to M. M. Sundt Construction Co. and M. J. Bevanda Co., Inc., and Altermatt-Action Ventures, Inc. Covered by the contract are roads, utilities, power and communication lines to be constructed at the U. S. Naval Missile Facility, Point Arguello, Lompoc, Calif. Earmarked for completion next March, work got under way in June.

* * *

Daryl M. Doyle, superintendent, assisted by **Samuel N. Cottrell,** is in charge of construction of 25.3 mi. of 4-lane freeway including 13 bridges in San Bernardino County, Calif. The Gordon H. Ball, Gordon H. Ball, Inc., Ball & Simpson and E. L. Yeager combine were awarded the contract on a low bid of $4,883,454; started work in April and expect to finish August 1961.

* * *

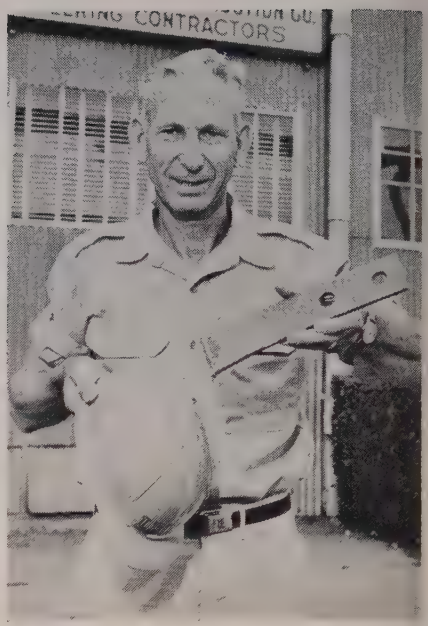
Howard Mead, project superintendent, **W. R. Nelson,** project engineer, and **Robert Haushfus,** accountant, are key men on construction of 354-unit dwelling project in San Francisco, a $4,689,000 contract awarded to Nomelini Construction Co. and Fruin-Colnin Contracting Co. Preliminary work in the construction of these homes started in May, with completion set for late 1961.

* * *

Ken Hill is supervising T. G. K. Construction Co.'s contract to construct an office building for the telephone company at Phoenix, Ariz. Work on this $2,962,300 structure with additions has been under way since April.

* * *

T. C. Beard, project manager, **Joe Wheeler,** project superintendent, and **Ralph Winnes,** project engineer, are key men on final excavation and construction of the powerhouse at Hills Creek Dam on the Middle Fork Willamette River, Ore. Other key contractor men are **Gerald Olson,** office manager, and **Howard Flake,** equipment superintendent. Scheduled to take two years, the project is costing $1,191,912. Green Construction Co. and Tecon Construction were awarded the contract. They also have the prime contract for construction of the main dam at Hills Creek and the powerhouse contract will coincide with the remaining work on the dam.



W. S. ROBINSON, superintendent, Underground Construction Co., Oakland, Calif., can thank a hard hat for saving his life when the piece of flatbar he holds here fell on him from a height of 21 ft. At a recent safety meeting of the contractor's supervisory personnel Robinson received a Turtle Club award.

* * *

Willard "Red" Thomas is supervising construction of the Public Safety Building in Anchorage, Alaska, a concrete and steel structure costing $1,576,600. Engineer is **John L. Bennett.** Successful bidder was J. B. Warrack Co. which started work in May, with completion earmarked for next July.

* * *

Harold Hasse, superintendent for Gardner Construction Co., and **Wayne A. Lowdermilk** of W. A. Lowdermilk, Inc., together with **Morris Gardner,** are acting as superintendents for the joint venture of Lowdermilk and Gardner which recently received a $1,464,-002 award for 3.1 mi. of grading, surfacing, and structures east of the Arizona-New Mexico state line in McKinley County, N. Mex. **Lloyd C. Smith** is office manager. Grade foremen are **Richard Simmons** and **Ted Kinsman. Dan Lo-**

(Continued on page 107)

SUPERVISING

(Continued from page 102)

pez heads the labor force. The job is one large cut, with very little rock, and contractor expects to finish by the end of November. All concrete work is being done by the Gardner organization.

* * *

Arnold Blair, superintendent, with the assistance of **Floyd Lambert**, heads a resurfacing job being done by Isbell Construction Co. The $469,953 project, now completing, covers grading, surfacing, and structures on U. S. 50 and 395 in Douglas and Ormsby counties, Nev.

* * *

Melvin Beach, John Montgomery, Lawrence Arnson and **M. L. Hollingsworth**, equipment, grading, gravel, and oil superintendents respectively, are key men on 4.3 mi. of grading, surfacing, and draining on the Box Elder-West road in Hill County, Mont. The O'Neil Construction Co. is doing the work at a cost of $193,891 and expects to be finished by Oct. 1.

* * *

Rex T. Mackay is superintending 2 mi. of grading and surfacing of streets in Salt Lake City for W. W. & W. B. Gardner, Inc., which successfully bid the job at $96,310. Assisting as foremen are **Franklin L. Drake, Jr.**, and **Abe Johnson.**

* * *

Ben Lowdermilk is supervising a $571,471 award to the contracting firm of H. E. Lowdermilk Co. covering grading, structures and surfacing on 4 mi. on State Highway 91 in Lake County, Colo. A 150-day job, work started in June, with **Lauren Burdick** in the timekeeper spot and **B. R. Clark** acting as grade foreman.

* * *

John C. Leo, superintendent, has charge of work on the 29th St. interchange and Eden interchange on the Pueblo Freeway, Colorado. Job entails grading, surfacing, and structure on 1.4 mi. on U. S. 85-76 and went to Broderick & Gibbons on a low bid of $617,949. Other key men are **Ken Reed**, general foreman, **Ed Lively**, grade superintendent, and **Mike Meiklejohn**, structure foreman. Grading is subcontracted to Harper Bros. Under way since June, the job will be finished in December.

RUNNING the Whiskeytown highway job in Northern California for Gibbons & Reed of Salt Lake City are, from left: *Craig Gates*, project engineer, *Jack Griffin*, project superintendent, and *Adrian Cox*, equipment maintenance superintendent. The $4,065,000, 5.1-mi. job is part of the Trinity project and involves building new east-west highway U. S. 299 through area to be inundated by Whiskeytown reservoir soon to be constructed. Job features extensive use of riprap construction where road crosses arms of reservoir.

* * *

Fred H. Endreson, superintendent, aided by **Wilford W. Graves**, surfacing foreman, and **Joseph H. McVeigh**, grade foreman, heads the crew working for Green Construction Co. on relocation of 0.47 mi. of roadway, including a 193-ft. bridge, along with grading and surfacing on Richardson Highway, Alaska. Earmarked for conclusion next June, the work started in July. Contract price $318,693.

* * *

C. A. Decker, project manager, **James Jones**, general superintendent, and **Charles Ptacek**, grade superintendent, are Interstate Contractors' top trio on a $538,522 award for construction of Gore Field runway extension at Great Falls, Mont. Job started in July; will finish in October.

* * *

Jim Stamatis, project superintendent, **C. H. Messenger**, project engineer, and **Roy Cook**, general foreman, head the crew of Del E. Webb Construction Co. which is constructing 400 housing units at Vandenberg AFB, Lompoc, Calif. Construction of this $6,557,346 project has been under way since June, and according to **Kim Bannister**, manager of project operation, will be finished about June next year.

* * *

Ben Keller and **Ken Thomas**, superintendents of Charles M. Smith, are in charge of this contractor's recent $397,000 award to erect a fishing bridge and approaches in Yellowstone National Park, Wyoming. With mid-November the target, work started in July.

* * *

Richard Van Weelden is job superintendent on grading, surfacing and two overpasses on the Gila Bend-Casa Grande highway in Arizona. Givens Construction Co. was the successful bidder at $348,759; started work in July and expects to have it complete the end of November.

* * *

George Borovich, superintendent, has charge of 1.3 mi. of 2-lane highway grading and surfacing with aggregate base, sub-base penetration treatment and seal coat, and a bridge to be constructed over Salt Creek in Tehama County, Calif. Assistant superintendent is **Howard Wilmoth**; structure foreman, **Murl Hobbs**; mechanic, **Jess Whitledge**. The $191,164 project is in the hands of Thomas Construction Co. Thomas started work in June and will finish this month.

MASTER MECHANIC

TECHNICAL representatives of equipment manufacturers making up the panel for the July meeting of EMSA's Los Angeles chapter were, from left: Jack Mason, Bucyrus-Erie; Rod Bartlett, P & H; Ernie Bridgeman, P & H; Ralph Currier, Allis-Chalmers; Bill Houpt, International Harvester and Ed Smith, Caterpillar.

Heavy equipment experts review maintenance problems

A QUESTION and answer session was the feature of the July meeting of EMSA's Los Angeles chapter. Representatives of six of the nation's largest heavy equipment manufacturing firms made up the panel to which equipment service and maintenance questions were directed by the 51 members in attendance.

Los Angeles

Included on the panel were: Jack Mason, Bucyrus-Erie; Ernie Bridgeman, P & H; Rod Bartlett, P & H; W. H. Houpt, International Harvester Co.; Ed Smith, Caterpillar; Ralph Currier, Allis-Chalmers.

Questions, ranging from problems connected with the maintenance and service of everything from radiators to final drives, held the attention of the group as few programs can. Some of the questions, and their answers:

Q. We're using our D8's as rippers and have been having a lot of trouble with our final drives. What's being done about this?

A. (Smith) A new gear has been developed by Caterpillar to withstand the shock load caused by this kind of work. It will be a tremendous help, but you've got to impress on your operators that when they have the engine revved up, then let the clutch fly in, they're throwing a strain of about 750 hp into that final drive in one snap. If they keep doing this, something's bound to give way no matter what you put in there.

Q. We've been sandblasting away the cores of our radiators. What can we do to halt this sort of thing?

A. Use of an outside fan instead of the conventional inside fan is about the only practical solution to this problem. Sandblasting comes from high speed reverses with sand being thrown up from the tracks into the air stream and blown through the radiator. International Harvester equipment can be easily modified with factory parts. There is a report that some Caterpillar equipment has similarly been modified. Those members in attendance who had used relocated fans supported this as the only effective method of getting away from damaged radiators from sandblasting.

Q. The model 30 Caterpillar cable control unit on our equipment is in constant need of adjustment, heats up and is hard to operate. Have you any suggestions?

A. (Smith) Reports have been received that logging people in the Northwest, faced with the same problem, are placing a .003 feeler gauge between the roller and the ramp, then welding the broken link solid. This eliminates all movement at that point and has reportedly eliminated these difficulties. We've had no experience with this down here, but it sounds like it would be worth a try.

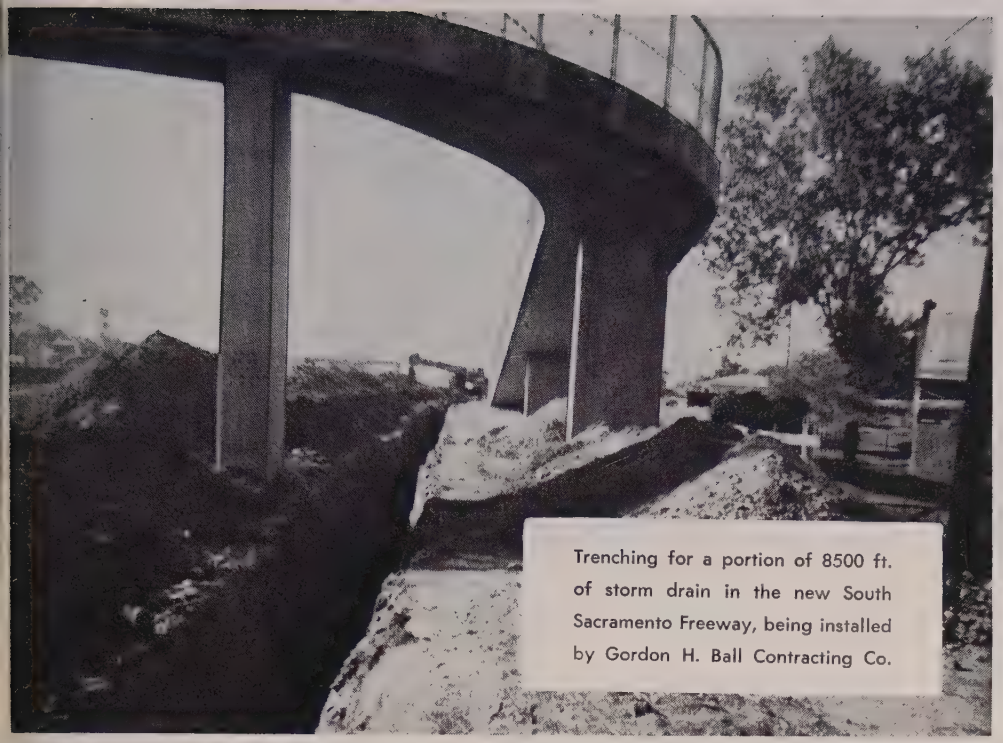
Q. Why can't manufacturers use decals on equipment to specify lubricant types?

A. Many firms do. But it's not always too satisfactory. For instance, some lubricant manufacturers believe a certain type of lubricant is good for a wide range of services; a competitor making about the same type of lubricant believes its uses are much more limited. This is partly the result of the great differences in conditions under which any one piece of equipment might be used. It may be hot and sandy on one job, cold and wet on the next. The same lubricant is probably not ideal for both conditions.

Q. The #27 cable control units on our DW21's chatter no matter how carefully we service them. Is Caterpillar making any changes in this?

A. Yes. A new 720° lining has been developed just for this purpose. It has been very successfully field tested here in Southern California with excellent results. It is now in production and should be available very soon. This new molded lining seems to have cleared up the problem entirely.

In response to requests from other EMSA members concerning the method of satisfying the spark arrester requirements of the forestry service and the local fire groups, Bob Moodie reported that the Forest Service looks upon the turbocharger as "a very efficient spark arrester." E. E. Silva, engineer in charge of the USDA Forest Service center in Arcadia, Calif. reported to Moodie that no other device was required on most turbocharged equipment. For equipment not equipped with turbochargers, a list of manufacturers with spark arresters approved by the USDA was included: (Air Maze, Caterpillar, Cone Arrester Co., Erickson Products Co., Harco Manufacturing Co.)



Trenching for a portion of 8500 ft. of storm drain in the new South Sacramento Freeway, being installed by Gordon H. Ball Contracting Co.

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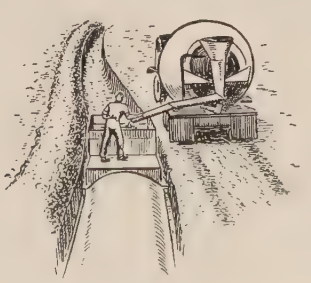

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Hydraulic Problems Reviewed

PROBLEMS in maintenance and operation of hydraulic systems were reviewed by A. W. Duarte, field engineer of the Rucker Co., Oakland hydraulic equipment distributor, before a recent meeting of the Bay Area chapter of Equipment Maintenance Supervisors Assn.

Bay Area

In general, he observed, most hydraulic maintenance problems arise from excessive loads, inadequate fluid reservoirs, and consequent operation at high temperatures.

He recommended use of a tank at least 3 times the size of the pump capacity, with other elements in the system matched to this capacity.

Cooling problems may be solved in certain cases by use of a radiator type heat exchanger, or by simply changing the direction of the return line. He noted that the return should face the opposite end of the intake, so that fluid will get a chance to circulate and dissipate its heat before returning to the system.

Duarte—and members of his audience—emphasized the necessity of

ILLUSTRATED explanation of hydraulic application is provided by A. W. Duarte, field engineer of the Rucker Co. (right, with pencil), for Gene Anson and Ralph Andre of Blakemore Equipment Co. Looking on is O. E. Thomson, Stolte, Inc., vice president of the Bay Area EMSA chapter. Duarte was a featured speaker at a recent meeting of the group.

keeping hydraulic fluid clean. The speaker urged use of tell-tale filters which indicate when the filter needs cleaning, and which can be used as flowmeters for the system.

In line with the discussion on clean fluid, the speaker warned against using galvanized pipe for the plumbing in a hydraulic system. The galvanized coating ultimately will flake off, plug the filter, score the cylinder, and generally tear up the system, he said.

Two new oil filters

DIESELPAK, Luber-finer's oil filter replacement pack for diesel and gasoline engines, is now available in two models, Regular and Imperial. The Imperial model Dieselpak, is recommended for operators with extended maintenance schedules. Under normal over-the-road diesel truck operation the Imperial Dieselpak will deliver from 7,000 to 12,000 miles of superior filtration.

The regular Dieselpak, recently introduced by Luber-finer, has been developed to give genuine Dieselpak protection to the operator who schedules oil and pack changes from 4,000 to 7,000 miles.

. . . Write No. 153

Pipe repair kit

A PORTABLE repair kit, designed for simple, economic, and rapid permanent repairs to pipe and tubing, pipe joints, pipe fittings, and tanks and other vessels has been announced by the Dresser Manufacturing Division.

Designated as the "Util-Seal" Kit, this new epoxy resin utility repair kit doubles as a carrying case, and

is small enough to be carried as spare gear on all service trucks.

The package contains individual portions of resin, activator and fibrous reinforcer, as well as a collector ring and pressure relief vents for use during the "setting-up" period.

. . . . Write No. 154

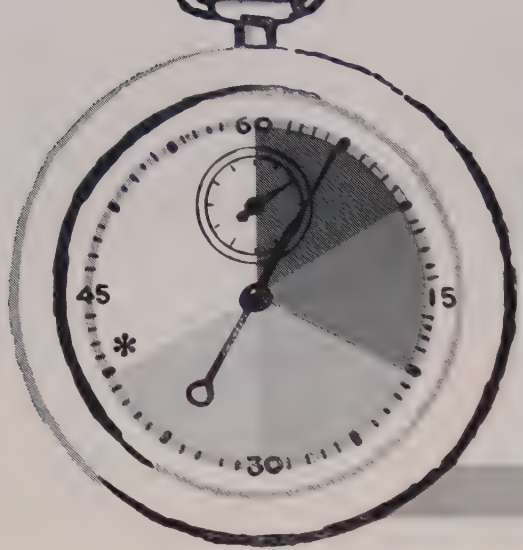
New turbocharger weighs only 43 lb.

EXPANSION of activity in the area of diesel engines with very high response rate is announced by The Garrett Corporation's AiResearch Industrial Division, through development of its model T-18 turbocharger.

The low inertia T-18 is designed for diesel power plants in the 220 to 500 hp. range, which are coming into prominence in the earth-moving fields. With a housing diameter of 10.4 inches and a weight of 43 pounds, the turbocharger is considered quite compact for its capability.

Use of a star design turbine wheel is greatly responsible for reduced inertia and quick response. In this design, the turbine blades extend from a small diameter hub without a heavy back shroud. Taking advantage of the parent company's extensive gas turbine background, AiResearch engineers have been able to design this star wheel with unusually low stress levels.

. . . Write No. 155



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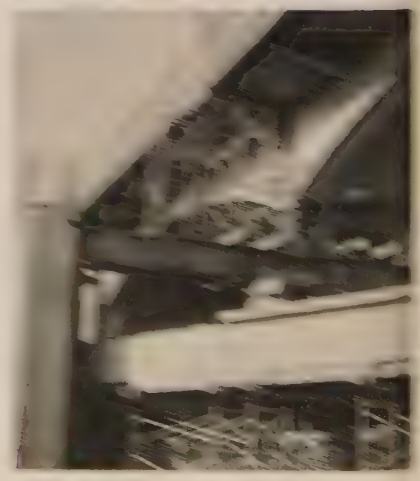
CONSTRUCTION BRIEFS

Cranes solve "Chinese Puzzle" on bridge approach contract



WORKING IN MUD...

DW21s push tough excavation job

Put yourself in the shoes of Grantwood Construction Co., Kirkwood, Missouri. The job—excavate 425,000 cu. yd. for the River Roads Shopping Center, St. Louis. Average haul distance—900-ft. round trip.

Here's the dark side of the picture. Bad weather turned the silt and clay into heavy, slippery muck. And the rains continued, throughout the spring.

Adverse conditions? Definitely! But the two DW21Gs took them in stride, moving big loads over soft ground.

Three features on the DW21G paid off big:

SYNCHROTOUCH TRANSMISSION CONTROL: It lets the operator shift simply by dialing the desired gear for automatic, split-second response. Result: faster shifting, faster cycles, more payloads per hour, less operator fatigue for higher daily production.

POWER: DW21G is rated at 345 HP (maximum output) . . . plenty of power to get heavy loads out of the cut . . . hustle them over soggy ground.

GOOD FLOTATION: Wide-base tires on tractor and matching 470B Scraper carry big loads over ground that bogs down other rigs. 470B is rated at 19.5 cu. yd. struck . . . 27 cu. yd. heaped. Other features add up to lower maintenance cost; longer, more productive service. For example, strong bowl, draft frame and apron shrug off the punishment of heavy loads.

The DW21G delivers top performance on any job . . . especially the tough ones. Your Caterpillar Dealer has complete details on this versatile scraper combination. Ask him to demonstrate its profit potential on your job.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

CATERPILLAR

WANTED—
THE HARD WORK

spaced scaffolding and place it on the work platforms.

The Austin-Western Model 410 and Model 210 hydraulic cranes were chosen for the job.

To get the concrete in place on the platforms, bottom-dump concrete buckets, loaded at ground level, were lifted by the 410 crane and, by use of the telescoping and raising boom, passed upwards through the small openings between the scaffolding to the platforms. From the platforms, the concrete was placed in the forms by hand as the most effective way to ensure placing the concrete properly. A total of 1,600 cu. yd. of concrete, positioned and poured in this manner, was needed to enclose the beams.

When the Austin-Western 410 crane was not handling concrete, Kiewit used it for many other tasks involving hard-to-reach places on the job. For such work as chipping concrete, demolition work on old support columns, removing forms from enclosed beams and tightening Howlett nuts to stress reinforcing rods on deck beams, men were quickly and safely put into position by means of a platform attached to the boom tip of the crane.

The platform was built by Kiewit on the job site. Four feet wide, 7 ft. long, and equipped with a removable guard rail, the welded steel platform is fitted with a line to hold it level regardless of the angle of the boom.

"POOR SMEDLEY"

To inflate this giant Firestone tire to 50 lb. pressure with a hand pump would take Airman Bill Singletary 17 hours and more than 15,000 strokes of the pump, tire engineers figure. The 8-ft. high 30 x 33 tire is used by the Air Force on its 50-ton Tournahaul crane, used to remove disabled aircraft from runways.

GIANT SALE!

CONSTRUCTION EQUIPMENT FROM MAMMOTH TRINITY DAM PROJECT

CALIFORNIA

(FOR DELIVERY LATE SEPTEMBER)

Liquidating $14,000,000.00 worth of well-maintained, top name equipment at BARGAIN PRICES!

CONVEYOR SYSTEM

2 miles long, 42" wide rubber belt. 9 flights, available individually, ranging from 672 ft. long to 1885 ft. long. Braking by electric motors acting as generators under belt load; also mechanical brakes. System includes drive-over hopper loading station for scraper discharge, screening and crushing plant, three drive-under terminal bins with total capacity of 1500 cu. yds.

SHOVELS AND CRANES

2—Model 150B Bucyrus Erie 6 cu. yd. Electric Shovels and Draglines (Note: 8 cu. yd. Dippers w/handles available for above); 1—Model 120B Bucyrus Erie 5 cu. yd. Electric Shovel and Dragline; 1—Model 38B Bucyrus Erie 1½ cu. yd. Shovel, Dragline, Backhoe, diesel; 1—Model 22B Bucyrus Erie ¾ cu. yd. Shovel, Dragline, Backhoe, diesel.

MOTOR PATROLS

9—Model 12 Caterpillar Motor Patrols, 8T, 80D, 70, and 71D Series.

HAULING UNITS

8—Model LRVX Mack Tractors w/ Model 137W Euclid 30 cu. yd. Bottom Dump Trailers powered by NVH-12-B1 Cummins Engines; 10—Model PH95AC International Payhauler Tractors w/Model PW20 30 cu. yd. Athey Bottom Dump Trailers.

END DUMP EUCLIDS

5—Model 46TD Euclid End Dump Units, 15 cu. yd., powered by Model NHRBIS Cummins Engines; 10—Model 63TD Euclid End Dump Units, 15 cu. yd., powered by Model 6-110 GMC Engines.

LOADERS

1—Model 175ADS Michigan 3 cu. yd. loader powered by Model 135DKBS Waukesha Engine; 1—Model D4 Caterpillar Loader w/ Model EA4 Trackson Loader.

CRAWLER TRACTORS

15—Model D9 Caterpillar Tractors w/P.C.U.'s and Dozers, 18A Series (Note: 4—Ateco Hydraulic Rippers available for above); 21—Model D8 Caterpillar Tractors w/P.C.U.'s and Dozers, 14A Series (Note: 6—Caterpillar #8 Hydraulic Rippers available for above).

RUBBER TIRED TRACTORS

30—Model DW20 Caterpillar Tractors w/Model 456P Modified Scrapers, 67C and 88E Series; 10—Model DW20 Caterpillar Tractors w/Model PW20 Athey Wagons, 88E Series; 2—Model 33LDT Euclid Tractors w/Model 32SH Scrapers.

QUARRY DRILLS

1—Model TWM2A Joy Quarry Drill w/T500 Drills, pneu. tires; 3—Model TWM-5 Joy Quarry Drills w/T500 Drills, pneu. tires.

SPRINKLER TRUCKS

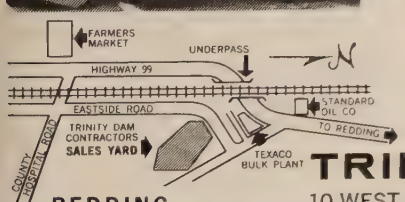
1—3400 gal. Model CF523C6 Kenworth powered by Model NRT6B1 Cummins Engine; 1—3400 gal. Model R1F402 International powered by Model NHB Cummins Engine; 1—3600 gal. Model RDF192A International powered by Model JBS600 Cummins Engine; 2—6000 gal. Model 46TD Euclid powered by Model NHRBIS Cummins Engine.

DUMPCRETE

5—4 yd. Dumpcretes mounted on International truck.

ALSO:

AIR COMPRESSORS • PUMPCRETE MACHINES • BATTERY LOCOMOTIVES • TRUCKS • PICKUPS AND JEEPS • WELDERS • LIGHT PLANTS • HOUSE TRAILERS • PUMPS • AIR TOOLS • ELECTRIC TOOLS • HOSE • PIPE • TANKS AND OTHER EQUIPMENT



All equipment kept in peak condition by elaborate preventive maintenance program. Choose from vast inventory while selection is complete. WRITE, WIRE OR PHONE FOR SALE PRICES OR TO ARRANGE A VISIT TO SALES YARD!

TRINITY DAM CONTRACTORS A JOINT VENTURE

10 WEST ORANGE AVENUE • SOUTH SAN FRANCISCO, CALIF. • PLAZA 6-0300, EXTENSION 279

SALES YARD • REDDING, CALIFORNIA Eastside Road at South end of Redding Phone: CHestnut 1-5241

. . . for more details, write No. 81 on Reader Service Postcard

NEW LITERATURE

To obtain free copies of literature described in this section, write the corresponding numbers on reply postcard.

Welded steel pipe data booklet

A 40-page spiral bound booklet on sizes, properties, and uses of welded steel pipe has been issued by **Armco Drainage & Metal Products, Inc.** The well illustrated book covers applications, standard specifications, size range, practices, and tolerances of pipe. There are 16 data tables with charts and typical installation photographs. The booklet includes information on linings and coatings of pipe, as well as data for design engineering use on thermal expansion flow or fluids, deflection and resistance to collapse. *. . . Write No. 157*

Airport construction

A 20-page booklet giving detailed case histories on the use of Pozzolith in construction of airport runways, hangars, and administration buildings has been issued by the **Master Builders Co.** The book contains nine articles on construction of airports ranging from Vancouver, B. C., to the Dominican Republic. The jobs include construction of runways, taxiways, thin shell hangar roofs, pre-cast clear span roofs and parking aprons. *. . . Write No. 158*

Rock drilling bulletin

Step-by-step instructions on rock drilling and maintenance of drill equipment are contained in an 8-page brochure, Bulletin No. 10815, issued by **Thor Power Tool Co.** Material covered includes operation of rotation, drill, and feed controls; starting a hole; proper feed practices; proper lubrication practices; how to add steels; how to remove steels; removing broken steels; and proper grinding of bits. *. . . Write No. 159*

Weight tables for steel bars

A 72-page book of tables showing the weights of various size steel bars in flat, square, and round sections has been issued by **Joseph Dyson & Sons, Inc.** Eleven tables give the weights of round and square steel bars in sizes from 1/8 in. through 47 7/8 in. and in lengths of 1 in., 1/8 in., and 1 ft. Similar comprehensive tables give the weights of square, round, hexagon, and octagon steel bars to the hundredths of a pound. The handy reference booklet has 34 weight tables of flat steel bars covering thicknesses of 1/16 in. to 11 7/8 in. in widths ranging from 1/8 in. to 23 3/4 in. in pounds per lineal inch. Other tables show decimal equivalents, tables of area and circumference of circles and other formulas. Dyson and Sons manufactures large forged nuts, bolts, threaded rods, and construction accessories. *. . . Write No. 160*

SERVING CONSTRUCTION *in the WEST*®

SAFWAY

PACIFIC

TO THE CONTRACTOR and the construction industry of the West, Safway now offers a complete scaffold sales, rental and erection service. Through acquisition of the Beatty Scaffold Co., the expanded Safway organization includes a manufacturing plant at San Francisco plus a sales and distribution organization with warehouse stocks in principal cities throughout the West, Hawaii and Alaska.

Safway's West Coast operation is headquartered at San Francisco and identified as Safway/Pacific (SAF/PAC), a division of Safway/Milwaukee.

All former Beatty personnel will be on hand to serve you.

ERECTION and ENGINEERING SERVICE

SCAFFOLDS and SHORING

SALES and RENTAL / CONVENIENTLY LOCATED WAREHOUSE STOCKS

SAN FRANCISCO, CALIFORNIA
Safway Steel Scaffolds

LOS ANGELES, CALIFORNIA
Safway Steel Scaffolds

OAKLAND, CALIFORNIA
Safway Steel Scaffolds

SANTA ROSA, CALIFORNIA
Safway Steel Scaffolds

SAN DIEGO, CALIFORNIA
Safway Steel Scaffolds

SAN JOSE, CALIFORNIA
Beatty Safway Scaffolds Company

SACRAMENTO, CALIFORNIA
Beatty Safway Scaffolds Company

FRESNO, CALIFORNIA
R. J. Wayte Company

BAKERSFIELD, CALIFORNIA
H. M. Skrable Company

SEATTLE, WASHINGTON
Safway Steel Scaffolds

SPOKANE, WASHINGTON
Safway Steel Scaffolds

PORTLAND, OREGON
Safway Steel Scaffolds

EUGENE, OREGON
Safway Steel Scaffolds

BOISE, IDAHO
Safway Steel Scaffolds

SALT LAKE CITY, UTAH
Lynn Hansen Scaffold Company

PHOENIX, ARIZONA
Baker Thomas Company

HONOLULU, HAWAII
Island Welding & Supply

ANCHORAGE, ALASKA
Taft Structurals Company

SAFWAY / PACIFIC, 505 TUNNEL AVE., SAN FRANCISCO — PHONE JUNIPER 5-0581

. . . for more details, write No. 58 on Reader Service Postcard

Street and road equipment

Huber-Warco Co. has issued a series of five new brochures describing its line of paving and road maintenance equipment. Each booklet describes the construction, component parts, operation and special features of the line. Included are:

Motor graders, covering four sizes and horsepower ratings, featuring hydraulic operation, and such accessories as power sliding mold board which enables the grader to trim around obstructions at the roadside.

. . . Write No. 161

Tandem rollers described in two brochures, one devoted to the small 3 to 5 ton tandem, the other covering four larger models ranging from 5 to 14 tons. Features of the small tandem include dual control, retractable transport wheels, rugged construction and design for easy servicing.

. . . Write No. 162

Components of larger tandem models are illustrated and such features as adustable guide roll assemblies and removable king pin are described. *. . . Write No. 163*

Three wheel rollers also feature adjustable front-end assembly and the Huber-Warco torque converter and two-speed transmission as well as simplified operating controls, replaceable tires and numerous specialty accessories.

. . . Write No. 164

The all-purpose wheel tractor Maintainer is covered in the final brochure of the series. Powered with a 45½-hp. gasoline engine, the unit's big hydraulic system will operate a wide range of attachments including front-end loader, backfilling blade, bulldozer, broom, side dozer, batch roller, mowers, plows, and levelers, as well as the standard blade.

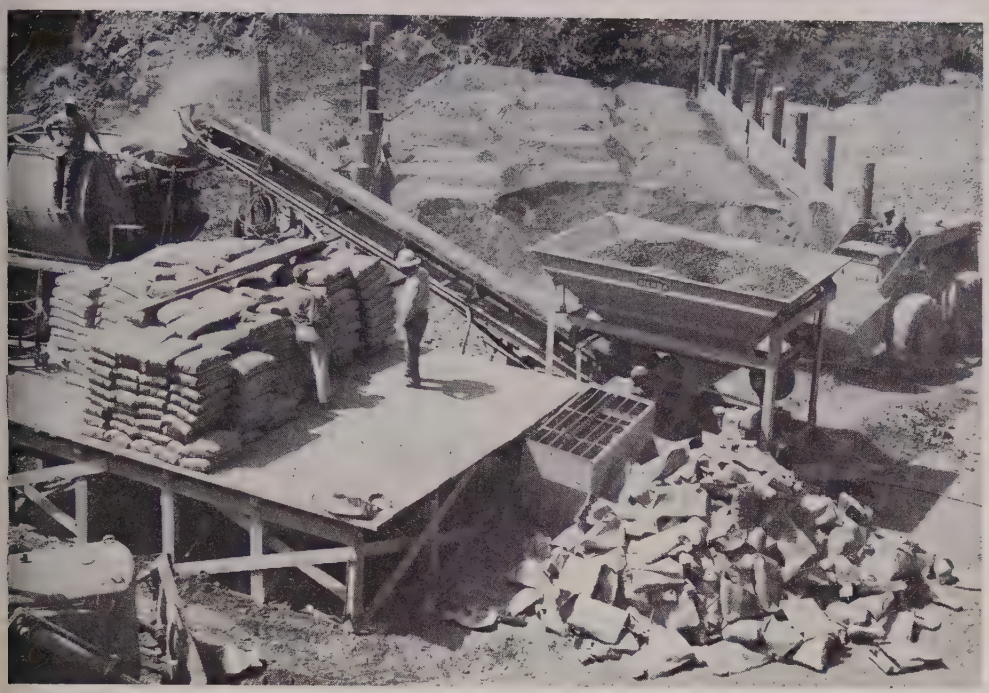
. . . Write No. 165

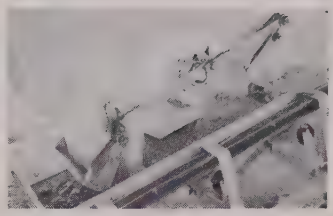
Information on how to install, repair, rebuild, and maintain tooth assemblies for dipper, dragline, or backhoe buckets is contained in a 15-page booklet issued by **Electric Steel Foundry Co.** Profusely illustrated with step-by-step drawings, the booklet covers these operations: Installation of points, solid adapters, installation of weld-on tips and weld-on noses, how to keep adapters and teeth tight, etc.

. . . Write No. 166

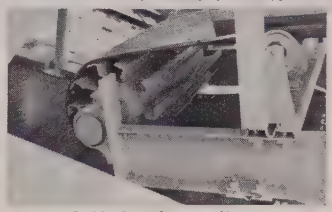
Diesel pile hammers

Operating description and specifications for its line of diesel pile hammers are included in a 6-page folder issued by **McKiernan-Terry Corp.** The diesel pile hammer is essentially a single cylinder diesel engine with the case functioning as the cylinder and the hammer as the piston. As the ram piston within the cylinder falls, it compresses trapped air in the bottom of the cylinder and also injects fuel through a cam-operated fuel pump at the side of the cylinder. Fuel ignites at the bottom of the piston stroke adding thrust to the hammer and causing the piston to recoil for a second cycle. On the up stroke, the exhaust ports are opened to permit scavenging the exhaust gases. The self-contained unit carries its own fuel tanks and is entirely independent of extra feed lines. It is worked from a single crane load line. Booklet includes a graphic description of the operating cycle along with information on design features, specifications, and the various drive caps which are available. *. . Write No. 167*





Exclusive "cement sandwich"



Self-cleaning pulleys

Tows behind any truck

ONLY A TOWBATCHER CAN DO YOUR JOB SO WELL!

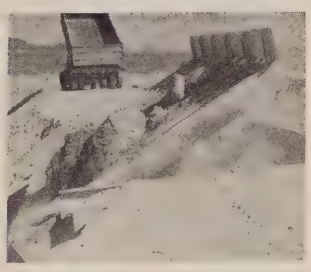
THE RUGGEDLY BUILT SIERRA TOWBATCHER GOES ANYWHERE, BEHIND ANY TRUCK AND SETS UP IN ONLY 30 MINUTES USING A FRONT END LOADER!

This remarkable portable batch plant gives you a normal capacity of 50 yards per hour, day after day, using a crew of only three men! The Towbatcher has many exclusive features such as the "cement sandwich" system which automatically places the cement between layers of aggregate on the conveyor belt. 45° troughing idlers form the belt for faster feeding of material into the mixer. Self-cleaning head and tail pulleys add to the life of the conveyor belt. Operating controls are conveniently grouped and the high visibility dial scale can easily be read at all times by the loader operator. You can select either gasoline or electric motor drive.

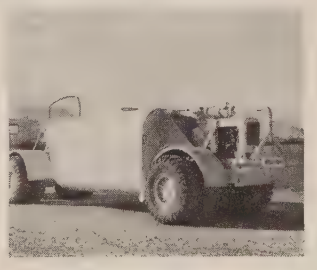
For fast, reliable concrete batching facilities, on the job, the Sierra Towbatcher is the right piece of equipment for you! See your dealer or write now for full details plus illustrated material.

OTHER SIERRA ENGINEERING PRODUCTS . . .

SIERRA TOW SILO: 330 barrel capacity horizontal model with gasoline or electric motor drive.



SIERRA GRIZZLY: 12′x12′ drive-over grizzly handles up to 27 yard hauling units. Hydraulic lift disposes of oversize material.



SIERRA TOW TANK: 6,000 gallon water wagon designed for off-highway use. Has 2 sets of 9 adjustable nozzles equipped with 6″ water pump.

SIERRA PIT LOADER: Large capacity loading conveyor for materials from fine to 20″ minus. Portable with exclusive "duo-belt" feature for longer belt life. Sizes from 36″ to 72″ belt.

SIERRA ENGINEERING CO. INC.

307 Morrill Avenue, Reno, Nevada

DEALERS: ARIZONA—Phoenix: Min-a-con Equipment Co. **CALIFORNIA**—Bakersfield: Inland Equipment Co.; Sacramento; Rix Central Equipment Co.; San Francisco: Rix Central Equipment Co. **COLORADO**—Denver: Colorado Builders Supply Co. **IDAHO**—Boise: Intermountain Equipment Co.; Idaho Falls: Western Machinery Co. **MONTANA**—Butte: Hall-Perry Machinery Co.; Great Falls: Hall-Perry Machinery Co.; Helena: Hall-Perry Machinery Co. **OREGON**—Portand: Balzer Machinery Co. **UTAH**—Salt Lake City: Western Machinery Co. **WASHINGTON**—Seattle: Sahlberg Equipment Co.

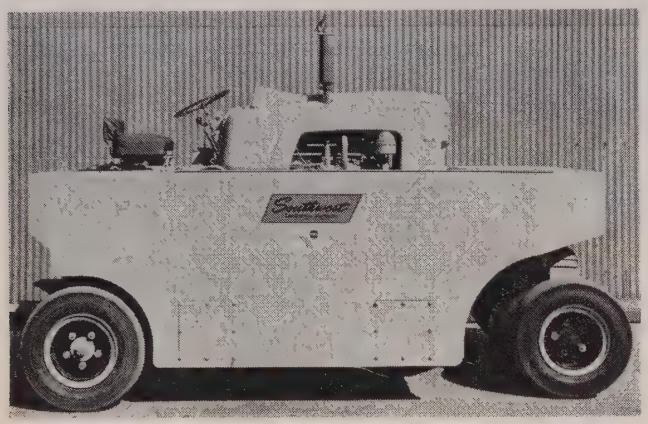
. . . for more details, write No. 61 on Reader Service Postcard

NEW EQUIPMENT

Obtain more information on these new developments in construction equipment by writing the corresponding numbers on reply postcard.

Rubber tired pavement roller

An 18-ton self-propelled compaction roller with 11 pneumatic wheels is marketed by **Yuba-Southwest,** Division of Yuba Consolidated Industries, Inc. The unit Model PR-11 has an 18-ton maximum ballested capac-



ity and is equipped with 90-psi. tires (7.50 x 15), which allows it to meet most highway specifications. Ballast boxes will hold either water or solid ballast. The PR-11 can be operated both forward and in reverse at the same speeds with equal ease for shuttle work in pavement rolling.

. . . Write No. 168

Earth hauler has 45-ton payload

The Earthking, a combination of powerful prime mover and double-hopper, bottom-dump semi-trailer, has been developed by **Challenge-Cook Bros., Inc.** The unit has a 45-ton payload and can be loaded in less than 30 sec. from a belt conveyor. Features of the

tractor-trailer combination include a top road speed of 52 mph., air-actuated bottom-dump gates operated by the driver from inside the cab, and matched heavy-duty construction of tractor and trailer. The unit is especially recommended for high speed cycles since the hoppers can unload on the move in less than 12 sec.

. . . Write No. 169

Portable hoppers handle aggregate

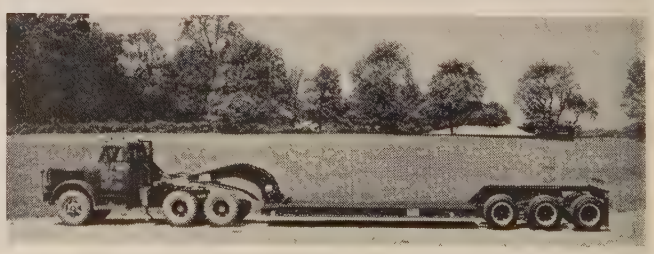
A portable aggregate hopper assembly containing four compartments, each of which discharges onto an individual conveyor belt is announced by **Iowa Manufacturing Co.** Designated Cedarapids Model 405-410 Charging Hopper and Feeder Units, they are available with or without running gear. The hopper unit is composed of four 5-cu. yd. capacity hoppers which can be increased to 10-cu. yd. capacity by addition of 2-ft. sideboards. The in-line mounted bins feed

to conveyor belts, each belt serving two bins. Conveyors discharge at the end of the unit where a 30-in. trough type gathering conveyor receives the output and delivers it to the asphalt plant elevator or feed conveyor. The unit may be powered by either a gasoline engine or electric motor as desired. Hopper bins are equipped with radial rising type gates of ½-in. to 8-in. opening ranges and direct reading gages. The unit can be set at any operating position within an arc of 180 deg. This feature assures easy access for all asphalt installations.

. . . Write No. 170

Light trailer handles 35-ton load

A drop deck trailer weighing only 13,410 lb. utilizing A-1 strength steel is announced by **Talbert Trailers, Inc.** The trailer which will handle a 35-ton load features Talbert new hydraulic removable gooseneck.

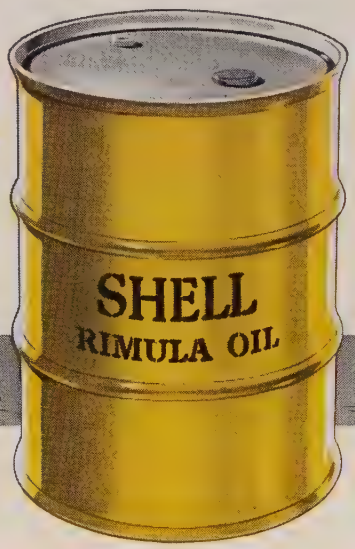


Powered by twin hydraulic rams, the gooseneck uses the entire bearing area of the tractor tandem to raise and lower the deck. Also featured are removable three-axle suspension, removable third axle, Henrickson rubber bushed tandem, and outriggers.

. . . Write No. 171

Today's finest crankcase oil for super-charged diesels

...standard of comparison for over ten years



Today . . . as for 10 years past, Shell Rimula Oil proves more than a match for the greatly increased engine ratings, high temperatures and pressures of modern high-performance diesels. Rimula® Oil successfully tends to resist every destructive force that accelerates engine wear.

Let a Shell Representative show you the benefits of using Shell Rimula Oil. Write to Shell Oil Company, 50 West 50th Street, New York 20, New York, or 100 Bush Street, San Francisco 6, California. In Canada: Shell Oil Company of Canada, Limited, 505 University Avenue, Toronto 2, Ontario.

SHELL RIMULA OIL

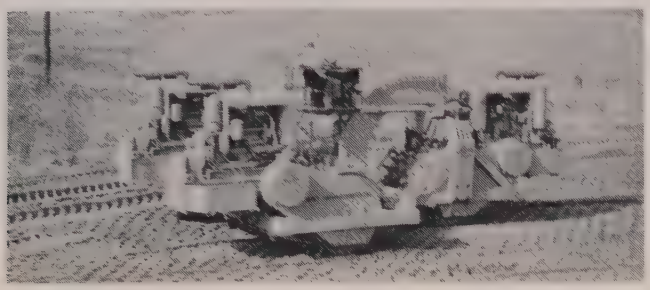
—the heavy-duty diesel lubricant

SHELL

. . . for more details, write No. 62 on Reader Service Postcard

Self-propelled sheepsfoot roller

Three individually powered sheepsfoot rollers arranged in V-formation with a gooseneck hitch to form an articulated compaction machine, the device manufactured by **Bros Inc.** is designated Model SP-3DT. It weighs 81,000 lb. empty and has an uninterrupted rolling width of 15 ft. 9 in. Three 130-hp. diesel engines drive the roller's three drums. Speeds of 1.5 to 7 mph. in both forward and reverse eliminate turnarounds at the end of a course. Each drum oscillates



to provide uniform compaction pressures. Drums are 5 ft. in diameter and 5 ft. wide. The roller has torque converter drives with power shift, three speed, full-reversing transmissions. Final drum drives are heavy-duty differentiating axles and roller chains. The operator's seat is located to provide full visibility on all sides. The gooseneck hitch permits the roller to be easily disconnected into three units for transport. Over-all dimensions are 29 ft. 6 in. long, 17 ft. 10 in. wide and 11 ft. 6 in. high. Literature available.

. . . Write No. 172

Heavy-duty mounting for shovel crane

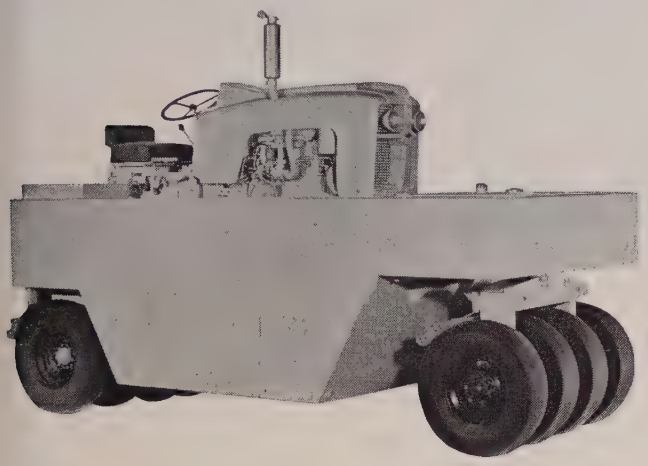
An all-new tractor type crawler assembly developed especially for long distance traveling and greater traction is announced by **Link-Belt Speeder Corp.** The crawler base mounting a ¾-yd. LS-78 shovel-crane is pointed for use in pipeline work and wherever added tractive ability and extensive traveling are required. Features of the new crawler are its tractor-type track belt with full grouser shoes, a unique compensating arrangement that automatically relieves excessive track tension caused by obstacles wedging between the track rail and idler wheel or drive sprocket, and a simple built-in track adjustment actuated by a grease gun. All track rollers, carrier rollers, idler wheels and

track drive sprockets are mounted on sealed, tapered roller bearings, requiring no further lubrication. Unit has extra high (22 in.) ground clearance with clean, flat underbody. A completely sealed car body that fully protects all components of the traction and power steer mechanism while traveling through deep water or muck is also an important feature of the new unit. Literature available.

. . . Write No. 173

Nine-wheel, 12-ton roller

The Model 12-SP, a 9-wheel compacting roller of 12-ton capacity is announced by **Western Equipment Div.** of Douglas Motors Corp. The unit features hy-

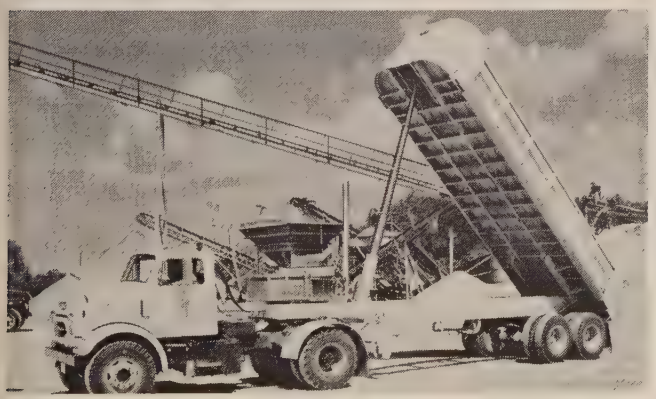


draulic brakes, power steering, torque converter, and oscillation of wheels in pairs. The new model is part of Western's line of vibratory rollers which includes six self-propelled and towed steel rolled units with and without vibration features.

. . . Write No. 174

Corrugations cut trailer weight

Dump trailer bodies utilizing 1-in. "V" corrugations to increase strength and reduce dead weight are announced by **Galion Allsteel Body Co.** Corrugated body design is combined with light-weight formed rail chassis and front-mounted telescopic hoists to give the lightest possible steel unit. Design features a com-

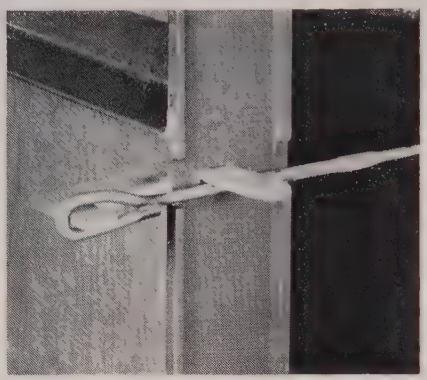


pletely boxed top roll section which acts as a strong compression member and provides maximum protection against side spreading at any stage of the dumping cycle. Available in standard lengths of 16 to 28 ft. with a capacity range of 10 to 35 cu. yd., the Model XL trailer body can be used with any combination of axles depending on the existing state weight laws.

. . . Write No. 175

Simple bolt locks form panels together

A simple C-shaped steel clip which engages the tie rod and the opposing edges of form panels has been developed by **Symons Clamp & Manufacturing Co.** to facilitate gang forming of any size Symons panels with regular hardware. Tie

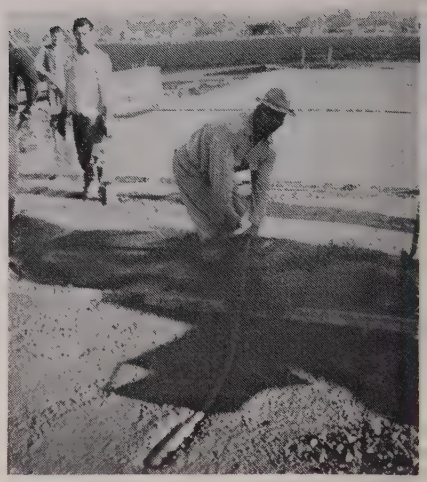


rods have been lengthened slightly to permit one arm of the "C" bolt to slip through the loop projecting outside the form. The other arm of the bolt is inserted through slots in the panel edges. It in turn receives a wedge which locks the panels together. Inside arm of the "C" bolt is off-set slightly to slip over the top of the form tie. The bolt may be used with all sizes of forms including fillers and panels.

. . . Write No. 176

Remodeled vibrator has four moving parts

Simplified working mechanisms in its line of 25,000 vpm. "Solo" concrete vibrators eliminate bear-

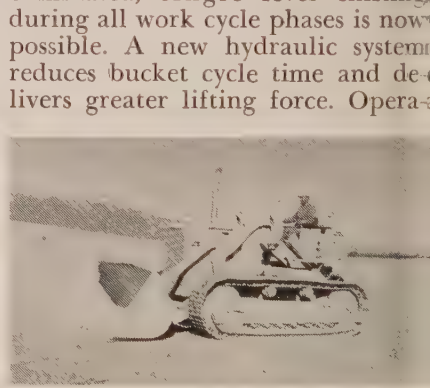


ings and cut the number of moving parts to four, **Pacific Mercury** announces. The new vibrators operate from standard 160-volt, 60-cycle current or from 120-volt DC. Six model PM concrete vibrators in two basic stinger diameters 1⅝ in. and 2 in. are available.

. . . Write No. 177

Power-shift Traxcavator

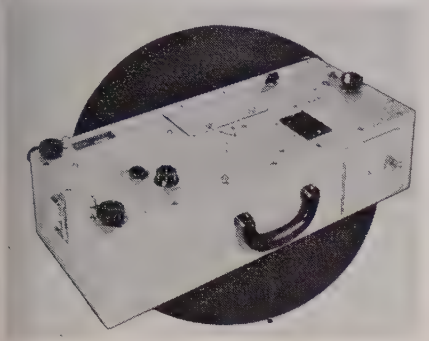
A crawler Traxcavator with power-shift transmission, the 977 Series H, has been announced by **Caterpillar Tractor Co.** Job testing shows the new machine to have 25% greater productivity. Its turbocharged diesel engine is rated at 150 hp. A 2½-cu. yd. bucket is standard. With the master clutch eliminated, single lever shifting during all work cycle phases is now possible. A new hydraulic system reduces bucket cycle time and delivers greater lifting force. Opera-



tor can choose between a high and low work range, each of which has two gear speeds forward and reverse. Heavy-duty undercarriage with welded track guiding guards and lifetime lubricated rollers are standard equipment. Fuel tank capacity has been increased 19 gal. The 977H has a hydraulic breakout force of 25,500 lb. and lifts 17,000 lb. to maximum height. It retains the proven features as automatic bucket positioner and kick-out, has 40-deg. tilt-back, three grouser track shoes and hydraulic steering boosters. *. . . Write No. 178*

Portable seismograph checks damage

A portable seismograph which measures the effect on buildings and other structures of vibrations caused by pile driving and explosives is marketed by **W. F. Sprengnether Instrument Co.** It provides

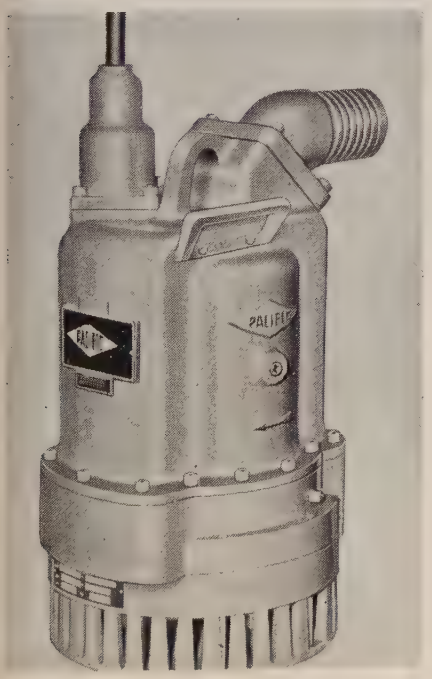


a simple method of determining the true value of vibrations and produces records for use in defense against damage claims. Operation requires no technical training and the instrument can be set up to operate in minutes. Is self-contained in a rigid aluminum carrying case and weighs 38 lb. It requires no external power source.

. . . Write No. 179

Submersible dewatering pump

A simplified contractor's pump which is always primed and has no suction hose is announced by **Pacific Pumping Co.** The Type SA submersible pump is operated by lowering it into the water and plugging in the electric cables. Attach the discharge hose and turn

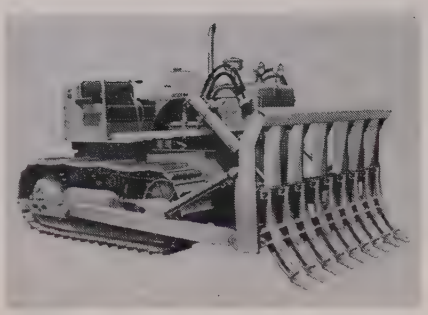


the start knob. The unit will pump whatever water comes in down to only 5% of capacity. It operates in muddy water or sludge under flood or semi-dry conditions in hot or freezing climate. Water discharge passes along the side of the motor, cooling the specially insulated windings. Motor ball bearings are lifetime lubricated. Pressurized double seal runs in oil, protecting it from grit and abrasion. The rubber-lined pump case and a special tough alloy impeller are resistant to wear of abrasive sand and mud. Light weight alloy casing resists action of salt water and erosive or contaminated water.

. . . Write No. 180

Drott brushrake has hydraulic or cable controls

A land clearing rake attachment for various sizes of International Harvester crawlers is announced by **Drott Manufacturing Corp.** The rake is available for cable or hydraulic controls, bulldozing or angle-dozing. It is available with or without top brush guard, and features teeth cast of special manganese molybdenum steel. Teeth are individually mounted and can be adjusted to suit the specification of the job. Special easily replaceable trips add life to the rake. Width of the attachment ranges from 95 in. for the TD-9 to 151 in. on the TD-25. Weight of the entire rake ranges up to 4,580 lb. for the largest rig.



. . . Write No. 181

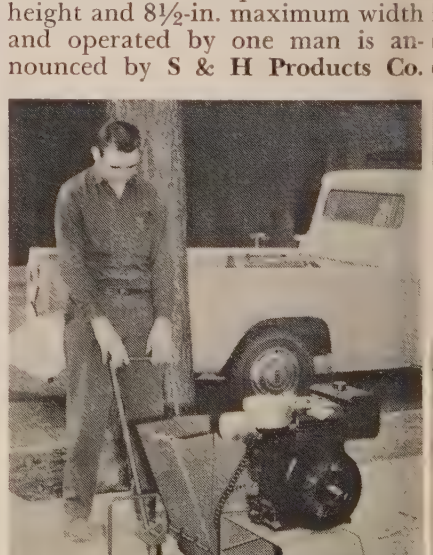
Small transit crane features telescoping boom

The Model 11-BH Series 2 carrier-mounted crane excavator with hydraulically-operated telescopic boom is announced by **Bucyrus-Erie Co.** The new transit machine is rated as a 12-ton crane. It can be equipped for clamshell or dragline service and adapted to other attachments. It features a 3-piece telescopic boom with smooth hydraulic control. Minimum boom length for road travel is 25 ft. A 12-ft. upper section provides 25 to 37-ft. short boom operation. With the intermediate section, its range is 38 to 50 ft. An optional 10-ft. section can be added to the base boom section for an extra 60-ft. reach. Jibs are available in 10 or 20-ft. lengths. Optional equipment includes hydraulic outriggers and power controlled lowering boom hoist. With an additional hydraulic control valve, a ½-yd. hydraulic clamshell bucket or a ¾-yd. materials handling bucket can be used.

. . . Write No. 182

Bituminous curb former

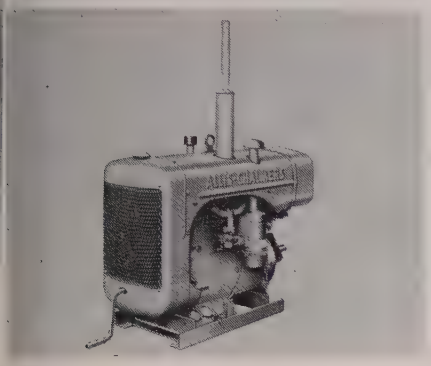
A bituminous curb forming machine which produces curbs of any contour desired up to 6 in. in height and 8½-in. maximum width and operated by one man is announced by **S & H Products Co.** Unusually light and compact, the new model weighs only 340 lb. Its over-all dimensions are 32x63½x19 in. including handle. It will lay up to 4 ft. of earth per minute.



. . . Write No. 183

New gas; natural gas engines

A 4-cycle, 4-cylinder, 138-cu. in. displacement unit that develops 39 brake hp. at 1,800 rpm., the model G-138, is announced by **Allis-Chalmers.** The engine is 46 in. long, 18 15/16 in. wide and 30½ in. high,



and weighs 402 lb. The power unit weighs 622 lb. Magneto ignition is standard. A 12-volt distributor ignition and a heavy-duty magneto for use with natural gas are optional. Compression ratio is 7.75 to 1 using regular fuel. Replaceable "wet" type cylinder sleeves of fine grain alloy iron provide even cylinder cooling for long wear and quick replacement. Positive exhaust valve rotators extend valve life. The engine has full-pressure lubrication.

. . . Write No. 184

Sealant for cracks in concrete and asphalt surfaces

A cold sealant which provides an elastic filler and surface seal that cannot be disturbed by mild shifting of pavements and walks due to expansion and contraction is announced by **Monroe Co., Inc.** The cold-sealing compound developed from ductile grades of asphalt pours and penetrates as readily as water. After setting, it will not run due to hot sun or become brittle during cold freezing temperatures.

The emulsified product can be applied quickly and easily from a cone shaped container. It is available in 5, 30, and 55-gal. drums. A 1-gal. can will fill a ½-in. crack 1 in. deep and 30 ft. long.

. . . Write No. 185

Low-cost blasting agent

A low-cost, efficient, pre-mixed blasting agent "Nilite" 101 nitrocarbonitrate blasting agent, which can be used in holes as small as 2 in. in diameter is announced by **Du Pont.** The new material is available in 50-lb. bags at a price of about $6.75 per cwt. It is free flowing and provides greater assurance of uniformity in blasting. It increases production efficiency and cuts maintenance costs on equipment as well as improving performance of delay blasting systems. The product is not cap sensitive and requires a primer for detonation.

. . . Write No. 186

News of DISTRIBUTORS

New sales head at Spears-Wells

Robert Bartlett is the new sales manager at Spears-Wells Machinery Co., Oakland. H. A. Olds, who formerly held this position, retired June 30.

Appointments and additions

Burke Concrete Accessories, Inc., San Francisco (formerly W. J. Burke & Co.) announces the following personnel changes and additions. John Kay has been made manager of the Los Angeles branch, with Richard Willson, sales manager. William Pankow has become manager of the newly formed San Diego division, and Charles Rothwell has been appointed to manage the San Bernardino branch. David J. Lavelle has been appointed sales manager of the San Francisco office. L. Ralph is a new salesman, covering parts of San Francisco and all the north coast. Ralph is not a new man to the company, but has been transferred from the order department.

Announcement is also made that Pacific Mercury Co. has appointed Burke to handle its complete line of generators, vibrators and pumps for the construction industry.

Foulger has Thew crane excavator line

Foulger Equipment Co., Salt Lake City, has been appointed by Thew Shovel Co. to handle the Lorain crane excavator line in the state of Utah. Announcement was made by George Gunther, Western sales manager for Lorain.

Personnel appointments

Announcement is made by Sanford Tractor & Equipment Co., Reno, of the promotion of George Miller to assistant general manager. Also, Don Barnett has joined the company as industrial and farm sales representative.

At the newly established branch store at Fallon, Nev., Bill Saxton has been placed in charge. The new facility, located on Hiway 50 West, handles complete sales, parts and service on all lines handled by the firm.

Contractors Rentals adds specialist

Don Andrews, president of Contractors Rentals, Seattle, announces the appointment of Harry J. Rekers as wellpoint engineer. Contractors Rentals is the Western representative for Moretrench De-

Rekers

Emahiser

watering Systems. Rekers, who received his engineering training in Holland, will serve as technical adviser on all dewatering problems and will also prepare rental estimates.

Top level appointment by Air-Mac

Appointment of Jack W. Emahiser, general manager of Air-Mac, Inc., of Oregon, as vice president and member of the board of directors has been announced by Stanley B. McDonald, Seattle, president of Air-Mac., Inc., the parent company. Emahiser has been general manager of the Oregon operation for the past nine years. Air-Mac, which specializes in major material handling machinery lines and complete construction equipment sales and service, covers Oregon, Idaho, Washington, Montana, and Alaska.

Robert Pierre made Cook general manager

Robert E. Pierre, the new general manager of Cook Bros. Truck & Equipment Co., Oakland, announces the following recent appointments: J. W. Plummer, administrative assistant; R. W. Parsons, assistant manager—Construction Equipment Division, and William "Bud" Holloway, assistant manager—Truck Division. Vulcan Iron Works, Inc., is a new account lately added by the firm.

Gordon Williams joins Cal-Ore

Cal-Ore Machinery Co., Medford, Ore., announces a new outside salesman. He is Gordon E. Williams.

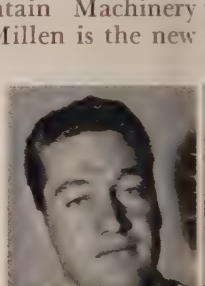
Change of name

Bradley Quinn, president, announces a change in his company name. Formerly known as Budd & Quinn Incorporated, the new firm name is Quinn Company. Headquarters are at Fresno, Calif.

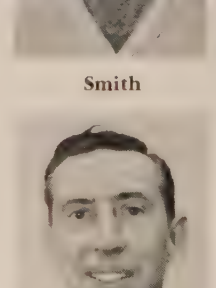
Important appointments, and major lines

Several new appointments are announced by Atlas Equipment Co. of Salt Lake City. John M. Smith, a long-time employee of Atlas, is vice-president of the firm. Floyd H. Humphrey is named sales engineer. Previously he served as an engineer with Kennecott Copper Co., and was a sales engineer for Rocky Mountain Machinery Co. Floyd C. McMillen is the new

Smith



Humphrey



McMillen

materials handling sales manager, while Walter G. Osborne, service manager for the former Lang Construction Equipment Co., is the recently appointed service manager. Joining the company as serviceman is Roy Fisher, also from the Lang organization.

Atlas has added four major construction equipment accounts: Harnischfeger Corporation (P&H), Barber-Greene Co., U. S. Steel

"WE USE UNION GASOLINES FOR PURE POWER"

Mr. William H. Baldwin, president, Baldwin Contracting Co., Inc., Marysville, California

"Powerful equipment needs powerful gasoline. That's why we use Union.

"Much of the time we're operating on jobs that are hundreds of miles away – such as a dam or a rocket testing stand. So we have to move a variety of heavy equipment to each location.

"That's one reason we specify gasolines that give maximum power under all conditions, regardless of heavy loads, altitude, or temperature extremes.

"And we find that using Union pays off another way, too. Equipment runs better and needs less maintenance. Our records show that carburetors and valves stay clean longer.

"I'm convinced that regular 7600 and Royal 76 are an unbeatable pair of gasolines for any contractor."

Union gasolines give you pure power clean through.

That's because Union developed its own high energy hydrogen refining process, which cleans *out* impurities, leaves *in* only hard-working octanes.

Try either or both of these gasolines in your equipment. They're pure and simply – The Finest.

UNION OIL COMPANY OF CALIFORNIA 76

UNION OIL CENTER, LOS ANGELES 17, CALIFORNIA

. . . for more details, write No. 69 on Reader Service Postcard

"Tiger" rope, and Smith Engineering Works.

New officers announced, plus more space

Treasure State Equipment Co., with headquarters in Kalispell, Mont., announces new officers of the company: president, John J. Leary; vice president, Phyllis Leary; secretary, Genevieve Purdy, and treasurer, John J. Leary.

Major expansion has now been completed at the Kalispell store, where 1,500 sq. ft. of space has been added to the parts department; and at the Missoula branch a new shop building of 5,000 sq. ft. has been added.

Machinery Supply gets Trojan line for Northern California

Machinery Supply, Inc., Stockton, Calif., has been appointed Northern California distributor for Trojan tractor shovels manufactured by the Trojan Division of Yale & Towne Manufacturing Co. According to announcement by R. M. Lewis, Machinery's general manager, their territory covers all of the coastal counties in California north of San Luis Obispo, and all interior counties north of Merced.

New salesman; more space

A new outside salesman, Tommy Byrun, has been taken on by Waco Scaffolding, Inc., at Stockton, Calif. Also announced is the addition of a tool rental yard 100 x 200 ft. in area.

Sales manager appointed

Robert E. Fair has resigned his position as sales manager covering the state of Colorado for The Colorado Builders' Supply Co., Denver. Dorman K. Jackson now holds that position. Leslie D. Carlson is Used Equipment manager.

Distributor appointments by Cook

Two appointments are announced by J. E. Hall, president of Challenge-Cook Bros., Inc., Los Angeles, manufacturer of heavy-duty hauling equipment for the construction industry. Diamond Beall Sales Co. of Portland, Ore., received the territory embracing Oregon, western Washington, Montana, and Alaska. Hobbs Trailer Sales Co., Inc., El Paso, Texas, which has served the trailer industry throughout the central Southwest for 20 years, will dis-

tribute the Cook line in west Texas and southern New Mexico.

New Intermountain distributor

With the addition by Arnold Machinery Co., Salt Lake City, of the International Harvester construction equipment line, as well as Drott Manufacturing Corp., The Frank G. Hough Co., and The Galion Iron Works & Manufacturing Co., all of which were formerly distributed by Lang Construction Equipment Co. (now in liquidation), Arnold has made some important organizational changes and additions.

Max C. Smith is the new construction equipment sales manager. Two new equipment salesmen are James Jamison and Ez Howe. Area of the parts room has been increased by 2,500 sq. ft., and additional personnel employed in order to continue giving efficient service to customer accounts in Utah, southern Idaho, and various counties in Nevada and Wyoming.

The Arnold branch at Boise has increased its parts and service department. Bob Hammond is a new construction equipment salesmen at the Idaho Falls branch. This branch has moved into the previous Lang company buildings on North Yellowstone Highway.

NEW BRANCH operation of Williams & Lane, Inc., in Oroville, Calif. This central location provides the increased "Jimmy Diesel" users in Northern California with a fully equipped service shop for repair and overhaul of GM Diesel engines, Allison transmissions and torque converters, plus a complete stock of parts. *Virgil Kling* is the manager. He has 20 years of experience in service of Jimmy Diesel engines. Williams & Lane is the authorized distributor for Detroit Diesel in Northern California.

Santa Fe Equipment adds Telsmith

Smith Engineering Works, a division of Barber-Greene, has just appointed Santa Fe Equipment Co., Los Angeles, its dealer in Southern California and for Clark County, Nev. Besides selling new machines, Santa Fe Equipment will stock wearing parts for Telsmith crushers, vibrating screens and other Telsmith equipment in the area and provide service on these units as well.

Honolulu distributor opens branch

S. T. Dickey, Hawaiian Equipment Co., Ltd., Honolulu, announces a new branch in Kahului, Maui, with George Powers as manager. The new facility, with 5,200 sq. ft. of space, will have parts and equipment inventory suitable for the area, and service facilities, including outside serviceman. Hawaiian Equipment was formerly represented on the Island of Maui by Maui Equipment Co.

MANUFACTURERS

CP opens new branch office at S.F.

To meet the increased sales and service demands of the Bay area industrial communities, Chicago Pneumatic Tool Co. has opened a new branch office at 145 Mitchell Ave., South San Francisco. Occupying about a ½-acre site, the new structure serves as sales, service and storage center for the company's operations in Northern California and Nevada. Chicago Pneumatic has had a branch office in the San Francisco Bay area for sixty years.

Macwhyte appoints assistant Pacific Coast manager

Macwhyte Wire Rope Co. announces the appointment of Russell F. Hendrick as assistant to Fred M. Sime, Pacific Coast manager. Hendrick has been associated for many years with the wire rope industry, both with a manufacturer and more recently conducting his own distributorship. The new assistant manager will headquarter at the company's offices in San Francisco.

Electric-drive truck made available

Electro Trucks Inc. has been formed at Portland, Ore., to design and market diesel-electric off-highway vehicles, as announced by S. J. Coffey, president. The firm will utilize the manufacturing facilities of the Peters Company, also of Portland, and employ electric drives produced by the General Electric Co.

Koehring plans equipment show

Koehring Company announces plans for a 4-day Construction Equipment Show to be held in September at the company's proving grounds near Waukesha, Wis. All Koehring construction equipment divisions, subsidiaries, and branches will have exhibits at the show, which will be held in two flights, September 19-20, and 22-23.

Top level elections at Lidgerwood

Louis D. Tenerelli has been re-elected president and chairman of the board of directors of Lidgerwood Manufacturing Co. John Reid was elected vice president and general sales manager and a director of the company. Lidgerwood has a long history of design and manufacture in the construction and other machinery fields. It is presently expanding its operations, particularly in cableway design and construction.

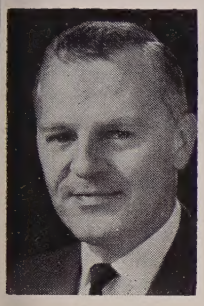
New District sales manager at Denver

Charles D. Maclure has been appointed a district sales manager for Ramset Fastening System, part of Winchester-Western Division, Olin Mathieson Chemical Corp. He is located in Denver, Colo., and is responsible for sales in Colorado, Wyoming, New Mexico, Utah, and

southern Idaho. Maclure was formerly head of Ramset sales for Landes, Zachary & Petersen Co., Denver.

Iowa Mfg. Co. names assistant sales manager

Appointment of Robert F. Plumb to the position of assistant sales manager of Iowa Manufacturing Co., Cedar Rapids, Ia., is announced by Kenneth Lindsay, executive vice president. Plumb has 26 years experience and service with the Iowa company, and in his new position will be closely related with sales functions for the Cedarapids line of aggregate producing, bituminous mixing and paving equipment.



Plumb

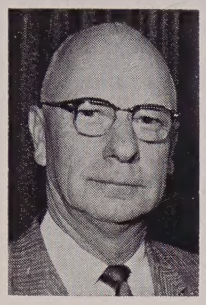
Jerome

Jerome joins Worthington

Forrest L. Jerome, former president of Columbia Equipment Co., Portland, Ore., has joined the Worthington Corporation in Harrison, N. J., as national supervisor, contractor sales. Jerome is well known in the Northwest. He served as a civil engineer with the U. S. Army Engineers at Portland, and has been associated with the Columbia Equipment Co. since 1945.

Diamond T appoints L. R. Scholl

Diamond T Motor Truck Co. announces the appointment of Lawrence R. Scholl of Oakland, Calif., as manager of its Western region. Scholl was previously vice president in charge of sales for Peterbilt Motors Co., with which he had been associated for more than 20 years.



Scholl

Smythe

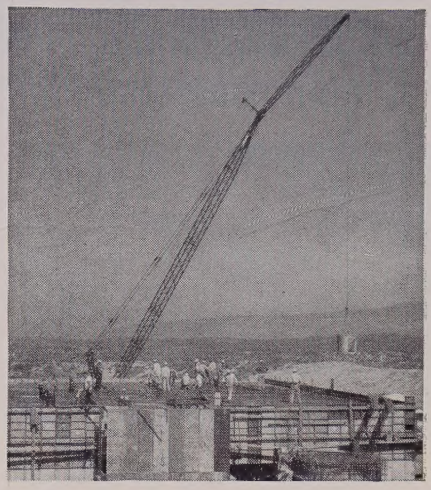
Thew honors Chauncey Smythe

Chauncey B. Smythe, president of The Thew Shovel Co. and a long-time leader in the crane and shovel industry, was honored recently with a two-day celebration on the occasion of his fiftieth anniversary of service with the company. He joined Thew Shovel in 1910 as a repair order clerk and in later years held numerous executive positions before his elevation to the presidency in 1945.

Link-Belt managerial promotions

Two Link-Belt Speeder Corp. vice presidents, N. V. Chehak and M. P. Luber, have been appointed to the board of directors. At the same time Chief Engineer F. J. Strnad was named vice president and chief engineer.

5625 Sq. Ft.



Speed in Forming Symons Steel-Ply Forms

. . . Keys Rocket Progress at Vandenberg Air Force Base

By discarding traditional forming methods in favor of prefabbed, lightweight, Symons Steel-Ply Forms, a heads-up piece of construction planning has reduced time and cost estimates for a 25,000-yard concrete job at Vandenberg Air Force Base, California. The average small 10-man carpenter gang erected up to *5625 square feet in a day.*

96 percent of the 80,000 square feet of total forming area was completed with Symons Steel-Ply Forms, fillers, corner pieces and necessary hardware. About 20,000 square feet of forms, reused, formed the total surface. The forms were used successfully for haunch building, forming suspended floor slabs and beams, all types of walls, heavy mass concrete, and they were even used on one side of the flame-bucket pour.

Advance detailing and shipment of forms from stock saved at least a month's valuable carpenter-gang time in getting the job under way. Complete Vandenberg story will be sent upon request. Symons Steel-Ply Forms can be rented with purchase option.

New bulk cement depot

Permanente Cement Co. is establishing a bulk cement distribution plant in Eureka, Calif. The plant will have a storage capacity of 3,000 barrels and will be the first such installation in the area.

Western district manager

Announcement is made of the advancement of Leo B. Manning to Western district manager of Beaver-Advance Corp., Ellwood City, Pa., manufacturer of tubular steel scaffold, hoisting towers and concrete handling equipment. He succeeds R. Bruce Angell who is entering the construction equipment distribution field in Honolulu. Manning's headquarters are at San Carlos, Calif.

J. R. Doyle named chief engineer

J. Rowland Doyle has been named to the position of chief engineer of The Cleveland Trencher Co., Cleveland, Ohio, manufacturer of trench excavating machines and allied equipment. He comes to Cleveland Trencher from The Oliver Corporation, where he held the position of assistant chief engineer.

Master Builders appoints Albert Quinn at Seattle

Announcement is made by The Master Builders Co., Cleveland, Ohio, of the appointment of Albert S. Quinn, Jr., as sales representative of its Seattle branch. Prior to joining Master Builders, Quinn was a sales engineer with Stebbins Engineering Corp. of Seattle.

Simplex Forms purchases division of Waco-Porter

Purchase of the Forms Division of Waco Manufacturing Co. by Simplex Forms System, Inc., of Rockford, Ill., is announced jointly by G. A. Markuson, Simplex president, and by H. P. Albrecht, president of Waco-Porter Corp., the parent organization. The acquisition includes inventory and manufacturing equipment for the Waco line of forms for concrete construction.

Bethlehem Pacific Coast offices move

Announcement is made of the removal of the Pacific Coast division general offices and the San Francisco district sales office of Bethlehem Steel Co. to the new Bethlehem Building, 100 California St., San Francisco.

Charles Lindgren to Oregon

The transfer of Charles Lindgren from Fresno, Calif., to Eugene, Ore., as sales representative for Calaveras Cement Co., a division of The Flintkote Co., is announced. This announcement follows the company's opening of a new bulk cement transfer plant at Springfield, Ore. Lindgren's place in Fresno will be taken by Craig A. Combs, former sales engineer for Soule Steel Co.

Rex-Spanall moves headquarters

Announcement is made of the relocating of the main office of Rex-Spanall, Inc., from New York City to Milwaukee, with office at 6427 W. Capitol Dr. Rex-Spanall is a subsidiary of Chain Belt Co., and was organized last year to market Rex Spanall horizontal shoring equipment in the United States.

Macwhyte purchases Pacific Wire Rope Co.

Announcement is made by George C. Wilder, president of the Macwhyte Company, of the purchase of all outstanding shares of stock of Pacific Wire Rope Co., Los Angeles. Pacific Wire Rope will continue to operate as a separate company, but will have additional production facilities for Macwhyte's expanded sales program. Kellogg Spear has been elected president and general manager of the 50-year old California company.

Gar Wood names Elliott dist. mgr.

Appointment of E. N. "Gene" Elliott as Gar Wood's Southwest and Northwest truck equipment manager is announced. Elliott has been associated with Gar Wood since 1955, and recently worked

on special sales development of the Snowlift and Dump-O-Matic hoist. In his new position he will represent the complete Gar Wood-St. Paul line in Arizona, Colorado, Wyoming, New Mexico, Utah, as well as Kansas, Missouri, Texas, Oklahoma and Arkansas. His headquarters will be in Boulder, Colo.

Top level appointments by A-C

John W. Carlson has been appointed assistant general manager of the Allis-Chalmers Construction Machinery Division, Wis. He had been general manager of the Deerfield Works since A-C acquired the Illinois firm (Tractomotive Corp.) a year ago. Succeeding him is James B. Codlin, formerly chief engineer at Deerfield.

District sales rep transfers

Jim O'Donnell has been appointed by Link-Belt Speeder Corp. to district sales representative for the Rocky Mountain and plains area, replacing W. B. "Bill" Severe who is transferring back to the Pacific Northwest. Included in O'Donnell's territory are the states of Colorado, Montana, New Mexico, Utah, Wyoming, and parts of Kansas, Nebraska and South Dakota. Severe's new territory covers Washington, Oregon, Idaho, and Alaska.

Nordberg establishes new office

Nordberg Manufacturing Co. has established office facilities in Dallas, Tex., and appointed Eugene T. Daum as sales engineer. Daum will headquarter at 143 Meadows Bldg., site of the Nordberg Engine Division in Dallas. He will cover the states of New Mexico, Colorado, Texas, Oklahoma, and part of west Kansas.

B-L-H consolidates manufacturing

Henry F. Barnhart, vice president—general manager of the Construction Equipment Division of Baldwin-Lima-Hamilton Corp., announces the transfer of all manufacturing operations from the division's Madsen Works in LaMirada, Calif., to the Lima Works in Lima, Ohio. The moving of Madsen manufacturing to Lima is part of a program to consolidate plant facilities and eliminate duplication of manufacturing efforts. After Sept. 30, a Lima-Madsen engineering staff, sales, and service—parts departments will be combined with Lima's present office at 14120 East Rosecrans Ave., LaMirada.

CLASSIFIED

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POSITION WANTED

Construction equipment superintendent and professional master mechanic with preventative maintenance program. Organize or reorganize and control equipment costs. Excellent personnel relations. Contact Box 9B, WESTERN CONSTRUCTION, 609 Mission Street, San Francisco 5, Calif.

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Exper. equip. salesman with potentialities as sales mgr. by young aggressive no. Cal. distr. acquiring good selected lines. Excel. oppor. with sound co. starting to grow. Interest in future possibilities should exceed concern for immediate max. earnings. Write in confidence to Box 9A, WESTERN CONSTRUCTION, 609 Mission Street, San Francisco 5, Calif.

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ESCO appointments and operations

Lawrence Gillen has been appointed manager of sales — ESCO foundry products, as announced by Henry Hazen, manager of the Portland sales district of Electric Steel Foundry Co. Gillen has been field engineer for this district which comprises Portland, northwestern Oregon, southern Washington, and southern Idaho. He will supervise sale of all company products including earthmoving and other contractor equipment.

Announced too is the transfer of James N. Dodson from the Portland headquarters to the district office in Honolulu, where he will serve as office manager. Also recently arrived in Hawaii to serve in sales is Joseph Bonawitz, who had been a salesman for Electric Steel Foundry and Hyster companies in Portland.

ESCO is moving its San Francisco international office to Portland in order to reduce communication time with manufacturing divisions. Halle P. Robb will remain in San Francisco as district manager of sales.

International opens in Wyoming

International Harvester Co. truck sales and service facilities have been expanded with the establishment of a company-owned branch operation, according to announcement by L. W. Pierson, manager of IH motor truck sales. Formal opening ceremonies for the new branch were recently held at 701 East First St., Cheyenne, Wyo.

The branch is being established to better serve the growing demand for IH trucks in southeastern Wyoming and adjoining areas of Colorado and Nebraska. Ross Taylor has been named manager, Don Wolf is service manager, Dick Bivens is parts foreman, and Jack Hansen, office manager. The entire operation is under the supervision of W. H. Davis, manager of the company's Denver motor truck district.

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