WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED
WESTERN HIGHWAYS BUILDER

PUBLISHED MONTHLY
VOLUME XXIV, No. 3

MARCH 15 • 1949

35 CENTS A COPY
$4.00 PER YEAR

The celebrated Pierced Steel Planking, used for beach landing mats and the remote airfields of World War II, is being pinned together for a variety of structures at Arcata experimental airfield (Story, page 60).

Landing Aids Experiment Station Photo.

WHY HAVE RUST IN DRILLS?

DRILLS LUBRICATED WITH TEXACO ROCK DRILL LUBRICANTS EP ARE FULLY PROTECTED

RUST is a constant threat to drill operating efficiency — and a common cause of high maintenance cost. *Texaco Rock Drill Lubricants EP* protect against these dangers whether your drills are running or idle.

But rust prevention is only one job. *Texaco Rock Drill Lubricants EP* do many others. Their high film strength and adhesiveness protect moving parts against wear. They lubricate effectively even under extremely wet conditions. They resist oxidation and flow readily at all operating temperatures.

Texaco Rock Drill Lubricants EP meet the exacting specifications of leading rock drill manufacturers and the Compressed Air and Gas Institute.

Let a Texaco Lubrication Engineer show you how effective lubrication can assure you longer drill life, faster drilling and lower maintenance costs. Just call the nearest of the more than 2300 Texaco Wholesale Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

For greater compressor efficiency, keep valves clean, rings free, air lines clear by lubricating with *Texaco Cetus, Alcaid or Algol Oils.* For heavy-duty service and wet conditions, use *Texaco Regal Oils (R & O).* Your Texaco Lubrication Engineer will recommend the ones best suited to your requirements. • Keep your hydraulically-operated construction equipment working more efficiently — systems free of rust and sludge — by using *Texaco Regal Oils (R & O)* as the hydraulic mediums.

TEXACO

TEXACO Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

Tune in . . . TEXACO STAR THEATRE presents MILTON BERLE every Wednesday night. METROPOLITAN OPERA broadcasts every Saturday afternoon.

Ask A. TEICHERT & SON, INC.

Sacramento, California

ABOUT NORTHWEST EQUIPMENT!

LOOK at this job — one of the six Northwests owned by A. Teichert & Son, Inc. of Sacramento, Calif., on the Arroyo Seco Flood Channel. Here is where such exclusive Northwest features as the Northwest "Feather-Touch" Clutch Control, Uniform Pressure Swing Clutches and the Northwest Worm Boom Hoist, pay out. The accuracy of spotting, faster handling, smoother swinging and easy control of the boom for reach, mean less spillage and time wasted. They mean money on the job.

You can't afford to have anything but the best in the heart of your job. Northwest Cranes, Shovels, Draglines and Pullshovels are built for the *Key Spots* where the profits begin. That's why one out of every three Northwests sold is a repeat order with responsible contractors.

Plan to have a Northwest. We will be glad to give you details and tell you how.

NORTHWEST ENGINEERING COMPANY
135 South LaSalle Street — Chicago 3, Illinois

SUCCESSFUL CONTRACTORS KEEP SUCCESSFUL WITH GOOD EQUIPMENT!

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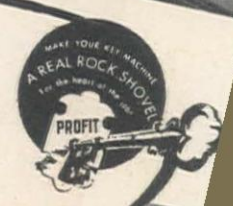

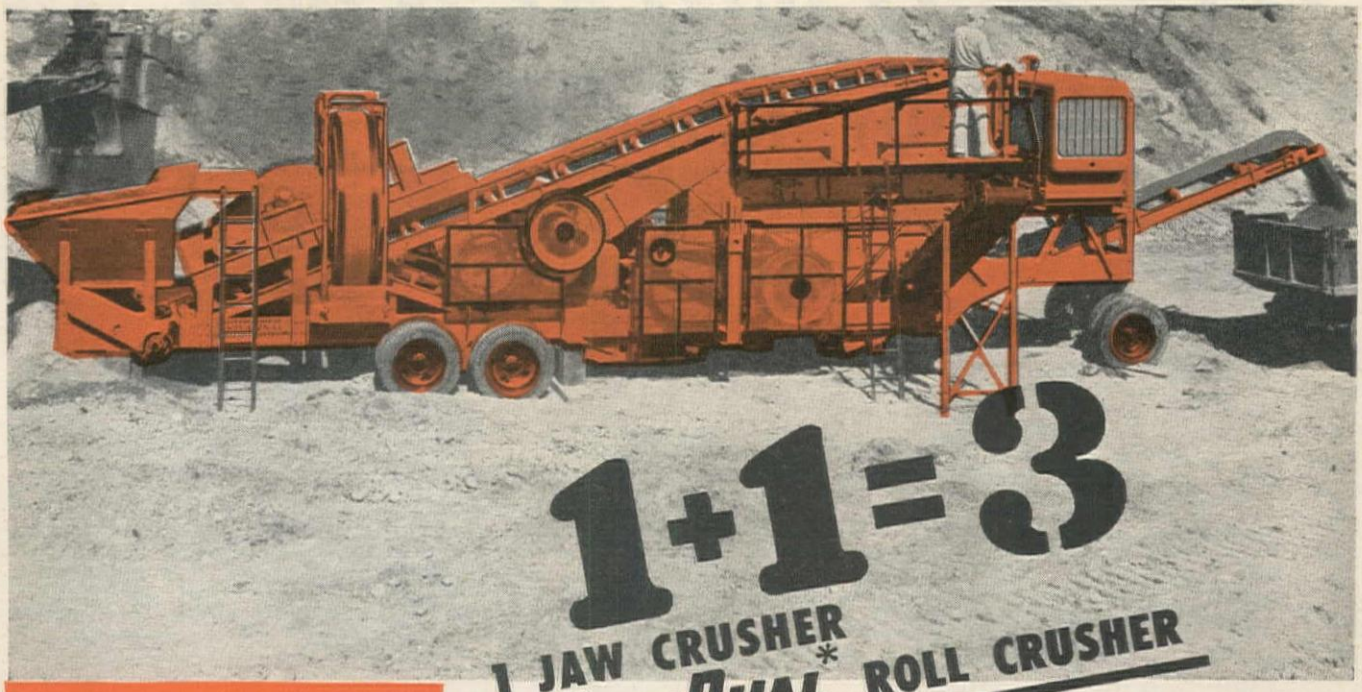

1+1=3

1 JAW CRUSHER
1 *TWINDUAL** ROLL CRUSHER
3 STAGES OF REDUCTION

For gravel requiring a large opening jaw crusher our 293Q Pacemaker also features the ***TWINDUAL*** *'method. Ask for Bulletin 31AA.*

INCREASE PRODUCTION 50 to 100%

Reduce cost per yard with Universal's *TWINDUAL* Master Gravel Plant

Here's the gravel plant designed to serve your requirements now and for a long time to come. Universal "Stream-Flo" engineering sets the standard for high production and ready portability with three full stages of reduction in a single-unit plant.

Proved in performance, proved in profit-making capacity, the ***TWINDUAL*** Master will outproduce conventional plants of comparable size and weight by 50 to 100%.

This modern plant features a Streamline jaw crusher in the first stage, and the ***TWINDUAL*** Method* of secondary reduction in the second and third stages. This exclusive Universal development gives all the advantages of two separate roll crushers without the bulk and weight . . . primary capacity is doubled, jaw crusher maintenance reduced. The over-all result is TOP CAPACITY AT LOWEST COST PER YARD. For complete details write for Bulletin No. 682.

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619 C Avenue N. W. Cedar Rapids, Iowa

A Division of **PETTIBONE MULLIKEN CORPORATION • Chicago • New York**

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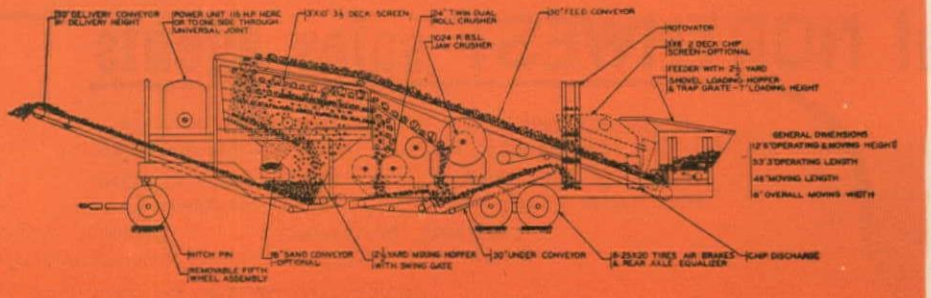

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Published Monthly by
KING PUBLICATIONS
503 Market Street
San Francisco 5, California
Phone YUkon 6-1537

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Subscription Rates

The annual subscription rate is $4 in the United States and countries in the Pan American Postal Union. To Canada, England, Australia and New Zealand, $5 per year; all other countries, $11.00 per year. Single Copies, 35¢

Entered as Second Class Matter at the Post Office in San Francisco, California under the Act of March 3, 1879.

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Volume 24 **MARCH 15 • 1949** Number 3

TABLE OF CONTENTS

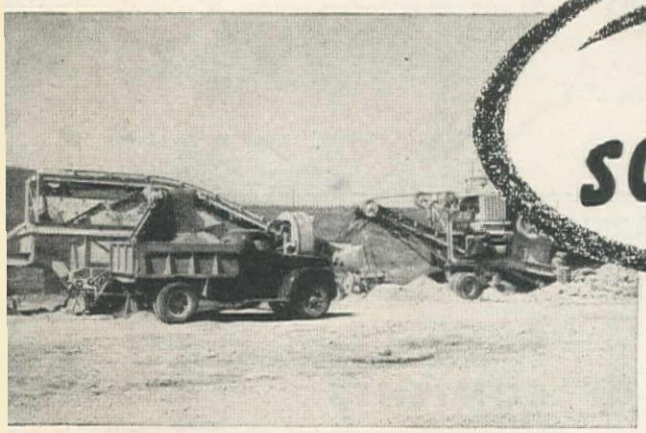
Covering Construction in the Western Half of the United States

Cedarapids

Built by IOWA

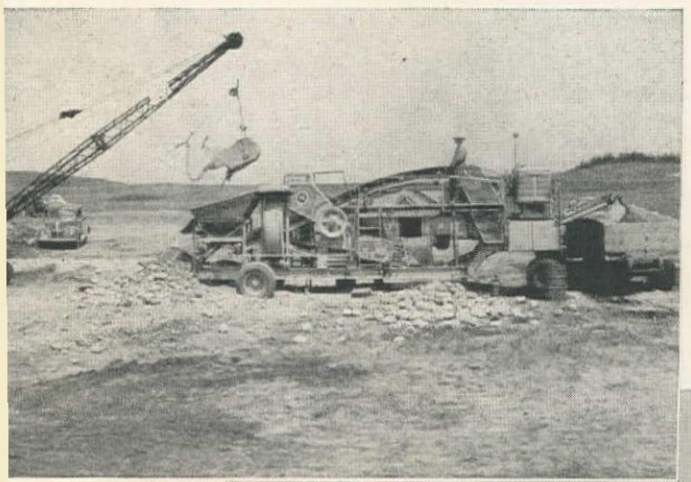
LOW INITIAL COST *plus* LOW MAINTENANCE COSTS

CRUSHING AND SCREENING PLANTS



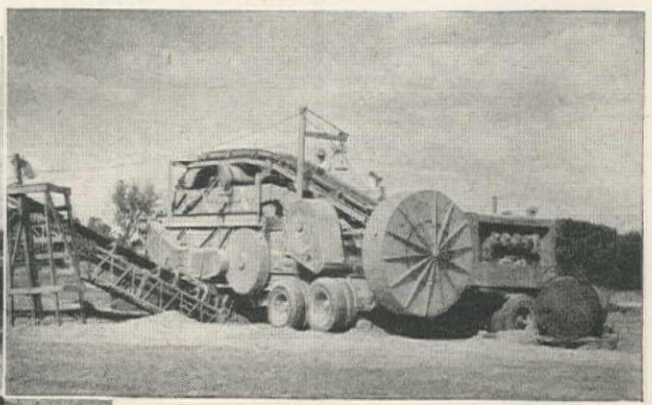
900 CUBIC YARDS of 1" material and 725 cubic yards of ¾" produced in 9 hours by this Cedarapids Portable Unitized Crushing and Screening Plant in Wisconsin. The plant consists of a jaw crusher primary and a roll crusher secondary.

LOW first cost, low operating cost, minimum repairs and maintenance — that's where your annual savings *begin* with Cedarapids Crushing and Screening Plants! And savings *continue,* year after year! With Cedarapids plants on the job, you get a combination of high capacity flexibility, portability and low operating costs that keep you consistently in the money. Smooth, balanced coordination of screens, crushers and conveyors ... instant adaptation to a wide variety of jobs ... fast, easy set-up and take-down ... all add up to more profitable operation. There's a wide range of sizes and types for every production need. From the smallest unit to the largest plant, Cedarapids Crushing and Screening equipment is built for high output at low cost.



35 CUBIC YARDS an hour with 55% of material crushed. That's easy production for this Cedarapids Pitmaster, the smallest complete tandem portable crushing and screening plant in the Iowa line. Operating in Canada.

100 CUBIC YARDS per hour of ¾" aggregate from this Cedarapids Junior Tandem. This plant is operating between the Elk River and Big Lake in Minnesota, producing aggregate for gravel surfacing shoulder and for black topping intersections.



260 TONS per hour with 35% crushing of minus 1" material! That's the production record of this Cedarapids Master Tandem Portable Crushing and Screening Plant in Colorado. *{above}*

Cedarapids

Built by IOWA

The IOWA LINE *of Material Handling Equipment Is Distributed by:*

HOWARD-COOPER CORP., Seattle, Washington; PorHand, Eugene and Central Point, Oregon; HALL-PERRY MACHINERY CO., Butte, Great Falls, Missoula and Billings, Montana; INTERMOUNTAIN EQUIPMENT CO., Boise and Pocatello, Idaho, and Spokane, Washington; WORTHAM MACHINERY CO., Cheyenne, Wyoming; KIMBALL EQUIPMENT CO., Salt Lake City, Utah; SHAW SALES & SERVICE CO., Los Angeles, California; H. W. MOORE EQUIPMENT CO., Denver, Colorado; EDWARD F. HALE CO., Hayward, California; ARIZONA CEDAR RAPIDS CO., Phoenix, Arizona; R. L. HARRISON CO., INC., Albuquerque, New Mexico; SIERRA MACHINERY CO., Reno, Nevada.

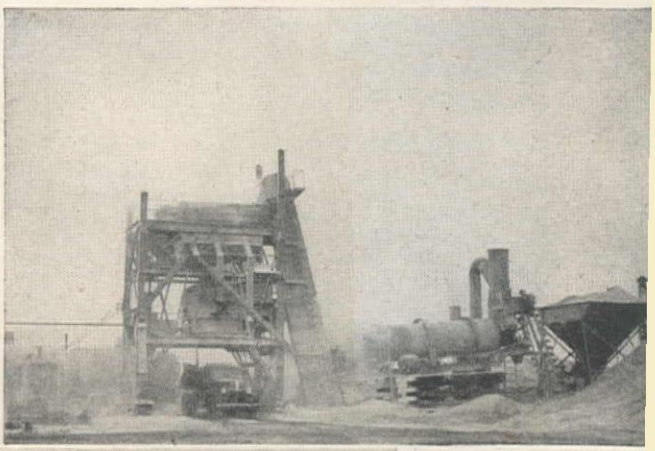
See Your Cedarapids Distributor For Full Details

assure LOW COST PER YEAR

BITUMINOUS MIXING PLANTS

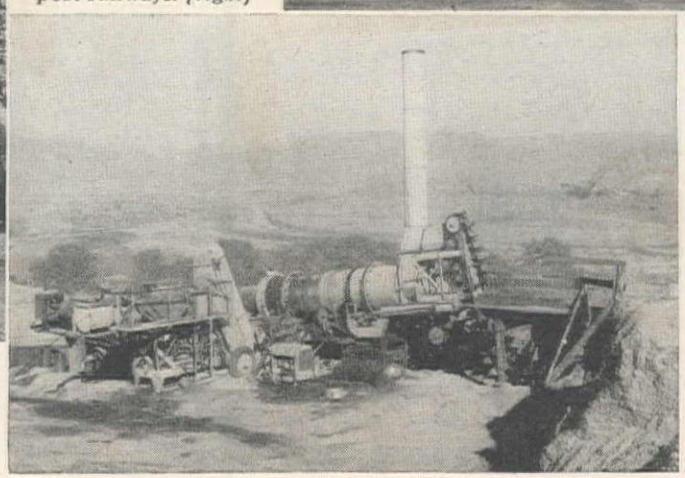
200 TO 250 TONS per day produced by this Cedarapids 1000 lb. Model "A" Bituminous Mixing Plant in Alabama. Another production record for Cedarapids.

WHATEVER your bituminous paving projects, you'll get bigger annual savings when you put Cedarapids Bituminous Mixing Plants on the job. Every feature is engineered for high tonnages accurately mixed at lowest possible cost. Perfectly matched screens, batchers, pug mills, elevators and driers assure a smooth, steady flow of uniform mixes that consistently meet the most exacting specifications. Finger-tip operating control assures fast, easy operation. Low over-all travelling dimensions and weight simplify transportation problems. Rock-bottom initial cost, plus low operating and maintenance costs, keep you in the profit picture. Cedarapids Portable, Stationary, Batch-Type and Continuous-Mix Plants are available in sizes and types for every requirement. When you buy a Bituminous Mixing Plant, buy the best — buy Cedarapids.



100,000 TONS of thoroughly mixed bituminous material produced by this 3000 lb. Cedarapids Model "E" Batch-Type Bituminous Mixing Plant and another 2000 lb. Model "E" Batch-Type Plant for resurfacing airport runways. *{right}*

As much as **350 TONS** per day of bituminous materials, thoroughly mixed, were produced by this Cedarapids Super-Portable Model "FA" in Ohio. *{above}*



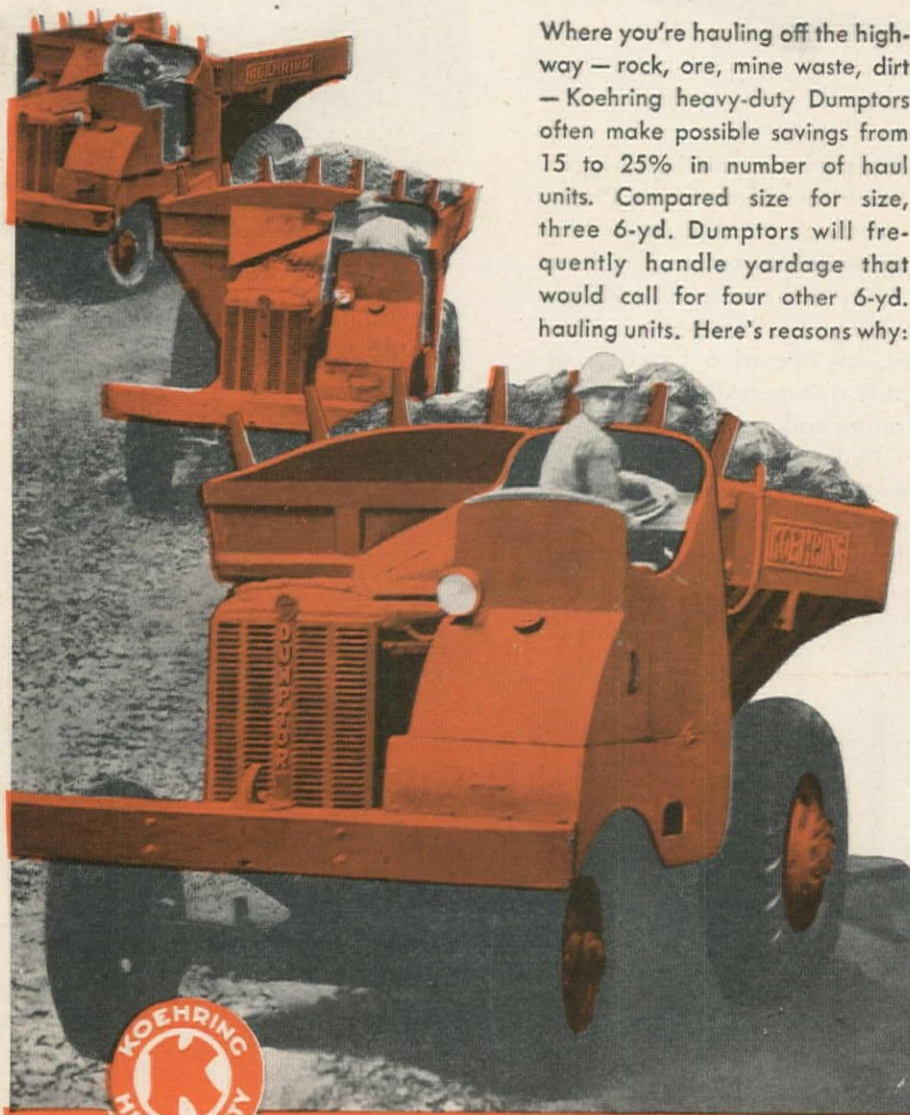
20 TO 30 TONS per hour production is obtained from this Cedarapids Portable Patchmaster, a volumetric type bituminous mixing plant in Iowa.

IOWA MANUFACTURING COMPANY

Cedar Rapids, Iowa, U. S. A.

3 DO THE WORK OF 4

Job studies prove 3 Dumptors do work of 4 other 6 yd. hauling units



Where you're hauling off the highway — rock, ore, mine waste, dirt — Koehring heavy-duty Dumptors often make possible savings from 15 to 25% in number of haul units. Compared size for size, three 6-yd. Dumptors will frequently handle yardage that would call for four other 6-yd. hauling units. Here's reasons why:

1. Save Spot, Load Time

Dumptors have short turning radius — only 19'-6". Operator always faces load, has 100% visibility. Big, 64-square-foot body opening provides a target that's easy-to-hit.

2. Save Travel Time

Dumptors travel rough haul roads fast — safely. There's 6 HP for every ton of gross vehicle weight. That means plenty of grade-ability, quick acceleration, more 'GO' and extra load-carrying capacity.

3. Save Turn Time

Dumptors never turn on shuttle hauls . . . travel at same speed in both directions. No turn time —means more haul time for you.

4. Save Dump Time

Koehring Dumptors dump in one second. Gravity tips the body fast . . . no waiting for body hoists. Eliminates body hoist maintenance.

KOEHRING HEAVY DUTY

GET COMPLETE DUMPTOR FACTS FROM YOUR KOEHRING DISTRIBUTOR

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Western Machinery Co., *Spokane*

CK817

KOEHRING HEAVY-DUTY DUMPTORS

JOHNSON central-mix . . . transit-mix . . . concrete products PLANTS

IT WILL pay you to get complete facts, figures on (1) Johnson Central-Mix plants that mix as well as batch . . . (2) Transit-Mix plants for dry-batching truck mixers . . . (3) Concrete Products plants for producing concrete block, pipe or other precast forms. You can use either one of these or a combination of any two or all three . . . depending on your requirements.

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PARSONS mile-a-day 200 TRENCHLINER*

WHERE you want to dig every possible foot of trench per day, this Parsons 200 wheel Trenchliner is the low-cost answer. Mile-a-day is not uncommon. Digs up to 20' per minute . . . trenches 15" to 26" wide . . . up to 5'6" deep. Produces clean-cut trenches ready for pipe or tile without extra, costly hand trimming. 4 other heavy-duty Trenchliners also available.

Trademark Reg. U. S. Pat. Off.

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KWIK-MIX save time, labor with Model 6-S MIXERS

EVERY batch delivered by a Kwik-Mix 6-S Dandie saves money-making seconds for you . . . careful design insures high-output on one-man operation. Whether charging or discharging drum, elevating skip or mixing, operator doesn't change position. Levers operating skip, automatic water measuring tank, Flow-line discharge chute are conveniently arranged, easy-to-reach. That's why operators like the 6-S Dandie.

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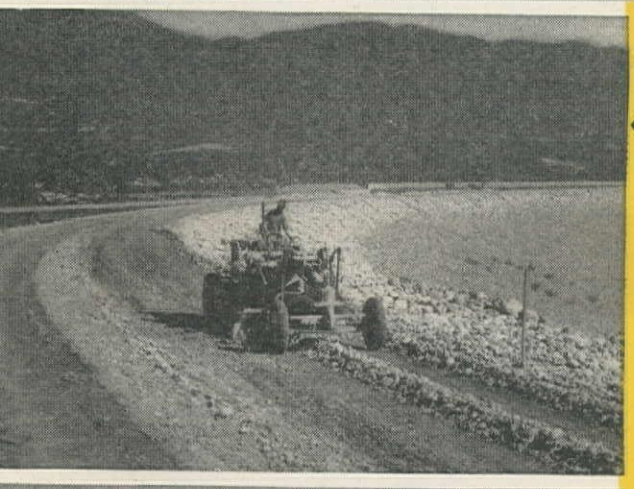
These money-making

ORLANDO, FLORIDA
Cutting this ditch for a curb line takes power and capacity. The sturdy No. 12 has both to spare.



SANTA FE DAM, CALIF.
Grading a haul road for heavy trucks on top of the dam, the No. 12 leaves a smooth surface in rocky material.

BALTIMORE, MARYLAND
Setting the pace for the paver, the No. 12 moves right along finishing final grade on the Philadelphia road.

RAMSEY COUNTY, MINN.
Keeping good roads good — another chore for the No. 12, windrowing on oil mix for stabilizer base.

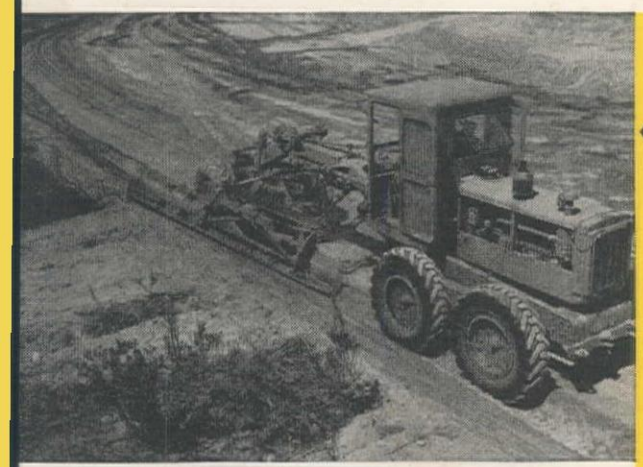
BERTHOUD PASS, COLO.
8000 feet up! This new road requires fine, accurate finishing. The No. 12 "can do" within ¼ inch.

motor graders

sure get around!

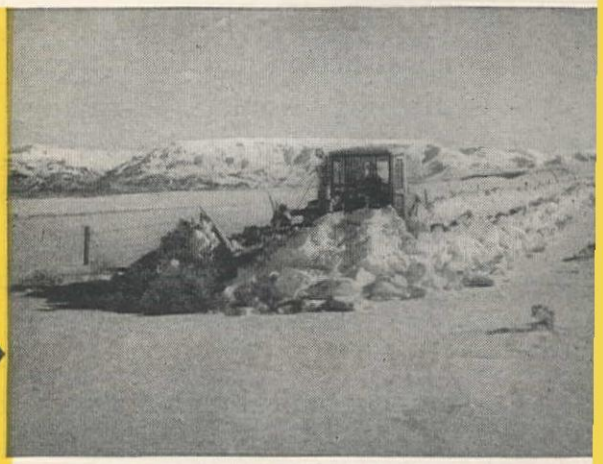
ALL YEAR AROUND, on hundreds of construction and highway jobs, you'll see these husky one-man "Caterpillar" Diesel Motor Graders tackling a wide range of tasks. In scorching heat and bitter cold, they have the rugged stamina for heavy grading, as well as the accuracy for fine finishing. Designed and built entirely by one manufacturer, they're all "Caterpillar"—front axle to radiator cap. And they're sold and serviced by one reliable, well-equipped dealer. The advantage is all yours with these hard-working money makers in your line-up.

CATERPILLAR TRACTOR CO., San Leandro, Calif.; Peoria, Ill.



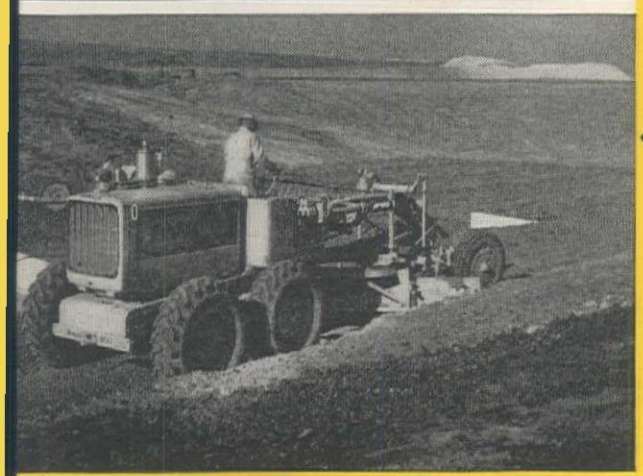
GRAND COULEE DAM, WASHINGTON

Relocating a highway calls for banksloping, ditching, grading. That's duck soup for the No. 12.



IDAHO FALLS, IDAHO

150 miles of Bonneville County road to keep clear. Equipped with V-type snow plow and wing, the No. 12 does the job.



CENTRAL VALLEY, TRACY, CALIF.

The versatile No. 12, besides maintaining haul roads, is also used for smoothing canal bed ahead of a Monighan.

WASHINGTON COUNTY, COLORADO

A No. 12 widens and rebuilds as much as one mile of road a day.

CATERPILLAR

REG. U. S. PAT. OFF.

DIESEL

ENGINES • TRACTORS • MOTOR GRADERS

EARTHMOVING EQUIPMENT

W-SPEED PATROL BD-3 BD-2 AD-3 AD-4

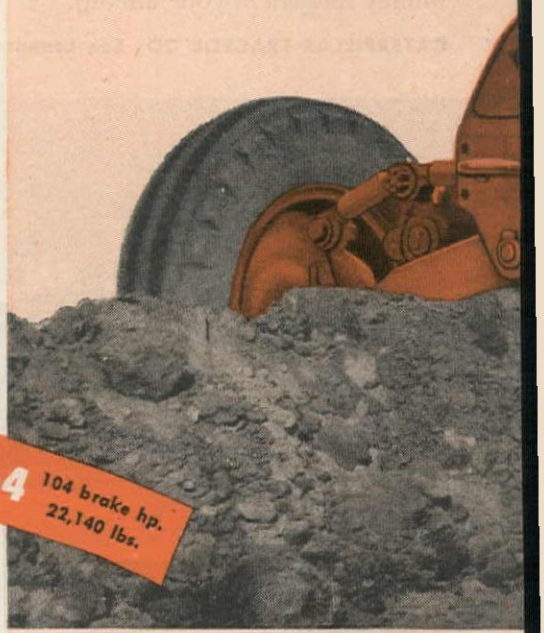
Choose the size

FROM ALLIS-CHALMERS' COMPLETE LINE

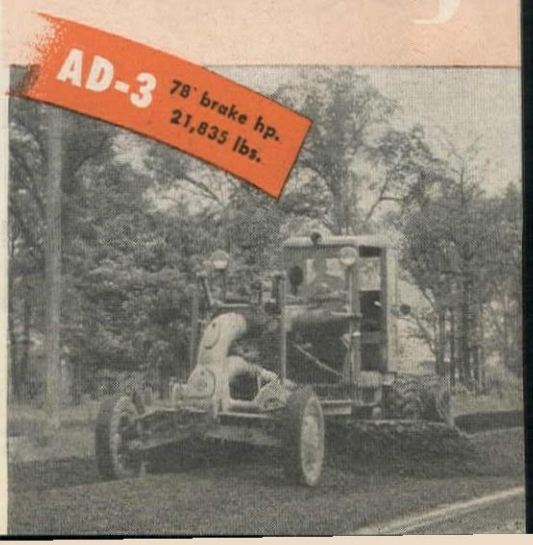
FOUR DIESEL-POWERED MODELS — all full-fledged construction machines — each one easily handles ditching, sloping, scarifying, black-top mixing, snowplowing, sod removal . . . as well as maintenance. Differences in weight, speeds, horsepower and cost enable you to match the machine to the job to be done . . . and to your budget.

LOW COST W-SPEED PATROL — long popular as an economical maintainer with townships, cities, counties . . . and with contractors for keeping up hauling roads and finished sections on their job. Gasoline powered, electric lights and starter, simple-to-operate controls.

Whatever your motor grader needs . . your Allis-Chalmers dealer can fill 'em!



SAME OUTSTANDING ADVANTAGES ON ALL AD AND BD MODELS



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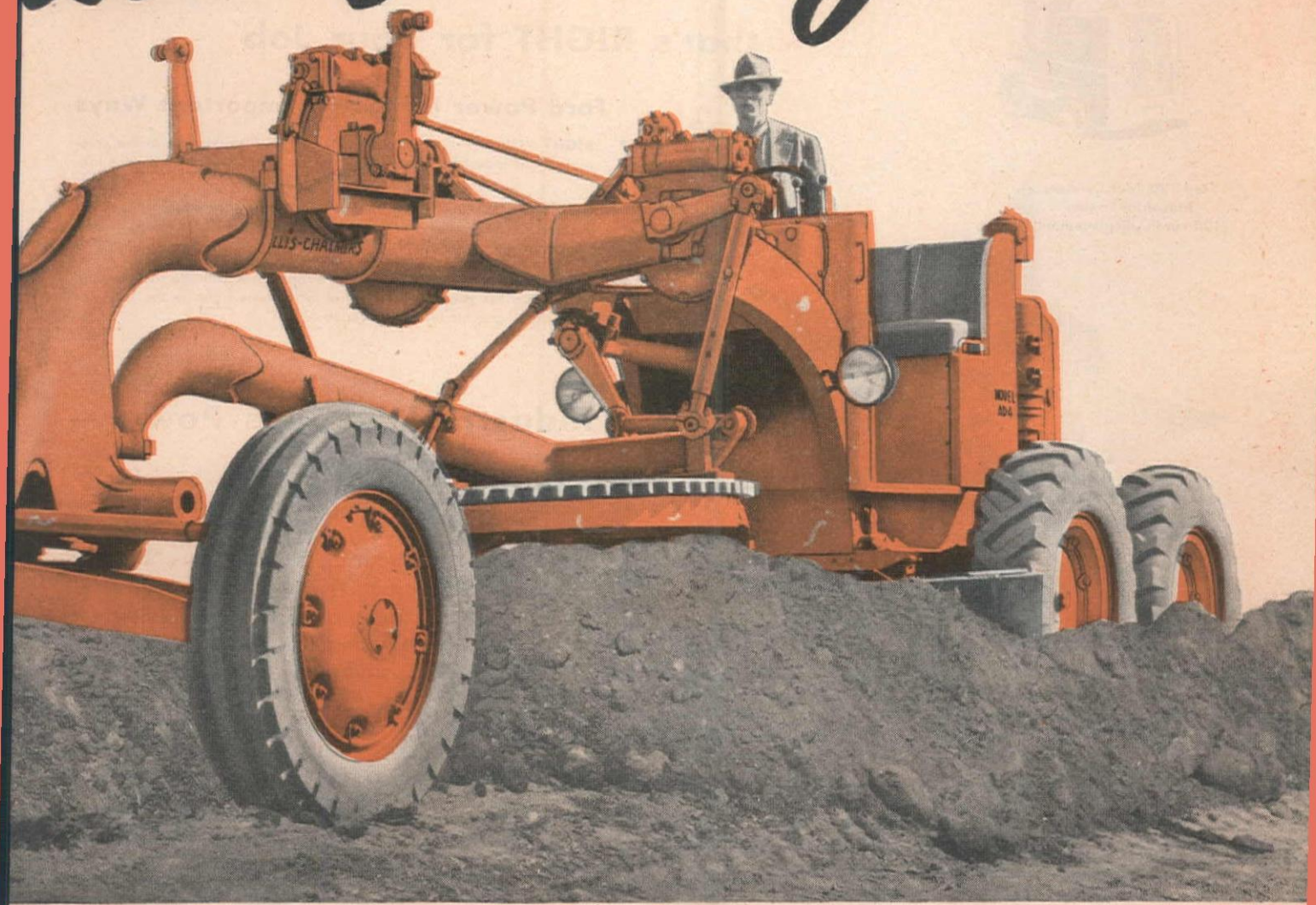
SPOKANE—Fred M. Viles and Company
YAKIMA—Wikstrom Motors, Inc.

WYOMING
CASPER—Studer Tractor & Equipment Company

that fits the job



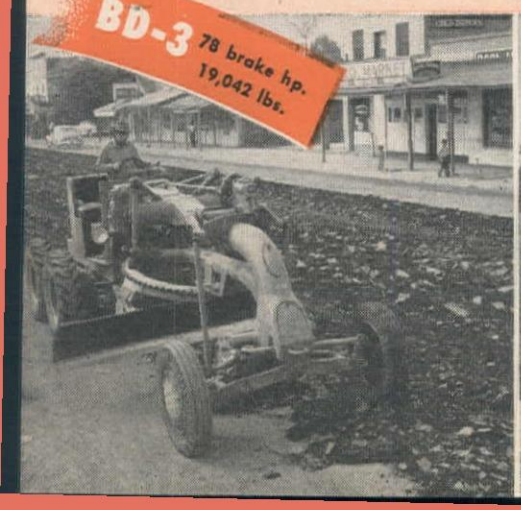
- A strong, shock-absorbing tubular frame that also protects control rods inside frame.
- High axle and throat clearance for handling bigger windrows without interference.
- Rounded construction of steering knuckles, spindles and drag links to prevent material from packing . . . assures unhindered operation.
- "Roll-away" moldboard that rolls instead of pushes material and thus speeds up work.
- A full circle revolving blade that allows grading forward or in reverse.
- A blade held firmly on its work, through direct down pressure, for precision cutting.
- A smooth-running, economical GM 2-cycle diesel engine that packs power in every stroke.
- Complete operator comfort with full vision, responsive controls, self-energizing brakes.

VERSATILE

FOR ALL KINDS OF USERS
FOR ALL TYPES OF MAINTENANCE

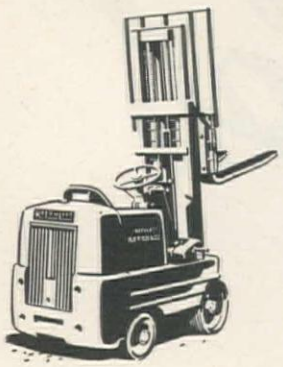
W-SPEED PATROL
31.5 brake hp. • 6,000 lbs.

BD-3 78 brake hp. 19,042 lbs.



BD-2 50.5 brake hp. 17,772 lbs.

For POWER,

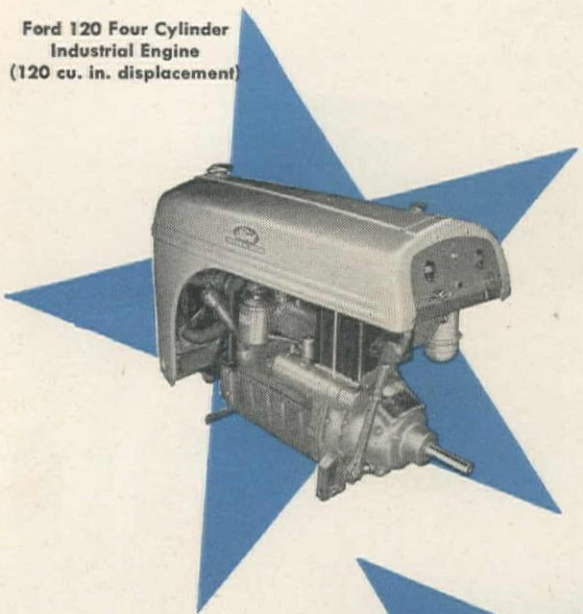


There's a Great New Ford Industrial Engine that's RIGHT for Your Job

Ford Power is RIGHT 3 Important Ways

1. **RIGHT POWER**—Your choice of five rugged workhorses in the complete Ford Industrial Engine line. There's one just right for your job.
2. **RIGHT FEATURES**—You're always right up to date when you specify Ford Power. Every model has all the latest benefits of Ford's famed progressive engineering.
3. **RIGHT SERVICE**—Ford Dealers are everywhere, with the facilities and experience for keeping Ford Industrial Engines right on the job—for longer life, greater service, lower costs.

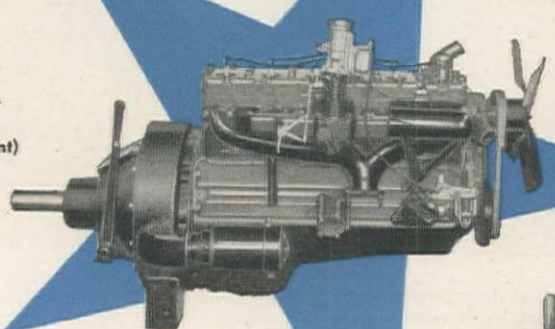
Ford 120 Four Cylinder Industrial Engine (120 cu. in. displacement)



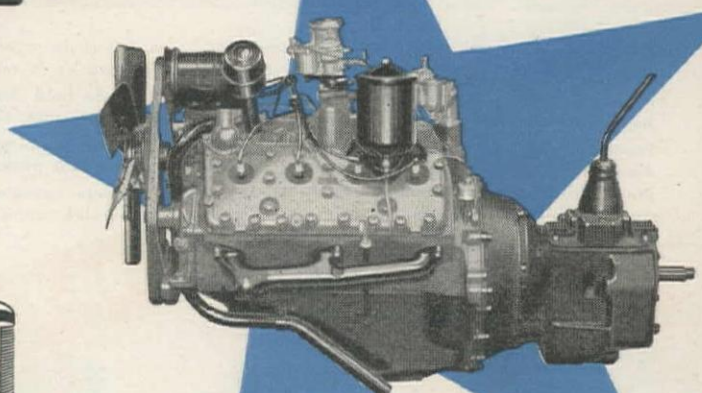
Ford Industrial Engines Power—

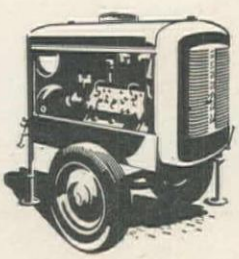
Agricultural Machinery . . . Orchard Equipment . . . Air Compressors . . . Road and Construction Machinery . . . Derricks and Hoists . . . Electric Generating Plants . . . Arc Welders . . . Fire-Fighting Equipment . . . Industrial Tractors . . . Lumber and Sawmill Equipment . . . Oil Field Equipment . . . Pumps . . . Railway Motor Cars . . . and many other applications.

Ford 226 Six Cylinder Industrial Engine (226 cu. in. displacement)



Ford 239 V-8 Industrial Engine (239 cu. in. displacement)





YOUR JOB IS WELL-POWERED

Pick FORD

Only Ford Industrial Engines Have All These Features

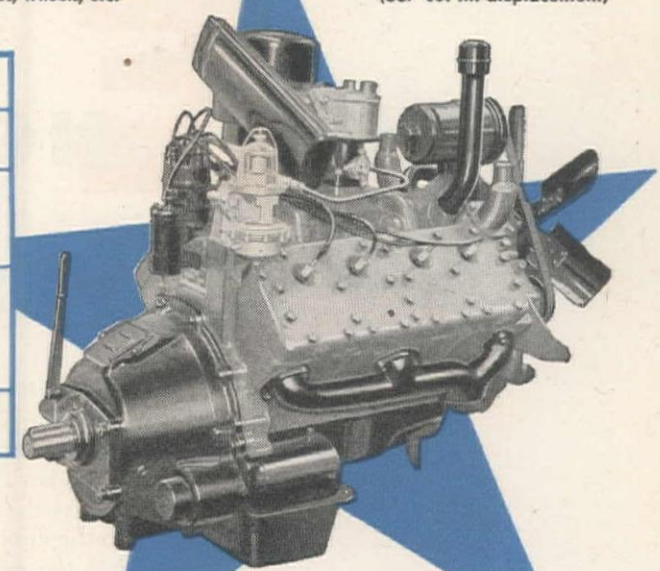
Made throughout to Ford famed hi-precision manufacturing standards . . . Fully counterbalanced crankshafts . . . Large, precision, replaceable main and connecting rod bearings . . . Long life, high-chrome nickel alloy valves . . . Moly-chrome alloy steel valve seat inserts . . . Shot-blasted, rust-proofed valve springs . . . Full-floating, tubular piston pins . . . Full pressure lubrication to all bearings . . . Deep oil pans with clean-out plates . . . Direct, gear-driven camshafts with aluminum timing gear . . . Removable cartridge type oil filters . . . Hi-capacity, full-jacketed, thermostatically controlled cooling . . . Balanced carburetion . . . Full-automatic distributors . . . Drop-forged connecting rods . . . Plus many other advancements applying to individual engines.

Also available to manufacturers, through the Industrial Engine Department, are any component Genuine Ford Parts including front and rear axles, transmissions, brakes, wheels, etc.

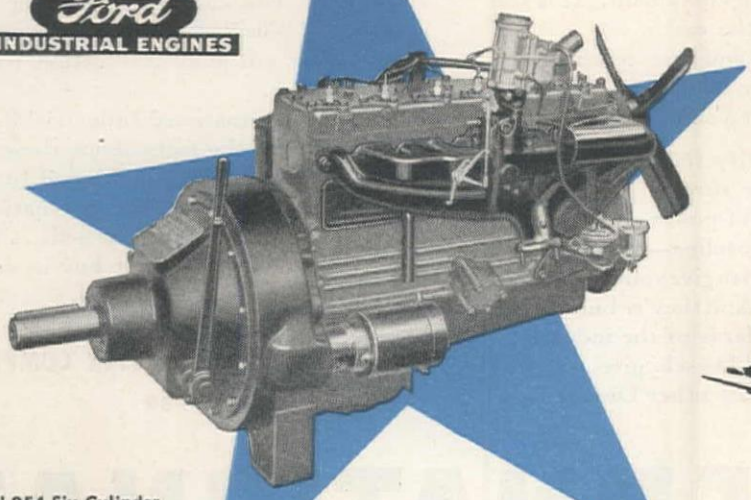
Specifications of Ford Industrial Engines

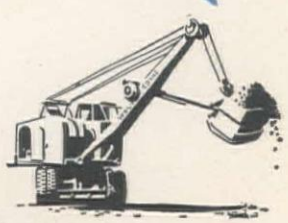
Model	Cylinders	Bore and Stroke	Displ. cu. in.	Dyn. B.H.P.	Max. Torque	Auxiliary Equipment Available
120	4	3 3/16 x 3 3/4	120	36 @ 2400	84#' @ 1600	Clutch; 3 and 4 speed transmissions; SAE #5 housing and power take-off. Also complete power unit.
226	6	3.3x4.4	226	80 @ 2400	182#' @ 1200	Clutch; 3, 4 and 5 speed transmissions; SAE #3 and #4 housings; power take-off.
239	V-8	3 3/16 x 3 3/4	239	85 @ 2400	187#' @ 1600	
254	6	3.5x4.4	254	95 @ 2400	212#' @ 1200	
337	V-8	3 1/2 x 4 3/8	337	117 @ 2400	257#' @ 1600	Clutch; 5 speed transmission; direct drive power take-off.

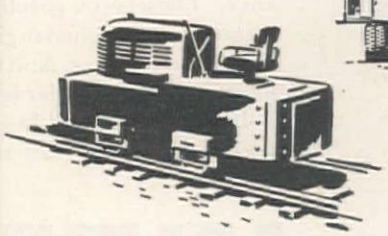
Ford 337 V-8 Industrial Engine (337 cu. in. displacement)



Ford INDUSTRIAL ENGINES





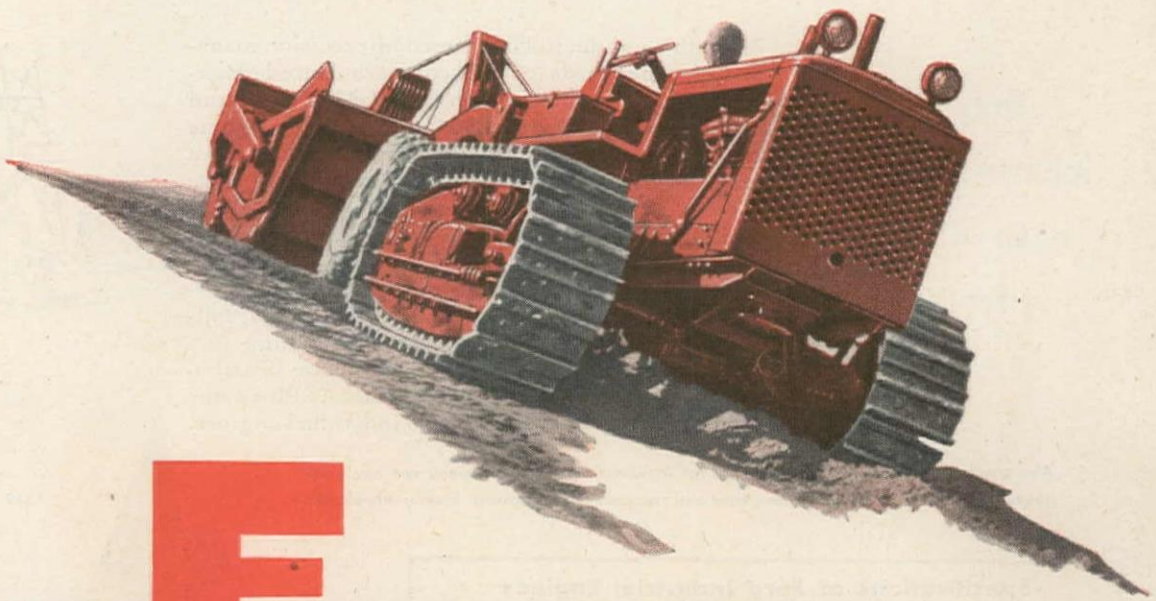


Ford 254 Six Cylinder Industrial Engine (254 cu. in. displacement)

FORD MOTOR COMPANY

INDUSTRIAL AND MARINE ENGINE SALES DEPARTMENT • DEARBORN, MICHIGAN

WHEN IT'S FORD-POWERED



THE ENGINE THAT MOVES THE EARTH

When you buy earthmoving power, you buy the tools of the construction trade —crawler or wheel tractors, motor graders, draglines and shovels. The one common denominator of all is the engine. It gives get up and go to the equipment. It is the power that moves the earth.

When you buy and use earthmoving equipment, you buy and use the power of engines to work for you!

When you specify INTERNATIONAL Power, you can be sure of getting your full money's worth of power and performance. Diesel—or gasoline—International Engines are designed to give you dependable and efficient power. And they're built to the most exacting standards of the industry.

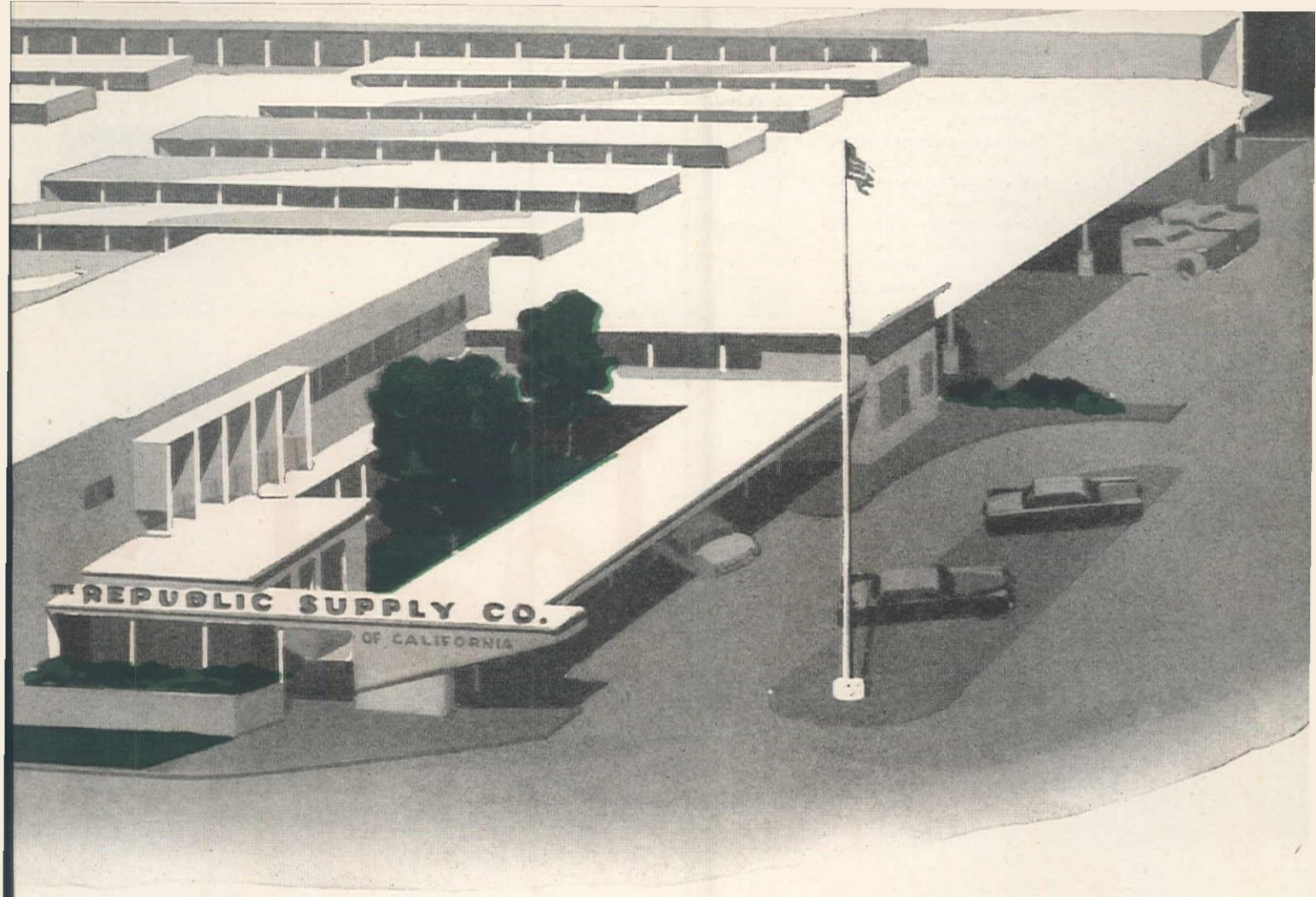
International full-Diesels give you features not found in any other Diesel. They provide in-built, gasoline-conversion starting which gets International Diesels warmed up and on the job instantly. The International designed and built fuel injection system gives you unusually high combustion efficiency and excellent fuel economy. Rifle-drilled oil-pressure passages assure adequate lubrication for all working parts.

See your International Industrial Power Distributor for the facts about these features. Remember, he is equipped to give you superb service on all International-powered equipment which he sells . . . another reason why your best buy in earthmoving power is International.

INTERNATIONAL HARVESTER COMPANY
Chicago

CRAWLER TRACTORS
POWER UNITS
DIESEL ENGINES
WHEEL TRACTORS

INTERNATIONAL

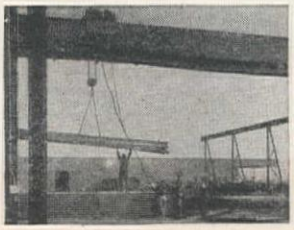


through better facilities

Dual height loading docks
r pick-up and standard
ucks. Electric transporters
r faster loading.

● Fork truck hoists to speed and facilitate handling of large merchandise.

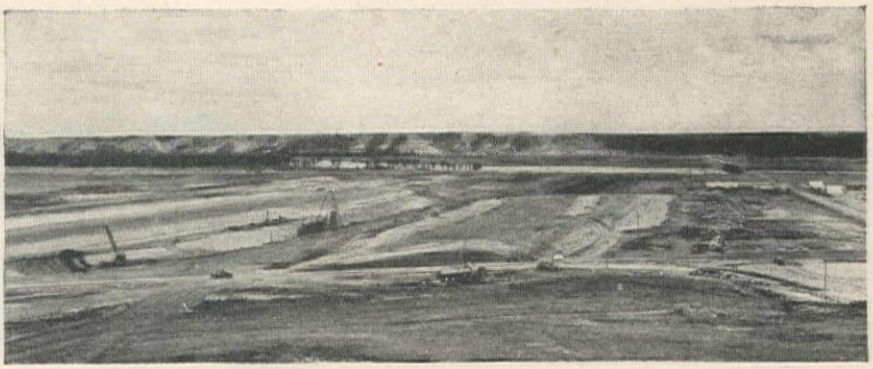
● Seven foot steel stock bins — easily reached without climbing. Modern order picking truck.



● Overhead cranes in both pipe yard and warehouse for faster service.

REPUBLIC *Supply Company*
OF CALIFORNIA

600 So. Eastland Ave., Los Angeles 54, Calif.



Garrison Dam, under construction on the Missouri River near Garrison, North Dakota, will be the world's largest rolled-fill earth dam. When completed, the dam will be 210 feet high and over 2 miles long with a base width of nearly half a mile—a total fill of more than 70,000,000 cu. yds.

A load a

WITH GM

Euclid Bottom Dump, powered by GM Series 71 Diesel, dropping a load of fill dirt. Eight of these units, working with a BV Loader, hauled 631 such loads in a 10½ hour working day, an average of one load a minute. Haulage distance at this stage was about 500 yards.

ON the world's largest rolled-fill earth dam near Garrison, North Dakota, records for moving dirt are being smashed every day.

Bulk of the heavy equipment on the Garrison Dam project is powered by General Motors Series 71 Diesel engines. GM Diesels were selected for this job because–as the contractor puts it–"They can move dirt faster."

Reasons for this superior performance are obvious. GM Diesel engines are

Garrison Builders, Inc., operators of this equipment, are working on the 14 million yard stage-one contract on the west side of the river. Shown is a convoy of four Euclid Bottom Dumps approaching the embankment fill area.

minute...

DIESEL POWER

2-cycle—with power on every piston downstroke. They deliver a smooth, steady power output—twice as many power impulses for each revolution of the crankshaft. This added power-per-turn makes them more compact with more horsepower for their size than other type engines. They start instantly on their own fuel. Their simplified construction and clean design make maintenance much easier. Service problems are greatly simplified by the interchangeability of parts.

Add up these advantages and you'll see why General Motors Diesels are the first choice of construction men for any heavy-duty operation. Let us show you how these engines can bring greater efficiency and economy to your particular job. See your local equipment distributor or write direct to us.

GM
GENERAL MOTORS
DIESEL POWER

DIESEL BRAWN WITHOUT THE BULK

DETROIT DIESEL ENGINE DIVISION

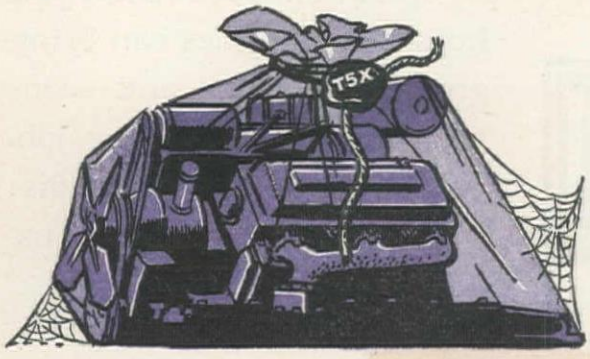
SINGLE ENGINES... *Up to 200 H.P.* **DETROIT 28, MICHIGAN** MULTIPLE UNITS... *Up to 800 H.P.*

You Get GREATER ENGINE PROTECTION with T5X—*the famous purple* oil*

1. T5X—the remarkable purple motor oil—gives greater protection to any type of internal combustion engine in any industrial operation. This fully compounded, detergent-type oil easily passes the most demanding lubricant requirements—including the U. S. Army Specification 2-104b, the "L-4" Coordinating Research Council gasoline engine tests and the grueling 500-hour continuous-run Diesel engine test.

2. T5X is a highly refined, 100% pure, paraffin-base oil obtained from highest quality base stock. An exclusive detergent compound is added to this base stock that retards sludge formation to a remarkable degree. With T5X, oil lines, ring grooves and pistons stay clean far longer!

3. A special oxidation inhibitor in T5X greatly retards oxidation and gives high heat stability. A neutralizing agent protects against corrosion. Another ingredient suppresses foaming even under the most adverse operating conditions. With T5X, wear is reduced to a minimum!



4. T5X forms an extremely tenacious and enduring oil film on metal surfaces that gives maximum protection against scuffing and seizure. This tough film assures the greatest possible defense against rusting — even when engines are idle for long periods.

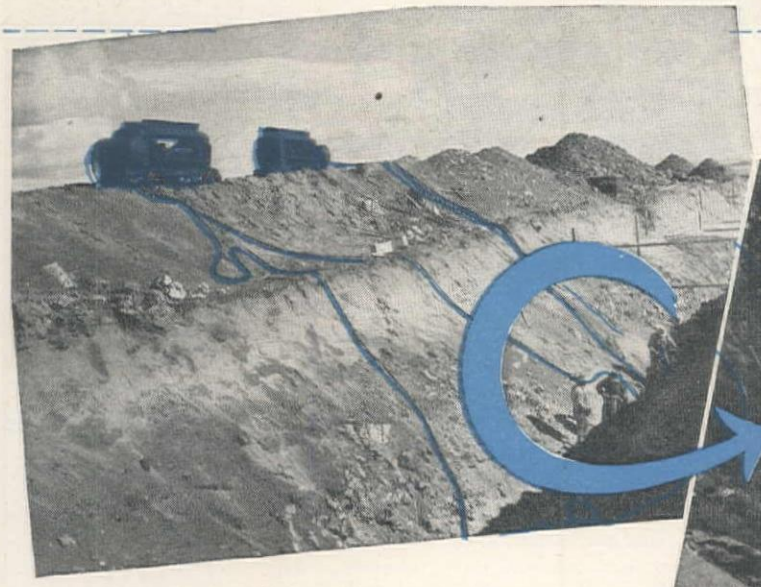
For full information on T5X phone your local Union Oil Representative or write Sales Department, Union Oil Company, Los Angeles 14, California.

ANOTHER

UNION OIL

SUCCESS-TESTED PRODUCT

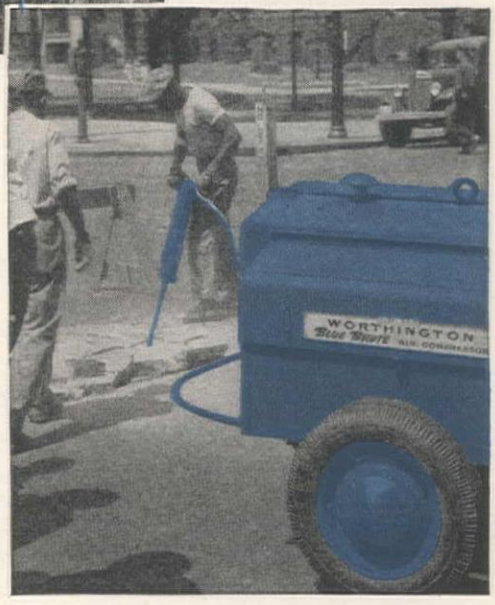
*T5X gets its distinctive color from an exclusive ingredient that helps give the oil its remarkable stability.



REPORT FROM OREGON: *"SPLENDID PERFORMANCE"*

Blue Brute team-mates — three of a battery of WJ-45 Rock Drills, powered by Portable Air Compressors — used by the Del R. Beebe Construction Co. of Eugene, Oregon, excavating for a big housing project's sewerage system. The Beebe Co. reports "splendid performance" in every detail of Blue Brute operation.

Oregon and Ohio Agree: BLUE BRUTE AIR TOOLS ARE TOP COST-CUTTERS!



REPORT FROM OHIO: *"VERY MUCH PLEASED"*

A Blue Brute construction team in Toledo, Ohio, removing street paving. Owner John V. Rush of Toledo says: "Our WB-85 Paving Breakers and 60′ Portable Compressors make ideal combinations. In four months' continuous operation, removing and replacing 6″ and 8″ concrete base, *we have had absolutely no maintenance trouble on this equipment.* We are very much pleased with it."

Put Blue Brute teams to work for you — and count on big savings from then on! Starting with Blue Brute Portable Compressors — 60′ to 500′ — you've got the most dependable and economical air suppliers ever made . . . tireless, trouble-free performers, with the easy-breathing Feather* Valves that get *all* the air out of every drop of fuel.

Then hook up their famous Blue Brute team-mates — Hand-Held Rock Drills, Clay and Trench Diggers, Tampers, Sheeting Drivers, Wagon Drills — and you're making air go farther and do more than it ever did before. That's because these Worthington air tools not only hit harder and last longer — they have the lightness, compactness and *precision balance* that means easier handling . . . faster, smoother progress . . . hours and dollars saved on every job.

Learn how Blue Brute teamwork can save *you* time and money. See your nearby Blue Brute Distributor for more reasons why *there's more worth in a Blue Brute*, or write us direct.

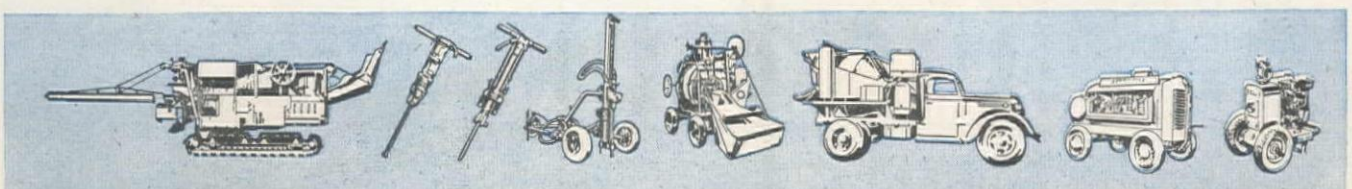
*Reg. U. S. Pat. Off.

H9-11

WORTHINGTON

WORTHINGTON PUMP AND MACHINERY CORPORATION
Construction Equipment Department, Harrison, New Jersey
Distributors in all principal cities

BUY BLUE BRUTES



IF IT'S A CONSTRUCTION JOB, IT'S A BLUE BRUTE JOB

TWO EASY STEPS
for solving your CURB . . . SIDEWALK CURB AND GUTTER PROBLEMS

THE FIRST STEP

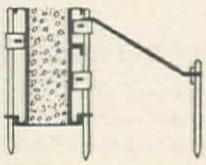
Send for your copy of the new Blaw-Knox Bulletin, No. 2259, for complete information on how Blaw-Knox Steel Forms can speed completion of your curb and gutter work, make each job better and more profitable. 24 pages of detailed illustrations show form set-ups for every type of work with complete instructions on how to use them. From this complete, up-to-date Steel Form Bulletin select the design that will meet all your requirements, make more money for you on every job.

THE SECOND STEP

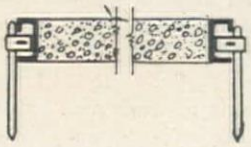
Use Blaw-Knox Steel Forms to insure greater profit on your next job, and on all your future concrete curb, curb and gutter, integral curb, and sidewalk jobs. They are easy to set, easy to strip, easy to handle and transport. They eliminate the building of expensive wood forms — especially on curves — and reduce expensive hand finishing and labor costs. Start using the Blaw-Knox Steel Form System now — it's the most complete and modern system available.

Here are just a few of the Blaw-Knox form designs available for any job!

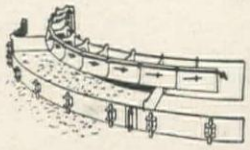
CURB AND GUTTER FORMS. For concrete curb and gutter when curb is battered and has radius at bottom.



STRAIGHT CURB FORMS. For curb with both faces vertical. Auxiliary bracing system for lateral stability.



SIDEWALK FORMS. Furnished for any required width or thickness of sidewalk.

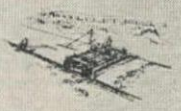


FLEXIBLE STEEL RADIUS FORMS. For curved work of variable radius. Back forms, gutter forms and battered curb face form can be set to any desired radius.

A complete line of Time and Labor Saving Construction Equipment.

AGGREGATE PLANTS

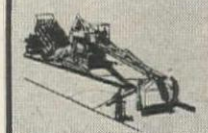
TRUCK MIXERS



FINISHING MACHINES

CLAMSHELL BUCKETS

BULK CEMENT PLANTS



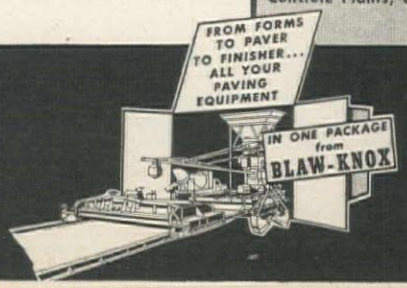
CONCRETE PAVERS

Road Forms, Paving Spreaders, Adnun Black Top Pavers, Kinetic Mixers, Concrete Buckets, Ready Mixed Concrete Plants, etc.

Send for your copy of BULLETIN 2259 *NOW!*

SF-491

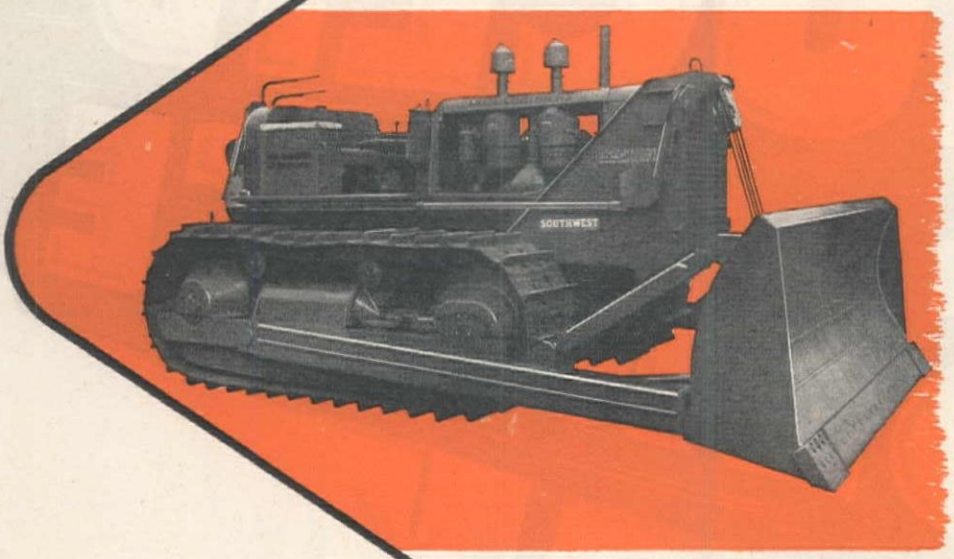
BLAW-KNOX



BLAW-KNOX DIVISION of Blaw-Knox Company
Farmers Bank Bldg., Pittsburgh 22, Pa.
Birmingham • Chicago • New York • Philadelphia • Washington

COLORADO BUILDERS' SUPPLY CO., Denver, Colorado; CONTRACTORS' EQUIPMENT CORP., Portland, Oregon; C. H. GRANT COMPANY, San Francisco, California; LIVELY EQUIPMENT COMPANY, Albuquerque, New Mexico; STAR MACHINERY COMPANY, Seattle, Washington; WESTERN CONSTRUCTION EQUIPMENT CO., Missoula, Montana; WESTERN MACHINERY CO., Phoenix, Arizona; WESTERN EQUIPMENT CO., Boise, Idaho Falls, Idaho and Spokane, Wash.; Le ROI-RIX MACHINERY CO., Los Angeles, Calif.

SOUTHWEST

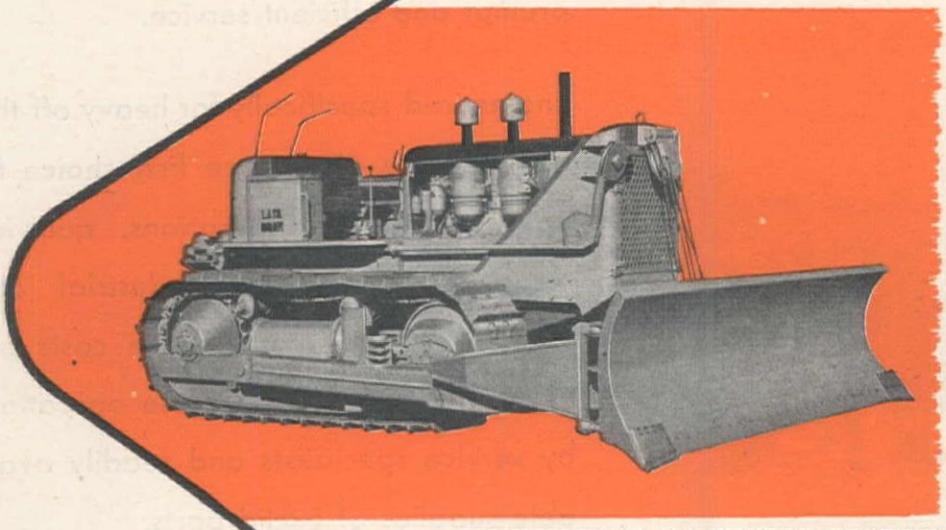


The new bulldozer and trailbuilder equipment developed by SOUTHWEST for use with Allis-Chalmers HD-19 tractors have proved exceptionally efficient and reliable in all types of operations. These are rugged, dependable units that provide outstanding economy and long service life.

Type "AFB" Bulldozers and Type "AFT" Trailbuilders for use with Allis-Chalmers Tractors.

"QUARRY-TYPE"

BULLDOZERS AND TRAILBUILDERS NOW AVAILABLE FOR ALLIS-CHALMERS HD-19 TRACTORS



NOTE THESE FEATURES...

Overhead "A" frame structures entirely eliminated.

New, rugged radiator guard type mounting.

Furnished for either rear or front mounted control units.

Bulldozers can be furnished with either adjustable arms or with side arms welded to blade.

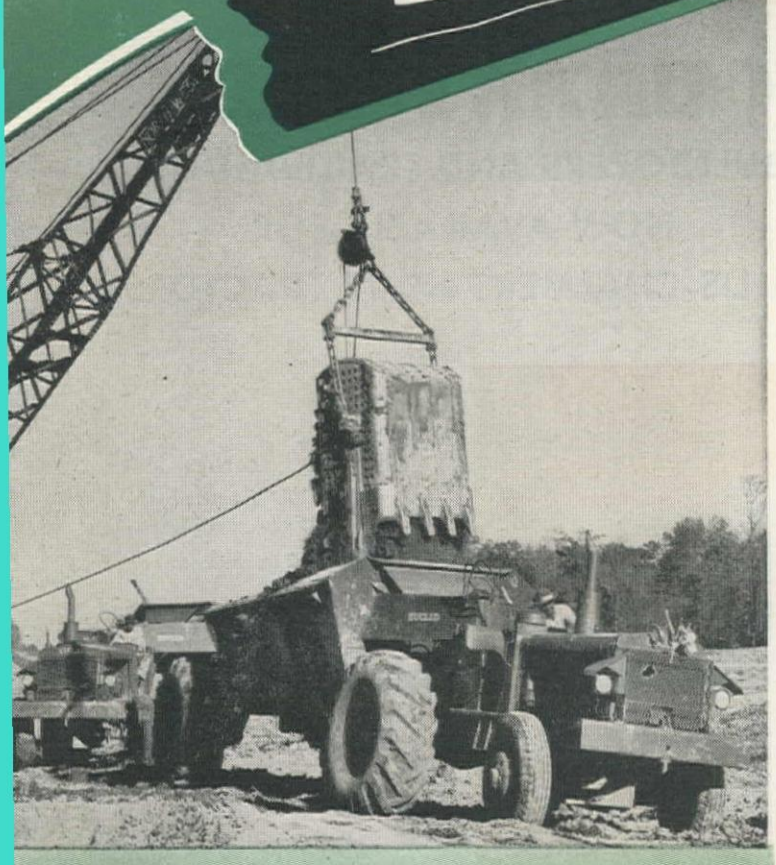
CONSTRUCTION MACHINERY DIVISION

Southwest Welding & Manufacturing Co.

ALHAMBRA, CALIFORNIA

SCOOPS BULLDOZERS CRANES WINCHES DUMP WAGONS RIPPERS TAMPERS SCRAPERS

EUCLID SERVICE



Bottom-Dump Euclids have payload capacities of 13 to 50 cu. yds.—20 to 40-ton payloads . . . top speeds loaded up to 32.8 m.p.h. . . . powered by 150 to 275 h.p. Diesel engines.

Thanks to factory trained personnel in Euclid distributor organizations throughout the world, Euclid users are assured prompt and efficient service.

Engineered specifically for heavy off-the-highway use, "Eucs" are first choice for open pit mining operations, quarries, large construction and industrial jobs. Down-time and maintenance costs are kept at a minimum on these operations by service specialists and readily available supplies of Euclid parts.

EUCLID THE PIONEER

EUCLIDS

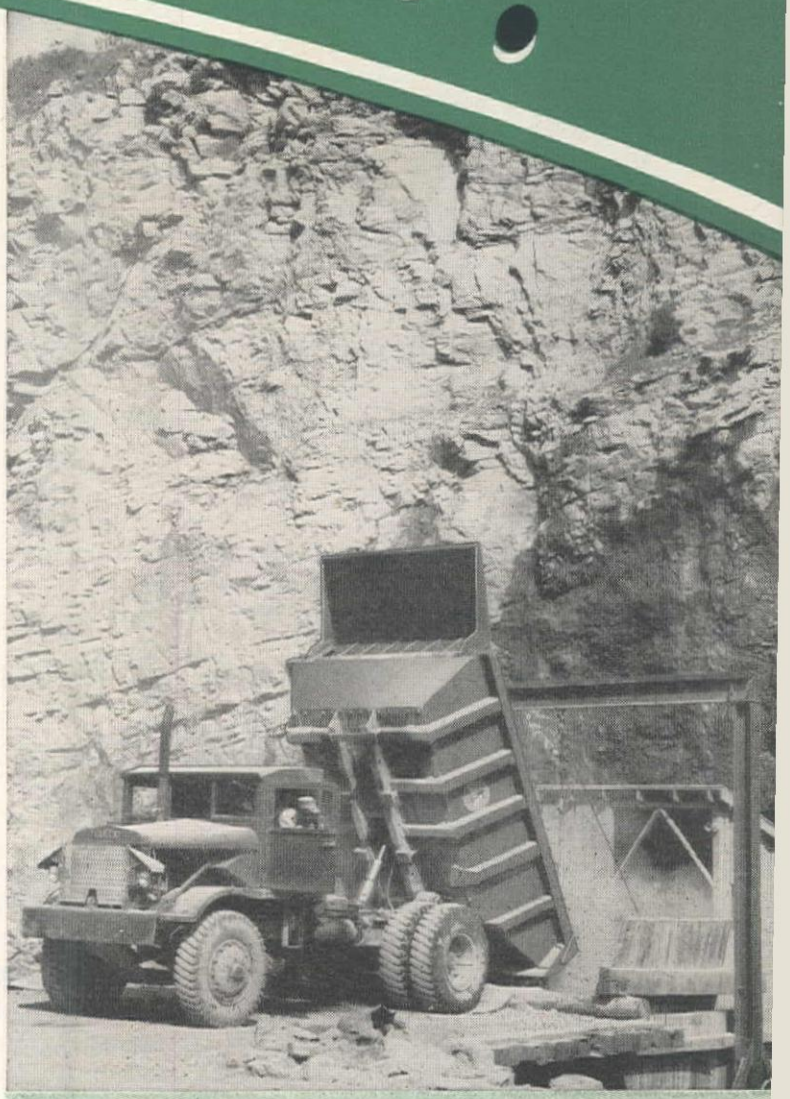
MEANS MORE PROFITS!

Ruggedly built with plenty of power and stamina, Euclids have proved their staying power on the tough jobs. First in performance—First in service...a Euclid combination that adds up to customer satisfaction.

Euclids move more payloads at less cost. Specially trained service experts are in readiness to provide service to owners when and where it is needed.

Your Euclid Distributor or Representative will be glad to go over your job requirements and show you how dependable performance day in and day out, plus speedy on-the-job service, keeps Euclids rolling and job profits up.

The EUCLID ROAD MACHINERY Co.
Cleveland 17, Ohio



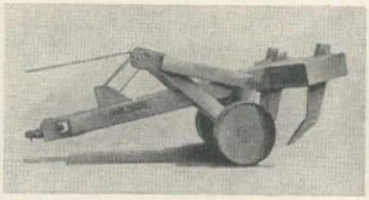
Rear-Dump Euclids, of 15 to 30-ton payload capacities, have body designs for low-cost hauling of all types of materials . . . wide range of travel speeds up to 35.4 m.p.h. . . . powered by Diesel engines up to 275 h.p. rating.

Move the Earth

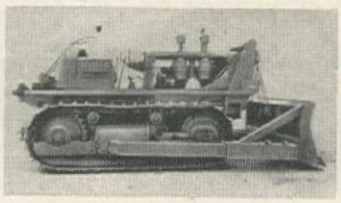
TERRA COBRAS PAY OFF ON 4500-FOOT HAUL!

Two Model TC-S14 Wooldridge Terra Cobras on Route 22 near Pittsburgh, Pa., where cut and fill operations required moving 800,000 cu. yds.

SCRAPERS: Boiling Bowl and Terra Clipper Scrapers from 7.5 to 27.5 cu. yd. heaped capacities.



RIPPERS: Three models: for extra heavy, standard, or light duty.



BULLDOZERS and Trailbuilders for all standard makes of tractors.

POWER CONTROL UNITS: Two-drum winches for use with all standard tractors.

On long or short hauls, Terra Cobra's quick loading, high haul speeds, and fast spreading or dumping pay off in higher profits. These powerful 200 hp Wooldridge self-propelled earthmovers have proved their ability to handle greater yardage at lower cost per yard. "Easy on the operator," states the shift boss. That means more profit, too, with less slow-downs from operator fatigue. Due to positive two-wheel steering, powerful rear-wheel brakes, and many other proved Wooldridge features, higher speed operation is maintained throughout each shift with maximum safety.

Before you figure that next job, contact your nearest Wooldridge Distributor for complete details on the Terra Cobra. Prompt delivery is assured by placing your orders early.

WOOLDRIDGE MANUFACTURING CO.
Sunnyvale, California, U.S.A.

EARTH-MOVING EQUIPMENT

WOOLDRIDGE

PROVED AND APPROVED FOR EVERY TYPE OF EARTH-MOVING JOB

Limestone quarry of the Ralph Rogers Company, Franklin, Tenn. Drilling equipment comprises 2 wagon drills, 2 pneumatic hammers, and one 500 cu. ft. compressor.

Why this large paving contractor uses TIMKEN® *Rock Bits*

The Ralph Rogers Company of Franklin, Tenn., operates a limestone quarry in connection with the production of asphalt aggregate.

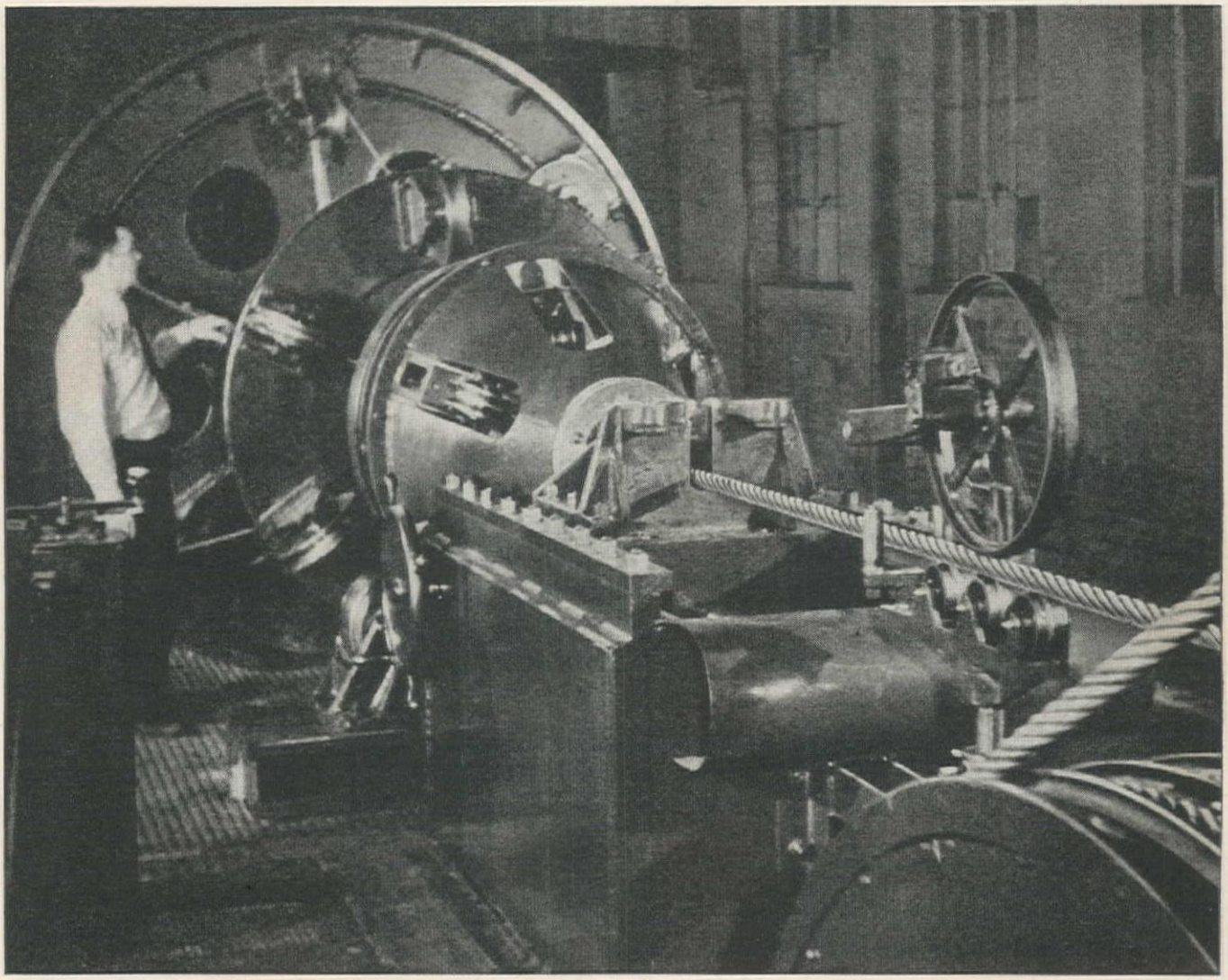
Rock drilling at this quarry is a 100% Timken rock bit operation because the quarry operator has found Timken rock bits superior in performance and more economical in use than the bits previously used.

Furthermore, by preventing the steel from bottoming in the bit, the Timken one piece, solid steel shoulder construction has eliminated drill steel breakage that previously was a source of delay and expense.

No matter where you are, there's a Timken rock bit distributor within telephone call. Conversion and reconditioning shops also are conveniently located for quick service. Put Timken rock bits to work now; cut drilling costs, increase production.

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
ROCK BITS

THE TIMKEN ROLLER BEARING COMPANY
CANTON 6, OHIO · CABLE ADDRESS "TIMROSCO"



Closing machine in Bethlehem Rope Plant. As the body of the machine rotates, the strands are laid into position in the finished rope.

Your Money's Worth

Bethlehem's aim is to produce the most serviceable wire rope in the business . . . to give you a dollar's worth for every dollar you spend.

Obviously, the true cost of a wire rope is not the price per foot, but the cost per unit of work it does for you. With this in mind, we invite you to stack Bethlehem rope against any competitive lines of your choice. The performance of ropes used on most kinds of construction equipment can be checked quite accurately. Where our product is involved, we welcome such comparisons.

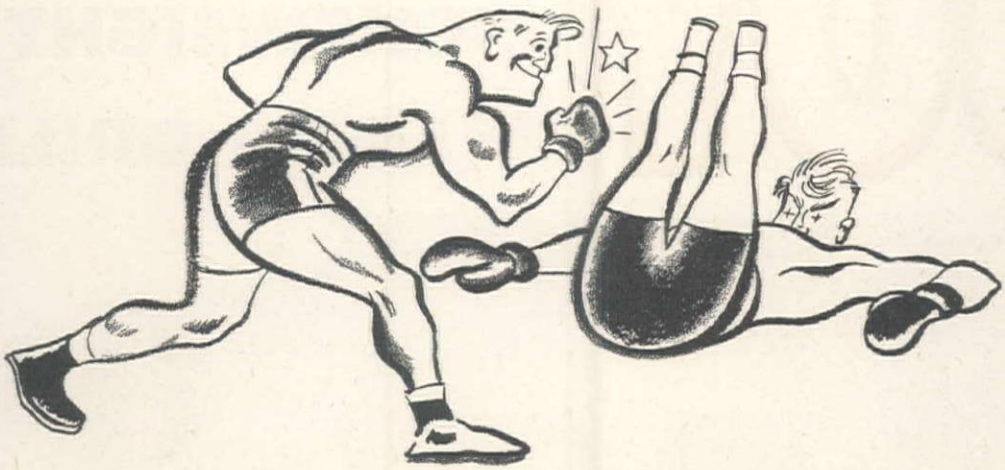
Your Bethlehem Wire Rope distributor will gladly recommend the size, grade, and construction of rope that will give maximum service on your particular job. See him today.

BETHLEHEM PACIFIC COAST STEEL CORPORATION

Sales Offices: San Francisco, Los Angeles, Portland, Seattle, Honolulu

BETHLEHEM PACIFIC

The One-Two Punch Does It!



You Can Depend On

ROCKMASTER

To Knock Down Blasting Costs!

It's a fact that labor and blasting supplies cost more! But *over-all* costs in quarries, mines, stripping operations, and construction jobs are being knocked down through the use of the ROCKMASTER Blasting System!

One quarry with a tough blasting problem used 100 pounds of dynamite daily *for secondary blasting alone* to produce four thousand tons of rock. Then they turned to ROCKMASTER. Today they maintain their production using only eight to ten pounds of dynamite per day. They do less drilling . . . waste less labor . . . cut secondary shooting by 90%. *That all adds up to real savings!*

When Atlas pioneered ROCKMASTER it introduced a new concept of blasting. ROCKMASTER is a blasting *system* based on the right explosive and method of loading . . . the proper spacing of holes . . . the selection of the right milli-second delays—all based on the kind of rock being blasted.

Ask your Atlas representative about ROCKMASTER's famous one-two punch! He'll be glad to show you how ROCKMASTER can help *you* duplicate the experience of the quarry mentioned here.

"ROCKMASTER"—Trade Mark
Manasite: Reg. U. S. Pat. Off.

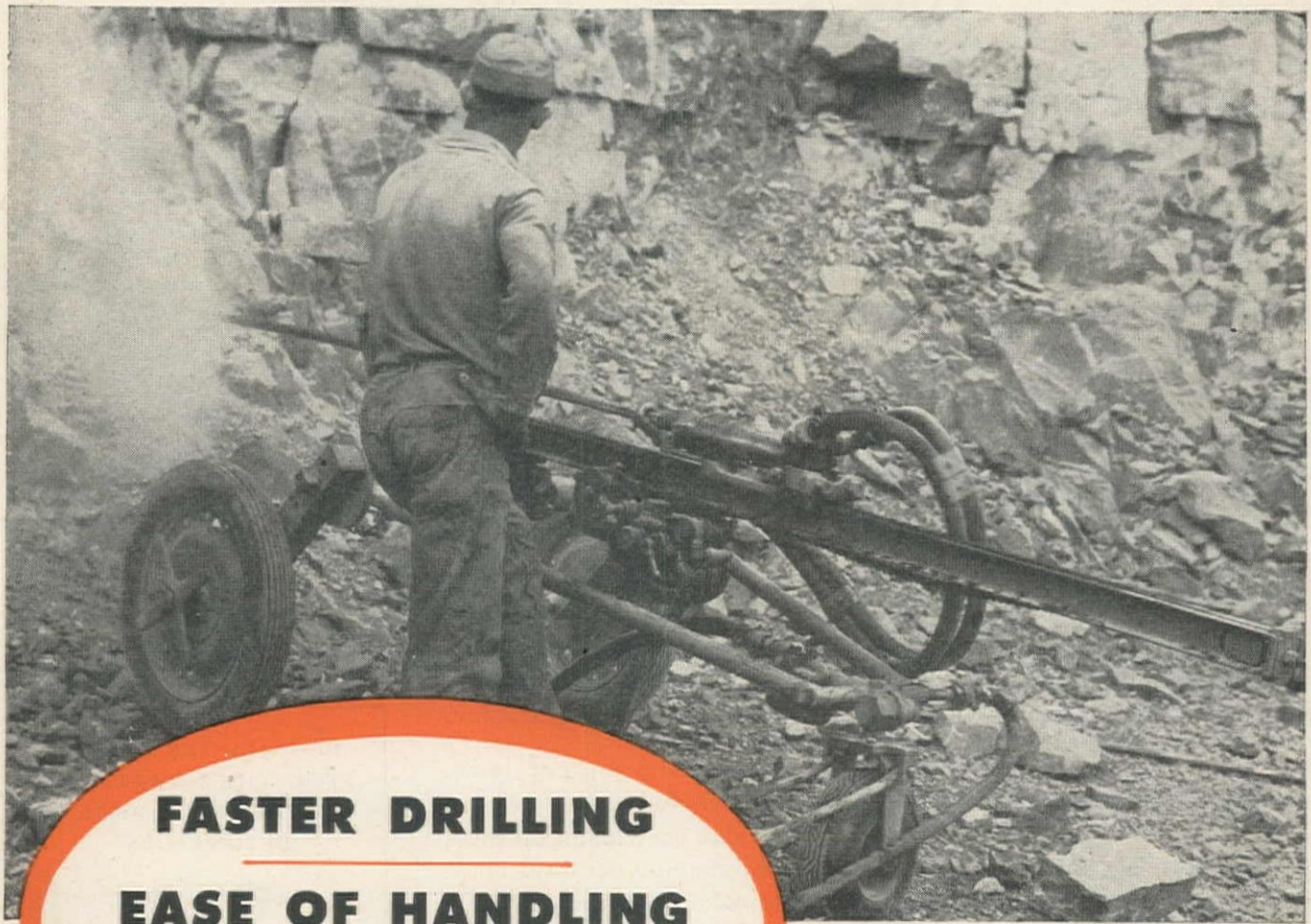
Offices in Principal Cities

ATLAS EXPLOSIVES
"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

SAN FRANCISCO 4, CAL. ATLAS POWDER COMPANY SEATTLE 1, WASH.

JOY ONE-MAN LIGHTWEIGHT WAGON DRILL



FASTER DRILLING

EASE OF HANDLING

LOW MAINTENANCE

You'll get *more hole* per shift, at lower costs, with the *exclusive* "drill and blow" feature of the JOY Lightweight Wagon Drill. And it's really lightweight—only 750 lbs.—easily operated by one man. Mounts JOY 55 or 65-pound sinkers, and 3" or 3½" drifters, as needed . . . requires no spikes due to the positive locked brakes. JOY pioneered the Lightweight eight years ago—more than 500 now in operation. It can save you time and money—*write for bulletin.*

Above, *drilling toe-holes—no need to stop drilling to blow. Piston speed and blow automatically adjusted to give fast, consistent and economical drilling in every kind of formation—especially in overburden, clay seams and other material that varies from hard to soft.*

W&D C 2011

Consult a Joy Engineer

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

FAST, ACCURATE DITCHING

SMOOTH, SPEEDY SPREADING

ADAMS MOTOR GRADERS

work faster...do more work per day

SWIFT, THOROUGH OIL MIX

HIGH-SPEED MAINTENANCE

LOCAL Adams DEALERS

Adams 8 overlapping forward speeds provide the *right working speed* for accomplishing each grading operation *at the fastest practical rate* . . . important on sustained-speed work as shown above. And you get fast job-to-job transport speeds—up to 25 mph. Other Adams advantages include rugged power—rigid construction—balanced weight distribution—precision mechanical controls. See your local Adams Motor Grader dealer.

J. D. ADAMS MANUFACTURING CO. • INDIANAPOLIS, INDIANA

J. D. ADAMS MFG. CO.
Western Factory Branch
San Francisco, California
Adams Distributors at: Oakland, Los Angeles, Sacramento, Redding, Riverside, San Jose, Fresno, Stockton, Salinas, Santa Rosa, Modesto, Visalia, Merced, Bakersfield, Santa Maria and San Diego, Calif.

THE O. S. STAPLEY CO.
Phoenix, Arizona

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INTERMOUNTAIN EQUIPMENT CO.
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NEVADA EQUIPMENT SERVICE
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Portland, Ore., Seattle, Wash.

THE LANG CO. INC.
Salt Lake City, Utah

GLENN CARRINGTON & CO.
Fairbanks, Alaska

Barber-Greene

the best roads need not cost the most . . .

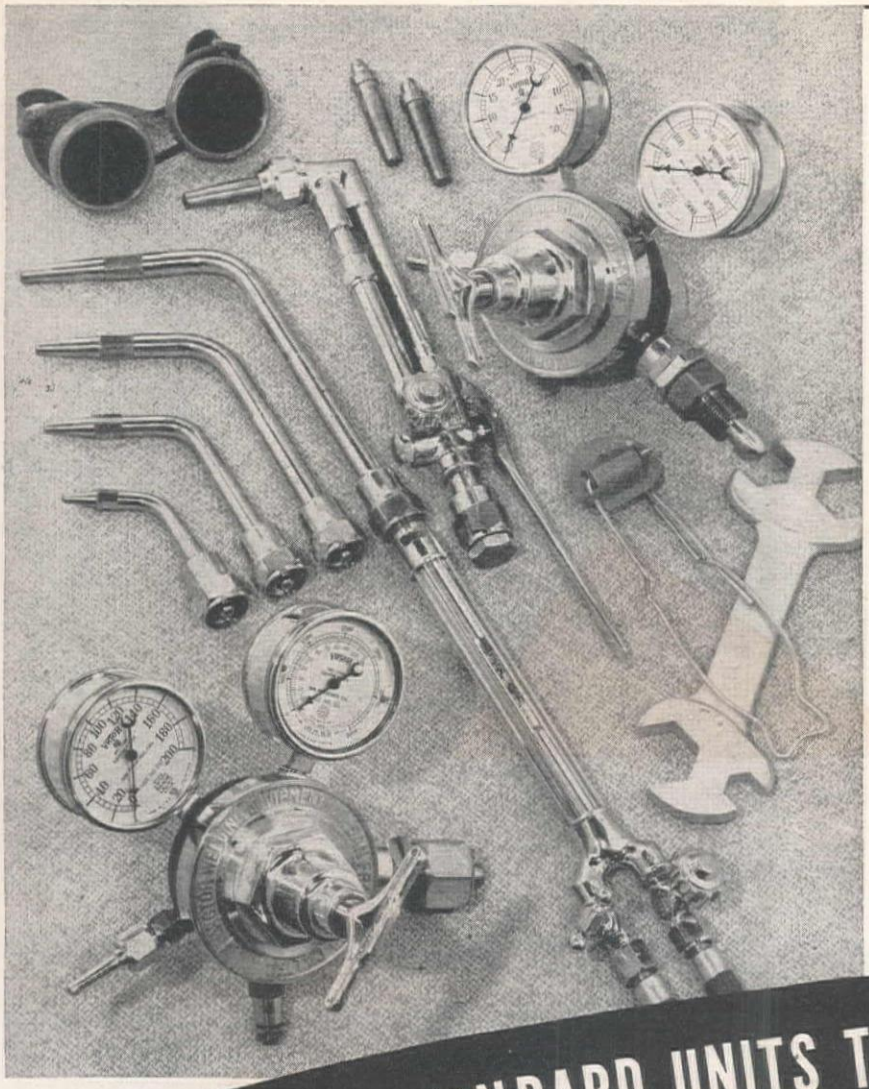
When it comes to a choice of road-surfacing methods, the Barber-Greene Travel Plant offers distinct cost-saving advantages. It produces a properly proportioned asphalt mix—*the correct amount of bitumen for every cubic yard of aggregate—plus thorough mixing.* And you pay no premium for this performance—for volumetric measurement and controlled, twin pugmill mixing are standard Barber-Greene Travel Plant features.

Travel Plant work is a speedy one-pass operation. The aggregate windrow is picked up and continuously discharged as a ready-to-spread mix. Traffic can be maintained during the mixing process.

The B-G Mixer can be used separately in central plant set-ups; and the B-G Bucket Loader can be used independently in cost-saving loading and light excavating jobs. Write for full information.

FOR SALE BY:

BROWN-BEVIS EQUIPMENT CO., Los Angeles 11, California; COLUMBIA EQUIPMENT CO., Spokane, Washington, Seattle, Washington, Boise, Idaho, Portland 14, Oregon; WILSON EQUIPMENT & SUPPLY CO., Cheyenne, Wyoming, Casper, Wyoming; CONTRACTORS EQUIPMENT & SUPPLY CO., Albuquerque, New Mexico; RAY CORSON MACHINERY CO., Denver 9, Colorado; JENISON MACHINERY CO., San Francisco 7, California; WESTERN CONSTRUCTION EQUIPMENT CO., Billings, Montana, Missoula, Montana; KIMBALL EQUIPMENT COMPANY, Salt Lake City 10, Utah; STATE TRACTOR & EQUIPMENT CO., Phoenix, Arizona.



VICTOR

REGULATORS for
- acetylene
- carbon dioxide
- compressed air
- hydrogen
- liquid pet. gases
- medical gases
- oxygen

TORCHES for
- air gas
- brazing
- bunsen burner
- descaling
- flame cutting
- flame hardening
- hand cutting
- heating
- lead burning
- machine cutting
- preheating
- soldering
- surface hardening
- welding

USE VICTOR STANDARD UNITS TO CUSTOM-BUILD Your Welding and Cutting Outfit

CYLINDER MANIFOLDS for
- all types of
- cylinder gases

CYLINDER TRUCKS

EMERGENCY FLAME CUTTING OUTFITS

WRITE us now for descriptive literature and name of nearest distributor.

Assembling your welding and cutting outfit is simple and low-cost if you start with one of VICTOR's basic units, such as the WC-1 shown here. WC-1 handles all ordinary welding jobs and cuts metal up to 10″ thick. For flame cutting, descaling, multi-flame heating or other special work, you add just the VICTOR tips, nozzles, or attachments which your job requires.

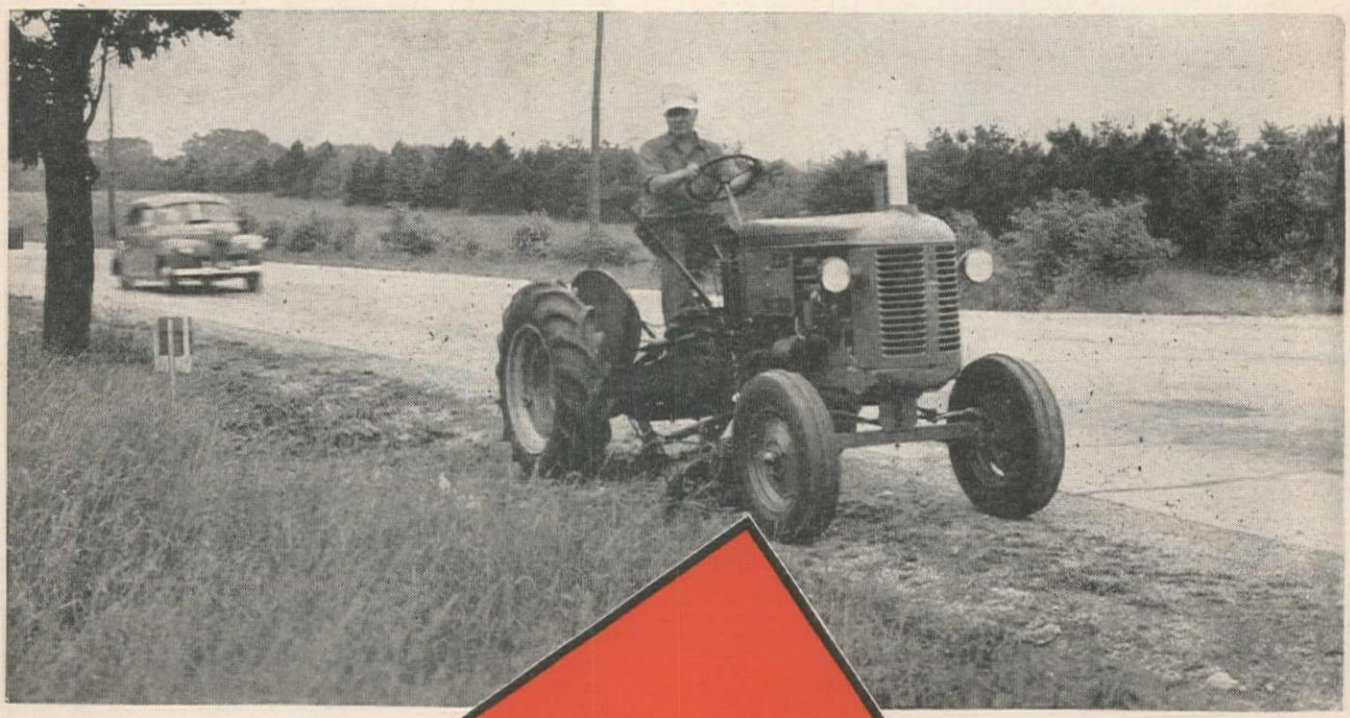
VICTOR makes welding and cutting equipment for all types of work, from fine jewelry manufacture, to cutting armor plate. Ask your nearest VICTOR distributor to help you custom-build the outfit best suited to your needs NOW.

VICTOR
FOR WELDING

For welding and money-saving ideas,
see the VICTOR display
Space 401, Western Metal Congress, Los Angeles, April 11-15

VICTOR EQUIPMENT COMPANY
844 Folsom Street, San Francisco 7, California
3821 Santa Fe Avenue, Los Angeles 11, California
1312 W. Lake Street, Chicago 7, Illinois

There's a Branch or Distributor to serve you in Portland, Spokane, Seattle, Salt Lake City, Casper, Great Falls, Anchorage, Boise, Denver, Tucson, Phoenix, Albuquerque, Oakland, San Diego, Fresno, Ventura, Sacramento.



At left, the eager power of the "VAI" engine drives an earth auger, digs holes for posts, poles or plantings. Several sizes of auger fit many different jobs.

Below, a single "VAI" tractor has just about everything—scarifier to loosen earth, scraper to dig and spread, loader to lift, carry and load. Hydraulic control system makes operation easy, accurate and fast.

Year 'Round MAN SAVERS

Until you see it, you'd hardly believe how much work . . . and how many kinds of work . . . a man can do with a Case "VAI" tractor and the mounted equipment made for it. Built to be used with mounted equipment, the "VAI" is slim-waisted, for side clearance and extra visibility. It has plenty of under-clearance, too—room for mounting and movement of structural members.

Teamed with the Case Highway and Airport Mower, as shown in top scene, the "VAI" brings new ease and speed to mowing amid obstacles. With its hydraulic pump direct-driven from the engine there are "no gears to shift to work the lift." At a touch of the control valve, the cutterbar raises, lowers, or holds at any desired position—regardless of whether the tractor is moving, stopping, or standing.

Model "VAI" is smallest of the four basic sizes of Case industrial tractors, ranging in weight from 2500 to more than 10,000 pounds. All have heavy-duty, Case-built engines.

See your Case Industrial Dealer

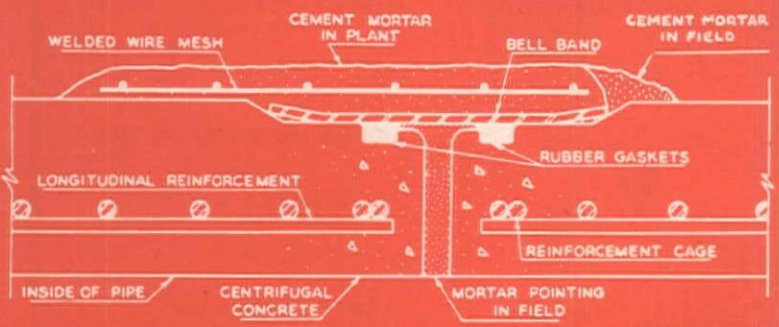
State Tractor & Equipment Co.....Phoenix, Arizona
Brown-Bevis Equipment Co.....Los Angeles, Calif.
Coast Equipment Co.....San Francisco, Calif.
Mitchell's .....Bakersfield, Calif.
Liberty Truck & Parts Co.....Denver, Colo.
Western Equipment Co.....Boise, Idaho, and Spokane, Wash.
Hilton's Inc.....Las Vegas, New Mexico
Nelson Equipment Co.....Portland, Ore. - Seattle, Wash.
Robison Machinery Co.....Salt Lake City, Utah
Wortham Machinery Co.
Cheyenne, Sheridan and Greybull, Wyo. - Billings, Mont.

CASE

5 BASIC REASONS

why this superior pipe helps reduce the cost of delivered water...

CENTRIFUGALLY SPUN REINFORCED CONCRETE PRESSURE PIPE
with double rubber gasket joints



FOR MODERATE OPERATING HEADS

SIZES 12" TO 48" INCLUSIVE
50 FT. TO 150 FT. HEAD
20# TO 65# PRESSURE

SIZES 51" TO 84" INCLUSIVE
50 FT. TO 100 FT. HEAD
20# TO 45# PRESSURE

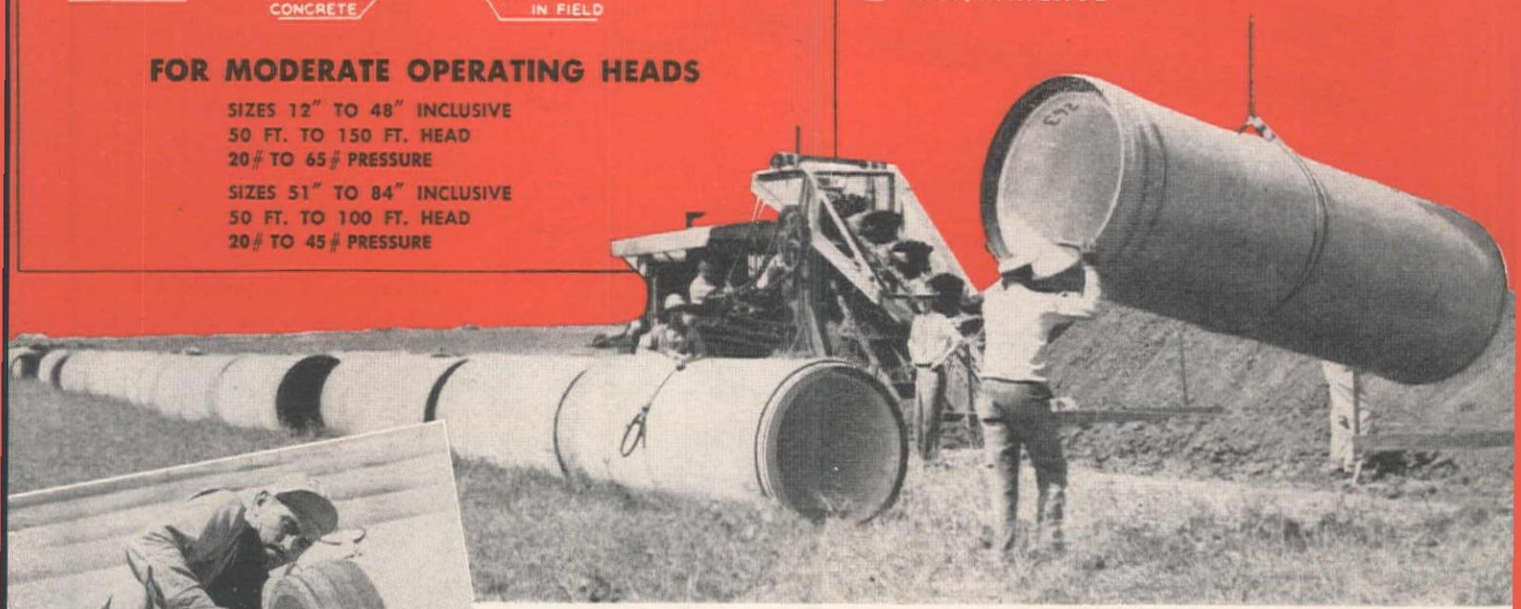
1 *LOW FIRST COST*

2 *EASE OF INSTALLATION*

3 *SUSTAINED MAXIMUM PERFORMANCE*

4 *FREEDOM FROM MAINTENANCE*

5 *PERMANENCE*



The advantages of centrifugally spun reinforced concrete pressure pipe for moderate operating heads (generally under 150') have become well established in this country during the past twenty-five years. High initial and sustained carrying capacity, permanence, and economy are some of the proven characteristics of Hume Centrifugal Concrete Pressure Pipe.

In recent years, development by this company of the Double Rubber Gasket Joint for centrifugally spun pipe has greatly increased its versatility and adaptability. It is proving outstandingly successful in a wide variety of installations throughout the West.

This joint is another example of American's ingenuity and skill in the development of better products for water supply lines. Further information is available upon request.

American
PIPE AND CONSTRUCTION CO.

Concrete Pipe for Main Water Supply Lines, Storm and Sanitary Sewers, Subaqueous Pipe Lines.

P. O. Box 3428, Terminal Annex • Los Angeles 54, California

QUALITY PIPE LINE PRODUCTS MANUFACTURED AND INSTALLED BY AMERICAN INCLUDE HUME CENTRIFUGAL CONCRETE PRESSURE PIPE, AMERICAN CONCRETE CYLINDER PIPE, PRESTRESSED LOCK JOINT CONCRETE CYLINDER PIPE, LOCK JOINT CONCRETE CYLINDER PIPE.
Main Offices and Plant — 4635 Firestone Boulevard, South Gate, California — District Offices and Plants — Oakland — San Diego — Portland, Oregon

Since I got this MICHIGAN, I've been able to handle a lot of the jobs around the country that I had to pass up before. That shovel gets to the job as fast as my trucks, and under its own power. It'll roll through city traffic without any trouble—and I don't have to worry about highway limits. Best of all, it'll pull in and out of any place the trucks can go. Yessir, my MICHIGAN is always ready to go—saves plenty of time too!

I looked 'em all over before I decided on MICHIGAN—and the way it has performed since convinces me that MICHIGAN is 'tops' as a money-maker.

DID YOU KNOW
you can buy
a brand new
MICHIGAN
TRUCK CRANE
complete with chassis
for as little as $10,250
F.O.B. factory?

Write for Bulletin 100, "*On the Job with* MICHIGAN"

MICHIGAN

MICHIGAN POWER SHOVEL COMPANY
430 SECOND STREET, BENTON HARBOR, MICHIGAN, U.S.A.

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WESTERN EQUIPMENT CO.
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WILSON EQUIPMENT CO.
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MICHIGAN SALES & SERVICE CO.
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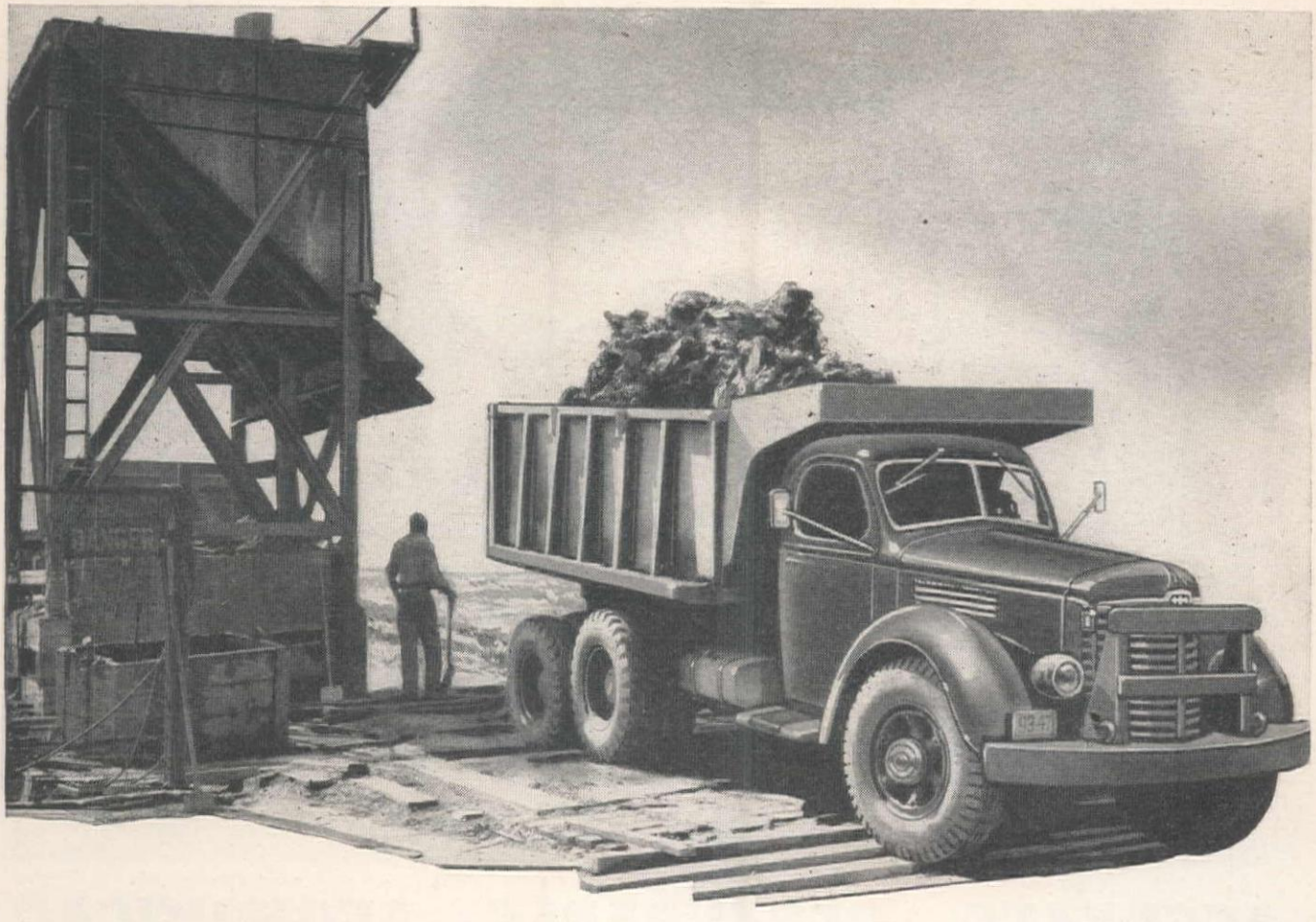


The 14-ton key to the city haul!

WHEN THIS SUBWAY excavation began, one problem was to find trucks that could truck the muck 24 hours a day and set a profitable pace over a route, 128 city blocks long!

These International six-wheelers could—and did! They took the muck, 8 yards at a crack, to a dump 8 miles away. Sure, they did it like they were made for the job. They *were!*

This operation required specialized equipment built for the job. The heavy-duty 6 x 4 International KB-11-F was selected. Reinforced side rails withstand unusual shock stresses of big loads dropping into the bed from elevated loading hoppers. The special power divider with integral auxiliary transmission provides a low creeper gear for pulling out of bad spots and an axle ratio coordinated with the main transmission to provide cruising speeds required to meet the schedule. Because of the heavy loads hauled through heavily congested areas, large-size heavy-duty air brakes were installed to insure safe operation.

That's what International means when it says it builds trucks *specialized* for the job. International offers 22 basic models, with gross weight ratings ranging from 4,400 to 90,000 pounds. And it forms 1,000 different truck combinations from 'em—one for every load, road, and haul.

And International's service facilities are just as complete as the line of trucks it offers. 4,700 International Dealers and 170 company-owned Branches are waiting to wait on you . . . any place . . . any time.

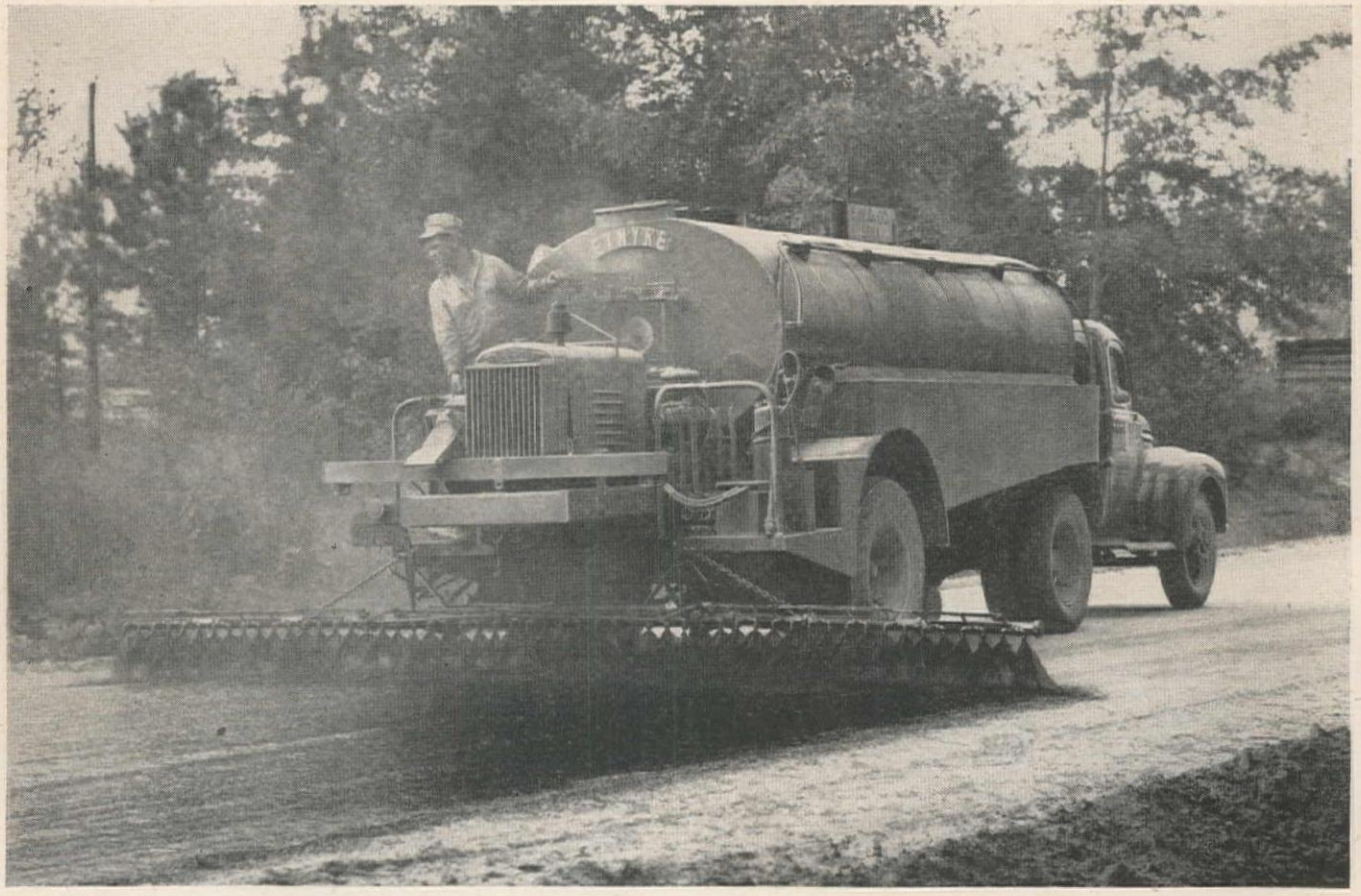
So whether you're working on a subway or a skyscraper, a sewer or a sausage factory, International offers a complete line of trucks specialized to the job. A call to your nearest International Dealer or Branch will put you on the right track to the right truck. Why not put in that call right away!

Other International Harvester Products . . . Industrial Power
Farmall Tractors and Machines . . . Refrigeration

Tune in James Melton and "Harvest of Stars"
CBS, Wednesday evenings

INTERNATIONAL TRUCKS

INTERNATIONAL HARVESTER COMPANY · CHICAGO



ACCURATE...DEPENDABLE...ECONOMICAL

For over 40 years—constant research, faithful attention to engineering detail, quality construction methods and materials—all assure you of efficient, economical operation with an Etnyre "Black-Topper."

Designed and engineered for simplicity, safety, efficiency and economy Etnyre "Black-Toppers" are proving everywhere that they can do the job faster, better and cheaper. Today there are more Etnyre "Black-Topper" Bituminous Distributors in use than any other kind . . . helping build better bituminous roads all over the world at lower cost.

For complete details on prices, specifications and delivery see your Etnyre dealer or write, wire or phone E. D. ETNYRE & CO., Oregon, Illinois.

MORE for your money

- Choice of front or rear engine mounting.
- Pump and circulating system are entirely outside of tank—designed for complete drainage and easy cleaning.
- Non-clogging nozzles on 4" centers, provide triple-lap spray.
- Will apply material from 1/20 to 3 gallons per square yard in any bar length.
- Spray is adjustable in length from 3′ to 24′.
- Positive circulation under pressure; positive start and cut-off of all nozzles—eliminates streaking and "fogging".
- Height of bar adjustable for difficult terrain.

ETNYRE

"Black-Topper"

BITUMINOUS DISTRIBUTORS

SEE YOUR ETNYRE DEALER.....

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Reno, Nevada

R. L. Harrison Co.
Albuquerque, N. Mexico

Howard-Cooper Corp.
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Intermountain Equip. Co.
Boise, Pocatello & Spokane

Kimball Equipment Co.
P. O. Box 1103, Salt Lake City, Utah

Neil B. McGinnis Co.
Phoenix, Arizona

Studer Tractor & Equip. Co.
Casper, Wyoming

The Crook Co.
Los Angeles, California

Colorado Builders' Supply Co.
Denver, Colo.; Scottsbluff, Neb.

Bay Equipment Co.
San Francisco, California

Industrial Equipment Co.
Billings, Montana

Normont Equipment Co.
Great Falls, Montana

STRONGER! TOUGHER! for MORE YARDAGE- Firestone TIRES

WHICH tires move the most yardage . . . stay on the job longest . . . with the least downtime? The answer is Firestone.

Off-the-Highway tires were pioneered by Firestone. They have held leadership ever since only because they are built stronger, they are built tougher, they are built to stand up on the job, and save you money.

Any Firestone Dealer or Firestone Store can prove these facts. He will be glad to show you on your own equipment on any job.

Listen to the Voice of Firestone every Monday evening over NBC

FIRESTONE
OFF-THE-HIGHWAY TIRES

At Last! The 3½ Billion Highway Construction Program Is Well Launched! Are You Ready?

It was a long time in coming, — but today the money is there and it's being spent. Competitive conditions prevail. Awards are going to roadbuilders with the most efficient equipment—and that means Bulk Cement Plants, Aggregate and Cement Batching Plants engineered and built by Butler for your specific work. . . . Have you investigated the new Butler Autobatch Twinbin so vital in solving the problem of irregular cement deliveries? Do you know about the most recent advances in other Butler equipment and in Butler Engineered Design? . . . Either or both of the Bulletins listed below will bring you up to date. Send in your request — today. . . .

Autobatch Twinbin Bulletin

Roadbuilders' Batching Plant Bulletin . . . (Aggregate-Cement)

BUTLER BIN COMPANY

WAUKESHA, WISCONSIN

No Idle Hours for This Worker!

Widening and deepening a Texas bayou, this Bucyrus-Erie 200-W walking dragline excavated 1,225,000 yards of sandy loam — almost half of it dug under water. Despite numerous moves and soft footing, the 200-W compiled a consistently high daily output average — the kind of record that is familiar to 200-W owners everywhere. They know from experience that its strong, simple construction means dependable performance with minimum time out for maintenance when far from service facilities. They know, too, that the 200-W's fast cycle, great operating range, exceptional stability and maneuverability enable it to deliver the consistently high output they need. Proper weight distribution, smooth walking mechanism and easy control all contribute to outstanding production records wherever this versatile walker goes to work. Boom lengths on larger machines up to 250 feet; bucket capacities to 25 cubic yards.

BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN

32M49

More Than 250,000 HOMELITE UNITS

Pumps · Generators · Chain Saws · Blowers · Paving Breakers

Are on the Job *Everywhere*

HOMELITE PUMPS

Everywhere . . . even in the most remote places . . . wherever water has to be pumped out fast *and with the least trouble* you'll find Homelite Carryable Gasoline-Engine-Driven Pumps in action.

HOMELITE GENERATORS

For operating electric tools . . . both high-cycle and standard 110 volt . . . and for operating floodlights, Homelite Carryable Gasoline-Engine-Driven Generators are the ever-ready, ever-dependable favorites everywhere.

HOMELITE CHAIN SAWS

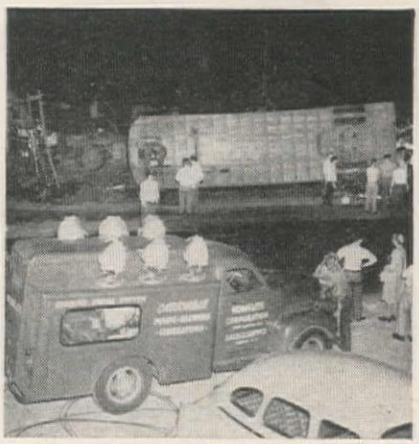
Lightweight, compact, safe and easy to handle, these one-man, high-cycle electric chain saws have super-fast cutting power and are rugged and dependable for all types of cutting on both tree work and construction jobs.

HOMELITE PAVING BREAKERS

More and more the new 84-lb. Homelite *Electric* Paving Breaker is being enthusiastically received by those who want a fast, efficient breaker that is compact and easy to move.

HOMELITE BLOWERS

Where ejecting smoke or supplying fresh air is a must for safety and efficiency, Homelite Carryable Gasoline-Engine-Driven Blowers are constantly on the job.



HOMELITE SERVICE

In all parts of the country Homelite representatives are ready to demonstrate the advantages of Homelite units and to service most efficiently all Homelite equipment.

Homelite Corporation

1303 RIVERDALE AVENUE, PORT CHESTER, NEW YORK

Manufacturers of

Homelite Carryable Pumps • Generators • Blowers • Chain Saws • Paving Breakers

See how Homelite Equipment can save time, trouble and money for you. Send for descriptive bulletins on any or all of the equipment shown above.

LA PLANT-CHOATE MOTOR SCRAPERS

GOOD BEFORE —BETTER NOW

Getting a 17½-yard heaped load in a hurry is standard practice for the improved LPC Motor Scraper with its curved bowl bottom and offset cutting edge.

Improved

FOR INCREASED PRODUCTION and Lower Operating and Maintenance Costs

Now you can have an even better LPC Motor Scraper, improved at every point so you can be sure it will stay on the job continually—complete your job on schedule—and assure good profits!

Increase production and profits—with the new transmission, you can use *all* of the 225 H.P. to handle capacity loads, at top speeds, up and down grades, even in tough operating conditions. Figure the added profit at your own bid prices of one additional load per hour over 10,000 hours of operation. The new 32-amp. generator provides all the "juice" needed for 'round the clock operation. Bigger air compressor for greater air output and more intermittent compressor operation. Improved cable control unit and controls save valuable seconds — give accurate spreading control.

24:00 x 29 24-ply traction-type tires—interchangeable front and rear. 21:00 x 29 also available.

Add these and other new and improved features to the original proven high production features and you'll see why LaPlant-Choate Motor Scrapers give you the lowest possible cost per yard—per hour—per day for the long life of the unit.

Ask your nearest LPC distributor to show you a Motor Scraper in operation and for the complete details of all the improvements which mean more profitable earthmoving for you. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa—1022 77th Ave., Oakland, Calif.

A Few of the New Features That Cut Down Time and Increase Hourly Earnings

- NEW Heavy Duty Constant Mesh Transmission
- NEW 32-amp. Generator
- NEW 12 cu. ft. Piston Type Compressor
- NEW and Improved CCU and Controls
- NEW Water Pump and NEW Cast-Type Radiator for More Efficient Cooling
- NEW Simplified Starting System—Dash Controlled

PLUS All These Original High Production Features

- Big Capacity—17½ yards heaped
- Big Power—225 H.P. Diesel—16 H.P. per struck yard capacity
- Big Brakes—22" x 7" 4-wheel—air
- Positive Hydraulic Steering—Double Acting
- High Speed—up to 19.25 m.p.h.
- Easy Loading—curved bowl bottom —offset cutting edges. Positive Forced Ejection plus high apron lift

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HEINER EQUIPMENT & SUPPLY CO.
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Salt Lake City, Utah

N. C. RIBBLE CO.
1304 N. Fourth Street
Albuquerque, New Mexico

ENGINEERING SALES SERVICE, INC.
410 Capitol Blvd.
Boise, Idaho

LAPLANT CHOATE

The Editor's Mail . . .

Totalitarianism Threatens

Editor, Western Construction News

As to my present position on the proposed Columbia Valley Authority, I wish to say I have not made final commitment on the issue and do not intend to do so until the adminstration submits to Congress a specific bill carrying out President Truman's recommendations and until hearings on pros and cons of the bill have been heard and I am satisfied that I have heard thorough analysis in support of any legislative proposal relating to it. There is no doubt about the fact that there is need for a coordinated program in handling of Columbia River Basin problems, but the burden of proof is on proponents of a C.V.A. program modeled on the basis of the Tennessee Valley Authority to show that such a program is the way the matter can be handled best.

Regards,

HON. WAYNE MORSE
United States Senator from Oregon

Telegram
Washington, D. C.

Editor, Western Construction News

I have just read your editorial appearing in the February 15th issue of *Western Construction News* entitled "Totalitarianism Threatens the West."

It seems to me that the basic issue facing this country is Federal versus State and local control; and in the West in particular, if not in other sections of the country, this question assumes the greatest importance perhaps in the field of water conservation, control, and utilization. Incidentally, if the western states go all out for a revision of the Reclamation laws that would give unlimited authority to the Secretary of the Interior to authorize projects and destroy any semblance of repayment standards in existing Reclamation law, as proposed in pending legislation, such as H.R. 1770, it seems to me that they must be prepared to accept predominant if not complete Federal control of water resources and developments.

Very truly yours,

RAYMOND MATTHEWS
Chief Engineer,
Colorado River Board of California

Los Angeles, Calif.

Editor, Western Construction News

Having acquired most of my editorial experience in the days of "crusading" newspapers, I admire greatly the editor who has the courage of his convictions and "speaks his mind."

Because the lead editorial in *Western Construction News* for February reflects that type of journalism, I offer congratulations to the writer.

It is not so much that I approve the views expressed, which I do, as the manner of expression.

Yours truly,

ROY H. COMPTON

Los Angeles, Calif.

Editor, Western Construction News

Congratulations on your Editorial in the current issue of W.C.N. Where is this Totalitarianism going to end? As long as the Administration totally disregards the expressed wishes of the West's best engineering and agricultural thinkers you may be butting your head against a stone wall, but I hope you will get more satisfaction in losing your brains that way, than by losing them from disuse.

(Continued on page 50)

Here's what CONTRACTORS say about this VERSATILE NEW MACHINE

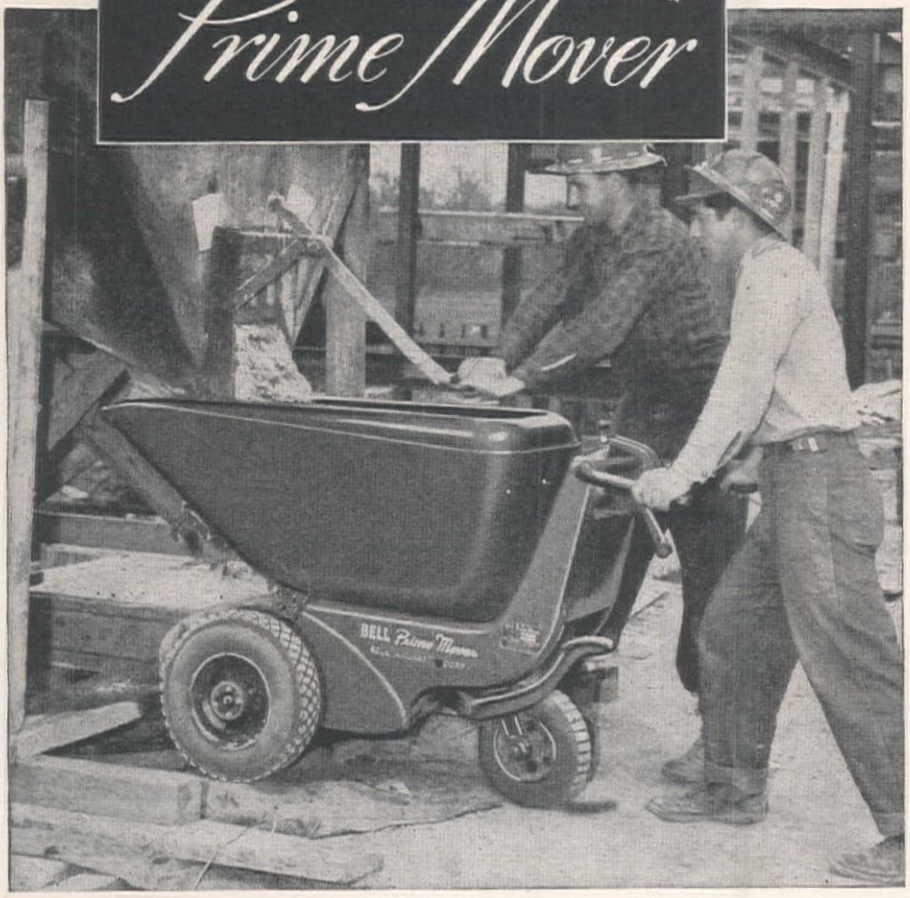
From Seattle, Wash.—"We let your distributor demonstrate two machines on a concrete pouring job. Inside of a half an hour we pushed aside our six concrete buggies and finished the job with the two Prime Movers. In 7½ hours we poured 160 yards of concrete with only two men."

From Yarmouth, Maine—"We estimate that our Prime Mover saves two to three men per day on an operation previously requiring nine men. For example, two men now unload a 632-bag cement car in three hours and ten minutes. It used to take four men six hours."

From Bastrop, La.—"We save 48 man-hours a day hauling concrete, brick, tile, and other construction materials."

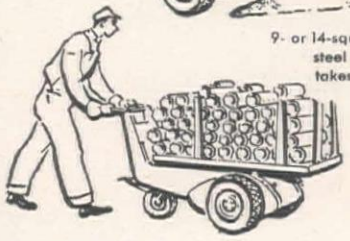
From Traverse City, Mich.—"We save 16 man-hours daily by using a Prime Mover to place concrete on grade. We also use it for transporting lumber and bagged cement over short distances."

The BELL Prime Mover*

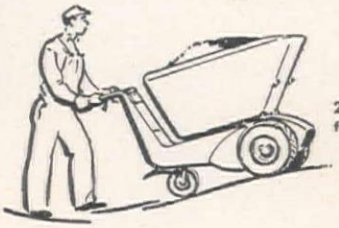


Bucket holds 10 cubic feet . . . 18 with sideboards

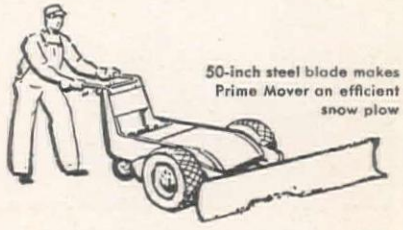
Mechanically dumped . . . operates by foot pedal



9- or 14-square-foot steel platform takes half-ton loads



Climbs 20% grades fully loaded



50-inch steel blade makes Prime Mover an efficient snow plow

● From every corner of the country we've had reports like these from contractors and builders interested in cutting costs. Some have reported savings as high as $36.00 a day. A machine that can accomplish savings like these is worth thinking about . . . and *doing something* about. A 15-minute demonstration will show you more than we can tell you. Phone or wire for the name of a nearby distributor. For literature, just sign the coupon and attach it to your letterhead.

FEATURES:

- gear-driven... no belts or chains
- fully enclosed engine protected against dirt and moisture
- clutch, engine, transmission all run in oil
- switch from bucket to platform without tools . . . in less than a minute
- turns in its own length (63½"), width 31½"
- 3-gallon tankful of fuel gives 8 hours continuous service

A PRODUCT OF

BELL *Aircraft* CORPORATION

SEND COUPON NOW

BELL AIRCRAFT CORPORATION,
Post Office Box 1WC3, Buffalo 5, New York

Please send me full facts about the *Bell Prime Mover*. Who is the nearest distributor?

Name..... *Company*.....

Address.....

City, Zone, and State.....

*Patents & T. M. Reg. Pending

The Editor's Mail...

(Continued from page 48)

This matter of a socialized economy uses some very subtle methods; to cite just one small example, Karl O. Kohler, Jr.'s article, "Need Water?" in the current W.C.N. is full of it. What he has to say in behalf of better irrigation practices for soil and water conservation is excellent but using Federally (S.C.S.) dominated Soil Conservation Districts to attain the end is a very definite step toward socialized agriculture. As I see it the Soil Conservation District as such serves no useful purpose other than to let the Federal Government a little deeper into the farmer's business.

More power to you,

WALTER W. WEIR
Drainage Engineer,
University of California
Agricultural Experiment Station

Berkeley, Calif.

Bring "Reber Plan" to Light

Editor, Western Construction News

I liked your article on "Good Report Half Done" in the January issue so well, that on the strength of this I would like to have you renew my subscription for another year.

I had been undecided until reading your editorial in this issue as to whether or not I would renew, as although W.C.N. is a wonderful construction magazine, very little is given over to pipe jobs, steam fitting, pipe line work, and general pipe fitting, which is my particular field. I have heard this topic discussed among subscribers in this field. I wonder if we couldn't get a little better coverage?

I'm not griping, I'm just asking!

I certainly wish we could bring the "Reber Plan" to light to more so-called little people. I think there would be such a clamor for it that the proposed "outmoded before it's built bridge" would never be built.

Thank you again for your splendid editorial. Keep up the good work.

CARL H. FRANCEE

Berkeley, Calif.

Modesty

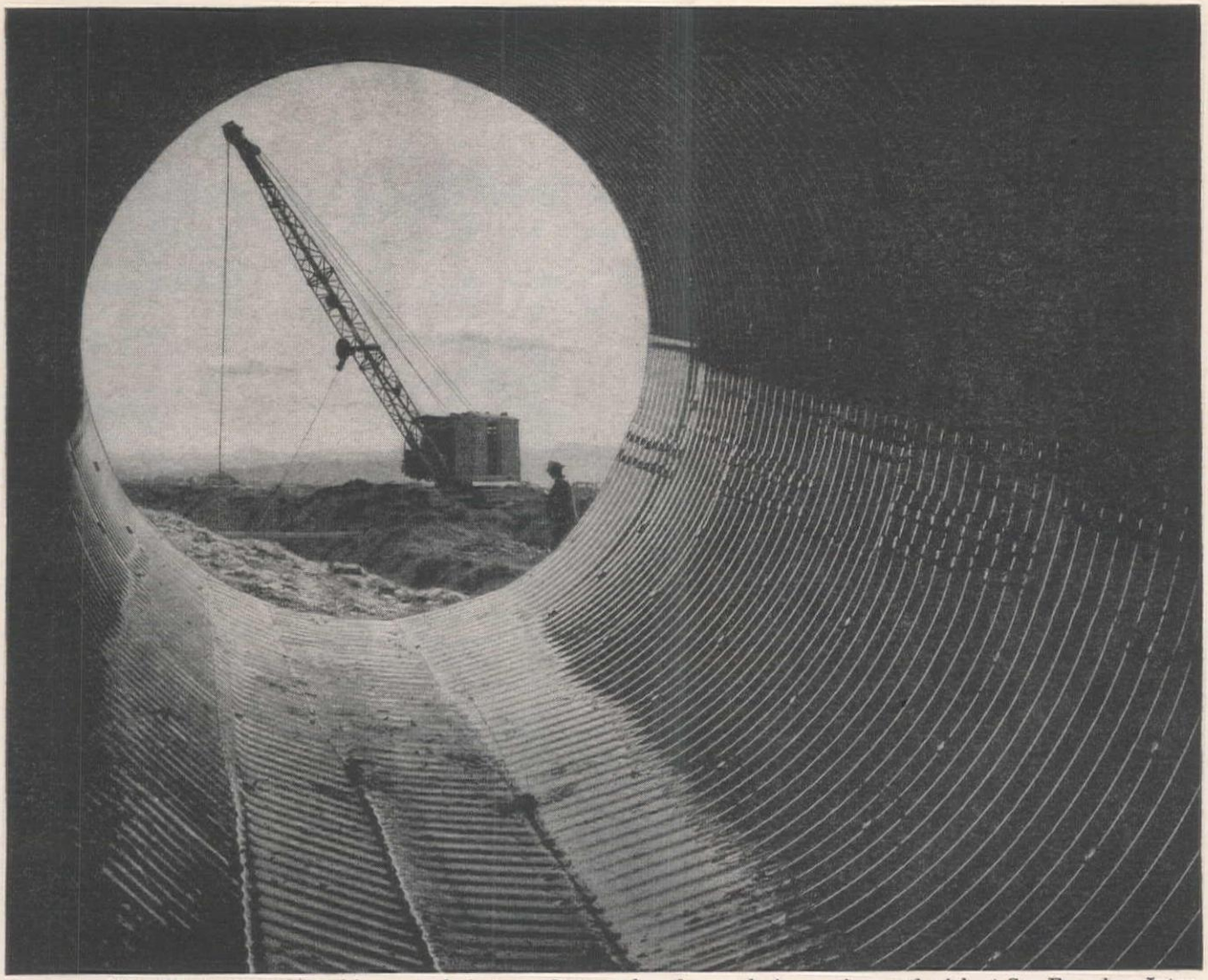
Editor, Western Construction News

Many thanks for the tear sheet covering the article about me in your February issue, and prepared by Mr. Larson. I wish I were as good an officer and engineer as he alleges.

Sincerely,

THERON D. WEAVER
Colonel, Corps of Engineers
Division Engineer,
North Pacific Division

Portland, Oregon



Picture of the West at work... this unusual photograph was taken from a drainage pipe on the job at San Francisco International Airport. The pipe is of U·S·S corrugated steel. Sections are 20′ long with 48″ diameters.

Steel is building the West—for Today—for the Future

Draining water from an airfield that's practically at sea level is a big job. At San Francisco's gigantic airport, more than 5,000 acres will be drained with some 100,000 feet of pipe... most of it of concrete reinforced with U·S·S steel rods. The pipe above is the steel "lip" that takes the water from the concrete lengths and empties it into the Bay. It is made of galvanized, corrugated, copper-steel culvert sheets.

Drainage jobs and office buildings... small homes and giant bridges... all over the West you'll see the signs of steel at work. It's adding its strength and speed of fabrication to the job of building the West fast and building it to stay built.

Columbia, as Western producing member of United States Steel, combines its own modern—and expanding—facilities with those of others in the U·S·S family to supply the West with everything in steel. For information on any product of the great mills of United States Steel, contact your nearest Columbia Steel Company office.

Only STEEL can give you all 7 of these structural advantages: Extra toughness and shock resistance • Incombustibility • High strength-weight ratio • Highest modulus of elasticity • Versatility of application • Great durability • Ultimate economy

Help boost steel production—TURN IN YOUR SCRAP

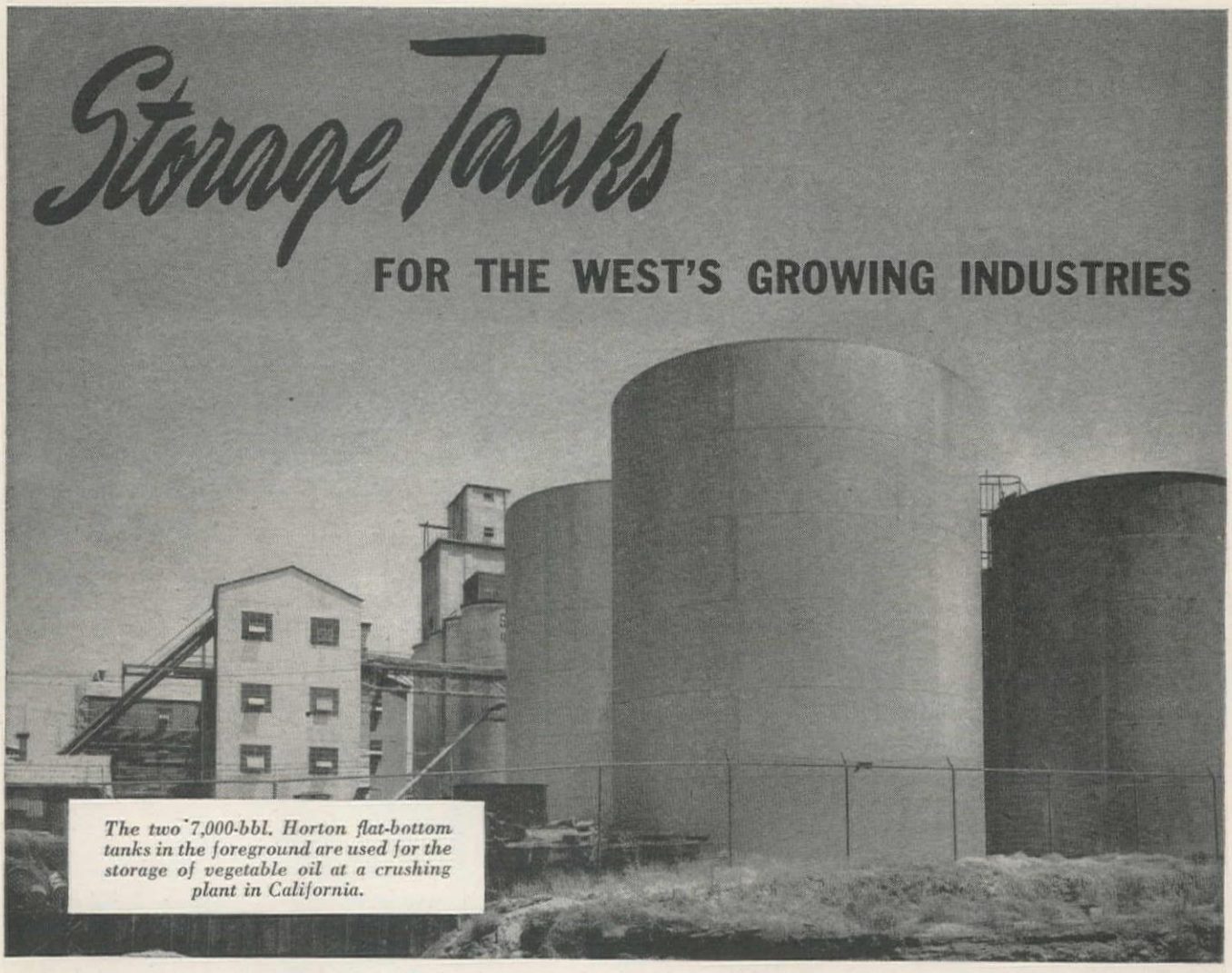
Columbia Steel Company

San Francisco Los Angeles Portland Seattle Salt Lake City

UNITED STATES STEEL

Storage Tanks

FOR THE WEST'S GROWING INDUSTRIES



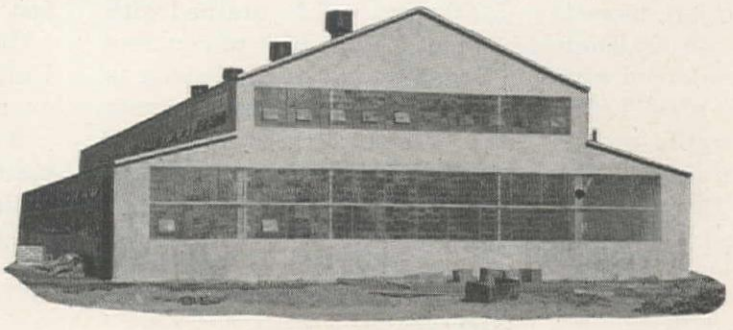
The two 7,000-bbl. Horton flat-bottom tanks in the foreground are used for the storage of vegetable oil at a crushing plant in California.

HORTON flat-bottom steel storage tanks; elevated water tanks; cylindrical, spherical and spheriodal pressure containers—these are a few of the types of steel plate structures we are erecting for expanding West Coast industries and cities. The tanks shown above, for example, are flat-bottom units—a type of storage used in many industries. Here they are storing vegetable oil at a crushing plant in California. Other examples are the tanks used by the oil industry to provide safe and economical facilities for handling of volatile petroleum products.

We will be glad to cooperate with you in planning, fabricating and erecting any type of welded steel storage units you need. Our nearest office can give you full details.

SALT LAKE CITY PLANT
Doubled In Size

Our new plant at Salt Lake City has been fabricating field-erected storage tanks for almost a year. A second shop unit, now under construction, will enable us to build our complete line of steel plate structures.



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Chicago 4.....McCormick Building	Los Angeles 14..1544 General Petroleum Building	Seattle 1.....1355 Stuart Building
Cleveland 15.....Guildhall Building	New York 6.....165 Broadway Building	Tulsa 3.....Hunt Building

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY, and GREENVILLE, PA. *In Canada*—HORTON STEEL WORKS, LIMITED, FORT ERIE, ONT.

WESTERN CONSTRUCTION NEWS
WITH WHICH IS CONSOLIDATED WESTERN HIGHWAYS BUILDER
March 15, 1949 Vol. 24, No. 3

Washington Loses to the Fish!

WESTERN CONSTRUCTION NEWS would be the very last to deny the people of the nation or of any state the right to make their own laws or tailor their future to their own measure. Likewise, it has always been our belief that in the long run, the people will develop the best answers, though they may for a time be misled or produce laws or customs which are stupid or backward or crazy. We have the confidence, for instance, that an Authority is not necessary in Western watersheds to regulate the resources, the employment, and the daily life of the citizens, believing that those citizens left to their own devices, will develop the best way of life and of resource utilization.

We feel, however, that we are justified in calling attention to some of these stupid or faulty situations which must one day be rectified in order to keep the country on a steadily advancing program. For instance, we look with apprehension at a stupid move recently made by the Washington State Legislature. True, conditions will in due time certainly bring about the repeal of Washington's recently-passed "Fish Sanctuary Law," a backward step made by the legislators under the influence of the spellbinding oratory and lobbying methods of the fishing interests of the state. Meanwhile, desperately needed development is held up.

But we feel we can be of service to the legislators and engineers of other states in the West by calling attention to the unprincipled demands of the fishing interests, and raising our voice in protest to their retrogressive influence. Briefly, the situation in Washington is this: Rapid growth of industry is demanding all the electric power that the combined generators of public and private agencies can produce, and is in fact asking for more. The Northwest is virtually at the point of forbidding the entrance of any more industry if no further sources of power are developed. A few weeks ago it was necessary to reduce the cycles on output to stretch available water power a little further. At peak hours, power is actually imported from far-away Utah to aid in the shortage.

The City of Tacoma, for many years one of the leaders in hydroelectric generation in the area, plans construction of two new hydro plants on the Cowlitz River, in order to add to the required supply as quickly as possible. Fishing interests, insensible or unconcerned about the development of that section of the great Western Empire, started besieging the Legislature with all the wiles of skillful lobbyists to stop the construction of the dams, even though permission for one of them had already been granted by the State's Department of Conservation and Development. The ruse was to declare all tributaries of the Columbia River below McNary Dam a "fish sanctuary" for ocean-going fish, and forbid construction of any dam higher than 25 ft.

Oddly enough, at approximately the same time the discussion on the bill was going on in the Washington Legislature, Dr. Fred Fish, federal aquatic biologist at Oregon State College, was testifying before that state's Legislature that in many cases, Shasta Dam on the Sacramento River as an example, fish life is actually benefited by construction of dams, by regulating release of water in the stream all year 'round, thus reducing violent flood flows in winter and preventing low flows in summer, and also by keeping the temperature of river water lower in summer, creating better conditions for spawning. It has, of course, been proven that fish ladders will permit the passage of fish to headwaters above the dam for spawning purposes.

It is evident, therefore, that the promoters of this "sanctuary" law have some private concern which they would promote without regard for the future of the area affected. What that concern is, we certainly do not pretend to know or even guess. We only know that the measure they have sponsored is a backward step for progressive Washington.

And these same reactionary interests, whether actually or masquerading as protectors of fish, are at work with similar pressures in every Western state. Be on the watch!

Roads Will Be Better

HIGHWAY CONFERENCES sponsored by several Western universities must come in for a word of praise. In recent weeks, such meetings have been held by the University of California, University of Washington, Oregon State College, University of Utah, University of New Mexico, and University of Colorado. It has been our privilege to have members of our editorial staff in attendance at four of these gatherings and to participate on the program of one.

Since it would obviously be impossible to assign space for an adequate report on each of them, and manifestly unfair to report but one or two, it has been decided not to attempt to actually report any. However, we cannot refrain from expressing our compliments to the schools and the men who have sponsored the conferences on the excellence of subject matter considered, and the high caliber of the speakers, both national and local, who were selected to discuss the problems of modern road-building.

Concrete and asphaltic pavements, soil and aggregate characteristics, low-cost construction, federal-aid, maintenance, truck use, bridge factors, and other problems have been presented to state and county highway engineers and officials, along with the latest and most satisfactory solutions. In addition to the helpful information given the present practicing road builders, engineering students at the several schools have had most beneficial contacts with the leaders in the field.

It is inevitable that because of these conferences, most of them annual, the highways of the future will be immeasurably better. Keep up the good work!

Engineering for Freedom

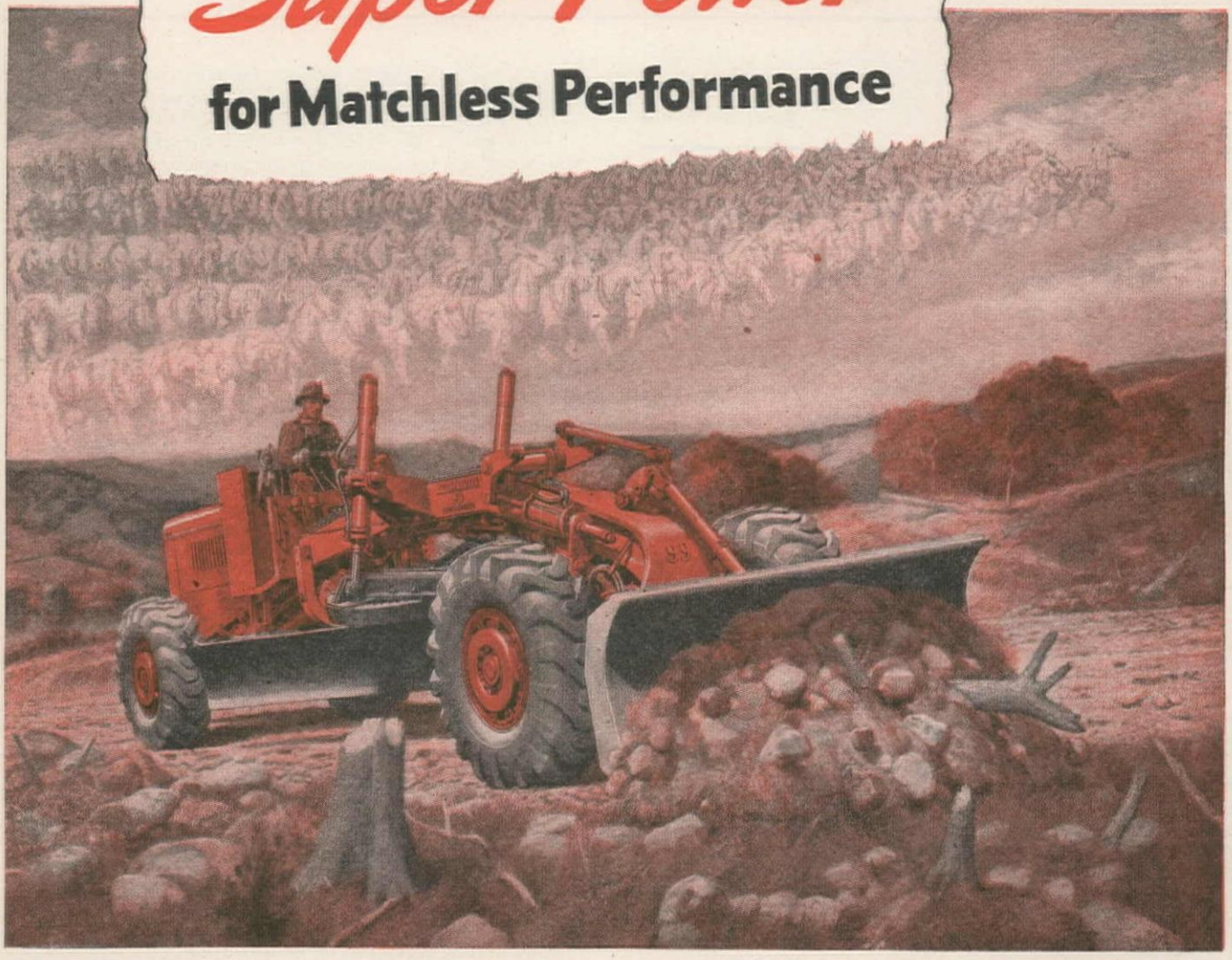
GEORGE M. GADSBY, President, Utah Power & Light Co., Salt Lake City, ended an address on Conservation at the 53rd Annual Congress of American Industry with the following words which should be thoughtfully considered by every American:

"In America, eroding forces of increasing potency, at times violently and at times insidiously, are depleting and carrying away the top soil of freedom which our forefathers so generously provided and left for our inheritance, to be enjoyed but preserved and passed down to the next generation. The debilitating effect of security versus enterprise, hard work and risk taking; the enforced averaging of individual effort; the surrendering of local burdens and responsibilities to a paternalistic central government, all these and many other socialist or collectivist influences are reducing the area of our freedom.

"The protective measures for us as businessmen are not to destroy the remaining top soil of free enterprise for the objective of immediate profits but rather to be forward looking, erecting dikes against the encroachment of the socialist flood and improve our industrial place in the sun by fair dealings now and for the future and by more and better public education. Let us give consideration to the prevention of further floods by building many, many little up-stream tributary reservoirs of friendship and understanding in our own plants through closer contact and understanding with our own employees."

Super-Power

for Matchless Performance



There is No Substitute for All-Wheel Drive and All-Wheel Steer in a motor grader . . . no way in which any rear drive, front steer machine can equal the maneuverability, power-at-the-blade, and all-around performance of an Austin-Western "88" or "99".

With All-Wheel Drive, there are no idling front wheels—no dead front end to consume power and decrease operating efficiency. All weight is on driving wheels—front and rear—contributing 100% to traction and utilizing the full power of the engine.

All-Wheel Steer provides unequalled maneuverability; saves time on every job; makes it possible to work in places where ordinary motor graders cannot go—do things they cannot do.

Get the complete story of the many additional features of these outstanding graders from your A-W distributor, or send for the latest bulletins.

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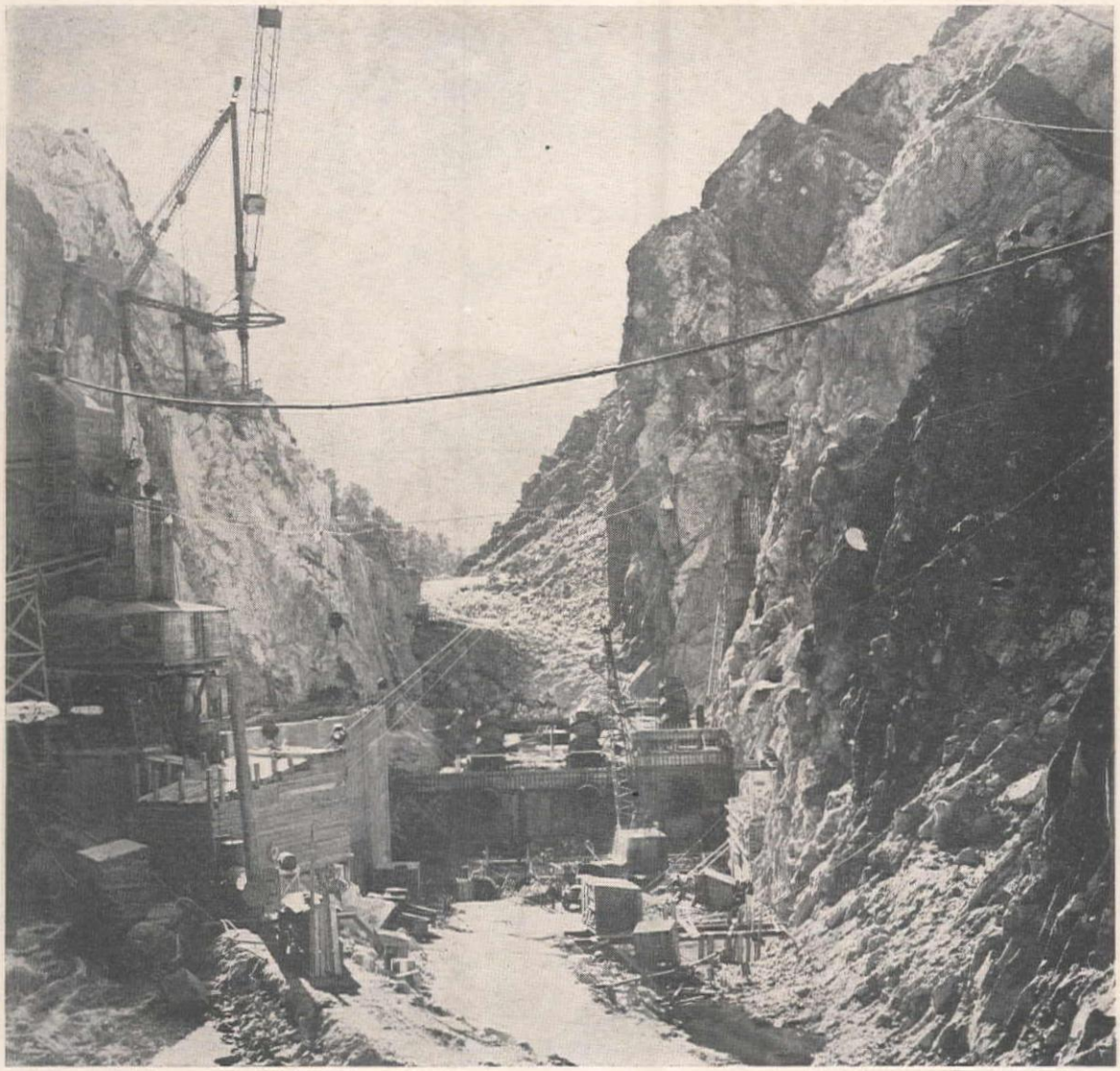
UTAH—WESTERN MACHINERY COMPANY.....Salt Lake City 13
WASHINGTON—COLUMBIA EQUIPMENT COMPANY.....Seattle
WYOMING—WILSON EQUIPMENT & SUPPLY COMPANY.....Cheyenne



Kortes Dam, They Say, Is—

Toughest Dam Job Since "Boulder"

Morrison-Knudsen's construction crews find the going rough in a steep Wyoming canyon—The damsite is remote and often inaccessible and the canyon walls are a scaler's nightmare

By JOHN P. OTTESEN
Engineer, Bureau of Reclamation
Denver, Colo.

"THE TOUGHEST dam job since Boulder." That's the opinion of construction men working on Kortes Dam and Power Plant. Located in the Black Canyon of the North Platte River about 60 mi. southwest of Casper, Wyoming, the damsite is remote and often inaccessible. Thirty miles of the road to Casper are unimproved, rough in the summer, drifted full of snow in the winter, and muddy in the spring. As housing and recreational facilities have been limited, the labor shortage has been unusually severe and the labor turnover extreme. However, with the help of a few old-time construction men and some newcomers who are prepared to meet the rigorous working conditions, the job will be done.

Kortes Dam is the first dam to be started under the Bureau of Reclamation's Missouri River Basin Project. Advertisement for bids for construction of the dam and power plant was made on January 11, 1946. Bids were opened on March 12, and the contract for construction of the dam and power plant was awarded to the Morrison-Knudsen Company, Inc., of Boise, Idaho, on its bid of $4,688,000. Work on the contract was started May 21, 1946. The program indicated completion of excavation in the summer of 1947 and completion of concrete placing in the fall of 1948. However, labor shortages, overrun of quantities, and other factors have caused delays, and the original program has been extended approximately a year.

Full use of power potential

Designed as a straight concrete gravity type structure, Kortes Dam is to be approximately 440 ft. in length at the axis, 240 ft. in height above bedrock, and is to contain 130,000 cu. yd. of concrete. An uncontrolled curved spillway is to be located at the right end of the dam and discharge through a 30-ft. diameter concrete-lined spillway tunnel. The lower or horizontal section of this tunnel is now being used as a diversion tunnel during construction. The power plant, to be located at the toe of the dam, is to house three 12,000-kw. vertical-shaft generators driven by 18,500-hp. turbines served by 108-in. penstocks extending through the dam. A permanent access road to the powerhouse has been constructed on the right side of the river.

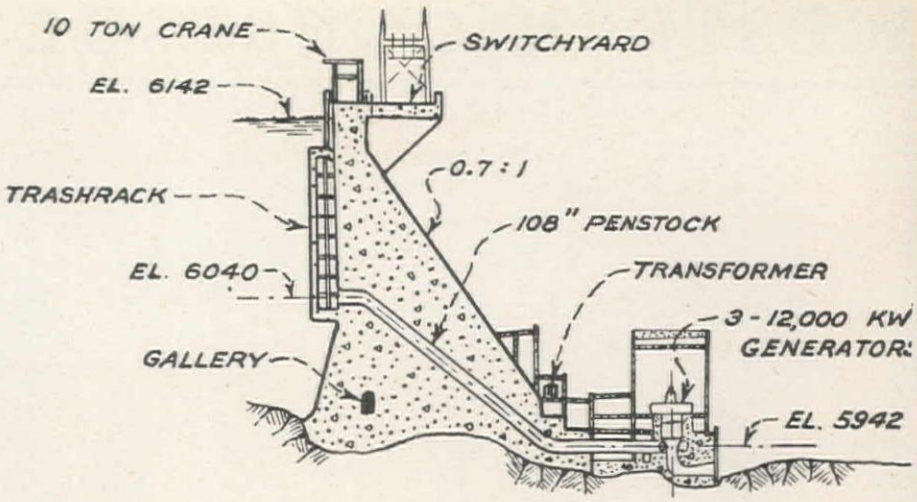
To utilize fully the power potentiality at the damsite, the tailwater elevation will be lowered by excavation in the river channel for about 2,200 ft. downstream. As Kortes Dam is located 2 mi. downstream from Seminoe Dam, the reservoir will impound only 5,000 ac. ft. and Kortes Power Plant will depend entirely on the Seminoe Reservoir for water storage. The two power plants will have practically the same capacity and will be operated "in series," Kortes Power Plant to be remotely controlled from Seminoe.

Steep canyon, fractured rock

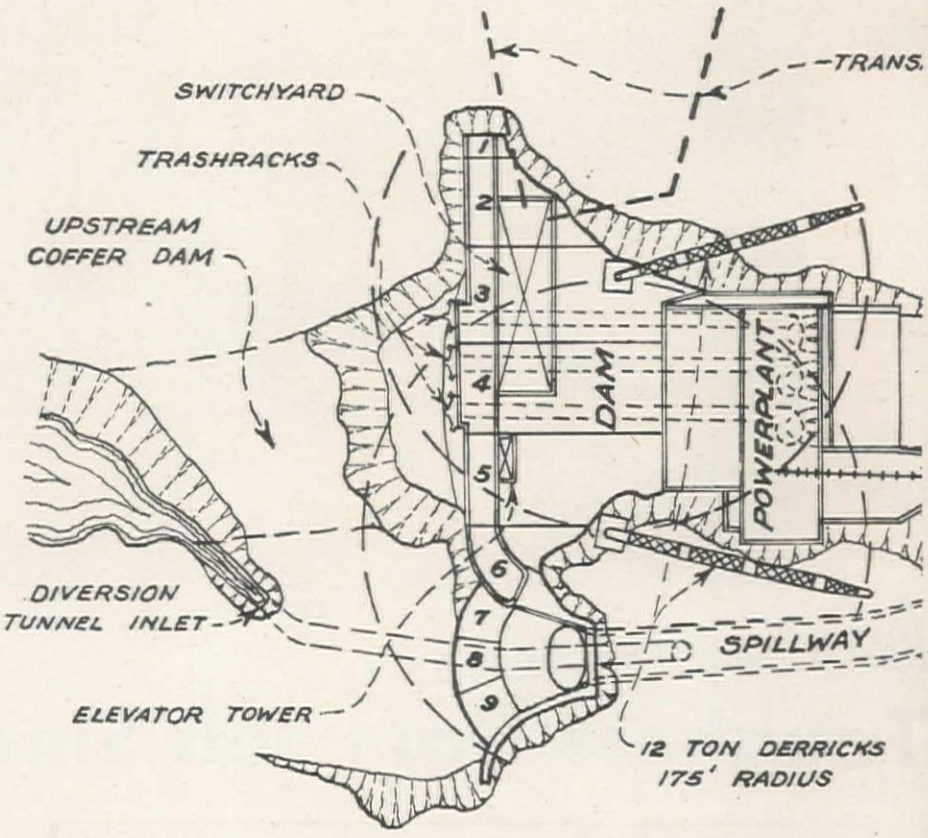
The damsite is in a steep, narrow canyon, the rim of which is about 1,500 ft. above the top of the dam. Talus material found in the draws of the canyon had to be removed entirely to eliminate this definite hazard to construction operations. The rock, a medium-grained granite having numerous altered zones, is almost as severely fractured at moderate depths as it is on the surface. Weathering has made the joints more prominent on the surface and consequently left large masses that were decidedly unstable and easily dislodged. Fractures and joints following no consistent or directional trend made the planning of excavation difficult. Excavation operations often uncovered fracture planes lying at such an angle as to render the entire slope unstable. This material then had to be excavated back to a new slope before operations could be resumed. Despite the fact that the rock beneath the surface was badly fractured, however, no supports were required in the spillway, diversion, or foundation tunnel.

Changed design eliminates hazards

Although extensive stripping operations on the canyon walls were carried out, it was not feasible to make the canyon entirely safe from the hazard of falling rock. To guard against damage which might be caused by falling rocks after construction is completed, several important changes were made in the original design. The switchyard was moved from the roof of the powerhouse to a platform that will extend downstream from the top of the dam. A cable gallery and shaft will be constructed in the dam to house the control cables from powerhouse to switchyard.



SECTION THRU DAM & POWERHOUSE

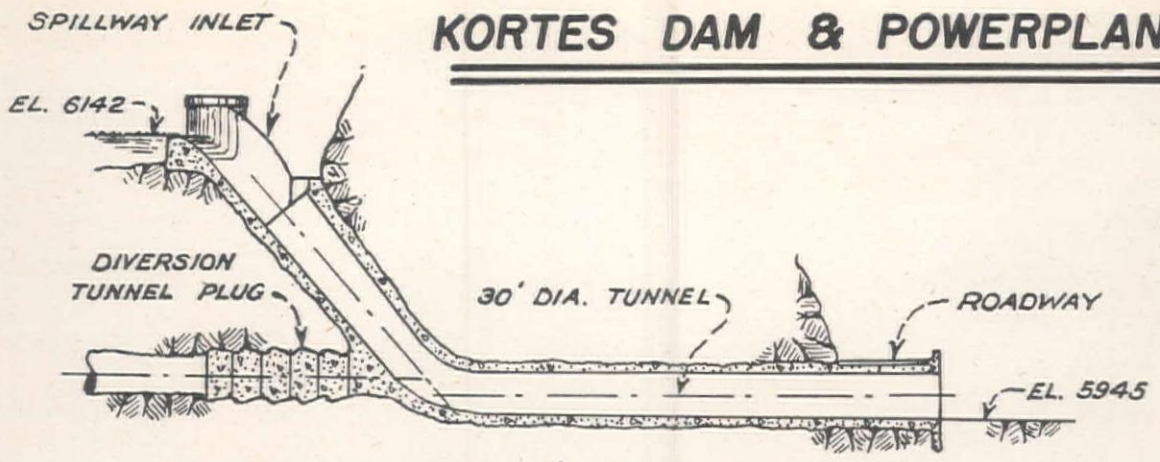


The transformers are to be located behind the powerhouse and protected by a roof of 2 feet of concrete covered by a 2-ft. layer of sand. In addition, concrete deflector walls 15 ft. high will be built across the two draws emptying into the powerhouse area and two 3-in. mesh wire fences will be built above the walls. The left wall of the powerhouse will be sheathed with 6- by 12-in. timbers. Two concrete stabilizing walls on the left abutment will anchor large masses of rock lying on steep fracture planes which might be subject to weathering. Another stabilizing wall will be designed for the outlet portal of the spillway tunnel to protect the access road.

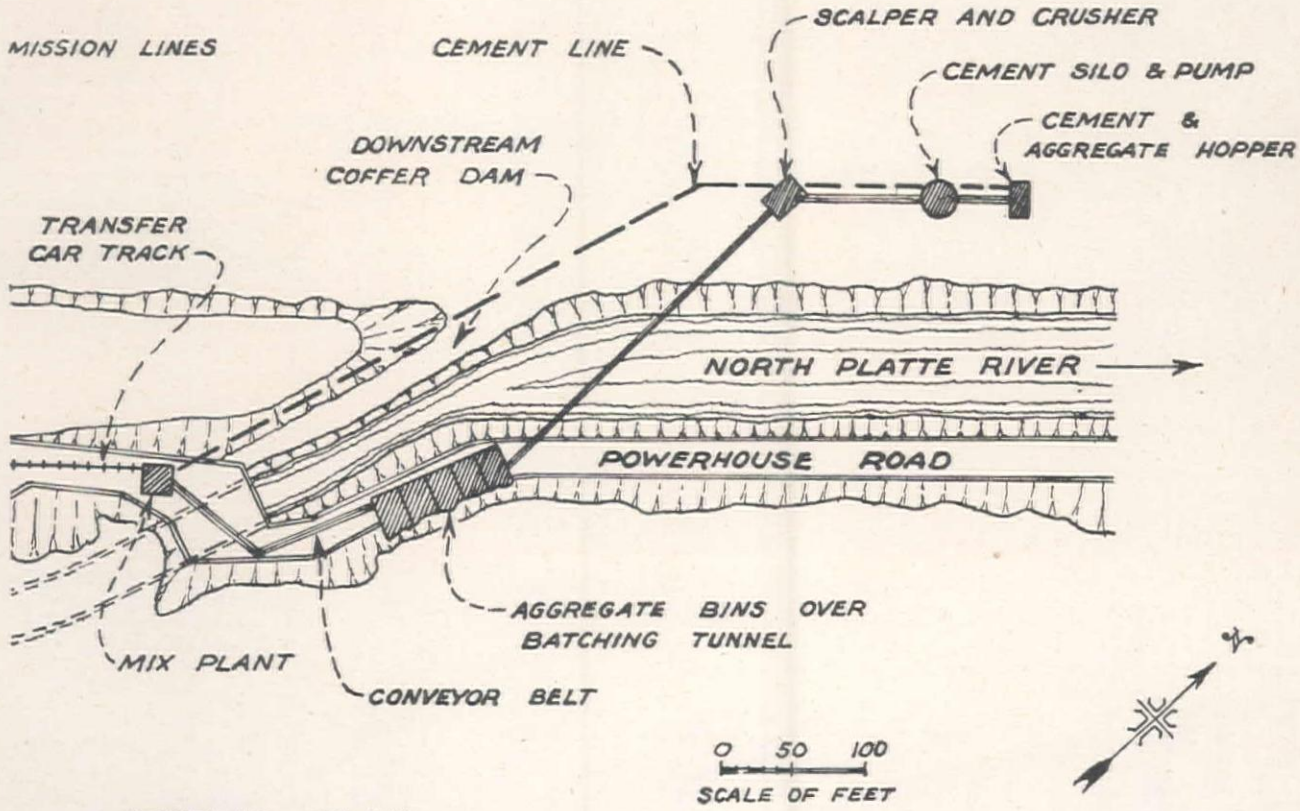
The railhead for delivery of all construction materials for the dam and power plant, except cement, is Casper, Wyo. All materials, therefore, must be hauled 65 mi. by truck, 32 mi. on a hard surfaced road having a load limit of 25 tons, and 33 mi. on an unimproved road from Alcova to the damsite. The cement is hauled in tank trucks from Hannah, Wyo., over 50 mi. of dirt road. This road is closed during the winter and the haul around through Rawlins and Alcova is 150 mi. The three transformers for the power plant, weighing 40 tons each, were hauled the entire distance on unimproved roads. Fords were constructed to bypass bridges where necessary.

Diversion of the river is being accomplished through an unlined tunnel in

KORTES DAM & POWERPLANT



SECTION THRU ℄ OF SPILLWAY



GENERAL PLAN

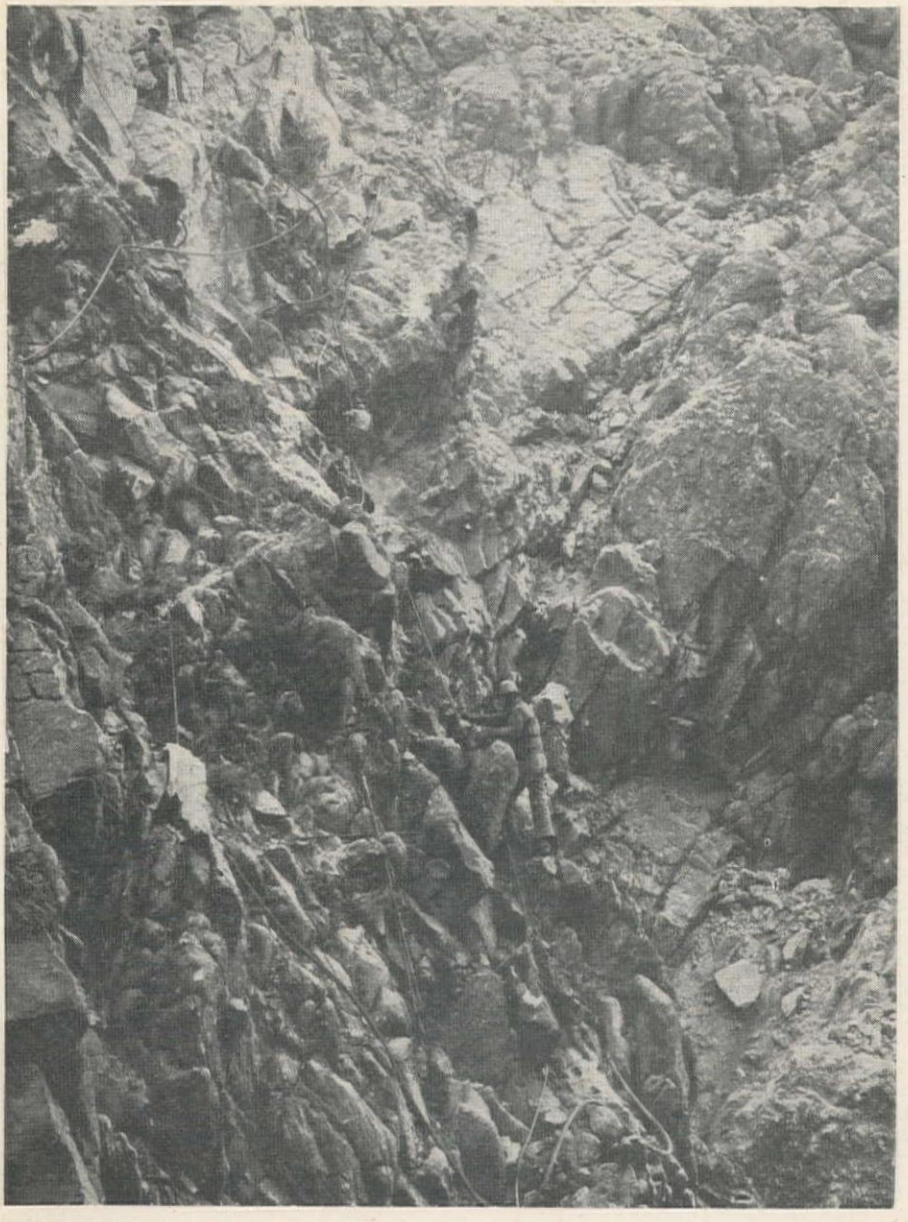
the right abutment joining the spillway tunnel. This tunnel will be used until the dam and powerhouse have been sufficiently completed to permit carrying the river flow in one penstock extended through the powerhouse. At that time, the intake gate on the diversion tunnel will be closed to allow the completion of the spillway tunnel lining and the plugging of the diversion tunnel.

Before the outlet portal of the spillway diversion tunnel could be completed, the level of the river had to be lowered by channel excavation and the powerhouse road constructed. Operation of Seminoe Reservoir provided for the shutting off of the river flow on Sundays and nights during certain periods, and during such periods, advantage was taken of the low water to drill and shoot rock and large boulders in the river channel. A dragline working from the bank loaded the material into trucks while the river was up. As soon as possible, an access road was built up the left bank of the river so that excavation on the powerhouse road on the right bank would not interfere with dam or channel excavation. Progress on the road was slow as jackhammer operators were hard to get and the cuts for the road were as high as 80 ft. in rock and so steep that the drillers had to work entirely on safety lines. One year was required to complete 90 per cent of the excavation for the road.

Shortly after channel excavation was started, it was observed that a large talus slope of about 100,000 cu. yd. on the left bank of the river was directly in line with the spillway outlet. Hydraulic model tests indicated that any appreciable discharge from the spillway tunnel would wash over this talus material and possibly cause the talus to slide and block the channel. To avoid this, it was decided to remove all material back to solid rock. Although the slope was 300 ft. in height, it was easily brought down by sluicing.

Variety of equipment for tunnel

Driving of the spillway diversion tunnel was started in January 1946. The 34-



LEFT ABUTMENT, on a ¼ to 1 slope, was badly fractured and weathered to an average depth of 10 ft. The entire scaling job was "rope work" and required nearly 9 months.

BLOCK 4, first to be placed, is 64 ft. wide and 192 ft. long. Placing in steps as shown was necessary to assure thorough compaction and to avoid placing on a slope.

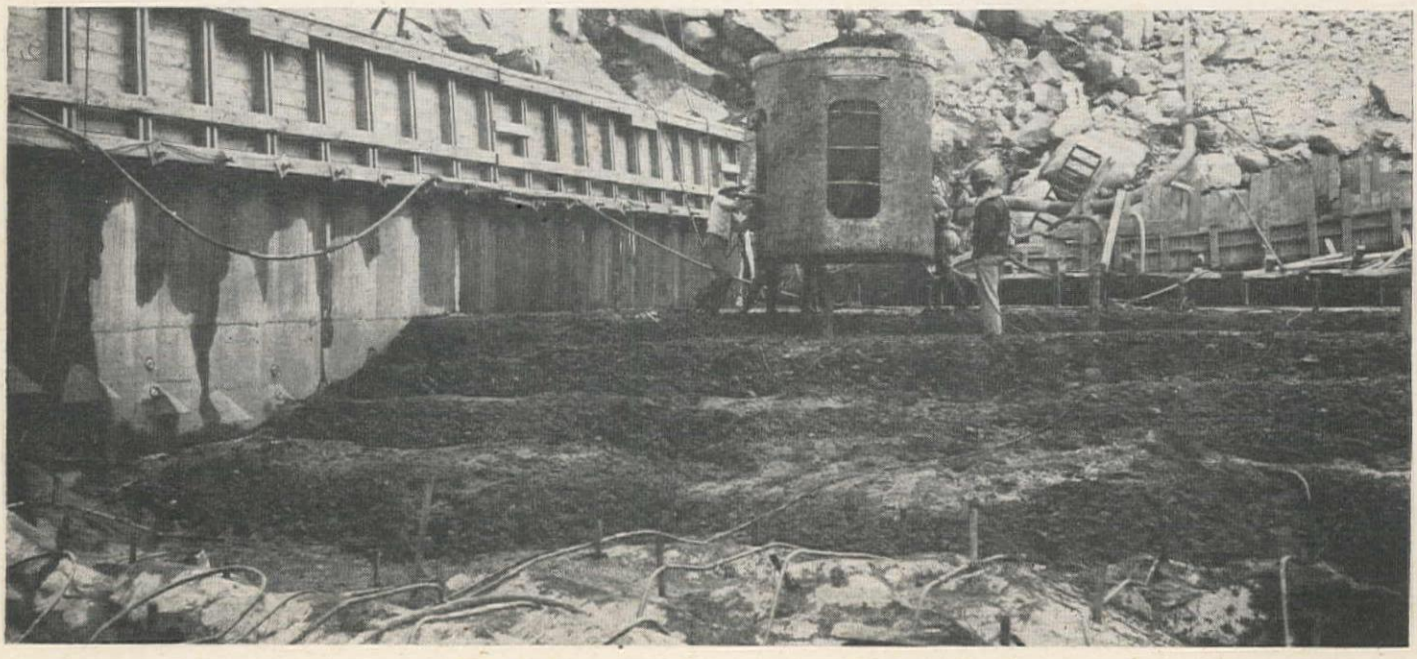
ft. diameter tunnel heading was drilled from a truck-mounted jumbo having 14 drilling stations. This same jumbo was cut down and used for driving the 14-ft. diversion tunnel. When the 280-ft. horizontal section of the spillway tunnel was completed, the jumbo was abandoned and the inclined section excavated by driving a 5-ft. by 10-ft. crown heading, which was then enlarged to the finished section. The blasted rock from the spillway tunnel was loaded into trucks by a shovel. A bulldozer was used to push the muck from the diversion tunnel back to the shovel.

The diversion tunnel was holed through on October 19, 1947, and the river diverted on November 1. The upstream cofferdam consists of two rock dikes with a compacted earth-fill core. The downstream cofferdam is an earth and rock-filled dike extending diagonally across the channel from the outlet portal of the tunnel. One 6-in. pump on the downstream cofferdam handled the seepage during excavation. Before concrete placing in the dam was started, a concrete wall was constructed on bedrock below the upstream cofferdam to form a sump for another 6-in. pump.

Scaler's nightmare

Excavation for the right abutment of the dam and the spillway intake presented no particular problem as the rock was massive, only slightly weathered and fractured, and sloped toward the channel on about a ½ to 1 slope. The left abutment was badly fractured and weathered, however, and sloped toward the channel on a ¼ to 1 slope. The badly weathered material had an average depth of 10 ft., and not only covered the entire abutment area but extended 150 ft. higher than the top of the dam before assuming a flatter slope.

About 2 days were usually required for scaling after each shot, so the abutment was worked in sections, with scaling going on in one area and drilling in another. As the entire job was "rope work," nearly 9 months were required to remove 50,000 cu. yd. of rock from



this abutment. Powerhouse excavation was carried on with the dam excavation. Bedrock in the area was only slightly fractured so only enough was removed to provide clearance for the penstocks and draft tubes. Excavation for the dam and powerhouse was completed in October 1948.

The plan for foundation treatment calls for blanket grouting to a depth of 30 ft. Holes are to be spaced on 20-ft. centers extending from the axis to 60 ft. downstream. The small amount of grout required for the bottom and right abutment (acceptance of 0.4 cu. ft. per linear foot of hole) indicates that this rock is comparatively tight. However, considerably more grout was taken in the lower portion of the left abutment (acceptance of 1.1 cu. ft. per linear ft. of hole), and surface leaks were more extensive and harder to calk. The cutoff curtain is to be drilled and grouted from the foundation galleries and tunnels when the dam is completed. A row of drainage holes downstream from the cutoff curtain will be drilled when this grouting is completed. Uplift pressure pipes are being installed and drilled in the four center blocks of the dam.

Canyon too rugged for cableway

The ruggedness of the canyon introduced problems into the concrete program as well as into the excavation. A cableway could not be used as it was practically impossible to provide a runway for a head tower on the precipitous abutments. For this reason, two stiff-leg derricks of 12-ton capacity having 185-ft. booms have been erected to transport the concrete. With one derrick on each abutment, any part of the dam and powerhouse area can be reached except the right half of the spillway intake area. Concrete in this area is being placed by pumping.

The gravel screening plant and batching tunnel, the mixing plant, and the concrete transfer car track are all located on the completed powerhouse road. An access road is maintained on the left side of the river for the hauling of cement and aggregate. The cement is pumped to the mixing plant and the aggregates transported across the river by conveyor belt. As final gravel screening at the batching plant is a specification requirement, only the sand is completely processed at the gravel plant, located about 4 mi. downstream from the damsite. One 4-cu. yd. front-charging mixer, the water and cement batchers, and control boards are located in the mixing plant proper. An electric-powered transfer car, built to accommodate two of the 4-cu. yd., manually operated buckets, transports the concrete to the pickup point of the derricks.

Block placement schedule

The dam is divided by transverse contraction joints into 64-ft. blocks, three smaller blocks forming the spillway crest. The contraction joints will be grouted in 50-ft. lifts after the concrete has cooled to 52 deg. F. Cooling pipe, consisting of 1-in. outside-diameter steel tubing in coil lengths of from 500 to 1,200 ft., is laid on foundation rock at 2½-ft. spacing and on the top of each

STIFF-LEG DERRICK is perched precariously above the powerhouse excavation. Note the completed deflector wall for protection against falling rock. Mixing plant, far left.

5-ft. lift with horizontal spacing of 5½ ft., up to elevation 6065. In the upper part of the dam, where the section is small enough to undergo normal temperature variations without danger of development of cracks and where the dam is thin enough to cool naturally to the desired temperature before the contraction joints are to be grouted, artificial cooling will not be required.

As excavation of the right abutment was completed long before the bottom excavation, the first concrete in the dam was placed on June 24, 1948, in Block 6. Blocks 6 and 7 can be reached by the right derrick but pumped concrete is being used in Blocks 8 and 9 and the spillway inlet structure. The first concrete in the bottom of the dam was placed on August 19 in Block 5. Block 4 is the only block that has been placed full length and full width. This placement, 64 ft. wide, 192 ft. long, and containing 2,250 cu. yd. of concrete, required 84 hours to complete. The first concrete was placed in the powerhouse on September 20. When operations were shut down for the winter, the draft tube forms had just been covered. Both right and left tailrace walls have been completed.

Concrete design

The interior 6-in. maximum concrete for the dam contains only 0.8 barrel of cement per cubic yard having a water-cement ratio of 0.60 by weight and an air entrainment of 3 per cent. The concrete mix for the face of the dam contains the same amount of air and 0.9 barrel of cement having a water-cement ratio of 0.53. The 3-in. mix for the powerhouse requires 1.1 barrels of cement per cubic yard with a water-cement ratio of 0.52 and an air-entrainment of 3 per cent. A richer mix for the piers, parapets, sidewalks, and other portions of

(Continued on page 132)

Wartime PSP—From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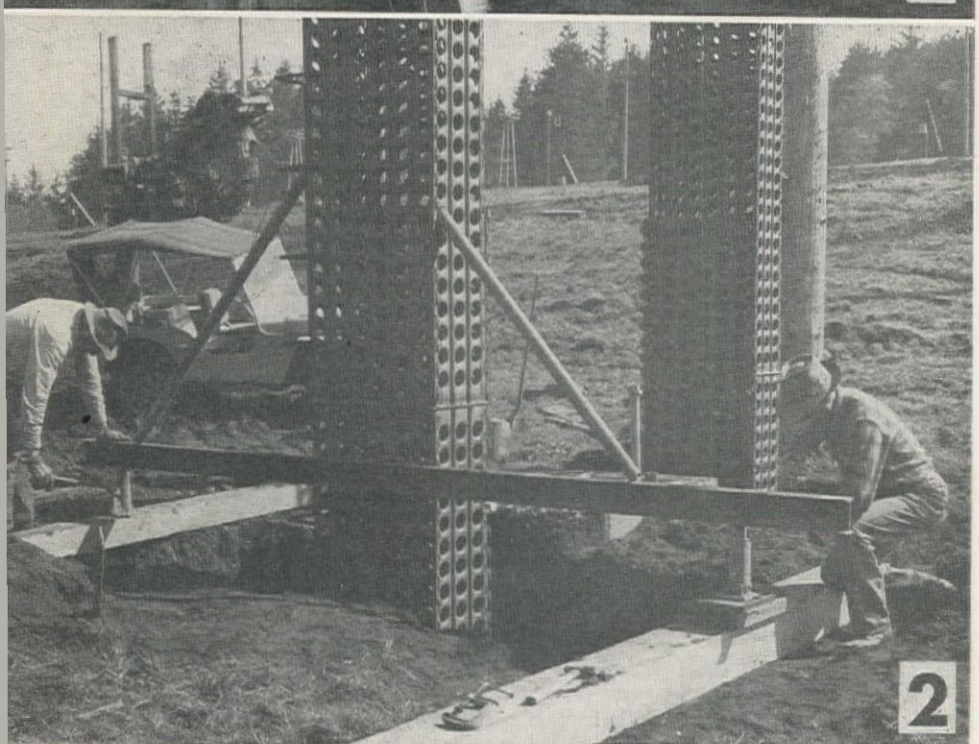
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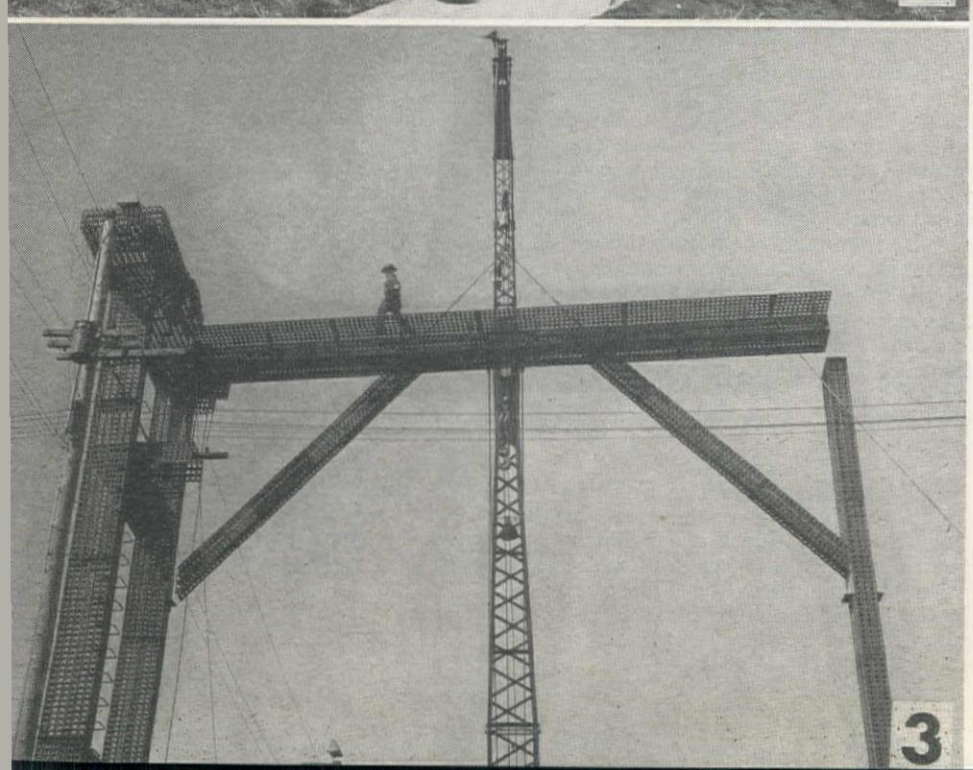
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Celebrated Pierced Steel Planking, used for landing mats and the remote airfields of World War II, is pinned together for a variety of structures at Arcata experimental airfield

PSP, the celebrated Pierced Steel Planking that was so widely used in winning the war for airports in unlikely spots, for making solid landing mats on sand beaches, and for scores of other uses, has been put to a great variety of construction purposes by Harold F. Hudson, chief engineer for Transocean Airlines on the company's contract to conduct extensive landing aid experiments at the airfield at Arcata, Calif. He has pinned it together in so many shapes and for so many purposes that the observer is reminded of a child's Meccanno set!

Arcata, said to be the foggiest spot in the continental United States, was chosen during the war as the site for experiments with FIDO (Fog, Intensive Dispersal of), the attempts to burn away or otherwise disperse heavy accumulations of fog, so as to enable the safe "contact" landing of aircraft. The experiments were conducted mainly by the Navy, and were so successful that an installation is currently being completed at the Los Angeles Municipal Airport. The experiments were discussed in an article appearing in *Western Construction News* for May, 1946.

Unlimited uses for PSP

Some of the most unusual uses for the wartime PSP, of which many bundles were assigned to surplus disposal at the station with the close of hostilities, are in the erection of poles, bridges, baskets, and other structures used to mount the experimental lights, although it has also been used for fencing, walkways, retaining walls and in other ways. The photos on these pages illustrate various adaptations of the planking made use of by Hudson in supporting the lights. Some of the taller structures are as much as 85 ft. above the ground. On subsequent pages, the various types of lights are illustrated.

The planking comes in bundles and is of uniform size, 10 ft. long and 15 in. wide, with alternate planks having a ½ in. additional width to permit fastening together with interlocking projections.

In the erection of the various structures, Hudson makes use of a simple standard cross-section, being four of the planks in the shape of a box 15 x 15½ in. These are simply and easily fastened with the attached locking keys, and are tack-welded at intervals. If additional length is required, another 10-ft. box is welded to the end of the first one, and it is thus a simple matter to tell the height of any of the structures by counting the number of 10-ft. sections welded

Beaches to Bridges

together. For the taller columns, Hudson merely doubles the box, making it 30 x 15½ in. in order to increase its stability. As observed in the pictures, taller structures have two columns, with other PSP sections welded across at intervals as lateral bracing, and in some cases diagonals of single box section are installed for added strength. The pictures show:

1. A double-column frame 80 ft. long, completely welded on the ground, being hoisted into position by a long-boom crane. The planking is light in weight, but has exceptional structural strength and stability. Because of its light weight, very large sections can be welded on the ground, and still be lifted conveniently.

2. Accurate positioning of a column. The method of securing the columns is also interesting. After having been properly adjusted both for elevation and vertical position, it is securely held by the I-beam and pipe supports shown in the photo, while concrete is poured to form a foundation block in the previously excavated hole. To assist in securing the column, reinforcing steel is laid in the concrete through the perforations in the encased portion of the PSP. Also illustrated in this picture are the interlocking projections at the corners of the column, and the added strength provided at the end welds by welding in a strip. This is only done in the taller structures, and at irregular joints, such as the connection of diagonals with vertical or horizontal members.

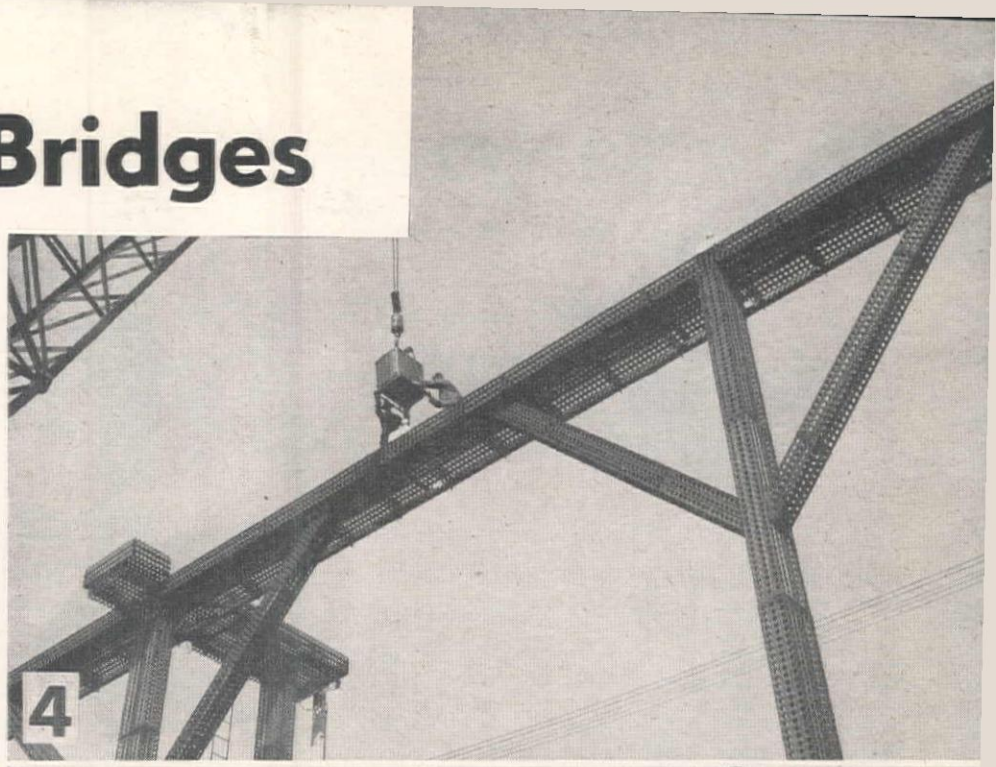
3. Placing a previously-fabricated beam section and diagonals at the top of two columns. In all three photos, the man ladder, composed only of ½-in. rod welded securely to the box section, is discernible.

4. One of the light installations being lowered into place atop an 80-ft. high trestle. An additional use of the planking is shown at the left of the picture, immediately over the column, where it has been used to form the walls of a safety basket, in which men may work while adjusting or maintaining the lights.

5. A diagonal light installation mounted on a frame of PSP. The two short columns are of the standard box section, while the diagonal member is composed of just two sheets of the planking. Another type of safety basket is shown at extreme right, mounted on a single pedestal.

6. Variations in the use of planking for different kinds of light installations. It is to be understood, of course, that this variety of lights would not be used at any regular airport, but that at Arcata all the various types are mounted so that any one can be turned on, and comparative studies carried out.

MORE PICTURES ON NEXT PAGE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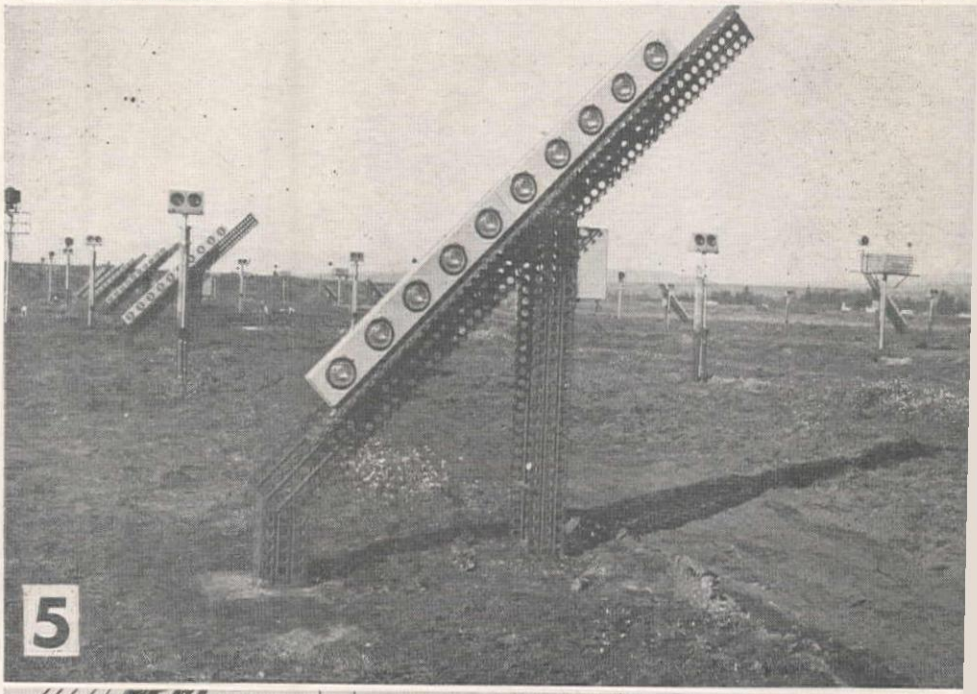
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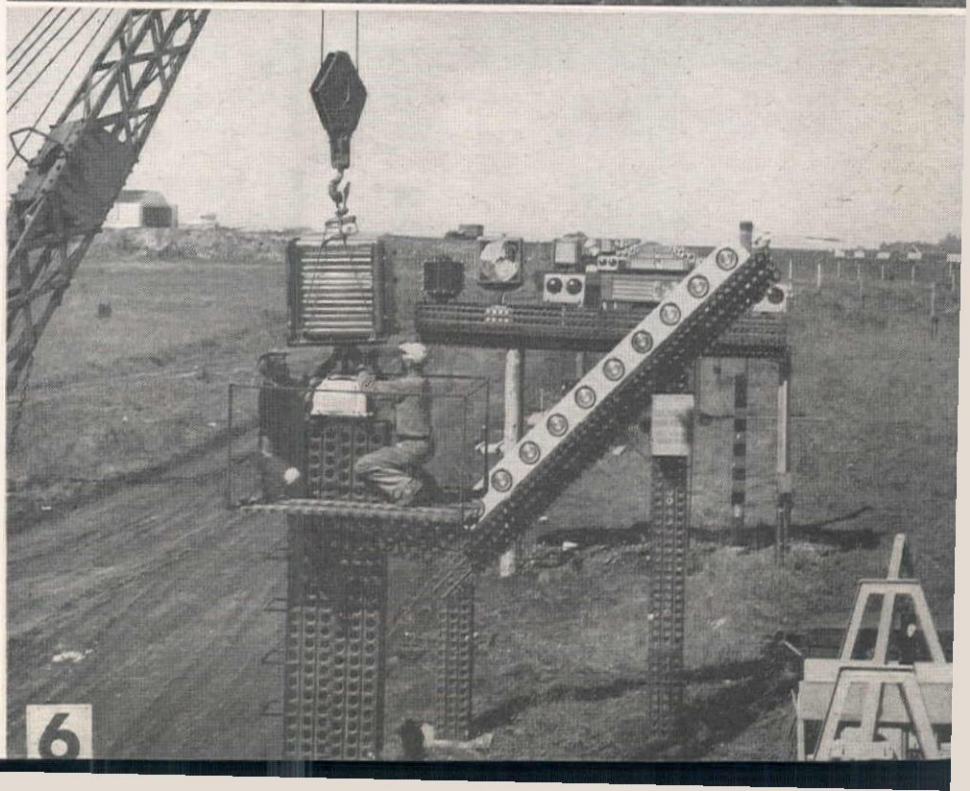
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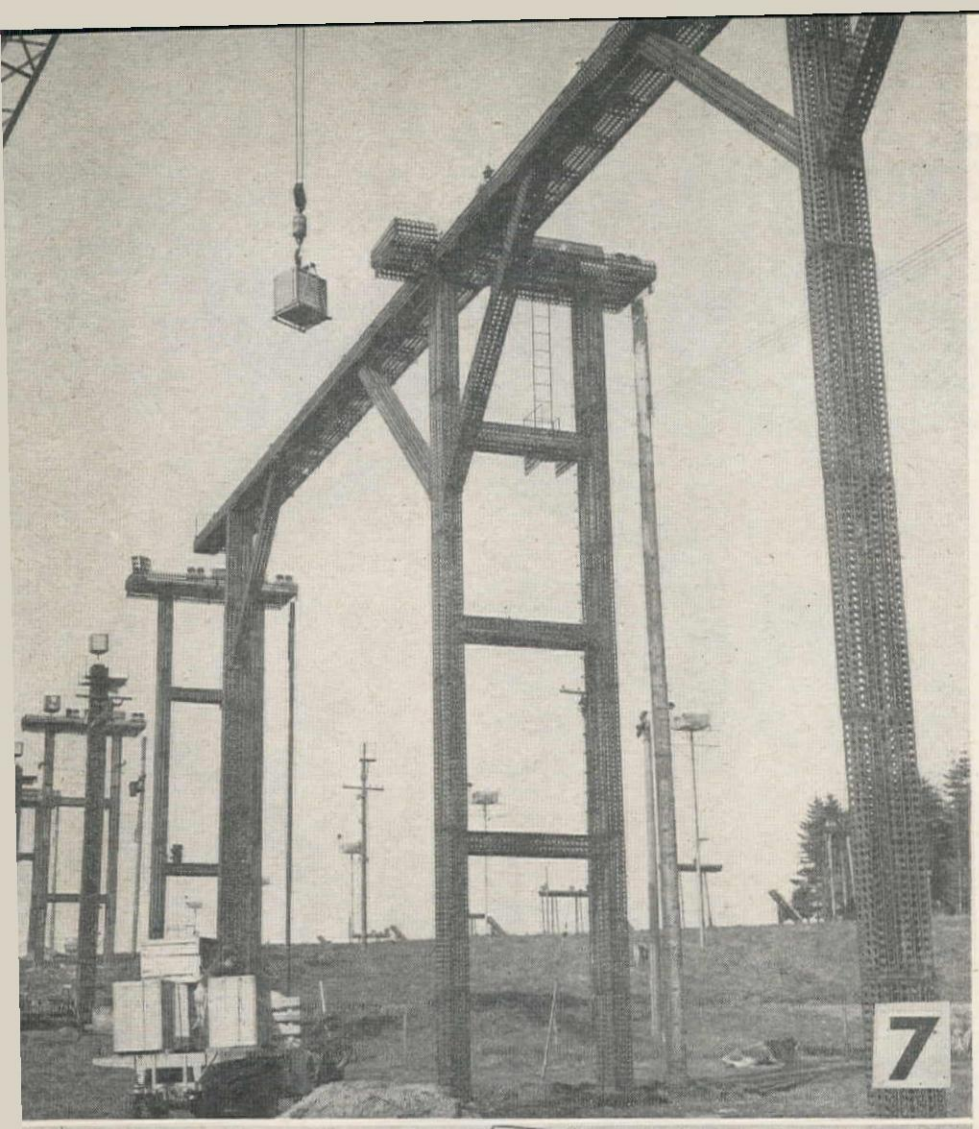

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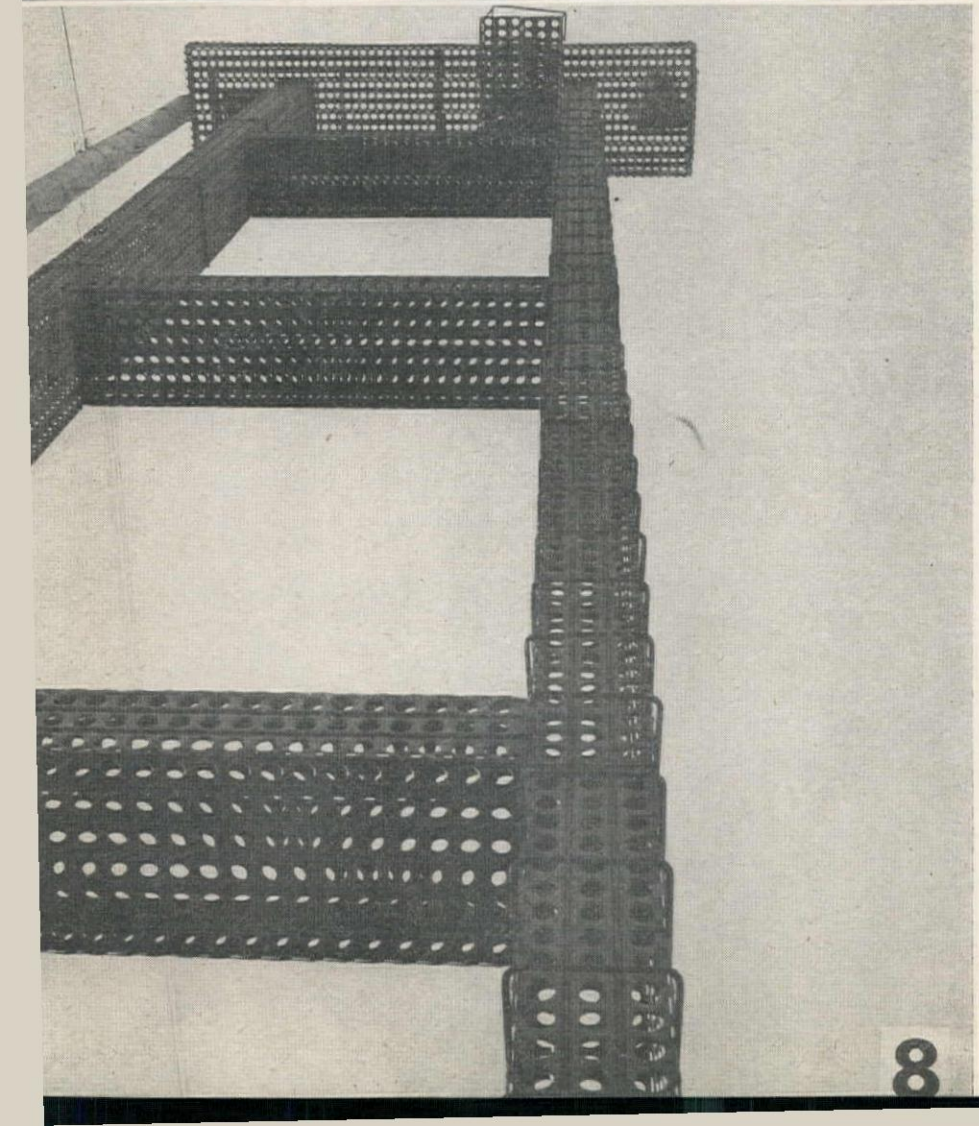

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7. As the distance from the end of the flight strip increases, lights are raised higher off the ground. In this photo, the trestle is about 60 ft. high. Cantilevers of 10 ft. are employed in some cases.

8. A view with the camera pointing upward, showing the deck flooring and cross-bracing to be of the same material.

9. This is one of the spectacular FIDO systems developed at Arcata in earlier experiments. Gasoline or Diesel fuel is forced out of the jets at high pressure and ignited by electrical units in the orifice. At full pressure, the height of the flame is about 8 ft., and it has been proven successful in burning away the fog to a height of about 300 ft. above the ground, thus allowing the pilot satisfactory vision, even though a heavy fog blankets the entire area. Because of the great quantities of fuel required and resultant high cost, however, the FIDO burning is economically feasible only on a large and very busy field. At the Los Angeles installation, for instance, it is estimated that operation will cost only about $80 per landing, because planes are coming and going continuously.

10. The next six pictures show various types of approach lights under investigation at Arcata. This is a "blaze" type unit, filled with neon tubes, which can either be burned steadily or flashed.

11. A "flash" unit filled with krypton gas, producing a brief flash of white light with a maximum light output of 3,300,000,000 candlepower. The lights are mounted in a single line 115 ft. left of the centerline of the approach zone. In operation they flash 40 times per minute in sequence from the outer and toward the runway. A dark interval of one second follows each flash.

12. Wide-beam lights, placed in two rows, parallel with and 125 ft. each side of the approach zone centerline.

13. A fixed wide-beam runway light placed at 100-ft. intervals for the first 800 ft. of the runway and at 200-ft. intervals for the balance of its length. These lights direct wide conical beams along the runway toward the approach zone, with at least 20,000 candlepower being directed toward all possible normal approach points.

14. Another variety of approach light, being a fixed wide-beam projector located along the centerline in a single row.

15. A controllable, narrow beam approach light, to be aligned with and located symetrically each side of the centerline. Remote control of beam elevation, and toe-in angles for best operation in prevailing visibility and ceiling conditions is possible with this light.

16. A view of the 3,000-ft. approach zone at Arcata, showing the mounting of the various lighting systems. The bright funnel shaped lights are illustrated in photos 5 and 6. These are called the "slope line" system, and have been adopted by Civil Aeronautics Administration as a standard. They consist of

a row of 500-watt sealed-beam bulbs in a metal box mounted at an angle of 45 deg. to the ground. As the pilot approaches the field, the lights give the appearance of a perfect funnel, as shown in this photo, if he is on the correct path. Seen from any other angle than the direct line of the runway, however, the lights break up into echelon formations, which, by their very nature, tell him quickly and positively in which direction he is off the path.

Experimental basis changed

The work at Arcata, properly known as the Landing Aids Experiment Station, was threatened with cessation shortly after the close of the war, but the importance of the findings was so great that it was resumed two years ago, and is now supported on funds supplied jointly by the Air Force, Navy, and Civil Aeronautics Administration. The CAA has been appointed the sponsor for the project, and actual operation was contracted to Transocean Airlines, who both install all equipment and carry out actual flight tests.

The FIDO work is about finished on the station, and most of the experimentation there is now devoted to a study of various approach lighting systems in the 3,000-ft. approach zone at the east end of the main runway, and various types of runway and taxiway lights. Numerous light installations have been set up, and their effective range through dense fog has been comparatively evaluated by repeated actual approaches in the fog. In thick weather, flight operations are controlled by GCA, the radar method of Ground Controlled Approach, in which pilots are "talked down" onto the runway.

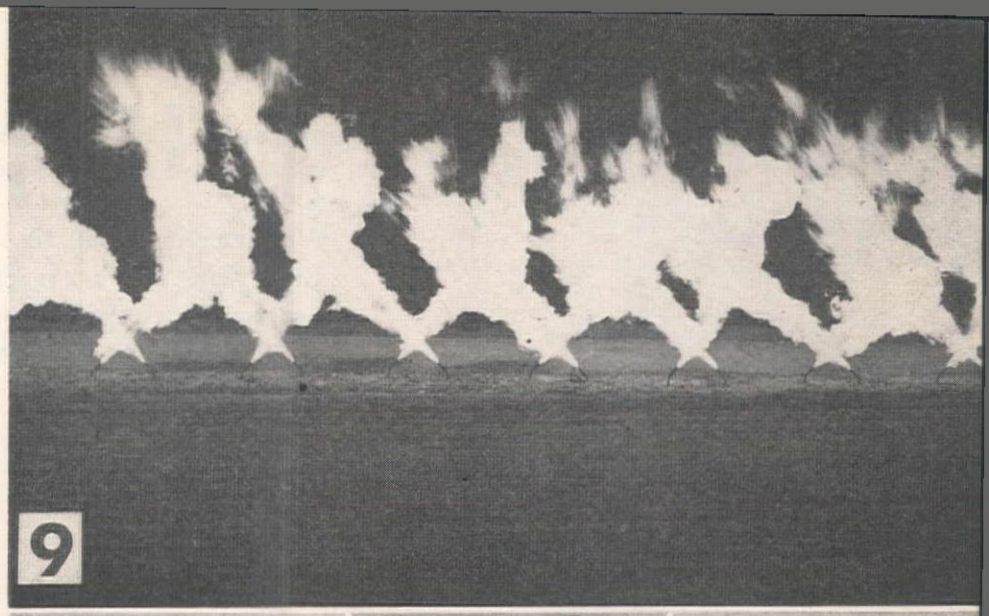
Other Transocean activities

Transocean Airlines has also established two other field test stations to collect additional data on flying in bad weather. One of these is in the severe snow area at Donner Summit on the boundary between California and Nevada, and the other is at Gander Airport in Newfoundland.

Hudson has only recently returned to Arcata from an assignment in Germany, where he supervised installation of approach lights at eight German airfields in the Western Zone. He is also president of Transocean Engineering Corporation, a subsidiary recently established to engage in airfield and other construction.

Los Angeles FIDO

The world's first commercial installation of FIDO, at Los Angeles Municipal Airport, will begin burning a tunnel in the fog for visual transport landings this month. A total of 392 "triad" burners, constructed by contract to Bechtel International Corp. for $840,000, parallel both sides of the airfield's 4,000-ft. east-west runway. Each "triad," with three jet atomizer nozzles, protrudes 14 in. above ground. Diesel fuel is pumped to the nozzles at pressures of 1,000 lb. per sq. in. Ignition of the system takes two minutes and is by push button control.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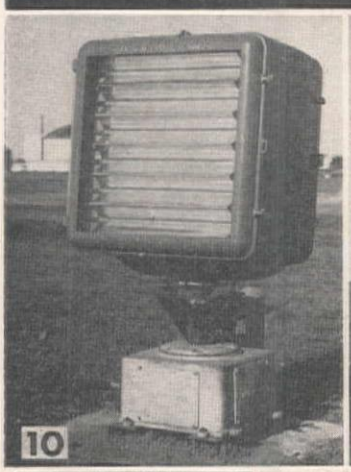
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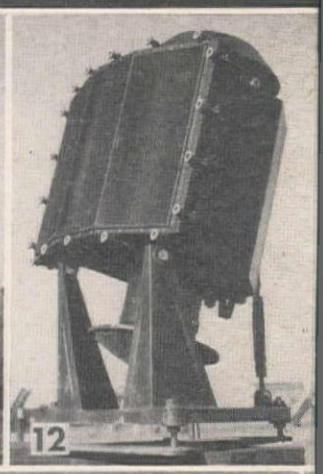
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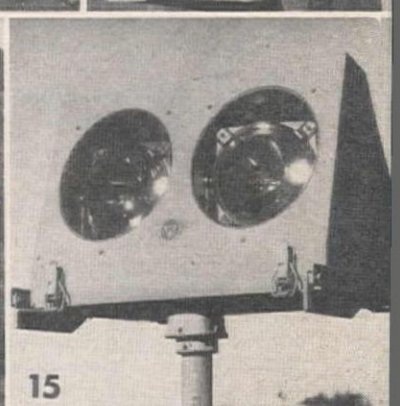
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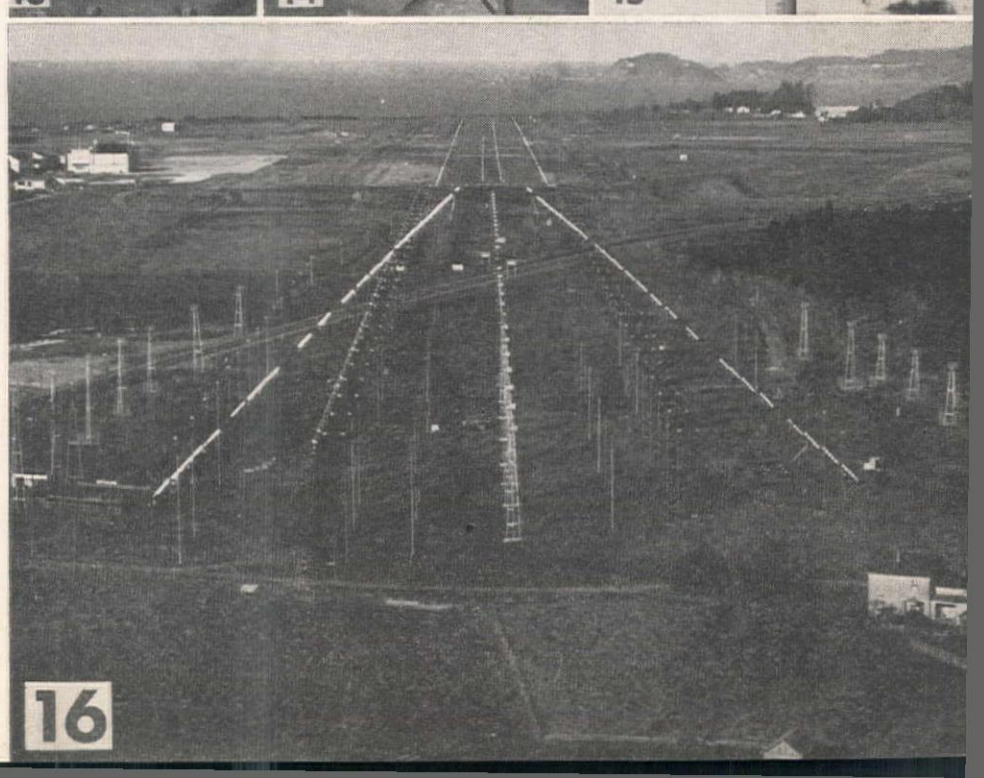
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Engineers Can Help Cut Costs

We are tempted to lay the blame for high construction costs on the doorsteps of labor, the materials supplier and the contractor—But the engineer has some costly habits too!

By CECIL C. ARNOLD
Civil and Structural Engineer
Seattle, Wash.

IN SPEAKING of construction costs today, one is tempted to place responsibility on those elements or divisions of the construction industry of which the writer, his group, or his direct endeavor is not a part. Labor scores owners and political bodies, contractors criticize engineers, engineers condemn material suppliers. If, however, the premise is adopted that each of the elements is responsible for certain portions of construction costs, this multi-ring circus of blaming the other fellow is readily understood. Obviously all elements of the industry are responsible for portions of the total cost, and reduction thereof can be attained only by close examination and correction at the proper level. It is not necessary to emphasize the terrific effect that costs of today are having on the construction program. Revenues, accruals, and budgets, established previously, are now too often inadequate, resulting in delays or postponement of a needed improvement.

Some costs are controllable

Faced with rising costs and an extensive program, the New York Housing Authority effected drastic reductions in the cost of their completed units. Quoted from a report on this achievement is the following: "The reduction was the result of a very realistic and direct approach. Instead of specifications such as those written for monumental buildings and enforced by what are sometimes called the 'razor blade, mirror and marble boys,' standards of design and construction, based on good commercial practice were formulated, and inspection, although thorough and efficient, was carried out for the good of the job and not for the glory of commas and semicolons."

This colossus of the industry may be broken down into five component parts: material costs, labor costs, equipment charges, overhead and management costs, profit. Consideration will be devoted to influences that affect the first four, the fifth will not be discussed other than to say that the profit rate is determined by competition over which engineers exercise little or no control.

Considering the first four of these components, however, considerable control may be exercised, varying from near absolute, as regards materials, to secondary for labor, to slight in the case of equipment charges, with an important and increasing amount in the item of overhead and management.

Decisions and practices affect costs

First, let us analyze how a contractor arrives at an estimate for a job or project upon which he proposes to bid. Let us determine the origin and scope of cost data. Material prices, freight, equipment outlays, labor rates have a current market price concerning which information is readily available. For those items of work that occur on the job the contractor and engineer are responsible for the cost of achievement: the contractor's function is to plan, coordinate and accomplish the physical features in such a way as to utilize the minimum of labor, material, time and equipment; the engineer's function is to design, specify and inspect.

Cost data and cost estimates are based on experience and reflect the contractor's initiative, resourcefulness, and management as well as the physical requirements of the plans, specifications, and inspection.

The predominant characteristic of cost data, from which estimates are prepared—is that it encloses, embraces, and sums up all the experience the particular contractor has encountered, as well as all other information he can obtain. In fewer words it is the balanced and adjusted tool with which he engages in business. All requirements of plans, specifications, inspection, contingencies are absorbed in the cost data. Only by changing requirements, eliminating contingencies or modification of previous practice can we—from an engineering viewpoint—affect construction costs. In our competitive economy undue allowance for anticipated costs and profit will prevent an operator from obtaining business. Insufficient allowance will usher him abruptly from the field. It is axiomatic that the owner and the engineer must pay for just what they require of the contractor.

The "See No Evil" attitude

Perhaps some professional habits or technical procedures are being followed without knowledge of their effect upon the cost of an improvement. Examination and correction where desirable is the first step for engineers in a program for reduction of construction costs. Let us analyze the effect of the engineer on costs and consider what response may be anticipated by departing from present procedures.

In comparisons of present costs with those of 8 or 10 years ago, engineers frequently omit consideration of the effect of present design standards. A great amount of thought is devoted to features heretofore considered of minor importance, or non-essential, including such items as slope treatment, flat embankments, transition of cut slopes, preserving and rehandling top soil, etc. Some have proceeded on the theory that inclusion of part or all of the above cost the owner nothing, or an inconsequential amount. This, however, is not the case.

Aesthetics up costs

The features just discussed are premised, or based, on the concept of improving the appearance of our vehicular routes while a second group stems from the desire to expedite traffic movement with safety and comfort. In this second group must be considered neutral zones on multilane routes, shoulder width, sight distance, curvature, channellized intersections, and pedestrian ways.

It must be kept in mind that the first group offers nothing to facilitate the movement of traffic. Expenditures made for appearance, and the maintenance of aesthetic features culminate in a pleasing panorama to the motorist, but concentration of effort on features that increase or enhance the traffic capacity of our presently overloaded system will certainly provide the most favorable return.

Regarding the second group, an entirely different attitude must be adopted. Each individual design problem should receive special consideration and not be subject to a predetermined cross section handed down as a model. Many provisions have been made for a future that never materialized. On the contrary, provision for normal development has not always been embraced by the original design, in which case critics have not failed to comment upon the lack of foresight. Very frequently provision included in the original construction was not adaptable to the requirements of additional development when the time for it occurred. There is no definite rule to apply in making decisions to provide for the future. Demands, equipment and needs change so fast that it is impossible to predict definitely what will be needed ten, fifteen or twenty years hence. There are, however, several fundamental criteria or guides to follow:

1. **All design should be an integral part of an overall highway, road or arterial system made after careful study**

AT THE SECOND Annual Conference on Road Building sponsored last month by the University of Washington, Mr. Arnold presented a valuable paper on the engineer's part in high construction costs, and suggested corrections which might be applied to reduce, at least in part, the present elevated price level. Re-written for publication, Mr. Arnold's excellent suggestions are presented herewith.—Editors.

of existing movement, changing areas and development trends. Future large industrial, business, or residential growth in an area is almost certain to overtax the existing traffic facilities. Provision in design for the future demands of all such potential growth will result in a waste of materials and funds. In the case of definite indications of forthcoming developments, consideration should be given in the original design to the location of future intersections, additional widths, pedestrian ways, etc. This has the effect of permitting the future development to participate **in the cost when, if, and to what degree it occurs.**

2. Effort and expenditure placed on drainage, alignment and sight distance will be of lasting benefit except for the unlikely condition of total abandonment of the route.

3. **Capital expenditures that operate to reduce annual maintenance costs will nearly always be of overall advantage,** although each such question should be analyzed separately. No demand upon our resources draws heavier than that of maintenance. Engineers would do well, concerning this topic, to consider the practice of railroad engineers, many of whose ideal or goal is to design an improvement which will require NO annual upkeep.

Keep foundations out of the courts

Probably the most controversial topic between engineers and contractors is that of responsibility for foundation conditions. This is almost comparable to Mark Twain's remark concerning the weather.

It is the usual practice for the owner's engineer to explore foundation strata, prepare a design upon his findings and state in the specifications that the responsibility for whatever may be found shall be that of the contractor. This practice has led to many long and intense arguments, sometimes ending in settlement by the courts. Such statements as "the contractor shall verify all dimensions and data in the field prior to initiation of construction operations" are frequently used. Often months are spent investigating foundation conditions, studying rainfall records, making alternate locations and other types of study and research preparatory to a final design. The owner then advertises for bids in thirty days and blithely states that "the contractor shall make his own investigations as to soil, runoff, nature of materials, etc." It would appear in such cases that the engineer is trying to make the contractor responsible for engineering matters and in addition **function above the level of information furnished him.** This evasion of engineering responsibility can have, **and does have,** the effect of placing a contingent allowance in the bid for the uncertainties or unknowns placed on the contractor's doorstep.

This contingent allowance **can be eliminated, or reduced,** by an adequate investigation by the owner's engineers, furnishing bidders with that information, and assuming responsibility for its accuracy.

During the recent defense emergency, various governmental agencies awarded contracts on incomplete plans and specifications. Many times, in such cases, contractor's quotations were far in excess of what the government agency considered adequate and a reconciliation was attempted and very often reached. Almost always the disparity of estimates resulted from incomplete or indefinite plans, specifications or description of the work to be done. Clarity and completeness of plans and specifications, with the supply of all pertinent information to contractors will result in lower bids and better accomplishment than vague detail, contradictory clauses, and incomplete information. The reaction of contractors to incomplete or contradictory plans is that the engineer himself is not certain as to what is needed, resulting in a contingent allowance in the bid.

THE ARTICLE IN BRIEF . . .

Practices, procedures or habits of engineers that tend to increase construction costs over the minimum are the following:

1. Design standards that require features heretofore not considered as essential or make an initial outlay for an indefinite future condition.

2. Requiring the contractor to assume responsibility for engineering features that already have, or should have been investigated.

3. Incomplete or inadequate plans and specifications.

4. Inelastic clauses in specifications that require exactness where unnecessary.

5. Programming that results in a concentration of work in the summer months.

6. Improper treatment of materials or processes.

7. Lack of standardization in basic materials.

Tolerances—for finished work

A characteristic of the engineer is to be precise. When writing specifications this characteristic results in specific and definite clauses for others to accomplish. Thus, it is stated, "forms shall be true to line and grade." This phrase means **exact**—a condition difficult to attain and in many cases not worth the effort and cost. Certainly forms should be sufficiently accurate that the utility and appearance of the finished structure would not be impaired, but there are many unexposed places where exactness of dimension is unimportant. A more reasonable and workable way to express accuracy would be a specified tolerance for various portions of the structure. The emphasis and work should be placed where it will return the most, and dispensed with where unnecessary.

A somewhat similar condition exists relative to line and grade control for earth work on sub-bases. A great deal of attention is frequently devoted to such control on grades that are not of uniform depth, have included an arbitrary shrinkage allowance, are composed of non-uniform materials, and then will be trimmed prior to placing base or wearing course.

Another common definite requirement is that concerning foundation piles: "shall be driven to refusal." No two inspectors have identical ideas as to what constitutes refusal. This can be better defined by stating the bearing capacity and appropriate formulae that will yield the pile resistance the engineer desires.

Precision can be overdone

The principle of requiring precision and exactness should be limited to the degree it is of advantage to the improvement, rather than attempting to attain the ultimate in performance by inelastic clauses. The inelastic clause eventually will be interpreted by the resident inspector in accordance with his views, experience, and advice from superiors. This in itself necessitates a contingent consideration in the bid. Although we cannot calculate the amount— **great waste occurs through fineness and accuracy that do not contribute to the use, life, or appearance of the improvement.**

Perhaps as a hangover from dump cart and fresno days, we continue to require hand finishing of earthwork and other surfaces. Under present conditions this is very expensive. Comparing present day prices of common excavation to those of ten years ago, the index factor is found to be much less than that for most other construction units. This favorable index for earthwork is due to the development of, and skill in the use of machines. Conversely all items requiring a large amout of hand labor have increased in cost to our high present level.

Here again tolerances could be established for finish work that would encourage the development of machines and machine skills and displace the expensive hand methods.

Making an ally of the weatherman

Seasonal operation, or production during only part of the calendar year, is a serious handicap to the construction industry. Every effort should be made to award, in the early fall, contracts which can be performed in whole or in a major part prior to the summer season. Certain operational costs of contractor's organizations are on an annual basis, such as rents, interest, insurance, equipment, key personnel, etc. If the annual cost of the foregoing can be distributed over more jobs throughout the calendar year and the key personnel occupied by a longer period of production, unit costs will be decreased.

This is not to say that grading of clay materials should be programmed for winter construction but rather, that a studied attempt should be made to award for summer construction only that work which cannot be accomplished in the winter. This will partially solve the economic-social problem of seasonal unemployment and reduce con-

struction costs by further distribution of annual operational charges.

Recognition must of course be granted to statutory limitations such as fiscal years, bienniums and budgets, but those are barriers which should be removed rather than used as a defense for concentration during the summer.

There are materials and materials

Non-competitive material items, or special materials and processes, make the contractor unable to quote the minimum for construction requiring such items, as he must allow for delays, premium prices and uncertain deliveries. It is pointless to argue that all potential bidders are equal in this respect. They are, but the aim is to determine how the total cost can be reduced. While the practice of specifying an article by the manufacturer's trade name and adding the words "or approved equal" gives every supplier an opportunity to quote, it must be remembered that the words do not **insure** competition among suppliers.

Where possible, material specifications should be built around those products or materials that are readily obtainable in the area where they will be utilized. Doing so insures competition, minimizes freight, and avoids delays. Again, material acquisition is more completely under the control of the job management.

Specifications should fit conditions

This does not mean that the engineer should ignore, or fail to consider, use of those products manufactured at some distance from the point of potential inclusion but to emphasize that when use of distant materials is considered, the economic study should envisage the additional time required for procurement, the availability of local craftsmen of the quality necessary for installation, the effect delays in material arrivals will have on progress, and other similar considerations. At a price, and in time, the construction industry can supply any commodity or item. The premise that new materials, special processes or their adapted use, successfully utilized in other areas or on other projects can be incorporated advantageously into the project under consideration should be used with **extreme reservation.** For example, the concrete plant at Coulee Dam contained many devices for scientific control of concrete, such as time recorders, weight recorders, energy consumed, etc. For such a project the need, or usefulness of such apparatus is not questioned. However, beyond a doubt, the requirements of that specification have subsequently been misused oftener than they have been utilized to advantage, by those who thought security against comment would accrue upon inclusion or adoption of the basic Coulee spec for their project.

About three years ago I reviewed concrete specifications for a project requiring approximately 2,500 cu. yd. of concrete, the greatest continuous pour being less than 200 yd. The Coulee specification was employed, adopted on the hope of obtaining the best possible product and avoiding comment and criticism. The reaction generated was nearly the opposite. Plants of this type are unwarranted for small volumes of concrete and their requirement results in cost without comparable benefit.

Standardization of material specifications

Further saving can be achieved by standardization of material specifications. The cost of manufacturing, storing, identifying, and handling of basic materials is increased by additional special requirements for chemical content, physical properties, and isolated storage. For large projects this may be warranted, as the saving offered in the field by a special characteristic of the product may offset the additional manufacturing-handling cost.

The effect of this practice as applied to Portland Cement is typical. Until about fifteen years ago there was one basic specification for Portland Cement. The design of several large projects opened the way for special cements whose characteristics were considered desirable for those projects. These special cements, in general, were refinements aimed at changing the behavior of the standard product. Today, Portland Cement is covered by five basic specifications, some of which are further modified by additional requirements, imposed by the engineer preparing the specifications, who desires a particular behavior, or who uses a specification taken from some project that he believes conducted exhaustive investigations to obtain the acme in quality.

These various requirements have been met by cement manufacturers but a higher price must be paid for isolation of near identical products, special handling, interruption of plant operation, and in some cases, scarcity of the basic material due to large commitments for the special product.

Great strides have been made toward standardization of basic materials, witness such common items as steel shapes, brick, sewer and culvert pipe, and recently bolt threads, but still there is a tremendous waste of effort devoted to isolating, warehousing and manufacturing near identical materials. The example cited of cement can be paralleled in many other commodities.

There need be no fear that scientific progress will be nullified through standardization, as competition between materials such as aluminum and steel, or Portland Cement and asphalt, provides sufficient incentive to keep each industrial group alert to the need for bettering their product.

The contractor's part

Contractors could contribute something in this field that would operate to reduce costs. Most contractors' organizations accept without question the owner's specification for materials and merely obtain quotations from suppliers. Upon receipt of these quotations it is rarely that they analyze and compare them to ascertain if the quoted prices reflect any increase attributable to departures from basic specifications. Were they to analyze quotations and find an appreciable price increase due to special requirements which will not provide comparable field savings, they should advise the engineer. While perhaps annoying to the engineer, this performance has possibilities not as yet developed. The burden of using it is on the contractor, engineer and material supplier. In construction for private industry, the contractor is frequently required to price component parts of the contemplated improvement in detail in order that the cost of each part may be compared with the anticipated service or utilization. Admittedly this restraint is more difficult to apply on public work, but only by determination of the cost of all elements of the whole plan can the non-essentials and unwarranted costs be eliminated.

This procedure applies similarly for work performed on the job. For here **again the contractor and engineer must balance cost against benefits.** Such analysis will require contracting organizations to know unit costs of various operations. Should business enter a cycle of diminishing volume, the practice of cutting the suit to fit the cloth will become a much more advanced science than it is today. Engineers likewise will have to know cost detail to stand competitively against fellow engineers.

All should share responsibility

Although not discussed here, the largest single factor in our cost structure is that of labor production per man. No treatment of costs can progress far without encountering this feature.

It must be borne in mind that the industry as a whole is responsible for the total cost and each of the elements, that is labor, manufacturers, contractors, engineers and dealers share responsibility at appropriate levels. No improvement is likely by sacrifice of any one element to the advantage of any other element: rather we must examine, analyze and determine over the entire industry where savings can be made, if we actually wish to do so.

F.P.C. Pegs Cost of Two P. G. & E. Pit River Dams

THE FEDERAL Power Commission has determined the actual legitimate original cost of two of the three dams comprising Pacific Gas and Electric Company's Pit River, Calif., hydroelectric project to be $14,176,096.

In its cost determination, the Commission disallowed as part of the cost of the two units items aggregating $680,887, and prescribed the accounting disposition to be made by the company.

Pacific Gas and Electric filed its latest statements of claimed cost for the units in April, 1947, after joint conferences were held by members of the FPC staff and representatives of the company. As proposed by the company and now approved by FPC, cost of the unit designated as "Pit No. 3" was determined to be $12,503,275 as of June 30, 1930 and "Pit No. 4," $1,672,822 as of Oct. 31, 1930.

Steel Conduit Crosses Hills, Swamps

AMIDST FOG and Sierra Nevada foothills, another 24 ft. of the new aqueduct is lowered into place. Slopes were mild here.

The $22-million Second Mokelumne Aqueduct, to carry an additional 105 m.g.d. of water to San Francisco East Bay cities, presents some unique design and construction problems

PROCEEDING CLOSE to estimated costs and construction time, the $22-million Second Mokelumne Aqueduct project which will ultimately carry an additional 105 million gallons of water per day to California's East Bay cities is expected to be in service by spring of this year. Seven-eighths of the 81 mi. of new pipe has already been installed, tested and accepted by the East Bay Municipal Utility District. Piling and installation is over half completed on the difficult Unit C between Bixler and Holt, a distance of 10.8 mi., for which Ben C. Gerwick, Inc., of San Francisco, holds the contract. United Concrete Pipe Corp., of Baldwin Park, Calif., is furnishing and installing the pipe on Unit E from the West Portal of Pardee Reservoir outlet tunnel to the vicinity of Lockeford, a distance of 14.6 mi.

Heavy demands

The existing aqueduct has been in service since 1929. It consists of a conduit 93.85 mi. long from Pardee Reservoir on the Mokelumne River in the foothills of the Sierra Nevada near Jackson, Calif., to reservoirs in the hills above Oakland, Berkeley, and the other East Bay cities. It was designed to carry a flow of 42 m.g.d. by gravity, and as demand increased, this flow was raised to 67 m.g.d. by installation of pumps near Walnut Creek, and again to 95 m.g.d. by installation of a pumping station near Brentwood.

In order to keep pace with the phenominal growth of the East Bay area the construction of the second aqueduct, which had been foreseen by the original designers, was launched in 1946. This consists mainly of 67 and 68-in. pipe, laid parallel to the existing line and generally 15 ft. from it. Tunnels, submerged river crossings, and other special structures were built to maximum capacity at the time of the original con-

ENGINEERS on the project include, l. to r., LEE ROVZAR and OTTO BOHL, resident engineers on Units C and E, and HAROLD POPE, supervisor of pipe placements and furnishing.

struction, so that only about 81 mi. of pipeline is involved at present. (A description of the design and construction of the line between Walnut Creek and Byron appeared in *Western Construction News* for August, 1947).

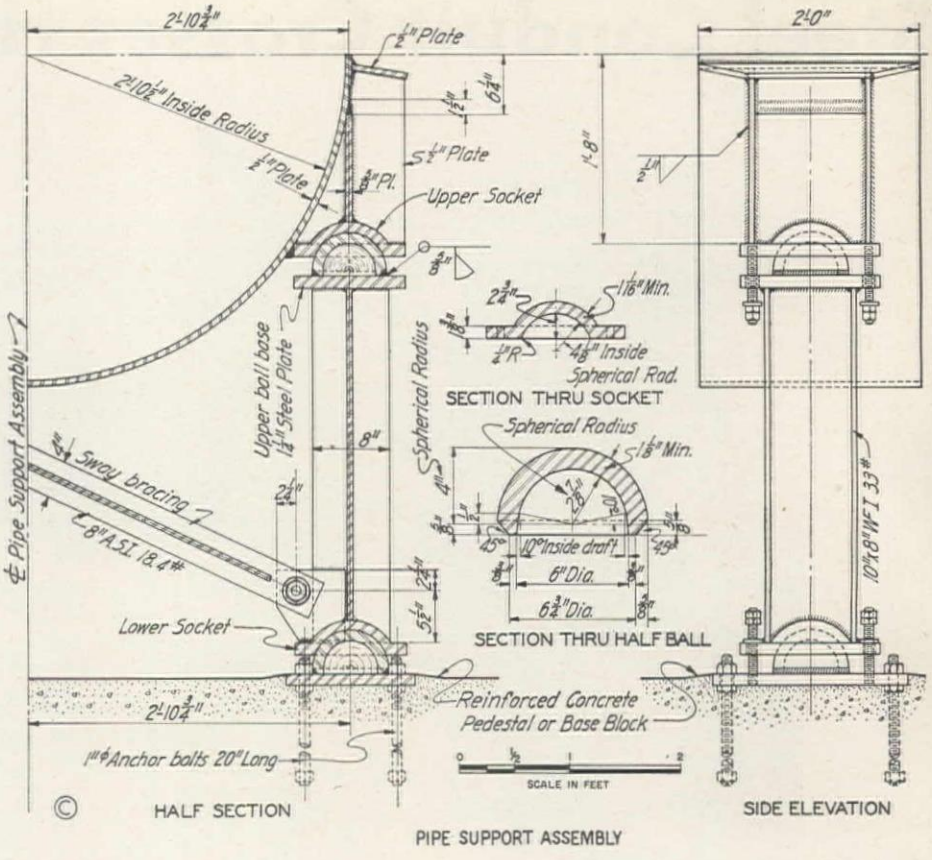
The line is buried for most of its length. However, Unit C, being placed under the Gerwick contract, crosses the swamps and peat land of the Sacramento-San Joaquin River delta, and must be supported above the surface. Many unique problems arose in this undertaking.

Double batter in marshes

Concrete anchor structures and intermediate piers rest on concrete piles driven to depths of 16 to 50 ft. through layers of peat up to 20 ft. deep. Resident engineer on this section of the aqueduct, Otto C. Bohl, achieved stability of the pipe supports by driving the 16-in. square concrete piles through 20 ft. of peat and 30 ft. of silt and fine sand in extreme cases before skin-friction or solid foundation would support the applied loads. The anchor structures are usually 990 ft. apart, and midway between them expansion joints are placed in the pipe. In order to give the pipe bents permanent stability, specifications called for the contractor to drive the 4 piles per bent on a batter of 3 on 12 at 30 deg. to the alinement of the pipe. This required specially designed heads on the pile driver rigs. Above the piling for each pier and tied to them by reinforcing steel is a heavy concrete deck, and upon these decks are erected special structural steel pipe supports with two ball and socket joints per column to permit axial movement of the pipe without lateral sway or frictional abrasion.

Mortar spun onto pipe

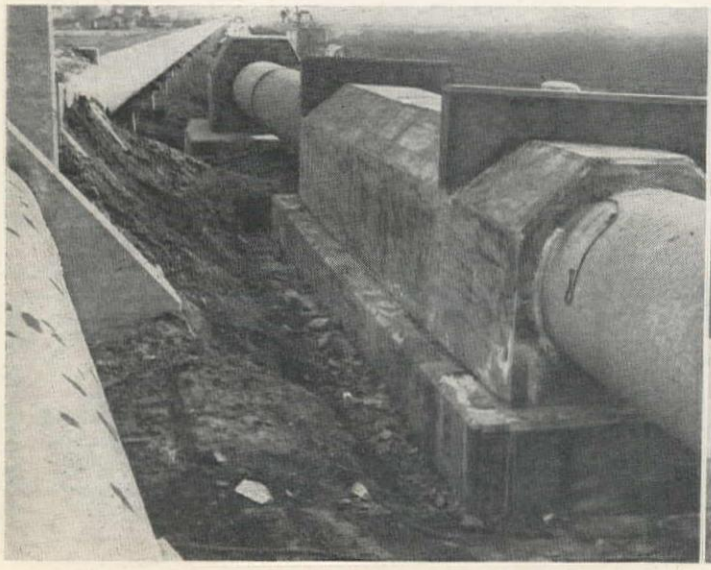
This above-ground section of the pipe is of 69-in. outside diameter steel, lined with ½-in. cement mortar, furnished by Consolidated Western Steel Corp., and lined by American Pipe & Construction Co. The cement mortar lining consists of 825 lb. of Portland cement, 600 lb. of fine 30-screen sand, and 1,850 lb. of coarse 4-screen sand per 30-ft. section of steel pipe. The batch is mixed with 50 gal. of water, then sprayed onto the spinning steel shell. Centrifugal force throws off two-thirds of this water. Recent sub-freezing temperatures in the Sacramento Delta area forced American Pipe to mix 8 lb. of calcium chloride with the mortar. This 1% admixture heated the mortar to 50 deg. F. in the frosty air. The pipe is then sprinkler-cured for 10 days and the outside sprayed with quick-drying (1 hr.) aluminum paint—American Pipe Company's Amercoat. This petroleum-resistant acetate-base paint is used because it will not burn more than 1/32 in. from the welding heat.

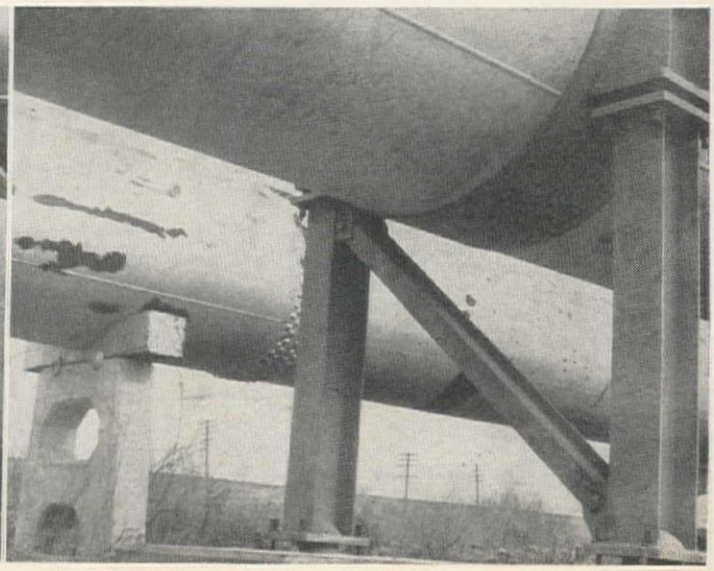


Custom-built supports

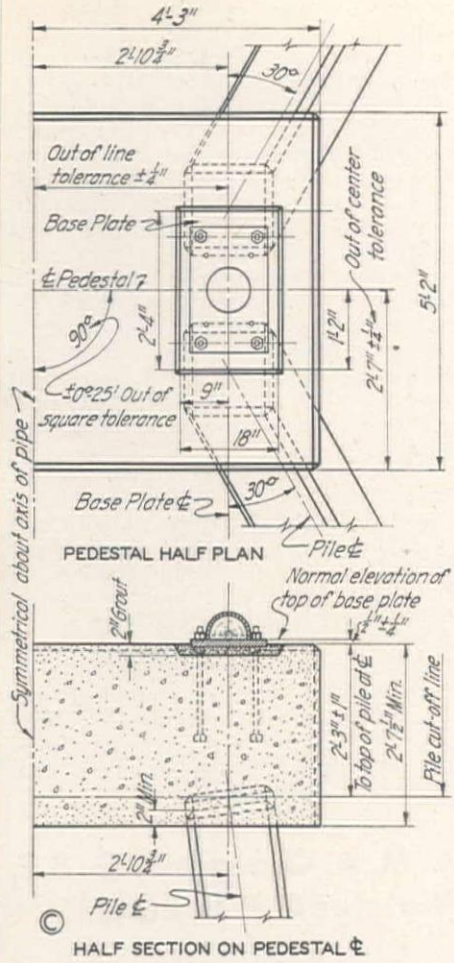
The pipe supports consist of a semicircular strap of ½-in. steel plate 2 ft. wide, with an inside radius of 2 ft., 10½ in. Gussets are welded to these straps near the open ends and to the gussets is welded the socket of the upper joint. The ball for this joint rests on top of a section of 10 x 8-in. wide-flange I-beam, to the lower end of which is attached the socket of the lower joint. The ball of the lower joint, in turn, is welded to a steel plate which is fastened to the concrete pedestal by stud bolts.

The balls of the joints are of 1⅛-in. steel, hemi-spherical in shape with an outside diameter of 8 in. The socket, 1-1/16-in. thick, has an inside spherical radius of 4⅛ in. The ball is a complete half-sphere, but the socket has a depth





OLD AND NEW. Anchor block on new pipe, left, will also support a roadway in the future. Close-up view of pipe bents, right, contrasts new custom-built steel type with concrete bent generally used to support original aqueduct.



of only 2¾-in., in order to allow revolving movement.

Thus, when the support column is in a neutral position (pipe at 60 deg. F.) the plates to which the ball and the socket are welded will be parallel and 1⅜ in. apart. Four control studs, 1⅛ in. in diameter, are then passed through drilled holes in both plates and nuts are screwed on, allowing a free length known as K, which amounts to ¼ in. plus an additional ⅛ in. for each 100 ft. or portion thereof from the nearest pipe anchor. The two columns under each semi-circular strap are tied together with sway bracing.

These steel bents are manufactured to order by Independent Iron Works of Oakland, Calif. The supporting steel plate saddles are of sufficient bearing area that no gasket material other than a second layer of Amercoat is required to cushion the pipe. The ball and socket joints are lined with one application of heavy grease, bearing flaked graphite.

Extensive falsework

Several miles of Unit C pipe are being laid on marsh-lands unsuitable for anything except military amphibious equipment. Instead of risking heavy equipment under such tricky conditions, Gerwick, Inc. built a heavy grid system of falsework supported on timber piling along this entire section. All piles and foundations for the bents and anchors were placed by working from this falsework and are actually submerged from sight in the marsh.

Then the pipe was stock-piled on a flat dock at the edge of the marsh adjacent to the line. One section at a time was then rolled onto a specially built sled runner and the sled and pipe pulled by cable to the point of placement. The pipe is then shoved into place by whipsawing back and forth with the cable, and the sled returned for a fresh charge of pipe.

This method requires no heavy equipment except trucks to place the pipe on the flat loading dock and a power winch to pull the cable. The loading dock is on solid ground and the power winch is a take-off from a pile driver rig anchored in place 1,200 ft. up the line. The pipe is cradled on the sled runner at a one degree angle off grade.

Two-point balance

After the runner is pulled to the open pipe end and parked in place with the mating ends intact, a single-pass 5-in. bead with a 3/16-in. rod tack-welds the bell to the spigot. As the sled is pulled away, blocks are mounted at the center of the section so that when the runner is entirely removed, the pipe pivots around the tack weld through the one-degree angle and lies exactly on grade. In this manner the 30-ft., 7-ton section of the pipe is completely supported by the center block and the tack weld until the joint is secured.

Final seal is made by a double-pass lap weld on both inside and outside of the 2-in. bell and spigot joint. Since there are no curved sections of this centrifugally spun pipe, change in line is done with 8-ft. pipe sections butt-strapped to give maximum bends of up to 3 degrees per joint. The pipe is tested several miles at a time under a static pressure of 180 p.s.i.

Under another contract, United Concrete Pipe Corp. is trenching the line at Unit E straight to the valve house at the West Portal of Pardee Tunnel. Bucking slopes of nearly 100 per cent and shooting bed rock in the Sierra foothills, trenchers in several instances uncovered the original pipe, laid 15 ft. off line center-to-center. Excavation and pipelaying on the steep slopes called for ingenious methods, including the use of extra long booms, anchor cables to stationary tractors, and 8-ft. terraces along the trench for operating space.

Shop work

Designed for heads up to 280 ft., the pipe furnished by United for this section of the aqueduct is 67 in. in diameter and formed by the welding together of 2 semi-circular steel plates, approximately 3/16-in. thick, spirally winding and tack welding ½-in. reinforcing steel wire to the outside of the steel shell, and placing a cage constructed of ⅝-in. to ¾-in. reinforcing steel bars on the outside a distance of 3 in. from the steel shell. The assembled cage and steel pipe, 24 ft. in length, are then lowered vertically into a steel form and the concrete poured and vibrated into place so that at the end of the operations, the pipe is 6¾ in. thick. The lengths are then steam cured for a minimum of 6 hr., with the total curing time of 6 days.

Since the grade may go up or down 100 ft. as the aqueduct crosses draws and ridges, the extra strength of the pipe allows a constant cross-section to be used. As the pipe is laid up the hill, a strip of lead is gasketed in the bell on the uphill end. The spigot is mated to the bell and then cinched in place. Asphalt paper is wrapped around the joint and later acts as the form for the outside mortar.

At the West Portal of Pardee Tunnel a second valve house will be built to control the additional flow. The existing valve house contains a Pelton needle valve now opened to capacity.

Four automatic wasteway structures

HEAVY FALSEWORK was used to support new steel aqueduct above marshlands, on this section of the job, before special steel bents were secured in place on submerged concrete foundations.

STEEL SHELL concrete pipe being placed to grade in the foothills of the Sierra-Nevada range. Steep slopes and wet weather were the toughest problems encountered in trenching and pipe-laying.

will be installed at different points in the new Mokelumne aqueduct to divert all flow in the event of a breakdown.

The entire project is under the direction of John S. Longwell, Chief Engineer and General Manager of the East Bay Municipal Utility District. R. C. Kennedy, Assistant Chief Engineer is in charge of design and J. W. Trahern is handling the preparation of plans and specifications. Construction work is directed by E. L. Macdonald, Manager of the Mokelumne Division. On Unit C, Otto C. Bohl is resident engineer for the district. L. H. Rovzar is resident engineer on Unit E, and Harold F. Pope is supervisor for United Concrete Pipe Corporation.

First State-wide Street and Highway Meeting Held at University of California

WITH THE AID of the University of California, the Institute of Transportation and Traffic Engineering at the Berkeley campus sponsored the first meeting of its kind in the California area to give city and county engineers first-hand information of the practical—and often rare—type that they want. These city and county engineers, necessarily practical in the extreme because of limited local funds in many cases, voiced their approval of the Street and Highway Problems Meeting by strong and sustained attendance and discussion.

Nine sessions, plus a 440-volt evening smoker and general exhibit, headlined the discussions which were designed to bring engineers up to date on what is being done to solve many local and state-wide headaches. County road and traffic engineering sessions were predominantly panel discussions led by the men who actually manage the budgets, write the annual reports, and struggle to reduce traffic congestion. Such points as equipment rental rates, load limits, capital outlay, and safety were aired. H. F. Cozzens, Road Commissioner of Monterey County, stated that as the construction dollar value goes down, so does the percentage of new construction go down, and added that self-styled critics of county budget managing must realize that many counties spend a major portion of their income on maintenance rather than new jobs for this same reason. W. B. Boggs, Road Commissioner of Alameda County and moderator for the morning County Road Session, added that new construction must be budgeted carefully, whereas maintenance costs need only be divided between primary and secondary systems.

Professors H. E. Davis and D. S. Berry, acting directors of the Institute, did a commendable job in the organization of the meeting. They recognized the need, then assembled a formidable list of specialized engineers to speak. Unfortunately, due to time limitations and organizational difficulties, first meetings of this kind are apt to leave wide gaps of information untouched which must lie undisturbed until the succeeding meeting. It is anticipated, however, that the interest exhibited in these sessions, and the existence of many further subjects to be explored will assure the success of future gatherings.

Among the principal speakers were: F. N. Hveem, Staff Materials and Research Engineer, California Division of Highways; D. J. Steele, Materials Engineer, Public Roads Administration; K. A. MacLachlan, Planning Engineer, California Division of Highways; A. F. Ager, Senior Transportation Engineer, California Public Utilities Commission; F. J. Grumm, Deputy State Highway Engineer, California Division of Highways; and Professor T. J. Kent, Director, Department of Civic Planning, University of California.

C. M. A. Charges P. G. & E. Violates C. P. U. Edict

A COMPLAINT charging that Pacific Gas & Electric Co. has operated in violation of the California Public Utilities Act has been filed by the California Manufacturers' Association. The complaint constitutes formal charges before the State Public Utilities Commission. P. G. & E. is being called upon to answer the charges in public hearings.

C. M. A. charges that P. G. & E. has been diverting natural gas from public consumers to its own use, and the rate at which the company sells gas to its other departments is far below the rate charged any of its public consumers, resulting in higher rates to the public. The charges allege that rates charged by the company for natural gas furnished to all industrial consumers have been increased to the point where they now merge with the rates charged residential and commercial consumers, whereas the service provided is "far inferior."

Further charges are that P. G. & E's gas department is producing sufficient revenue to provide a rate of return in excess of 8 per cent, and that such a rate is excessive and unreasonable. The accusation pointed out that P. G. & E. is able to withhold gas from public consumers and divert it to its own use because of war emergency rulings.

P. G. & E. is presently asking for gas rate increases affecting residential, commercial and industrial consumers to return $6,000,000 additional revenue. C. M. A. charges that P. G. & E. practice of selling gas to itself at "unreasonably low rates" has necessitated the higher public rates, and is placing California industry at a distinct disadvantage in competing with other states.

Slip Forms, Elevator Climb Together

Continuous, round-the-clock pouring of concrete for large grain elevator made possible by use of movable wooden slip forms that climbed the walls

THE LARGEST grain elevator in northern California is now being completed at Pier 90—technically, Islais Creek—San Francisco, for the California State Harbor Commission. The elevator is being built by the Dinwiddie Construction Co. of San Francisco, for lease to the Kerr-Gifford Co., grain exporters, and will have a 500,000 bushel capacity. Previously, grain for export has been handled in sacks at this port. The present structure will allow bulk grain to be brought in on cars or trucks and dumped directly into a series of storage bins, providing a more efficient and economical operation. An endless conveyor belt with a movable dock spout will carry the processed grain to waiting ships, for export.

Eleven days of straight pour

Considerable interest was shown by the local contractors during the pouring of concrete for the 21 circular bins, each 88 ft. high and 20 ft. in diameter. The job was completed between January 3 and January 14, using a technique rarely seen in this region where grain elevators are uncommon, although it is standard procedure for structures of this type elsewhere. Continuous, round-the-clock pouring was made possible by use of a movable wooden slip form which continuously climbed up the walls. The form, four feet high, was supported by a yoke and raised by screw-type jacks. The 275 jack rods, one inch in diameter and spaced approximately every four feet around the perimeter of the bins, also served as the vertical reinforcing steel. In addition, at every foot, semi-circular steel reinforcing rods were fed in horizontally.

The pouring was carried out with almost military precision. The foreman's whistle was the signal for each man to give every jack in his section a quarter turn, raising the form ¼ in. This was later increased to a half, and then a full turn. In operations of this kind, as the jack raises the form, the concrete below is exposed, and it is necessary to gauge the speed of elevation very carefully, since, if the form is moved too quickly, the concrete will bulge at the bottom, while if the rate of speed is too slow, the concrete clings to the form. If for any reason the work must be halted, the jacks are kept turning forward and back so the form will not freeze to the concrete. Meanwhile, a man with a level keeps constant check to see that the surface is absolutely even.

The speed of pouring is determined by weather conditions which govern the setting of the concrete. In this case, the jacks were raised approximately 8 ft. ever 24 hr. There were three shifts, each pouring around 20 yd. a day. The bin walls are 6½ in. thick, and the concrete was given no curing treatment after the forms had slipped past.

Ample strength developed

All concrete was transit-mixed, being furnished by Pacific Coast Aggregate Corp. It was specified that 3,000-lb. concrete was required in the foundation and 2,500-lb. in the walls, but test cores indicated a developed strength of 4,500 lb. in the foundations, and 3,000 to 3,500 lb. in the walls.

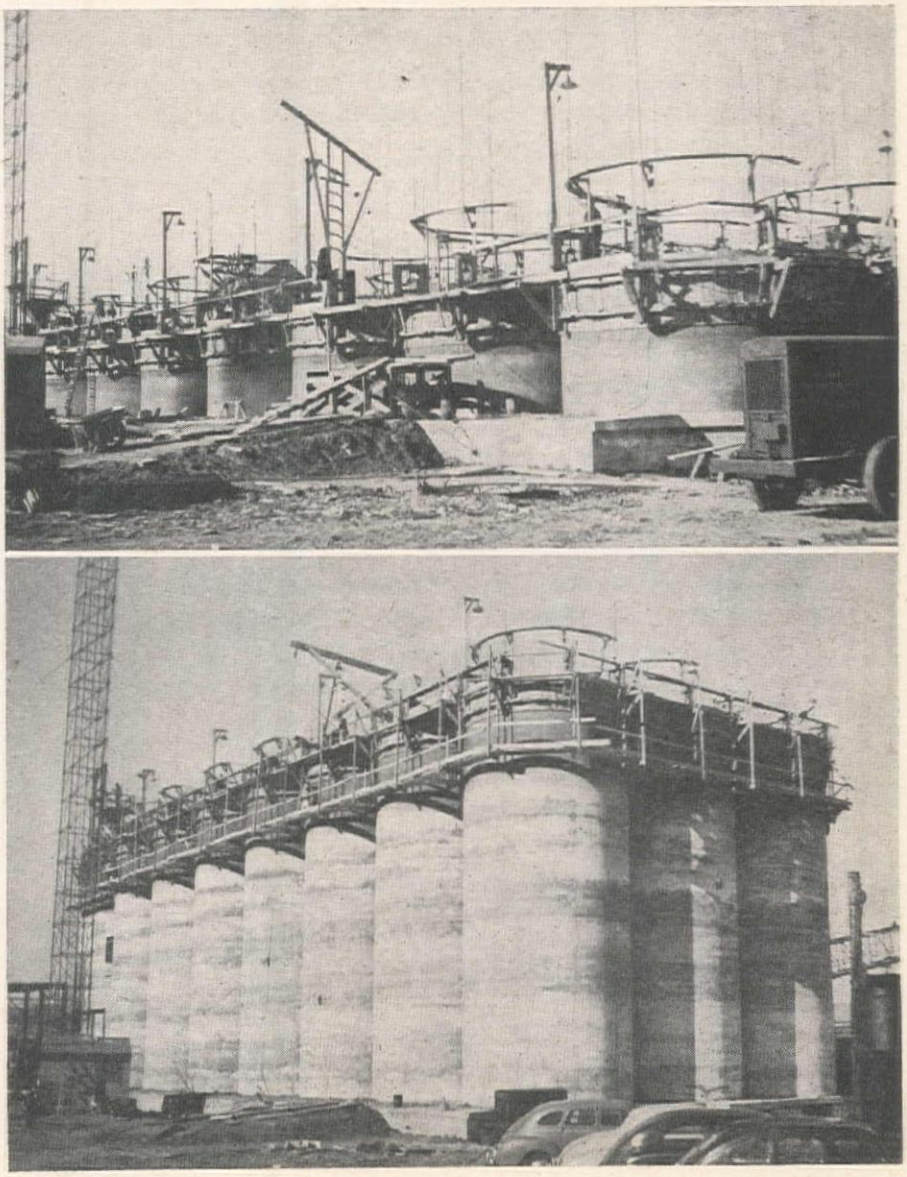
The only hazard to the schedule was an unexpected one, caused by California's Big Freeze. During the day and night pouring, the already low temperatures at Pier 90 were made almost unendurable by winds blowing in off the water, and the combination was more than some of the graveyard shift could take. Men who quit could not immediately be replaced, which doubled the load on the rest, and slowed down the job to some extent.

No more than 2 ft. of rod were exposed at any time, and as the top of one rod was reached by the jacks, another was welded to it. When the pouring of the walls was finished, the working deck mounted on the inside form became the form for the roof. Since there was no provision for expansion on the roof, steel was put in the concrete roof slabs to distribute the shrinkage throughout. The roof is 4 in. thick and is tied to the side walls with steel dowels. It is covered with composition roofing.

Piling required for support

Aside from pouring the bins, the biggest problem on the job was caused by the insecure foundation. The Douglas fir piles go down through mud, and hardpan is not hit until approximately

AT A RATE of 8 ft. in every 24 hr., the elevator climbed to its full height in 11 days. Concrete pouring was with almost military precision, to the tune of the foreman's whistle.



FOUNDATION for the grain elevator was 80 ft. of uncompromising mud atop hardpan, requiring an extensive piling system. Note transit propped on three piling butts.

70 or 80 ft. Test holes were bored before the actual driving commenced, and due to the possibility of displacement by shifting mud, it was required that all piles be re-driven for final position and stability. The pilings had a minimum 8-in. tip, 14-in. butt and each had to sustain a 15-18 ton load. Penetration was from 65 to 75 ft.

The completed elevator will contain 21 round bins and 12 star bins. Operation will be entirely automatic. Grain cars will be moved in over a pit from which the grain will go up through the scalper to designated bins, while a truck lift and dump handles grain arriving by truck. When storage of grain is in progress, all bins will be automatically shut off, except those scheduled to receive the shipment.

W. H. Faulkner is project manager in charge of work on the elevator, under a contract amounting to approximately $1,900,000. G. H. Bull is job superintendent, and Edward F. Carter of Vancouver, B. C., is the consulting engineer. Chief engineer for the California State Harbor Commission is Harry Squire.

Private Contractors Pool Fleets of Equipment for "Operation Snowbound"

PRIVATE CONTRACTORS from California to Michigan have placed a tremendous fleet of equipment in a pool of snow-moving machines on which the Army is drawing in its fight to break the snow blockade in the snowbound Western disaster area. This equipment supplements the Army, Navy, and Air Force equipment already in operation.

From the hour that appeals went out by press and radio on Jan. 29 for machines and operators to throw into "Operation Snowbound," the response was excellent, the Department of the Army reported.

Offers of heavy-type civilian-owned equipment needed in the fight poured into the Army operations headquarters in Omaha at the rate of more than 100 daily. No second appeal to the civilian contractors was necessary. Estimates in Washington give the total of heavy machines placed at the disposal of the Army by private contractors at approximately 675 bulldozers and more than 125 motor patrols and snowplows.

The contractors are also providing the necessary supervisory and equipment operator personnel. In addition, the labor unions in the area are cooperating in the titanic effort by furnishing all civilian employees of contractors the proper types of clothing for snow fighting in zero weather. The Engineer Operators Union and the Building and Trades unions also are advancing any needed funds to the civilian heavy-machine operators and maintenance men, in an effort to tide them over until pay checks are received.

Major General Lewis A. Pick, Army field commander, highly praised the cooperation of the contractors and unions. He has stated that their all-out assistance in providing equipment, operators and maintenance personnel has been a fine contribution to the relief program.

An example of the cooperation being given by the many large and small private contractors is the response of the Martin Wunderlich Company, contractor on the Corps of Engineers' Cherry Creek Dam near Denver, Colo. This contracting firm loaded all of the suitable equipment it had at the Cherry Creek job on flat cars and pooled it for quick shipment to the Nebraska area.

Meanwhile, the Peter Kiewit Sons Company, which has offices in Denver and Omaha, also placed all its useable equipment in the Denver pool. This quick pooling made possible the shipment of a 90-car train out of Denver for the disaster area. Both organizations provided supervisory personnel, operators and supply and repair equipment.

The Harlan County Constructors, a combination of firms that have the contract for building the main embankment and completion of the Harlan County Dam on the Republican River in Nebraska, released all their available heavy equipment for the snow battle. Their equipment and operator supervisory personnel were moved immediately into the snowbound area in Nebraska. Similarly, the S. J. Groves and Sons Company of Minneapolis placed all its available equipment at General Pick's disposal. Thirty pieces of equipment from this concern are working in the area.

Members of A.G.C. units, and other private contractors, in Colorado, Idaho, Kansas, Minnesota, Missouri, Montana, Nebraska, Nevada, South Dakota, Utah and Wyoming have participated actively in the snow removal work.

The A.G.C. pointed out that contractors were, in most instances, the first rescue and relief forces on the scene and that, in almost every case, their machinery and men had been put to work with no guarantee that there would be funds to pay for the work.

In Utah, all available road equipment was offered to Utah State Road Commission to alleviate distress in snow areas. Much of A.G.C. equipment is still in use, according to Allan E. Mecham, manager of Intermountain Branch of A.G.C.

Homer A. Scott, secretary-treasurer, A.G.C. of Wyoming, reported six prime contractors there had 48 bulldozers, 15 motor graders, three lowboys, and maintenance equipment as required on the job in six communities.

Nevada Chapter members have offered all of their equipment and personnel to assist in any way in opening roads and in feeding stock. Twenty big bulldozers and considerable lighter equipment are known to be in action. Parts were flown in by contractors' planes when necessary.

Hydraulicers Meet on June 12

PLANS for the Fourth Hydraulics Conference, to be held at Iowa City, Iowa, June 12-15, have been announced by the Iowa Institute of Hydraulic Research. The program will include five technical sessions, a guided tour of the new Institute facilities, and ample opportunity for informal gatherings. Thirteen correlated papers, which are now being preprinted for distribution to conference registrants, will represent a symposium on present-day principles and methods of analysis. Following the conference the papers will be published as the successive chapters of a comprehensive volume on "Engineering Hydraulics."

Thermit Weld Makes Ship Seaworthy

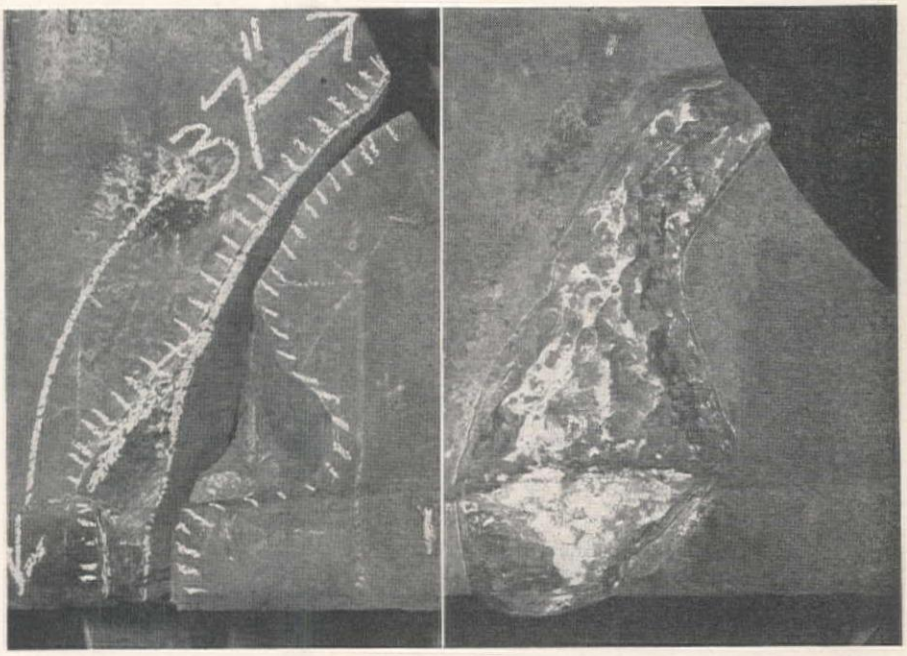
Large crack in ship's skeg made ship-shape by thermit weld in 72 working hours—Only alternative would have involved removal of the entire lower section of the stern frame

A THERMIT welding job, one of the largest ever performed on the Pacific Coast, was recently completed on the Matson C-3 freighter, "SS Hawaiian Merchant," at the San Francisco Yard of Bethlehem Steel Company, Shipbuilding Division. In 72 round-the-clock working hours the thermit weld was successfully made and considered by the American Bureau of Shipping as a permanent repair.

Explosion enlarges crack

When the vessel was placed on dry-dock for usual bottom painting and opening of sea valves, a small 4-in. surface crack, or what was thought to be a surface crack, was discovered in the forward end of the skeg at the point where the radius of the aperture starts. While the crack was being chipped out, it was found to be growing larger so burning and sluffing was started with an oxygen acetylene torch to further widen the area. At this time a small amount of water was noticed bleeding out of the crack. Soon after, because of the heat generated by the torch, there was a small steam explosion. Therefore, the cavity was further enlarged.

After the full extent of this defect in the casting had been determined, it was recommended by the American Bureau of Shipping that the only satisfactory method of repair, other than removal of the entire lower section of the stern frame, would be to make a 2-in. cut completely through the skeg at this point and then fill up the cavity and cut by thermit weld.



TWO-INCH CUT completely through the skeg, left, was made prior to welding. Completed thermit weld, right. Ship was floated just 25 hr. after the weld was applied.

48 hours with no sleep

The following time table shows the speed with which the job was performed. At 9 a. m. on a Friday morning authorization to thermit weld was received. The necessary sand box, shoring and aligning were completed ready for pre-heating at 8 p. m. the next day. The stern frame was pre-heated by kerosene torches until 8:55 a. m. Sunday morning. Then the thermit weld was made.

The frame was allowed to cool until 9 p. m. Sunday, and the box was removed. The weld was then ground, dressed and the adjoining areas restored to their original condition. The vessel's rudder was tested Monday morning at 8 o'clock and passed by the regulatory bodies concerned as being in proper alignment. The ship was floated at 10 a. m., left the yard and was ready to resume service.

Two Metal and Thermit Corporation welding engineers, Elmer C. Thylin, and C. W. Humphreys, stayed on the job continuously from 9 a. m. on Friday to 9 a. m. on Sunday without sleep to supervise and perform the work directly connected with that of making the thermit weld.

Proposed Shakeup of Colorado Road Commission Becomes Political Fodder

PROPOSED reorganization of the Colorado State Highway Department became political fodder last month in both houses of the State's Legislature after a bill was introduced to abolish the present highway advisory board, create a new five-man highway commission and place administration of the department in the hands of a non-civil service director of highways. The bill passed the House of Representatives without too much fireworks, but touched off a series of heated public debates when it reached the State's Senate.

The National Research Council, after an extensive survey of Colorado highway needs, geography and highway department organization, had recommended abolishment of the present seven-man advisory highway commission in favor of a three-man commission of non-paid members. This commission would be given the power to select a director detached from the classified civil service. A third phase of the report by the national council, concerning statutes for budgeting long-range planning, was not yet available for the legislators.

The Colorado State Association of County Commissioners, meeting in Denver, disagreed with the study results of the National Research Council. The Association stated its belief that a three-man commission would not be representative of the entire state of Colorado due to wide differences of topography and the diverse interests within the state. It urged that the present seven-man commission be retained.

Four public hearings have been held by the Colorado Senate in an attempt to clarify the legislator's knowledge of the present department's organization and functions. Chief among those testifying were State Highway Engineer, Mark Watrous, Colorado Governor Lee Knous, and six county commissioners. Arguments pro and con have bounded back and forth, and substitute reorganizational plans have been introduced, until it now appears that April 15 is the earliest possible date that any legislative action may be taken.

At month's end, two developments were being watched closely. One was the Kimball-Rogers Bill, introduced before the Senate, calling for a seven-man commission and investing of all administrative authority with the chief engineer, as at present. The other is a bill introduced before the House of Representatives, proposing a five-man commission and authorizing appointment of an overall director. Senator John J. Harpel, chairman of the Senate's highway investigation committee, was reported trying to bring the factions together to write a compromise bill uniformly acceptable.

Western Association Officers—1949

American Society of Civil Engineers

Arizona

John A. Baumgartner, Assistant District Engineer for the Water Resources Division of the U. S. Geological Survey at Tucson, is 1949 president of the Arizona Section. **George W. Howard,** Engineer with the Army Test Branch at Yuma is first vice-president and **John Girand,** consulting engineer of Phoenix, is second vice-president. **Dario Travaini,** Engineer with the Sanitary and Sewerage Department of the City of Phoenix, is the secretary-treasurer. **G. L. McLane,** District Engineer for Public Roads Administration, was elected director.

Seattle

E. L. Strandberg, consulting engineer, is the 1949 president of the Seattle Section. **George I. Teufel,** Seattle contractor, was named vice-president, and **James H. Reid,** consulting engineer, was named treasurer. **Robert O. Sylvester** of the Civil Engineering Department at the University of Washington, is the 1949 secretary.

Wyoming

Robert L. Streeter of Casper is the 1949 president of the Wyoming Section. **Joseph S. Bailey** of Cheyenne was named assistant to the president, and **Pendleton Beall** of Casper was elected vice - president. **N. D. Morgan, Jr.,** was appointed to the position of secretary-treasurer. **Clinton A. Hitchcock** will act as assistant to the secretary.

San Francisco

Austin W. Earl, practicing engineer, is 1949 president of the San Francisco Section. Vice - presidents are **Glenn B. Woodruff,** of Woodruff & Sampson, and **Clement T. Wiskocil,** Professor of Civil Engineering at the University of California. **R. D. Dewell,** practicing engineer, is secretary-treasurer.

Spokane

L. Vaughn Downs, engineer with the Bureau of Reclamation, is 1949 president of the Spokane, Wash., Section. First vice-president is **Allen S. Janssen,** Professor at the University of Idaho in Moscow, and second vice-president is **William A. Hill,** engineer with the Washington Water Power Co. **J. Byron Barber,** engineer with W. L. Malony of Spokane, is secretary-treasurer.

Sacramento

Fred Paget is the elected president of the Sacramento, Calif., Section. Other officers elected to serve the Section during 1949 are **Edwin F. Sullivan,** first vice-president; **Arthur C. Showman,** second vice-president, and **Melvin A. Koontz,** secretary-treasurer.

PAGET RAGSDALE

Oregon

Theron W. Ragsdale, Chief of the Construction and Operations Division of the Portland District, Corps of Engineers, is 1949 president of the Oregon Section. **Robert E. Cushman** is first vice-president and **Guy A. Taylor** is second vice-president. **H. Loren Thompson** is secretary and **George E. Hyde** is treasurer.

Intermountain

Milton T. Wilson, District Engineer for the U. S. Geological Survey at Salt Lake City, Utah, was elected president of the Intermountain Section. First vice-president is **George P. South,** engineer for the Bureau of Reclamation at Salt Lake City, and second vice-president is **Cleve H. Milligan,** Professor at the Utah Agricultural College, Logan, Utah. **C. E. Painter** was re-elected secretary and treasurer for a two-year term.

Colorado

Carl A. Gould, Regional Engineer for the U. S. Forest Service at Denver, is the 1949 president of the Colorado Section. **John S. Marshall,** Engineer of Surveys and Planning for the Colorado State Highway Department, is vice - president. **August L. Ahlf,** Engineer, Canals Division of the Bureau of Reclamation's Branch of Design and Construction at Denver, is secretary-treasurer.

Montana

John H. Morrison, principal, Morrison Engineering Co. of Helena, is 1949 president of the Montana Section. **John D. Officer,** Engineer with the Bureau of Reclamation at Columbia Falls, is first vice-president, and **Harold O. Egeberg,** Engineer with the Bureau of Reclamation at Great Falls, is second vice-president. **Louis Henke, Jr.,** Engineer with the State Highway Department at Helena, is the new secretary-treasurer.

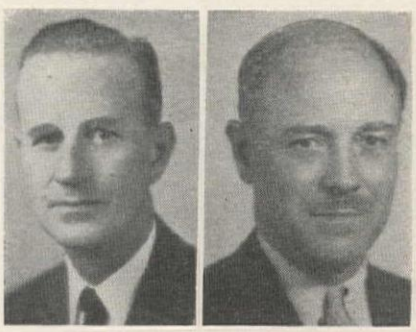
Los Angeles

D. Lee Narver is the elected 1949 president of the Los Angeles, Calif., Section. Vice-presidents are **Robert R. Shoemaker** and **Sterling S. Green. Homer W. Jorgensen** is secretary and **Robert J. Kadow** is treasurer.

Associated General Contractors

Intermountain Chapter

Carl E. Nelson is this year's president of the Intermountain Branch of A.G.C., with headquarters at Salt Lake City, Utah. **Perce Young** is vice-president and **G. M. Paulson** is secretary-treasurer. **Allan E. Mecham** is the chapter's manager and counsel. The 1949 board of directors includes **Walter Christiansen, Pat Gibbons, Wallace Smith, Ellis W. Barker** (retiring president), **W. W. Gardner, Ed Dorland** and **Mark Garff.**



NELSON FOLSOM

Denver General Contractors Association, Inc.

George B. Folsom, Jr., of Folsom Construction Co., Denver, Colo., is president of the Denver General Contractors Association for 1949, and **James R. Howell** is vice-president. **David A. Olson** was named secretary and **Gerald H. Phipps,** treasurer. **E. B. Tarpley** is the secretary-manager. Directors for 1949 are **Roger B. Mead, J. A. Schrepferman, N. G. Petry, E. B. Jones** and **James B. Kenney.**

Nevada Chapter

A. D. Drumm, Jr., is the 1949 president of the Nevada Chapter of the A.G.C. **E. E. Games** is first vice-president and **Walker J. Boudwin** is second vice-president. **C. V. Isbell** is treasurer. **Edward L. Pine** was appointed secretary-manager, and **Lyell Kofoed** was reappointed assistant secretary. The board of directors is composed of **E. J. Maupin, Jr., F. R. Smith** and **Wendell Nelson** in addition to the officers.

Inland Empire Chapter

R. W. Meighan of the Central Construction Co., Spokane, Wash., is the first president of the new Inland Empire Chapter of A.G.C., headquartering at Spokane. The new chapter is taking its membership from building contractors, sub-contractors and

building materials suppliers. Other officers include **J. L. Hazen** of Hazen & Clark, vice-president; **Henry George, Jr.,** of Henry George & Sons, secretary-treasurer; and **H. Halvorson** and **Harry Roblee,** directors.

Northern California Chapter

Gordon H. Ball, of N. M. Ball Sons, Berkeley, Calif., was elected president of the Northern California Chapter of the A.G.C. **George C. Loorz,** of Stolte, Inc., Oakland, is vice-president for 1949, and **A. G. Raisch** of A. G. Raisch Co., San Francisco and San Rafael, is treasurer. New directors of the chapter are **A. E. Holt** of Guy F. Atkinson Co., South San Francisco; **Harold O. Parish** of Parish Bros., Benicia; and **Jack How** of Edward R. Bacon Co., San Francisco. Other directors for 1949 are **Al Biasotti,** retiring president, **Charles L. Harney, H. C. Maginn, B. F. Modglin, H. Earl Parker** and **Robert N. Pomeroy. Winfield H. Arata** is the chapter manager, **Florence Smith** is assistant secretary, **William D. Coughlin** is labor representative and **F. W. Callahan** is field representative.

BALL

NORTHCUTT

Portland Chapter

Ray H. Northcutt, vice-president and Northwest manager for the Guy F. Atkinson Co., succeeds **Marshall R. Newport** as president of the Portland, Ore., Chapter of the A.G.C. **Karl F. Jacobsen** of the K. F. Jacobsen Co., is the newly elected first vice-president and **Henry A. Kuckenberg** of the Kuckenberg Construction Co., is second vice-president. **Frank Lyons,** of Frank Lyons & Co., was re-elected secretary-treasurer. Two new members elected to the board of directors are **W. R. Rogers** of Rogers Construction Co., and **Harry I. Hamilton** of Hamilton & Thoms, Eugene, Ore. Other members of the board of directors are **Glen E. Kibbe, George W. Lind, Jack McDougall H. G. Palmberg, C. A. Schram, Fred H. Slate, J. R. Wininger** and **Louis A. Peacock. Harry A. Dick,** National Director of A.G.C., and Past National President, and **Donald W. Hall,** National Director, are also included as members of the board.

Tacoma Chapter

M. L. Larson, of the firm of O. F. Larson & Son, Tacoma, was elected president of the Tacoma, Wash., chapter of the A.G.C. Also elected were **George Warter,** of Warter Construction Co., vice-president, and **James Purvis,** of Construction Engineers and Contractors, treasurer.

Pacific Northwest Chapter

Walter Meyers, of Walter Meyers Co., Spokane, is the 1949 president of the Pacific Northwest chapter of the A.G.C. **J. P. Carbon** of Spokane is secretary and **Henry Hansen** of Spokane is treasurer. **Paul Frederickson** is executive secretary. Directors include **Ivan Bruensbach, Don L. Cooney, Paul G. Ellis, Wayne Sutton, Arthur Atherton, John Sellen, Cliff Mortenson** and **Jim Cawdrey,** all of Seattle; **Roy T. Early, M. L. Larson, A. S. McDonald** and **J. A. Woodworth** of Tacoma; **H. A. Dick, Donald W. Hall, Marshall R. Newport, Ray H. Northcutt, Henry Mason, William Hammond, Bernie Hoffman** and **Fred Reimers,** all of Portland.

San Diego Chapter

1949 OFFICERS of the San Diego Chapter, A.G.C., are, seated left to right: W. E. KIER, retiring president; R. S. SEABROOK, president, and M. A. MATHIAS, manager. Standing, left to right: C. A. LARSEN, W. P. ELSER and WALTER BARBER, directors, and B. O. LARSEN, vice-president.

Mountain Pacific Chapter

Wayne Sutton of the Washington Asphalt Co., was re-elected president of the Mountain Pacific Chapter, A. G. C., Seattle. **Ivan Bruensbach** was named vice-president and **T. H. Youell** was named treasurer. **Paul Frederickson** is the secretary-manager and **W. H. Landass** is assistant manager. Board of trustees for the year include **Don L. Cooney, Paul G. Ellis, Joe Fiorito, Gil Griffin, Alex McEachern, Henry Nollan, W. J. Pierce, Kenneth Riggle, Elmer White, C. R. Wilcox** and **C. V. Wilder.**

Arizona Chapter

W. E. Orr, Jr., of Orr and Orr Construction Co., Phoenix, is the 1949 president of the Arizona Chapter, A.G.C. He succeeds **P. W. Womack,** who will remain on the board of directors. **D. W. Kelly** of the Arizona Sand & Rock Co., was elected to serve as vice-president and treasurer. **Joseph P. Condrey** was reappointed executive secretary. **R. M. Makemson** was elected to a one-year term as director. Re-elected to the board were **Edward O. Earl** and **L. G. Vinson.**

Central California Chapter

Art B. Smith, partner in the firm of Swinerton & Walberg, San Francisco, and vice-president of Engineers, Ltd., San Francisco, is 1949 president of the Central California Chapter of A.G.C., largest building chapter of A.G.C. in the United States. **Harold O. Sjoberg,** president of N. H. Sjoberg & Son, San Francisco, is the chapter's vice-president. **Carl N. Swenson,** retiring president and building contractor of San Jose, is treasurer for 1949. **William E. Hague** was re-elected secretary-manager, a post he has held for the past 18 years.

Southern California Chapter

J. A. Thompson of J. A. Thompson & Son, was elected president of the Southern California Chapter of the A.G.C. Other officers elected are: Vice-presidents, **J. P. Shirley, Jr.,** of Gunther & Shirley Co., representing the Engineering Division; **B. M. Laulhere, Jr.,** of Pacific Pipeline and Engineers, Ltd., representing the Utilities Division, and **Claude A. Fisher** of Claude Fisher Co., Ltd., representing the Highway Division. As treasurer, **Donald E. Reed** of Stanton Reed Co., represents the Building Division. **W. D. Shaw** is the chapter's manager. Newly elected directors, to serve on the chapter's board for the coming 3-yr. period, include **R. A. Smith** of the P. J. Walker Co., and **H. M. Baruch** of the Baruch Corp., as representatives of the Building Division; **Ben Griffith** of the Griffith Co., as representative of the Highway Division; **Robert V. Edwards** of American Pipe & Construction Co., and **Tom Polich** of United Concrete Pipe Corp., as representatives of the Engineering Division; **R. A. Wattson** of R. A. Wattson Co., to represent the Utilities Division.

Alaska Chapter

R. H. Stock, of Stock and Grove, Inc., Anchorage, is the first president of the new Alaska Chapter of the A.G.C. **E. W. Dunn,** of Birch, Johnson, Lytle Co., has been appointed the chapter's manager.

Colorado Contractors Association

Zimmie Lowdermilk, of Lowdermilk Brothers, Denver, is the 1949 president of the Colorado Contractors Association, Inc., affiliated with the A.G.C. **Dan G. Bell,** of Peter Kiewit Sons' Co., is first vice - president, and **Walter Steinwald,** Colorado Constructors, Inc., is second vice-president. **Morris E. Adelstein,** of the Northwest Engineering Co., is secretary-treasurer. Directors include **Maurice Gardner, C. M. Hanes, A. S. Horner, Stanley Larson, R. J. Lawrence, J. H. Monaghan** and **Walter Schmidt.**

Montana Building Chapter

Charles Pew is the 1949 president of the Montana Building Chapter of A.G.C., headquartering at Butte. Other elected officers are **William R. Lowe,** of Billings, vice-president; **Wilbur L. Graham** of Kalispell, treasurer; and **Frank Messmer, Ed Decker,** and **Floyd Pappin,** directors. **Ned Hergert** of Helena is the chapter's secretary-manager.

Montana Contractors Association

Dan J. Mooney of Butte was re-elected president of the Montana Contractors Association, Inc., Chapter of the A.G.C. All other officers were re-elected, including **George Nilson** of Great Falls, vice-presi-

dent, and **Ed O'Neil** of Havre, treasurer. **Bert Lalonde** of Sidney was named to the board of directors. **Ned Hergert** of Helena is the chapter's secretary-manager.

Seattle Chapter

James J. Cawdrey, vice-president of the Henrik Valle Co., succeeds **George Teufel** as president of the Seattle Chapter. **Cliff Mortenson** of Nelse Mortenson & Co., is first vice-president, and **Elmer Edwards** of the Manson Construction and Engineering Co., is second vice-president. **Howard Lease** of Lease & Leighland is secretary

CAWDREY receives the gavel from TEUFEL

and **Walter Harfst** of Walter W. Harfst, Inc., is treasurer. **E. B. "Bill" Hickock** is the chapter's manager. Two members elected at large to serve with the officers on the Executive Committee were **Don Mowat** of A. F. Mowat Construction Co., and **John Sellen** of John H. Sellen Construction Co.

Other Groups

Seattle Engineers Club

O. Ingalls Hall, is president of the Engineers Club of Seattle, Wash. **Beverly A. Travis** is vice-president, **W. G. Carr** is treasurer, and **Evans K. Blackford** is secretary. New trustees are **Marius Anderson, P. N. Royal** and **William J. Royea.**

Phoenix Engineers Club

R. F. Blakely is the elected President of the Phoenix, Ariz., Engineers Club. Other officers are **William E. MacMorran,** vice-president; **R. J. McKnight,** secretary-treasurer, and **F. M. Shaw** and **Les Jennings,** directors.

Ventura Engineers Club

Hugh M. Wood is president of the San Buenaventura Engineers Club, California. **Henry I. Davies** is vice-president, and **Robert L. Sprinkel, Jr.,** is secretary-treasurer.

Tacoma Engineers Club

Carl F. Pflugmacher, of Tacoma City Light, is 1949 President of the Tacoma, Wash., Engineers Club. **Walter J. Ryan** of Weyerhaeuser Timber Co. is first vice-president, **Clyde Murray** of Smith and Murray is second vice-president, **David Countryman** of the Douglas Fir Plywood Association is secretary-treasurer, and **W. D. Smith** of Smith and Murray heads the executive committee.

Vancouver General Contractors

L. G. Murray, chief engineer of the British Columbia Bridge & Dredging Co., Ltd., Vancouver, B. C., is the elected President of the Vancouver General Contractors Association. Other officers are **F. J. Dawson,** first vice-president, and **D. McAlister,** second vice-president. Directors are **A. J. Armstrong, H. C. Allport, M. C. Cameron, R. A. Hall, P. A. Matheson, W. D. Lee** and **J. Tucker. R. C. Pybus** is retiring president.

California Professional Engineers

Earl N. Holm, civil engineer of Sacramento, is the 1949 President of the California Society of Professional Engineers, now affiliated with the National Society. Other officers are: **R. R. Walker,** Los Angeles, first vice-president; **Lawrence Adams,** Modesto, second vice-president; **Fritz Zapf,** San Diego, third vice-president; **John L. Trebilcock,** San Leandro, secretary; **H. J. Fitzgerald,** San Francisco, treasurer, and **D. E. Travis** of Sacramento, assistant secretary.

Arizona Professional Engineers

Walter H. Croft is chapter President of the new Arizona Society of Registered Professional Engineers. Croft is with the Central Arizona Light and Power Co. **William D. Williams,** of Headman, Ferguson and Carollo, is vice-president; **Roger I. C. Manning,** with the Arizona Department of Mineral Resources, is secretary-treasurer; **Harold W. Yost,** of Yost and Gardner, is director at large, and **Charles F. Willis,** consulting mining engineer, is national director.

Oregon Professional Engineers

J. T. Hood is the 1949 President of the Professional Engineers of Oregon, headquartering at Portland. **J. A. Corenbaum** is vice-president, **Carl E. Green** is past president, **R. C. Shoemaker** is treasurer, and **Howard Arnett** is secretary.

Northern Calif. Structural Engineers

Jesse Rosenwald, consulting structural engineer of San Francisco, is 1949 president of the Structural Engineers Association of Northern California. Other officers are **Arthur W. Anderson,** vice-president, and **George A. Sedgwick** and **Harold O. Sjoberg,** new directors. Other directors include **John Blume,** retiring president, **John E. Rinne** and **Henry J. Degenkolb.**

Willamette Valley Professional Engineers

F. O. McMillan of Corvallis, Ore., is the President-elect of the new Mid-Willamette Valley section of the Professional Engineers of Oregon. **Robert T. Stanley,** of the Oregon State Highway Department, is secretary-treasurer; **Ray B. Boals,** of the Eugene Water Board, is vice-president; and **W. C. Williams,** assistant engineer of the state highway commission and **John H. Quinler** of Eugene are directors.

So. Oregon Professional Engineers

R. S. Daniels, of Medford, Ore., is 1949 president of the Professional Engineers Club of Southern Oregon. **Elmer Biegle** of Ashland is vice-president, and **Harry Olsen** of Medford is secretary-treasurer.

Seattle Professional Engineers

The Seattle, Wash., chapter of the National Society of Professional Engineers has elected **Howard E. Schroedel** of John Graham & Co. as President. Other officers include **William D. Sharp** of Seattle City Light as vice-president; **Millard M. Hill** of DeWitt Griffin & Associates as secretary, and **Con O. Mannes,** also of DeWitt Griffin, as new trustee.

California Consulting Engineers

Mark Falk, consulting engineer of San Francisco, is the 1949 president of the Consulting Engineers Association of California. **H. M. Engle** is vice-president, and **Mac Perkins** is secretary.

FALK STEELE

San Francisco Engineers Club

I. Cleve Steele, vice-president and chief engineer of the Pacific Gas & Electric Co., San Francisco, is the 1949 President of the Engineers' Club of San Francisco. Other new officers are: **Lawrence B. Wright,** vice-president; **Josiah A. Polhemus, Jr.,** secretary; and three directors, **Frank E. Bonner, G. W. Aljian** and **Eric S. Warner.**

Utah Bldg. & Construction Congress

Raymond J. Ashton is the 1949 President of the Utah Building and Construction Congress. Other officers are **R. L. Irvine,** vice-president; **Gilbert W. Williams,** secretary-treasurer, and **R. A. Hart,** executive secretary. All of the officers are residents of Salt Lake City.

Idaho Society of Engineers

Orland C. Mayer of Boise is 1949 president of the Idaho Society of Engineers, affiliated with the National Society of Professional Engineers. **Allen S. Janssen** of Moscow is vice-president; **Archie L. Biladeau** of Boise is treasurer, and **James L. Morris** of Boise is secretary.

MAYER OSGOOD

Nevada Civil Engineers

E. P. Osgood, Jr., civil engineer of Reno, is 1949 president of the Associated Private Civil Engineers of Nevada, Inc. **E. McKenzie,** with the Nevada Engineering Service, Inc., as part owner, is vice-president, and **Peter Guisti,** in charge of Malone Engineers, is secretary-treasurer.

OFFICERS OF OTHER GROUPS ON PAGE 96

Dredge Reclaims 200 Acres of Marsh

Five miles of dike and hydraulic fill, dredged in half the scheduled time, create valuable new industrial land for the Port of Oakland—Two slips will bring ocean-going vessels to the site

BY DREDGING for 144 hr. out of the 168 hr. in a week, sun or snow, the San Francisco Bridge Co. of San Francisco, Calif., completed ahead of schedule a suction-dredged hydraulic fill of 200 ac. in San Leandro Bay, located on the east side of San Francisco Bay near the Oakland Municipal Airport. The contract, approximately $600,000, was let by the Port of Oakland in May, 1948, as part of a master plan for the development of industrial land to serve the needs of the crowded and mushrooming East Bay area.

Grand central shipping terminal

The municipally-owned Port of Oakland has under present consideration the filling of 950 ac. of tidal flat, involving some 11 million cu. yd. of fill, creating that much choice industrial land. This land will be served by transportation facilities such as spur track to transcontinental railroads, a direct through-road to the Oakland Municipal Airport, and an access road to the new north-south multimillion-dollar East Shore Freeway, now under construction.

The new land will be served by two slips, each 500 ft. wide and 3200 ft. long, bringing Pacific shipping facilities for 28 ocean-going vessels straight to the industrial site. This will give the East Bay one of the few grand central terminals with immediate air, transcontinental rail, expressway, and marine shipping services to be found adjacent to industrial property. The development will be served by the new south-intercepter sewer of the East Bay Municipal Utility District, now under construction at an adjoining location on the mainland.

Five miles of dike

First step in the industrial development is the recently completed 200 ac. of dredged fill, involving 2,371,000 cu. yd. Beginning in May, 1948, the San Francisco Bridge Co. started preliminary work on the project by dredging new channels for two creeks, which formerly ran through the project area and emptied into the bay, rerouting them so that they would flow around the new site. Subcontractor for this portion of the job was Chas. Hover, of Burlingame, Calif., who closed the existing channel at the edge of the fill and then dragglined a new channel, banking the material to form the dikes. Heavy equipment was supported by timber mats in the tide-lands area. Five miles of dike was constructed around the fill area, and a power line was run in on Navy war-surplus floats across the auxiliary fill basin connected to a submarine cable laid to power the electrically-operated suction dredge.

Principal equipment on the job was the shore-powered dredge, the *Duwamish*, with a 24-in. discharge aperture. For simplicity of operation in the shallow water at the dredging site, the *Duwamish* was equipped with twin anchor booms, 60 ft. long, for stability during the actual dredging. This procedure, unusual in the West where anchor scows are commonly used, is reminiscent of much dredge work done on the shallow Mississippi River where the draft of all equipment is kept to an absolute minimum.

Dredging time halved

Actual dredging operations, scheduled to take one year, required little more than 5 months to complete. The contractor worked crews around the clock for 6 days a week on dredging and pumping. Fill material, mostly clay interspersed with sand and gravel, was obtained by dredging one of the 35-ft. deep ship terminal slips and from the channels of Elmhurst and San Leandro Creeks. Maximum length of discharge pipe was 6,000 ft., mounted on pontoons and crossing channels on trestle. Many times during the course of the job the thick clay muck would cut down the efficiency of the dredge pumps and discharge, although the pumps were at all

(Continued on page 132)

Forecasting Weather, Water Supply

U. S. Weather Bureau, finding empirical relationship between precipitation and water supply, initiates series of monthly reports predicting runoff at 250 points in the Western states

By MERRILL BERNARD
Chief
Climatological and Hydrologic Services
U. S. Weather Bureau
Washington, D. C.

A RELATIONSHIP between precipitation and runoff that makes possible the reliable forecasting of water supply in the West has been disclosed by U. S. Weather Bureau studies. Of the Bureau's 2,500 observing stations in the Western States, about 350 function as reporting stations. Precipitation data reported by these stations during the accumulation season (October to May) furnish the basis of forecasts put out each month from January to May.

Early efforts to establish precipitation stations in the mountain states of the West are now paying dividends. Long records, many going back more than 30 years, form the basis of forecasting water supply for power, irrigation, and other purposes.

Network not too thin

The Bureau's Western network of some 2,500 cooperative observers thins out in the more remote mountain regions, and only occasionally are stations found at the highest elevations. For this reason, it was commonly believed until recent years that the network was not sufficiently representative to form the basis of water supply forecasts.

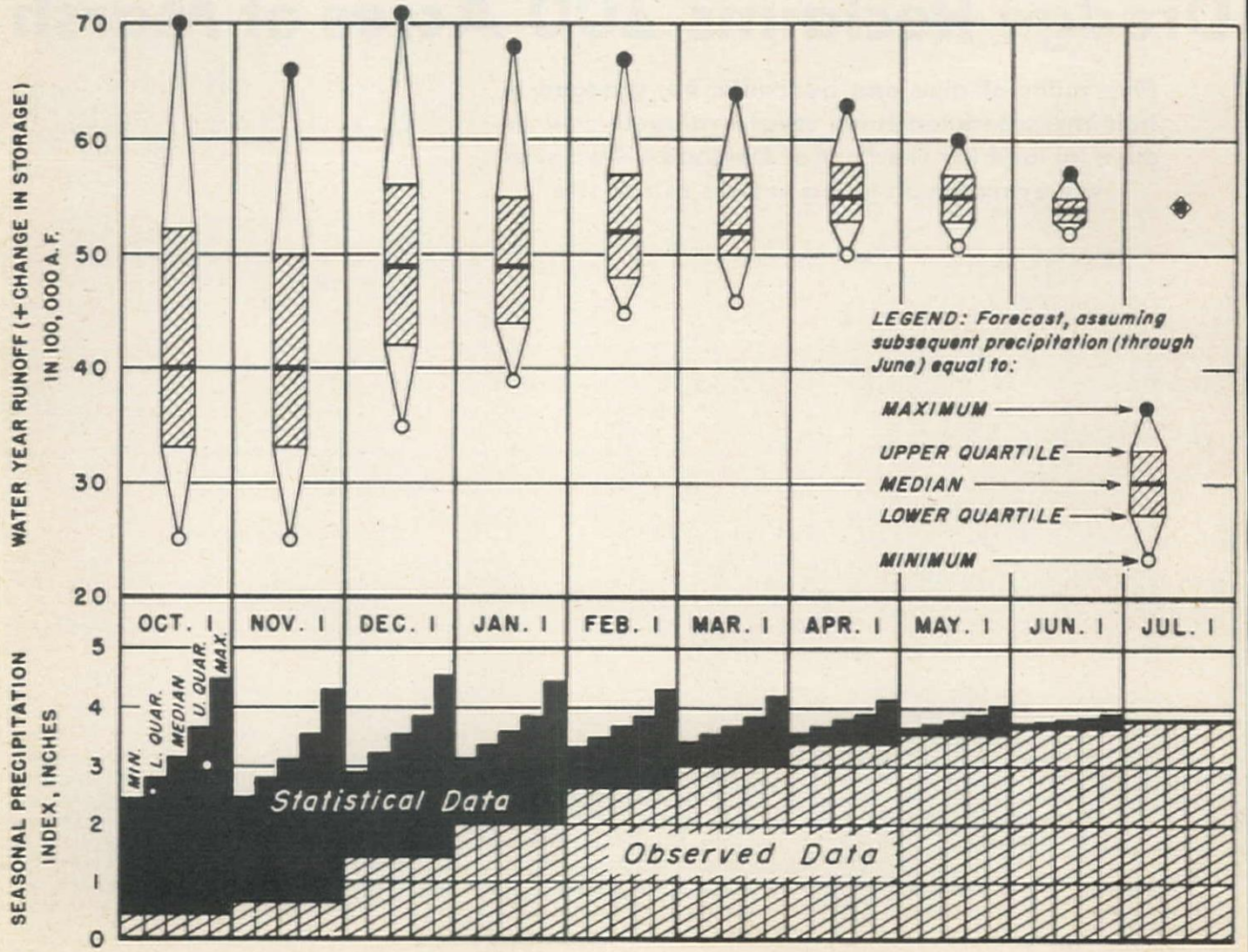
However, investigations by J. C. Alter of the Weather Bureau in 1940 revealed a surprisingly high correlation between seasonal precipitation, measured at intermediate elevations, and basin runoff, much of which originated at high elevations. In 1944, the Weather Bureau, under its organic authority to "gage and report on the rivers," issued its first forecasts of water-year flow-volume based on the correlation between river flow, as measured by the Geological Survey, and precipitation.

FIGURE 2. Forecasts issued at monthly intervals progressively replace statistical with observed data. Odds are approximately 30 to 1 in favor of the forecaster (Explanation in text).

Gamblers should know the odds

Reliability of the forecasting procedures, as measured by the correlation index, is illustrated by the frequency distribution shown in Fig. 1. Over half the basin forecasting procedures have correlations greater than 0.90, and in nearly 90 per cent the correlation is greater than 0.80.

These correlations are attained through progressive adjustment and refinement in the basic data. The steps are (1) adjustment of the individual precipitation record throughout its length to overcome the effects of minor changes in location, exposure conditions, etc., (2) assignment of station weights, (3) assignment of a weight to each month in the accumulation period, (4) adjustment for "carry-over" effect from previous season or seasons, and (5) adjustment of long-term trends in both precipitation and runoff records.



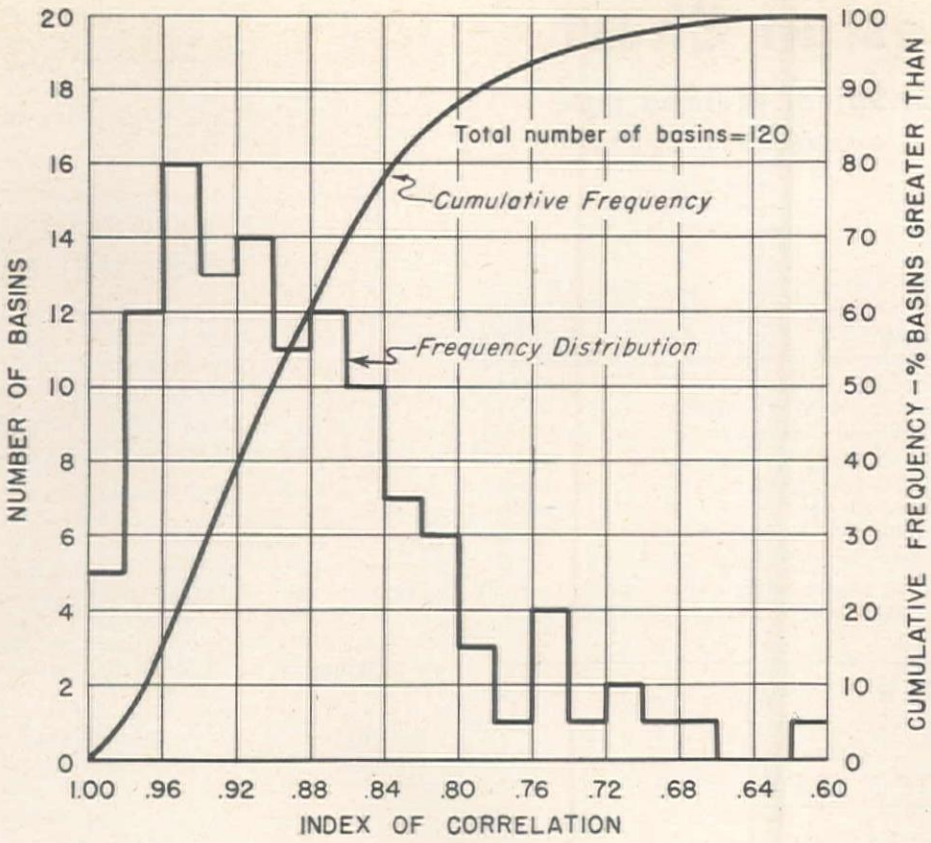


FIGURE 1. Correlation index illustrates reliability of the new forecasting procedure.

To be most useful, a water supply forecast must have maximum range and flexibility. If the water user is to be adequately served, he should be given all possible information regarding the water supply for the year ahead before his decision must be made. Furthermore, since most operations involving the utilization of water have in them the element of gambling, the operator should know what his "water availability odds" are, and how these odds change as the accumulation season progresses.

The first forecast of the year is issued as of January 1. Data for the remaining months of the accumulation period are, of course, essential and must be represented by a statistical expression based on past records. The forecast is based on the median of subsequent precipitation. In addition, four values of known probabilities are given under the assumptions that subsequent precipitation will be equal to the maximum, minimum, or quartiles of record. The odds are 3 to 1 that the lower quartile of record will be equalled or exceeded, while odds of 1 to 3 apply to the upper quartile. Since the average record length is 30 years, the odds that the maximum or minimum of record will be equalled or exceeded are approximately 1 to 30 and 30 to 1, respectively.

Statistics replace guesses

Subsequent forecasts issued at monthly intervals through May progressively replace the statistical with observed data as reports are received. The successive monthly estimates based on the quartiles and extremes converge on the median forecast as shown in Fig. 2.

Both aerial coverage and the number of forecast points have increased rapidly since 1944. During the 1948-49 season, the Bureau's Water Supply Forecast Bulletin will publish forecasts for more than 250 points in the Western States.

$45-Million Reclamation Project Gets U.S.B.R. OK

THE SOLANO reclamation project in California has been authorized for construction by Secretary of Interior J. A. Krug, who has sent to Congress a finding that the project has engineering and economic feasibility and that it meets the requirements for authorization within reclamation law. He described the need for the project as "compelling" in order to relieve a critical water situation among national defense establishments in the area.

"There has been uniform approval of the project by all of the Federal agencies which have primary concern with the development of water resources," according to Krug. "The Departments of the Army, Air Force and Navy have all urged that the proposed construction be undertaken promptly in order to alleviate the effects of the critical water supply situation on important military establishments in the area. The multiple-purpose Solano County Project is the only satisfactory solution available."

The project contemplates the construction of Monticello Dam on Putah Creek to create a reservoir capable of storing 1,600,000 ac. ft. of water for irrigation use on 83,000 ac. of land and for domestic use in the cities of Vallejo, Fairfield, Suisun and Benicia, as well as the Mare Island Navy Yard, the Benicia Arsenal, and the Fairfield Air Base. The reservoir will also control floods downstream. A diversion dam two miles downstream and the Putah South Canal, as well as the Sweeney Creek Wasteway, Vacaville Wasteway, Terminal Reservoir and Wasteway and necessary laterals and drainage works are included.

The total estimated cost of the project is $45,577,000 of which $26,699,000 is allocated to irrigation; $11,900,000 is for a distribution system for irrigation waters; $5,048,000 is allocated to domestic and industrial water supplies; and $1,930,000 is allocated to flood control. The financial analysis for the project, which is prepared upon the basis of repayment of appropriate costs within 50 years, is on the basis of repayment at the rate of $3.80 per ac. ft. for irrigation water supplies, and a charge of $10 per ac. ft. for waters sold to domestic and industrial water supplies.

Monticello Dam would be primarily for storage with water releases to be of a seasonal nature, hence no firm supply would be available for generation of power. Nevertheless, provision is recommended to allow for future power installations so that necessary basic works could be constructed at a later date.

Metal Congress Will Tell Of New Developments

THE WESTERN Metal Congress and Exposition, staged by approximately 20 cooperating technical societies and applying to oil, chemical, construction, manufacturing, aviation, mining and other western industries, will be held April 11-15 in Shrine Convention Hall, Los Angeles.

William H. Eisenman, secretary of the American Society for Metals, Cleveland, will be in active charge. His headquarters are at 3232 Royal St.

Newest developments in producing, fabricating and applying ferrous and non-ferrous metals will be described at the technical sessions. Authoritative speakers from all parts of the United States will deliver papers.

Displays will be both operating and non-operating. They will demonstrate what is new or improved in metals, metal working equipment and processes. Ferrous and non-ferrous metals, welding supplies and equipment, heat treating equipment and service, foundry supplies, inspection aides, materials handling, and tools will be exhibited.

A local general committee headed by E. R. Babylon of the Kaiser Company, has spent six months planning the affair. The following societies are cooperating in various ways:

American Chemical Society, Society for Non-Destructive Testing, American Institute of Electrical Engineers, American Petroleum Institute, American Society of Civil Engineers, American Society of Mechanical Engineers, American Society for Testing Materials, Pacific Coast Electrical Association, Pacific Coast Gas Association, Society of Automotive Engineers, and others.

Construction Design Chart

CV... Flow of Water in Steel Spiral Welded Pipe

By JAMES R. GRIFFITH
Dean of Engineering
University of Portland
Portland, Oregon

PRIOR TO the inception of this series, I prepared a chart for the determination of the flow of water in steel spiral welded pipe. The original chart has been reproduced in the Handbook of Water Control[1] and also in the Handbook of Welded Steel Pipe.[2] The accompanying chart is similar to the original one, but has been revised to include currently available commercial sizes.

Steel spiral welded pipe is conventionally specified by outside diameter. Therefore, the inside diameters vary with the thickness of the plate for any constant pipe size. Since the discharge is a function of the inside sectional area of the pipe, it becomes necessary to plot each thickness. As an example, 10-in. O.D. pipe has an inside sectional area of 0.494 sq. ft. when fabricated from No. 3 gage plate. The same O.D. size pipe has an area of 0.522 sq. ft. when No. 12 gage plate is used. These variations are automatically taken care of on the accompanying chart. On the O.D. scale, which is actually a plotting of the sectional areas, all points are shown for pipe sizes from 4 in. to 10 in. inclusive. Above 10-in. pipe, I have indicated only the extreme ranges, since the individual values would come too close together if all gages were plotted.

A single straight line intersecting all scales is necessary for a solution of the accompanying chart. As a consequence, variables on any two scales must either be known or assumed in order to determine the remaining variables. I have drawn a solution line on the chart for the following conditions:

12-in. O. D. pipe
Plate thickness, No. 3 U. S. Std. gage
Loss of head = 0.5 ft. per 1,000 ft. of pipe.

The following additional data will be noted on the respective scales:

Pressure loss = 0.216 p.s.i. per 1,000 ft. of pipe
Discharge = 400 gal. per min.
= 0.89 cu. ft. per sec.
Velocity = 1.22 ft. per sec.
Velocity head = 0.023 ft.

As a check on the above results, we have the following: Referring to table No. 33, Handbook of Welded Steel Pipe,[1] for the assumed pipe size, gage, and loss of head, we find the given discharge to be 400 g.p.m. and 0.89 sec. ft. Table No. 67 of the same reference, gives the sectional area of this assumed pipe as $A = 0.724$ sq. ft. We then have

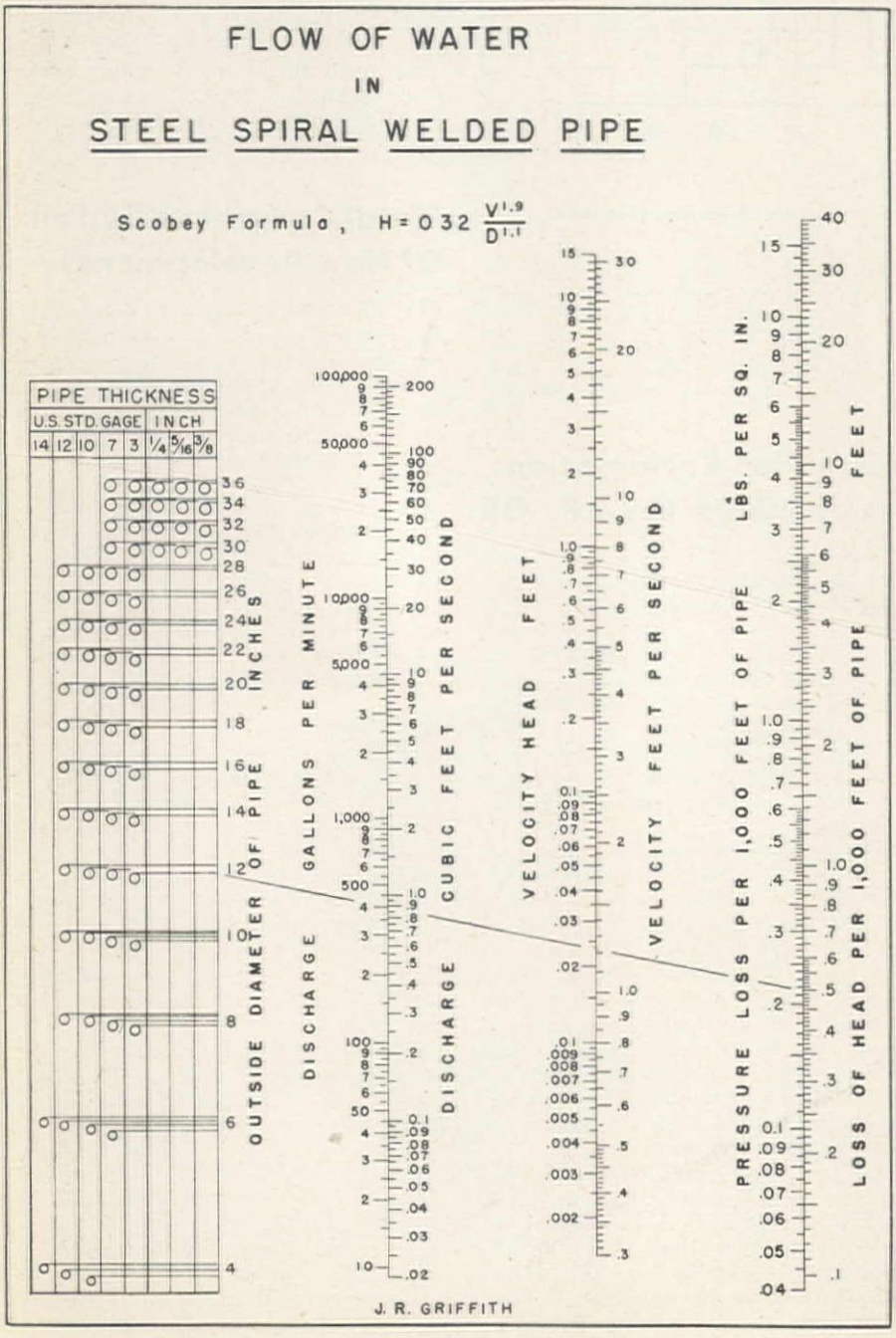
$$\text{Velocity} = \frac{Q}{A} = \frac{0.89}{0.724} = 1.23 \text{ ft. per sec.}$$

$$\text{Velocity head, } h_v = \frac{V^2}{2g} = \frac{1.23^2}{64.4} = 0.0235 \text{ ft.}$$

Pressure loss = 0.5 × 0.4335 = 0.217 p.s.i.

Such a chart as this has a distinct advantage over the computed tabular values when it comes to intermediate values. One of the men at the office wanted a rough check on the power necessary to deliver 5,000 g.p.m. against a static head of 50 ft. with a 10,000 ft. pipe line. Two pipe sizes were under consideration. The accompanying chart used in conjunction with the one giving the theoretical power required to lift water,[2] quickly gave the answer desired. The quotation by a pump manufacturer, instead of being unreasonable, proved to be correct. On the basis of the power cost for 24-hr. operation, it was then possible to quickly determine the logical choice of pipe.

[1] Armco Drainage and Metal Products, Inc.
[2] *Construction Design Charts*, 1947 edition, page 139.



Use of Colorado River Water Up 100 Per Cent Since 1947

DURING 1948, use of Colorado River water reached a record level, with more than 48 billion gallons alone consumed by southern California cities and members of the Southern California Metropolitan Water District. Chief engineer and general manager for the district, Julian Hinds, stated that this is an increase of more than 100 per cent over consumption in 1947. He also pointed out that the population served by the district had increased by 48 per cent as compared to the national average of 11 per cent for this same period.

C. C. Elder, hydrographic engineer for the water district, announced that during 1947-1948 there was less than 10 in. of rainfall.

Portrait—A Contractor and a Lady

The only woman member of A.G.C. is known all over the Southwest as a successful road construction contractor—She has also found time to raise a family of 27 children

By RICH JOHNSON
Phoenix, Ariz.

WHEN SHE was 14 years old, the woman whose name is known all over the Southwest as a road construction contractor ran away from home to get started on her own. Today, even Jeanette Daley herself must wonder a little at the memory of the North Carolina child who left her parents' farm with just a few dollars in her pocket and one nice dress. She headed for California with only her boundless courage and ambition to recommend her to the world of business which she intended to enter.

Respect in a man's world

For five and a half years the young farm girl worked as a telephone operator in California before she met the man who was to be her husband, and with whom she founded an important construction company at San Diego. The business experience she got at the phone company proved valuable, but contracting had always been in her blood.

It was contracting that earned her enough money to leave home. She and a brother agreed to haul tanbark out of the North Carolina woods to a leather concern, and her share of the earnings was exactly $14.

Family of 27 children

Now, after 31 years in the road building business, Mrs. Daley can't think of anything she would rather do. She has lived in a man's world all those years, more than held her own in the stiff competition of her field, and yet has lost none of the essential femininity which demands the respect of everyone with whom she is associated.

In fact, it wouldn't be stretching the point too much to say that Mrs. Daley is a super-woman, for besides owning and operating the Daley Construction Co., and the Acme Material Co., in Phoenix, Arizona, she has found time through the busy years to raise a family of 27 children. She adopted them at various times out of broken or impoverished homes, mothered and educated them to maturity. "And seven of my 'grandchildren' are named Jeanette, after me," she says with pride.

For many years Mrs. Daley and her husband engaged largely in road construction in California. They built practically all the paved streets in East San Diego. Then the depression came along and road building almost ceased in California. Looking around for more fertile fields, the Daleys discovered that Arizona was spending its WPA money for new roads and city sidewalks, so in 1934 they opened a branch in Phoenix.

One of Mrs. Daley's first jobs in Arizona was the 13-mile long walk along the rim of the Grand Canyon at Angel's Rest. But many more miles of walks in Phoenix, and of roads throughout the state, were soon showing the results of her quality workmanship.

Then, in 1945, Mrs. Daley decided to cut her California ties and continue on alone in Arizona. She founded the two firms which quickly won positions of leadership. The Daley Construction Co. contracts building work, while the Acme Material Co. supplies rock, sand and gravel to many local industries.

JEANETTE DALEY

Expert on aggregate

With an eye for the future, Mrs. Daley made an exhaustive study of the beds of sand, rock and gravel laid down through the centuries by the Salt River just south of Phoenix. When she was sure that she had found what she wanted, she bought one and a half square miles of land and built her plant for crushing and processing the materials on the spot.

In spite of the tremendous building boom experienced by Phoenix since then, Mrs. Daley figures that she has enough sand, rock and gravel in this deposit to last another 21 years even at the present rate of use.

For local jobs all materials are processed at one of the two plants at the location, but Mrs. Daley contracts many paving jobs throughout the state and some of them are in remote wilderness areas. For such jobs she has a huge portable crusher, and the only portable asphalt plant of its kind in Arizona. She's mighty proud of that piece of machinery, and thinks she could tear it down and put it back together again herself if she could lift the parts.

"I THINK I could tear it down and put it together again if I could lift the parts," says Mrs. Daley of her portable crusher. Her know-how is highly respected by employees.

Gender introduces no problems

Behind her back, but with admiration bordering on affection, her mechanics grin and say, "Mother Daley might be able to do it at that. She's an amazing woman."

Wise in the ways of business and labor relations, is a better way of putting it. With as many as 200 employees working for her she has never had a problem that came about because she is a woman in a man's field. "Men don't mind working for a woman," she says,

"if the woman knows her business and asks no special considerations."

Mrs. Daley is a master at the art of winning loyalty, though she does it unconsciously and because she likes people, rather than as a pointed policy. Strangers who drop in at the company's cottage-like main office around noon bump into a confusing sight.

Girls who have been efficient typists, secretaries and filing clerks all morning, are in a small but well-equipped kitchen making salads, frying steaks and cooking vegetables for lunch. When everything is ready, the gang that is the backbone of the Daley Construction Co., including the boss, pulls up chairs to a table to enjoy lunch together.

Some of the men may have a tall hunting or fishing story to exchange with the boss, for Mrs. Daley loves the outdoors and goes fishing or hunting as often as possible. She's no parlor fisherman either according to the stories that go the rounds.

"I'm going to retire in another 18 years," she says, "and do nothing but travel all over the world and hunt and fish." But nobody believes she'll ever retire. Her history of innumerable activities makes retirement sound illogical.

Only woman in A.G.C.

Besides her construction work and raising a family of 27, she found time to serve three consecutive terms in the California State Assembly before moving into Arizona. She is the only woman member of Associated General Contractors which she joined in 1920, and she has missed only one of the organization's conventions in all those years.

She is the only licensed woman member of General Engineering Contractors, and a member of the National Ready Mix Assn. She also operates the only Valencia Spanish style tile plant west of Dallas, Texas.

About the future she is very optimistic. "The Southwest and Phoenix in particular, is growing fast," she says. "More and better streets and roads will be needed for years to come. Those of us who want to work and have the know-how should find ourselves very busy."

Her alma mater is the school of hard knocks, and her diploma the kind of success of which any construction contractor could be proud.

Arizona's Valleys Assured Adequate Water During 1949

FOR THE FIRST TIME in several years, Arizona's Salt River Valley and San Carlos irrigation projects are virtually assured of a more than adequate water supply. Present storage of water in reservoirs and anticipated runoff from the snow cover remained at high levels during the first two months of 1949, according to the U. S. Geological Survey.

San Carlos Reservoir at Coolidge Dam now stores 144,000 ac. ft. compared to 647 ac. ft. a year ago, and storage is increasing at the rate of 2,000 ac. ft. per day. Runoff of the Salt and Verde Rivers is the highest since 1941.

Rotary Plow and Grader Combination Clears Colorado's Mountain Highways

A NEW COMBINATION that has proved its great value in snow removal during the extreme weather this winter, is the Adams Rotary Snow Plow, mounted on the heavy duty Model 610 Motor Grader. The grader is owned and operated by the Colorado State Highway Department.

In the photograph, the Rotary is shown at work clearing the Colorado highway leading to the Mt. Evans Cosmic Ray Laboratory. At this laboratory high in the Rocky Mountains, important studies are made of the light rays from the sun and other solar systems. The plowing was carried on at altitudes ranging from 11,000 to 12,000 ft. The 100-h.p. Diesel engine in the grader provided ample power even at high altitudes for propelling the machine.

The Rotary is powered with two 90-h.p. International 450 power units, coupled through multiple V-belt drive to a common shaft which in turn drives the rotary blowers. The design is such that all the snow can be discharged to either side, or to both sides simultaneously. The revolving rake with eight steel blades breaks up the snow and ice ahead of the plow and feeds the material to the rotors to keep the plow operating to capacity.

The power controlled leaning front wheels, coupled with hydraulic steering booster, add to the flexibility and ease of control and also stabilize the unit to resist side slipping.

This machine is equipped with 14.00-24 rear tires and 13.00-24 front tires. With a special auxiliary transmission furnished with the Rotary, it was found possible to reduce the speed of travel to as low as ⅓ m.p.h., with no interference to regular high transport speed of 25 m.p.h.

The Adams Rotary Snow Plow is comparable in size and capacity to other rotary plows commonly mounted on trucks. However, truck-operated rotary plows may stand idle out of the snow removal season, whereas an Adams Rotary Snow Plow can be easily removed, and the grader used on normal construction and maintenance jobs during the summer working season.

Southwest ASCE Groups Get Together March 25

THE PROGRAM for the joint meeting of the California and Arizona Sections of the American Society of Civil Engineers to be held at San Diego on March 25-26 has been announced.

On the morning of the 25th, Merrill Butler, assistant city engineer of the City of Los Angeles, will discuss the new activated sludge treatment plant now under construction by that city, and Fred Grumm, assistant state highway engineer, will outline California's freeway plan. In the afternoon of the same day, a student member oratorical contest will take place, with representatives from the student chapters in the states participating. At a dinner that evening the two winning papers will be read, and Franklin Thomas, national president of ASCE, will discuss "Widening Horizons of the Engineering Profession."

On the morning of the 26th, I. C. Steele, chief engineer of the Pacific Gas & Electric Co., will outline the current steam plant program of that utility. In the afternoon, an interesting excursion over San Diego Bay and several important projects in the area will be taken.

Equipment Maintenance—

Getting the Most Out of Your Welder

High-cost breakdowns of welding units usually caused by inattentive maintenance and operation—Heads-up care and equipment checks will assure a prolonged and useful life for your unit

By G. E. TENNEY
Service Manager
The Lincoln Electric Co.
Cleveland, Ohio

A DC ARC WELDING unit is a piece of machinery containing moving parts, and like all machinery of this nature, it is subject to the effects of wear. Failures, breakdowns and loss of efficiency do occur in arc welders. When failures occur, fault is generally laid by the operator at the door of the manufacturer of the equipment for careless or faulty construction. Over a period of many years, however, records show that of all the welders returned to The Lincoln Electric Company for repair, more than 95 per cent of them have failed because of neglect, improper operation and maintenance, or just plain abuse.

To get the most out of a welding machine used in construction work, it is important, therefore, that the unit be handled and maintained properly, as operating conditions in the field are often unusually severe.

First item—proper installation

The first place to begin avoiding trouble with the welder is in the installation of the equipment, and this is true whether the installation is a permanent one in a shop or a temporary one in the field.

Adequate ventilation should always be provided. Insure a supply of clean fresh air to the welding set at all times. Where dust or moisture conditions are excessively bad, this may necessitate the construction of a separate enclosure. Dust or corrosive vapor in the air will destroy the insulation and shorten the life of the machine.

Do not place the welding set where air either coming to or leaving it is blocked in any way. All covers on electric sets and canopy doors on engine sets should always be kept on and closed tightly as only thus is proper circulation of air obtained.

For operation out-of-doors, the set should be protected against the weather with adequate covering. If coils have been exposed to moisture, they may be dried out by baking in an oven or furnace. Drying should be done carefully, however, varying the amount of heat and time with the condition of the coils and type of oven used.

The welder should be firmly and evenly supported wherever it is operated. A welder is a precisely aligned mechanism, and mechanical abuse will destroy the balance and alignment of the armature. Do not drop the welder from any height or drop anything on it. If the armature appears to be jammed, do not force any moving parts but inspect or dismantle to determine the cause of the trouble. The control box cover or canopy hood should be kept on at all times to forestall dropping anything into the unit that might cause electrical or mechanical damage.

When installing electrically driven welders, always ground the set and use adequate power input cables. The line should be fused at two to three times the rated motor current.

Another installation detail which is frequently the source of inefficient welder operation is the matter of loose electrical connections. Before operating the set, check cable connections at the control panel and at the electrode holder. Weak arc, unstable arc and generally unsatisfactory arc operating characteristics will result from loose cable connections.

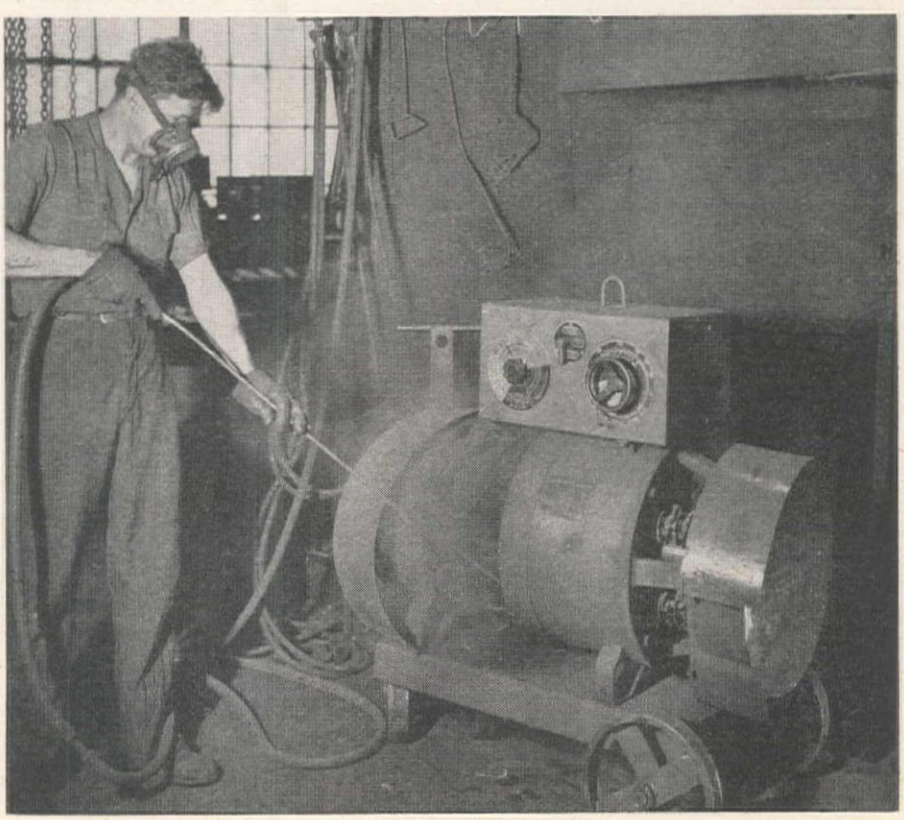
Maintenance of power supply

DC welders depend on a rotating armature for their current generation. There must be some source of power to rotate the armature. The first maxim of good welder maintenance is — protect the source of power. That power may either be an electric motor or a gas engine; but in either case when that source of power fails or becomes inefficient, the welder is of little or no value.

On electric motor driven welders, the line voltage at the welder should be up to the specified voltage on the nameplate, although satisfactory operation is usually secured if voltage varies no more than 10 per cent from this figure. Size of power cable should be adequate to carry required power.

Electric motor maintenance is fairly simple. Ample fuse protection against single phase conditions is essential. The motor should also have some sort of thermal protection against overload and overheating. Keeping the motor clean by blowing out with compressed air and greasing bearings once a year is about all the periodic maintenance that is needed.

PROPER METHOD of blowing out the interior of an arc welder motor-generator with compressed air is shown below. Cleaning motor and greasing the bearings are the foremost maintenance items.



A gasoline engine, however, presents a more serious problem in maintaining the source of welder power at a high level. With lack of care, engines deteriorate rapidly, and as the horsepower output of the engine falls off, the output of the welder will decrease correspondingly. An engine will continue to operate under abuse, but simply because it is turning over does not mean that the engine is producing sufficient power. Welder service is the toughest service to which an engine can be put. The full load of the generator is applied immediately as the arc is struck, and the engine must pick up immediately. It is extremely important, therefore, that the engine manufacturer's recommendations for maintenance be carefully followed.

The oil filter and air cleaner breathers and gasoline strainers should be changed and cleaned regularly, and the oil changed after the specified number of hours of operation. Air filters of oil reservoir type require that the oil be changed when it becomes dirty. This servicing will vary from a few days in comparatively clean operating conditions to twice or more times daily in very dusty conditions. Engine bearing wear is critical in welding units as it can affect the air gap of the generator armature. Bearing wear can be minimized by keeping clean oil in the engine.

It is also important that oil does not leak back from the engine into the welding generator. Grease quickly accumulates dirt and dust, clogging the air passages between generator coils.

Overloading makes failure certain

A welding machine will absorb a lot of punishment and continue to operate. Some units, literally dragged through a river and loaded with mud, have still produced current. Rough handling and mechanical abuse, however, are hard on a unit and take something out of the life of the machine. Eventually the breakdown point is reached. Proper handling and operation will add many years of useful service to its life.

Welders are not recommended for use on any continuous load duty. In operating a machine on a steady load for such work as thawing water pipes, supplying current for lighting, running motors, charging batteries, or operating heating equipment, it is not always possible to control the load conditions and, as a result, the welder is overloaded and damaged before any indication of danger is noticed.

If, however, operation of a welder under steady load condition is unavoidable, do not set welder output at the machine's rated maximum capacity. The maximum output on steady load should be no more than 80 per cent of the rated capacity. For example, a machine with a duty cycle of 60 per cent and a NEMA rating of 300 amp. and 40 volts, or 12

TROUBLE SHOOTING CHART FOR DC WELDERS

CAUSE	CURE
Machine Fails to Start:	
1. Power circuit dead.	Look for open in line, blown fuses, open switch.
2. Power circuit single phased.	Look for one blown fuse or one dead line.
3. Power line voltage not suitable for motor, or extremely low. Starter may chatter when button is pushed on.	Check line voltage; especially when starting.
4. Machine jammed.	See that armature turns freely by hand. Do not force. Look for foreign material in air gap.
5. Engine failure.	Follow manufacturer's recommendation for shooting trouble. May be fuel, or ignition or mechanical.
6. Motor starter single phased.	Check to see that all contact fingers make contact when closed.
7. Overload protection device tripped or contact open-circuited.	If machine has had time to cool after tripping caused by overload, or is cold and starter fails to close, check for circuit through push button, no-voltage release coil and thermostats to find open circuit. Check against wire diagram for the machine. Some contacts are normally open.
Welder Starts But Fails to Generate:	
1. Running the wrong way.	Check direction of rotation with manufacturer's instructions or arrow. On 3-phase motor direction may be changed by interchanging any two input leads.
2. Generator or exciter brushes loose or missing.	Check all brushes for surface contact and spring tension.
3. Field circuit of generator or exciter open.	Check for open circuits in rheostat, field leads and coils. Check resistors and rectifiers, if any. Some welders give low output when fields are open.
4. Exciter not operating.	Check exciter output voltage with meter.
5. Exciter has lost residual magnetism.	Flash the field with a storage battery or another generator, first with one polarity then another to see if it builds up. Flash exciter fields if set has separate exciter.
6. Series field and armature circuit open-circuited.	Check circuit with ringer or voltmeter.
7. Reversing switch wiper contact bent and not clearing the blade of the switch when switch is closed.	Bend or replace to secure correct operation.
8. Engine fails to pick up speed when arc is struck.	May be due to dirt in vacuum relief valve or vacuum line to idling device. Mercury switch may not be shorting rheostat. Check lines and switch.
9. Engine stalls when arc is struck.	Mixture in carburetor may be too lean. Try richer mixture.
Motor Trips Off the Line:	
1. Power circuit single phased.	Check for one blown fuse or dead line.
2. Welder operating above current capacity.	Check load against welder nameplate.
3. Welding leads to work or electrode too long or too small in cross section.	Check output terminal voltage at machine while it is loaded. Should not exceed 30 volts on small machines and 40 volts on larger machines when operating at rated currents. Change leads if machine is being overloaded.
4. Ambient temperature too high.	See that temperature around set does not exceed 100 deg. F., and that there is no ventilation interference.

CAUSE	CURE
5. Motor input voltage too low under load.	Voltage should not fall below 90 per cent of normal. Have power company check supply. Supply leads may be too long or too small.
6. Phase voltage unbalanced.	Determine cause and correct.
7. Ventilation impaired.	Determine cause and correct. Keep all covers on welder.
Welding Current Not Constant:	
1. Rough or dirty commutator.	True or clean commutator.
2. Brushes worn down to limit of adjustment or life.	Replace or readjust brushes.
3. Brush springs lost tension or broken.	Check brush spring tension. Replace or readjust brush springs.
4. Field circuit has variable-resistance connection or intermittent open circuit, caused by loose connection or broken wire.	Check field current with ammeter. This applies to both the main generator and exciter, if used.
5. Electrode lead or work lead connections poor.	Tighten all connections.
6. Wrong grade of generator brushes.	Check with manufacturer's recommendations.
7. Field rheostat or tap switches make poor contact or overheating.	Inspect rheostat, clean, and adjust finger tension on switches.
8. Current control brush holder contact springs worn out or bent. Contact surfaces dirty, rough or pitted.	Inspect, replace defective parts, clean internal contact surface of control device. Do not lubricate. Smooth up roughened surface.
9. Current control brush holder support stud and mating contact surfaces dirty or pitted and burned.	Clean brush holder stud and internal contact surface — apply vaseline lightly to stud, and replace. If brush holder internal contact surface is burned, replace brush holder and support stud.
10. Engine regulator rheostat shorting switch out of adjustment.	Adjust switch contacts or mercury switch tilt angle so that circuit is open when engine is at full speed and when welding.
Welding Arc Loud and Excessive Spatter:	
1. Current setting too high.	Check setting and current output with ammeter.
2. Polarity wrong.	Check polarity. Try reversing polarity, or an electrode of opposite polarity.
3. Engine regulator shorting switch contacts close intermittently when running at full speed, causes increasing surge of current and spatter.	Adjust so that contacts are well open or mercury level is well below contact on mercury tilt switch when engine is at full-speed position of regulator (bellows fully extended).
Welding Current Too Great or Too Small According to Setting:	
1. Current control shaft and handle turned slightly in the insulated bushing of current control brush holder, caused by turning handle too hard against stop.	See that current control indicator yellow arrow is in horizontal position when handle is turned against stop in minimum direction.
2. Exciter output low, causing low output compared to dial indication.	Check for open circuit through field discharge resistor wired to reversing switch.
3. Current control set to minimum and welder output so great that motor stalls when arc is struck.	Determine if motor is running backward, or generator series fields are connected reversed to make a cumulative series generator.

kw., should not be used for any continuous load greater than 9.6 kw., and not more than 240 amp. At the start of such a load the voltage rheostat should be set at its minimum. Machines with lower load factor ratings must be operated at still lower percentages of the rated load.

Most welding machines are designed and made with a considerable margin of safety in the operating factor, but the machine should not be worked over its rated capacity. In other words, just because a welder rated at 200 amp. will produce 280 amp., it does not follow that it should be used to do the work of a 300-amp. unit. Operating above the rated capacity in welding causes overheating, which destroys the insulation and may melt soldered connections in the commutator.

The electrode should never be left grounded to the work while the machine is running. This causes the worst possible overload condition. Grounding the electrode creates a "dead short" in the welding circuit and the machine is forced to generate much higher currents than that for which it is designed.

Fight against dirt

Dirt is the worst enemy of machinery. It will attack a welding unit in many ways and the principal effort in maintenance should be directed against the effects of dirt. The large volume of air drawn through a welder for ventilation is one source of danger. Air-borne dust and abrasive materials will collect in air passage and clog ventilation, causing overheating. Metallic dust will also collect around coils and constitute a potential source of coil failure. Abrasive dust will cause commutators to become grooved and pitted and will accelerate brush wear.

Where machines are subject to ordinary dust conditions, good maintenance practice calls for blowing out the complete unit once a month with clean, dry, compressed air. Where conditions are severely dusty, the cleaning should be more frequent. Air pressure should not be so high that the force of the air damages the insulation or windings.

Where cast iron or steel dust is present in the air, the welder should be cleaned out with vacuum equipment, as blowing with compressed air tends to drive the metallic dust into the windings. If vacuum equipment is not available, use compressed air at reduced pressure.

If the coils of the welder become clogged with greasy dirt or mud that cannot be blown out, disassemble the unit and clean the coils with naptha gasoline. After loosening dirt with naptha, blow out with compressed air. After cleaning, it is good practice to paint coils with an air drying insulating paint.

Dirt is also a great enemy of bearings. It is responsible for more bearing failures than any other cause. Dirt may be introduced to the bearing through the grease cup when the cap is removed for greasing, or it may be in the grease itself. Wipe grease cups clean before greasing and keep the grease container clean and covered at all times. A particle of dirt no larger than the period at the end of this sentence, and which might be floating around in the air, can cause bearing failure.

Keep the magnetic starter clean. An accumulation of dirt and dust around the starter can cause the line voltage to jump between phases and burn out the

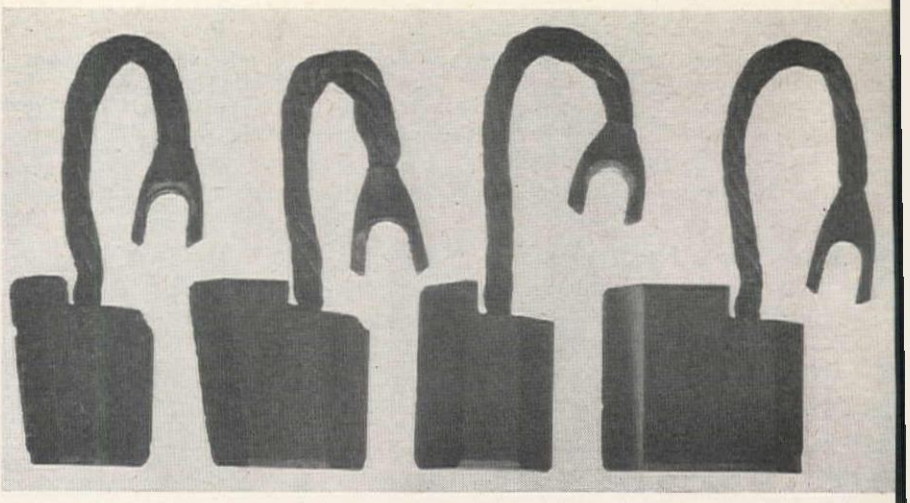
starter. Keep the entire control box clean. Check all insulation in the control box to be sure it is clean and in good condition.

Periodic preventive maintenance

The following preventive maintenance inspection is suggested as an absolute minimum to be performed once a month. It is based on an assumption of average operating conditions. If it is impossible to maintain this schedule with the crew available, many authorized field service shops with factory trained men have this type of preventive maintenance available on a contract basis. A service contract will be more than worth the investment in the returns received through operating efficiency of the welding equipment.

Generator or electrical maintenance:

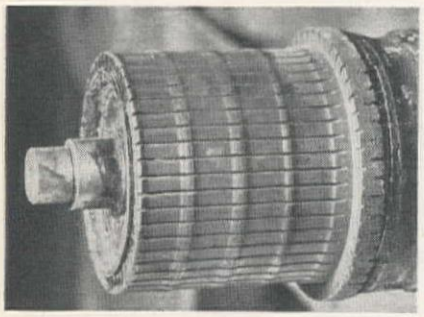
1. Blow out and clean entire unit.
2. Inspect and adjust commutator brushes on both exciter and main generator commutators.
3. Inspect, clean if necessary, armature and commutator.
4. Clean starter contacts.
5. Examine bearings and grease at proper intervals.
6. Examine all external electrical connections and condition of welding cables.
7. Check machine for proper welding operation and control of current range.



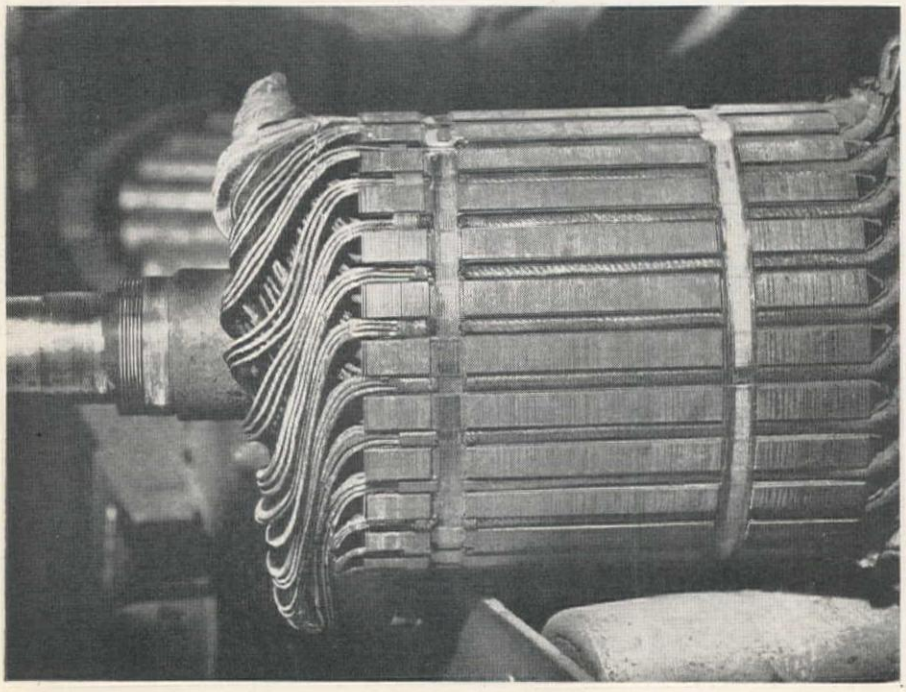
LEFT TWO BRUSHES show effect of improper feeding. Third from left is ready for replacement. Far right shows how brush should look if properly sanded and squarely seated.

Gasoline engine maintenance:

1. Check governor and idling device and other engine controls to regulate welding.
2. Check output engine speeds.
3. Clean air filter.
4. Adjust carburetor.
5. Clean gas filter.
6. Check generator and battery.
7. Check points.
8. Check magneto.
9. Check cooling system.
10. Check oil.
11. Change oil and oil filter cartridge when necessary.



BADLY GROOVED commutator with "segment rings," shown in above view, is caused by abrasive atmospheric conditions or improper contact between brush and commutator. View below shows burned-out armature coils, caused by overheating. Early attention would prevent this damage.



In making engine adjustments and minor repairs, follow the engine manufacturer's recommendations. Following are suggested procedure for making generator repairs:

Greasing and over-greasing

Many bearing failures can be traced directly to over-greasing. Most welder ball bearings need greasing only once a year. From one-half to one ounce of grease is all that should be added to the bearing once a year. A pad of grease approximating a cubic inch in volume weighs close to one ounce. Forcing grease in under pressure should be avoided.

Grease used should be about the consistency of apple butter and should be checked periodically to be certain it has not turned rancid. Bearings should not be opened for inspection as they are sealed against dirt. Inspection should be made by listening for any unnatural noise. A screw driver held against the housing and against the ear makes a convenient tool for listening to bearings.

If it is necessary to pull a bearing, a special puller should be used. A properly constructed bearing puller draws against the inner race of the bearing only. Do not wipe grease or otherwise clean new bearings taken directly from a sealed carton. Always drive them on by hitting against the inner race.

The bearing housing may become worn oversize from the pounding of an armature that is out of balance. Remove brackets by tapping lightly around the outside diameter of the bracket ring with a babbitt hammer. Check the bearing housing for fit by trying a new bearing. A new bearing should slide into the housing with a light drive fit.

Armatures and commutators

Armatures should be kept clean to prevent them from becoming unbalanced. The armature should be cleaned

(Continued on page 126)

NEWS OF WESTERN CONSTRUCTION

MARCH 15, 1949

C.V.A. Proponents Object as Public Approves "308" Report

VIRTUALLY UNANIMOUS endorsement of the Corps of Engineers "308" Report for the $3,000,000,000 development of the Columbia River Basin was forthcoming at public hearings held in Spokane and Seattle, Wash., Portland, Ore., and Boise, Ida. The plan, recommending construction of seven major dams in the Columbia Basin and twenty in the Willamette Valley, was approved by about 90 per cent of the 200 witnesses who appeared at the four hearings. Maj. Gen. Roscoe C. Crawford, deputy chief of engineers, presided at the hearings.

Chief among the few objections to the comprehensive development plan was the opposition to Glacier View Dam on the Flathead River in Montana, proposed $95,000,000 multiple-purpose structure. Opponents point out that 19,500 ac. of national park land would be destroyed if the dam was built, and suggested that Paradise Dam on the Clark Fork of the Flathead River be substituted. Interior Secretary J. A. Krug also is insisting on elimination of Glacier View Dam from the program, upholding the findings of the Pacific Northwest Field Committee of the Interior Department. Construction of Paradise Dam would require relocation of several small towns and relocation of two transcontinental railroads. In addition to protection of wilderness and wildlife values in Glacier Park, substitution of the Paradise structure, it is claimed, would provide greater power benefits downstream as well as greater flood control benefits.

Opposition by navigation interests to the proposed $342,000,000 Hell's Canyon Dam on the Snake River at the Oregon-Idaho boundary failed to materialize. Opponents made a token appearance at the hearings after the Corps of Engineers explained that locks without gates may be used to raise barges several hundred feet at the dam site, similar to the systems used on the Rhine and Danube canal systems in Europe.

Strong support was given for immediate construction of the 31,070,000 Albeni Falls Project on the Pend Oreille River, tributary of the Columbia in Idaho.

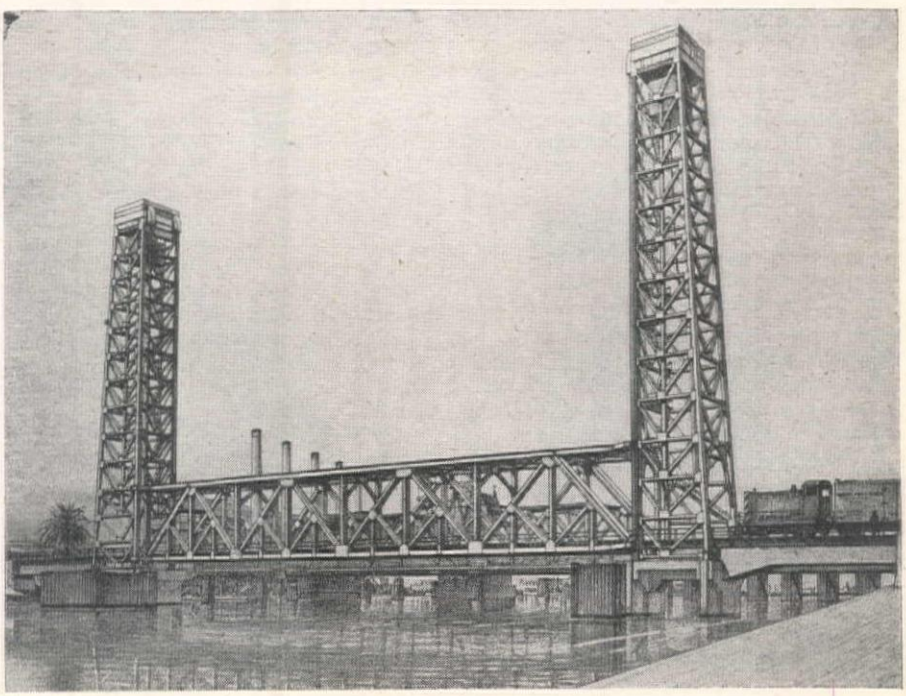
Fast action was also urged by various witnesses on The Dalles and John Day Projects on the lower Columbia (estimated cost, $286,286,000 and $379,826,000, respectively), and Priests Rapids Project on the Columbia main stem in Washington, to cost $326,124,000.

Despite assertion by Gen. Crawford that discussion of administrative details or of a possible Columbia Valley Authority should not be made a part of the hearings, attempts were made at each hearing to inject support of a C.V.A. into the discussion. Arguments were advanced that the Corps of Engineers should proceed slowly with Columbia Basin Development since limited cooperation of existing agencies is not enough to meet the region's needs, principally for power. Power development under the Engineers' comprehensive plan would be equivalent to 60 times the power produced presently at Bonneville Dam and Power Plant. Another opinion was extended that nothing short of a valley authority would permit regional development to progress in an orderly manner.

Staffs of the Corps of Engineers Division offices at Portland, Seattle and Walla Walla met with Gen. Crawford and the 7-man Corps of Engineers Board of Review for Rivers and Harbors after the meetings to begin consideration of all testimony.

$1,000,000 VERTICAL LIFT BRIDGE WILL SPAN OAKLAND ESTUARY

RAILROAD FACILITIES across the estuary at Fruitvale Ave. in Oakland, Calif., will be carried on a new vertical lift bridge with 200 ft. clear distance between fenders. Piers are being designed to permit dredging of the channel to a depth of 40 ft. below low water. Plans and specifications are being prepared by the firm of Woodruff and Sampson, San Francisco, for the Corps of Engineers, sponsors of the project. Separate contracts will be awarded for substructure and superstructure.



TACOMA FLOOD DANGER TO BE REDUCED BY DREDGING AND LEVEE WORK

MANSON AND OSBERG construction companies have completed approximately 60% of their contract for channel dredging, levee construction, and work on the Northern Pacific transfer bridge on the Puyallup River at Tacoma, Wash. The contract is part of a $3,000,000 Corps of Engineers flood control project.

Big Earthwork Jobs Invited by Bureau Of Reclamation in the Western States

INVITATION to bid will be extended about March 15 by the Bureau of Reclamation for construction of earthwork, concrete lining and structures for about 17 mi. of the Delta-Mendota Canal near Los Banos, Calif. The project will include 5,500,000 cu. yd. of excavation and 127,000 cu. yd. of concrete in the lining and structures. Specifications and bid forms may be obtained from the office of the Chief Engineer in Denver, Colo., or from local Regional offices of the U.S.-B.R.

Also about March 15, invitations will be issued for relocation of about 14 mi. of Forest Service road between Riverside Creek and Elk Park ranger station on the Hungry Horse Project in Montana. The work is about 14 mi. northeast of Kalispell. The job involves about 350,000 cu. yd. of excavation. On March 22, bids will be called for rehabilitation of Ochoco Dam, spillway and outlet works on the Deschutes Project in Oregon. The dam is an earthfill structure 125 ft. high and 970 ft. long near Prineville. The work includes 240,000 cu. yd. of excavation and 100,000 cu. yd. of rockfill on the downstream slope of the dam.

On March 28, bid invitations will be extended for construction of earthwork and structures for the 15-mi. long Winchester wasteway on the Columbia Basin project in Washington. The job includes nearly 3,000,000 cu. yd. of excavation and the furnishing of 1,150,000 lb. of reinforcing steel.

On March 15, invitations to bid will be issued for the construction of about 45 mi. of 115-kv. wood-pole, H-frame transmission line from Fort Randall dam substation near Fort Randall, South Dakota to O'Neill, Neb.

During the next two months, the Bureau expects to invite bids on the following projects. Canals: Construction of the 18-mi. long Wellton-Mohawk canal on the Gila Project in Arizona; construction of earthwork and structures for about 16 mi. of the Courtland Canal near Superior, Neb., on the Missouri River Basin Project; construction of earthwork and structures for 6.5 mi. of Cambridge canal near Arapahoe, Neb., on the Missouri River Basin Project, and construction of pumping plants Nos. 1, 2, and 3 on the Wellton-Mohawk canal about 20 mi. east of Yuma, Ariz.

Electric installations: Construction of the Estes Park-Marys Lake and Estes Park-Granby Pumping plant transmission lines (about 40 mi. long) on the Colorado-Big Thompson project in Colorado; construction of 18 mi. of double-circuit and 54 mi. of single-circuit steel tower transmission line from Elverta to Tracy, Calif., and stringing 57 mi. of single-circuit conductor for the Oroville to Elverta, Calif. transmission line on the Central Valley Project; construction of the 41-mi. long Bismarck to DeVaul 69-kv. transmission line near Bismarck, N. D.; stringing conductor and overhead ground wire for 70 mi. of the 230-kv., 3-phase, single circuit transmission line between Davis Dam and Parker Dam, and for 64 mi. of 230-kv., 3-phase, single circuit transmission line between Davis Dam and Hoover Dam on the Davis Dam Project.

Miscellaneous: Relocation of 4 mi. of State Highway at Palisades Reservoir 56 mi. southeast of Idaho Falls, Ida., and construction of a government camp for Anchor Dam about 35 mi. west of Thermopolis, Wyo. The latter job involves erection of one permanent residence, 5 temporary residences, one office and laboratory building, one shop and garage building and sewer and water systems.

Federal Funds Withheld Until Arguments Stop

PRESIDENT TRUMAN indicated last month that he would veto any bill authorizing the $738,000,000 Central Arizona Project, until the Arizona-versus-California water rights problem on the Colorado River is settled. The project which would divert 1,000,000 ac. ft. annually from the Colorado River to irrigation uses in Arizona is now up for consideration before the U. S. House of Representatives Public Lands Subcommittee.

The President stated that "authorization of the improvement is not in accord with his (budget) program at this time, and that measures should be taken to bring about prompt settlement of the water rights controversy." Secretary of the Department of Interior, Julius Krug, in a report to Congress last September, said the project was economically feasible, and recommended that it be authorized, if Arizona claims to Colorado River water were upheld.

Approval of the project has been sent to Congress by the Governors of Arizona, New Mexico and Utah, states in which project works would be built, as well as Colorado and Wyoming. California and Nevada have expressed opposition to the project, chiefly on the basis of the question of state water rights. The water rights issue has been recommended for adjudication by the U. S. Supreme Court.

Floodgates to Be Installed At Arizona's Horseshoe Dam

DISPUTE over installation of floodgates at Horseshoe Dam on the Verde River in Arizona has reached an amicable solution despite threats by downstream landowners to fight against the project "into the next century." The floodgates would raise the potential water level of the reservoir at the dam by 35 ft. and provide the City of Phoenix with an additional 20,000 ac. ft. of water annually.

The downstream landowners' threat was made at a public hearing held by the Arizona State Land and Water Commission. The landowners claimed the water for their own use that would be diverted to the Phoenix domestic water supply. Representative of the City of Phoenix pointed out that only water considered surplus in the Verde River would be impounded at the dam.

Order Is "Full Speed Ahead" April 1 At Hungry Horse Project in Montana

FULL-SPEED CONSTRUCTION of major plant facilities at the Hungry Horse Project in Montana will begin about April 1, weather conditions permitting. Major plant additions to be completed this spring and summer by the general contractor, General-Shea-Morrison, will include all facilities needed to permit placement of the first concrete in the huge dam this summer.

Already under construction and scheduled for completion this summer is the big cement unloading dock at Coram. The dock, which will be approximately 320 ft. long, 58 ft. high and 25 ft. wide, will house 20 silos with a total capacity of 30,000 barrels of cement and pozzolan.

Sand and gravel will be hauled in 25-cu. yd. capacity trucks to the dam site from the aggregate pit, which is situated at the confluence of the South Fork and the Middle Fork of the Flathead River, approximately 5 miles from the dam. Construction will be completed this spring on a road from the aggregate pit to the dam site. Construction work at the dam site this spring and summer will include installation of the concrete batching and mixing plant, cement and pozzolan silos and the aggregate screening plant.

The concrete plant will include four 4-cu. yd. mixers and the latest electrically controlled equipment for accurately measuring and controlling the quantities of cement, sand and gravel and water used in the concrete mix. Maximum capacity of the plant will be 320 cu. yd. of concrete per hour. Approximately 3,000,000 cu. yd. of concrete will be required to complete the 520-ft. high Hungry Horse dam and powerhouse.

The aggregate screening plant will occupy an area approximately 200 ft. wide and 2,000 ft. long, will have a capacity of 700 tons of graded sand and gravel per hour. It will produce four different sizes of gravel ranging in size from 3/16th-in. diameter to 6-in., and various grades of sand.

Water to be used in mixing and cooling concrete for the dam will be obtained from Fawn Creek which flows into the South Fork a short distance below the dam site. A 16-in. wood pipe line 7,700 ft. long is being constructed from Fawn Creek to the dam.

Placement of concrete in the dam and powerhouse will be accomplished with 8-cu. yd. bottom-dump buckets operating from four steel cableways to be strung between steel towers on the canyon walls.

The main headtower will be 200 ft. high and will be anchored to the south wall of the canyon which forms the left abutment for the dam. A 15-ton crane will be mounted on top of the tower to handle equipment and facilitate repair work. Three steel cables, each of 3-in. diameter, will span the river canyon from the headtower to three moveable tailtowers operating on an 810-ft. track on the north canyon wall. The tailtowers will be 52 ft. high.

The fourth cableway to be located a short distance downstream, will be used to place concrete in the powerhouse. The 85-ft. high headtower will be situated on the right abutment, and the 102-ft. high tailtower will operate on a 600-ft. long track on the left abutment.

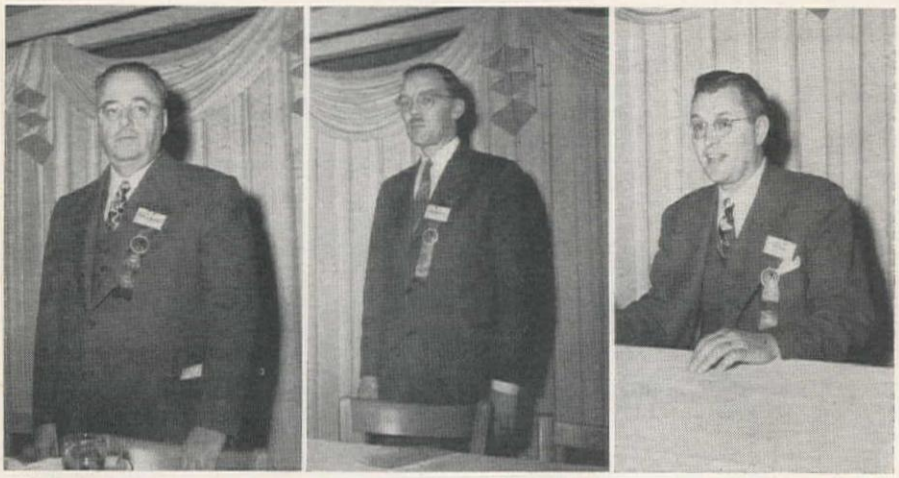
Other construction scheduled at the dam site this spring and summer by General-Shea-Morrison will include a pipe shop and field office.

Plant facilities already completed by General-Shea-Morrison include a machine shop, blacksmith shop, carpenter shop, warehouse facilities, truck and tire shops, and complete camp facilities, including single family houses, dormitories, messhall, recreation hall, store and offices. The contractor's steel fabricating yard is nearly complete.

Total number of men to be employed by G-S-M this summer is estimated at 1,500 to 2,000. The summer's peak for all contractors and Bureau of Reclamation personnel will be over 3,000. G-S-M needs carpenters, structural iron and steel riggers, drillers, concrete and building laborers, electricians, and equipment operators. Large scale hiring will begin about April 1.

HEAVY SNOWS have interfered with Hungry Horse construction this winter. Here, CLEM CAIN keeps a Chicago Pneumatic drill operating on abutment despite snow.

Westerners Well Represented At A.E.D. National Convention



WESTERNERS elected as 1949 officers of A.E.D. include, left to right: C. F. HALLADAY, Sioux Falls, S. D., as Executive Vice-President; R. L. ARNOLD of Salt Lake City, Utah, as Vice-President, and JACK HOW, San Francisco, Director of Region 11.

UNDER ABLE direction of **A. F. Garlinghouse,** of Los Angeles, 1948 president, the recent national convention of Associated Equipment Distributors held at the Stevens Hotel in Chicago was one of the finest meetings ever sponsored by the organization. In several respects it was notable. In the first place, the program, forums, and entertainment were of the finest; further, for the first time in several years, all attendants were housed in one hotel, thus facilitating fellowship and conferences between manufacturers and distributors.

A brief report of the meeting was presented in *Western Construction News* last month, but pictures and a full report were not available at publication time of that issue. The West was well and prominently represented at the meeting. In addition to **Jack How, Wm. H. Booth, R. L. Arnold, Jewel A. Benson** and **C. F. Halladay,** who were mentioned in the previous release as among the officers for 1949, the following Western men were in attendance:

R. G. Arnold of ARNOLD MACHINERY CO., INC., Salt Lake City; **George W. Flatt,** BALZER MACHINERY CO., Portland, Ore.; **John A. Beynon,** BROWN-BEVIS EQUIPMENT CO., Los Angeles; **Oscar B. Bjorge,** CLYDE EQUIPMENT CO., Portland, Ore.; **William H. Booth,** CLYDE EQUIPMENT CO., Seattle, Wash.; **W. M. Nosman,** COAST EQUIPMENT CO., San Francisco; **Charles E. Berry, Charles B. Hansen,** and **James D. Maitland,** COLORADO BUILDERS SUPPLY CO., Denver, Colo.; **Frank B. McBath,** COLUMBIA EQUIPMENT CO., Portland, Ore.; **H. W. Hurd,** COLUMBIA EQUIPMENT CO., Boise, Ida.; **Charles A. Burnette,** CONSTRUCTION EQUIPMENT CO., Spokane, Wash.; **D. G. Gibson** and **T. M. Sanders,** CONSTRUCTORS EQUIPMENT CO., Denver, Colo.; and **F. O. Skidmore,** CONTRACTOR'S EQUIPMENT & SUPPLY CO., Albuquerque, N. Mex.

Oliver C. Jessup, CONTRACTORS EQUIPMENT CORP., Portland, Ore.; **R. E. Corson** and **J. J. Booth,** RAY CORSON MACHINERY CO., Denver, Colo.; **J. A. Widrig, L. E. Wick** and **C. J. Higman,** A. H. COX & CO., Seattle, Wash.; **Charles P. Cramer,** CRAMER MACHINERY CO., Portland, Ore.; **R. G. Falk,** EQUIPMENT SUPPLY CO., INC., El Paso, Texas; **D. J. Feenaughty** and **M. B. Mack,** FEENAUGHTY MACHINERY CO., Portland, Ore.; **B. L. Foulger** and **J. T. Holland,** FOULGER EQUIPMENT CO., Salt Lake City; **Bert Fornaciari** FORNACIARI CO., Los Angeles; **A. F. Garlinghouse** and **R. N. Armstrong,** GARLINGHOUSE BROTHERS, Los Angeles; **E. J. Simons, Jr.,** GENERAL MACHINERY CO., Spokane, Wash.; and **C. H. Grant,** C. H. GRANT CO., San Francisco.

L. E. Jones and **Ben L. Smith,** HALL-PERRY MACHINERY CO., Butte, Mont.; **John E. Carroll,** HARRON, RICKARD & McCONE CO. OF SOUTHERN CALIFORNIA, Los Angeles; **F. R. Cooper** and **W. A. Wylie,** HOWARD-COOPER CORP., Portland, Ore.; **W. C. Hardie,** INDUSTRIAL EQUIPMENT CO., Billings, Mont.; **P. A. Dufford** and **R. W. Stevens,** INTER-MOUNTAIN EQUIPMENT CO., Boise, Idaho; **E. S. Jenison,** JENISON MACHINERY CO., San Francisco; **Walter W. Kershaw,** THE LANG CO., INC., Salt Lake City; **Fred Forbes,** LEE & THATRO EQUIPMENT CO., INC., Los Angeles; **R. F. Deane** and **F. A. Kingston,** LE ROI-RIX MACHINERY CO., Los Angeles; **W. E. Lively, Jr.,** LIVELY EQUIPMENT CO., Albuquerque, New Mex.; **A. F. Sersanous,** LOGGERS & CONTRACTORS MACHINERY CO., Portland, Ore.; **Joseph N. McRae,** LUND MACHINERY CO., Salt Lake City; **William J. Edwards,** MINE & SMELTER SUPPLY CO., Denver, Colo.; and **C. H. Davis,** MODERN MACHINERY CO., INC., Spokane, Wash.

John C. Moore and **Walter Babcock,** H. W. MOORE EQUIPMENT CO.,

ENJOYING the Early Bird's Breakfast, top, are A. F. GARLINGHOUSE, A.E.D.'s 1948 President, JACK HOW, JOHN CARROLL, WARREN BROWN and BERT FORNACIARI. Officers for 1949, bottom, are—in back row, C. F. HALLADAY, E. J. CROSBY, W. W. BUCHER, President, and J. A. BENSON—and seated, D. G. MACPHERSON, R. L. ARNOLD and F. G. KNIGHT.

AGAIN IT'S LORAIN IN MONTANA

UNION CONSTRUCTION CO.
OF GREAT FALLS

USE LORAIN-41 DRAGLINE
FOR
DITCH WORK ON MONTANA HIGHWAY JOB

A $325,000 secondary highway project south of Dillon, Montana gets low cost drainage ditches with the help of this Lorain-41 Dragline. Project is 15 miles long, with ditches from 18 in. to 4-feet deep—to accommodate drainage tiles. Union Construction Co. of Great Falls joins the ranks of thousands of Lorain-41 owners benefiting by this tried and proved design.

THE THEW SHOVEL CO.
Lorain, Ohio

THEW-LORAIN 50th ANNIVERSARY 1899 1949

EVERY PART OF THE "LORAIN-41 SERIES" IS PACKED WITH PROVED FEATURES FOR PROFITS

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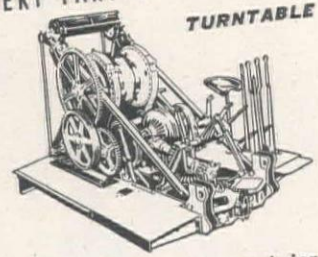
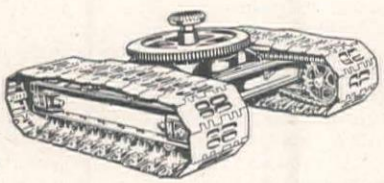


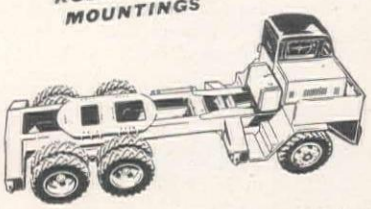
Center Drive power transmission concentrates power when and where you need it—Balanced design for maximum lifting capacities at minimum weight.

2-SPEED CRAWLER



- Chain drive, 2 speeds in both directions . . . Steers from cab with turntable in any position . . . 4 way Tread and Travel Lock . . . Drop forged Treads.

RUBBER-TIRE MOUNTINGS



- 2-engine Moto-Cranes, 3 axles, 10 tires, with or without front wheel drive; 1 to 31 M.P.H. . . . Single-Engine Self-Propelled units, 4 speeds up to 7 M.P.H.

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ANDREWS EQUIPMENT SERVICE OF WASHINGTON, INC.
Spokane, Wash.

BUNTING TRACTOR CO., Inc.
Boise, Twin Falls, Gooding, Fairfield, Burley, Carey, Idaho

CATE EQUIPMENT CO.
Salt Lake City 4, Utah

CENTRAL MACHINERY CO.
Great Falls and Havre, Mont.

COAST EQUIPMENT CO.
San Francisco 3, California

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

P. L. CROOKS & CO., INC.
Portland 10, Ore.

INLAND MACHINERY CO.
LaGrande, Oregon

LE ROI-RIX MACHINERY CO.
Los Angeles 22. Branches: Bakersfield, Long Beach 6, Calif.

LIBERTY TRUCKS & PARTS CO.
Denver 1

MOUNTAIN TRACTOR CO.
Missoula and Kalispell, Mont.

LEE REDMAN EQUIPMENT CO.
Phoenix, Arizona

SOUTHERN IDAHO EQUIPMENT CO.
Idaho Falls, Idaho

TRACTOR & EQUIPMENT CO.
Sidney, Mont. Branch: Miles City Equip. Co., Miles City, Mont.

WORTHAM MACHINERY CO.
Cheyenne, Wyo. and Billings, Mont. Branches: Sheridan, Greybull, Casper and Rock Springs, Wyo.

Denver, Colo.; **V. R. Howell,** MOUNTAIN TRACTOR CO., Missoula, Mont.; **H. H. Nielsen,** H. H. NIELSEN CO., Salt Lake City; **J. B. Beatty,** NORMONT EQUIPMENT CO., Great Falls, Mont.; **H. J. Agee** and **M. E. Headrick,** OLSON MANUFACTURING CO., Boise, Idaho; **Dean M. Gillespie,** POWER EQUIPMENT CO., Denver, Colo.; **N. C. Ribble,** N. C. RIBBLE CO., Albuquerque, New Mex.; **Melvin Seitz,** SEITZ MACHINERY CO., Billings, Mont.; **William T. Martin,** SERVICE EQUIPMENT CO., Seattle, Wash.; **Beal Shaw, J. C. Frush** and **N. I. Hickman,** SHAW SALES & SERVICE CO., Los Angeles; **Carl E. Baker** and **Alex Kostyzak,** SMITH BOOTH USHER CO., Los Angeles; and **S. L. Cate,** SOUTHERN IDAHO EQUIPMENT CO., Idaho Falls, Idaho.

H. E. Walters, O. S. STAPLEY CO., Phoenix, Ariz.; **I. B. Rabel** and **J. T. Hatten,** STAR MACHINERY CO., Seattle, Wash.; **Fred M. Viles,** FRED M. VILES & CO., INC., Spokane, Wash.; **Harold M. Dollen,** WESTERN CONSTRUCTION EQUIPMENT CO., Billings, Mont.; **Arthur F. King,** WESTERN CONSTRUCTION NEWS, San Francisco; **Gene Flaherty, G. M. Gehrke** and **F. W. Steckman,** WESTERN EQUIPMENT CO., Boise, Idaho; **M. W. McCann,** WESTERN EQUIPMENT CO., Eugene, Ore.; **H. N. How, H. J. Mayer** and **G. G. Carto,** WESTERN MACHINERY CO., San Francisco; **Leigh Jones,** WESTERN MACHINERY CO., Phoenix, Ariz.; **K. J. King,** WESTERN MACHINERY CO., Denver, Colo.; **L. T. McGuire,** WESTERN MACHINERY CO., Salt Lake City; and **H. A. Myers,** WESTERN MACHINERY CO., Spokane, Wash.

Glen Moss, WILSON EQUIPMENT & SUPPLY CO., Cheyenne, Wyo.; **Roy E. Wood,** WOOD TRACTOR CO., Portland, Ore.; **C. W. Featherly,** CAIRD ENGINEERING WORKS, Helena, Mont.; **David E. Hughes,** CATE EQUIPMENT CO., Salt Lake City; **Neil B. McGinnis,** NEIL B. McGINNIS EQUIPMENT CO., Phoenix, Ariz.; **Rex D. McKelvy,** McKELVY MACHINERY CO., Denver, Colo.; **P. H. Cohn,** SAWTOOTH CO., Boise, Idaho; **R. A. Studer,** STUDER TRACTOR & EQUIPMENT CO., Casper, Wyo.

As announced previously, **William W. Bucher** of R. E. BROOKS CO., New York, was elected president for 1949, and **C. F. Halladay,** Sioux Falls, S. Dak., was named executive vice-president. **Frank G. Knight,** Chicago, was reappointed executive secretary.

Of particular interest on the program were two panel discussions. The first, conducted by **H. R. Lunn** of THE BOARDMAN CO., Oklahoma City, discussed the enlargement and extension of the services AED could offer to its members. Advertising and sales promotion were the principal matters discussed. The second forum of wide interest was conducted by **Ralph K. Stiles** of AUSTIN-WESTERN CO., and concerned the relationship between distributors and manufacturers. Raw material outlook, cooperative advertising, financing of equipment sales, sales training and parts inventories were discussed.

In other meetings it was made plain that equipment distributors expect a drop in sales volume and lower profits in 1949.

PERSONALLY SPEAKING

Major General Lewis A. Pick, on March 1, succeeded **Lt. General Raymond A. Wheeler** as Chief of Engineers at Washington, D. C. A man of action, General Pick is best known as builder of the famed Ledo Road in the China-Burma-India theater of World War II and as co-author of the Pick-Sloan Plan for comprehensive control and development of the Missouri Basin's rivers. After service with the 23rd Engineers in France during World War I, Pick drew his first Regular Army assignment for duty in the Office of the Corps Engineer at the Presidio of San Francisco. For the next ten years, he served in various capacities in the Philippines and the United States, and in 1932 was assigned to the Command and General Staff School at Fort Leavenworth, Kansas. In 1939, he became Executive Assistant to the Division Engineer, Ohio River Division, and in 1942, was named Division Engineer of the Missouri River Division at Omaha, Neb. It was then he began putting on paper his ideas for controlling the Missouri. His ideas became a plan which was approved by the Chief of Engineers and later by the Congress of the United States. From 1943 to 1945, he was responsible for the supply of the United States and Chinese troops operating in Burma and for the construction, operation and maintenance of the Ledo Road. In Sept., 1945, he was assigned to the Office of Chief of Engineers in Washington, D. C., and two months later returned to the position of Missouri River Division Engineer.

GEN. PICK, New Chief of Engineers

General Wheeler completes 42 years of active military service. Immediately upon his retirement, he became Engineering Advisor for the International Bank for Reconstruction and Development, known as the World Bank. He had requested retirement last year, but continued on active duty at the request of the Secretary of the Army. He is a graduate of West Point, and commanded the 4th Engineers in World War I. In World War II he was successively, Commanding General of the Army Service of Supply Forces in the China-Burma-India Theater, Deputy Supreme Allied Commander of the Southeast Asia Command, and Commanding General of United States Forces in the India-Burma Theater. He became Chief of Engineers by Presidential appointment in October, 1945. In addition to directing all military construction for the Army and Air Force, General Wheeler has initiated an extensive post-war civil works program for flood control and the development of the nation's rivers and harbors.

* * *

R. H. Stalnaker, Principal Equipment Engineer for the California Division of Highways since 1921, has retired from that post after 37 years in state service. When the equipment department was organized in 1921, Stalnaker was placed in charge and served continuously in that capacity until his retirement. During his tenure, he set up the equipment rental system of the Division of Highways in 1924, and steadily perfected it until both the department and the rental system have been used as models by a number of other states. He is succeeded by **Earl E. Sorenson.**

GEN. WHEELER, Retired Chief

* * *

John S. Moore, Bureau of Reclamation engineer at Boise, Ida., has been named superintendent of the Minidoka Project in Southeastern Idaho to replace **Stanley S. Marean,** retired. Moore was superintendent of the 450,000-ac. Yakima Federal Reclamation Project in Eastern Washington from 1931, and in charge of operation and maintenance for the entire Bureau from 1941 to 1945, when the unit was moved from Denver to Washington, D. C. Marean, upon his retirement February 28,

WHAT'S NEW in OFF-HIGHWAY TRUCK DESIGN?

● You'll find the answer in Mack's new series of folders describing Mack truck models in payload capacities up to 55 tons.

These colorful, fully-illustrated folders give you complete, up-to-the-minute information on new developments in Mack super-duty truck design. They also describe the many outstanding and exclusive Mack features that assure lower costs and more profitable operation.

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Fill in the coupon below and we will gladly send you a complete set of these folders by return mail. No obligation on your part, of course.

IT'S PART OF THE LANGUAGE:

Built Like a *Mack* Truck

Mack Trucks, Inc., Empire State Building, New York 1, New York. Factories at Allentown, Pa., Plainfield, N. J.; New Brunswick, N. J.; Long Island City, N. Y. Factory branches and dealers in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Limited.

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Gentlemen: Please send me your five new folders describing Mack truck models for off-highway operation.

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had been superintendent of the Minidoka Project for ten years. He concludes 35 years of service with the Bureau.

* * *

Dudley F. Stevens, formerly Associate Editor for *Western Construction News* in the Pacific Northwest region, is now Assistant Traffic Engineer for the Engineering Department of the City of Sacramento, Calif.

* * *

Joseph Jensen, chief petroleum engineer of the Tidewater Associated Oil Co. at Los Angeles, Calif., has been elected chairman of the Metropolitan Water District of Southern California to succeed **John H. Ramboz** of San Marino, who was elected last July to serve out the unexpired term of **Victor H. Rossetti,** who resigned. Jensen was appointed to the District's Board of Directors in 1940, and has been acting as vice-chairman since last July. For a number of years, he was chairman of the water and power resources committee of the Los Angeles Chamber of Commerce. **Warren W. Butler** of Compton was chosen vice-chairman, and **A. H. Allen** of Santa Ana was re-elected secretary. Butler has been on the Board as Compton's representative since 1935.

* * *

Brigadier General Philip G. Bruton, retired Army Engineer, has joined the firm of Miller & Ames, contractor's insurance and bonding service with offices in Los Angeles and San Francisco. Gen. Bruton is former Division Engineer of the Engineer's Pacific Division, and is a member of the American Society of Civil Engineers. His offices will be in San Francisco.

* * *

Allan W. McCulloch, for the past four years head of the irrigation section in the Portland, Ore., regional engineer's office of the United States Soil Conservation Service, has taken over new duties as chief engineer of the Farm Improvement Co., a farmer-service organization in Denver, Colo. He will specialize in general irrigation work and in the setting up of technical standards for sale and use of sprinkler equipment on Western farms. McCulloch is a specialist in irrigation development,

A. McCULLOCH, irrigation specialist

W. B. WOLFENDALE, dam builder

having worked on many major water conservation and irrigation improvement programs developed by the Soil Conservation Service in the Pacific Northwest.

* * *

Dewey Farr of St. Johns, Ariz., is the elected chairman of the Arizona State Highway Commission, succeeding **Marcell Forman** of Yuma. **Brice Covington** of Kingman was elected as the commission's vice-chairman. The reorganized commission, at its first meeting, reappointed **W. C. Lefebvre** as Arizona state highway engineer.

* * *

Robert Wickenden, City Engineer of Carson City, Nev., has submitted his resignation to the Carson City Board of Trustees.

* * *

Markham E. Salsbury, civil engineer of Los Angeles, Calif., is temporary chairman of the newly-organized California Legislative Council of Professional Engineers, and **J. G. Wright,** delegate of the Structural Engineers Association of Northern California, is temporary treasurer. The Council is being formed as a central organization to represent all branches of the engineering profession in California on legislative matters.

* * *

Carl E. Berg, Construction Supervisor for the Sacramento District of the Division of Architecture, California Department of Public Works, since 1947, has retired from active service. During the last two years, he directed the remodeling of the DeWitt Hospital at Auburn and the Modesto Hospital at Modesto. He entered state service as an estimator for the Division of Architecture in 1922.

* * *

Robert W. Millard, Ely city engineer, is 1949 President of the Eastern Nevada Chapter of the Society of Professional Engineers. Other officers are **W. G. Sandell** of McGill, vice-president; **Harold Bishop** of Kimberly, secretary-treasurer; and **A. J. O'Connor** of Kimberly, two-year trustee.

* * *

Anthony Brackett, Licensed Surveyor, is now maintaining a surveying service at Hollywood Blvd. and Vine in Los Angeles, Calif. He is specializing in lot surveys, subdivisions, contour maps, boundary disputes, court exhibits and mine surveys.

* * *

Russell T. Hutchins, former City Engineer of El Segundo, Calif., has been named president of the board of directors of the West Basin Water District at El Segundo.

W. B. Wolfendale, veteran engineer with Seattle City Light in Washington, has retired after 31 years of service with the city. He began his employment with the city in the Seattle Engineering Department in 1918. Later, he was assigned to the construction of City Light's Diablo Dam on the Skagit River as a junior engineer, and rapidly worked up to the position of senior associate engineer. In 1936, he was appointed assistant resident engineer for Ross Dam, largest unit of the Skagit Project, while the dam was being designed. When construction of the world's fourth tallest dam began in 1937, he was placed in charge of the work as resident engineer. His title was changed to project engineer in 1943. Under Wolfendale's direction, several innovations in dam construction were tried for the first time at Ross Dam, with uniform success. Notable among these were the use of deflector hoods to control the water in the spillways, and the use of large refrigeration machinery to cool the concrete in the dam (*Western Construction News,* February, 1949).

* * *

Lt. Col. John W. Miles of the Corps of Engineers has been assigned as resident engineer for the construction of Detroit Dam on the North Santiam River in Oregon. Miles has been serving as a special assistant to **Col. O. E. Walsh,** Portland District Engineer.

* * *

J. H. Brannan, location engineer for the Public Roads Administration in Arizona, and **Walter P. Wesch,** Public Roads Administration bridge engineer in Arizona, are the recipients of service pins and certificates in recognition of twenty-five years of service in the cause of good roads. The awards, conferred by the American Association of State Highway Officials, were presented by **W. C. Lefebvre,** Arizona state highway engineer and president of the association's Western region.

* * *

Kent S. Ehrman, Bureau of Reclamation Engineer in charge of canal and lateral design on the Deschutes Project in central Oregon, has been named to direct the important job of locating and designing the approximately 400 mi. of main canals and 2,000 mi. of lateral canals that will be con-

KENT EHRMAN, canal designer

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Versatile TRAXCAVATORS take every job in their stride. In the open — their speed and fast action are money makers. Digging, loading trucks, stripping, leveling or stockpiling. Cut the operating costs on your job to the nub — use TRAXCAVATORS!

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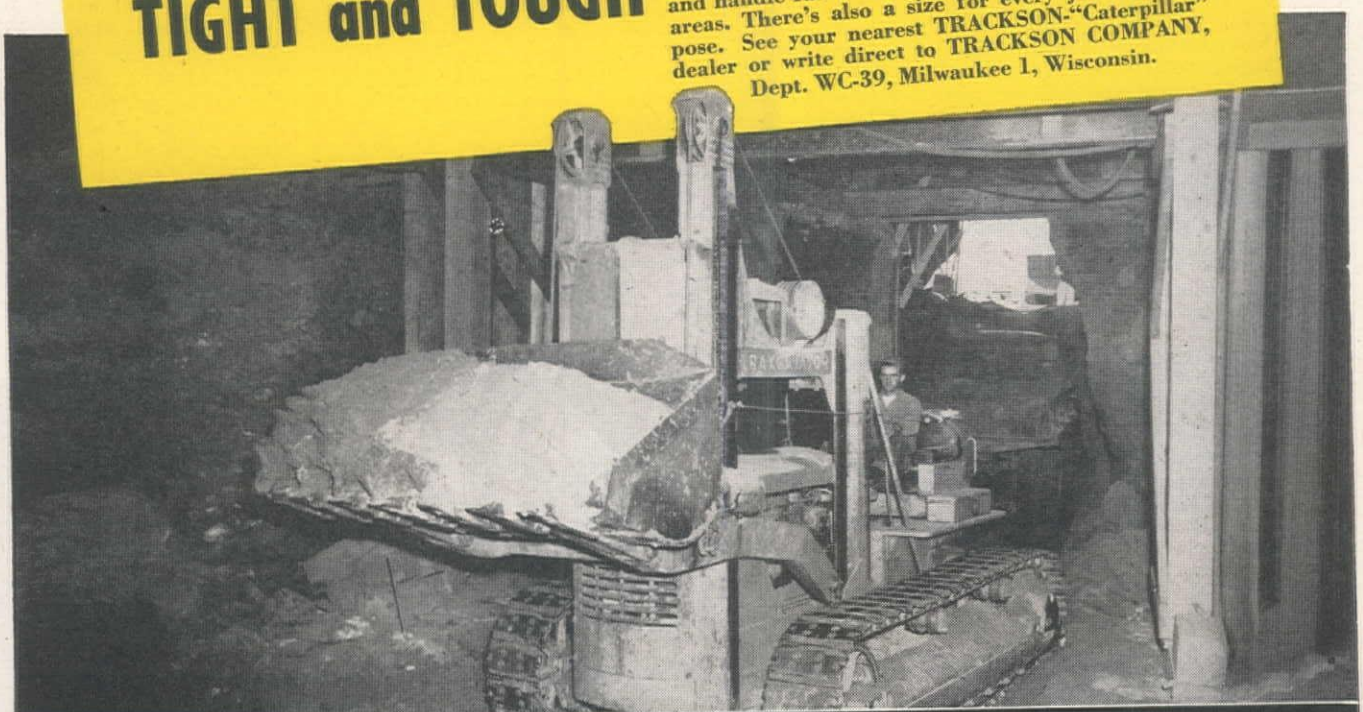
For tough going — and tight squeezes — TRAXCAVATORS are compact, built close to the ground and handle fast and easy. Ideal for tight congested areas. There's also a size for every job and purpose. See your nearest TRACKSON-"Caterpillar" dealer or write direct to TRACKSON COMPANY, Dept. WC-39, Milwaukee 1, Wisconsin.



TRAXCAVATOR

REG. U. S. PAT. OFF.

THE ORIGINAL TRACTOR EXCAVATOR

SOLUTION of an old controversy between Texas and New Mexico was reached with signing of the Pecos River Compact (Article, *Western Construction News*, Feb. 1949). Signing is JOHN BLISS, New Mexico Commissioner; standing at left is CHARLES H. MILLER, Texas Commissioner; right, BERKELEY JOHNSON, Federal representative.

structed on the Columbia Basin Project in Eastern Washington. Ehrman began his career with the Bureau of Reclamation in 1935 at the Chief Engineer's office in Denver.

* * *

A number of changes within the engineering staff of the Denver & Rio Grande Western Railroad have been announced by **K. L. Moriarty,** Chief Engineer. **G. M. Darby** becomes locating engineer with headquarters in Denver, replacing **L. O. Doane,** who is retiring after a railroad and civil engineering career of 46 years. **W. H. Freeman** will replace Darby as engineer of track at Denver. **C. L. Schiller** is the new division engineer at Grand Junction, Colo., replacing **J. R. Murray,** who moves to Gunnison, Colo., as roadmaster-trainmaster. **A. C. Black** replaces Schiller as supervisor of structures at Salt Lake City, Utah. **R. B. Rosenberg** has been hired as assistant superintendent of structures at Grand Junction. He replaces **E. N. Haase,** who moves to Pueblo, Colo., to perform the same duties.

* * *

Officers of the Oregon Building Congress in Portland for 1949 have been named as follows: **Harold P. Davidson,** president; **Dexter W. Johnson,** vice-president; **Henry M. Mason,** treasurer, and **Roy C. Hill,** secretary.

* * *

Vern Johnson of the general contracting firm of Busboom & Rauh, Spokane, Wash., is the elected head of the Spokane Construction Council. He succeeds **Lester N. Johnson,** partner in the R. L. Bair Co. of Spokane. **Russell Babcock,** principal in the firm of Babcock & Fossum, was named vice-president.

* * *

Chauncey Sandberg of Hurricane, Utah, was named 1949 president of the Colorado River Water Users Association at the concluding session of a two-day meeting in Las Vegas, Nev. Sandberg is the mayor of Hurricane and for many years a member of the Hurricane Irrigation Co. Elected to serve with Sandberg were **Hugh A. Shamberger** of Carson City, Nev., assistant chief engineer of Nevada, as vice-president, and **Leo A. Snow** of St. George, Utah, secretary-treasurer.

* * *

Robert B. Johnson, building contractor of El Cerrito, is the new President of the Home Builders' Council of California. Regional vice-president of the National Association of Home Builders, representing Northern California, is **Carl Gellert,** president of the Associated Home Builders of San Francisco and of Standard Building Co.

* * *

Jack Y. Long is president of the East Bay Structural Engineers Society of the San Francisco East Bay Region. **R. H. Cooley** is vice-president and **MacGregor Graham** is secretary-treasurer.

* * *

N. F. Nielsen, building contractor of San Francisco, is 1949 president of the General Building Contractors Association of San Francisco. **A. H. Wilhelm** is vice-president, and **Charles Carlin** is secretary-treasurer.

* * *

James E. Waite is the 1949 President of the Bay Counties Civil Engineers and Land Surveyors Association, headquartering in San Francisco. Other officers are: **Basil Walters,** vice-president; **Theodore V. Tronoff,** secretary, and **John C. Oglesby, E. Elmore Hutchinson, Ralph E. Cotter, Jr., Leo Coleman, Art James** and **Charles Randlett,** directors.

* * *

The American Society of Building Officials, meeting at San Antonio, Texas, have selected **Gilbert E. Morris,** City Superintendent of Building at Los Angeles, as their president for 1949. Elected as secretary of the national organization is **Hal Colling,** managing secretary of the Pacific Coast Building Officials Conference. **Harold Rasmussen,** head of the Santa Ana, Calif., building department, was named second vice-president.

* * *

J. B. Cleary has been appointed manager of the Texas Lightweight Aggregate Co. plant at Eastland, Texas, manufacturers of Haydite. Cleary has retired temporarily from private practice at Bothell, Wash., to assume management of the company during its 1½ million dollar three-plant expansion in the Southwest.

* * *

W. O. Cuthbertson, city manager of Abilene, Kansas, has been named city manager of Bend, Oregon. He will fill the vacancy in the Bend city government created by the resignation of **C. G. Reiter,** now Coos Bay, Ore., city manager. Cuthbertson, a registered engineer, also served as city manager of Newton, Kansas.

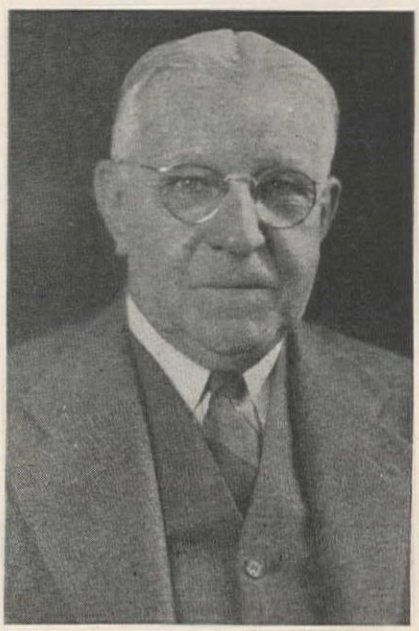
* * *

Major John R. Grant, structural engineer and veteran bridge engineer of Vancouver, B. C., has been authorized by the Vancouver City Council to prepare drawings for the proposed eight-lane bridge across False Creek in Vancouver. Major Grant designed the Burrard Street Bridge in Vancouver, and was also the bridge engineer on the Deep Creek Viaduct in the Cariboo, and the Kootenay River suspension bridge at Brilliant.

OBITUARIES...

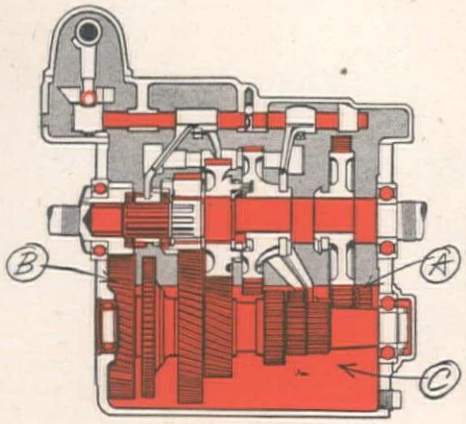
Frederick Ross Muhs, 76, Civil Engineer and retired President of the San Francisco Bridge Co., died Feb. 9 in San Francisco. He was actively engaged in construction business in California for more than 40 years, and for 26 years was associated with the San Francisco Bridge Co. Muhs received his degree in civil engineering in 1892 from Iowa State College at Ames, Iowa, and for ten years after graduation worked as an engineer for various firms in the Middle West. In 1903, he came to San Fran-

THE LATE FREDERICK MUHS



STANDARD ENGINEER'S CASE FILE

Case 1129—Stopping Lube Leaks in Heavy-Duty Gears



HEAVY-DUTY TRANSMISSION

Because compounded RPM Gear Lubricant will not foam, it eliminates a common cause of leakage from gear cases on trucks and other machines working in extreme conditions of temperature and load. Comes in four grades: SAE 80, 90, 140, 250. For spur, spiral and automotive worm gears. (For hypoids, use RPM Multi-Service Gear Lubricant.)

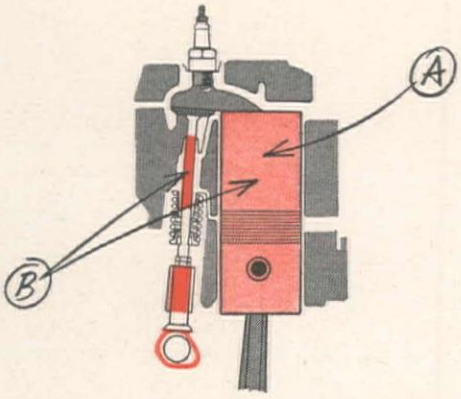
A. Contains foam inhibitor — prevents retention of air whipped into lubricant by rotating gears; breaks bubbles that form.

B. Oiliness compound helps provide tough lubricating film — withstands shock and overloads.

C. High resistance to oxidation prevents deposits; assures lubrication in extreme temperatures.

The stability and high lubricating qualities of RPM Gear Lubricant (Compounded) provide outstanding lubrication for bronze worm gears.

Case 1117—Preventing Starting Wear in Gasoline Engines



GASOLINE ENGINE PISTON AND VALVE

Engines lubricated with RPM Motor Oil had a film of oil on cylinders, valve stems and other parts at all times, even when idle. The film provided lubrication from the instant the engines started to turn over. Recommended for all gasoline engines. Comes in seven grades: SAE 10/10W to SAE 70.

A. Special compound keeps lubricant on hot or cold metal — reduces wear and protects against corrosive moisture in engines.

B. Detergent cleansing agent loosens and removes carbon, gum and lacquer from all parts . . . keeps rings free. Contaminants stay dispersed in the oil and flow out with drainings.

RPM Motor Oil contains other compounds which prevent corrosion of any bearing metal, resist oxidation and stop foaming.

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RPM

FOR EVERY NEED A **STANDARD OF CALIFORNIA** JOB-PROVED PRODUCT

cisco as Contract Manager for the American Bridge Co. of New York, a firm actively engaged in heavy steel construction. He was an executive of the Santa Cruz Cement Co. from 1907 until 1918, and joined the San Francisco Bridge Co. in 1919, serving as vice-president until 1938 and president until 1946 when he retired. He engaged in many important construction projects with the San Francisco company, including the development of Los Angeles Harbor, Long Beach Harbor, and the Stockton Deep Water Channel. The Bureau of Yards and Docks of the U. S. Navy cited him in 1945 with a Certificate of Merit for contributing to the war effort. He was a Mason, a member of the San Francisco Engineers Club and of the American Society of Civil Engineers, and a Director of the National Association of River and Harbor Contractors.

* * *

James O'Sullivan, 72, lawyer and building contractor of Ephrata, Wash., died Feb. 15. For 28 years, O'Sullivan led the battle to get support and funds for the Columbia Basin Project and Grand Coulee Dam. Only a few months ago, dedication of the $10,000,000 O'Sullivan Dam south of Moses Lake, Wash., was made to perpetuate the memory of his name.

* * *

Roy Nunn, 58, engineer for Benton County in Washington, died Jan. 27 of a heart attack while driving home from his office. He had been Benton County Engineer for five years, and was previously Douglas County Engineer.

* * *

Harry Leypoldt, 60, engineer for the Los Angeles Harbor Department, died Feb. 6. An authority on tidal phenomena, he had been with the department for 26 years.

* * *

Frank D. Wagner, 91, retired contractor of Los Angeles, Calif., died Feb. 19.

* * *

Gustave B. Schunke, 56, assistant superintendent of the Seattle, Wash., City Water Department, died Feb. 3. He had recently been given the Fuller Award by the American Water Works Association.

* * *

James Robertson, contract engineer for the Dominion Bridge Company's Pacific Division, died recently at his home in Vancouver, B. C. He was resident engineer for the company on Royal York Hotel in Toronto, and Pattullo Bridge, Burrard Bridge and Lions Gate Bridge in Vancouver.

* * *

Wayne Perkins, 52, engineer with the City Surveying Department of Los Angles, Calif., died Jan. 28 of a heart attack.

* * *

Arthur J. Boase, 56, for the past 16 years Manager of the Structural and Railway Bureau of the Portland Cement Association at Chicago, Ill., died of a heart attack in his office on Feb. 9.

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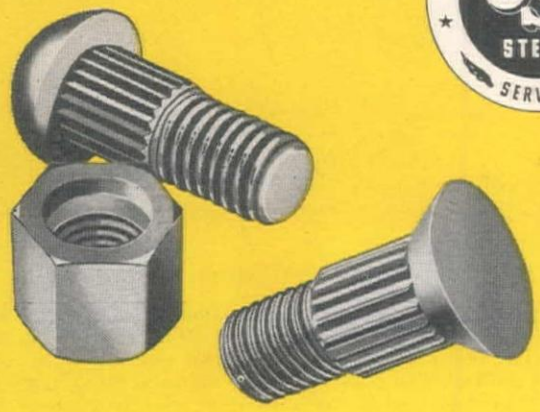

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USS

UNITED STATES STEEL

"Consolidate Engineers and U.S.B.R." Says Engineer, Ex-President Hoover

NO ASSURANCE is forthcoming that recommendations of the Hoover Committee on reorganization of the executive branch of the Federal Government will meet with approval by the Democratic administration. However, a bombshell in engineering circles is the Commission's proposed consolidation of the Corps of Engineers, Bureau of Reclamation and other Federal water development agencies into one new agency, the Water Development Service.

The proposal calls for the new agency to take over, in addition to functions of the Bureau of Reclamation and rivers, harbors and flood control functions of the Corps of Engineers, functions of the various agencies making river basin and power market surveys, and the Federal Power Commission's right to make decisions regarding installation of power generation facilities. The new agency would also receive power marketing functions of Bonneville and Southwestern Power Administration, and would handle construction of international boundary streams.

The bombshells began exploding when the Hoover Commission pointed out that the present system of scattering administrative responsibility among the number of agencies is resulting in duplication of work and competition for projects, in inequitable and inconsistent repayment policies, in deficiencies in hydrological data due to hurried planning, and in the perpetuation of special-purpose policies. The Commission claims that millions of dollars could be saved annually by the reorganization.

The Committee also went on record as being opposed to the extension of the valley authority type of organization to other basins than the Tennessee Valley, stating the belief that the administration of national water resources development functions through regular departments of the government would provide greater assurance of equality in treatment of resource problems throughout the nation.

Reclamation Report Favors $21-Million Alaska Project

A BUREAU of Reclamation report recommending the Eklutna project for development of hydroelectric power at Eklutna Lake, near Anchorage, Alaska, has been approved by the Secretary of the Interior. The report was sent to other interested Federal agencies and the Governor of Alaska for comments before submittal to the Congress.

The recommended plan, estimated to cost $21,580,900, calls for building a low dam to raise the level of Eklutna Lake two feet and for diversion of the firm flow of water away from Eklutna Creek through a 4½-mi. tunnel to a power plant to be built a short distance north of the present Eklutna power plant, owned by the City of Anchorage.

The primary function of this project would be to produce electrical energy, urgently needed to help Alaska expand and stabilize its economy. The proposed new plant would have installed capacity of 30,000 kw. compared with 2,000 kw. from the present plant.

In the report it is pointed out that $20,365,400 of the estimated project cost would be reimbursable from power revenues. The remainder of the cost would represent non-reimbursable recreational facilities. The reimbursable project cost would be returned to the Government over a 52-year period with interest at 3 per cent.

In pointing out the need for the project, the report listed the expanding activities in the area including the Matanuska Valley farming area, Fort Richardson army base, and Elmendorf airfield, as well as the City of Anchorage itself, which is now estimated to have a population of upwards of 19,000 persons compared with 3,495 in 1939.

American Road Builders Convene and Re-Elect

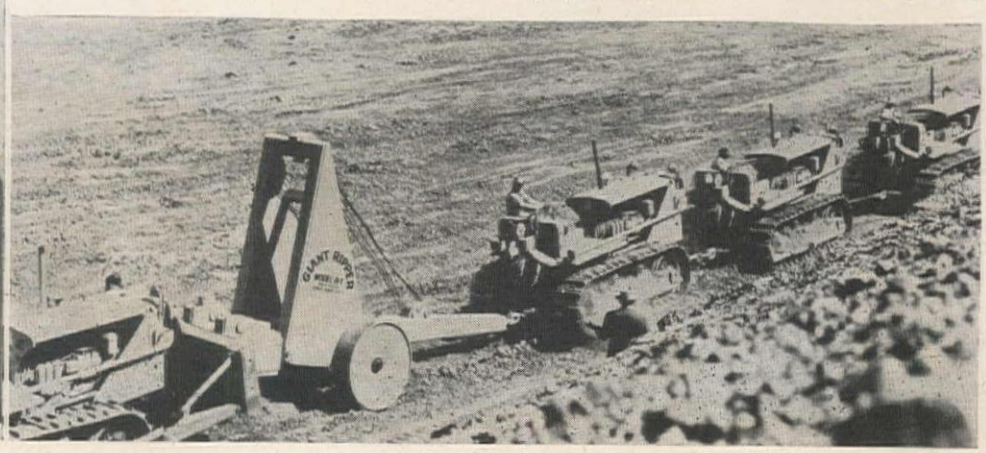
COL. E. R. NEEDLES, a member of the New York consulting engineering firm of Howard, Needles, Tammen and Bergendoff, was elected president of the American Road Builders' Association at its 46th annual meeting in Washington, D. C., last month. Regional vice-presidents elected to succeed themselves, in each case, were Paul B. Reinhold, Pittsburgh, Pa.; Charles W. Smith, Pensacola, Fla.; W. A. Roberts, Milwaukee, Wis.; and T. E. Stanton, materials and research engineer of the California Department of Public Works, Sacramento, Calif.

One Westerner was elected to the Board of Directors, he being Paul B. Rynning, highway engineer of Jackson County, Oregon. Vice-presidents of the Airport Division from the West included O. J. Porter, consulting engineer, Sacramento, Calif.; J. D. Ramsey, Director of the Nebraska Aeronautics Commission, Lincoln, Neb.; and Frank W. Wiley, Director of the Montana Aeronautics Commission, Helena, Mont.

Among the Directors of the Airport

HUGE RIPPER TOOTH NOW "BOILING UP" ROCKY ARABIAN DESERT

IMMENSE TOOTH, measuring 5 x 18 in. in cross section and 10½ ft. long, is being used by Bechtel International Corp. to aid in the laying of a 30-in. tap line in Arabia for Arabian American Oil Co. The tooth is being used in rocky soil to a depth of 4 ft., its maximum with five tractors pulling. The giant tooth was manufactured by Soulé Equipment Co., Oakland, Calif.; forged by Earl M. Jorgensen Co. from Bethlehem Alloy steel.



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A massive tire to carry heaviest loads. 50% more tread rubber; tremendous, tough shoulders, practically snag proof. With free rolling ribs for highway travel and tractor-traction cleats for soft going.

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Division were: R. F. McKee, engineer of planning and research, Continental Air Lines, Denver, Colo.; W. A. Bugge, managing engineer, The Asphalt Institute, San Francisco; and Louis Wasmer, vice-chairman of the Washington State Aeronautics Commission, Spokane, Wash. Chris P. Fauerso, engineer for Wasco County, Ore., was re-elected a vice-president of the County Division. Rynning and Wayne S. Talbott, chairman of the Board of County Commissioners, of Nez Perce County, Idaho, were elected to the Board of Directors of the County Division.

W. N. Frickstad, City Engineer of Oakland, Calif., was named a vice-president of the Municipal Division, and Ralph Wadsworth, City Engineer of San Francisco, was elected to the Board of Directors of that division.

New Portland Runway Will Be Longest in NW

IMMEDIATE CONSTRUCTION of an 8,800-ft. runway at the Portland, Ore., Army Air Base has been recommended by the Port of Portland Commission. The runway, to handle international overseas air traffic, would be the longest in the Pacific Northwest (longest present runway is 8,200 ft., at Geiger Field Army Air Base, Spokane, Wash.). The Commission has already authorized $2,000,000 in bonds to pay for the project, although final cost has not been estimated.

The new runway, paralleling the Columbia River, would extend about 4,000 ft. beyond present right-of-way at the air base, eliminating seven holes at the south end of the Alderwood Country Club's golf course. Connection would be made with the air base's main northeast-southeast runway.

A recommendation was also adopted that John W. Cunningham & Associates, Portland, should be retained to engineer the project.

Seattle City Light Plans $50-Million Works Program

AS PART of a $50,000,000 expansion program, City Light of Seattle, Wash., will place several large contracts for heavy construction, including power transmission lines, sub-stations, and new office space for the utility company. Bids for 101.7 mi. of 230,000-volt steel tower transmission line are expected to be called for this month, with general construction to begin sometime in September. Estimates on this transmission line place the cost at more than $6,000,000. Some 70 mi. of 110,000-volt transmission line will be erected in the Seattle area.

Work on the Bothell and Broad St. sub-stations will begin early this year, with the work needed at the Bothell unit estimated at 2.3 million dollars. The expansion program will add 274,000 kw. to Seattle City Light's distribution capacity, and is being coordinated with the development of the first 270,000 kw. of power from the Ross Dam power house.

SUPERVISING THE JOBS

Bob Jenks is project manager for Guy F. Atkinson Co., J. A. Jones Construction Co., and Ostrander Construction Co. on their $21,648,763 contract for construction of a major portion of the huge navigation lock, abutment embankment and a portion of the spillway at McNary Dam on the Columbia River near Plymouth, Wash. **John Morton** is the assistant project manager, **Bill Rives** is concrete superintendent, and **L. "Blackie" Armstrong** is in charge of excavation. Other key personnel includes: **Jim Brown,** master mechanic; **Leo Stewart,** assistant master mechanic; **Louis Sheddy,** cofferdam superintendent, **Everett Govan,** electrical superintendent; **Glen Roper,** ironworker superintendent; **Walt Hill,** assistant excavation superintendent; **Bob Brown,** engineer assistant to the concrete superintendent; **Chris Nielsen,** drill superintendent; **Jim Good,** assistant electrical superintendent; **W. L. "Holly" Hollingsworth,** truck foreman; **P. C. Johnson,** personnel manager and paymaster, and **Al Chaussee,** project engineer. **Val Schaaf** is engineer on the job, and **E. L. Ford** and **F. W. Ryan** are mechanic foremen. **Tom Foran** is the office manager and **John Ziemer** is the storekeeper. **"Pinky" Schuman** is the lubrication foreman, **C. N. Sowash** is truck shop foreman, **Fred Stuller** is blacksmith foreman, **L. S. Jacobs** is machinist foreman, **D. Holbeck** is field mechanic, and **J. S. Krantz** is heavy duty mechanic.

* * *

Keith Wasson is general superintendent for Peter Kiewit Sons' Co. of San Francisco on the firm's new $7,494,767 contract for an additional 27 mi. of the Bureau of Reclamation's Friant-Kern Canal. The work extends from near Lindsay, Calif., to the White River.

* * *

J. N. Barnett is project manager for T. E. Connolly, Inc., San Francisco contractors for tunnel driving work on Pacific Gas & Electric Company's Feather River Project north of Oroville, Calif. **H. F. Pearce** is walker on the Bear Creek adit of the tunnel, **Ted Slaight** is superintendent at the Grizzly Creek section and **Fred Brunskoll** is superintendent at the outlet. **H. B. Larison** is caprenter superintendent and **Thomas N. Beall** is office manager. Time keepers are **Barney Keating, C. B. Cook, C. Bagshaw** and **Al Privis.**

* * *

M. L. Kobe is the superintendent for Bates & Rogers Construction Corp. of San Francisco on construction of the 12th Street Underpass at Sacramento. **V. C. McIntire** is in charge of all form work on the reinforced concrete structure. **H. A. P. Smith** is the timekeeper. **T. C. Royce** is resident engineer on the job for the California Bridge Department.

* * *

J. A. Sheldon is general superintendent and **Jack Wilson** is the job superintendent for Harms Bros., Sacramento, Calif., on the construction of state highway near Vacaville, Calif. Other key men for the contractor include: **George McFarland,** master mechanic; **Roy Ziegler,** structure foreman; **Bill Tregembo,** hot plant foreman; **Dick Stone,** grading foreman, and **A. L. "Pop" Wiens,** crusher foreman.

* * *

S. W. Blakeley is superintendent for C. O. Johnson & Son of Phoenix, Ariz., on construction of the $73,000 First National Bank Building in Phoenix.

* * *

R. J. Kennedy is supervising construction of a $115,000 church at Woodland, Calif., for Goodenough Construction Co. of Stockton, Calif. **William Church** is the job foreman. **A. Paulson** is resident engineer.

* * *

J. E. Davidson, former general manager at Richland, Wash., for Guy F. Atkinson Co., is now general manager of the Massman Construction Co. at Kansas City, Mo.

* * *

H. W. Brooks is the superintendent for King & Hoover of Phoenix, Ariz., on construction of the $90,000 sewage disposal facilities for the City of Tempe, Ariz. **Norman McKinley** is foreman on the job.

* * *

Bob Roberts is general superintendent for Daun-Donaldson Construction Co. of Phoenix, Ariz., on construction of additions to a hospital, a teacher's dormitory and 8 houses for the Phelps Dodge Copper Co. at Ajo, Ariz. Job cost is approximately $300,000. **Thomack, Bauldwin** and **Childress** are foremen for the work. **Ray Neal** is project manager for Daun-Donaldson Construction Co. on construction of a $300,000 school building at Chandler, Ariz., and **Bob Roberts** is the general superintendent.

* * *

Chester Cooper is the superintendent for Tanner Construction Co. and Hauser & Garnett of Glendale, Calif., on road construction near Sentinel, Ariz.

* * *

Earl Kurtzeman is superintendent for Home Construction Co. on construction of a $75,000 warehouse building for the Central Arizona Light & Power Co. in Phoenix, Ariz.

* * *

E. L. Gilbert is the superintendent for Lawrence & Mackey, contractors for concrete work on the structures at the Solons baseball team's park at Sacramento, Calif. **J. Randolph, A. H. McAuley** and **L. L. Keys** are foremen. Contract cost is $300,000. **H. Devine** and **E. Francis** are the resident engineers.

* * *

Craig & Joy Constructors is a new organization engaged as engineering contractors with office and yard at 2241 Curry Street, Long Beach, Calif. The firm is headed by **L. L. Craig** and **Robert L. Joy.** Craig was formerly in the sewer construction business in the Lakewood area of Long Beach. Joy has been a general contractor in Long Beach for the last year, and prior to that was with Consolidated

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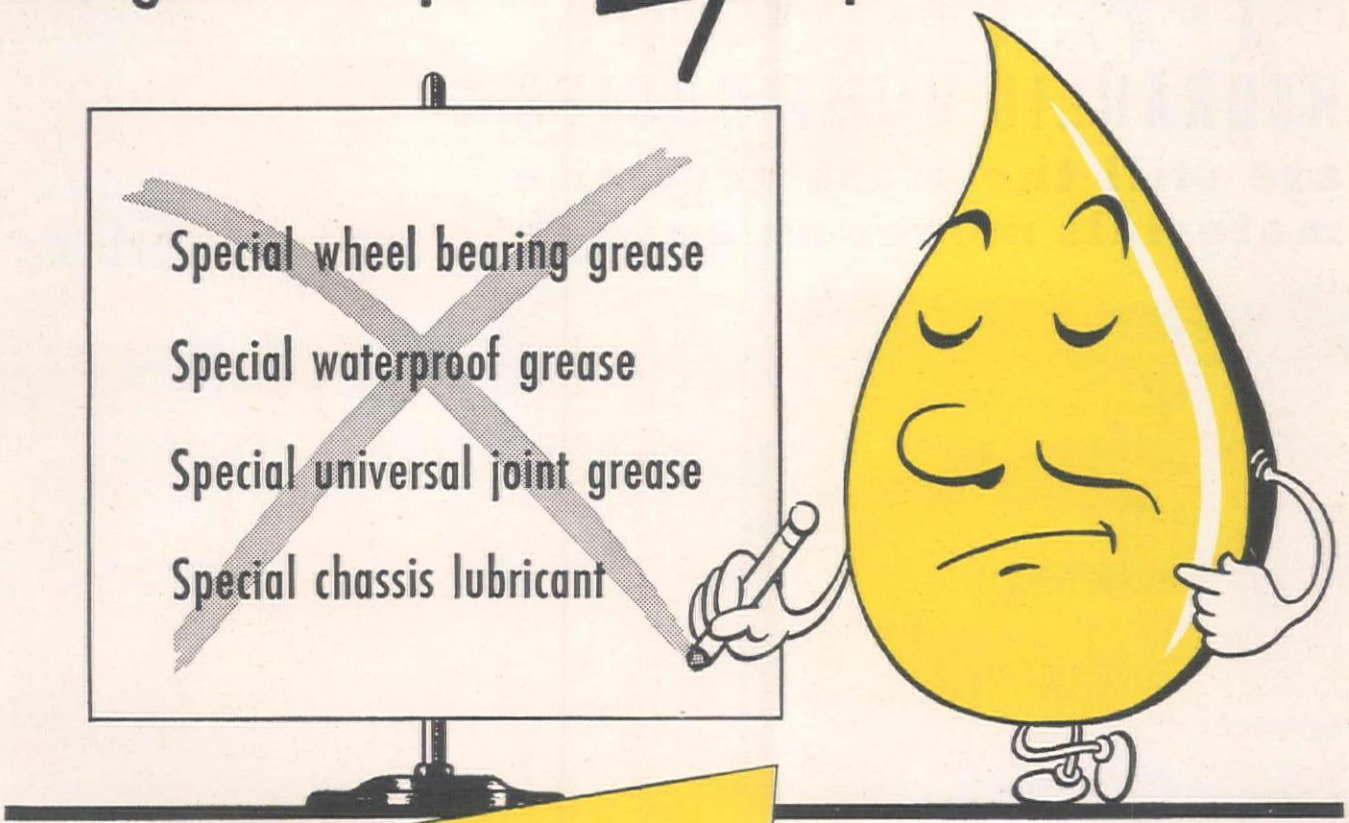

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* * *

L. H. Bradley is now superintendent for the Leo F. Piazza Paving Co., of San Jose, Calif., on highway and street construction. Bradley has served for the past 17 years as an engineer with the California Division of Highways, and was resident engineer on many major projects, including the Donner Summit highway.

* * *

Howard Porter is the superintendent for contractors, W. P. Neil Co. of Los Angeles, on construction of a new building to house the National Screw & Machine Co., Hodell Chain Co., and Chester Hoist Co., in Los Angeles. **James Crusbert** is the carpenter foreman and **Lee Ackert** is labor foreman.

* * *

Louis Biasotti & Son, contractors of Stockton, Calif., are sub-contractors for dirt moving at the Mines Field project near El Segundo, Calif. **Al Biasotti,** member of the firm, is supervising the job. **Al Regalia** is the equipment superintendent, and **Ed Sayler** is the office manager.

* * *

Harry Olson is supervising the $176,000 expansion of the Center Street School at Manhattan Beach, Calif. **Fred Rowley** is the carpenter foreman. Sallinger Construction Co. are the contractors.

* * *

E. C. Nickel, contractor of Arcadia, Calif., is personally supervising construction of the Campbell Street Reservoir for the City of Glendale, Calif. **Jerry S. Rodgers** is the job superintendent, **George Kelly Fletcher** is general foreman, and **Ace Miller** is general labor foreman.

* * *

Cloyd St. Clair is superintendent for Swinerton & Walberg Co., San Francisco, on construction of additions to the Fairmont Hospital in Oakland, Calif., a $140,000 job. **Ole Brastet** and **Bruce Scott** are foremen on the job. **William Fales** is the job engineer and **Dick Adamson** is office manager. **D. B. Gladstone** is project manager for the contractor.

* * *

E. E. "Beachhead" Davis, formerly general foreman for Guy F. Atkinson Co. on a paving job at Walla Walla, Wash., is now general foreman for Daley Bros., Belmont, Calif., on building construction in Portland, Ore.

* * *

H. S. Booth is the project manager for Guy F. Atkinson Co., South San Francisco, on construction of the reinforced concrete Roseville Underpass at Roseville, Calif. **J. C. "Joe" Lawrence** is the structure superintendent and **W. C. Wooten** is excavation superintendent. **C. A. Skelton** is general carpenter foreman, and **C. N. Snyder** and **H. E. Record** are carpenter foremen. **L. E. Rylen** is labor foreman, **E. G. Gressot** is shovel foreman, and **J. E. Burnside** is master mechanic. **E. B. Platt** is the office manager and **M. W. Roser** is the timekeeper. Resident engineer on the job for the California Bridge Department is **G. A. Green. M. Chapman** is assistant resident engineer and **R. C. Cather** is bridge inspector.

* * *

Paul Matus is supervising construction of 9.2 mi. of the Chico to Paradise cut-off

highway in California for Granite Construction Co., Watsonville, Calif. The job is under a $368,000 contract. **Ed Spaith** is supervising bridge work on the contract and **Virgil Force** is the carpenter foreman. **George Elliot** is grade foreman on the job, and **George Barrett** is powder foreman. **Red Redford** is master mechanic and **Bill Yager** is pile driving foreman. Resident engineer for the California Division of Highways is **Parks Tottman,** and **Pat Ryan** is his assistant. **Fred Marshall** is the bridge engineer.

* * *

A crew of about 100 men make up Pacific Gas & Electric Company's field engineering forces on the firm's huge Feather River Project north of Oroville, Calif. **George Thatcher** is field engineer in charge for the firm. **J. E. Cooney** is P. G. & E.'s superintendent of construction and **Sam G. Laughlin** is his assistant. **John W. Woodward** is resident engineer and **Ted Schellin** is chief of surveys. **Joe Geyer** is office engineer and **Arlo B. Elsen** is office manager. Field engineers include **Charlie Joslyn** on Cresta Dam, **Elmer Hall** on Rock Creek Dam, **Bert Marliave** on Rock Creek Power House, and **Mike Donahy** on Cresta Power House. **James E. Schumann** is concrete technician and **Howard J. Hines** is chief inspector. **Freeman Lamm** is warehouseman. P. G. & E. inspectors include **Fred Hewes, Bill Fitzgerald, Bill Flint, Tim Englehart, John Phillips, B. A. Boudy, C. M. Andrews** and **Stan Olds.** Labora'ory men include **Phil Flint, Bill Beck** and **Ray Hoar.**

* * *

Henry W. McGraw, formerly general foreman for Piombo Construction Co. of San Francisco, is now job engineer for Arundel Corp. and L. E. Dixon Co., on construction of the Rock Creek Tunnel on Pacific Gas & Electric Company's Feather River Project north of Oroville, Calif.

* * *

Al. E. Anderson, general labor and cement foreman for Stolte, Inc., Oakland, Calif., has returned to Oakland after 8 months at Santa Rosa, Calif., on Stolte's freeway construction job at that city. He will work under **Elof Gustafson,** Stolte general superintendent on the firm's next contract.

* * *

C. B. Adelmann is the general superintendent and **H. M. Pharis** is project manager for Humiston-Rosendahl, Inc., on construction of refinery facilities at Richmond, Calif., for the Standard Oil Co. **H. H. Hammer** is foreman for construction of the wax plant unit of the job, and **Russ Hansen** and **Jack Ruark** are foremen for pipeline construction.

* * *

L. W. Riebe is superintendent for Dell Riebe, sub-contractor for highway construction north of Camptonville, Calif. **John Dissett** is foreman on the job.

* * *

S. W. Gibbs is general superintendent for Piombo Construction Co., San Francisco, on construction of the earth-fill Bon Tempe Dam near Fairfax in Marin County, Calif., for the Marin Municipal Water District. **W. A. "Bill" Pierce** is the job superintendent and **P. J. Dunn** is his assistant. **Jim Hawkins** is the quarry foreman, **Fred Garrterr** is laboratory foreman, **"Buzz" Piombo** is shop foreman, and **F. R. "Curtie" Toles** is master mechanic. **R. Piombo** is the office manager. **Herb Brainard** is resident engineer for the Water District, and **H. Craig** is his assistant. **C. Franklin** is chief inspector, **B. Patterson** is soil inspector and **D. Glendenning** is chief of party.

* * *

L. F. d'Artenay is superintendent for Minton & Kubon, contractors for construction of a reinforced concrete bridge at Clayton, Calif. **R. J. Minton** is project manager, and **Bill Thill** is job foreman.

* * *

Harry Luthens is superintendent and **V. Morris** is carpenter foreman on construction of a $55,000 bridge, 7 mi. west of Chico, Calif. Contractor is Chittenden & Chittenden of Auburn, Calif. **Sam Countryman, Charlie Van** and **Andy Mamilak** comprise the pile-driving crew.

* * *

Jerry Haskell is general superintendent for B & R Construction Co., San Francisco, on the $500,000 construction of concrete and frame buildings at Chico, Calif. **Cliff Kjer** is the job foreman, and **Angelo Manzo** is labor foreman. Kjer has been a superintendent in South America for the past 13 years.

* * *

M. P. Brotherton, heavy duty mechanic for A. Teichert & Son on flood control work at Ventura, Calif., has been transferred to North Hollywood where he will work on the firm's flood control project along the Los Angeles River.

* * *

Walter Schlicting is manager-owner of the rock crushing plant, producing concrete aggregates and asphalt paving mix for the new Chico-Paradise road near Chico, Calif. **Eddie Boddin** is superintendent of the plant, and **Carl Thomsen** is foreman on outside paving and surfacing work. Other key men are **William H. Myers** and **Ted Rife, Jr.**

NEWS BRIEFS

DETROIT DAM BIDS—Consolidated Builders, Inc., of Oakland, Calif., with a bid of $28,230,509 (more than $3,000,000 below government's estimate) were low before the Corps of Engineers at Portland, Ore., for construction of the main structure of Detroit Dam on the North Santiam River 13 mi. east of Mill City, Ore. Consolidated, which also constructed the high dam at Grand Coulee, is a combine of General Construction Co., Seattle; J. F. Shea Co., Alhambra, Calif.; Kaiser Engineers, Inc., Oakland; and Walsh Construction Co., San Francisco. The three other bidders were Guy F. Atkinson Co. with 4 other contractors, $32,798,282; Morrison-Knudsen Co., Inc., with 2 other contractors, $32,889,995; and Santiam Constructors, Los Angeles, composed of 7 Western contractors, $34,798,775. The contract will call for construction of the concrete gravity dam, complete with outlet gates and valves, penstocks, trashracks, stilling basin, control house and other appurtenant structures. Completion time will be 1,550 days.

CALIFORNIA POWER DEVELOPMENT — Pacific Gas & Electric Co. has begun construction work in western Fresno County, Calif., on more than $3,000,000 worth of transmission and distribution facilities to enlarge the system feeding the lower San Joaquin Valley. The project includes a $2,530,000 sub-station 10 mi. south of Mendota.

WASHINGTON POWER COMMISSION—Washington's Legislature is being urged to approve a bill creating a state commission with sweeping powers for developing Washington's hydro-electric resources. A five-man appointed commission, to receive annual salaries of $10,000, would direct the acquisition, construction and operation of electric transmission systems, plants and facilities. Power projects developed by the commission would be "consistent with plans for improvement of commerce and navigation, reclamation, flood control and fisheries."

MONTANA HIGHWAY IMPROVEMENT — Bills introduced before the Montana Legislature would change the state's five-man highway commission to a three-member commission plan of administering its roadbuilding and maintenance work, and would amend the present gasoline tax income to provide more money for counties to be used in maintaining and building secondary roads.

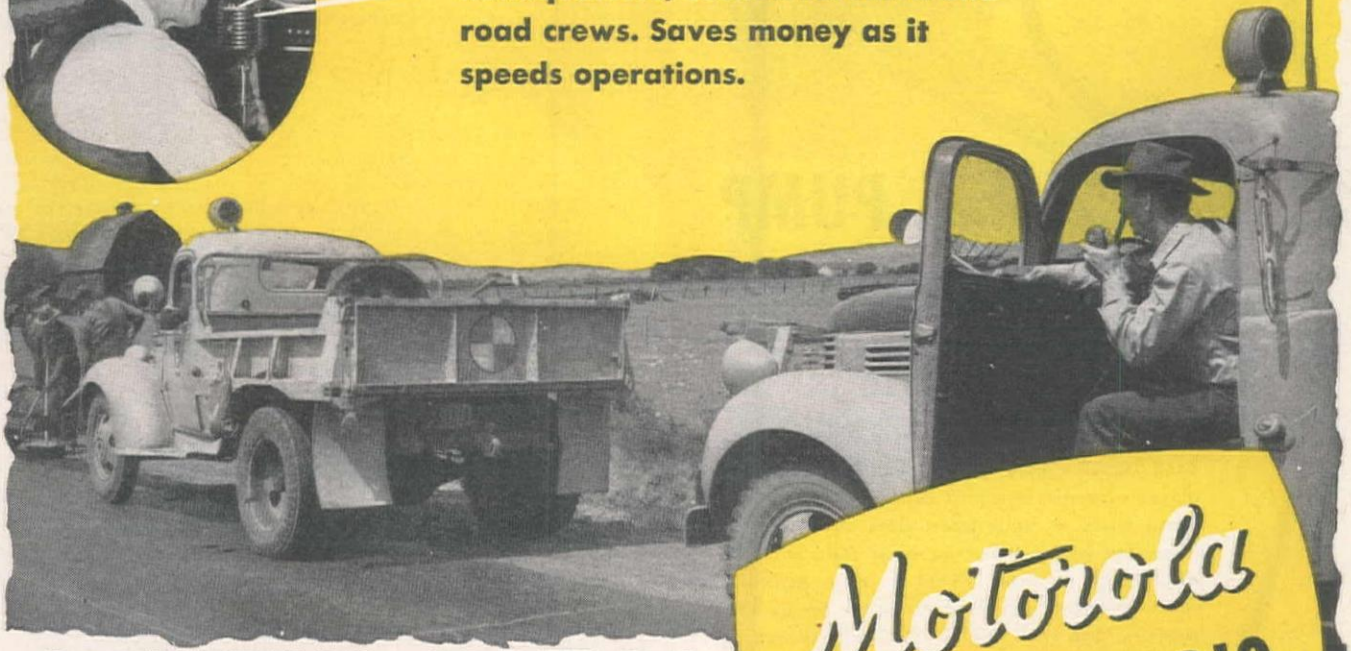
$1,000,000 CHEYENNE SEWAGE PLANT—An election will be held this spring by Cheyenne, Wyo., residents to decide upon the matter of floating a bond issue to raise more than $1,000,000 for construction of a sewage treatment plant for the city, according to H. G. Watson, City Engineer.

CANYON FERRY BID OPENING—Bids for construction of the Bureau of Reclamation's Canyon Ferry Dam and Power Plant on the Missouri River 16 mi. northeast of Helena, Mont., will be opened April 6. A previous low bid of $12,940,845 by Canyon Constructors was rejected in January as too high. The job will involve about 400,000 cu. yd. of excavation, 400,000 cu. yd. of concrete, and 4,600,000 lb. of reinforcing bars.

CONSTRUCTION WORKERS' PAY RAISED — The American Federation of Labor's Hoisting Engineers' Union has signed a contract granting heavy construction workers a 13-cent hourly pay raise with the Mountain Pacific and Alaskan Chapters of the Associated General Contractors.

CHINOOK HELPS GRAND COULEE WORK—Morrison-Knudsen Co., Inc., Peter Kiewit Sons' Co., and Pacific Bridge Co. have declared a bonus for the weatherman after chinook winds began blowing in the Grand Coulee Dam area, Washington. Activities on the more than $18,000,000 construction in progress by the contractors had been stalemated during the long cold stretch. If present mild temperatures persist, work on the various jobs will be rushed without interruption.

Instant, constant contact between headquarters, section foremen and road crews. Saves money as it speeds operations.



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FLOOD CONTROL ON JORDAN RIVER—Flood control operations to prevent late spring overflows of the Jordan River in Salt Lake County, Utah, have begun. The river is being dredged of sandbars and sedimentation, and a small irrigation dam is being removed.

3½ MILLION GALLONS WASTED — Residents of Great Falls, Mont., were told that permitting a small stream of water to run through faucets would prevent freezing pipes, so during the cold spell 3,500,000 gal. of water were wasted each night. Great Falls faces no shortage of water and officials explained that reduction of damage to the city's mains and house services more than offset the unexpected increase of expense.

SANTA MARGARITA DAM PACT—Erection of a $20,000,000 dam on the Santa Margarita River near Fallbrook, Calif., before the end of 1949 is promised following an agreement by Federal and state authorities to share the cost. The project is sponsored by the Fallbrook Public Utility District.

UPPER COLORADO COMPACT—Ratification of the Upper Colorado River Basin Compact by the five states concerned was completed when the governors of New Mexico and Colorado affixed their signatures last month to bills passed by the state legislatures. The three other states (Utah, Arizona and Wyoming) approved the compact in January. The compact divides among the states 7,500,000 ac. ft. of water annually from the river and its tributaries. Favorable action by Congress is required before the pact becomes effective.

LARGEST DEMOUNTABLE DREDGE—The largest demountable dredge ever built, constructed for about $1,000,000 by the Pacific Coast Engineering Co. of Alameda, Calif., has been turned over to the Bureau of Reclamation for the clearance of a channel 13 mi. long on the Colorado River between Needles and Topock, Ariz. The dredge is 130 ft. long and is powered by two Diesel engines, 1,350 and 525 h.p. It has a 5-ft. rotary root chopper and a 20-in. cutter head. Unique feature of the dredge is its design and assembly which allow it to be dismantled and moved overland. The Bureau plans to use the unit on many flood control and hydro-electric projects planned along the Colorado River in future years.

$4-MILLION BUILDING PROGRAM — The Nevada State Planning Board has revealed plans for construction of buildings to cost $4,000,000 during the next two years. Two largest items are construction of a new highway building at Carson City ($699,354), and erection of a life science building at the University of Nevada, Reno ($538,955).

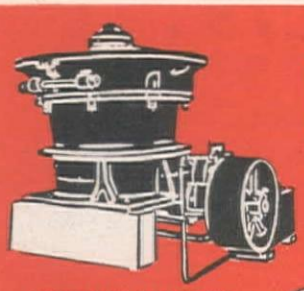
$12½-MILLION POWER PLANT—The Imperial Irrigation District at El Centro, Calif., has asked approval from the California District Securities Commission to allow the calling of a bond election on a proposed $12,500,000 revenue issue. Proceeds would be used to finance construction of a 33,000-kw. hydro-electric power plant at the Pilot Knob site on the All American Canal.

WASHINGTON MAY ACQUIRE FERRIES — The Senate of the State of Washington has passed a bill allowing the State Toll Bridge Authority to float a bond issue to acquire ferries of the Puget Sound transportation system. This would allow the state to build bridges across the sound to eliminate many present ferry routes. First to be constructed would be the $1,400,000 steel cantilever Agate Pass Bridge.

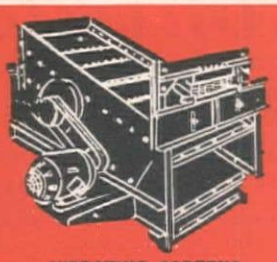
SWING BRIDGE PLANNED IN SEATTLE — Construction plans for a 190-ft. swing span steel bridge in Aberdeen, Wash., will be prepared by General Engineering Co. of Seattle. Voters of the area have approved a $375,000 bond issue to finance the construction.

NEW MEXICO HIGHWAY REORGANIZATION—Both houses of the New Mexico legislature have approved creation of a bi-partisan, five-man state highway commission. No more than three of the five members may be members of the same political party.

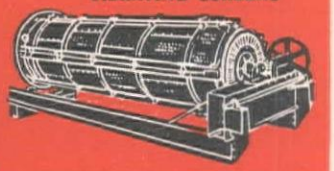
HIGHWAY IN WAY OF DAM—Governor Warren of California signed a bill clearing the path for construction of



GYRATORY BREAKERS

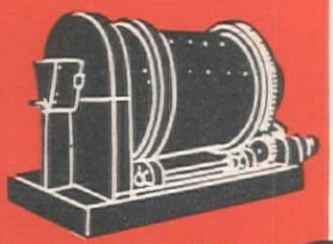


VIBRATING SCREENS



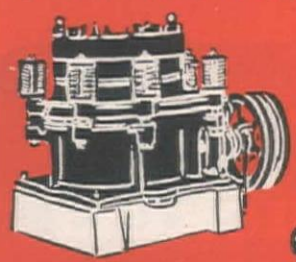
ROTARY SCREENS

JAW CRUSHERS



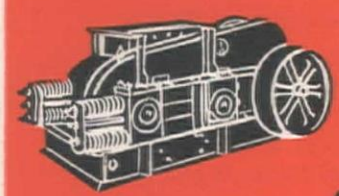
SUPER SCRUBBERS

GYRASPHERE SECONDARY CRUSHERS



INTERCONE SECONDARY CRUSHERS

SAND CLASSIFIERS



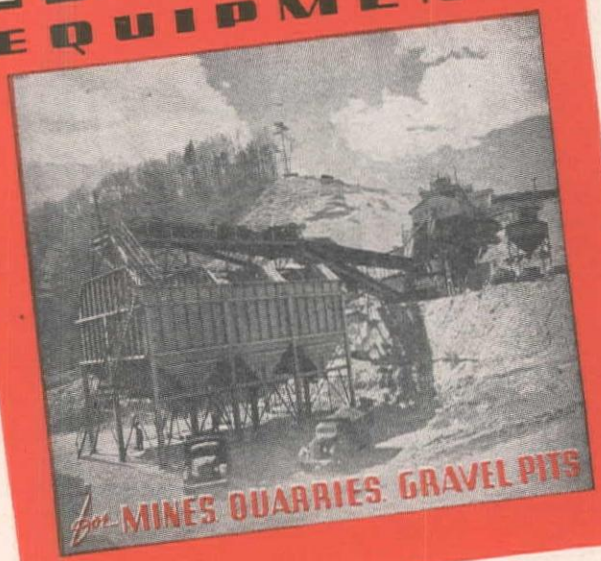
DOUBLE ROLL CRUSHERS

PLATE FEEDERS

APRON FEEDERS

CONVEYORS AND ELEVATORS

TELSMITH EQUIPMENT



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Clyde Equipment Co.
Portland 9, Ore.

General Machinery Co.
Seattle 4, Wash.
Spokane 1, Wash.

The Sawtooth Co.
Boise, Idaho

Gordon Russell, Ltd.
Vancouver, B.C.

a new water storage dam on Los Gatos Creek in Santa Clara County. The bill is intended to aid relocation of the Los Gatos-Santa Cruz Highway, a necessary step before construction of the dam by the Santa Clara Valley Water Conservation District can be authorized.

ALAMEDA ISLAND TO GET NEW TUBE—Specifications for a parallel tube between Oakland and Alameda, Calif., are almost complete, according to Charles H. Purcell, director of public works, but must await a decision on location of the second San Francisco Bay crossing. Alameda city officials have been assured by Gov. Warren at a recent conference that a new Oakland Estuary traffic tube will be the first construction project when work starts on a second Bay crossing. Cost of the new tube is estimated at $20,000,000.

ROAD UPHEAVAL—Acting director of Washington State Highways O. R. Dinsmore estimates that it will cost $550,000 to repair state highways damaged by the severe winter weather conditions. He said an accurate estimate is difficult because many upheavals and potholes will not show until the frost leaves the ground.

$1,100,000 INVESTIGATION — Governor Langlie of Washington has urged an investigation of the state's purchase of the Longview Bridge, which was bought by the state toll bridge authority under Governor Mon C. Wallgren in 1947. Langlie states that the highway department appraised the bridge at $1,400,000 before it was purchased for the sum of $2,500,000.

URGE RENAMING OF DAMS—Washington state senator Henry J. Copeland urged the legislature to change the names of 4 proposed dams on the Snake River. Copeland proposed that Ice Harbor Dam, 10 mi. upstream, be named Whitman Dam in honor of Marcus Whitman; Lower Monumental Dam, 45 mi. upstream, be named Lewis Dam for Capt. Merriwether Lewis; Little Goose Dam, 72 mi. upstream, be named Clark Dam for Capt. William Clark; Lower Granite Dam, 113 mi. upstream, be named Spaulding Dam in honor of Missionary Henry Harmon Spaulding.

Contracts . . .

Summary of Major Construction Contracts Awarded Last Month

A contract to place the Government-owned magnesium metal production facilities at Velasco, Texas, in "moth-ball" status was awarded to the **Austin Co.**, Houston, Texas, by W. E. Reynolds, Commissioner of Public Buildings, Federal Works Agency. The work under this contract is estimated to cost about $1,143,000. The original cost of these magnesium facilities was $26,500,000 with a rated capacity of 72,000,000 lb. of magnesium metal annually. The plant was constructed in 1942, and during the war was operated by the Dow Magnesium Corp., a subsidiary of the Dow Chemical Co., Midland, Mich.

Williams & Burrows, Inc., 10 California Dr., Burlingame, Calif., were awarded a $1,230,000 contract for construction of the Archbishop Hanna School for Boys at Boyes Hot Springs, near Sonoma, Calif. The school will include a main building, living quarters for 125 boys, auditorium, chapel, vocational training shops, an administration building, and will be patterned after the renowned "Boy's Town" supervised by the late Rev. Wm. J. Flanagan.

C. M. Elliott & John C. Gist, 1020 46th St., Sacramento, Calif., were low bidders for work on completion of Keswick Dam and Power Plant, situated about 4 mi. northwest of Redding, Calif., on the Sacramento River. The work is part of the Bureau of Reclamation's Central Valley Power Project and will cost $1,239,409.

Alaska district, Army Corps of Engineers, awarded the following contracts as part of their $65,000,000 building program: **Peter Kiewit and Morrison-Knudsen,** a joint venture, Seattle, $2,063,000 for multiple-unit family quarters at Ladd Field; **Reed & Martin,** Fairbanks, $624,000 for two 20-man bachelor officer quarters at Ladd Field; **J. B. Warrack,** Seattle, $687,000 for three 8-family quarters at Fort Richardson; **S. Patti-McDonald,** $282,-

813 for one 20-man bachelor officer quarters at Richardson; **Henrik Valle Co.**, Seattle, $725,000 for a warehouse at Whittier. Main projects for which bid call dates have not been scheduled include transmitter buildings, powerhouses, garages and quarters at Alaska stations, and addition to the power plant at Fort Richardson.

Haddock Engineers, Ltd., 1616 S. Greenwood Ave., Montebello, Calif., have been awarded a $1,920,500 contract by the Naval Ordnance Test Station, Inyokern, Calif., for the construction of 70 duplex units (140 housing units) including new roads and walks, street lighting, fire alarm, electric, water, and sewer systems to service the new buildings.

The Bureau of Reclamation has recommended award of a $2,049,922 contract to **American Pipe and Construction Co.**, Los Angeles, Calif., to build laterals and sublaterals as part of the Coachella Canal Project. The work will carry water from the last section of the 124-mi. canal to 14,000 ac. of farm land.

Southern California Edison Co. has awarded a contract for approximately $19,400,000 to **Morrison-Knudsen Co.**, Los Angeles, and **Bechtel Corp.**, Los Angeles, a joint venture, for construction of a new dam and hydro-electric powerhouse on the San Joaquin River. The new unit, to be completed in 1952, will be part of the company's Big Creek Project and will have a capacity of 84,000 kw. in two generating units. The storage reservoir holding 35,000 ac. ft. will be impounded by a 228-ft. high concrete dam.

Edwin C. Gerber, Oregon City, was awarded a $792,215 contract by the Oregon State Highway Department for 5.7 mi. of grading and paving on the Pleasant Valley section of the Oregon coast highway in Tillamook County. Included in the contract are 4 concrete bridges and 7 culverts.

Henry Hagman, Cashmere, Wash., and **Erickson Paving Co.**, Seattle, a joint venture, were awarded a $539,191 contract for steel work on a bridge across the Clearwater River at Lewiston, Idaho. The 1,352-ft. bridge will require 17,000 tons of steel and cost more than $1,000,000 when completed. A contract was previously let for construction of the concrete piers and abutments.

Parker Steffens and Pearce, San Francisco, have been awarded a $1,792,000 contract for construction of a 100-bed hospital in Redwood City, Calif. Time of completion is scheduled as 1½ years.

California Department of Public Works awarded the following contracts for construction of 3 new wards at Agnew State Hospital: **Herbert Mayson**, Los Angeles, general, $1,817,814; **A. J. Peterson & Son**, San Jose, plumbing, $188,720; **Associated Electrical & Mechanical Co.**, San Francisco, heating and ventilating, $146,689; **Kurze Electrical Works**, San Jose, electrical, $86,310.

Guy F. Atkinson Co. was awarded a $1,084,358 contract by the Washington State Highway Department for clearing, grading, and draining 3.5 mi. of P.S.H. No. 1 in Cowlitz County, Wash.

Williams & Burrows, Burlingame, Calif., and **Carl N. Swenson**, San Jose, were awarded a $1,867,000 contract to build 2 schools in San Jose. The project consists of a group of 14 building units, forming the first construction program for the school sites.

The University of California at Berkeley has awarded the following contracts as part of a new $1,655,000 engineering building: **James I. Barnes Co.**, Santa Monica, Calif., general, $1,084,000; **Western Plumbing and Heating Co.**, San Francisco, mechanical, $241,110; **Del Monte Electric Co.**, Oakland, electrical, $299,259.

Amis Construction Co., Oklahoma City, and **C. F. Lytle Co.**, Sioux City, were low bidders at $11,350,647 for construction on Cedar Bluff Dam and relocation of county road, part of the Missouri River Basin Project, Kansas, Bureau of Reclamation.

A $634,022 contract for construction of earthwork and structures on the Hudson Lateral and various drains on the Tucumcari Project in New Mexico has been awarded to **D. D. Skousen**, Springer Bldg., Albuquerque, New Mexico. The Bureau of Reclamation project will require 360 days for completion.

Charles MacClosky Co., 112 Market St., San Francisco, have been awarded a $506,752 contract by the California Division of Public Works for improvements on Hollywood Parkway in Los Angeles County. The work includes construction of a reinforced concrete box girder at Heliotrope Drive.

The Colorado State Highway Commission has awarded a $360,355 contract to the **Western Paving Co. & Associates** of Denver, Colo., for construction of a railroad overpass on State Highway 72 near 27th Ave. and Inca Street in Denver. 700 days are allowed for completion.

TRADE WINDS

News of Men Who Sell to the Construction West

Western Distributor News Round-Up

The CONTRACTORS EQUIPMENT CORPORATION of Portland, Ore., recently took over its new streamlined building located at 2727 S. E. Union Ave., where the company carries a general line of contractors' equipment. Contractors Equipment Corp. was created when, in 1938, **Oliver C. Jessup** and **Robert D. Vial** bought the L. A. Snow Co.'s Portland branch. They soon moved to better facilities on S.E. Grand Ave., where they have remained until constant growth and expansion necessitated the erection of the new structure. Jessup is president of the company and directs the sales activities. Vial is vice-president in general charge of credits, service and plant operations. Among the many firms represented by Contractors Equipment are: All-Purpose Spreader Co., American Road Equipment Co., Blaw-Knox Division, Butler Industries, Inc., Carver Pump Co., Davey Compressor Co., Gledhill Road Machinery Co., Hetherington & Berner, Inc., Independent Pneumatic Tool Co., Unit Crane & Shovel Corp., Universal Engineering Co., Wickwire Spencer Division.

☆ ☆ ☆

Regional sales meetings were held recently in Seattle, Los Angeles and Denver between the management and dealers personnel of BARBER-GREENE CO., Aurora, Ill. Three distributors of Barber-Greene equipment participated in the meeting at Seattle, three at Los Angeles and five at Denver. **H. A. Barber,** vice-president of Barber-Greene, **J. D. Turner,** director of publicity, and **Bill Gifford** of B-G's Construction Division conducted the meetings, along with **E. L. Benson,** area sales manager, and **Harry Jackson,** service manager. The get-togethers were part of a national series of meetings. More than 14 such meetings have been held since the beginning of this year.

☆ ☆ ☆

McCOY MACHINERY CO., Caterpillar distributors of Denver, has established a sales office and parts depot at Burlington, Colo. **Edward P. Honnen** is in charge of the new branch servicing the contractors on the Bonny Dam, part of the Missouri Basin Project.

☆ ☆ ☆

PIERCE TRAILER & EQUIPMENT CO. of Portland, Ore., are the newly-appointed distributors for the truck hoists and bodies manufactured by GAR WOOD INDUSTRIES, INC., at their Richmond, Calif., branch.

☆ ☆ ☆

KEYSTONE DRILLER COMPANY, Beaver Falls, Pa., manufacturers of blast hole, well drilling and heavy excavating machinery since 1882, has recently formed a new department, known as the Equipment Division, to enlarge their scope of activity in the industrial and construction machinery field. The company has acquired the services of ROBERT H. FOX AND ASSOCIATES of Van Nuys, to direct the engineering and marketing of this line of industrial equipment. Fox, formerly with Six Wheels, Inc. of Los Angeles, has pioneered the application of rubber tires to heavy construction machinery since 1922 and brings to Keystone the assets of his years of experience in this field.

☆ ☆ ☆

Appointment of VICTOR EQUIPMENT CO., San Francisco, as exclusive distributors for Nelson Stud Welding equipment and products in the Pacific Coast area, has been announced by **Leonard C. Barr,** vice-president of MORTON GREGORY CORP., and general sales manager of its Stud Welding Division, Lorain, Ohio. The distributorship will cover both sale and rental of Nelson stud welding guns and control units, and sale of Nelson flux-filled studs and other fasteners in California, Oregon, Washington, Nevada and Idaho. **L. W. Stettner,** president of Victor Equipment Co., in commenting on the arrangement, pointed out that the company's seven branches, from Seattle in the north to San Diego in the south, are in a position to render prompt service to manufacturers, shipbuilders and construction industries where stud welding has proven profitable.

☆ ☆ ☆

J. V. Shea, former Eastern District Manager, is now sales manager for LE ROI CO., Milwaukee, Wis. He replaces **John Dolan,** vice-president in charge of sales, who resigned. FRED M. VILES & CO., Spokane, Wash., have been named distributors for Le Roi products in Eastern Washington and the panhandle of Idaho.

Manufacturers Active in California

An announcement has been released by **L. A. Lundstrom,** president and general manager of the PETERBILT MOTORS COMPANY of Oakland, builders of heavy-duty motor trucks, that the corporation had purchased the entire assets of the MacDONALD TRUCK & MANUFACTURING CO., builders of low-body and lift trucks, a partnership formerly owned and operated by **W. W. MacDonald** and **John R. Pomfret,** San Francisco. "The MacDonald low-body truck which has proven

W. W. LUNDSTROM, center, President of Peterbilt Motors, Oakland, with BILL MacDONALD, left, JACK POMFRET and a MacDonald truck.

itself so entirely satisfactory in the fields of operations needs no introduction to transportation companies or truck operators. Its ease of handling, its compact power plant, and short turning radius make this particular lift truck the most outstanding lift truck on the market today," according to President Lundstrom. W. W. (Bill) MacDonald and John R. (Jack) Pomfret will be associated with Peterbilt, and the trade name of MacDonald will be carried on, the firm operating under the name of MacDonald Truck & Manufacturing Co., a division of Peterbilt Motors Company. All manufacturing of low-body and lift trucks will be done at the Peterbilt Motors Company factory in Oakland, while parts and service facilities for both Peterbilt and MacDonald products, as well as the sales office, will be maintained at the former address of the MacDonald concern at 575 Folsom St., in San Francisco.

Finishing touches are being put on the huge new General Petroleum Building, new home office for the GENERAL PETROLEUM CORPORATION, located in downtown Los Angeles. The building incorporates the most modern developments in the building, construction and equipment fields. It was designed by Wurdeman & Becket, architects, and built by P. J. Walker Co., general contractors. The company expects to be in the new building in March and formal opening is scheduled for early April.

☆ ☆ ☆

In line with THE WHITE MOTOR CO.'s new expansion program for the West Coast, **Wilson D. Patterson,** Pacific Coast regional manager, announces the following appointments and promotions in the West Coast personnel. **Lee F. Bergstrom** leaves his position as superintendent of White's San Francisco parts department to take over a new assignment in the service sales division of the San Francisco branch sales department. **Con L. Murphy,** parts superintendent of White's Portland branch, is transferred from Portland to the San Francisco branch to serve in a similar capacity as parts superintendent. **Lue E. Warner,** formerly with the parts department of the Portland branch, will take over from Murphy as superintendent of the Portland parts department.

☆ ☆ ☆

Announcement was recently made by **Frank M. Roberts,** president of UNIVERSAL HOMES, INC., of Palo Alto, that arrangements have been made with Claude T. Lindsay, Inc., well known producers of Lindsay "Lifetime" Homes, for additional mass production of Universal Homes at the Lindsay factory at Decoto, Calif.

☆ ☆ ☆

Appointment of **Rand Hogan** as assistant district sales manager of Kaiser Steel for Northern California was recently announced by the KAISER COMPANY, INC., through **C. F. Borden,** general sales manager. Hogan will be in temporary charge of the northern California district sales office during the absence of **Norman Balaam,** who has been loaned to Kaiser Fleetwings for an indefinite period. At the same time, Kaiser Steel announced the transfer of the northern California district

sales office from 1924 Broadway to new and larger offices at 360 Seventeenth St., Oakland. General sales office for Kaiser Steel remains at 1924 Broadway. The move reflects the need for additional space in order to serve the customers of this section of California more effectively.

☆ ☆ ☆

The Board of Directors of the FLUOR CORPORATION, LTD., Los Angeles, recently announced its officers for 1949. **Shirley E. Meserve,** president since 1947, was elected chairman of the board. Succeeding him as president is **Donald W. Darnell.** Darnell joined Fluor in 1925 as chief engineer, and successively attained

DARNELL FLUOR

the positions of vice-president, and since 1947, vice-president and general manager. Of further interest to the industry was the announcement of the return of **J. S. Fluor, Jr.** Fluor, actively connected with the development and management of the Fluor Corporation since 1921, has been away from the company since 1946. Elected to the position of executive vice-president, he was induced to return to lend his abilities, experience and guidance to the company's affairs.

☆ ☆ ☆

CHAIN BELT COMPANY of Milwaukee, Wis., announces that its Los Angeles district office and warehouse has been moved to new and larger quarters at 3838 Santa Fe Ave., Los Angeles 11. **J. V. MacDonald,** district manager, will continue in charge. Newly installed facilities for the machining of sprockets, shafting, shaft couplings and other power transmission items now supplement warehouse stocks of these items.

☆ ☆ ☆

J. E. Donovan has been appointed manager of MACK TRUCK's San Francisco branch, announces **A. C. Fetzer,** vice-president and general sales manager. In assuming direction of one of the largest of Mack's 67 direct facory branches, Donovan climaxes a 25-year period of service with the company. During this time he held various positions, the last being that of special sales representative in charge of national and fleet owner accounts in the San Francisco area.

☆ ☆ ☆

TRI-CITIES ELECTRICAL SERVICE, INC., with main offices in Los Angeles at 1745 E. Slauson Blvd., have moved their Oceanside offices to an expanded location at 314 Wisconsin St., and have recently opened a new branch in Santa Fe, New Mex. Located at general headquarters in Los Angeles is President **D. J. O'Dell** and General Manager **F. C. Van Sickle.** Manager at Oceanside is **T. C. Kirkland;** Santa Fe manager is **Henry Ford.**

☆ ☆ ☆

THE TRAILMOBILE COMPANY, California Division, Berkeley, recently made the announcement that **Marvin Holm** formerly of the company's Los Angeles sales staff, has been appointed manager of the Sacramento branch. Holm is an old time employee of the company and established a fine sales record in southern California.

☆ ☆ ☆

Election of **W. P. Fuller, III,** as a director of W. P. FULLER & CO., San Francisco, has been announced by President **A. H. Brawner.** Fuller, a great-grandson of the company's founder, is manager of the firm's glass division and in charge of labor relations. He is the son of **W. P. Fuller, Jr.,** who served as president of the company from 1924 to 1946, and is the first member of the fourth generation of the Fuller family in California to serve on the board.

☆ ☆ ☆

THE REPUBLIC SUPPLY COMPANY OF CALIFORNIA, jobbers and manufacturers of industrial and oil well supplies, and an independently owned California corporation with a net worth of $5,300,000, recently announced the official opening of their new modern home office headquarters and main company warehouse at 2600 S. Eastland Ave., East Los Angeles. The company is headed by **P. M. Pike,** founder and chairman of the board, **John J. Pike,** president, and **W. Dale Russell,** vice-president.

☆ ☆ ☆

BETHLEHEM PACIFIC COAST STEEL CORPORATION, through **W. J. McClung,** operating vice-president, recently announced the appointment of **R. J. Tremblay** to the position of general superintendent of the company's steel plant in Los Angeles. Since July, 1947, he had been assistant general superintendent, having

TRADE WINDS

been appointed to that position from Bethlehem Pacific's Seattle operations. In his new position, he will have charge of all steel making, processing and manufacturing units at the Los Angeles plant. Appointed to the position of assistant general superintendent is **Hubert C. Swett,** who has moved from the company's South San Francisco plant where he has been employed since 1924, to the Los Angeles plant.

☆ ☆ ☆

Earl B. Maloon, manager of the Construction Machinery Division of SOUTHWEST WELDING & MFG. CO., Alhambra, has announced the appointment of **A. H. (Art) Tetrick** as sales manager of that division. Tetrick has been associated with the equipment industry for many years. Previous to his present appointment he was with a major manufacturer of heavy construction machinery. His wide experience in the construction equipment field makes him a valuable addition to the Southwest organization.

☆ ☆ ☆

The CALAVERAS CEMENT CO. of San Francisco began installation recently of a new Cottrell electric precipitator at its San Andreas, Calif., plant, with the arrival of the first load of steel. It is expected that installation will be completed during April. The new precipitator is being added to the two now in operation and will cost nearly $200,000.

☆ ☆ ☆

J. P. Courtright, vice-president in charge of sales for MARION POWER SHOVEL COMPANY, Marion, Ohio, was a recent visitor to San Francisco to attend the annual meeting of the American Institute of Mining and Metallurgical Engineers. **Edward R. Daley,** District Manager, accompanied Courtright on a trip to Los Angeles, after which he returned to Marion.

☆ ☆ ☆

Men and Firms Move to The Pacific Northwest

Arrangements have been made with the Lidgerwood Manufacturing Co. for the manufacture in the United States of a new type of aerial cableway recently developed in Canada for the handling of concrete, placing steel, etc. This development has now been put into a new company, known as Construction Improvements, Ltd., and the COLBY STEEL & ENGINEERING CO. of Seattle has taken on the selling agency for all the territory west of the Rocky Mountains. **M. R. Colby** is president of the latter firm.

☆ ☆ ☆

The appointment of **M. H. Freedman** as division manager of the Pacific Northwest Division of COLUMBIA STEEL CO. of San Francisco, subsidiary of United States Steel Corp., was announced by the company. Columbia's newly created sales division will comprise the states of Washington, Oregon, and northern Idaho. At the same time it was announced that **C. C. Johns** will be manager of sales at Portland, Ore., and **Ralph Winship** will be manager of sales at Seattle, Wash. Freedman first joined U. S. Steel at San Francisco in 1920. In 1931 he was transferred to the Seattle office of Columbia Steel Co. as salesman. He was subsequently advanced to the positions of assistant manager of sales and manager of sales at Seattle.

☆ ☆ ☆

After completion of its $75,000 building program, a new product will be turned out in the Northwest by the CENTRAL PREMIX CONCRETE CO., Spokane, according to announcement made by **Herbert D. Sullivan,** vice-president of the company. "Sakrete," a dry pre-mix construction material, will be manufactured in a separate building, either adjacent to the company's plant at N. 805 Division, or in the vicinity of the Union Sand & Gravel plant at Fort Wright. Dry mixes of concrete, mortar and sand-cement will be manufactured.

☆ ☆ ☆

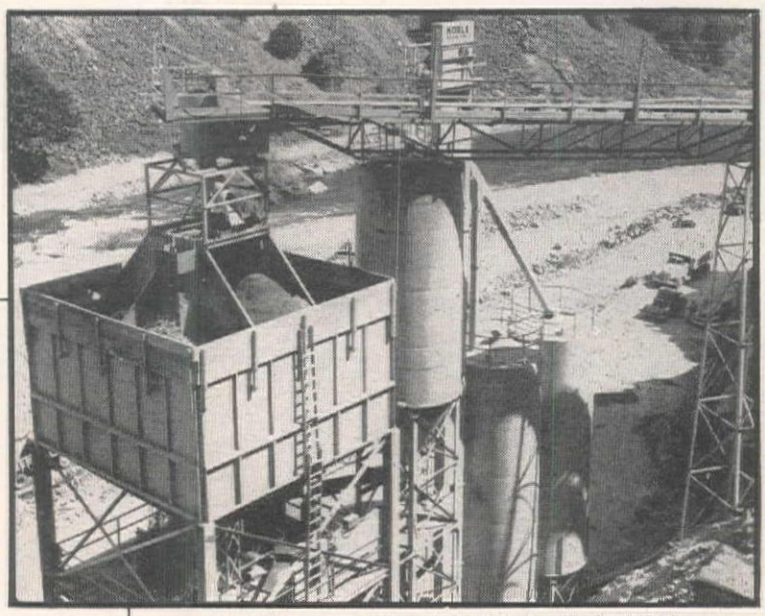
"Operation Snowbound"

The heavy snows in the mountain and northwestern states gave the highway departments of the various counties a real problem in keeping the highways clear. According to **John E. Battes,** zone manager of FOUR WHEEL AUTO DRIVE CO., who recently returned from a tour of those states, the highway departments were using all types of equipment at their disposal attempting to keep the roads clear but almost as soon as they were cleared, another heavy snow would again cover the highways. His company was in a position to make immediate delivery of converted Four Wheel Drive trucks equipped with hoist and snow removal equipment. These units were placed in service immediately in Washington, Idaho, Nevada, Utah, Colorado and Wyoming. Other deliveries were made on 10 hours' notice.

MORE TRADE WINDS, PAGE 116

On Big Concrete Jobs...

NOBLE ENGINEERS DESIGN SPECIAL PLANTS TO FIT YOUR SPECIFIC NEEDS



This Noble concrete mixing plant at Morrison-Knudsen's Rock Creek job includes two 3250 cu. ft. cement storage silos, a 2500 cu. ft. cement batching silo, a 30-inch Noble aggregate conveyor, and a 500-ton, 6-compartment aggregate bin. It has a Noble full-automatic batcher and Noble automatic water scales. The Noble plant at Cresta Dam is similar in size, but has one storage silo instead of two.

AT ROCK CREEK AND CRESTA DAMS, MORRISON-KNUDSEN GET TWO CUSTOM-BUILT 500-TON BATCHING PLANTS, MONEY-SAVING CEMENT STORAGE, ACCURACY TO .2 OF 1%

Like Morrison-Knudsen, you can get a special batching plant from Noble, designed to fit the exact needs of your particular job. You save time and money because—

1. Noble engineering "know-how" and production facilities get your plant up in a hurry.
2. Noble job-proved batchers give you accuracy to within .2 of 1%—well within strict U. S. Bureau of Reclamation and state highway specifications. All batching controls are centralized for one-man operation.
3. With Noble's system of batching you use a fair-sized cement silo, receive and handle cement from storage silos to batcher through a single elevator, thus holding down your equipment investment. You keep cement alive, prevent undue packing and profit from the lower cost of bulk cement.

These same money-making advantages are yours in Noble standard plants, built in the following sizes to fit most jobs:

Aggregate Bins: 80, 100, 150, 350, 500, 750, 1000 and 1500-ton capacities; 3 to 6 compartments.

Cement Silos: 500, 1000, 1200, 1450, 2000, 2500, 3250 cu. ft. and 1500, 2000, 3000, 5000, and 7500 bbl. capacities.

Weigh Hoppers: 1, 2, 3, or 4 yd.

Scales: Back-balance beam, or dial.

CALL ON OUR ENGINEERS

Our engineers will gladly help you plan the plant best fitted to your needs, whether it be a special design or standard units. No obligation. Wire, write or phone us for help N O W.

DESIGNERS AND BUILDERS OF

CEMENT AND AGGREGATE BATCHING PLANTS • BULK CEMENT PLANTS • CONVEYORS • ELEVATORS • HEAD FRAMES • SWIVEL DISTRIBUTORS AND CHUTES • GATHERING HOPPERS • CALIBRATED WATER TANKS • WATER SCALES • SLIDE GATES • CLAMSHELL GATES • AGGREGATE BINS AND CEMENT SILOS

NOBLE CO.

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TEMPLEBAR 2-5785
4017 MEDFORD STREET • LOS ANGELES 33, CALIF. • ANGELES 2-6455

YOUR CHOICE OF MANUAL, SEMI-AUTOMATIC OR FULLY AUTOMATIC PROPORTIONING

BOW LAKE EQUIPMENT CO., Seattle; ENGINEERED SALES, San Antonio; HALL-PERRY MACHINERY COMPANY, Butte; RAY L. HARRISON CO., Albuquerque; LOGGERS & CONTRACTORS MACHINERY CO., Portland; TATTAN-DOUGLAS EQUIPMENT CO., Oklahoma City; TRI-STATE EQUIPMENT CO., El Paso; TRI-STATE EQUIPMENT CO., Spokane; J. K. WHEELER MACHINERY COMPANY, Salt Lake City; CONNELL BROS. CO., LTD., San Francisco.

Firms Expand in the Intermountain Region

Greatly expanded repair, maintenance and warehousing facilities for increasing service on GENERAL ELECTRIC CO.'s apparatus in the states of Utah, Idaho, Montana and Nevada, will be established in Salt Lake City by the G-E apparatus department, according to a recent announcement by **B. C. J. Wheatlake,** manager of the company's Salt Lake City office. The Salt Lake City service facilities will be housed in a new service shop and warehouse building scheduled to be completed by late summer at Third and Seventh West. The new facilities, coupled with those opened in Denver in 1946, will give the Rocky Mountain area "one of the most up-to-date G-E service organizations in the country," according to Wheatlake.

☆ ☆ ☆

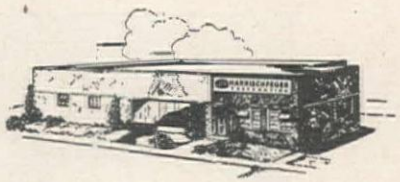
It has recently been announced by the WICKWIRE SPENCER STEEL DIVISION of The Colorado Fuel & Iron Corp., that **E. L. Klingler** will direct the sale of Wickwire rope in the area of Houston and Abilene in Texas, and Tulsa, Okla., with headquarters at Houston. Prior to this change, Klingler operated out of the Palmer, Mass., sales office. Klingler has a background of nineteen years in the wire rope industry, including production, engineering and sales.

☆ ☆ ☆

The HARNISCHFEGER CORPORATION, Milwaukee, Wis., recently made the announcement that construction has started in Dallas, Tex., of a new P&H

TRADE WINDS

office and warehouse to serve the territory of New Mexico, Oklahoma and Texas. P&H has had a district warehouse there for over twenty years, but was forced because of greatly increased business in the



area to build larger quarters. The present address of the P&H Dallas office is 2223 Commerce St., and is managed by **James Enochs.** P&H products include arc welders and electrodes, power shovels, truck cranes, electric excavators, single pass soil stabilizers, electric cranes and hoists.

☆ ☆ ☆

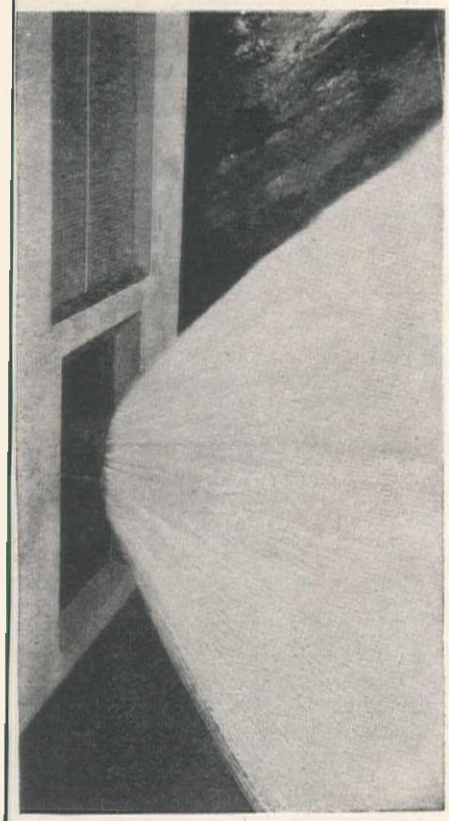
Since last fall, **Harry J. Waldrip** has been serving as industrial sales manager at the Billings, Mont., branch of the ALLIS-CHALMERS MFG. CO., Tractor Division. For thirty years Waldrip has serviced automotive equipment up and down the West Coast. In 1936 he transferred his interests from cars and trucks to crawler tractors and became service manager for one of Allis-Chalmers' West Coast dealers. In 1941 he joined Allis-Chalmers' Los Angeles branch, and a year later he became branch service manager and spent most of his time in this capacity, working with the armed forces as a technical service adviser. After the war, Waldrip was transferred to the Tractor Division's industrial service department and was stationed at Portland, Ore.

News of the Eastern Manufacturers

At the annual meeting of the WIRE ROPE INSTITUTE held in January, **David Larkin** was elected president of the organization for a one-year term. He succeeds **E. C. Low** of John A. Roebling's Sons Co., Trenton, N. J., who became chairman of the board. Larkin, executive vice-president of Broderick & Bascom Rope Co., is widely known in the wire rope industry, with which he has been actively identified for over twenty years. In addition to Larkin and Low, other new officers of the institute are: vice-president, **H. C. Parker** of Bergen Wire Rope Co.; secretary, **W. A. Huber** of American Chain & Cable Co.; treasurer, **D. W. Vernon** of A. Leschen & Sons Rope Co.

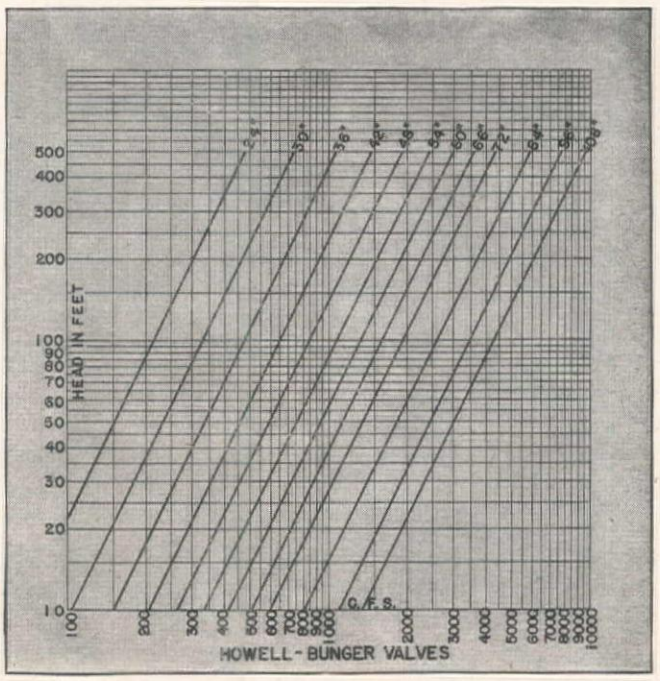
☆ ☆ ☆

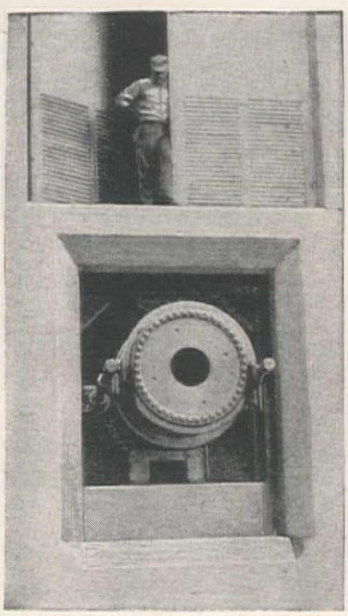
Changes in officer personnel of the FULLER MANUFACTURING CO., Kalamazoo, Mich., took place at the regular quarterly meeting in Chicago at the end of 1948, and were announced by **J. Seton Gray,** president of the company. Gray, president of the company for the last four-

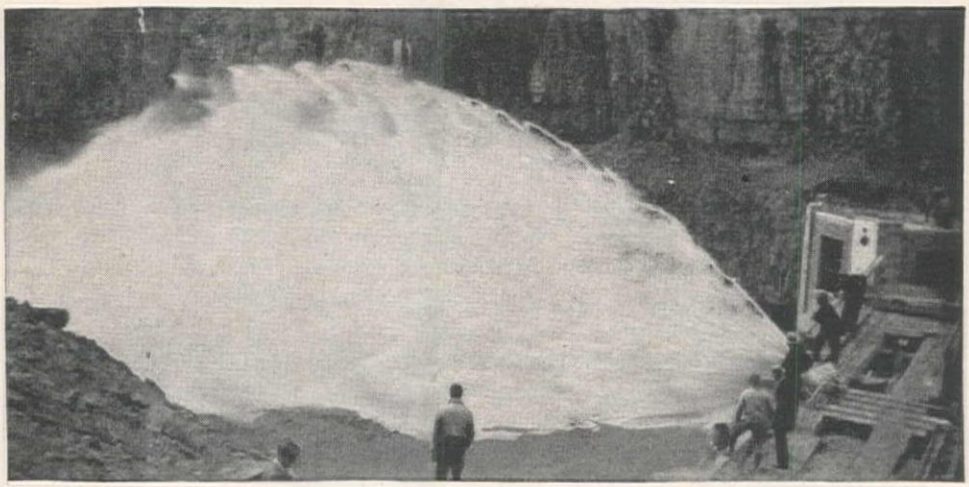


for FREE DISCHARGE

These Pictures *and* Graph Tell the Story-







Howell-Bunger Valve

If It's Hydraulics~ Put It Up to Us!

HIGH DISCHARGE efficiency, simplicity of design and low cost are the outstanding advantages of this unusual Valve, described in Bulletin No. 144. Send for it.

S. MORGAN SMITH Co.

YORK. PENNA. U.S.A.

TRADE WINDS

teen years, was named chairman of t board. Succeeding Gray as president is **L. Ludvigsen. Harold E. Brey** was nam executive vice-president. Two new vic presidents were named by the board directors. **William E. Niness** is now vic president in charge of sales, and **Thom Backus,** vice-president in charge of eng neering. **Eric A. Pullan** remains as secr tary and treasurer of the company. Full manufactures a complete line of heav duty automotive transmissions at Kal mazoo and also produces forgings at M waukee, Wis.

☆ ☆ ☆

In line with their expanding sales pr gram, MERRILL BROTHERS of Ma peth, N. Y., makers of fine forgings sin 1866, recently announced the appointme

of **Howard L. Franks** as director of sale for the company. Franks brings to his new position a broad experience in the steel and metal working industry and a vast knowledge of product production and materials handling problems.

☆ ☆ ☆

Newest addition to the road machinery sales staff of the W. A. RIDDELL CORP., Bucyrus, Ohio, is **A. William McGraw,** who will serve in the capacity of sales promotion manager for WARCO motor graders and HERCULES road rollers. After three years as a pilot in the Navy Air Force during the war, Riddell became associated with one of the nation's larger construction machinery manufacturers, as a district representative in the St. Louis area.

☆ ☆ ☆

Among the recent personnel changes announced by **A. C. Fetzer,** vice-president and general sales manager of MACK TRUCKS, INC., was the naming of **H. J. Fikejs** as district manager in charge of the Kansas City branch, and **T. J. Colter** as district manager in charge of the company's Milwaukee branch.

☆ ☆ ☆

Seward T. Salvage, 38, assistant district manager of industrial bearing sales in the Cleveland office of THE TIMKEN ROLLER BEARING CO. of Canton, Ohio, has been made sales promotion man-

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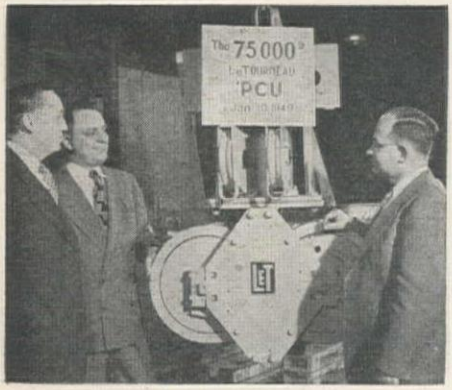
ager, and will be stationed at the headquarters of the company in Canton. Salvage has been with Timken since 1933, and at one time was district manager in the Los Angeles office. Another recent change in the personnel was the appointment of **T. F. Rose,** Cincinnati branch manager, to the managership of the Timken Roller Bearing Service & Sales Limited, Toronto, Canada. **H. C. Telford** becomes the new Cincinnati manager.

☆ ☆ ☆

The 75,000th LeTourneau power control unit came off the production line recently at the Peoria plant of R. G. LeTOURNEAU, INC., manufacturer of earthmov-



ing and construction equipment. This cable control unit actuates earthmoving tools towed by or mounted on tractors. On hand to view this unit as it left the assembly line were **Roy E. McCluskey,** vice-president and general sales manager; **Merle R. Yontz,** vice-president and treasurer, and **Harold Jeter,** manufacturing manager. Le-

TRADE WINDS

Tourneau manufactures power control units for all makes of track-type tractors.

☆ ☆ ☆

O. B. Wilson, eastern regional sales manager for Brown Instruments Division of MINNEAPOLIS-HONEYWELL REGULATOR CO., has been named manager of sales for the east, southeast and central regions, it was announced recently by **L. Morton Morley,** Brown's vice-president and general sales manager. He will make his headquarters at the Brown plant in Philadelphia.

☆ ☆ ☆

J. C. Macon, Jr., assistant sales manager of the Tar Products Division, KOPPERS COMPANY, INC., Pittsburgh, Pa., since September, 1947, has been named sales manager of the Division, according to announcement by **J. N. Forker,** vice-president and general manager. In his new position, Macon succeeds **R. R. Holmes,** who was named as assistant general manager of the division.

☆ ☆ ☆

Carl F. Oechsle, assistant vice president and manager of the Construction Equipment Dept., will make his headquarters at the executive offices at Harrison, N. J., it was announced today by **C. E. Wilson,** vice president, WORTHINGTON PUMP & MACHINERY CORP., Harrison, New Jersey. **W. J. Fleming,** manager of the Holyoke Construction Equipment sales division, will continue to make his headquarters at Holyoke, Mass., and **W. F. Lockhardt,** manager of the Ransome Co struction Equipment sales division, will r main at Dunellen, N. J. The corporatic also announces a change in the Washin ton, D. C. personnel, with **J. S. Bachman** Construction Equipment regional superv sor succeeding **H. C. Sargent.** Addition regional supervisors for construction equi ment sales have been set up in Atlanta, Ga and Tulsa, Okla., with **R. F. Litaker** a signed to the post in Atlanta, and **R. Barz** at Tulsa.

☆ ☆ ☆

Francis W. Vigneault, Jr., has bee named district repre sentative for tracto equipment in th northeastern terr tory, according to a announcement fro **Theron Howard** head of tractor equip ment sales in th eastern division o the HYSTER COM PANY of Portland, Ore., and Peoria an Danville, Ill. Since 1940, except for thre years of military service, Vigneault ha been connected with the Caterpilla Tractor Co., and has had experience i factory work as well as sales training an sales development.

☆ ☆ ☆

William T. Nichols of the Westvac Chemical Co. in New York has been name director of the general engineering depart ment of MONSANTO CHEMICAL CO in St. Louis, Mo., it was recently an nounced by **William M. Rand,** Monsanto' president.

UNIT BID SUMMARY

Highway and Street . . .

Wyoming—Natrona County—State—Grade and Drain

Sharrock & Pursel, contractors of Casper, Wyoming, with a bid of $485,051, were awarded the contract by the Wyoming Highway Department for grading, draining, 10 reinforced concrete culverts and miscellaneous work along 11.46 mi. of the Midwest-Casper Road. The bid was $67,000 below the estimated cost. Unit bids are listed for the lowest 8 of 12 contractors, along with the estimate. Unit bids were submitted by the following:

(A) Sharrock & Pursel $485,051
(B) Peter Kiewit & Sons' Co. 497,183
(C) Platte Valley Construction Co. 498,049
(D) Knisely-Moore Co. 502,728
(E) S. Birch & Sons Construction Co. 508,099
(F) Leach Bros. 527,132
(G) Forgey Construction Co. 541,553
(H) J. H. & N. M. Monaghan & Associates Co. $544,528
— H. W. Read 566,140
— Northwestern Engineering Co. 567,150
— Taggart Construction Co. 586,071
— Gibbons & Reed Co. 680,294
(I) Engineers' Estimate 552,830

(1) 900,000 cu. yd. excavation
(2) 32,000 cu. yd. excav. (selected embankment)
(3) 1,592,000 cu. yd. sta. overhaul
(4) 312,500 cu. yd. mi. haul
(5) 13,500 M. gal. watering
(6) 2,900 hr. sheepsfoot roller operation
(7) 190 hr. equipment roller operation
(8) 175 hr. smooth steel roller operation
(9) 160 hr. pneumatic tired roller operation
(10) 1,796 lin. ft. 18-in. standard reinf. conc. pipe
(11) 1,025 lin. ft. 24-in. standard reinf. conc. pipe
(12) 376 lin. ft. 30-in. standard reinf. conc. pipe
(13) 448 lin. ft. 36-in. standard reinf. conc. pipe
(14) 192 lin. ft. 42-in. standard reinf. conc. pipe
(15) 576 lin ft. 48-in. standard reinf. conc. pipe
(16) 280 lin. ft. 60-in. standard reinf. conc. pipe
(17) 136 lin. ft. 48-in. extra str. reinf. conc. pipe
(18) 40 lin. ft. 60-in. extra str. reinf. conc. pipe
(19) 1,471.1 cu. yd. Class B conc.
(20) 143,260 lb. reinforcing steel
(21) 1,380 cu. yd. structure excav.
(22) 1,150 cu. yd. excav. for pipe culverts
(23) 1,300 hr. mechanical tamping
(24) 330 cu. yd. special backfill
(25) 230 cu. yd. Class I riprap
(26) 100 cu. yd. grouted riprap
(27) 51,000 lin. ft. standard r/w fence
(28) 41,000 lin. ft. r/w fence (5 wire)
(29) 30,500 lin. ft. Type (A) r/w fence
(30) 75 ea. end panels
(31) 170 ea. brace panels
(32) 60 ea. r/w markers
(33) 2 ea. cattleguards
(34) 4 ea. 16-ft. galv. steel gates
(35) 49,200 cu. yd. selected matl. surf. (Type 1)
(36) Lump sum, removing and resetting corral

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
(1)	.175	.18	.18	.20	.18	.21	.215	.20	.23
(2)	.25	.25	.25	.22	.35	.30	.38	.35	.30
(3)	.01	.01	.01	.01	.01	.01	.01	.01	.01
(4)	.18	.12	.15	.15	.12	.16	.17	.12	.17
(5)	1.50	1.50	2.00	1.60	1.40	2.00	1.50	2.50	2.00
(6)	9.00	10.00	10.00	9.00	10.00	8.50	9.75	10.00	10.00
(7)	12.00	12.00	12.00	12.00	13.00	10.00	14.00	12.00	13.00
(8)	7.00	8.00	9.00	8.00	6.00	7.00	8.00	6.50	7.00
(9)	6.00	5.00	5.00	6.00	6.00	7.00	9.00	7.00	7.00
(10)	5.00	6.00	4.50	4.00	4.50	4.40	4.60	4.50	4.50
(11)	6.00	8.00	6.50	6.00	7.00	6.25	6.25	6.50	6.00
(12)	9.00	11.00	10.00	8.00	10.00	9.35	8.50	9.50	8.00
(13)	11.00	16.00	13.00	11.00	13.00	12.50	10.75	12.00	11.50
(14)	15.00	17.00	15.50	13.00	15.00	15.65	13.50	17.00	14.00
(15)	17.00	22.00	20.00	15.00	20.00	18.40	17.50	21.00	18.00
(16)	26.00	34.00	29.00	25.00	30.00	27.85	27.00	28.00	28.00
(17)	18.50	25.00	22.00	19.00	22.00	20.00	19.50	25.00	19.00
(18)	28.00	37.00	30.00	28.00	31.00	30.00	30.00	35.00	29.00
(19)	45.00	45.00	46.00	46.00	53.00	46.00	46.00	50.00	48.00
(20)	.135	.12	.14	.13	.15	.13	.13	.13	.13
(21)	3.00	3.00	2.00	4.00	4.50	4.00	4.00	4.00	2.50
(22)	2.00	1.90	2.00	1.50	1.50	2.00	2.00	2.00	2.00
(23)	4.00	7.00	5.50	6.50	6.50	5.00	7.00	5.00	6.00
(24)	2.00	5.00	3.00	3.00	3.50	3.00	3.00	4.00	1.00
(25)	8.00	10.00	8.00	11.00	15.00	10.00	15.00	12.00	10.00
(26)	10.00	16.00	20.00	20.00	18.50	13.00	20.00	20.00	15.00
(27)	.21	.22	.22	.21	.21	.24	.235	.26	.24
(28)	.22	.23	.24	.22	.22	.25	.25	.29	.25
(29)	.27	.30	.30	.27	.29	.29	.29	.36	.30
(30)	18.00	22.00	20.00	18.50	20.00	20.00	20.00	16.00	20.00
(31)	16.00	19.00	18.00	15.00	16.50	16.00	18.00	14.00	18.00
(32)	10.00	9.00	10.00	10.00	8.00	10.00	15.00	15.00	10.00
(33)	300.00	260.00	250.00	250.00	300.00	200.00	275.00	600.00	200.00
(34)	50.00	75.00	50.00	50.00	200.00	50.00	75.00	70.00	50.00
(35)	.30	.38	.25	.32	.40	.32	.38	.52	.30
(36)	500.00	100.00	150.00	250.00	300.00	100.00	150.00	500.00	100.00

California—San Bernardino County—State—Grade & Surf.

Basich Bros. and Basich Bros. Construction Co. of San Gabriel, Calif., were low at $390,593 before the California Division of Highways at Sacramento for the grading and surfacing of 8.4 mi. of Pigeon Pass Road. Portion of the highway under this contract extends from the west city limits of Redlands to 1.5 mi. south of Colton. The route will be graded and surfaced with plant-mixed surfacing on existing pavement and imported base material. Crucial item in the bidding was for nearly 8,000,000 sta. yd. of overhaul. The Basich firms bid .001 for this item, less than half the next lowest bidder. Unit bids for all items were as follows:

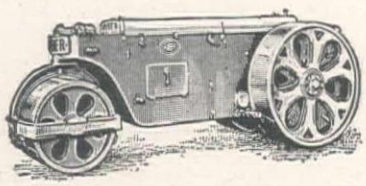
(A) Basich Bros. and Basich Bros. Construction Co. $390,593
(B) Griffith Co. 397,827
(C) Winston Bros. and Yount Construction Co. 406,881
(D) J. E. Haddock, Ltd. 414,630
(E) Matich Bros. and E. L. Yeager 419,300
(F) Oilfields Trucking Co. and Phoenix Construction Co. 424,473
(G) J. A. Payton $446,106
(H) R. A. Erwin 452,862
(I) Hensler Construction Corp. 474,826
(J) T. M. Page 481,304
(K) A. Teichert & Son, Inc. 483,126
(L) Peter Kiewit Sons' Co. 497,086
(M) George Herz and Co. 511,591

(1) 445 sta. clearing and grubbing.
(2) 115 ea. remove trees.
(3) 580 cu. yd. remove conc.
(4) 155,000 cu. yd. roadway excav.
(5) 3,000 cu. yd. struct. excav.
(6) 40 cu. yd. ditch and channel excav.
(7) 7,814,000 sta. yd. overhaul.
(8) 140,000 sq. yd. compact. original ground.
(9) 36,500 cu. yd. imp. base matl.
(10) developing water supply and furn. wat. equip.
(11) 9,100 M. gal. applying water.
(12) 445 sta. finish roadway.
(13) 86 tons liq. asph., SC-2 (prime coat).
(14) 43,000 tons plant-mixed surf.
(15) 41 tons asphaltic emulsion (paint binder).
(16) 135 tons asphaltic emulsion (seal-coat).
(17) 1,200 tons screenings (seal-coat).
(18) 650 lin. ft. raised bars.

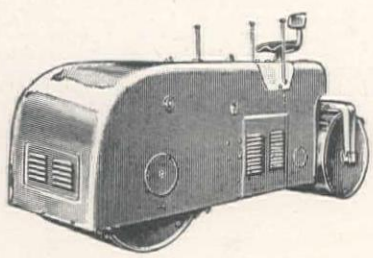
(Continued on next page)

FOR DEPENDABLE ALL-YEAR-ROUND PERFORMANCE ON MANY JOBS . . .

THE HUBER MAINTAINER IS YOUR BEST BUY



HUBER 3-WHEEL ROLLERS
4 models — 4 to 12 Tons



HUBER TANDEM ROLLERS
5 models — 3 to 14 Tons

Lick your year-round maintenance problems with the Huber Maintainer. It's a versatile and dependable machine—built to handle every phase of highway, road, street, and airport maintenance at savings to you! The Huber Maintainer with its hydraulically operated auxiliary units is readily adaptable for service as a bulldozer, patch roller, lift loader, snow plow, rotary broom or berm leveler. Ask any experienced operator about the Maintainer! He'll speak well of Huber's advanced design . . . rugged "engineered" construction . . . rigid material specification . . . and other manufacturing skills that add up to dollar savings and longer years of trouble-free service for you.

Remember, too, that Huber's complete line of road machinery—3-wheel rollers . . . tandem rollers . . . trench rollers has for years been a standard in the construction field. See a Huber before you buy any road machinery. Write today for descriptive bulletins and name of dealer nearest you.

THE HUBER MFG. COMPANY • MARION, OHIO, U. S. A.

LEE & THATRO EQUIPMENT CO.....Los Angeles 21, California
JENKINS & McCLOUD.....Reno, Nevada
CONTRACTORS' EQUIPMENT & SUPPLY CO.....Albuquerque, New Mexico
NEIL B. McGINNIS CO.....Phoenix, Arizona
FEENAUGHTY MACHINERY CO.....Portland 14, Oregon
FEENAUGHTY MACHINERY CO.....Boise, Idaho
FEENAUGHTY MACHINERY CO.....Seattle 4, Washington
FEENAUGHTY MACHINERY CO.....Spokane 2, Washington
EDWARD F. HALE CO.....Hayward, California
EDWARD F. HALE CO.....San Francisco 7, California
FOULGER EQUIPMENT CO., INC.....Salt Lake City 8, Utah
THE COLORADO BUILDERS' SUPPLY CO.....Denver 9, Colorado
THE COLORADO BUILDERS' SUPPLY CO.....Scotts Bluff, Nebraska
THE COLORADO BUILDERS' SUPPLY CO.....Casper, Wyoming

(19) 125 cu. yd. Cl. "A" P.C.C. (structures).
(20) 16,600 lb. bar reinf. steel.
(21) 1 ea. manhole frame and cover.
(22) 640 lin. ft. furn. steel piling.
(23) 40 ea. driving piles.
(24) 240 cu. yd. P.C.C. (curbs and gutters).
(25) 22 lin. ft. timber guardrail.
(26) 360 lin. ft. metal plate guardrailing.
(27) 152 ea. culv. markers and guide posts.
(28) 6 ea. clearance markers.
(29) 996 lin. ft. 24-in. R.C.P.
(30) 38 lin. ft. 30-in. R.C.P.
(31) 548 lin. ft. 36-in. R.C.P.
(32) 1,475 lin. ft. 18-in. C.M.P. (16 ga.).
(33) 14 lin. ft. 21-in. C.M.P. (14 ga.)
(34) 96 lin. ft. 24-in. C.M.P. (14 ga.)
(35) 114 lin. ft. 60-in. C.M.P. (10 ga.)
(36) 70 lin. ft. 22-in. x 13-in. C.M.P. arch (16 ga.)
(37) 72 lin. ft. 36-in. x 22-in. C.M.P. arch (14 ga.)
(38) 1 ea. spillway assembly.
(39) 32 lin. ft. 8-in. C.M.P. down drains (16 ga.)
(40) 702 lin. ft. salv. exist. conc. pipe.
(41) 42 lin. ft. relay. salvaged conc. pipe.
(42) 681 lin. ft. salv. exist. C.M.P.
(43) 546 lin. ft. relay. salvaged C.M.P.
(44) 110 lin. ft. salv. exist. stl. drainage pipe.
(45) 1,350 lin. ft. new 4-in. stl. pipe.
(46) 1,162 lin. ft. salv. exist. 4-in. stl. pipe.
(47) 300 sq. ft. placing plant-mixed surf. spillways.

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
(1)	13.50	11.00	7.00	10.00	16.00	15.00	27.00	55.00	60.00	25.00	18.00	15.25
(2)	32.00	35.00	15.00	40.00	34.00	65.00	36.00	50.00	90.00	100.00	60.00	27.00
(3)	5.00	5.50	5.00	4.25	7.50	6.00	7.00	9.00	5.00	4.70	6.00	3.60
(4)	.43	.48	.43	.50	.55	.48	.34	.39	.45	.75	.50	.66
(5)	2.85	2.75	3.00	3.50	2.40	2.25	2.00	3.00	2.50	3.60	3.00	3.40
(6)	4.00	2.00	2.00	3.50	3.00	2.00	2.00	2.50	1.25	3.60	3.00	9.00
(7)	.001	.0025	.003	.0025	.0025	.005	.006	.0018	.003	.004	.005	.003
(8)	.045	.03	.03	.025	.04	.06	.04	.03	.04	.06	.04	.066
(9)	.80	.85	1.00	.86	.98	.95	.85	1.05	1.00	1.00	1.10	1.15
(10)	$8,500	$6,000	$2,000	$7,000	$6,000	$6,400	$4,500	$20,000	$20,000	$7,500	$3,000	$3,500
(11)	1.00	1.65	2.00	1.95	2.00	1.50	1.50	1.75	1.20	1.95	1.00	1.90
(12)	12.00	6.00	9.00	7.50	10.00	4.00	10.00	10.00	10.00	11.00	10.00	8.00
(13)	30.00	32.00	26.00	30.00	27.00	26.00	30.00	32.00	22.00	35.30	30.00	37.25
(14)	3.95	3.69	4.00	3.85	3.75	3.50	4.47	4.05	4.25	3.45	4.80	4.60
(15)	45.00	70.00	30.00	40.00	40.00	35.00	49.50	42.00	40.00	52.00	40.00	40.00
(16)	35.00	32.50	30.00	35.00	32.00	30.00	38.50	37.00	40.00	36.50	40.00	31.50
(17)	5.00	3.80	4.50	5.25	5.00	5.00	5.00	5.00	4.50	5.60	5.00	5.70
(18)	1.00	1.25	1.00	1.00	1.00	1.50	1.65	1.25	1.25	1.60	1.50	1.00
(19)	55.50	75.00	55.00	66.00	54.00	50.00	54.00	85.00	65.00	55.00	45.00	72.00
(20)	.13	.13	.12	.15	.12	.15	.12	.16	.12	.15	.10	.13
(21)	45.00	60.00	70.00	60.00	100.00	150.00	35.00	70.00	100.00	62.00	200.00	60.00
(22)	3.00	2.70	2.50	2.75	3.25	5.00	3.50	2.90	2.90	3.25	4.00	2.50
(23)	50.00	30.00	30.00	40.00	27.00	100.00	25.00	48.00	80.00	60.00	50.00	33.00
(24)	34.00	37.00	35.00	38.00	34.00	46.00	40.00	52.00	30.00	42.00	40.00	52.00
(25)	5.00	6.00	4.00	5.50	5.00	7.00	4.50	2.50	4.00	5.85	5.00	5.25
(26)	5.00	4.25	3.50	4.35	3.50	6.00	4.00	3.50	4.00	7.15	4.00	3.40
(27)	5.00	6.00	5.00	4.00	5.00	10.00	6.00	6.00	6.00	6.90	6.00	6.10
(28)	10.00	8.00	6.00	6.00	10.00	15.00	9.00	10.00	6.00	14.00	10.00	7.35
(29)	6.00	5.30	6.30	5.30	5.00	5.50	6.00	5.10	7.00	6.00	5.00	8.00
(30)	7.00	7.00	8.50	7.50	8.00	9.00	8.00	6.60	8.50	8.20	7.00	9.20
(31)	8.90	9.00	10.50	9.00	8.00	9.00	9.00	10.75	10.50	10.90	9.00	9.90
(32)	3.80	3.00	3.00	3.00	3.25	3.00	3.00	2.80	4.50	3.25	3.00	3.40
(33)	4.50	4.00	4.00	4.00	4.50	5.00	4.00	4.00	5.20	4.80	3.50	4.65
(34)	4.75	4.40	4.50	4.50	5.00	6.00	4.50	4.40	6.00	4.95	4.00	4.80
(35)	18.50	18.70	17.00	18.00	20.00	20.00	20.00	20.00	20.00	23.00	20.00	21.00
(36)	3.50	3.30	3.50	3.75	3.75	4.00	4.00	3.75	5.00	3.75	3.50	4.00
(37)	6.75	6.00	6.50	6.50	7.00	10.00	5.00	7.80	9.00	7.35	6.00	7.00
(38)	30.00	25.00	20.00	25.00	25.00	30.00	35.00	31.50	30.00	42.00	30.00	31.00
(39)	2.00	1.90	1.50	1.70	2.50	2.00	2.00	2.00	2.50	2.50	2.00	2.00
(40)	1.50	1.25	1.70	2.40	1.00	2.00	1.50	2.50	2.75	2.90	1.00	2.50
(41)	2.00	1.50	1.70	3.60	2.00	3.00	1.50	2.50	2.75	2.00	2.00	4.25
(42)	1.50	1.00	1.30	1.25	1.00	1.00	1.50	1.60	1.75	1.20	1.00	1.10
(43)	2.00	1.00	1.00	1.25	1.50	2.00	1.25	1.50	2.50	1.20	1.00	1.00
(44)	1.50	1.80	1.30	1.00	1.00	1.00	1.50	1.25	1.75	1.20	1.00	1.10
(45)	1.85	2.30	2.50	2.00	1.25	1.40	3.00	3.00	3.00	2.60	5.00	2.20
(46)	.50	.90	.80	.75	.75	.70	1.00	1.00	1.00	.50	2.00	.80
(47)	.40	.40	.30	.30	.50	.25	1.50	1.25	.30	.40	1.00	.40

Dam . . .

Washington—Lincoln County—Bur. of Reclam.—Spillway Repairs

Pacific Bridge Co., 333 Kearny St., San Francisco, Calif., submitted the low bid of $1,804,840 for repairs of the spillway face and spillway bucket at Grand Coulee Dam in Washington and improvement of the Columbia River channel below the dam. Most of the work must be performed during the low water season, since the principal item of equipment involved is a barge-equipped caisson which will be used in repairing the spillway bucket. The caisson rests in a circular drydock below the dam and will be moved out into the Columbia and lowered over the bucket to permit men to work in a normal atmosphere below the surface of the river. Other work in the contract, which covers 530 calendar days, will involve a separate caisson for repairing the spillway face, removal of two abandoned bridge piers about a mile downstream from the dam, dredging the river channel, and preparing the floating caisson for the high-water season. Unit bids submitted by the two contractors are as follows:

(1) Pacific Bridge Co., San Francisco.....$1,804,840
(2) Morrison-Knudsen Co., Inc., Peter Kiewit Sons' Co., and the Prepakt Concrete Co., Seattle, Wash. 2,747,000

	(1)	(2)
150 hrs. operation of cableway for the Government	50.00	60.00
1,000 ton dredging in drydock approach channel	3.70	10.00
150,000 ton dredging in main river channel	2.45	3.40
2 operations, sweeping approach channel	$2,400	$2,500
Lump sum, removal of bridge piers	$21,540	$32,755
120 hr. furnishing diving service for Cofferdam removal	85.00	130.00
50 diver hr. furnishing additional diving service	85.00	90.00
50 hr. furnishing diving service other than for cofferdam removal	85.00	100.00
Lump sum, repair of puller houses	.....	$5,500
Lump sum, completion of puller-machine installations	$9,100	$15,000
Lump sum, testing puller machine	$12,500	$32,500
2 operations, preparations of dry-dock for submergence	$1,350	$3,500
2 operations, preparation of dry-dock for operating season	$3,100	$20,000
4 operations, removal of miter-gate locking devices	750.00	$1,500
4 operations, re-installation of miter-gate operating mechanisms	$1,450	$1,500
Lump sum, overturning of front-arch segment of dry-dock	$14,000	$20,000
500 cu. yd. riprap at dry-dock	7.00	18.00
Lump sum, installation of fender barges for the first operating season	$21,500	$20,000
Lump sum, re-installation of fender barges	$2,700	$3,000
2 operations, removal of fender barges	$2,700	$2,500
2 operations, re-installation of caisson equipment and machinery	$11,400	$30,000
1,400 lb. furn. and installing pipe and fittings for overflow pipe for trim tanks	.70	.80
Lump sum, testing floating caisson in dry-dock	$9,500	$15,000
Lump sum, constructing concrete anchor	$2,500	$3,000

(Continued on next page)

FOR HEAVY MIXING, RETREAD AND STABILIZATION JOBS –

Under the toughest of operating conditions

THE NEW Heavy Duty MOTO-PAVER

The Moto-Paver is a very flexible as well as a mobile unit. The illustration shows it being used as a stationary mixing plant.

Although developed primarily to meet the rugged conditions of hilly and mountainous terrain, the heavy duty Moto-Paver is proving equally efficient under widely differing conditions in other sections of the country.

Wherever you have a heavy bituminous mixing, retread or stabilization job, it will pay you to investigate this new and more powerful Moto-Paver. It does the *complete mixing* and *laying job—in one continuous operation.* See your local distributor listed below, or write direct for specifications and complete information on either the heavy duty or standard Moto-Paver.

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Distributed by

SPEARS-WELLS MACHINERY COMPANY

OAKLAND, CALIFORNIA

Welder Maintenance

. . . Continued from page 86

thoroughly with compressed air by attaching a long pipe to the compressed air hose and reaching with the pipe inside the armature coils. Commutator solder and armature banding should be closely inspected to check for evidence of overheating.

Commutators normally need little care. They will build up a surface of brown copper oxide which is highly conductive, hard and smooth. This surface film helps to protect the commutator. Do not remove it simply to keep commutator a bright copper color. The brown copper oxide film prevents the formation of a black abrasive film that has a high resistance and causes excessive wear. As long as the commutator remains smooth the only care needed will be an occasional wiping to remove grease and other discoloration from fumes.

If, however, brushes are chattering from uneven bars, or high mica segments, or if grooves become worn in the commutator or it is burned or pitted, the commutator should be dressed down with a commutator stone or removed and turned in a lathe. It is good practice for the commutator to run within a radial tolerance of 0.003 in.

The mica separators in the commutator should be undercut to a depth of 1/32 or 1/16 in. Mica exposed at the commutator surface causes brush wear and poor commutation. If mica is even with the surface, undercut it with a hack saw blade or a commercial undercutter.

When the commutator is in good condition and set properly, there is very little visible sparking and the brush surface is shiny and smooth with no evidence of scratching.

Failure in brushes

The wrong grade of carbon brushes is frequently the source of commutator trouble. Brushes that contain too much abrasive material or have too high a copper content usually scratch the commutator and prevent building up the desired oxide film. A brush that is too soft, on the other hand, may smudge the surface and prevent the film forming. In general, brushes that have a low voltage drop will give poor commutation. Conversely, a brush with a high voltage drop commutates better, but may cause overheating of the commutator surface.

In all cases, use the grade of brush recommended by the manufacturer of the welder.

Brushes should be replaced when the pigtails are within ⅛-in. of the commutator or when the limit of travel of the brush spring is reached. New brushes must be sanded in to conform

(Continued on page 130)

7	ea. furnishing maneuvering line floats	$1,750	$1,850					
16	hr. testing floating caisson in spillway bucket	70.00	150.00					
4	operations, moving floating caisson betw. dry-dock and spillway bucket	$5,900	$5,800					
4	operations, operating floating caisson	$8,000	$71,000					
2	operations, storing caisson equipment	$3,900	$15,000					
2	operations, moving face caisson between mooring and spillway face	$2,000	$1,300					
4	operations, operating face caisson	$9,000	$10,500					
Lump sum,	completing constr. and pre-assembly of steel frame for seat constr.	$62,200	$85,000					
2	operations, assembly of steel frame for seat construction	$34,650	$18,000					
3	operations, placing steel frame for seat construction	$90,000	$141,000					
2	operations, placing end frame for seat construction	$30,000	$51,000					
Lump sum,	assembly of 5 x 12 pontoon barge	$19,000	$10,000					
20,000	lin. ft. drilling holes for anchor bars and grouting bars in place	11.00	6.50					
12	ea. installing sets of 16 anchor rods and sleeves	$1,750	$3,000					
125	cu. yd. excavation of concrete on spillway face above tailwater	190.00	350.00					
50	cu. yd. excavation of concrete using face caisson	200.00	305.00					
400	cu. yd. excavation of concrete using floating caisson	190.00	300.00					
3,000	sq. ft. refinishing concrete surfaces	2.00	4.50					
10,000	lb. furnishing and installing steel screeds	.90	1.30					
30,000	lb. placing reinforcement bars	.15	.30					
5	cu. yd. concrete in recesses	310.00	775.00					
750	cu. yd. concrete in spillway bucket	110.00	260.00					
125	cu. yd. concrete in spillway face above tailwater	210.00	280.00					
50	cu. yd. concrete in spillway face using face caisson	210 00	280.00					
200	cu. yd. prepakt concrete	130.00	260.00					
750	cu. yd. prepakt concrete in right training wall	100.00	170.00					
Lump sum,	repair of floating caisson electric freight elevator	$5,000	$9,000					
300	ton furnishing pig iron for ballast	170.00	110.00					

Bridge and Grade Separation . . .

California—Los Angeles City—State—Overcrossing

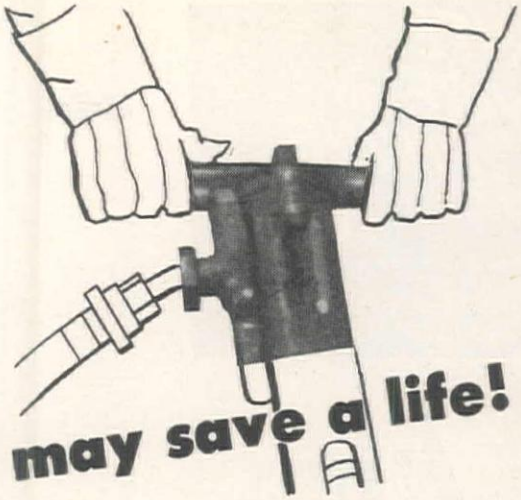
Oberg Bros. Construction Co., Inglewood, Calif., submitted the low bid of $664,204 to the California Division of Highways at Sacramento for construction of a structural steel girder overcrossing on Hollywood Parkway in Los Angeles at Western Avenue. Unit bids were submitted by the following:

(A) Oberg Bros. Construction Co. $664,204
(B) W. J. Distelie and R. J. Daum Construction Co. 674,201
(C) J. E. Haddock, Ltd. 678,250
(D) Bates & Rogers Construction Corp. 718,265
(E) Peter Kiewit Sons' Co. $773,885
(F) Spencer Webb Co. and George W. Peterson 794,372
(G) Charles MacClosky Co. 798,442
(H) Guy F. Atkinson Co. 832,642

(1) 1,700 cu. yd. removing concrete
(2) Lump sum, clearing and grubbing
(3) 47,500 cu. yd. roadway excavation
(4) 1,800 cu. yd. struct. excav. (over cr.)
(5) 6,650 cu. yd. struct. backfill (overcrossing)
(6) 8,300 cu. yd. structure excavation
(7) 2,000 cu. yd. ditch and channel excav.
(8) 80 cu. yd. pea gravel backfill (storm dr.)
(9) 3,300 tons imported base mat'l
(10) 3,000 sq. yd. prepar. Class "C" subgrade
(11) Lump sum, dev. water supply & furn. water equipt.
(12) 100 M. gals. applying water
(13) Lump sum, finishing roadway
(14) 350 tons plant mixing surface
(15) 620 tons asph. conc. pav'mt
(16) 580 cu. yd. P.C.C. (pav't & base)
(17) 3,720 cu. yd. Class "A" P.C.C. (structs.)
(18) 4 cu. yd. Class "C" P.C.C. (pipe reinf.)
(19) 280 lin. ft. rubber waterstops
(20) 80 cu. yd. pneumatically applied mortar
(21) 1,122,000 lb. structural steel
(22) 10,100 lb. misc. iron and steel
(23) 724 lin. ft. structure railing
(24) 304 lin. ft. stair railing
(25) 252 lin. ft. handrail
(26) 548 lin. ft. elliptical welded steel pipe
(27) 465 sq. ft. sheet packing
(28) 1,130 lin. ft. stairway safety tread
(29) 200 cu. yd. Class "A" P.C.C. (curbs, gutters, sidewalks and local depressions)
(30) 115 lin. ft. laminated gd. railing
(31) 150 lin. ft. portable timber gd. railing
(32) 132 lin. ft. 4-in. cast iron pipe
(33) 10 lin. ft. 5-in. cast iron pipe
(34) 21 lin. ft. 6-in. cast iron pipe
(35) 40 lin. ft. 15-in. R.C.P. (standard str.)
(36) 130 lin. ft. 18-in. R.C.P. (std. str.)
(37) 96 lin. ft. 24-in. R.C.P. (1250-D)
(38) 60 lin. ft. 30-in. R.C.P. (1250-D)
(39) 110 lin. ft. 42-in. R.C.P. (950-D)
(40) 150 lin. ft. 48-in. R.C.P. (950-D)
(41) 30 lin. ft. 57-in. R.C.P. (900-D)
(42) 50 lin. ft. 63-in. R.C.P. (900-D)
(43) 96 lin. ft. 66-in. R.C.P. (1050-D)
(44) 230 lin. ft. 75-in. R.C.P. (1000-D)
(45) 6 lin. ft. pipe shaft manholes (storm-drain)
(46) 460 lin. ft. 12-in. C.M.P. (16 ga.)
(47) 254 lin. ft. 6-in. perf. metal pipe
(48) 10 cu. yd. filter matl.
(49) 90 lin. ft. 6-in. vitr. clay pipe (std. str.)
(50) 6 lin. ft. 6-in. vitr. clay pipe (extra str.)
(51) 8 lin. ft. 8-in. vitr. clay pipe (std. str.)
(52) 740 lin. ft. 10-in. vitr. clay pipe (extra str.)
(53) 3 ea. sewer manholes "B"
(54) 1 ea. sewer manholes "Q"
(55) 2 ea. sewer junction chambers "F"
(56) 1 ea. remodeling exist. sewer manholes
(57) 3 ea. adjusting sewer manholes to grade
(58) 1,020 lin. ft. salv. exist. pipe culv.
(59) 220 lin. ft. relay. salvgd. 60-in. reinf. conc. pipe
(60) 475,000 lb. bar reinf. steel
(61) 1,400 sq. yd. mesh reinforcement
(62) 1,200 lin. ft. chain link fence
(63) 1 ea. drive gates
(64) lump sum, elec. equip.
(65) lump sum, engineer's office

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
(1)	4.00	5.00	4.80	4.85	5.70	5.00	4.00	5.00
(2)	$1,000	500.00	$1,000	306.00	500.00	$2,000	$3,200	$2,000
(3)	1.12	.90	.80	.97	1.05	1.20	1.05	2.00
(4)	3.50	2.00	1.80	1.70	2.50	3.00	1.75	3.00
(5)	2.00	2.50	2.30	2.05	3.25	2.50	2.50	3.00
(6)	2.00	3.00	3.00	2.80	2.90	3.00	5.00	4.00
(7)	2.10	1.75	2.00	1.53	1.05	2.50	1.50	3.00
(8)	5.00	3.75	6.75	4.70	4.50	3.00	6.00	10.00
(9)	2.60	2.50	2.00	2.40	2.70	2.50	3.40	2.40
(10)	.25	.20	.24	.40	.30	.25	.27	.25
(11)	500.00	325.00	$2.000	357.00	$1,000	$1,000	$3,400	$1,000
(12)	3.00	1.75	2.50	2.80	3.00	3.00	2.00	3.00
(13)	300.00	800.00	500.00	$1,530	$1,300	$1,000	$1,000	$3,000
(14)	7.00	6.25	6.00	6.55	8.50	6.50	6.25	6.00
(15)	7.00	6.25	5.75	7.10	9.00	8.00	6.75	6.00
(16)	20.00	20.00	18.00	20.20	21.00	20.00	17.00	20.00
(17)	53.00	53.00	52.00	66.40	53.50	60.00	72.50	70.00
(18)	26.00	40.00	25.00	26.45	25.00	24.00	50.00	30.00
(19)	3.00	3.00	2.40	2.25	1.65	2.50	3.50	2.50
(20)	50.00	35.00	45.00	32.00	36.50	36.00	29.00	40.00
(21)	.14	.15	.158	.1476	.184	.20	.16	.16
(22)	.35	.35	.35	.46	.40	.40	.37	.40
(23)	13.50	12.50	14.00	12.75	16.00	15.00	14.00	13.00
(24)	16.00	15.50	17.00	15.30	20.00	18.00	17.00	16.00
(25)	8.00	7.75	8.50	7.65	9.00	9.00	9.00	8.00
(26)	100.00	98.50	100.00	104.35	124.00	110.00	102.50	100.00
(27)	4.00	1.60	1.75	2.00	7.50	2.50	3.00	2.00
(28)	2.50	2.50	2.60	3.55	3.20	3.00	3.00	3.50
(29)	35.00	37.00	36.00	33.00	44.50	40.00	40.00	40.00

(Continued on next page)



This "Rule of Thumb" may save a life!

A quick flip of the operator's thumb . . . and the Throttle Lever of the Gardner-Denver B87 Paving Breaker is "on safety"—securely latched to prevent accidental opening of the throttle. This Safety Latch—an exclusive Gardner-Denver feature—enables your operator to move the breaker *safely* without shutting off the air in the line. Accidents are prevented before they happen. That's one reason this paving breaker enjoys such popularity. Others are:

EASY OPERATION—*shorter from top of gad to holding handles. Easier to operate with standard length chisels and gads.*

BUILT-IN LUBRICATOR—*holds enough oil for five hours of normal operation.*

RENEWABLE CHUCK LINER—*when chuck wears to a loose fit, it is unnecessary to replace entire chuck end.*

SPECIAL FRONT HEAD ATTACHMENT—*converts the Paving Breaker into a highly efficient Sheeting Driver.*

ALL-WEATHER PERFORMANCE—*no tendency to "freeze" on cold, damp days.*

LESS OPERATOR FATIGUE—*Air Inlet at side of cylinder and not through backhead assures cool handles. It rides the steel so steadily, every hammer blow counts.*

WESTERN BRANCH OFFICES:

Butte, Montana; Denver, Colorado;
Los Angeles, California; Salt Lake City, Utah;
San Francisco, California;
Seattle, Washington; Wallace, Idaho;
El Paso, Texas

For complete information, write
Gardner-Denver Company
Quincy, Illinois

GARDNER-DENVER
SINCE 1859

(30)	4.00	3.50	5.00	3.80	4.75	3.00	3.60	4.00
(31)	3.00	3.75	6.00	4.65	4.10	3.00	4.50	4.00
(32)	2.50	2.70	2.30	3.00	4.00	3.00	4.00	4.00
(33)	3.00	5.00	6.00	3.85	7.00	3.50	6.00	5.00
(34)	4.00	5.25	7.20	4.00	7.00	4.00	7.00	6.00
(35)	4.00	3.00	3.60	5.90	5.00	4.00	4.00	4.00
(36)	4.40	3.75	4.10	7.55	6.00	5.00	5.00	5.00
(37)	6.00	5.00	5.50	9.35	8.00	6.00	6.00	6.00
(38)	8.00	7.00	7.25	10.70	10.00	7.00	8.00	8.00
(39)	12.00	10.50	12.30	14.00	15.00	12.00	12.00	12.00
(40)	14.00	13.00	14.60	16.65	17.00	15.00	17.00	15.00
(41)	18.00	17.00	19.25	19.70	22.50	18.00	22.00	20.00
(42)	19.00	18.25	20.00	21.75	24.00	20.00	24.00	21.00
(43)	21.00	19.50	22.00	23.00	26.50	22.00	25.00	22.00
(44)	25.00	23.50	25.25	26.40	31.50	25.00	29.00	25.00
(45)	17.00	11.00	20.00	18.50	20.00	12.00	70.00	30.00
(46)	2.50	2.70	2.20	2.55	4.00	3.00	3.00	2.50
(47)	2.50	2.00	2.10	1.30	3.00	2.50	1.50	2.00
(48)	5.00	5.00	6.50	5.85	8.00	6.00	10.00	12.00
(49)	2.00	2.00	3.50	1.30	4.00	2.00	2.00	2.00
(50)	4.00	2.00	3.50	1.35	4.00	2.50	3.00	3.00
(51)	4.00	2.50	3.75	1.55	5.00	2.70	4.00	4.00
(52)	3.00	3.25	2.10	1.85	4.00	3.00	4.00	4.00
(53)	350.00	410.00	325.00	280.00	450.00	300.00	400.00	400.00
(54)	350.00	400.00	360.00	280.00	400.00	300.00	400.00	400.00
(55)	350.00	410.00	325.00	280.00	450.00	330.00	300.00	400.00
(56)	100.00	100.00	100.00	55.00	85.00	120.00	100.00	55.00
(57)	50.00	125.00	30.00	40.00	65.00	35.00	100.00	40.00
(58)	4.00	5.50	6.00	2.85	7.50	6.00	3.00	3.00
(59)	3.00	4.00	7.00	9.55	5.75	3.60	7.00	4.00
(60)	.10	.105	.106	.0935	.12	.115	.115	.12
(61)	.70	.70	.85	.505	.80	.60	.70	.80
(62)	2.10	2.00	1.95	1.95	2.00	2.00	2.00	2.00
(63)	125.00	85.00	85.00	113.00	100.00	90.00	100.00	100.00
(64)	$7,500	$8,765	$8,500	$6,900	$8,850	$8,400	$7,000	$7,850
(65)	$1,800	$1,500	$2,500	$2,560	$3,535	$1,800	$1,700	$2,600

Oregon—Multnomah—State—Approaches

Kuckenberg Construction Co., Portland, was awarded a $1,277,597 contract by the Oregon State Highway Commission for the construction of ramp approaches and roadway grading and paving at the west end of the Front Avenue steel bridge on the Pacific West Highway in Portland. Bids were received on two schedules; one using treated timber piles and the other using composite piles. Kuckenberg's low bid was for the use of composite piles. The project involves construction of approx. 0.31 mi. of highway roadbed with miscellaneous reinforced concrete viaduct ramps as approach ramps to the upper deck of the west end of the bridge. Total amount of composite piling will be 79,240 lin. ft. Unit bids were submitted by the following:

	Using Treated Piles	Using Composite Piles
(1) Kuckenberg Constr. Co.	$1,301,080.50	$1,277,597.30
(2) L. H. Hoffman	1,379,339.09	1,357,783.04
(3) Birkemeier & Saremal	1,402,189.00	1,365,264.45
(4) C. J. Montag & Sons	—	1,442,539.00
(5) J. G. Watts Constr. Co. and S. Birch & Sons Constr. Co.	—	1,497,402.42
(6) Guy F. Atkinson	—	1,505,357.00
(7) General Construction Co.	1,530,825.50	—

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Lump sum, clearing and grubbing	$3,500	$12,445	$23,000	$16,140	$9,842	$8,000	$7,500
10,600 sq. yd. removal of pavement	.75	.73	1.00	.65	1.14	1.10	.90
4,000 sq. yd. removal of walks & driveways	.20	.73	.70	.50	.63	.65	.50
2,000 lin. ft. removal of curbs	.20	.73	.30	.25	.38	.50	.30
14 only removal of inlets	10.00	24.20	20.00	15.00	18.93	20.00	15.00
1 only spec. manhole removal and cover construction	125.00	302.50	250.00	250.00	316.00	350.00	250.00
1 only removal of manholes	50.00	151.25	75.00	75.00	158.00	150.00	125.00
940 cu. yd. removal of miscl. conc. and masonry structs.	5.00	12.10	6.00	6.00	6.30	6.00	5.00
1,300 lin. ft. removal of rails in car track	1.00	1.21	1.00	1.50	1.58	1.50	1.25
1,300 lin. ft. removal of ties in car track	1.00	.61	.90	1.50	1.58	1.25	1.25
2,700 cu. yd. struct. excav., unclass.	5.50	7.87	7.00	7.00	8.22	8.00	6.50
36,700 cu. yd. general excav., unclass.	1.20	1.17	1.60	2.00	1.71	1.75	1.35
Lump sum, finishing roadbed and other areas	$3,250	$2,235	$4,000	$6,000	$8,218	$6,800	$6,500
7,000 cu. yd. furn. and placing topsoil	2.50	3.03	3.00	3.00	3.47	3.00	2.75
30 lin. ft. 4-in. conc. drain pipe	1.00	1.09	.40	.50	1.00	1.30	.90
1,800 lin. ft. 8-in. perf. conc. drain pipe	1.25	1.45	1.40	1.00	1.52	1.40	1.20
270 cu. yd. rk. or grav. backfill in trenches	3.00	4.84	5.00	4.50	5.10	4.80	4.00
380 cu. yd. rk. or grav. backfill in subdrns.	3.00	4.84	6.00	5.50	5.05	4.50	4.00
4,500 lin. ft. 8-in. sewer pipe	.90	1.57	1.25	1.50	1.64	1.50	1.30
380 lin. ft. 10-in. sewer pipe	1.50	1.69	1.60	2.00	1.75	1.70	1.40
460 lin. ft. 12-in. sewer pipe	1.75	2.00	2.10	2.50	2.10	2.00	1.65
200 lin. ft. 15-in. sewer pipe	2.00	2.42	2.75	3.00	2.53	2.40	2.00
140 lin. ft. 24-in. sewer pipe	4.50	4.84	3.25	5.50	5.05	4.70	4.00
90 lin. ft. 24-in. reinforced sewer pipe	6.00	5.45	3.50	6.50	5.70	5.50	4.50
300 lin. ft. extra for installing pipe under pavement	5.00	3.63	5.00	3.00	3.79	4.00	3.00
5 cu. yd. Class "C" concrete	50.00	60.50	40.00	40.00	63.20	70.00	50.00
6 only adjustment of manholes	80.00	90.75	150.00	50.00	95.00	100.00	75.00
2 only adjustment of inlets	50.00	42.35	30.00	50.00	44.50	50.00	35.00
4 only adjusting bollards	100.00	121.00	125.00	25.00	126.50	100.00	100.00
1 only reconstructing manholes	150.00	193.60	150.00	200.00	202.00	175.00	160.00
13 only type "A" manholes 5 - 10 ft. deep	175.00	302.50	250.00	350.00	316.00	300.00	250.00
5 only type "A" manholes 10 - 20 ft. deep	300.00	423.50	500.00	450.00	442.60	425.00	350.00
1 only type "B" manholes	200.00	242.00	150.00	500.00	253.00	250.00	200.00
1 only special manhole with gate	750.00	907.50	350.00	950.00	948.00	800.00	750.00
2 only wood manhole boxes and covers	50.00	121.00	150.00	35.00	126.50	125.00	100.00
2 only concrete catch basins	60.00	90.75	75.00	75.00	95.00	100.00	75.00
42 only concrete inlets	60.00	78.65	75.00	75.00	82.00	80.00	65.00
12 only concrete drain inlets	75.00	78.65	50.00	75.00	82.00	80.00	65.00
70 lin. ft. 1-in. copper water pipe	2.25	3.03	1.50	1.00	3.20	3.00	2.50
50 lin. ft. 3-in. copper water pipe	3.75	7.26	3.00	3.00	7.58	8.00	6.00
470 lin. ft. 3½-in. copper water pipe	4.25	9.08	4.00	4.50	9.50	9.00	7.50
250 cu. yd. concrete curbs	35.00	48.57	50.00	55.00	60.00	60.00	48.00
30 cu. yd. concrete gutters	35.00	48.57	50.00	55.00	60.00	65.00	48.00
70 sq. yd. concrete driveways	3.25	4.23	4.00	4.50	4.50	4.50	3.50
4,800 sq. yd. concrete walks	2.75	2.83	3.00	3.25	3.48	3.50	2.75
200 cu. yd. concrete islands	40.00	46.04	50.00	55.00	63.20	62.00	50.00
12 concrete guard posts	15.00	12.10	10.00	11.00	12.75	12.00	10.00
90 lin. ft. 3-ft. metal guard fence	3.00	1,88	3.00	2.50	2.50	2.50	2.00
Lump sum, constr. recesses for traffic control markers	500.00	423.50	$1,500	300.00	443.00	375.00	350.00

(Continued on next page)

Built to take a beating

Economical operation at full or partial load.

CP Sinker Drill at Benson Mines, Star Lake, N.Y. Photograph through courtesy of Jones & Laughlin Steel Corp.

No priming is necessary with CP Sump Pump.

CP compressors, drills, demolition tools, vibrators, tampers, clay diggers, sheeting drivers, impact wrenches, etc., stand up on tough jobs because of their simplicity of design and sturdy construction. Write for a copy of SP-2083.

15% to 35% fuel savings is an outstanding feature of CP Portable Compressors, thanks to the CP gradual speed regulator—that adjusts engine speed exactly to air demands—and other CP features. Gasoline-driven portables range from 60 to 315 c.f.m. actual capacity; Diesel-driven, from 105 to 500 c.f.m. Illustrated is the Diesel-driven CP-500.

You'll find just the right sinker in the complete CP line of Sinker Drills, ranging from the light CP-14 (14-pound) to the heavy-duty CP-60N (119-pound).

To remove water from manholes, ditches, tanks, pits, CP Pneumatic Sump Pumps are the answer. Just turn on the air, lower the sturdy pump into the water, and pumping starts immediately.

CHICAGO PNEUMATIC TOOL COMPANY
General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
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Welder Maintenance

. . . Continued from page 126

to the shape of the commutator. This may be done by either stoning the commutator with a stone or by placing a piece of fine sand paper (never emery cloth) under the brush with the grit side facing the brush and moving the paper back and forth while holding the brush firmly against it.

In replacing brushes see that the brush springs seat squarely against the brush and that pigtails are fastened securely. Be sure that the brush contact surface of the brush holder is clean and free of pit marks. Brushes must be able to move freely in the holder. If brush holders have been removed from the rocker, in resetting them be sure they are square in the rocker and that the brushes are parallel to the mica segments in the commutator. The holder should be 1/16 to ⅛ in. above the commutator surface.

Inspect brushes regularly for: (1) Uneven wear caused by uneven spring pressure; (2) Chips from excessive clearance in the holder; (3) Excessive wear from high spring pressure, high segments, uneven bars or abrasive dust.

Starter and controls

All starter contact fingers should make contact simultaneously. Keep the fingers free from deep pits or other defects that will interfere with a smooth sliding contact. Copper fingers may be filed lightly. Deeply pitted fingers should be replaced.

All connections in the control should be maintained and kept tight. All cable connections on the output panel should be tight. Loose connections are not only a source of loss of current but can start to arc and be the source of considerable damage.

Final check

After all adjustments have been made the unit should be checked for operation. An arc should be struck with the controls set at minimum and the current output checked with a tong meter. The welder should also be set at maximum and a reading taken. An electrode should be run off without interrupting the arc to check for arc stability and other welding characteristics.

If a meter is not available, the output of the welder may be checked by measuring the number of inches of electrode melted off in one minute of welding. This melt-off rate as measured can be compared with charts available in procedure handbooks and from electrode manufacturers. The check will only be approximate but it is satisfactory for a preventive maintenance check.

MAINTENANCE ARTICLES ARE NOW A REGULAR MONTHLY FEATURE IN W. C. N.

4,800 cu. yd. 3-in. - 0-in. material in base	2.75	3.33	3.00	3.00	3.10	2.60	2.4
330 cu. yd. 1¼-in. - 0-in. material in base	2.75	5.45	3.50	3.25	4.55	4.00	3.6
550 cu. yd. ½-in. - 0-in. matl. in cush'n crse.	3.00	4.84	3.80	3.75	5.05	4.50	4.0
110 M. gal. sprinkling	3.00	3.63	3.00	2.00	3.15	6.00	2.5
19,500 sq. yd. Portland cem. conc. pavement	3.60	3.98	3.60	3.60	5.00	4.60	3.9
40 lin. ft. ¾-in. x 4-in. expansion joints	.75	.13	.15	.20	.15	.15	.1
1,200 lin. ft. ¾-in. x 8-in. expansion joints	.25	.29	.25	.40	.32	.30	.2
290 lin. ft. ¾-in. x 10-in. expansion joints	.30	.35	.30	.50	.38	.40	.3
2,800 lin. ft. ½-in. x 4-in. expansion joints	.15	.11	.12	.20	.13	.15	.1
3,000 lin. ft. ½-in. x 8-in. expansion joints	.25	.23	.15	.35	.25	.25	.2
120 lin. ft. ½-in. x 10-in. expansion joints	.30	.29	.20	.40	.32	.30	.2
10,700 lin. ft. contraction joints	.15	.04	.10	.10	.04	.05	.0
32 ¾-in. x 10-in. dowel pins	.50	.42	.35	.25	.45	.50	.3
700 ¾-in. x 18-in. dowel bars	.60	.48	.40	.50	.50	.55	.4
44,000 lb. tie bars and reinforcement	.12	.15	.11	.14	.15	.14	.1
1,400 ton Class "B" asphaltic concrete	8.50	9.08	9.12	8.50	10.10	8.50	8.0
10 raised traffic markers	5.00	12.10	7.00	5.50	12.60	12.00	10.0
6 acres fertilizing and seeding	250.00	$1,930	400.00	200.00	379.50	350.00	300.0
150 sq. yd. concrete slope pavement	5.00	4.24	4.00	4.00	4.45	4.00	3.5
4,540 cu. yd. excav. for structs.	10.00	4.23	10.00	8.00	8.40	9.00	8.5
450 cu. yd. structural excav. below eleva. shown	12.00	12.10	10.00	9.00	9.75	11.00	5.0
8,280 cu. yd. Class "A" concrete	60.00	62.62	64.00	75.00	65.15	80.00	87.0
1,292,000 lb. metal reinforcing	.12	.119	.12	.1175	.125	.115	.11
252,000 lb. structural steel	.18	.23	.20	.19	.195	.18	.1625
3,700 lb. copper and bronze	.90	1.55	3.00	1.50	2.17	1.60	1.5
6,400 lin. ft. metal handrail	9.50	12.40	10.00	9.50	11.38	10.00	10.0
230 sq. yd. membrane waterproofing	5.00	4.11	3.00	10.00	6.00	5.00	5.0
Lump sum, pump installation	$15,000	$14,106	$6,900	$8,500	$6,320	$10,000	$6,0
Lump sum, electrical work	$25,000	$18,755	$19,000	$23,500	$30,659	$14,000	$14,0
Lump sum, remodeling steel bridge	$40,000	$22,854	$20,000	$15,000	$62,317	$17,500	$70,0
79,240 lin. ft. furn. treated piling	1.35	1.45	1.37	.....	.....	.....	1.2
1,150 drive treated piles	30.00	31.16	45.00	.....	.....	.....	25.7
63,085 lin. ft. furn. untreated piling	.49	.53	.55	.50	.56	.60	.....
16,155 lin. ft. furn. cast in place piling	2.53	2.78	2.50	2.60	2.86	2.80	.....
1,150 drive composite piles	40.18	44.20	42.00	43.85	52.76	42.00	.....

Miscellaneous . . .

California—Shasta County—Bur. of Recl.—Railroad Reloc.

R. A. Heintz Construction Co., Portland, Calif., was low bidder before the Bureau of Reclamation at Redding, Calif., at $1,744,619, for relocation of the Shasta Dam Branch line of the Southern Pacific Railroad from Middle Creek to Matheson and for relocation of Shasta County roads at Keswick Reservoir, along with earthwork and structures. The work involves construction of approx. 7.77 mi. of single-track railroad, of which 0.37 mi. are passing track, construction of approx. 2 mi. of county roads, and construction of approx. 13.5 mi. of two-wire telephone line. Principal features involved in the railroad construction are earthwork; structures, including a highway underpass; and track work, including ballasting and laying track. Three sections of county road are to be constructed. The Middle Creek section is approx. 3,500 ft. in length and the work includes earthwork, structures and gravel or crushed-rock surfacing. The Spring Creek section is approx. 6,200 ft. in length and the work includes earthwork, structures, crusher-run base and asphaltic surfacing. The third section, designated as Keswick-Old Shasta Road, is approx. 2,300 ft. in length and the work includes minor earthwork and gravel or crushed-rock surfacing. Principal features of the telephone line construction are setting wood poles attaching brackets and insulators, and stringing wire. 360 days are allowed for completion. Unit bids were submitted by the following:

(A) R. A. Heintz Construction Co. $1,744,619
(B) Morrison-Knudsen Co., Inc. 1,788,390
(C) Piombo Construction Co. 1,893,823
(D) Peter Kiewit Sons' Co. 1,958,668
(E) Fredricksen & Kasler 2,037,471
(F) Gibbons & Reed Co. 2,134,953
(G) Fredrickson Bros. 2,218,517
(H) Harms Bros. and N. M. Ball Sons 2,263,137
(I) Guy F. Atkinson Co. $2,291,381
(J) Utah Construction Co. 2,298,718
(K) A. Teichert & Son, Inc. 2,317,386
(L) Fredrickson & Watson Construction Co. 2,516,338
(M) The Shea Co. 2,585,986
(N) Vinnell Co., Inc. 2,672,904
(O) Sharp & Fellows Contracting Co. ... 2,733,409

(1) 100 ac. clearing right-of-way
(2) 702,000 cu. yd. excav., common, for rdwy.
(3) 251,00 cu. yd. common rock for rdwy.
(4) 20 cu. yd. remove conc. in exist. rdwy. struc.
(5) 50 lin. ft. remove and salvage corr. metal pipe in existing culvert
(6) 70 lin. ft. remove and salvage 108-in. diam. multiple-plate corru. metal pipe in exist. culv.
(7) 5,500,000 sta. cu. yd. overhaul
(8) 4,000 M. gals. watering
(9) 2,000 roller hrs. rolling embankment
(10) 8,800 cu. yd. excav., common, for structs.
(11) 5,900 cu. yd. rock excav., for structs.
(12) 29,000 cu. yd. backfill
(13) 23,000 cu. yd. compacting backfill
(14) 13,500 cu. yd. riprap
(15) 1,000 sq. yd. dry-rock paving
(16) 120 cu yd. rubble masonry walls
(17) 130 cu. yd. dry rubble walls
(18) 112 lin. ft. furn. and lay 36-in. diam. conc. pipe
(19) 60 lin. ft. furn. and lay 12-in. diam. 16-gage corru. metal pipe
(20) 580 lin. ft. furn. and lay 18-in. diam. 16-gage corru. metal pipe
(21) 570 lin. ft. furn. and lay 24-in. diam. 14-gage corru. metal pipe
(22) 295 lin. ft. furn. and lay 30-in. diam. 14-gage corru. metal pipe
(23) 85 lin. ft. furn. and lay 36-in. diam. 12-gage corru. metal pipe
(24) 75 lin. ft. furn. and lay 42-in. diam. 12-gage corru. metal pipe
(25) 1,930 lin. ft. furn. and lay 24-in. diam. 14-gage, bitum-coated, paved-invert corr. metal pipe
(26) 24 lin. ft. furn. and lay 24-in. diam. 12-gage, bitum-coated, paved-invert corr. metal pipe
(27) 445 lin. ft. furn and lay 30-in. diam. 14-gage, bitum-coated, paved-invert corru. metal pipe
(28) 230 lin. ft. furn. and lay 30-in. diam., 12-gage, bitum-coated, paved-invert corru. metal pipe
(29) 125 lin. ft. furn. and lay 30-in. diam., 10-gage, bitum-coated, paved-invert corru. metal pipe
(30) 325 lin. ft. furn. and lay 36-in. diam, 12 gage, bitum-coated paved-invert corru. metal pipe
(31) 500 lin. ft. furn. and lay 36-in. diam. 10-gage, bitum-coated, paved-invert corru. metal pipe
(32) 325 lin. ft. furnish and lay 36-in. dia. 8-gage, bitum-coated, paved-invert corru. metal pipe
(33) 95 lin. ft. furn. and lay 42-in. diam. 12-gage, bitum-coated, paved-invert corru. metal pipe
(34) 110 lin. ft. furn. and lay 42-in. diam. 10-gage, bitum-coated, paved-invert corru. metal pipe
(35) 130 lin. ft. furn. and lay 42-in. diam. 8-gage bitum-coated, paved-invert corru. metal pipe
(36) 200 lin. ft. furn. and lay 54-in. diam. 8-gage, bitum-coated, paved-invert corru. metal pipe
(37) 280 lin. ft. furn. and lay 60-in. diam. 8-gage, bitum-coated, paved-invert corru. metal pipe
(38) 160 lin. ft. furn. and erect 60-in. diam., multiple-plate corru. metal pipe at railroad Sta. 195 plus 74
(39) 198 lin. ft. furn. and erect 78-in. diam. do, at Sta. 202 plus 94
(40) 167 lin. ft. furn. and erect 96-in. do, at Sta. 125 plus 42
(41) 236 lin. ft. furn. and erect 108-in. do, at Sta. 183 plus 96
(42) 620 lin. ft. furn. and erect 144-in. do, at Sta. 76 plus 02
(43) 600 lin. ft. furn. and erect 150-in. do, at Sta. 87 plus 30
(44) 180 lin. ft. furn. and erect 150-in. do, at Sta. 213 plus 36
(45) 60 lin. ft. furn. and erect 8-ft. 11-in. span, multiple plate corru. metal pipe arch
(46) 135 lin. ft. furn. and erect 11-ft. span, do
(47) 20 lin. ft. furn. and erect 12-ft. span, do
(48) 1,024 lin. ft. const. 8-in. dia. perf. pipe drains
(49) 450 lin. ft. const. 12-in. dia. perf. pipe drains
(50) 50,000 lb. fabricate and erect struc. steel in underpass
(51) 6 mi. const. barbed-wire right-of-way fence
(52) 1 mi. const. woven wire right-of-way fence
(53) 4 gates, furn. and install right-of-way fence gates
(54) 60 posts, furn. and place propty. line posts

(Continued on next page)

Important Questions..

about iron and steel scrap for every top business man in every industry

Q. ***How* bad *is the shortage of scrap?***
A. Actually, we have enough scrap to get along, but too much of it is *light* scrap. What is badly needed today is more *heavy* scrap.

Q. ***Why more* heavy *scrap?***
A. Because heavy scrap will produce *more and better* steel in *less* time.

Q. ***Why is the heavy scrap shortage so* harmful *to our economy?***
A. Half of all the ingredients that are melted to make steel and castings consists of scrap iron and steel. The short supply of heavy scrap during the past year limited the production of steel mills and foundries. At the present record rate of production, there is still not nearly enough steel to meet the current and anticipated demands of our domestic economy, military requirements, and ERP. More heavy scrap will help bridge the gap.

Q. ***What's being* done *about it?***
A. A drive . . . and everybody is cooperating . . . is being started for industrial scrap, to (1) help step up present steel production, and (2) *create a visible reserve of heavy scrap in the event of national emergency.*

Q. Why *is there a shortage of heavy scrap?*
A. Several reasons:

1. Very little of the 123,000,000 tons of steel and steel products exported during the war has come back as scrap.
2. With replacements scarce and expensive, much old equipment which would normally have been junked by now, is still in use.
3. A halt has been called on the junking of old vessels and military equipment which has until recently been a source of scrap.
4. The amount of heavy scrap produced in fabrication —the left-overs of machinery, etc.—is not enough to meet the demand for new steel and castings.

Q. ***How about the heavy scrap that must exist in huge quantities in* Germany *and* Japan?**
A. Some of this will be coming through, but not in good quantities until preparation and transportation facilities within those countries improve.

Q. ***Where can* additional *scrap be obtained from domestic sources?***
A. From industrial plants which have on hand large amounts of heavy scrap in the form of obsolete machinery, idle equipment—tools, dies, jigs, fixtures, etc.—and unnecessarily large repair parts inventories. Such scrap is the best possible type for the manufacture of quality steel.

Q. ***Isn't such material* ordinarily *turned in as scrap?***
A. Experience shows that plant "housekeeping" is not particularly good when plant production is high. People are too busy. However, if executives realized the critical situation, they would order the necessary steps to be taken.

Q. ***How can I help in this drive?***
A. Appoint one top official in your plant as a Salvage Director —with full authority to give orders and throw out everything that is not going to be needed. Have him consult with your trade association's Steel Scrap Drive Committee. Call in your local scrap dealer. (Incidentally, the prices paid for scrap are the highest ever.) Promote your scrap drive by meetings of department heads and through plant bulletin boards and newspapers.

Q. ***How do I benefit from moving scrap in addition to the money received for it?***
A. 1. You get the use of much-needed and expensive floor space now occupied by such equipment and material.
2. You eliminate the cost of keeping records and inventory.

Q. ***When does the scrap drive* start?**
A. Right this minute. The very next thing to do after reading this page, should be to start *your* plant's scrap drive!

Q. ***What is the goal of this drive?***
A. One million tons of *heavy* scrap . . . and "housecleaning" in your plant will help.

A PUBLIC SERVICE PROJECT — THE ADVERTISING COUNCIL

SCRAPPY SAYS:

Search your plant for HEAVY SCRAP ...Help make MORE STEEL!

WESTERN CONSTRUCTION NEWS

503 Market Street, San Francisco 5, California

Oakland Airport Fill

. . . Continued from page 77

times run at full capacity. This forced the contractor to take smaller bites with the cutters, thus eliminating difficulty in pumping and spreading by heavily watering the discharge material.

The reclaimed land was built up from an average elev. 5.0 to elev. 12.0, and with the anticipated consolidation of material and grading, the final height will be elev. 11.0. Excess water, heavily laden with fines, was carried from the present fill down to an auxiliary settling basin at elev. 9.5, and thence emptied into the bay. Cleaning-up operations for the 200-ac. project are being continued to remove spillways and complete a new channel for one of the drainage creeks.

Personnel

The entire master plan for the marshland in San Leandro Bay is being undertaken in units, and will be built as required to meet the growing needs of the industrial bay area. Construction is under direction of A. H. Abel, port manager and chief engineer for the Port of Oakland, J. G. Bastow, assistant port manager and assistant chief engineer, and Wm. J. Kearney, job inspector. C. E. London was general superintendent for the contractor, and on the *Duwamish*, C. R. Francis was captain and Ed. Nelson chief engineer. Einar Johnson was shore superintendent.

Kortes Dam

. . . Continued from page 59

the structure exposed to freezing and thawing will contain 1.3 barrels of cement per cubic yard having a water-cement ratio of 0.45 and an air entrainment of 5 per cent.

Concrete placing was shut down for the winter in December. When operations are resumed in the spring, the immediate goal will be to complete enough of the dam to permit diversion through the penstock and enough of the powerhouse substructure to start turbine installation. The winter months will be spent excavating for the channel and road and building forms in the inclined portion of the spillway tunnel.

The construction camps of the Government and the contractor are located on a flat at the mouth of the canyon about one mile below the damsite. The Government camp has 19 prefabricated houses, a 6-unit apartment building, dormitory, office, garages, and a small warehouse. The contractor's camp has 19 single-unit houses, 7 duplexes, dormitories for 200 men, office, commissary, and facilities for a trailer camp. A machine shop, carpenter shop, warehouse, and riggers' loft housed in Quonset-type buildings are included in the shop area just above the campsite. The compressor house and blacksmith shop are located in a draw about a quarter mile below the damsite.

Kortes constructors

Design and construction of Kortes Dam and Power Plant are under the

(Continued on page 134)

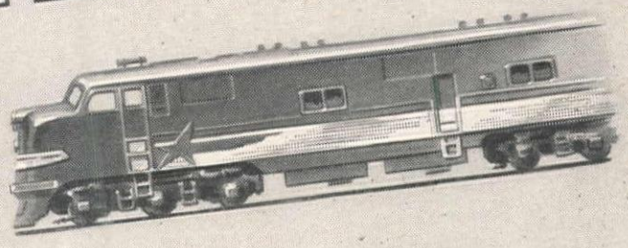
(55) 24 posts, furn. and place guide posts
(56) 2 cattle guards, const. cattle guards
(57) 0.720 Mbm. const. county road crossings
(58) 0.465 Mbm. const. private do
(59) lump sum, relocating wigwag warning signal
(60) 50 cu. yd. conc. in headwalls for pipe culv.
(61) 200 cu. yd. conc. in headwalls and footings for multiple-plate arch culv.
(62) 3,400 cu. yd. conc. in arch culvert
(63) 380 cu. yd. conc. in underpass
(64) 6,000 bbls. furn. and handle cement
(65) 391,000 lb. furn. and place reinf. bars
(66) 50 lin. ft. drilling holes for anchor bars and grouting bars in place
(67) 70 lin. ft. place rubber water stops
(68) 800 sq. ft. furn. and place elastic filler matl. in joints
(69) 7.77 track miles laying track on ballast
(70) 45 lin. ft. laying track on underpass
(71) 20,000 anchors, applying rail anchors
(72) 3 turnouts, const. turnouts
(73) 2 derails, const. switch point derails
(74) 20,000 cu. yd. ballasting
(75) 510 assemblies, furn. and set pole assemblie
(76) 125 assemblies, furn. and install telepho pole down buy assemblies
(77) 60 braces, furn. and install corner telepho pole ground braces
(78) 13.5 mi. furn. and string telephone line wir
(79) 3 booths, relocating telephone booths
(80) 1,900 tons crusher-run base
(81) 6 tons, liquid-asph. prime coat
(82) 980 tons mineral aggr. for bitum. surfacing
(83) 47 tons liq. asph. for bitum. surf.
(84) 11 tons asph. emul. for seal coat
(85) 128 tons stone chips for seal coat
(86) 585 cu. yd. gravel or crushed rock surfacing

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L
(1)	740.00	175.00	300.00	150.00	855.00	500.00	422.00	600.00	300.00	225.00	200.00	300.0
(2)	.24	.35	.575	.52	.45	.67	.43	.72	.72	.67	.93	.8
(3)	.95	1.05	.575	1.40	.95	.67	1.46	.72	.72	1.13	.93	1.5
(4)	10.00	15.00	7.00	20.00	10.00	20.00	12.00	30.00	25.00	16.00	20.00	10.0
(5)	5.00	2.50	3.00	3.00	2.00	1.60	2.50	2.00	3.00	1.50	2.50	4.6
(6)	10.00	6.00	13.50	23.50	3.50	24.00	18.00	25.00	15.00	7.00	15.00	35.0
(7)	.005	.005	.004	.01	.005	.01	.01	.01	.008	.01	.005	.00
(8)	1.50	4.00	4.00	2.40	2.50	3.20	2.40	3.50	2.00	3.00	3.00	3.4
(9)	3.50	6.25	5.15	4.30	10.00	6.30	10.00	10.00	5.00	9.00	8.00	6.8
(10)	4.00	5.50	2.75	2.00	4.17	2.30	3.60	4.50	5.00	3.00	3.50	6.0
(11)	7.50	5.50	5.30	7.00	7.00	3.20	8.50	4.50	5.00	5.00	7.00	8.0
(12)	1.00	1.35	.70	1.00	1.05	.30	1.80	1.50	.80	1.25	.60	1.6
(13)	.50	2.00	2.75	1.00	2.65	2.20	2.40	3.25	2.10	3.00	2.50	2.3
(14)	2.75	1.50	2.50	2.15	6.30	2.70	2.50	2.50	2.70	4.00	2.50	3.7
(15)	10.00	5.00	5.30	10.00	6.50	3.15	6.35	6.00	6.00	5.00	5.00	5.6
(16)	30.00	60.00	35.00	37.00	53.00	38.00	30.00	50.00	60.00	50.00	35.00	60.0
(17)	30.00	49.00	24.00	33.00	45.00	26.00	27.00	40.00	60.00	32.00	25.00	35.0
(18)	17.00	10.00	13.00	12.00	12.00	11.00	12.72	11.25	14.00	15.00	11.00	10.4
(19)	2.60	2.60	2.30	2.25	2.65	2.90	2.50	2.62	3.50	4.00	2.30	2.5
(20)	3.75	3.60	3.40	3.40	3.35	3.15	3.48	3.75	4.20	4.65	3.20	3.3
(21)	5.00	5.30	5.10	4.90	4.80	4.85	5.20	5.60	6.30	6.85	5.00	5.0
(22)	6.34	6.60	6.60	6.20	5.80	6.15	6.54	7.50	8.00	8.60	6.30	6.1
(23)	9.86	10.00	10.00	9.25	8.65	9.25	9.86	11.25	12.00	12.85	9.50	9.1
(24)	12.28	11.65	12.00	10.90	10.20	10.80	11.67	12.50	14.00	15.00	12.00	11.0
(25)	6.49	6.40	6.30	6.00	5.90	6.00	6.60	7.50	7.70	8.75	6.70	6.0
(26)	7.50	7.00	7.70	7.20	7.10	7.50	8.25	9.30	9.80	11.65	8.30	7.5
(27)	7.60	8.00	8.20	7.65	7.25	7.70	8.50	10.00	9.80	11.00	8.50	7.8
(28)	9.20	10.00	10.00	9.25	8.30	8.50	10.30	11.97	12.00	13.60	10.50	9.4
(29)	13.47	11.30	11.50	10.75	10.15	10.50	11.80	15.00	14.00	16.15	12.50	10.8
(30)	11.75	11.75	11.90	11.10	10.40	11.20	12.15	15.00	14.40	15.75	12.50	11.2
(31)	14.50	13.50	13.80	12.90	12.00	14.00	14.10	16.25	17.00	18.30	14.30	13.0
(32)	22.75	16.00	16.20	15.10	14.00	15.00	16.35	18.10	19.70	22.00	17.00	15.0

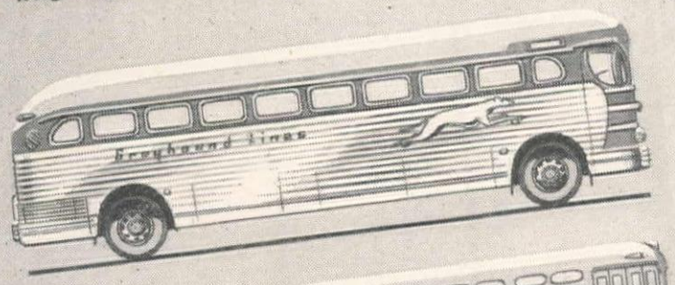
(Continued on next page)

By Road and by Rail

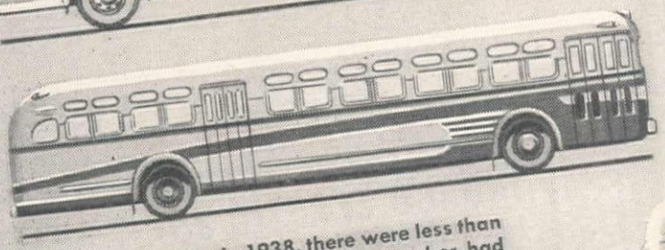
THE TREND IS TO DIESEL



DIESEL LOCOMOTIVES—In 1938, there were 262 mainline Diesel locomotives. In 1948, the number was in excess of 5,000. Seven out of ten Diesel locomotives in passenger service, and three out of four hauling the new fast freights, bear the General Motors nameplate.*



DIESEL COACHES—In 1938, less than 200 Diesel coaches were in operation. By 1948, the number had multiplied to over 18,000. GMC production has accounted for more than 90 per cent of the total. Latest examples of GMC's Diesel coaches are the streamlined Greyhound inter-city coach and the long, low 55-passenger transit model, shown at left.*



DIESEL TRUCKS—In 1938, there were less than 500 Diesel trucks. By 1948, the number had jumped to 12,000. In recent months, GMC has produced nearly 30 per cent of the total. Shown below is a GMC 200-horsepower Diesel tractor.*

GMC Diesel trucks are powered by engines of the same basic design as the Diesel locomotives which pull many of the finest, fastest trains.

This advanced and exclusive GM 2-cycle design cuts Diesel weight without sacrifice of power, thus permitting greater payloads. It also provides outstanding fuel economy, low maintenance costs, exceptional dependability and long life.

GMCs are the only Diesel trucks offering a choice of four- and six-cylinder engines . . . specially engineered Diesel chassis . . . a selection of eight series of models. And, more important, GMC has had unequalled experience in equipping vehicles with these modern, time and money saving power plants.

GMC TRUCK & COACH DIVISION
GENERAL MOTORS

GM GENERAL MOTORS COACH

GMC TRUCKS

*Estimated figures based on latest available information

Kortes Dam

. . . Continued from page 132

direction of Leslie N. McClellan, Chief Engineer of the Bureau of Reclamation. Charles S. Rippon is Construction Engineer, and the author is Chief Inspector. The dam is a principal feature in the North Platte River District of Region 7 of the Bureau of Reclamation. I. J. Matthews is District Manager, and A. A. Batson is Regional Director. W. B. Williams and George Piedmont are Project Manager and Superintendent, respectively, for the Morrison-Knudsen Co.

No. 2 Douglas Boards Okehed

THE USE of No. 2 Douglas fir boards and dimension lumber will henceforth be approved in California school construction when the structure has been designed to incorporate this grade appropriately, it has been stated by the State Division of Architecture.

By act of the California State Legislature the Division of Architecture has since 1933 had the duty of ascertaining the structural adequacy of all public school buildings constructed within the state. In executing this duty the Division has established rules, regulations, specifications and working-stresses for materials of construction.

Prior to the war, when Douglas fir lumber was used, the No. 1 grade of boards was the minimum accepted.

(33)	16.30	14.00	14.20	12.90	11.90	13.00	14.30	16.25	16.80	19.00	12.70	13.00
(34)	20.30	16.00	16.50	15.10	14.10	15.50	17.00	18.75	20.00	22.00	16.50	15.30
(35)	25.66	18.00	19.40	17.75	16.50	17.75	19.90	21.25	23.10	26.00	19.70	18.00
(36)	28.96	32.00	28.80	27.20	24.10	29.00	28.20	32.50	32.00	39.00	28.00	27.00
(37)	31.50	35.00	31.60	30.30	26.35	31.50	33.10	35.00	36.00	43.00	31.00	30.00
(38)	35.00	42.00	37.00	45.00	40.00	48.00	44.88	50.00	48.00	43.00	42.00	39.00
(39)	35.00	43.50	40.00	45.00	43.00	55.00	47.50	56.25	52.00	45.00	45.00	44.00
(40)	40.45	55.00	48.00	50.00	48.00	66.50	56.75	68.75	62.00	56.00	51.00	52.00
(41)	44.55	74.00	72.50	63.00	67.00	98.00	78.20	96.25	86.00	77.00	75.00	75.00
(42)	57.58	100.00	94.50	89.00	88.00	115.00	100.00	123.75	110.00	99.00	95.00	96.50
(43)	60.00	102.00	97.50	92.00	93.00	120.00	104.50	141.25	115.00	100.00	110.00	100.00
(44)	65.00	110.00	108.00	96.00	104.00	137.00	114.00	137.50	122.00	110.00	125.00	107.00
(45)	78.30	80.00	82.50	95.00	72.00	115.00	87.60	85.62	120.00	84.00	90.00	83.00
(46)	40.37	50.00	56.00	52.00	56.00	60.00	60.00	70.62	59.00	50.00	60.00	64.00
(47)	55.37	61.00	72.50	59.00	68.00	74.00	69.12	87.50	72.00	65.00	80.00	76.00
(48)	2.00	2.60	2.00	2.00	2.30	2.50	3.20	2.50	3.50	3.60	3.00	3.60
(49)	2.70	3.00	3.00	2.80	3.10	3.15	4.20	3.25	4.50	4.90	4.00	4.00
(50)	.12	.147	.13	.13	.13	.15	.15	.17	.16	.17	.17	.14
(51)	$3,000	$1,350	$1,275	$1,800	$1,700	$1,850	$2,400	$1,600	$2,500	$2,360	$2,000	$2,300
(52)	$4,000	$1,650	$1,450	$2,000	$2,000	$2,125	$2,640	$2,000	$3,000	$2,700	$2,000	$2,600
(53)	150.00	100.00	60.00	50.00	90.00	60.00	60.00	65.00	100.00	60.00	50.00	57.00
(54)	12.00	8.00	10.00	15.00	13.00	24.50	12.00	18.00	7.00	19.00	12.00	14.00
(55)	5.00	5.00	6.00	10.00	9.00	13.50	6.00	7.00	7.00	8.00	8.00	6.00
(56)	380.00	700.00	485.00	500.00	700.00	$1,200	$1,800	$1,000	$1,000	660.00	600.00	$1,150
(57)	500.00	600.00	550.00	500.00	500.00	600.00	600.00	700.00	800.00	360.00	500.00	690.00
(58)	400.00	500.00	310.00	500.00	500.00	600.00	600.00	700.00	$8,000	360.00	500.00	400.00
(59)	150.00	225.00	$1,100	750.00	$1,100	600.00	215.00	250.00	$2,000	$3,000	500.00	200.00
(60)	70.00	110.00	76.50	70.00	77.50	71.00	78.00	150.00	90.00	160.00	110.00	115.00
(61)	65.00	54.00	67.50	49.00	52.00	56.00	62.00	62.00	70.00	76.00	80.00	80.00
(62)	50.00	33.00	45.00	31.00	46.00	35.00	60.00	55.00	60.00	43.50	47.00	46.50
(63)	60.00	35.00	47.00	32.00	48.00	47.00	66.00	55.00	60.00	76.00	56.00	55.00
(64)	6.00	6.50	4.75	5.50	5.25	5.60	5.30	5.00	6.00	7.55	5.00	5.20
(65)	.115	.116	.10	.105	.11	.14	.11	.11	.14	.105	.12	.10
(66)	5.00	2.50	1.75	5.00	9.50	6.00	2.40	3.00	2.70	3.20	2.00	3.15
(67)	1.00	2.50	2.00	2.00	6.00	1.00	1.80	3.00	2.70	3.20	2.00	3.50
(68)	.50	1.50	.65	2.00	2.00	1.85	3.00	2.50	3.00	2.55	2.00	1.15
(69)	$51,000	$40,920	$43,300	$47,500	$42,000	$60,300	$45,364	$44,500	$51,550	$49,220	$48,000	$49,000
(70)	20.00	95.00	34.00	56.00	53.00	65.00	80.00	32.00	90.00	76.00	35.00	120.00
(71)	.44	.49	.48	.42	.50	.60	.50	.46	.60	.56	.50	.54
(72)	$2,250	$1,833	$2,200	$1,700	$2,300	$1,500	$2,310	$2,100	$3,000	$2,520	$2,200	$2,400
(73)	850.00	291.00	525.00	730.00	550.00	$1,200	600.00	500.00	700.00	600.00	600.00	600.00
(74)	3.45	3.70	6.80	4.00	6.55	5.565	6.00	5.25	6.90	6.75	6.00	6.50
(75)	35.00	50.00	48.00	48.00	51.00	38.50	50.00	40.50	59.00	40.00	70.00	48.00
(76)	24.00	40.00	36.00	30.00	38.00	24.00	40.00	44.00	41.00	31.00	37.00	39.00
(77)	20.00	33.00	14.75	12.00	16.00	13.50	32.50	62.15	34.00	17.00	50.00	32.00
(78)	310.00	625.00	610.00	600.00	639.00	250.00	621.00	632.50	625.00	735.00	500.00	606.00
(79)	75.00	130.00	110.00	125.00	88.00	60.00	130.00	88.00	300.00	48.00	100.00	126.00
(80)	2.90	3.85	3.00	2.50	2.77	2.70	3.75	4.00	3.30	3.45	2.50	3.45
(81)	75.00	60.00	45.00	50.00	55.00	46.00	42.00	50.00	65.00	45.00	50.00	55.00
(82)	4.15	6.40	5.00	3.00	4.35	3.65	5.82	5.50	6.00	4.45	4.50	5.20
(83)	75.00	30.00	45.00	50.00	43.00	46.00	36.00	30.00	30.00	42.00	30.00	40.00
(84)	75.00	60.00	44.00	50.00	50.00	53.00	42.00	45.00	80.00	54.00	60.00	50.00
(85)	5.50	10.00	7.00	5.50	8.00	8.00	7.80	6.50	9.00	10.20	7.00	9.60
(86)	3.20	4.70	4.00	2.50	4.75	4.00	6.00	5.50	4.00	3.20	4.00	3.75

NEW EQUIPMENT

MORE COMPLETE INFORMATION on any of the new products or equipment briefly described on the following pages may be had by sending your request to Equipment Service, Western Construction News, 503 Market Street, San Francisco 5, Calif. For quicker service, please designate the item by number.

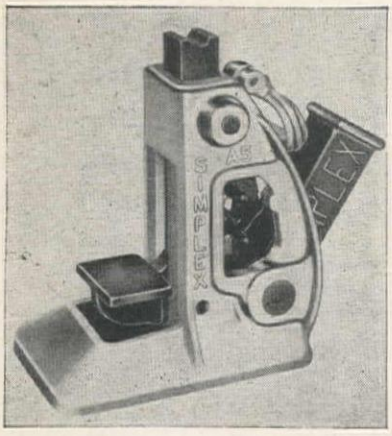
301

Railroad Jack

Manufacturer: Templeton, Kenly & Co., Chicago, Ill.

Equipment: Aluminum alloy track jack for railroad work.

Features claimed: The new A5 jack, weighing only 26 lb., is 15 lb. lighter than its malleable iron companion, the No. 15A Simplex jack, and yet has all four of the



major improvements embodied in the latter. The new jack's lighter weight is accomplished through its aluminum alloy housing and carrying handle. The design permits three operations of tamping, surfacing and lining. The enlarged toe lift of 2½ x 3¼ in. accomplishes lifting at the end of ties without cutting into the bottom of ties. Height of the jack is 11 in.; capacity, 15 tons.

302

Electric Paving Breaker

Manufacturer: Homelite Corp., Port Chester, N. Y.

Equipment: Paving breaker operated by electricity rather than compressed air.

Features claimed: This new 84-lb. high-cycle breaker is claimed to hit a harder blow than the largest pneumatic breaker. Electricity to operate the breaker is supplied by a 129-lb. dual voltage gasoline engine generator. Both breaker and generator make a compact combination that can fit in the trunk of a car. The new breaker is unaffected by dust or abrasive particles.

303

Portable Crushing Plant

Manufacturer: Universal Engineering Corp., Cedar Rapids, Iowa.

Equipment: Crushing plant specifically designed for economical operation on small jobs where specifications are not too rigid.

Features claimed: On the Model TS 16, gravel is delivered to the hopper over a mechanical feeder and then to the screen where the over-size is removed and passed to the crusher. The fines passing through the screen are delivered by chute to the loading conveyor. As the over-size is crushed, it too, goes to the delivery conveyor and is not returned to the screen for grading. The crusher is of a design that makes it possible to reduce the over-size to minus one inch, if desired. Capacity of the plant is 30 to 60 tons per hour, depending on the amount of crushing required and the size to which the over-size must be crushed. The plant is controlled from the special platform where the operator has full view of the entire plant.

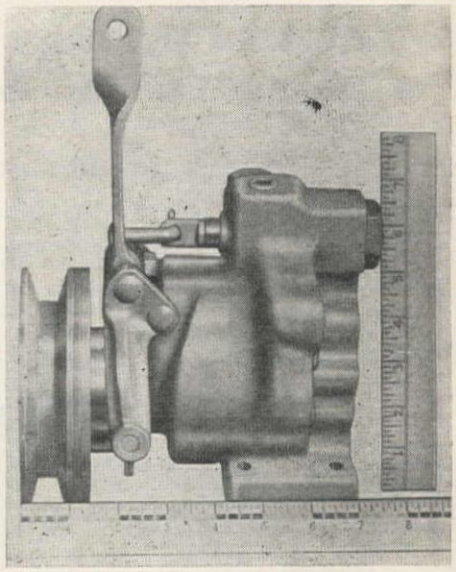
304

Hydraulic Power Pump

Manufacturer: Waukesha Hydraulic Corp., Waukesha, Wis.

Equipment: Hydra-Clutch Pump, designed for applications where hydraulic power is desired for periodic short lengths of time.

Features claimed: The Hydra-Clutch Pump operates only when power is needed. One simple control (1) engages the clutch, (2) disengages the clutch, and (3) operates the slide valve. When the power is required, the clutch is engaged, transmitting the power to the application. The pump contains an overload relief valve and is not hand-pumped. The pump should meet a



wide variety of control needs in mobile equipment. It will provide the machinery equipment manufacturer with a quick easy low-cost installation which would assure his customers of long trouble-free service. For instance, it would save time and labor by actuating dump bodies, lifting tailgates and other miscellaneous operations. The pump is 7 in. long, 7 in. high and 4 in. wide. Its small size permits easy installation and requires a minimum of space. Because the pump operates off the fan belt, the hydraulic application can be operated without difficulty while the tractor or truck travels.

305

Diamond-Type Diesel Engine

Manufacturer: Morris Development Co., Los Angeles, Calif.

Equipment: Diesel engine with twice as many cylinders as the conventional opposed-piston unit.

Features claimed: The new Morris Diesel is now available for production under license. Test model is a 24-cylinder, two crankshaft, opposed-piston, two-stroke cycle engine, 3¼-in. bore, 3⅞-in. stroke. Indicated potential, although not a final power limitation, is 550 h.p. at 1825 f.p.m. or 2800 r.p.m. Approximately the size of a

large truck engine, the Morris Diesel is only 2 ft. wide, 4½ ft. high and 4½ ft. long. Weight complete with cast iron block and all accessories is 3300 lb. The engine requires only 12 injectors since there is a common combustion chamber for each set of two pistons. Piston control of intake and exhaust ports eliminates poppet valves. By using the diamond type construction, the Morris Diesel uses twice as many cylinders as the conventional opposed-piston, two-stroke-cycle engine, with resultant proportional power increases without increasing over-all engine size.

306

Earthmoving Equipment

Manufacturer: R. G. LeTourneau, Inc., Peoria, Ill.

Equipment: Three additions to the LeTourneau earthmoving and materials handling line of equipment: the E-35 Tournahopper, the E-40 Tournarocker, and the E-25 Carryall Scraper.

Features claimed: The Tournarocker, illustrated at top, is a rear dump wagon powered by a 240-h.p., two-wheel prime mover. It has a 41-cu. yd. capacity and a rear dump which is multiple-cable controlled by an electric motor which tips the body beyond vertical position for fast dumping. Drive wheels are up front where they can pull the rig forward quickly in an emergency. The Tournarocker can make a 90-deg. turn, and can turn in an 18-ft. radius. It is easy to spot at shovel or dragline, its 16-ft., 8-in., by 10-ft. body providing a big target for fast, accurate loading.

For bottom dump hauling, LeTourneau is offering the Tournahopper, illustrated below. It is a 27-cu. yd. or 35-ton capacity unit which will travel at speeds up to 30 m.p.h. It is powered by a 240-h.p., two-wheel prime mover, and has multiple-disc, 4-wheel air brakes. The 10-ft. by 10-ft. bowl presents an easy target for the shovel or dragline operator to hit and fill. Electric power steering enables it to make a 90-deg. turn. The bottom-dump doors are designed to operate in a manner similar to a clamshell, swinging upward along the outside of the bowl as they open. When controlled ejection is unnecessary, the doors can be opened completely to a 10-ft. by 10-ft. opening.

Also taking its place in the LeTourneau line is the E-25 Carryall Scraper, also powered by the 240-h.p., two-wheel prime mover. Being supplied because of contractor demand, the scraper possesses all the design features associated with the new line of equipment; fingertip electric control, positive power steering, Tournamatic differential, more flotation and sure-footed traction. The 240-h.p. prime mover is interchangeable with all three new pieces of equipment.

307

Bulldozer and Trailbuilder

Manufacturer: Southwest Welding & Mfg. Co., Alhambra, Calif.

Equipment: New equipment for use with Allis-Chalmers HD-19, HD-14, and HD-10 tractors.

Features claimed: Southwest has recently developed new bulldozer and trailbuilder equipment which eliminates the over-head "A" frame structure now commonly in use. They are now the radiator guard type mounting, rugged and dependable, and furnished for either front or rear mounted control units.

308

Hardfacing Alloys

Manufacturer: Air Reduction Pacific Co., Los Angeles, Calif.

Equipment: Complete new line of hardfacing alloys bearing the Airco trademark.

Features claimed: Divided into three primary groups, ferrous alloys, cobalt base alloys and tungsten carbide, there are a total of fifteen Airco hardfacing alloys available. According to the manufacturer, this is the largest, most complete line of hardfacing alloys on the market today. The new alloys are especially developed to combat abrasion, impact, heat and corrosion. In order to stimulate the introduction of

these alloys, the manufacturer is making a special offer of a trial assortment of alloys, at a price of $2.95. The assortment consists of the new Aircolite hardfacing alloy, especially recommended for equipment subjected to severe abrasion and medium impact, and the new Airco Self-Hardening alloy for equipment subjected to severe impact and abrasion, such as bucket teeth. The assortment contains a sufficient quantity to assure an adequate performance test. Instruction sheets for each of the two alloys are included along with a booklet covering the entire hardfacing line.

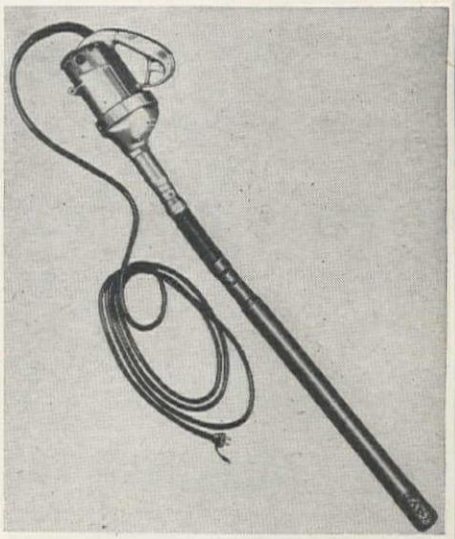
309

Concrete Vibrator

Manufacturer: Mall Tool Co., Chicago, Ill.

Equipment: One-man, short-coupled vibrator.

Features claimed: The vibrator's powerful electric motor, operating on 115-volt AC-DC current, is enclosed in a sturdy aluminum die cast housing. The motor is



equipped with a built-in handle switch for convenience of the operator. The vibrator head, delivering 7000 frequencies per minute, features a revolving off-balance weight. The powerful waves produced by the off-center motion of the weight is transmitted to the concrete through precision bearings. The vibrator head tip is armored with hard welding rod metal to resist abrasion. High grade seamless steel tubing is used for the vibrator head shell. The vibrator should be useful as an auxiliary tool for spots in forms that are hard to reach.

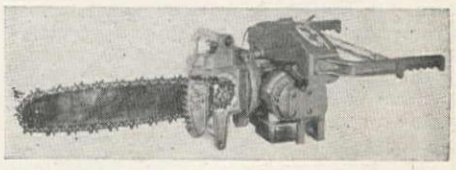
310

Chain Saw

Manufacturer: Mall Tool Co., Chicago, Ill.

Equipment: Lightweight gasoline engine chain saw for one or two-man use.

Features claimed: The lightweight die-cast magnesium construction of this saw



makes it easy for one man to carry and to make horizontal, vertical or any angle cuts. It indexes to any desired angle for felling or bucking. Two gear ratios provide a slow speed for cutting big trees and a high speed for cutting small ones. The round-nose

Harbor Presents Star PerFORMers for Concrete Form Work!

You'll find basic concrete form panel problems answered by Harbor Plywood's quartet of concrete form panels—each engineered to meet specific service requirements, and starred in order of their performance, quality and price.

★★★★

HARBOR **Harborite**

Trade Mark Registered. Patents 2,150,697—2,150,698—2,150,841 and 2,343,740

The Superior Multiple Re-Use Concrete Form Panel

★★★ SUPER-Harbord **PLYCRETE**

Bearing the industry grade-mark:

EXT • DFPA • AA

For multiple re-use form work demanding relatively high architectural treatment, Harbor hot-press bonded with phenol-type resin adhesive. ALL veneer is jointed, which eliminates appreciable voids. All defects in centers and crossbands are repaired, eliminating weak areas and concealed voids. All panels are re-humidified after pressing, reducing tendency to warp. These exclusive Harbor extras mean longer service on your form work. Sanded smooth both sides. Factory edge-sealing and oiling optional.

★★ Harbord **PLYCRETE**

Bearing the industry grade-mark:

INTERIOR • AA • DFPA

Harbord PLYCRETE has the same AA (Sound) veneer faces as SUPER-Harbord Plycrete, but is bonded with 10-cycle moisture-resistant glues instead of the water-proof adhesives used in the Exterior-type panels. A superior form panel, sanded smooth on both faces. Will withstand many re-uses, but can not, of course, be expected to deliver the service established by Harborite or SUPER-Harbord Plycrete. Ideal for average jobs where limited re-use will write off the cost. Factory edge-sealing and oiling optional.

★ HARBOR **PLYFORM**

Bearing the industry grade-mark:

PLYFORM • DFPA • BB

The standard DFPA PlyForm panel, manufactured to Harbor Plywood Corporation's strict quality standards. Bonded with highly water-resistant 10-cycle glues (not waterproof), it will withstand a reasonable number of re-uses. Both faces are BB (solid) veneer, with surfaces free from open defects, but admitting neatly made plugs, tight splits, and slightly rough grain, sanded smooth. Factory edge-sealing and oiling optional.

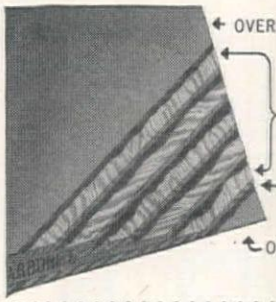
"Four-Starred" Harborite

. . . engineered to deliver the lowest cost-per-foot-per-use

MADE by Harbor's exclusive hot-press bonding of phenolic-type resin-impregnated overlays on a core body of genuine SUPER-Harbord, Harborite offers these outstanding advantages for concrete form work:

1. Harborite has hard, check-free, durable overlay faces which cast easily-finished, near-perfect concrete surfaces.
2. Harborite's overlay is tough, abrasion-resistant—not brittle. Its "tooth" holds oil, sealers or lacquers. Its absorptive-liner effect reduces pit voids.
3. Harborite's reddish-brown color does not bleed or discolor concrete. No added finishing problems!
4. Harborite's durable overlay faces, plus the superior core body of genuine AA SUPER-Harbord, gives you maximum panel re-use. It delivers the lowest cost per foot per use.

Harborite—"Four-Starred" for perFORMance—is the panel to demand if you require superior, easily-finished concrete surfaces PLUS form panels which can be re-used again and again . . . to ultimate destruction.



Harborite is manufactured under rigid quality control. The core panel is genuine SUPER-Harbord, with improved face veneers. ALL veneers (even core veneers) are jointed. All veneers and overlays are hot-press bonded with phenol-type resin adhesive. Thickness tolerance of finished panels, 1/64". Standard Harborite sizes: Widths—36" up to 48"; Lengths—96" up to 144"; Thicknesses—¼" to 1 5/16". Edge-sealing and mill-oiling optional.

Like any other quality product, most satisfactory results are gained by using approved procedures. For full data on Harborite use, write requesting instructions.

For Information Concerning Harborite and Other Harbor Concrete Form Panels, Contact:

HARBOR PLYWOOD CORPORATION, Hoquiam, Washington

—or any of the following—

California - Geo. E. Ream Co., 235 S. Alameda St., Los Angeles 12; Harbor Plywood Corporation (of California), 540 Tenth St., San Francisco 3 **Colorado** - Donald B. Richardson, 1650 Eleventh St., Denver 4 **District of Columbia** - Harbor Sales Co., Inc., 4th and Bryant Sts., N. E. Washington **Florida** - Harbor Plywood Corporation, 2355 Dennis St., Jacksonville 4; Harbor Plywood Corporation, Box 265, Buena Vista Sta. (3627 N. E. 1st Court), Miami 37; Harbor Plywood Corporation, P. O. Box 2168 (802 No. Rome Ave.), Tampa 1 **Georgia** - Harbor Plywood Corporation, 1161 Ridge Ave. S. W., Atlanta 3 **Illinois** - Harbor Plywood Corporation, 1444 W. Cermak Road, Chicago 8 **Indiana** - E. W. Camp Plywood Co., Inc., 1001 E. New York St., Indianapolis 7 **Kentucky** - E. W. Camp Plywood Co., Inc., 825 S. 9th St., Louisville 2 **Maryland** - The Harbor Sales Co., Inc., 1501 S. Warner St., Baltimore 30 **Massachusetts** - Kimball Lumber Co., 148 Waltham St., Watertown; Lawrence R. McCoy & Co., Inc., 332 Main St., Worcester 8 **Missouri** - H. H. Horton, Harbor Plywood Corporation, 1301 R. A. Long Bldg., Kansas City 6; Fry-Fulton Lumber Co., 148 Carroll St., St. Louis 4 **Nebraska** - W. R. Stelzer, 200 Foster-Barker Bldg., Omaha 2 **New Jersey** - J. R. Quigley Co., 811 Market St., Gloucester City **New York** - Plunkett-Webster Lumber Co., Inc., 815 East 136th St., New York 54; Plunkett-Webster Lumber Co., Inc., 271 North Ave., New Rochelle; Kimball Lumber Corporation, P. O. Box 625, Schenectady **Ohio** - E. W. Camp Plywood Co., Inc., Commerce at Plum St., Cincinnati 2 **Pennsylvania** - J. R. Quigley Co., Front and Railroad Sts., Cressona; J. R. Quigley Co., 1290 S. Cameron St., Harrisburg; J. R. Quigley Co., 309 Harrisburg Ave., Lancaster; J. R. Quigley Co., 1028 N. Delaware Ave., Philadelphia 25; G. A. Whitmeyer, Harbor Plywood Corporation, 1028 N. Delaware Ave., Philadelphia 25; Wholesale Distributing Co., 36th St. and A. V. R. R., Pittsburgh 1 **Washington** - Harbord Mercantile, Port Dock, P. O. Box 998, Aberdeen; Lundgren Dealers Supply, P. O. Box 1373 (440 E. 25th St.) Tacoma 1

bucking bar makes it possible to start a cut with the tip of the round end, and also permits bucking trees with a diameter twice the bar's length. A quick detachable tailstock that fits on the end of the round nose bucking bar converts the model into a two-man saw.

311

Circular Saw

Manufacturer: Delta Division of Rockwell Mfg. Co., Milwaukee, Wis.

Equipment: Production line circular saw.

Features claimed: Built for production line work, the new floor-model 8-in. tilting

arbor saw has a table 25 in. deep and 33 in. wide, with the motor and all working parts suspended from the table and enclosed within the cabinet. All standard Delta accessories, including a dado head, moulding cutter head, and table inserts are available for the new saw. Cutting capacity is 2-5/16 in., and table depth in front of the blade at maximum cut is exactly 1 ft. The maximum cut at 45 deg. is 1⅝ in.; dado cuts up to 13/16 in. wide can be made. The motor plate will take any frame motor, 3-phase, single-phase, or DC for all common voltages.

312

Paver Boom

Manufacturer: The Foote Co., Inc., Nunda, New York.

Equipment: Highlift Boom for both the Singlemix and Duomix MultiFoote Concrete Pavers.

Features claimed: This boom can be controlled from the operator's platform and held in any position above the ground with a vertical lift of 23-ft. bucket clearance. This allows the paver to be used in a wide variety of work such as parapets, bridge abutments, retaining walls and footings and walls for general building construction.

313

Power Shovel

Manufacturer: Marion Power Shovel Co., Marion, Ohio.

Equipment: Marion Type 111-M Ward-Leonard all-electric shovel.

Features claimed: Outstanding feature of the new shovel is the fact that all motions are electrically controlled. Controls of the various motor speeds and direction of rotation is obtained by use of the Ward-Leonard system of generator voltage control. Three generators are supplied; one supplying power for the hoist motor, one for the swing and propel motor and one for the crowd motor. The hoist motor is equipped with roller bearings and is force ventilated. The swing and propel motor is of the vertical type with ball bearings. The crowd motor, which is of the horizontal type with roller bearings, is bolted to a base which is welded to and forms an integral part of the shovel boom. Other features of the shovel include: Simplified machinery design and construction; all-welded construction; "stiff-leg" gantry; all-welded box section made from formed plates having rounded corners for greater strength, and conveniently arranged and simply designed operating control equipment. As a standard shovel the machine is equipped with a 3½-cu. yd. dipper and 33-ft. boom.

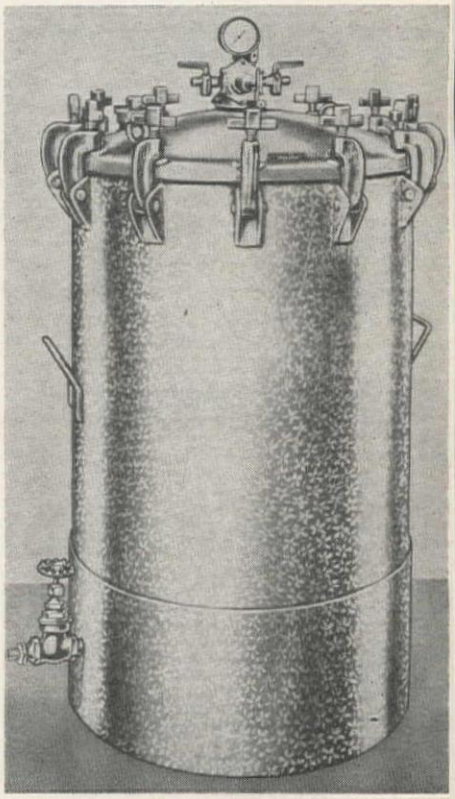
314

Pressure Tanks for Spray Painting

Manufacturer: Binks Manufacturing Co., Chicago, Ill.

Equipment: Standard tanks ranging in capacity from 2 to 60 gal.

Features claimed: The tanks have seamless drawn steel shells and are galvanized,



inside and outside. They are made to meet A.S.M.E. specifications and handle working pressures to 110 lb. Steel bands welded to the concave bottoms provide solid support. Cadmium plated pressed steel lids are secured with C-type clamps. Tanks are available with manual or motor-driven agitators, top or bottom outlet.

315

Piling Installation

Manufacturer: Western Foundation Corp., New York City.

Equipment: "Button Bottom" piles which can be driven to a depth of 110 ft. or more, using rigs with 90-ft. leads.

Features claimed: The piling installation features (1) bearing on a large point (227 sq. in. compared with 90 sq. in. for the usual 10¾-in. Pipe Composite type pile), (2) a 12-in. diameter shaft for the full depth which keeps column strength high to develop end-bearing value of the pile in good stratum, and (3) the Cylindrical Drive Casing does not indicate false bear-

ing value in weak upper strata. The precast Button Bottom, followed by steel casing is driven into bearing stratum. Corrugated steel shell is then lowered undamaged inside the protective driving casing. The Shell is then filled with concrete and the casing is withdrawn, allowing soil to expand and grip the pile shaft.

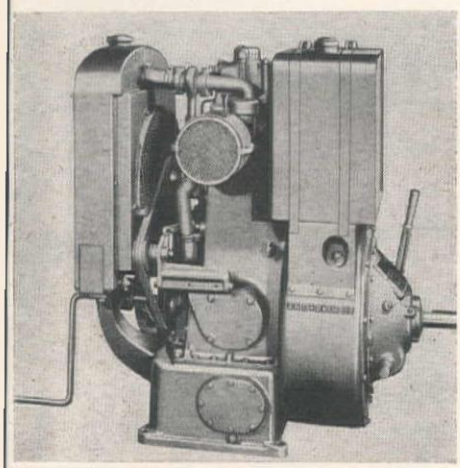
316

Diesel Engine

Manufacturer: Nordberg Manufacturing Co., Milwaukee, Wis.

Equipment: Ten-horsepower engine of the heavy-duty vertical type.

Features claimed: The 4-cycle, single-cylinder mechanical injection engine has a



4½-in. bore and 5¼-in. stroke, and is conservatively rated at 10 h.p. at 1200 r.p.m. and 15 h.p. at 1800 r.p.m. The new Nordberg Type 4FS-1 engine is available for all small stationary and portable power applications as electric generating units, pumping plants and power units for belt or chain drive or direct connection, and also with a stub shaft for direct connection. The engine is a completely self-contained unit ready to be put into service. Its 10-gal. tank provides sufficient fuel for 12 hours of operation at full load.

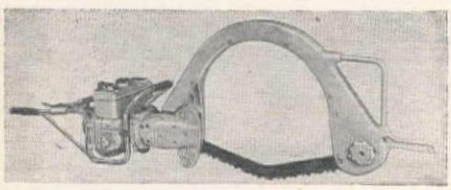
317

Bow Saw

Manufacturer: McCulloch Motors Corp., Los Angeles, Calif.

Equipment: New 20-in. bow saw.

Features claimed: Designed to save time in logging small timber, the new 20-in. bow



saw can be used on any tvpe wood in any position without pinching, prying, or wedging. Powered by the 5-h.p. McCulloch unit, the bow can be interchanged with any length of straight blade and chain up to 5 ft., and the curve of the blade allows cuts to be made without difficulty through a log that is flat on the ground. The entire saw weighs 63 lb. complete.

318

Transmissions

Manufacturer: Fuller Manufacturing Co., Kalamazoo, Mich.

Equipment: Complete series of 4, 5 and 10-speed transmissions for use with engines of up to 1120-cu. in. displacement.

Features claimed: The newest Fuller Transmission is designed for both on and off-highway applications where a high percentage of operation through gears in conjunction with auxiliaries is required. Model 4-A-112 is based on the proved design features of Fuller's Model 5-A-1120. High capacity in the new model is insured by use of helical gearing in all four forward speeds. The helical gears, easily engaged by sliding jaw clutches, permit easy shifting and reduce driver fatigue. In combination with a 3-speed auxiliary transmission, Model 4-A-112 provides 12 forward and three reverse speeds. When used with a 2-speed auxiliary, 8 forward and 3 reverse speeds are obtainable.

319

Tilting Trailer

Manufacturer: La Crosse Trailer Corp., La Crosse, Wis.

Equipment: New 8 and 10-ton capacity trailers, easily loaded and unloaded by one man without skids or blocks.

Features claimed: The trailers can be used behind any standard ½ to 1-ton truck equipped with standard pintle hook. Model TSA-2 has 8 to 10-ton capacity with 96-in. by 187-in. platform, riding on a single axle with 2 wheels. A double-acting hydraulic cylinder "cushions" the trailer platform when being tilted or without load. In addition, the one-piece axle and drawbar are

removable, permitting use as a pole trailer, etc. The lower-priced model LTA-4 has 6 to 8-ton capacity with 78-in. by 124-in. platform riding on a tandem axle with 4 wheels. The entire trailer tilts for loading by removing pin from hinged drawbar. Weight of the load brings the trailer down into position, after which the pin is inserted and the trailer is ready to move.

320

Front-End Loader

Manufacturer: Meili-Blumberg Corp., New Holstein, Wis.

Equipment: Loader designed as an attachment for power graders.

Features claimed: Operation of the loader is independent of the grader blade,

scarifier or leaning wheels. The grader may windrow dirt or snow scooped up by the loader for dumping into trucks. The loader is also effective for handling materials in stock piles. It is equipped with a standard ½-cu. yd. bucket for handling dirt, sand, gravel, etc. A one-cu. yd. bucket is available for handling snow and other light bulky materials. The bucket when in dumping position has a clearance of 8 ft., 6 in., for easy loading of even the highest dump trucks. A single lever at the operator's seat provides complete remote control of the digging pitch, leveling, dumping, shaking and lowering of the bucket.

321

Rubber Traffic Cone

Manufacturer: Enterprise Development Corp., Burbank, Calif.

Equipment: Cones of safe, collapsible rubber for traffic control.

Features claimed: Outstanding feature of this cone is its durable, flexible construction which means infrequent replacement because of breakage, distortion or wear. Cones have the appearance of steel. The lightweight construction of the cones make them easy for a man to handle and it has been found that traffic barriers can be set up in a short time. The cones stack, so many can be stored in a small space.

322

Sewage Coagulant

Manufacturer: Stauffer Chemical Co., San Francisco.

Equipment: Sewage treatment grade of Ferric Sulfate.

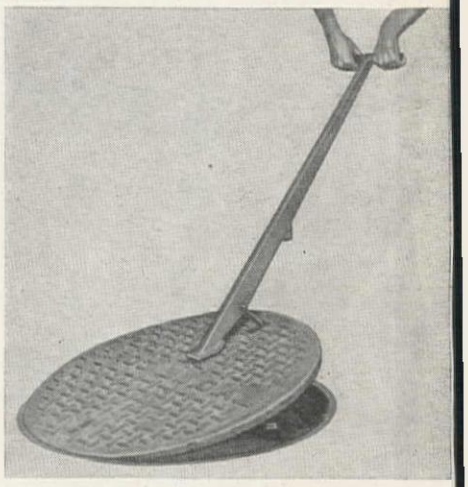
Features claimed: The use of Ferric Sulfate as a coagulant in sewage treatment plants is well known, but its widespread utilization in the West has been retarded by the high freight rates on the material from the East. Stauffer Chemical Co. is now producing this material at their plant at Richmond, Calif. Ferric Sulfate builds the stable floc common to iron salts, and has the added advantage of ease in shipping and handling (in paper bags) and freedom from corrosion in operations. By its use present capacities of overburdened sewage plants can be increased and the construction cost of new plants can be reduced.

323

Cover Lifters

Manufacturer: B. F. McDonald Co., Los Angeles, Calif.

Equipment: Lifter designed to eliminate strain in handling cover plates.



Features claimed: Manhole covers and other hard-to-lift plates can now be lifted quickly and easily with the Cover-Lifter. The tool is light in weight (7¼ lb.), but is

sturdily built of chrome molybdenum steel. Under normal condition, the two-point pressure exerted by the hook and the V-canted foot of the device furnish more than enough leverage for easy lifting. A specially designed spur on the underside makes short work of plates "frozen" with dirt, scale or ice.

324

Underbody Coating Pump

Manufacturer: Binks Manufacturing Co., Chicago, Ill.

Equipment: Lightweight, air - driven pump that attaches easily to any standard 55-gal. shipping drum, the common container for underbody coatings.

Features claimed: This new unit handles materials of light or heavy viscosity with

equal ease. The material is delivered to the spray gun at 4 times the applied air pressure, assuring fast and even flow. A standard regulator control permits precise regulation of both material and atomizing pressure. Dual material pistons give surge-free delivery of material at a rate up to 5½ gal. per min. The material is carried directly to the spray gun through a standard ¾-in. material hose.

325

Asphalt Expansion Joint Remover

Manufacturer: San Jose Pipe & Tank Co., San Jose, Calif.

Equipment: Willits Rotary Expansion Joint Remover.

Features claimed: Averaging 1500 lin. ft. per hour, the machine cuts, removes, and collects old asphalt joint material on concrete highways and airports. Looking somewhat like a power lawnmower, the cutter has a 4-hp. engine and a depth-of-cut control.

326

Keys for Plaster Surfacing

Manufacturer: Buffalo Products, Inc., Buffalo, N. Y.

Equipment: New device which forms a "lathless" mechanical bond between concrete and plaster.

Features claimed: Kifs, which are small elastic button-like knobs the size of a large daisy, are nailed about 6 in. apart to the wooden forms which support the concrete when it is being poured. They may be walled in and worked over without any damage or interference to other trades. After the concrete has hardened, the removal of the forms pulls the Kifs out, leaving under-cut, cone-shaped cavities. When applied, the plaster then squeezes into the cavities, forming a keyed, permanent, mechanical bond between the concrete and plaster.

327

Crane Clutch

Manufacturer: American Hoist and Derrick Co., St. Paul, Minn.

Equipment: Entirely new clutch as standard equipment for swinging and traveling on "American" Locomotive Cranes.

Features claimed: The outside band clutch has always been a desirable type due to its simplicity, efficiency and the ease of replacing lining. The new design makes this type clutch even more desirable as it overcomes a problem previously encountered, that of keeping the band perfectly round, enabling its full surface to contact the drum. This has been done by using a double tandem clutch, which consists of two half bands rather than one full band. Each half band is actuated by separate air cylinders, both cylinders being controlled by a single valve.

328

Drawing Instrument

Manufacturer: Plastic Enterprise, Inc., Canton, Ohio.

Equipment: Drawing rule that is actually 14 instruments in one.

Features claimed: The Colmery Protractor Geometrical Rule AA combines an English scale in 16ths, a metric scale in millimeters, an engineer's scale in 10ths and 20ths, a protractor, 30 and 60-deg. triangles, and various geometric shapes. The rule hooks conveniently into standard 3-ring notebooks, either large or medium size. Sells for $2.00.

LITERATURE FROM MANUFACTURERS...

Copies of the bulletins and catalogs described in this column may be had by addressing a request to the Western Construction News, 503 Market Street, San Francisco 5, California.

329

MOTOR GRADER — **J. D. Adams Manufacturing Co.,** Indianapolis, Ind., announces the release of a new catalog on their 100-h.p. motor grader, the No. 610. The No. 610 is powered by a 100-h.p. UD-16 International Diesel engine and weighs from 25,200 to 27,000 lb., depending on equipment. The 24-page catalog shows cutaway views of the combination mechanical-hydraulic steering, full-floating rear axle, and other outstanding features of the grader. Views also are shown illustrating the wide range of positions of the blade.

330

DESIGN OF V-BELT DRIVES—The mechanical goods division of **United States Rubber Co.,** New York City, has published a 100-page manual to assist engineers in designing both multiple and light duty V-belt drives. The manual contains a comprehensive set of drive tables for multiple belts; complete sheave data including construction, dimensions, and weights; complete fractional horsepower drive layouts, and comparison tables with information on quarter turn drives and hexagon double V-drives. Detailed information on U. S. Royal super-service V-belts, U. S. Rainbow steel cord belts and standard U. S. RainbowV-belts with equa-tensile cord section is also contained in the manual.

331

BAY AREA DEVELOPMENT PROGRAM—"Cooperation Makes It Greater" is the slogan of the booklet published by the **San Francisco Bay Area Council** reporting on 1948 progress and 1949 program activities. Council activities are reported in terms of civic and area-wide planning, industrial location factors, airport planning, economic surveys and housing studies, port and shipping development, proposals for Baywide advertising and public relations and the projects of Council committees. The booklet, 8 pages in two colors, closes with a list of sponsors and a summary listing of all Council publications and reports.

332

CONCRETE ADMIXTURE—**Portite Division of Hopper Products, Inc.,** New York City, has published a 4-page bulletin describing Portite, a new, foolproof, nontoxic admixture. The folder points out that Portite is, in its effect, three things: a controllable air entraining agent, a wetting or dispersing agent, and a promoter of cement hydration. Fourteen advantages of Portite are described under the headings: air entrainment control, water requirement reduction, segregation elimination, improved workability as low slump, reduction of bleeding, increase of bond to steel, shrinkage reduction, resistance to freeze-thaw effects, increased compressive strength, waterproofness, reduction of finishing time, allowance of early removal of forms, prevention of honeycombing and increase in yield.

333

ELECTRIC HOISTS — **Wright Hoist Division of American Chain & Cable Co., Inc.,** York, Pa., has released a new folder, DH-65, which describes their new advanced design line of Wright Speedway Electric Hoists. The 6-page, 3-color folder introduces the Speedway ½-ton to 10-ton as the 21 points of superiority of the electric hoists. It includes such informa- hoists, action photographs, illustrations of each type of hoists, cross-sectional view of the hoist frame and complete specifications.

334

INSULATING BOARD—**Johns-Manville,** New York City, is distributing a new 12-page brochure describing J-M's decorative insulating board. It describes ceiling panels, wall plank and building board, three of the most popular forms in which the insulating board is made. Full color illustrations suggest the many types of rooms which can be built with these versatile products either in new construction or remodeling. The text provides information on sizes, applications, and special features such as the ready-to-use Glazecoat finish and the Lightning Joint that conceals nailing.

335

DIESEL ENGINES — **Cummins Engine Co.,** Columbus, Ind., presents a booklet showing the application of Cummins Diesels in all types of logging equipment, and pointing out why, in the big timber country, there are more Cummins Diesels powering yarders and loaders than any other Diesel engine. Twenty-five photographs of logging equipment powered by Cummins Diesels are shown along with descriptive text.

336

FUNDAMENTALS OF LIGHTING —The Lamp Department of **General Electric Company's** Engineering Division has prepared an 86-page textbook pointing the

way toward a successful application of lamps and lighting equipment. The bulletin outlines fundamentals of the nature of light and how we see, the physics of light and its measurement, methods of control, characteristics of materials used in lighting equipment and the principles of illumination design. Illustrations, color and drawings are liberally used throughout the book, and six nomographs are included for lighting calculations.

337

STEEL FACILITIES — **Bethlehem Pacific Coast Steel Corp.,** South San Francisco, has prepared a colorful 40-page booklet describing the company's three steel-making plants, three fabricating works, four mill depots and five sales offices and the place they have in serving every major industry on the Pacific Coast with a full line of steel products. Pictures illustrate both the activities within most of the departments of the company's plants and various structures fabricated from Bethlehem Pacific's products. The book serves as a highly interesting and complete introduction to a major expanding Western industry.

338

TRAVELER CRANES AND EXCAVATORS—A 24-page catalog, published by the **Byers Machine Co.** of Ravenna, Ohio, pictorially illustrates the mobility and versatility of the Byers Traveler, Model "61W" ½-cu. yd. and Model "71W" ⅝-cu. yd. excavators and cranes. The booklet points out the adaptability of the rubber-tired Traveler to either construction work or a factory materials handling job. Using both photographs and line drawings, the most important mechanical features of the operating machinery are also described.

339

OIL PRODUCTION—The interesting story of the production of oil, from the first survey to the refined product, is told in the Petroleum Issue of the Production Road, magazine of the **Twin Disc Clutch Co.** of Racine, Wis. The 28-page pictorial review of the oil industry contains sections devoted to the exploration, drilling, pumping, piping and refining of oil. Profusely illustrated with action photographs of Twin Disc equipped machinery, it tells the complete story of oil and the part played by Twin Disc Clutches and Hydraulic Drives in its production.

340

HARD FACING ELECTRODES — **Lincoln Electric Co.,** Cleveland, Ohio, have published a "Weldirectory for Hard Surfacing." A preface discusses preparation of surfaces for parts to be hard-faced, dimensions of the weld required and other factors necessary for successful arc-welding surfacing. The remainder of the 16-page booklet is devoted to a guide for selection of the correct electrode for each application. Applications, properties and procedure are given for each classification.

341

ROLLING SCAFFOLDS—**The Patent Scaffolding Co., Inc.,** New York City, is distributing a 2-color pamphlet describing the Gold Medal Tubelox steel rolling scaffolds. The booklet points out advantages of the scaffolding for safety, adjustability, simplicity, appearance, fire hazard and service. Typical uses of the scaffolding are illustrated.

342

WESTERN CENTENNIAL — All of the 1949 issues of Westward, **Kaiser Steel Company's** handsome monthly magazine, will be dedicated to men who have built the West during the last 100 years. Featured in the January issue were the story of the growth of Sacramento, P.G.&E's Feather River Project, an analysis of steel production in the West, a story on flying contractors and some other very clever articles.

343

INSULATION ADHESIVES — **Benjamin Foster Co.,** Philadelphia, Pa., announces a new illustrated Reference Manual on sealers, surface coatings, cements, mastics, emulsions and other adhesives for use with various types of insulation in both industrial and marine applications. This 16-page manual gives a detailed discussion of the basic properties and uses—viscosity, coverage, flammability, heat flow and resistance to acids and alkalis of the complete line. Also included is a concise, informative reference chart which summarizes bonding and drying times, colors, temperature limits, types of thinner and pertinent application data for each type of adhesive material.

344

SELF-LOADING DIRTMOVER — Information on the new D Roadster Tournapull, one-man operated, self-loading dirtmover, is contained in a new broadside published by **R. G. LeTourneau Co.,** Peoria, Ill. Profusely illustrated, the broadside carries complete specifications on this new 9-ton tool, and lists and illustrates features which make it a profitable machine on a wide variety of jobs. These include its positive-ejection Scraper, travel speeds up to 25 m.p.h., all-weather torque-proportioning differential, 2-speed positive power

steer, electric control and 4-wheel air brakes.

345

REFRACTORIES — **Johns-Manville,** New York City, are distributing a small folder entitled "Two New Johns-Manville Refractories for Service to 3000F" and presenting pertinent information on 3X Blazecrete (for gunning and patching) and 3X Firecrete (for casting special shapes). It covers recommended uses and technical data such as cold compressive strength, modulus of rupture, per cent linear change, yield per lb., etc.

346

ENAMELING FORMED-METAL PRODUCTS—A 6-page folder describing in detail the construction, operation and advantages of its pickling and washing machine which prepares formed-metal products for enameling, painting or plating has been published by **The B. F. Goodrich Co.,** Akron, Ohio. The company claims that use of the machine reduces man-hour costs 30 to 75 per cent. Among features of the folder are a cut-away illustration of the machine, with descriptions of the most important parts and the roles they play. A table listing the solutions used in each of the ten sections, automatic cycle time and immersion cycle time is included.

347

PETROLEUM PRODUCTS — **Pennsylvania Refining Co.,** Cleveland, Ohio, is distributing new descriptive literature covering the Penn Drake line of petroleum and

specialty products. A 6-page folder, printed in two colors, gives a bird's eye view of the more than 1,000 standard and specialized Penn Drake products. Special emphasis is placed on the Penn Drake Petrosuls (petroleum sulphonates) which have innumerable industrial applications proved by wartime demands on the oil industry.

348

BUILDING INSULATION — A new handbook of insulation values is being made available by **Silvercote Products, Inc.**, of Chicago, Ill. The 108-page booklet lists 12,852 certified, F.H.A.-approved "U" values of various walls, floors and ceilings. Illustrating the book are 238 drawings showing typical wall, floor and ceiling sections. Drawings illustrate the proper position of the insulation to obtain stated "U" values. For maintenance engineers, builders and architects, the new book provides a handy, authoritative ready reference manual of calculated winter or summer "U" values for any set of building conditions. Copies of the handbook are free to qualified architects, engineers and builders.

349

SELF-PROPELLED CRANES—**Thew Shovel Co.**, Lorain, Ohio, has released a new 16-page bulletin illustrating 48 of the various applications of self-propelled cranes for industrial material and handling and construction operations. Described in detail are the Lorain Self-Propelled Cranes, that are single-engine, one-man operated cranes with four speeds in either direction. Applications of the self-propelled machines are illustrated in the fields of bulk material handling, construction, concrete products, excavating, pipe handling, public utilities and shipyard work among others.

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