25 years of WESTERN CONSTRUCTION

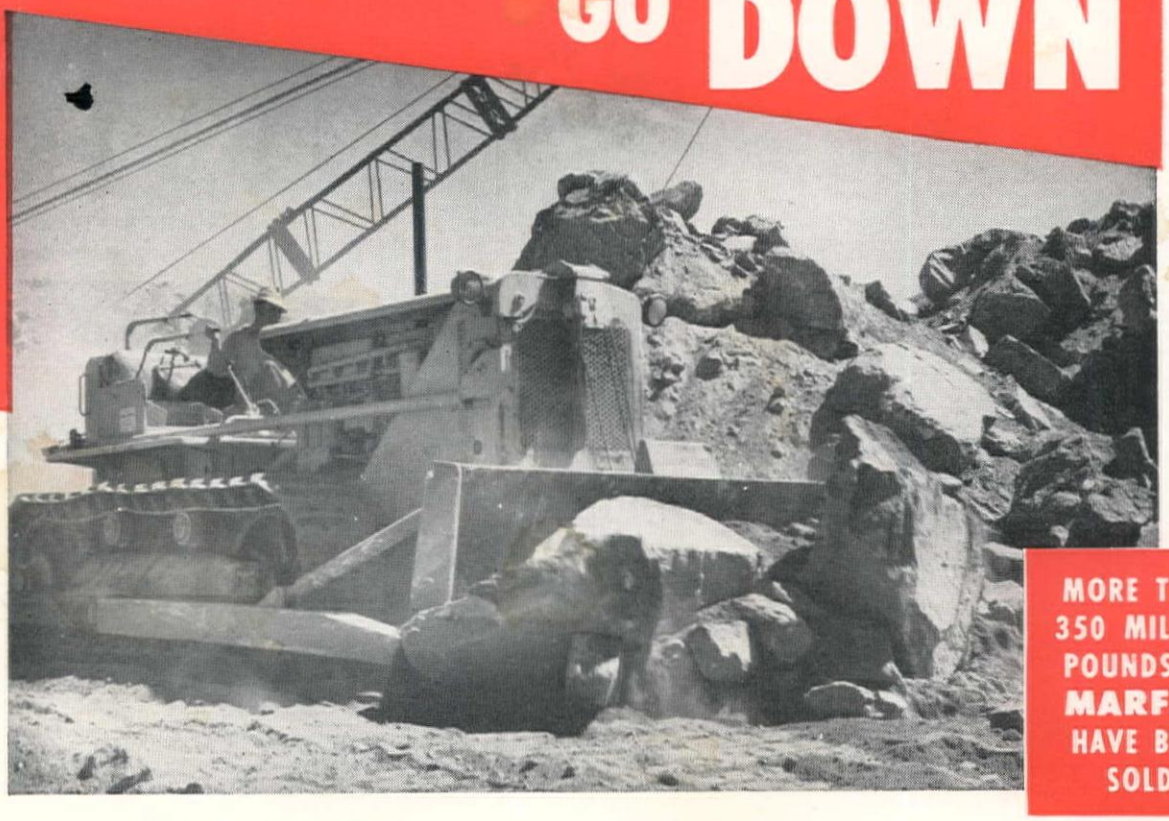
–1926–

DEDICATED
to the
engineering-construction
industry of The West, whose
members are unsurpassed
for their determination
and resourcefulness.

–1951–

JANUARY 1951

MAINTENANCE COSTS GO DOWN



MORE THAN 350 MILLION POUNDS OF MARFAK HAVE BEEN SOLD!

...when TEXACO MARFAK goes in

Texaco Marfak stays in bearings in spite of the roughest service your bulldozers, shovels, trucks and other equipment may get. *Texaco Marfak* is both adhesive and cohesive, won't pound or squeeze out, resists washout. You get longer lasting protection against wear and rust... positive assurance of longer parts life, lower maintenance costs.

In wheel bearings, *Texaco Marfak Heavy Duty* gives similar long-lasting protection against wear and rust... requires no seasonal change. It seals out dirt and moisture and seals itself in—assuring longer bearing life, as well as safer braking.

For further savings, lubricate engines—heavy-duty gasoline or Diesel—with *Texaco Ursa Oil X***. This fully detergent-dispersive oil cleans as it lubricates... keeps rings free, assuring better compression and combustion... keeps fuel consumption and maintenance costs down.

Let a Texaco Lubrication Engineer work with you to simplify your lubrication procedures and reduce your costs. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

TUNE IN... TEXACO presents MILTON BERLE on television every Tuesday night. METROPOLITAN OPERA radio broadcasts every Saturday afternoon.

YOU BUY A DRAGLINE

...to make money!

Perhaps in no other business does the difference between profit and loss depend so heavily on the performance of one machine. Your dragline is the heart of your job and you can't afford anything but the best for the heart of the job.

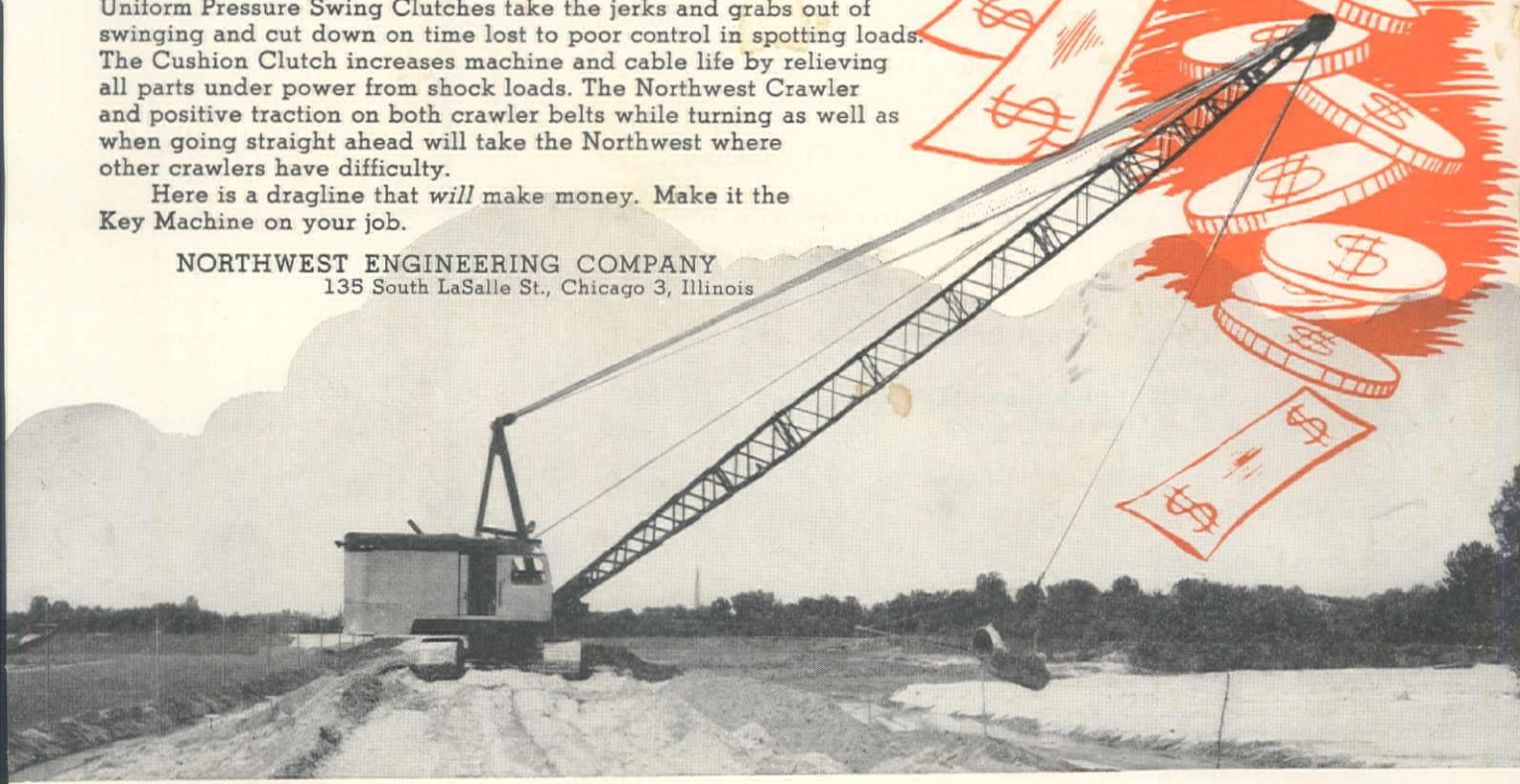
Northwest design brings you the stamina for dragline service — long travel and steady output.

Cast Steel Bases and Cast Steel Machinery Side Frames maintain shaft and bearing alignment in rough going. Simplicity assures easy upkeep and minimum down time. The "Feather-Touch" Clutch Control gives ease of operation without tubing, delicate valves or pumps (your Northwest can't be shut down because of control failure). Uniform Pressure Swing Clutches take the jerks and grabs out of swinging and cut down on time lost to poor control in spotting loads. The Cushion Clutch increases machine and cable life by relieving all parts under power from shock loads. The Northwest Crawler and positive traction on both crawler belts while turning as well as when going straight ahead will take the Northwest where other crawlers have difficulty.

Here is a dragline that *will* make money. Make it the Key Machine on your job.

NORTHWEST ENGINEERING COMPANY
135 South LaSalle St., Chicago 3, Illinois

NORTHWEST ADVANTAGES MEAN MORE YARDAGE



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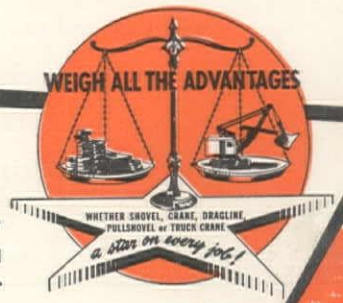

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WESTERN CONSTRUCTION

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SILVER ANNIVERSARY ISSUE FEATURES

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B.F.Goodrich

The tire that should lose but doesn't

WHEN water, sharp rocks and rubber start fighting—it's usually the tire that has the handicap. The water acts as a lubricant, causing the tires to spin — while the sharp rocks cut at the slipping rubber.

But the BFG Rock tires shown above are an example of how B. F. Goodrich builds tires to lick tough problems.

To resist cutting, these tires have a special, tough tread—compounded for rock service. To resist slippage, the heavy cleats on the shoulders are non-directional . . . they dig in for a non-slip bite, in forward or reverse. To give real shock protection to the cord body, these and other B. F. Goodrich off-the-road tires have a patented *nylon shock shield* (double in larger sizes).

Found only in BFG tires, the shock shield is made of two nylon cord breakers. This is vulcanized between the tread and cord body to protect the life of the tire against the shocks of hard service.

The Wallowa County Road Department office in Enterprise, Oregon, operators of the equipment shown above, have this to report: "The B. F. Goodrich tires have given longer and better all-around service than any other brand we have used." In other words, the tire that's hard to cut is the tire that cuts costs.

Whatever job your off-the-road equipment must perform, there's a special BFG tread built to help you do it better. In addition, you get the exclusive protection of the nylon shock shield at no extra cost.

So see your B. F. Goodrich dealer. And specify BFG tires for your new equipment. Enjoy the longer life and lower operating costs offered you by *The B. F. Goodrich Company, Akron, Ohio.*

RESEARCH KEEPS B.F.Goodrich FIRST IN RUBBER

NOW TWO MORE *Completely New*

HD-9

WEIGHT: 18,500 lb.
70 DRAWBAR Hp.
GM 4-71 DIESEL ENGINE
SPEEDS: 6 forward, to 5.68 mph.;
3 reverse, to 4.43

OUT AHEAD

Modern Allis-Chalmers Line sets New Tractor Standards

HD-5 HD-9 HD-15 HD-20

Each of these four Allis-Chalmers crawlers gives you a new yardstick for rating tractors. Each brings you a new kind of performance . . . plus new strength, operator comfort and service simplicity. For the finest in crawler tractors, see your Allis-Chalmers dealer.

SEE YOUR ALLIS-CHALMERS DEALER

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THE WORLD'S MOST MODERN LINE OF CRAWLER TRACTORS

Allis-Chalmers Tractors

NEW POWER RATING

POWER, WEIGHT, BALANCE put them in a class of their own — never such traction . . . such pulling, pushing or lifting ability. And the smooth-operating GM 2-Cycle Diesel engines work without strain under the most extreme conditions.

NEW STRENGTH

All parts are designed and built to carry their loads with a margin of safety. No need to go to a larger tractor just for strength alone. The HD-9 and HD-15 set new standards for tractor quality.

- ✓ For Greater Production
- ✓ For Easier Operation
- ✓ For Simplified Servicing

NEW DESIGN SIMPLICITY . . .

for Easier Control and Greater Operator Comfort—Easy-shift transmission • Self-energizing brakes • Booster steering controls • Adjustable, cushioned seat • Wide arm rests • Convenient controls and pedals • Full visibility • Instant electric starting.

for Simplified Servicing—Unit construction permits removing major assemblies without disturbing companion groups • Extended lubrication periods throughout—1,000 hours on truck wheels, idlers and support rollers.

Complete Line of Matched Equipment, Developed in Cooperation With Allied Manufacturers, Available For Both The HD-9 and HD-15.

HD-15

WEIGHT: 27,500 lb.
102 DRAWBAR Hp.
GM 6-71 DIESEL ENGINE
SPEEDS: 6 forward, to 5.80 mph.; 3 reverse, to 4.51

GUTS

When two-legged people have guts, they finish the fight and do the job.

Real guts—that's what the world admires—man or machine.

You can't define what makes guts in a man, but you can "analyze" the fighting, working, dogged innards of the Champ. So let's put the X-ray on the TD-24:

Drawbar Horsepower: 148 working horsepower delivered at the drawbar in official tests.

Synchromesh Transmission: you "shift on-the-go," with eight speeds forward, eight reverse for faster time cycles with more pay dirt per cycle.

Instant Speed Change: up or down one speed without declutching.

Planet Power Steering: all turns are easier . . . pivot turns, feathered turns, turns with power on both tracks.

Reserve Torque: gives the Champ the lugging ability to fight through temporary overloads.

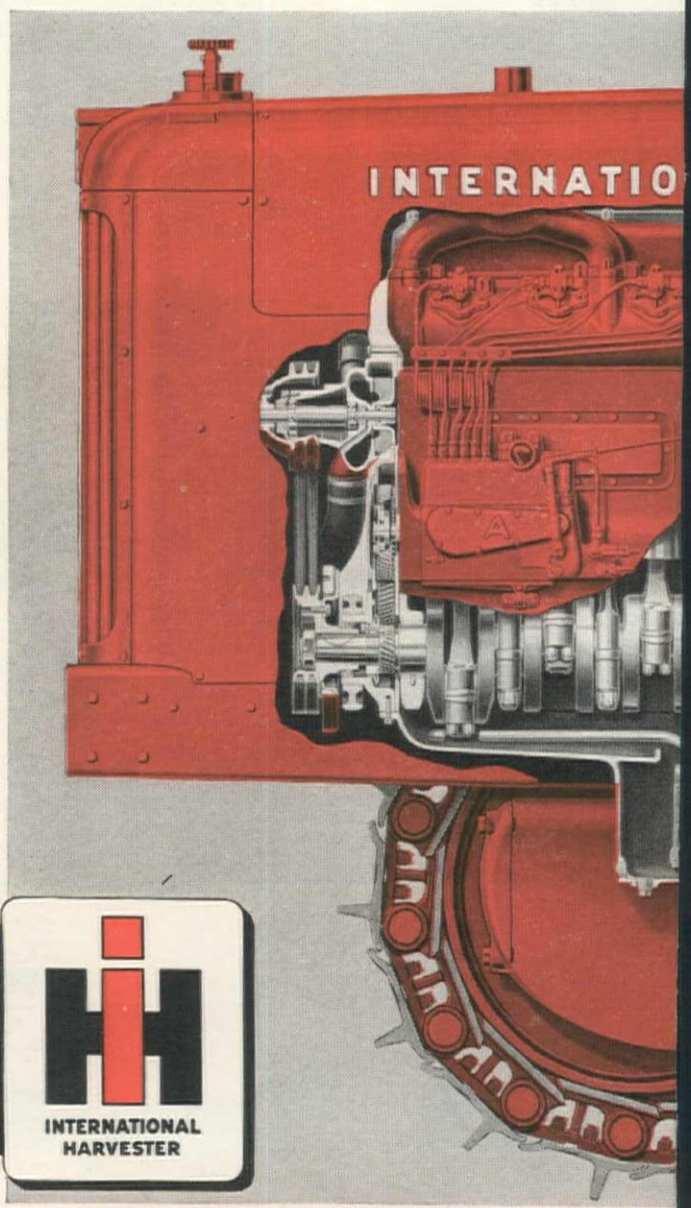
Easy Steering: finger-tip hydraulic controls.

All-Weather Starting: push-button, gasoline-conversion starting—an International exclusive—gets you on the job fast.

More Work: the TD-24 is doing more work—with more speed and more lugging ability—than any other crawler tractor on the market.

Look it over. Then ask your International Industrial Distributor to show you what it can do for you. You'll be a TD-24 man from then on in.

INTERNATIONAL HARVESTER COMPANY
CHICAGO 1, ILLINOIS



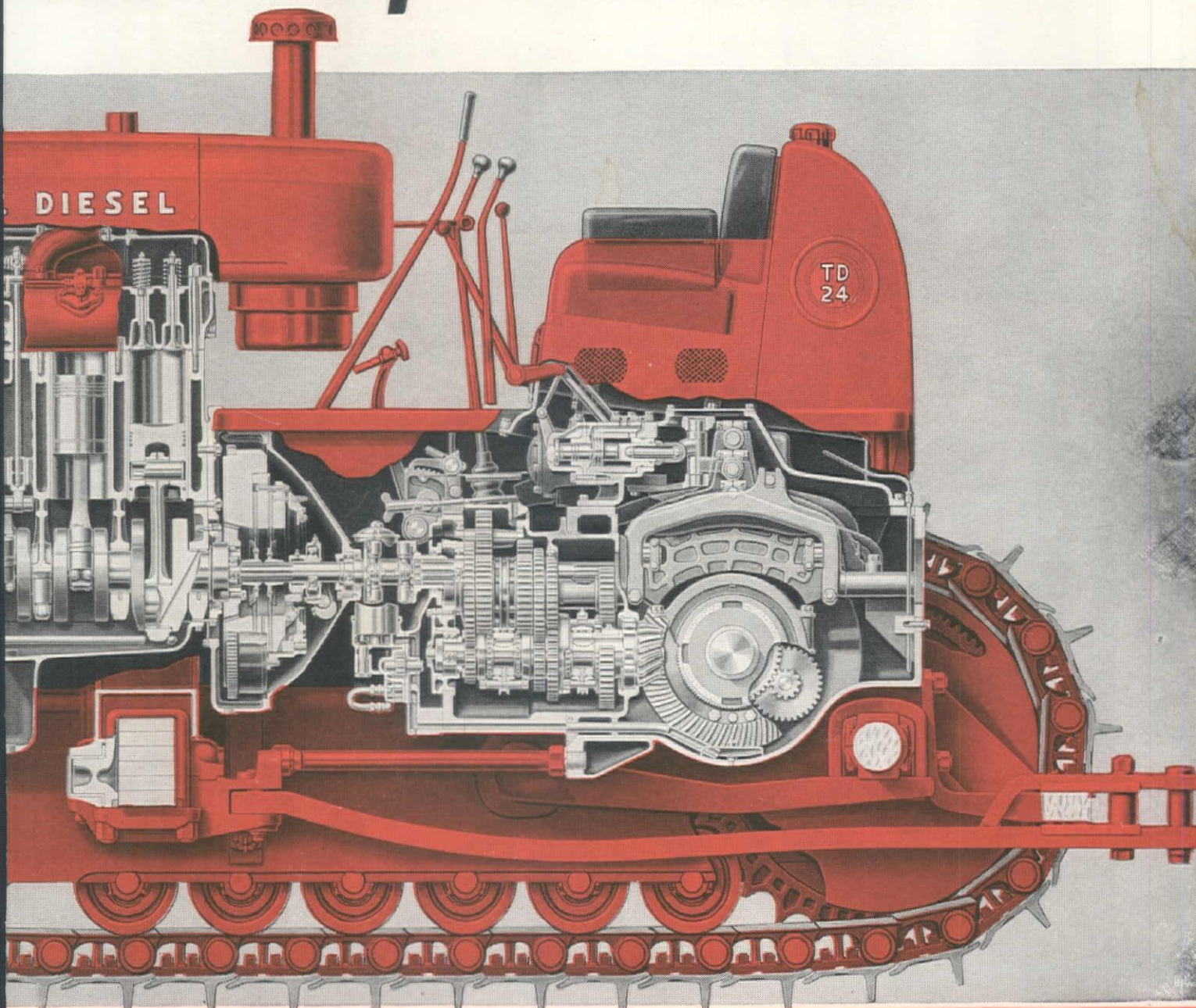
POWER THAT PAYS

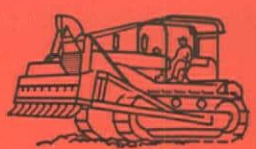
INTERNATIONAL

INTERNATIONAL HARVESTER

OF A CHAMP

inside story of the TD 24






THE
BAKER
THE NEW BAKER
HYDRAULIC & CABLE
ROOT RIPPERS
FOR
ALLIS-CHALMERS
HD-9, HD-15, HD-20
TRACTORS
HOTEL
WAGON WHEEL
DRY GOODS
Introducing
3
NEW ACTORS
for your
A-C Tractors
"An Earthy Show"
The RIPPER
HEADLINERS

3/4 min. loads 17 pay yds.

Equipped for earning extra profits, this Tournadozer has Angledozer on front . . . 2-drum PCU on rear for scraper hook-up.

TOURNADOZER delivers fast pusher service for contractors on Delta Mendota canal

United Concrete Pipe Corp., Baldwin Park, Calif., and Vinnell Co., Inc., of Alhambra, have 10,000,000 cu. yds. of dragline and scraper dirt to move on excavation, embankments and earth linings for California's Delta Mendota Canal and Firebaugh Wasteway in the Central Valley Irrigation Project. Sections of extremely heavy, wet, tough-to-load clay have been assigned to a fleet of 3 LeTourneau veteran Super C Tournapulls, and 3 extra-capacity, crawler-drawn scrapers. Here's how a LeTourneau 180 h.p. Super C Tournadozer, used as pusher, keeps the 3 oversize crawler-scraper rigs "humping" through heaviest digging:

Makes contact every 1⅙ min.

With its instant speed selection, Tournadozer makes smooth pusher contact . . . 180 h.p. push puts 17 pay yards into the scrapers in 110′ distance, and an average loading time of only 45 seconds. 2nd gear does it! Complete pushing cycle, including load, back-up and spot for the next contact, averages 1 min., 10 seconds.

That's typical pusher performance for this mobile, quick-maneuvering Tournadozer. There's plenty of loading power and ground-grip traction in its 4-wheel drive on giant, 21.00 x 25, low-pressure tires. It steps into any of 4 fast forward gears, or 2 reverse, at a flick of a speed selector lever . . . no foot clutching, no stops for shifting.

Drove 169 mi. in 11 hours

United Concrete Pipe Corp., and Vinnell Company's Tournadozer drove 169 miles from Sacramento to their job at Firebaugh in 11 hours . . . averaged over 15 m.p.h. through city and highway traffic. With top speed of 19 m.p.h. on rubber, it's easy to see why Tournadozer runs fast from one job to the next . . . makes quick on-the-job moves . . . gets more work done wherever pushing, pulling and dozing power is needed.

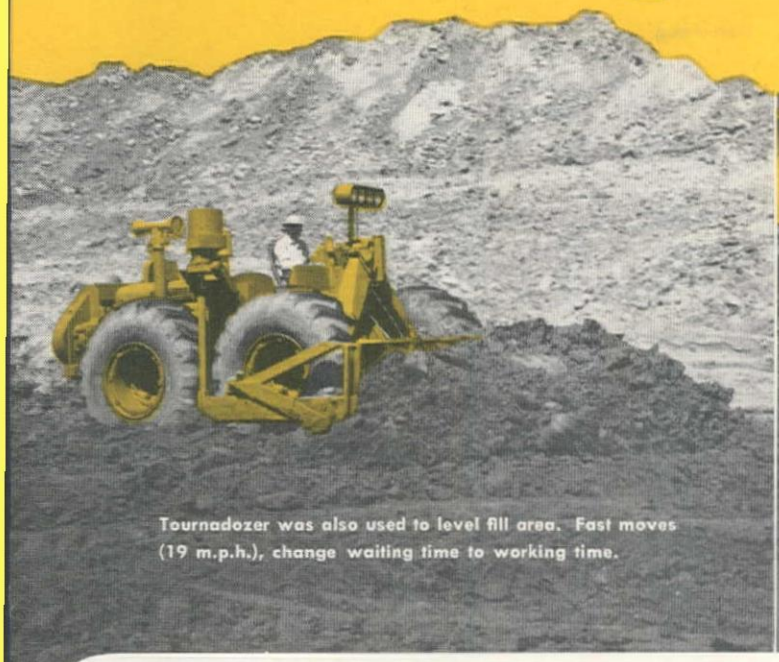
Better look into its big production possibilities . . . call your LeTourneau Distributor for more Tournadozer information NOW . . . don't wait another day!

LETOURNEAU
PEORIA, ILLINOIS

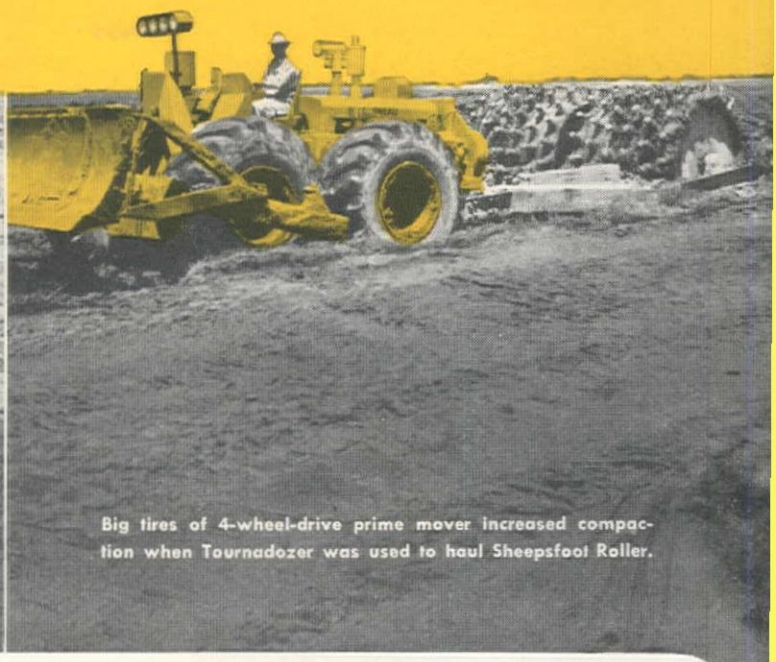
JOB-PROVED The World Over

TOURNADOZERS

with 180 h.p. PUSH *on rubber*



Tournadozer was also used to level fill area. Fast moves (19 m.p.h.), change waiting time to working time.



Big tires of 4-wheel-drive prime mover increased compaction when Tournadozer was used to haul Sheepsfoot Roller.

let us show you what TOURNADOZERS can do for you:

ARIZONA
Arizona Equipment Sales, Inc.
2750 Grand Avenue, P. O. Box 1472, PHOENIX

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Capitol Tractor & Equip. Co.
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Idaho Machinery Company
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J. K. Wheeler Machinery Company
POCATELLO

MONTANA
Montana Powder & Equipment Co.
12 East Lawrence Street, P. O. Box 1688, HELENA
3425 1st Avenue, South, P. O. Box 1597, BILLINGS

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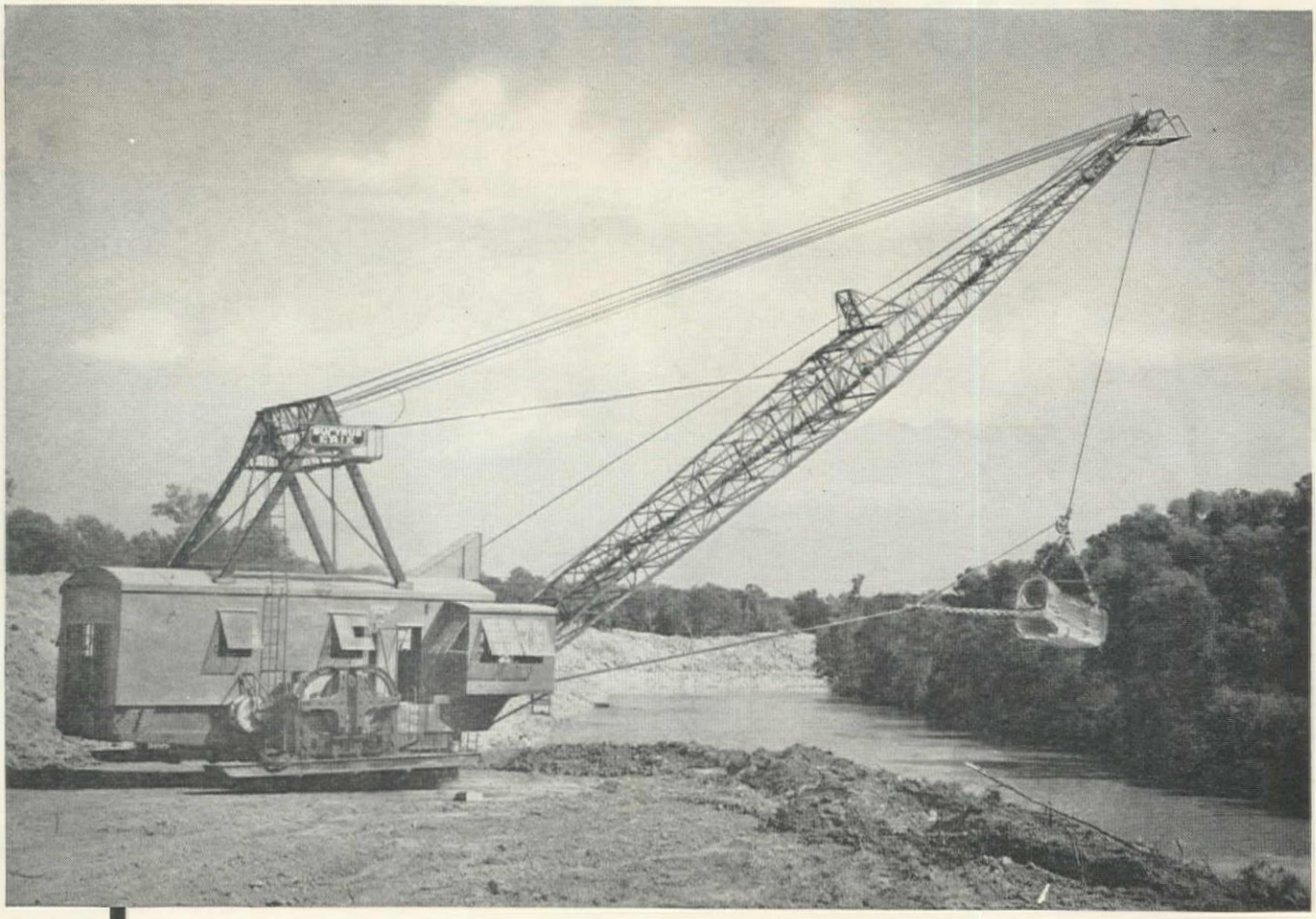
LeTOURNEAU LET EQUIPMENT

TOURNADOZERS* TOURNAPULLS* TOURNAROCKERS** TOURNAHOPPERS**

IT'S RUBBER THAT PUTS THE ACTION IN TRACTION



Smooth Walker...Smooth Worker...

An outstanding feature of Bucyrus-Erie walking draglines is the exclusive design of the walking mechanism itself. Combining strength and simplicity with freedom from rigid, pin-connected linkage, it provides safe, sure walking action without jerks or shocks to the machine. It enables a Bucyrus-Erie to travel over soft or wet spots, to detour dangerous ground conditions, to make maximum effective use of the machine's range and capacity. Convenient, fast-responding controls and unobstructed vision, backed up by big dependable machine parts, make the operator's job easier, permit him to work smoothly and efficiently for big output records every shift. With bucket capacities from 4 to 30 cubic yards and boom lengths to 250 feet, there is a Bucyrus-Erie walking dragline to meet any job requirement.

94L50

BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN

EUCLID PERFORMANCE

Pays Off

MORE LOADS PER HOUR
MORE PROFIT PER LOAD!

Illustration at left shows a Euclid scraper dumping approximately 20 cu. yds. of fill material at Hickory airport in North Carolina. Powered by a 275 h.p. diesel engine, this scraper has a top speed loaded of 28.2 m.p.h.

Above, a Rear-Dump "Euc" places 22 tons of earth and rock fill during construction of Chief Joseph Dam at Bridgeport, Washington. Other Euclids of this type have capacities of 10 to 34 ton payload, 125 to 400 h.p.

Carrying a heaped load of about 18 cu. yds., this Bottom-Dump hauls overburden at a big open pit bauxite operation in Arkansas. Bottom-Dump "Eucs" are powered by engines of 190 to 300 h.p., have capacities of 13 to 50 cu. yds.

Engineered specifically for heavy off-the-highway hauling, Euclids are standard equipment on many construction and industrial jobs, quarry and open pit mining operations. Combining large capacity and high speed, "Eucs" haul more loads at less cost per load.

Continuous performance records on hundreds of the toughest jobs are evidence of the dependability and long life built into every Euclid. With payload capacities ranging from 10 to 34 tons or 6.6 to 50 cu. yds., there is a Euclid model for every type of job and material. Backed by a competent world wide distributor organization, Euclid equipment pays off in lower hauling costs.

Your Euclid Distributor will be glad to discuss the advantages of using Euclids for your off-the-highway hauling jobs. Call or write for information or a hauling cost estimate.

The EUCLID ROAD MACHINERY Co. CLEVELAND 17, OHIO

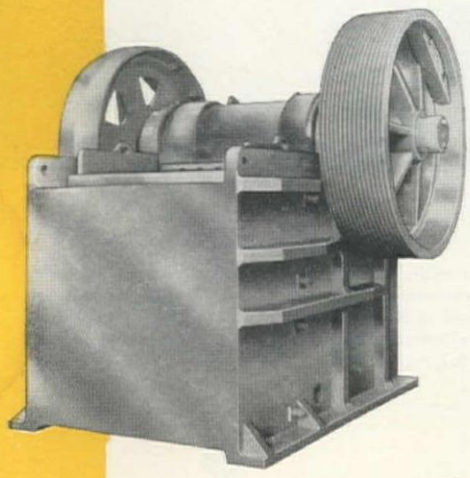
Calbe Address: YUKLID Code: BENTLEY

EUCLID THE PIONEER

EUCLIDS *Move the Earth*

GREATER PRODUCTION CAPACITY for INCREASED PLANT EFFICIENCY LOWER OPERATING COSTS INSTALL

for crushing

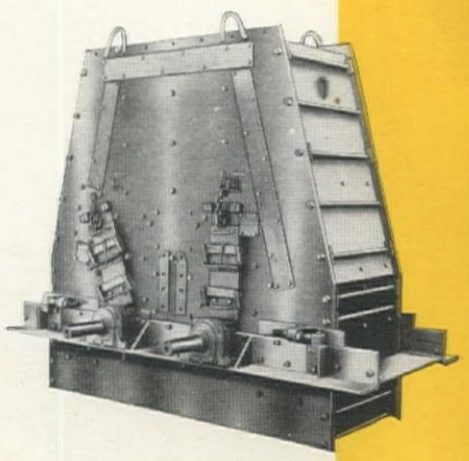


JAW CRUSHERS

HERE'S the high capacity primary crusher that sets the production pace for your entire plant! Cedarapids quality-built Jaw Crushers are the overhead eccentric type with one stationary jaw and one movable jaw and are engineered for *extra capacity* with smooth, steady performance plus low operating and maintenance costs. There's a size for every need from 6″ x 12″ to 32″ x 40″.

DOUBLE IMPELLER IMPACT BREAKERS

THIS is the unit that assures greater hourly tonnage capacities of the cubical shaped aggregate required in so many specifications today. Used for both primary and secondary reduction in many applications, its extremely high ratio of reduction eliminates much accessory equipment such as secondary crushers, screens, conveyors, etc. Less horsepower required because a high percent of material is broken in suspension. 50% less contact of stone on metal reduces wear on working parts. Four sizes available.



Use Cedarapids Crushers in your plant to be sure of meeting production schedules

TWIN JAW CRUSHERS

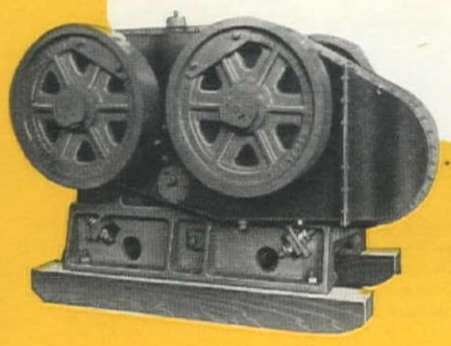
YOU get approximately twice as much capacity with a Cedarapids Twin Jaw Crusher as with a single-jaw crusher of the same size. This increased capacity is ideal for maintaining high production in pits with 50% or 60% of oversize material to be crushed. Rubbing between jaw plates is eliminated because both jaws move in-and-down as well as out-and-away in synchronized motion. A complete range of sizes.

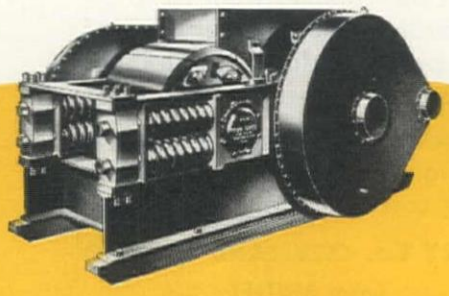
ROLL CRUSHERS

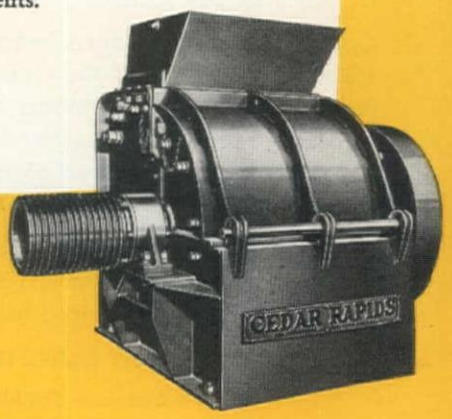
For secondary crushing, Cedarapids Roll Crushers assure high production of the required smaller size aggregates. Manganese steel roll shells, either smooth or corrugated, and large, heavy flywheels, plus other heavy-duty construction features provide maximum long life and economical operation. Cedarapids exclusive patented safety shear plates prevent crusher damage from foreign material. Sizes range from 16″ x 16″ to 40″ x 24″.

HAMMERMILLS

Cedarapids Hammermills feature a revolutionary principle of crushing to give more tons per hour of finer quality finished products than similar types of equipment of comparable size. They produce either crushed limestone up to 1½″, or agricultural lime, or a percentage of both, depending on the setting of the grates and speed of the rotor. Three sizes . . . 2033, 3033, and 4033, will meet all your requirements.







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

HALL-PERRY MACHINERY CO., Butte, Great Falls, Missoula and Billings, Mont.; INTERMOUNTAIN EQUIPMENT CO., Boise and Pocatello, Idaho, and Spokane, Wash.; WORTHAM MACHINERY CO., Cheyenne, Wyo.; KIMBALL EQUIPMENT CO., Salt Lake City, Utah; H. W. MOORE EQUIPMENT COMPANY, Denver, Colo.; JACK SAHLBERG

CEDARAPIDS

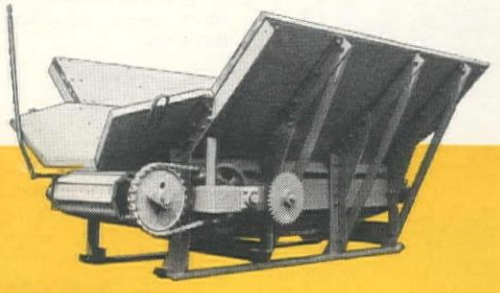
AGGREGATE PRODUCING UNITS *Now!*

for material handling

CONVEYORS
Cedarapids portable belt conveyors with their own power unit are the flexible and economical answer to aggregate handling problems. Either the channel frame or lattice frame type can be supplied in 30′, 40′ or 50′ lengths and 18″ or 24″ widths.

FEEDERS
Apron type or reciprocating feeders provide a smooth, workable flow of material to crushers, conveyors and bucket elevators, preventing overloads and surges. Available in a wide variety of sizes for all types of aggregate or asphalt plants.

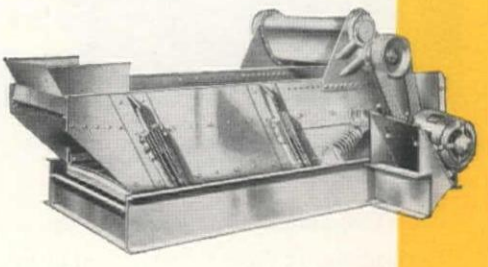
BINS
All-steel storage and loading bins give sturdy, dependable storage facilities for all types of prepared material. Jack leg and knockdown types are available with or without partitions. Special sizes and types can be built to order.



for screening

HORIZONTAL VIBRATING SCREENS

Here is the most efficient screen available today! Its better screening action, highly accurate gradation and large capacity combine to give you faster and more profitable screening at lower cost. Sizes range from 36″ x 8′ to 48″ x 14′ in single, double or triple deck styles. In addition, the Cedarapids line contains screens for special uses in a wide variety of sizes, including ag-lime screens, inclined vibrator screens and revolving screens.



CONGRATULATIONS

To *Western Construction*, on your 25th Anniversary, as we grow old together. One of the first Iowa Manufacturing Company advertisements appeared in 1926, before you were a year old and we were hardly three, featuring a revolutionary idea—a portable plant in a single unit—The Cedar Rapids "One Piece Outfit." Today we offer a complete line of portable aggregate producing and bituminous mixing equipment that will fit all your production needs and pocketbook as well.

IOWA MANUFACTURING COMPANY

Cedar Rapids, Iowa, U. S. A.

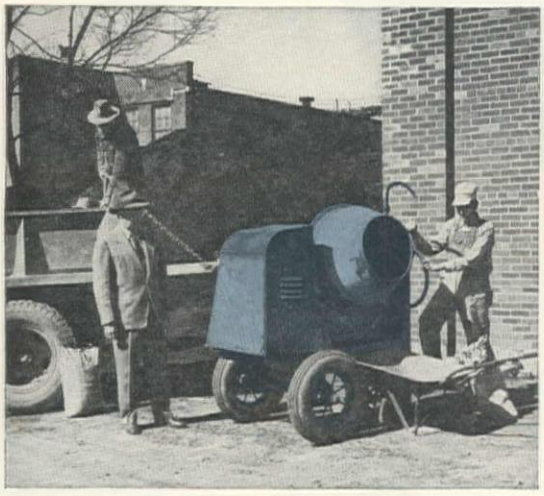
Cedarapids

Built by IOWA

BLUE BRUTE USERS AGREE:

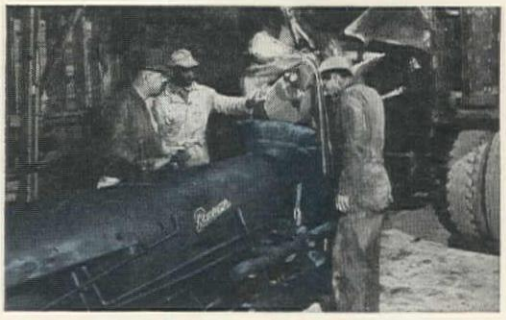
"It's a Great Line of Mixers!"

FOR CENTRAL MIXING This modern plant of the Clark Certified Concrete Company, Inc., of Baltimore, Md., produced 125,000 yds. of pre-mixed concrete during the past year. Vice-President Duncan writes: **"Your Blue Brute 84-5 Stationary Mixer has proven entirely satisfactory. Maintenance costs have been practically nothing."**



FOR PORTABLE MIXING. Le Roy W. Vival, chief engineer of the O'Sullivan Rubber Corporation, Winchester, Va., reports: **"We are extremely gratified by our Blue Brute 3½S Tilting Mixer, which has had two years of constant, severe use. It is extremely mobile, well constructed and performs excellently. Long exposure has not decreased its efficiency. The mixing cycle is fast and the mix consistently uniform. It is a pleasure to endorse and recommend this equipment."**

FOR TRANSIT MIXING. President Bob McCorkle of the Abilene, Texas, Concrete Company, gives his reasons for re-ordering Blue Brute Hi-Up Truck Mixers: **"We have compared competitive makes on our jobs and find your Hi-Ups best in every way. Maintenance costs have been negligible. Just purchased your first chain-drive Hi-Up and find it even better than the older machines — faster charging and discharging, easier to maintain and smoother running."**



FOR PLACING. In building the Washburn vehicular tunnel under the Houston, Texas, ship channel, the "Trench method" of construction was used. The last yard or two of concrete placed in each of the section joints had to be placed *straight upwards* — a tricky pouring problem. Merritt-Chapman & Scott Corporation reports **an easy solution was found with the aid of a Blue Brute Pneumatic Placer, which performed excellently.**

Yes, among Blue Brute owners it's a never-ending story of more concrete at lower cost, trouble-free operation, time and money saved in every detail of mixing operations. Why not look into this proof that *there's more worth in Worthington*? See your nearby Worthington-Blue Brute Distributor, or write for bulletins on mixer types in which you're interested.

NATIONAL READY MIXED CONCRETE ASSOCIATION NRMCA

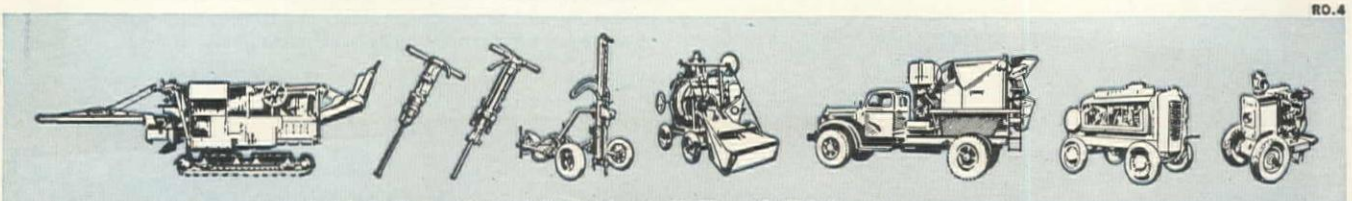
Worthington Pump and Machinery Corporation
Construction Equipment Department
Harrison, New Jersey

Distributors In All Principal Cities

WORTHINGTON

BUY BLUE BRUTES

RD.4



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

18 COBRAS

perform for Utah Construction Company

WOOLDRIDGE

Two big Oregon contracts find 18 Wooldridge Cobras at work for Utah Construction Company.

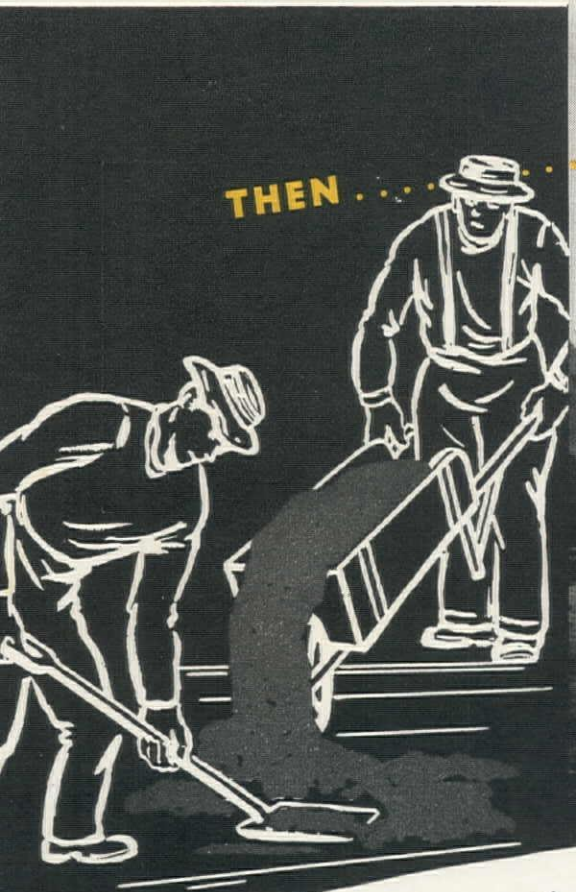
There's no greater challenge to men and equipment than the rugged terrain of the Pacific Northwest. On two big Oregon rail and highway relocation contracts, Utah Construction Company met this challenge with 18 Wooldridge Cobras working 16 hours per day. Ten units were used to move tough rocky soil and sticky clay over mile-long hauls on the Lookout Point Dam project. The other eight Cobras are removing 650,000 cu. yds. of gravel from a mid-stream island of the Columbia River for the McNary Dam project. On a typical 7,000-foot cycle, these eight Cobras moved 738 PAY YARDS per hour. Again and again performance records like this prove that Cobras have the ruggedness to *maintain* constant high-speed operation month after month. Simplified maintenance minimizes down-time to measure every hour in pay yards. Watch the new Cobras in action—study performance records—get the complete Cobra story from your Wooldridge Distributor, and see how you can up your profits, too.

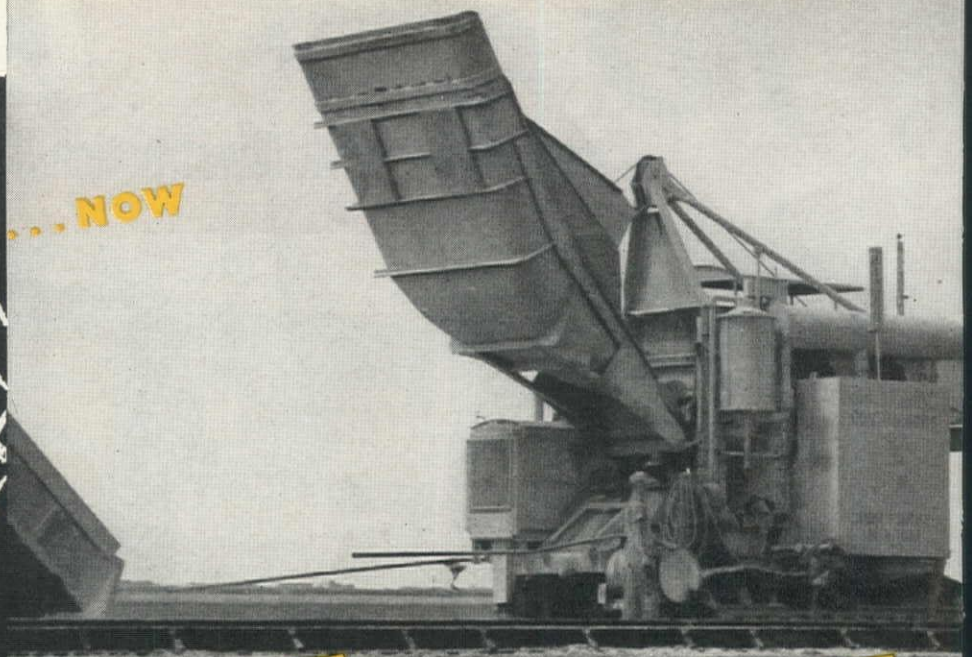
WOOLDRIDGE MANUFACTURING COMPANY
Sunnyvale, California • 5345 North Winthrop, Chicago 40, Ill.

WOOLDRIDGE EARTHMOVING EQUIPMENT

PROVED AND APPROVED FOR EVERY TYPE OF EARTH-MOVING JOB

BLAW-KNOX





PAVING FORMS

MULTIFOOTE PAVER

Famous Blaw-Knox Firsts

MATERIAL HANDLING

CLAMSHELL BUCKETS
FIRST with the largest line of clamshell buckets to meet all your needs.

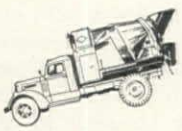
CONCRETE BUCKETS
FIRST big concrete buckets for handling huge quantities of low slump concrete.

BULK CEMENT PLANTS
FIRST bulk cement plants for mechanically handling large volume of cement.

AGGREGATE BATCHING PLANTS
FIRST aggregate batching plants brought accurate measurement of aggregates to meet strict concrete specifications.

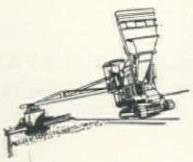
MIXING

ADNUN
FIRST black top paver, the ADNUN, developed by The Foote Co., to lay all types of black top mixes at big volume rates.



TRUKMIXER
FIRST truck mixer with the revolving hopper that eliminated seal maintenance

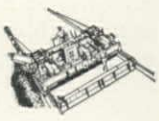
MULTIFOOTE
FIRST concrete paver, the Multifoote, and the only construction machine ever to receive a gold medal from the American Institute.



PAVING

FINISHER
FIRST concrete finishing machine to apply vibration to a concrete paving slab in combination with concrete paving spreader resulting in higher speeds and superior quality.

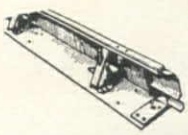
SUBGRADER
FIRST subgrading machine using the vibration principal for accurately preparing subgrade in hardest material.



SPREADER
FIRST blade type concrete paving spreader helped build Pennsylvania Turnpike, now considered a "must" on concrete paving of roads and airports.

FORMS

PAVING FORMS
FIRST self-aligning steel paving forms —now saving money and speeding concrete paving jobs everywhere.



STEEL STREET FORMS
FIRST steel street forms in a range of shapes and sizes that meet all your curb, sidewalk, and curb and gutter jobs.

HEAVY FORMS
FIRST heavy steel forms were used on the Panama Canal. Since then, thousands of other monolithic concrete projects have been built with Blaw-Knox forms.

has set the pace for 100% mechanized concrete construction since 1906 . . .

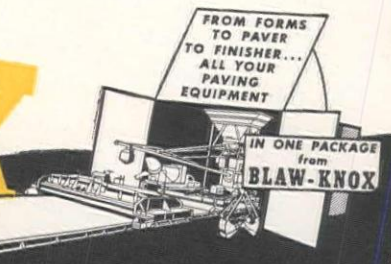
FIRST

SETTING the pace through the years and staying in first place definitely established the leadership of Blaw-Knox in the development of equipment that has mechanized all the operations in concrete construction. Whatever the job —building the Panama Canal, the nation's big dams, paving Main Street or making the curb in front of your home—all the facilities, skill and experience of Blaw-Knox have been devoted to doing it better, faster and at lower cost. The result is an enviable list of FIRSTS now consolidated in the Blaw-Knox Complete Package of equipment for 100% mechanization of concrete construction sold and serviced by a nation-wide distributor organization.

BLAW-KNOX DIVISION of Blaw-Knox Co.
Farmers Bank Bldg., Pittsburgh 22, Pa.

THE FOOTE CO., INC.
(Subsidiary of Blaw-Knox Co.)
Nunda, New York

BLAW-KNOX



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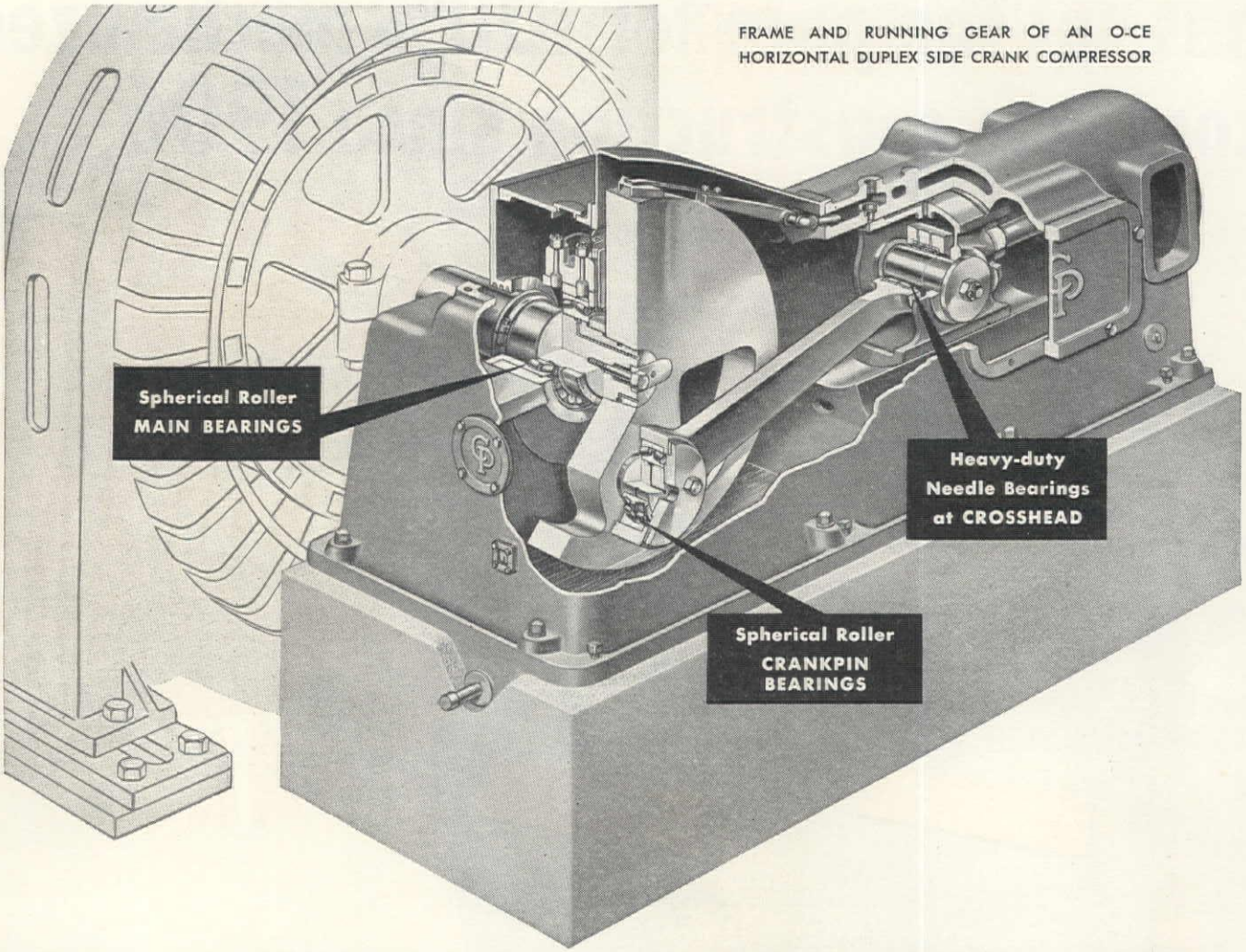


FRAME AND RUNNING GEAR OF AN O-CE
HORIZONTAL DUPLEX SIDE CRANK COMPRESSOR

FIRST WITH ROLLER BEARINGS THROUGHOUT

IN A HORIZONTAL DUPLEX COMPRESSOR

- SPHERICAL ROLLER MAIN BEARINGS
- SPHERICAL ROLLER CRANKPIN BEARINGS
- HEAVY-DUTY NEEDLE BEARINGS AT CROSSHEAD

Chicago Pneumatic's Class O-CE AIR COMPRESSORS are the first horizontal duplex, side crank compressors to have anti-friction roller bearings throughout . . . spherical roller main and crankpin bearings . . . heavy-duty needle bearings at the crosshead pins.

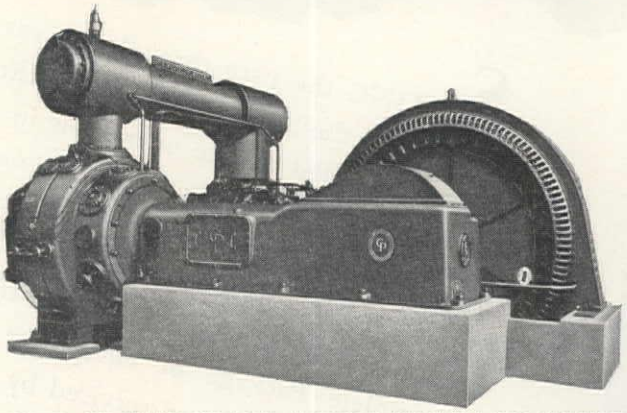
To the user, "roller bearings throughout" means easier and cheaper maintenance, and no possibility of improper bearing adjustment with resultant serious damage to frame and running gear.

Roller crankpin bearings permit the use of solid-end connecting rods—the strongest, safest type.

This revolutionary innovation is made possible by the recent development of the oil injection method of bearing and crank disc installation and removal. This simple method, requiring only a hand-operated oil pump and ordinary hand tools, is employed also for the application or removal of gears, couplings and sleeves on shaft ends.

Class O-CE Motor-driven Compressors are furnished in sizes up to 2000 h.p.

Write for Bulletin 726-5



CLASS O-CE TWO-STAGE MOTOR-DRIVEN COMPRESSOR

CHICAGO PNEUMATIC TOOL COMPANY
General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

TIMKEN® alone offers all 3 rock bit types

and a complete Rock Bit Engineering Service!

HAVING rock bit troubles? If you think your unit bit cost or cost per foot of hole is too high—or drilling is too slow—get the help of the Timken Rock Bit Engineering Service *now*. Only Timken® rock bit engineers have *all three* types of bits to choose from:

1 **MULTI-USE**—gives lowest cost per foot of hole when full increment of drill steel can be drilled and when control and reconditioning of bits are correct.

2 **CARBIDE INSERT**—for extremely hard and abrasive ground. Drillers spend less time changing bits.

3 **ONE-USE "SPIRALOCK"**—for use where reconditioning is impractical or undesirable. Lowest unit cost. Has revolutionary new "Spiralock" union.

Timken rock bit engineers are the world's largest field organization devoted exclusively to rock bit problems. They've been helping to solve those problems for more than 17 years and their research leads the field.

FREE BOOKLET! Illustrations and detailed descriptions of the full line of bits. Information on engineering service. Write to The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO".

TIMKEN

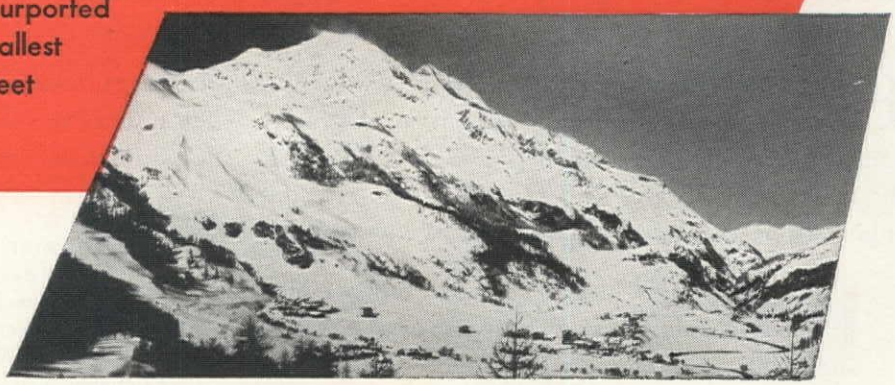
TRADE-MARK REG. U. S. PAT. OFF.

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

3 LIDGERWOOD high speed electric cableways at . . .

TIGNES DAM IN THE FRENCH ALPS • *(being built by Electricite de France)*

Tignes Dam is purported to be the world's tallest dam—height: 613 feet



Designers and builders of Special Large Hoisting Machinery of every type; Electro-Hydraulic Marine Auxiliary Machinery; "Denny-Brown" Ship Stabilizers and Construction Equipment.

LIDGERWOOD INDUSTRIES, INC.

7 DEY STREET, NEW YORK 7, N. Y.

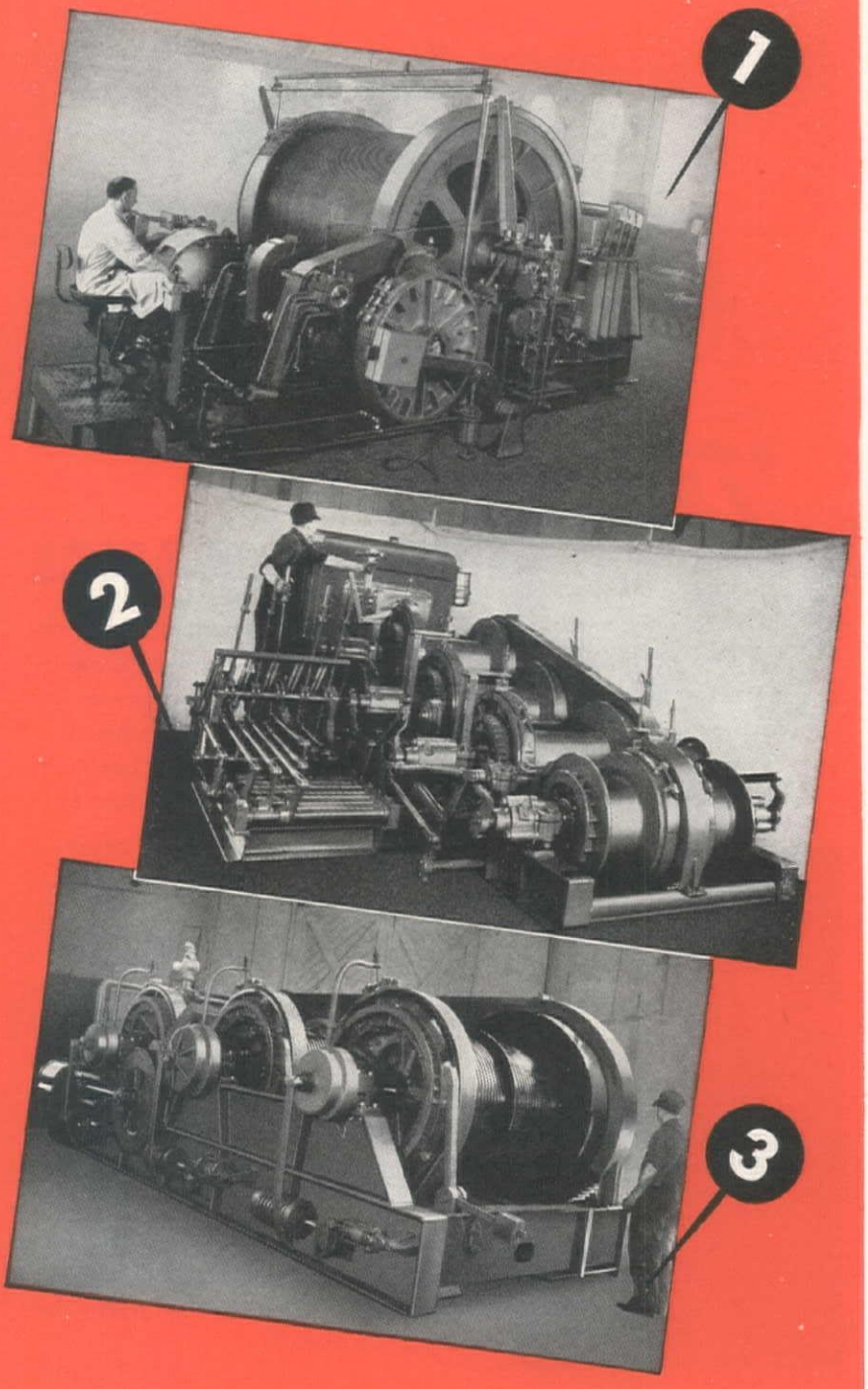
hoists...ENGINEERED AND

designed to suit...yet built from standard parts

Because Superior-Lidgerwood-Mundy hoists are designed and built to specific needs, they perform your lifting tasks more easily and economically.

Because they are built with standard parts which may be modified and recombined, various additional types are available.

Lidgerwood hoist designs have been *proved* on construction jobs all over the world for the past 77 years. Let this versatile experience solve your next hoisting problem. For more complete information, write for Bulletin M 515.



1. Freight and Passenger Incline Hoist (250 h.p.)
2. Five Drum Gas Hoist with Torque Converter (100 h.p.)
3. Three Drum Steam Derrick Hoist. (Duty 55,000 lbs. single pull line at 60 f.p.m.)

Designers and Builders of Mine, Shaft, Incline, Standard Contractor's and Special Hoists of every description; Car Pullers; Steam, Electric and Gas Marine Deck Auxiliary Machinery.

OVER 200 YEARS OF ACCUMULATED EXPERIENCE
1495 SUPERIOR 1873 LIDGERWOOD 1869 MUNDY

Superior–Lidgerwood–Mundy Corporation

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NEW YORK OFFICE–7 Dey St., New York 7, N. Y. **EXPORT OFFICE–50 Church St., New York 7, N. Y.**

Cable Address — BROSITES, NEW YORK

Trouble-Free PERFORMANCE

"It's the only machine we've had for any length of time that has had no major repairs." That's what William Wylie, equipment foreman, says about the MICHIGAN ½ yd. Crawler Excavator owned by A. G. Woods Company, Windsor, Connecticut. Yes . . . it's quite a record for an excavator that has been *"worked hard," 10 to 14 hours a day for a year and a half.*

At Woody Crest Housing Development in West Hartford, Connecticut, the MICHIGAN digs service, sewer, water and drainage ditches . . . excavates for septic tanks and basements . . . loads trucks. Digging 450 feet of trench and laying the eight inch pipe is an average day's work.

Service records like this are typical for MICHIGAN Excavator-Cranes. Why settle for less? When *you* need an excavator-crane . . . investigate MICHIGAN . . . you'll agree it's *your best buy!* Write, wire or phone for complete details.

MICHIGAN POWER SHOVEL COMPANY
430 Second Street, Benton Harbor, Michigan, U. S. A.

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JAMES CASHMAN
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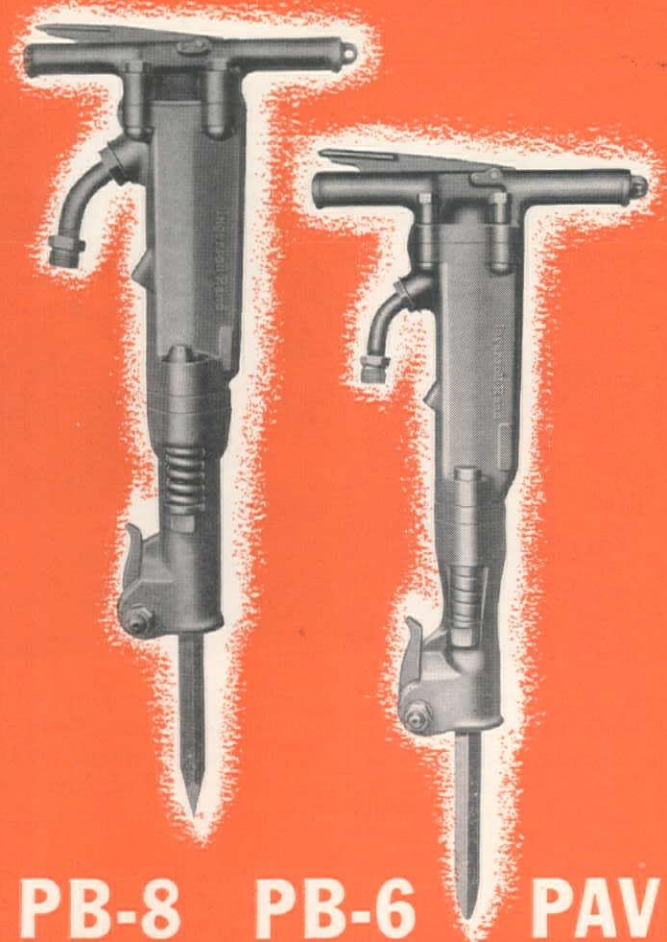
ROUGH and TOUGH

ON PAVEMENTS

but so much

EASIER

on your operators!



I-R paving breakers are built to give and take a beating — to slug it out on your toughest pavement and demolition jobs, with minimum wear and tear on both the machine *and the operator*.

They're easy to manipulate—with big sturdy handles, long smooth surface for the knee in prying, and excellent working balance. The air connection is out of the way, and the latch bolt is easy to open or close. A gradual throttle release with automatic cutoff gives easy starting, better speed control.

Other features include a new double-kicker port valve — full air cushioning — four-bolt handle — oil reservoir and metering device for proper lubrication of all parts.

Use the 82-lb. PB-8 for the heaviest duty service, and the 58-lb. PB-6 where a lighter-weight machine is needed.

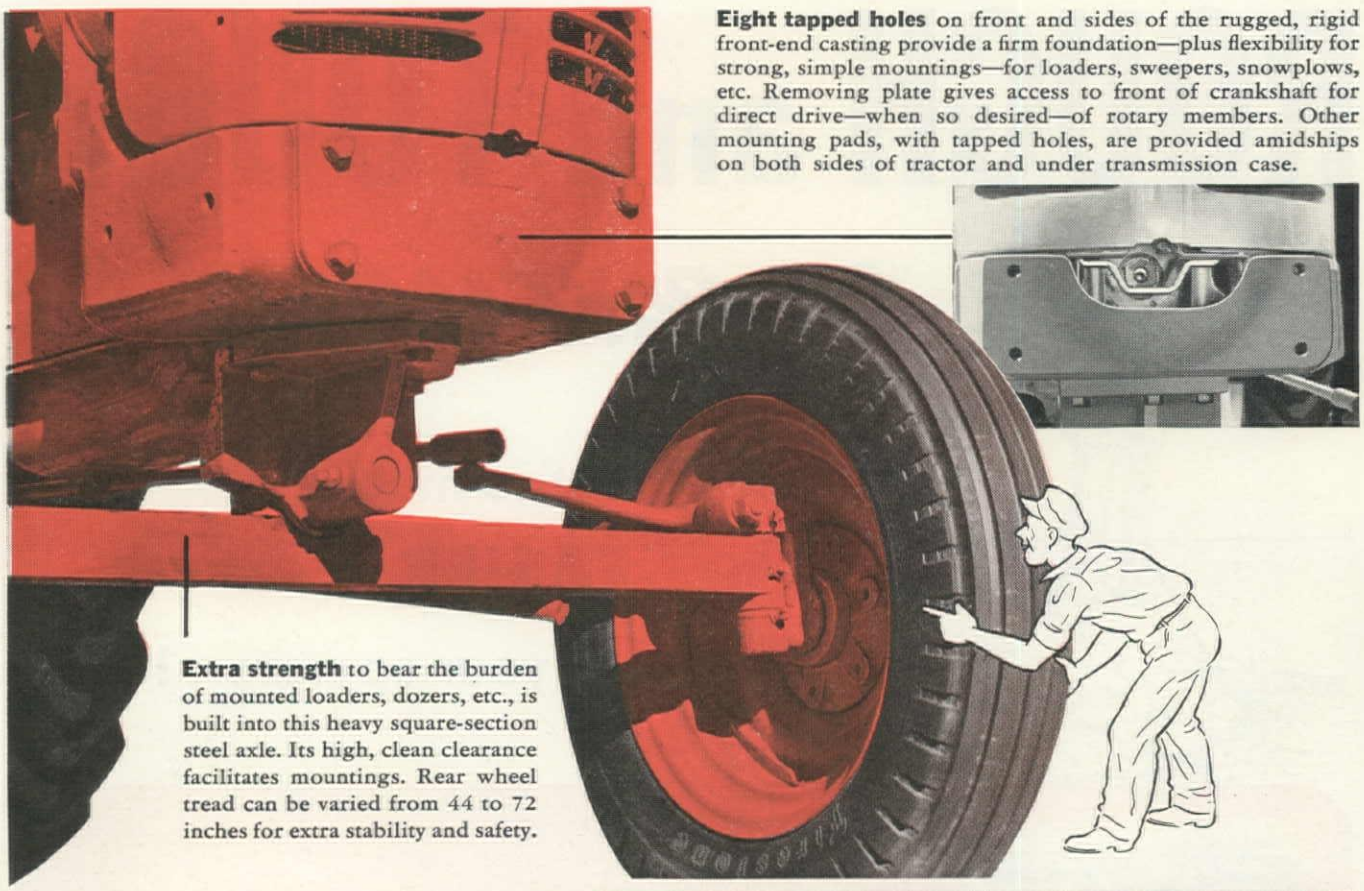
Ask your I-R representative for full details.

PB-8 PB-6 PAVING BREAKERS

529-5

Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N. Y.



Eight tapped holes on front and sides of the rugged, rigid front-end casting provide a firm foundation—plus flexibility for strong, simple mountings—for loaders, sweepers, snowplows, etc. Removing plate gives access to front of crankshaft for direct drive—when so desired—of rotary members. Other mounting pads, with tapped holes, are provided amidships on both sides of tractor and under transmission case.

Extra strength to bear the burden of mounted loaders, dozers, etc., is built into this heavy square-section steel axle. Its high, clean clearance facilitates mountings. Rear wheel tread can be varied from 44 to 72 inches for extra stability and safety.

Only Tractor of Its Size BUILT for FRONT-MOUNTED Equipment

Hayward Equipment Co.....Los Angeles, Calif.
Contractors Machinery Co.....San Francisco, Calif.
Lake County Equipment Co.....Lakeport, Calif.
E. O. Mitchell, Inc.....Bakersfield, Calif.
Liberty Truck & Parts Co.....Denver, Colo.
Western Equipment Co.,
Boise & Idaho Falls, Idaho and Spokane, Wash.
Hilton's, Inc.....Las Vegas, New Mexico
Electric Tool & Supply Co.....San Bernardino, Calif.
Growers Tractor & Implement Co.....Sacramento, Calif.
Hiway Farm Equipment Co., Inc.....Modesto, Calif.
Farmers Machinery & Supply Co.....Reno, Nevada
Foulger Equipment Co.....Salt Lake City, Utah
Nelson Equipment Co.....Portland, Oregon - Seattle, Wash.
Wortham Machinery Co.,
Cheyenne, Sheridan and Greybull, Wyoming-Billings, Montana

• There is one tractor in the 2500-pound class designed all the way through to work with front-mounted equipment. Besides its structural strength and strategic locations for mountings, the Case Model "VAI" provides rotary motion at any or all of three places —the crankshaft in front, pulley shaft on right side, and regular power take-off at rear center.

The Case "VAI" is a complete tractor. It needs no costly changes or extras in order to stand up under mounted equipment or other heavy duty. Electric starting and lighting are standard equipment. Let your Case industrial dealer show you how much your money will buy in the "VAI." J. I. Case Co., Racine, Wis.

CASE

New tool steps up production

"CATERPILLAR" MOTOR GRADER WITH DOMOR ELEVATOR ATTACHMENT AVERAGES 40 TO 50 LOADS PER HOUR

Now the versatile "Cat" Motor Grader is more useful than ever. With the new DoMor Elevator Attachment, it becomes a one-man Elevating Grader that steps up casting and loading and steps down costs.

Here you see a "Cat" No. 12 Motor Grader with the DoMor Elevator at work in a stone quarry in Kentland, Indiana, for the Moellering Construction Co., Fort Wayne. The vein of rock varies from shallow to complete drop-offs. The "Cat"-DoMor unit is stripping overburden and loading it into trucks at the rate of 1 every 35-45 seconds. One day's production averaged about 440 loads in 10 hours. There is also a 1½ yd. shovel on the job. E. O. White, Superintendent, says: "We have 35 trucks on the job and they can't keep up with the DoMor. It has produced more than 2 loads to 1 over the shovel."

For information about this new tool, see your "Caterpillar" dealer. With the increasing use of "Caterpillar" equipment both for military needs and for maintaining the civilian economy, it's a good move to see him today. Talk over your needs. He has a complete stock of parts to keep your present equipment in running order and will do his utmost to make prompt delivery of new machines.

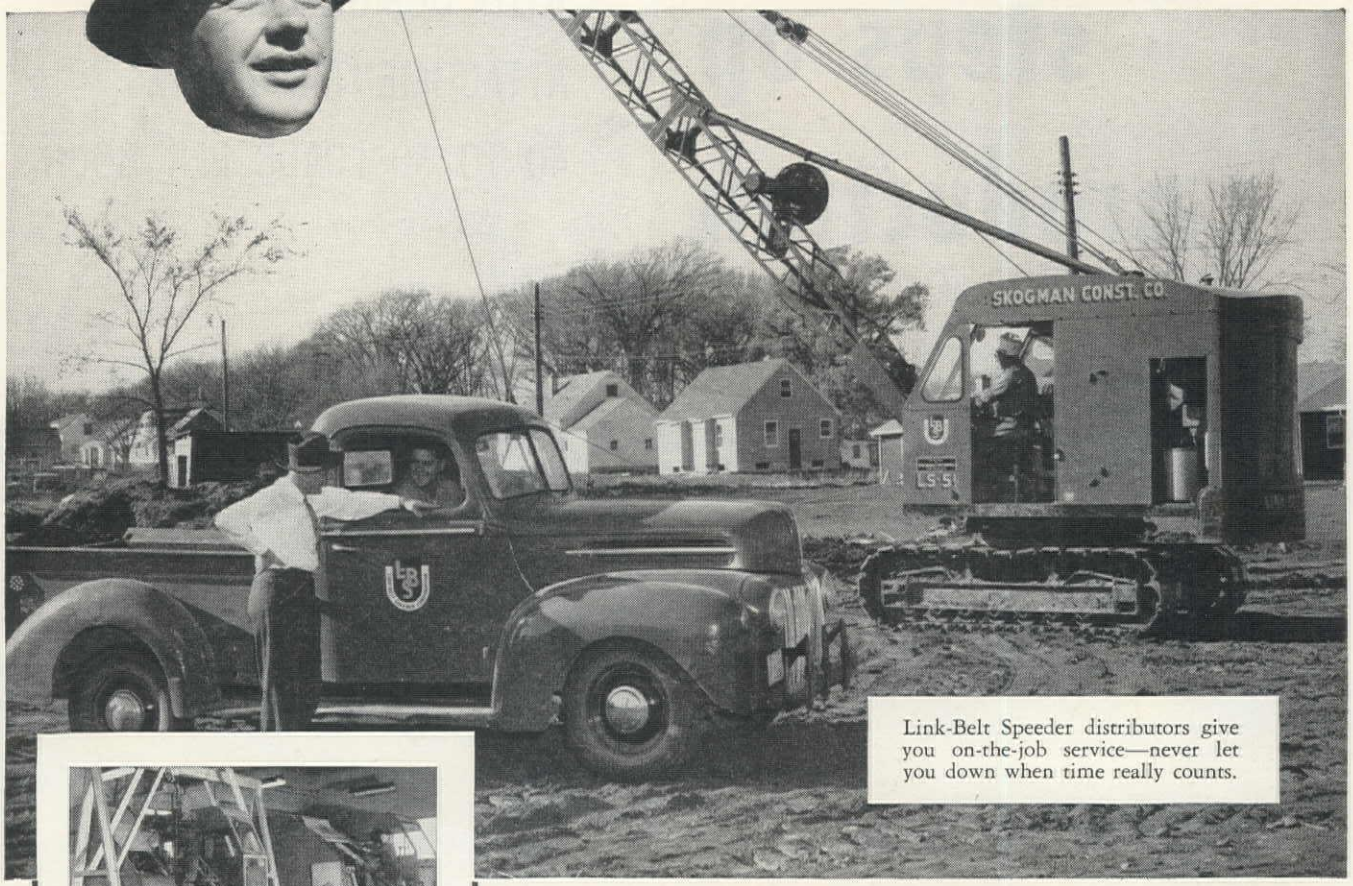
CATERPILLAR, SAN LEANDRO, CALIF.; PEORIA, ILLINOIS

FAST FACTS

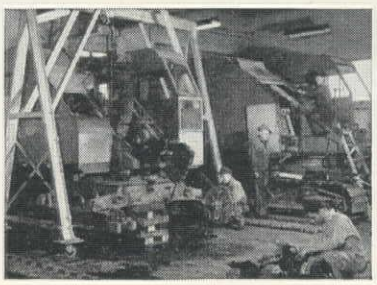
- ★ The DoMor Elevating Grader Attachment works with "Cat" No. 12 or No. 112 Motor Graders.
- ★ One-man operation from the operator's seat. Regular blade controls operate grader actions.
- ★ 30-in. plowing disk cuts furrow just outside the wheel line.
- ★ Big-capacity 42-in. carrier runs at 400 ft. per minute.
- ★ Conversion from Motor Grader to Elevating Grader and vice versa gives you a double-purpose unit.

CATERPILLAR
REG. U. S. PAT. OFF.
DIESEL ENGINES • TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

"That's what I call SERVICE!"



Link-Belt Speeder distributors give you on-the-job service—never let you down when time really counts.



In modern shops like this, factory-trained servicemen of your Link-Belt Speeder distributors give you fast, complete service.

Complete stocks of parts at your Link-Belt Speeder distributor mean no costly delays.

Down-time is no problem when you're operating a LINK-BELT SPEEDER

When you're counting minutes in dollars, you want service *now* . . . not next week! And you want parts replaced on the spot . . . not at some distant factory. Furthermore, you want repairs made by men who know every move to make . . . not by boys who have to look in the book.

Service for your Link-Belt Speeder measures up to these requirements . . . and more. It is a factory-planned and directed service, through selected distributors equipped with modern shops, complete stocks and highly-skilled, factory-schooled personnel. That's why you can depend on a Link-Belt Speeder for more service, for more kinds of work, more of the time.

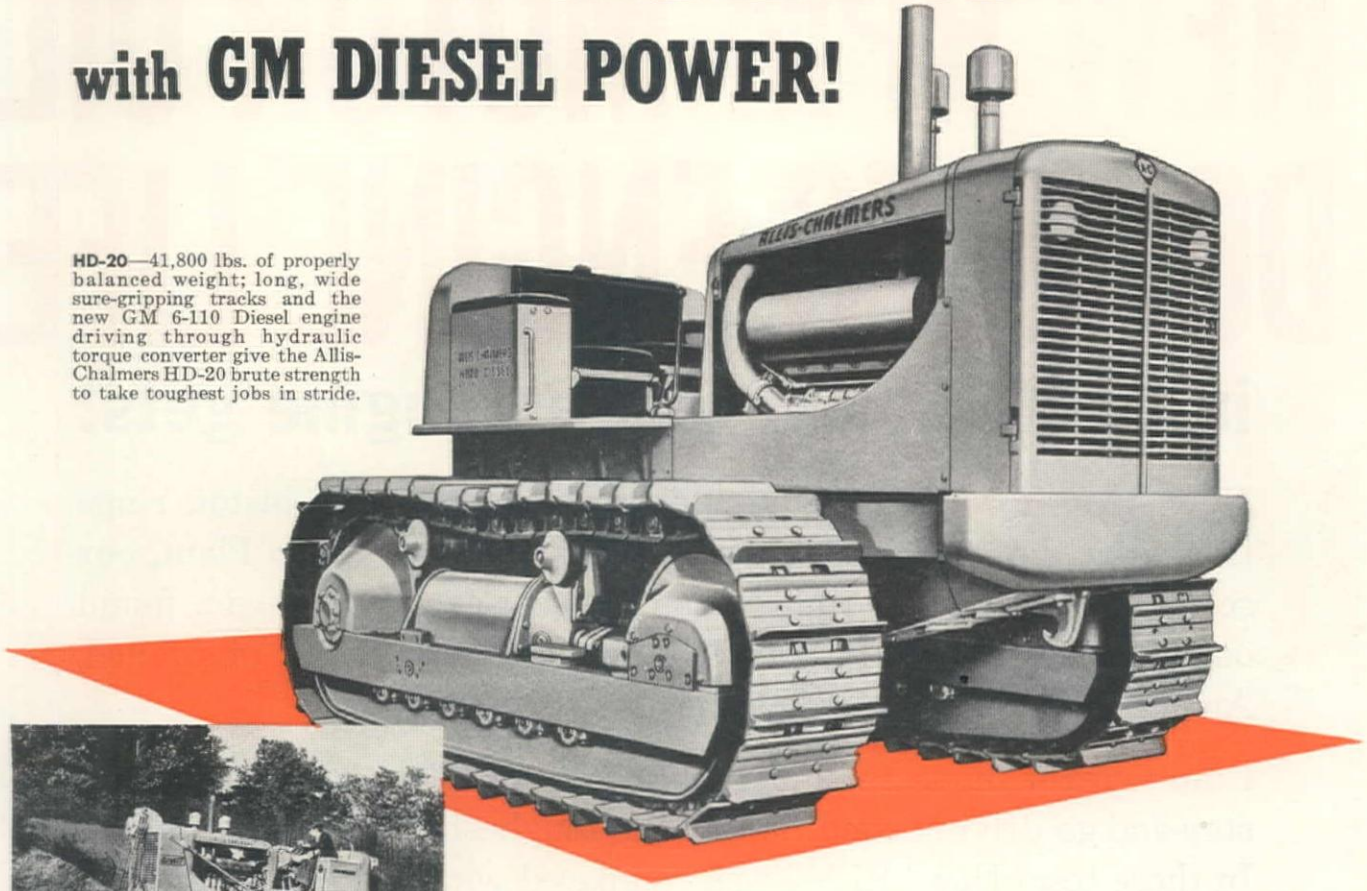
12,227

LINK-BELT SPEEDER
CORPORATION

Builders of the most complete line of cranes, shovels and draglines
CEDAR RAPIDS, IOWA

OUT AHEAD

with GM DIESEL POWER!



HD-20—41,800 lbs. of properly balanced weight; long, wide sure-gripping tracks and the new GM 6-110 Diesel engine driving through hydraulic torque converter give the Allis-Chalmers HD-20 brute strength to take toughest jobs in stride.

HD-15—27,500 lbs.—102 Drawbar H.P.—powered by a 6-cylinder GM Series 71 Diesel engine.

HD-9—18,500 lbs.—70 Drawbar H.P.—powered by a 4-cylinder GM Series 71 Diesel engine.

General Motors 2-cycle Diesel engines supply the hard-hitting power that enables Allis-Chalmers' great new line of tractors to outwork all others.

Four and six-cylinder GM Series 71 engines driving the HD-9 and HD-15—and the powerful new GM 6-110 engine driving the HD-20—give these new tractors a reserve of smooth, dependable power for easy handling, increased work and minimum maintenance.

The greater efficiency of 2-cycle operation and direct fuel injection simplifies design and enables these engines to produce far more horsepower than other Diesels of equal size and weight. Interchangeability of Series 71 engine parts provides maximum availability—keeps them on the job.

That's why GM Diesel engines are chosen to power not only the "World's most modern line of crawler tractors"—but more than 500 different kinds of machinery built by 120 manufacturers.

DETROIT DIESEL ENGINE DIVISION

SINGLE ENGINES... *Up to 275 H.P.* **DETROIT 28, MICHIGAN** MULTIPLE UNITS... *Up to 800 H.P.*

GENERAL MOTORS

GM GENERAL MOTORS DIESEL POWER

DIESEL BRAWN WITHOUT THE BULK

Developed by Atomic Energy

NEW RPM MOTOR OIL DOUBLES ENGINE LIFE

in the toughest test an engine gets!

New Atomic tool! By equipping test engines with piston rings treated at the Atomic Energy Commission's Oak Ridge Plant, our scientists, for the first time measured wear as it happened... found out with Geiger counters exactly how and why motor oils failed. An entirely new oil was developed... New "RPM"!

Cold Operation tests, under rigid controls, were used to simulate stop-and-go driving conditions... the toughest kind a motor meets. In these tests New "RPM" was compared with the best of conventional "premium type" motor oils as designated by A. P. I. The results were amazing!

New RPM Motor Oil was shown to double the life of average auto engines between major overhauls due to lubrication. Laboratory tests proved it. Severe road service backed it up.

CUT REPAIR BILLS WITH NEW "RPM"

No motor oil gives you better protection than New "RPM". Compared with conventional motor oils* it:

- **Doubles the life of auto engines... time between overhauls due to lubrication.**
- **Cuts in half wear-rate of critical engine parts.**
- **Doubles protection against gummy carbon deposits, acid and varnish.**
- **Maintains the low-oil-consumption mileage of the average engine twice as long.**
- **Eliminates worries about overhauls due to faulty oil performance.**

Ask for New RPM Motor Oil from your Standard Representative or Fuel and Lubricant Engineer

*"Premium Type" motor oils as designated by the American Petroleum Institute.

STANDARD OIL COMPANY OF CALIFORNIA

Plan to get *more* out of wood . . . specify PENTA-PROTECTED wood for longer life and serviceability.*

PENTA-PROTECTED wood is safe from termites and rot, and lasts up to *four times longer* than untreated wood. PENTA-PROTECTED wood is excellent to build with because the wood is clean and easy to handle. You'll also find PENTA-PROTECTED wood is cheaper in the long run, as installations need less maintenance. Make wood serve you better. Use PENTA-PROTECTED wood. Realize to the fullest the many advantages of building with wood.

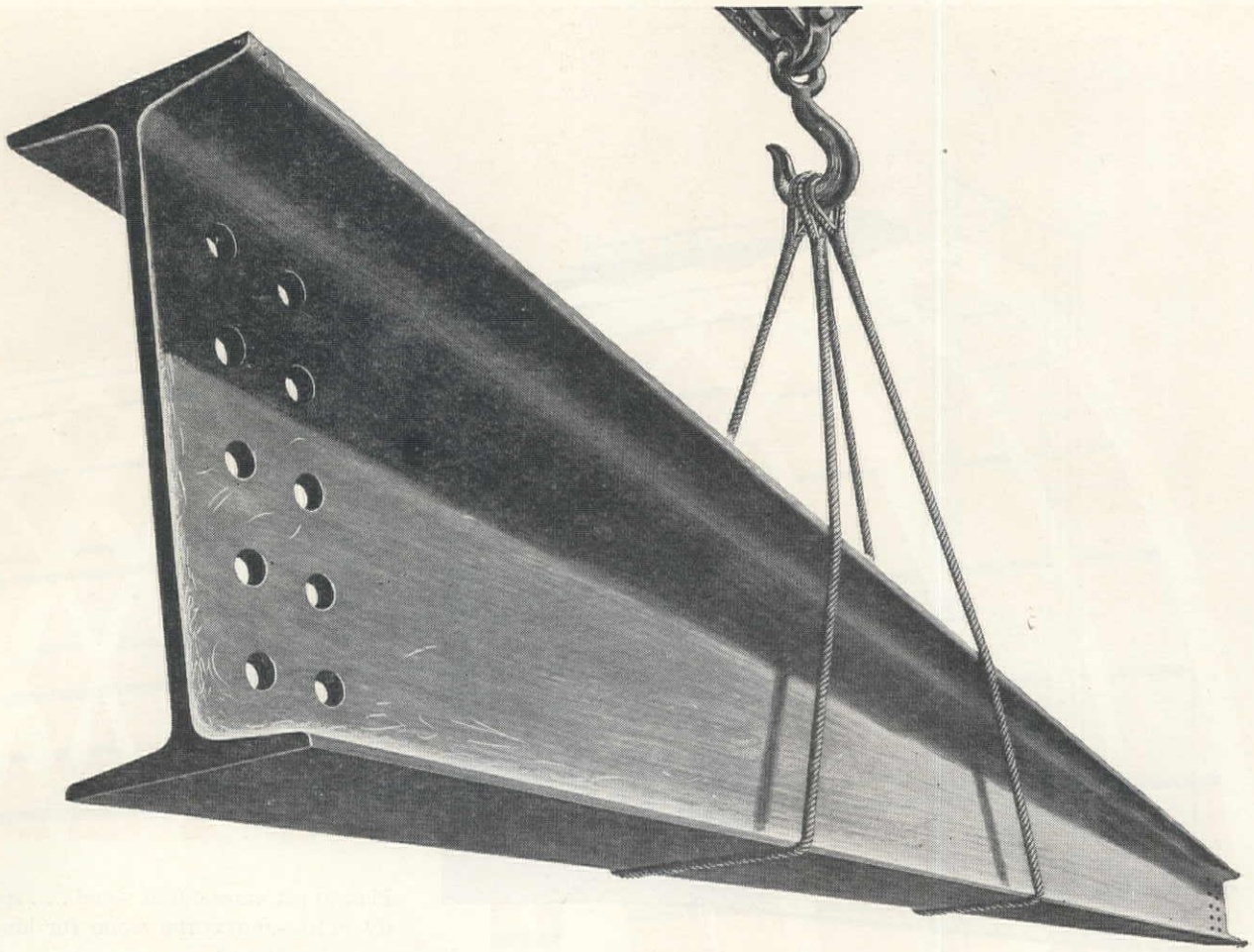
(*PENTA is a popular abbreviation of the chemical, PENTA-chlorophenol.)

THE DOW CHEMICAL COMPANY
MIDLAND, MICHIGAN

Make construction last . . . build with Penta PROTECTED wood!

Write Dow, Dept. PE-3 for free booklet
"Pointers on Penta"

DOW
Penta
chlorophenol



A Plus for the West

Before you specify structural shapes for heavy construction, consider *all* the advantages offered by Kaiser Steel, the only integrated independent steel plant on the West Coast.

Complete control of quality at every step, from the mining of coal and iron ore to finished product.

The most modern mill facilities, operated by experienced, highly skilled personnel, producing a wide range of structural shapes.

Nearby shipping point, which means shorter carrier delivery time.

Prompt engineering and mill service, due to Kaiser Steel's strategic location.

Add to this Kaiser Steel's consistent record of dependability—unsurpassed in the industry—and the answer is clear...

It's good business to do business with

Kaiser Steel

built to serve the West

PROMPT, DEPENDABLE DELIVERY AT COMPETITIVE PRICES • plates • continuous weld pipe • electric weld pipe • hot rolled strip • hot rolled sheet • alloy bars carbon bars • structural shapes • cold rolled strip • cold rolled sheet • special bar sections • semi-finished steels • pig iron • coke oven by-products
For details and specifications, write: **KAISER STEEL CORPORATION, LOS ANGELES, OAKLAND, SEATTLE, PORTLAND, HOUSTON, TULSA, NEW YORK**

EATON
2-Speed Truck
AXLES
Haul More Every Day

More trips with full load whether roads are good or bad—that's the contribution of Eaton 2-Speed Axles to greater truck operating profits. Eaton 2-Speeds have double the conventional number of axle gear ratios. As a result, the tremendous power of today's engines is utilized to best advantage—speed for good roads . . . pulling capacity under full load for tough spots. Regardless of driving conditions, faster trips are the rule—without sacrificing payload. This ability to haul more is the reason that Eaton Axles pay for themselves over and over.

Eaton's performance is made possible by its exclusive planetary gearing, positive lubrication and other features which your truck dealer will be glad to explain.

Axle Division

EATON MANUFACTURING COMPANY

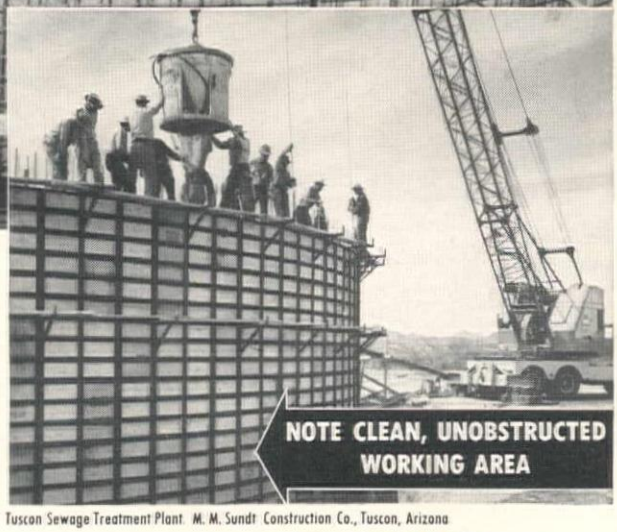
CLEVELAND, OHIO

EATON

PRODUCTS: SODIUM COOLED, POPPET, AND FREE VALVES • TAPPETS • HYDRAULIC VALVE LIFTERS • VALVE SEAT INSERTS • JET ENGINE PARTS • ROTOR PUMPS • MOTOR TRUCK AXLES • PERMANENT MOLD GRAY IRON CASTINGS • HEATER-DEFROSTER UNITS • SNAP RINGS SPRINGTITES • SPRING WASHERS • COLD DRAWN STEEL • STAMPINGS • LEAF AND COIL SPRINGS • DYNAMATIC DRIVES, BRAKES, DYNAMOMETERS

UNI-FORMS cut material costs ½ ...labor savings — 35%!

Winter Haven Sewage Treatment Plant CONTRACTOR. Coleman & Fry, Gen'l Contractors, Clewiston, Florida



Tuscon Sewage Treatment Plant. M. M. Sundt Construction Co., Tuscon, Arizona

UNI-FORMS . . . the concrete form system . . . for *all* types of concrete forming . . . ready to go to work when they reach your job . . . *permanent* equipment . . . insure substantial material and labor savings . . . on large or small jobs . . . years of extra profitable service to you.

Send us a set of plans today. Let us show you the UNI-FORM way to extra profits.

HERE'S PROOF Illustrating Material and Labor Costs for forming 40,000 sq. feet of contact area in Circular Wall Construction.

	UNI-FORMS	CONVENTIONAL FORMS	SAVINGS with UNI-FORMS
Forms	3.2¢* per sq. ft.	8.0¢** per sq. ft.	5.99¢ per sq. ft.
Alignment and Bracing Lumber	.75¢ per sq. ft.	2.53¢ per sq. ft.	**Total Material Saving $2396.00**
Ties	1.68¢ per sq. ft.	1.09¢ per sq. ft.	8¢ per sq. ft.
Labor	15¢ per sq. ft.	23¢ per sq. ft.	**Total Labor Saving $3200.00**

*Based on 25 uses @ an approx. cost of $1.60 per sq. ft. with 50% salvage.
**Based on 5 uses @ an approx. cost of $ .50 per sq. ft. with 20% salvage.

RENTED...SOLD...OR RENTED WITH A PURCHASE OPTION

UNIVERSAL FORM CLAMP CO.

2051-59 WILLIAMS ST.
SAN LEANDRO, CALIFORNIA

SIX LaPLANT-CHOATE MOTOR SCRAPERS

complete a 60 day schedule

IN 39 DAYS!

"On the Malton Airport job in Toronto, we had 60 days to move 426,000 cu. yds. of dirt. Our six LPC Motor Scrapers finished the job in 39 days! We're buying three additional units to help us move dirt faster on future big jobs."

ELGIN ARMSTRONG
Armstrong Bros. Construction
Brampton, Ontario

ON Toronto's Malton Airport project, the six LaPlant-Choate Motor Scrapers owned by Armstrong Bros. Construction *cut schedule time by one third!*

The job called for moving 325,000 cu. yds. of heavy clay over a 1000-ft. one-way haul, and approximately 100,000 cu. yds. over a 4200-ft. one-way haul. On the 1000-ft. haul each Motor Scraper averaged 15 loads per hour with an average pay load of 14 cu. yds. On the 4200-ft. haul each unit averaged 7.9 loads per hour with an average 13.5 cu. yd. pay load. These fast 4 and 7.5 minute cycles are typical of the big production features of the fast-stepping, power-packed LPC Motor Scraper.

Your LPC distributor can show you Motor Scrapers at work. When you call him, ask him to tell you about the new, larger engines—either the Buda 280 h.p. or Cummins 275 h.p. Diesel, that give you more *usable* power and speed for schedule-trimming production. LaPlant-Choate Manufacturing Company, Inc., Cedar Rapids, Iowa—LaPlant-Choate Sales and Service, 1022 77th Ave., Oakland, Calif.

LaPLANT CHOATE

INDUSTRIAL EQUIPMENT COMPANY
4441 Santa Fe Avenue LOS ANGELES 11, CALIFORNIA

LaPLANT-CHOATE SALES AND SERVICE
1022 - 77th Avenue OAKLAND, CALIFORNIA

WESTERN EQUIPMENT COMPANY
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ESTERN CONSTRUCTION EQUIPMENT CO.
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Stephens & Mount Ave. MISSOULA, MONTANA

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ENGINEERING SALES SERVICE, INC.
410 Capitol Boulevard BOISE, IDAHO

STUDER TRACTOR & EQUIP. CO.
East Yellowstone Hwy., P. O. Box 779, CASPER, WYOMING

EQUIPMENT SALES CO.
720 So. 19th Avenue PHOENIX, ARIZONA

ARNOLD MACHINERY CO., INC.
433 West Second South St. Salt Lake City 1, Utah

N. C. RIBBLE CO.
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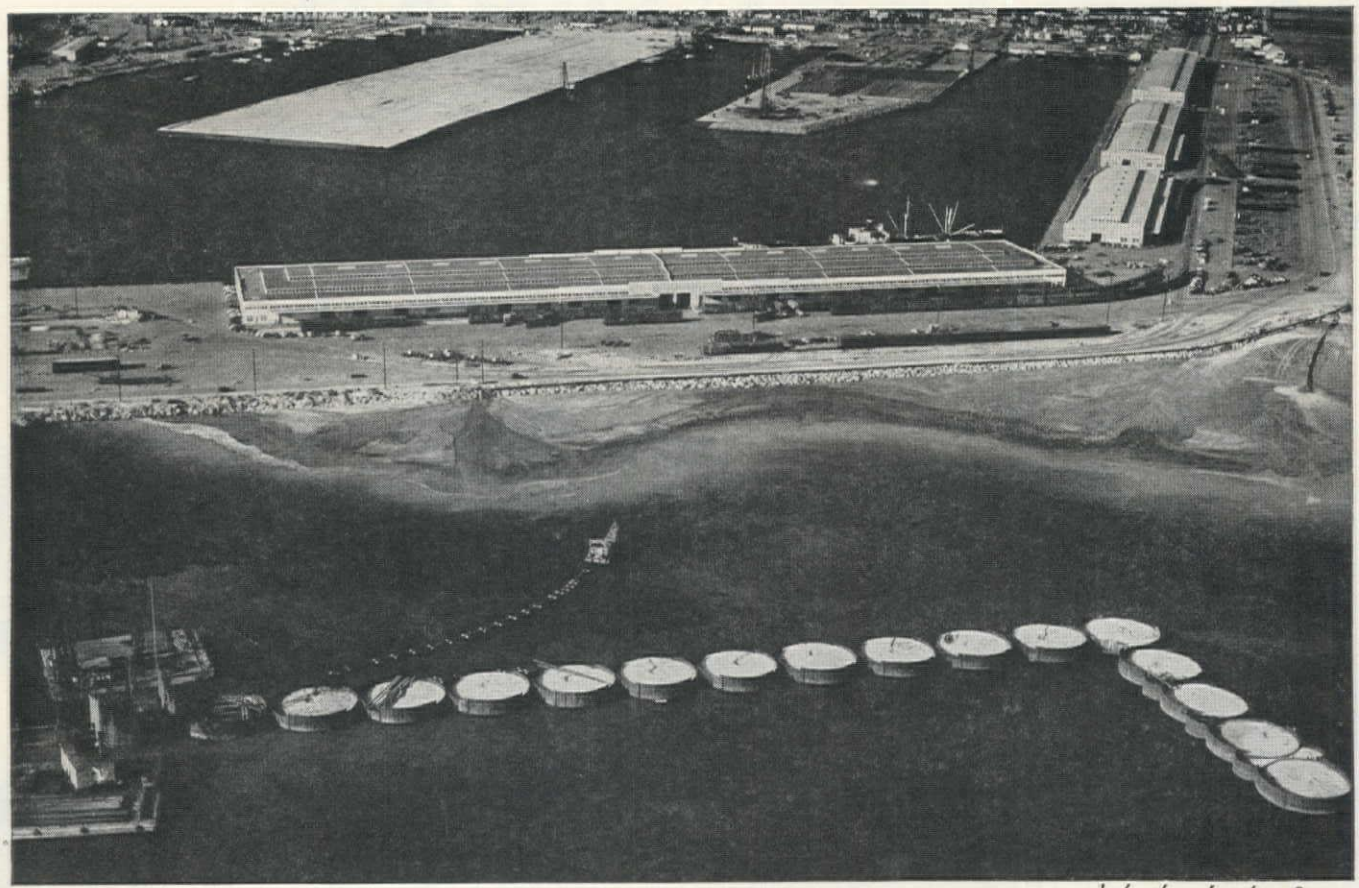
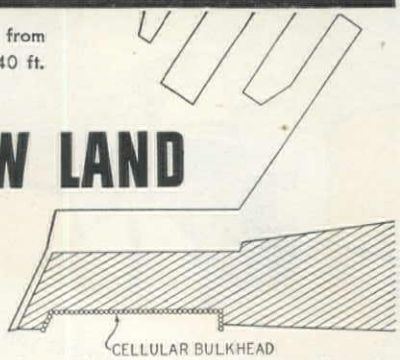
COLUMBIA EQUIPMENT CO.
1240 S. E. 12th Ave. PORTLAND, OREGON
5030 1st Ave. South SEATTLE, WASHINGTON



Part of the 2,780-ft quay wall for the enlargement of Pier A. Bethlehem steel-sheet piling in lengths from 69 ft to 76 ft is used in the circular cells. After dredging, the depth of water outside the quay will be 40 ft.

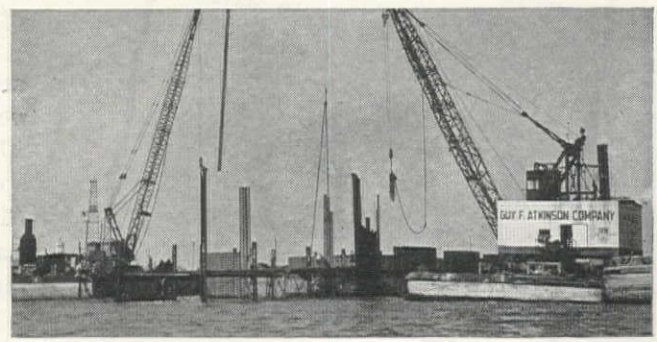
MANUFACTURING 136 ACRES OF NEW LAND IN THE OPEN SEA OFF LONG BEACH



Pier A, East Unit of the Long Beach harbor development program, will soon provide 136 acres of land in the open waters of San Pedro Bay where the depth of water was originally 35 feet. This new land will greatly increase harbor facilities for the Port of Long Beach and at the same time will make dry-land drilling sites available for the development of undersea oil reserves.

The pier will be of earth-fill construction retained by a quay wall of 44 circular cells made from interlocking steel-sheet piling. These permanent cells, similar to those used in cofferdam construction, are 62 feet in diameter and are connected on the seaward side by sheet-piling fillets. Sand dredged from the ocean bottom will be used to fill the individual cells and the area behind the wall.

20,000 tons of sheet piling as well as a considerable tonnage of H-piling, tie-rods, turnbuckles and bolt and nut specialties were furnished by Bethlehem Pacific for this and the three other piers in the Long Beach harbor project.



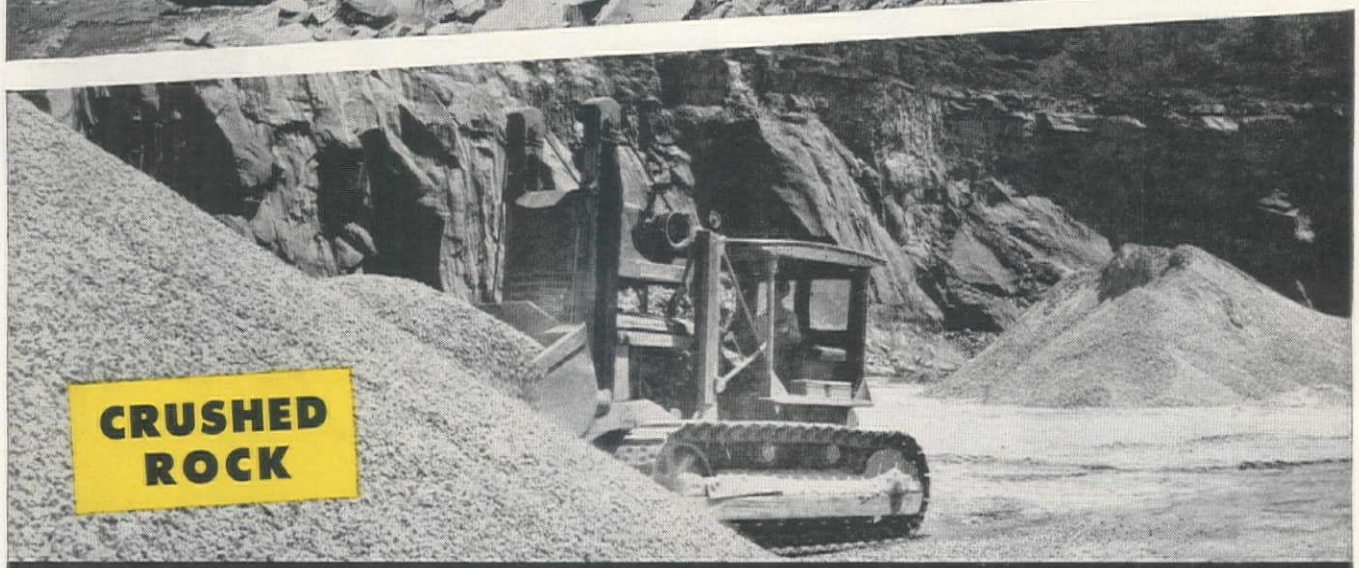
Under the best operating conditions, and using H-piling supports with cylindrical templates, Guy F. Atkinson Co. of Long Beach was able to drive the 156 piles on a single cell in one day.

BETHLEHEM PACIFIC COAST STEEL CORPORATION

Sales Offices: San Francisco, Los Angeles, Portland, Seattle, Honolulu. *Steel Mills:* South San Francisco, Los Angeles, Seattle

BETHLEHEM PACIFIC

★ BETHLEHEM STEEL ★



TRAXCAVATOR *handles 'em in stride*

▶ "Upstairs", this T7 TRAXCAVATOR hustles, to dig and move 100,000 cubic yards of overburden (including considerable hard clay) from a mile-long, 30-foot highwall. Next, the big T7 romps down a steep ramp to clean a 2-foot layer of dirt, 400 feet wide and a mile long from the quarry base. Tough stripping excavation service is only the beginning of this powerful tractor shovel's job.

At the quarry face the TRAXCAVATOR uses full traction-backed horsepower of the "Caterpillar" D7 Tractor to crowd its bucket full of shot rock after each blast. Its 6.0 M.P.H. fifth speed, to sprint all over the job carrying full buckets of heavy material, emphasizes that TRAXCAVATORS capably replace and "run rings around" several limited-duty machines.

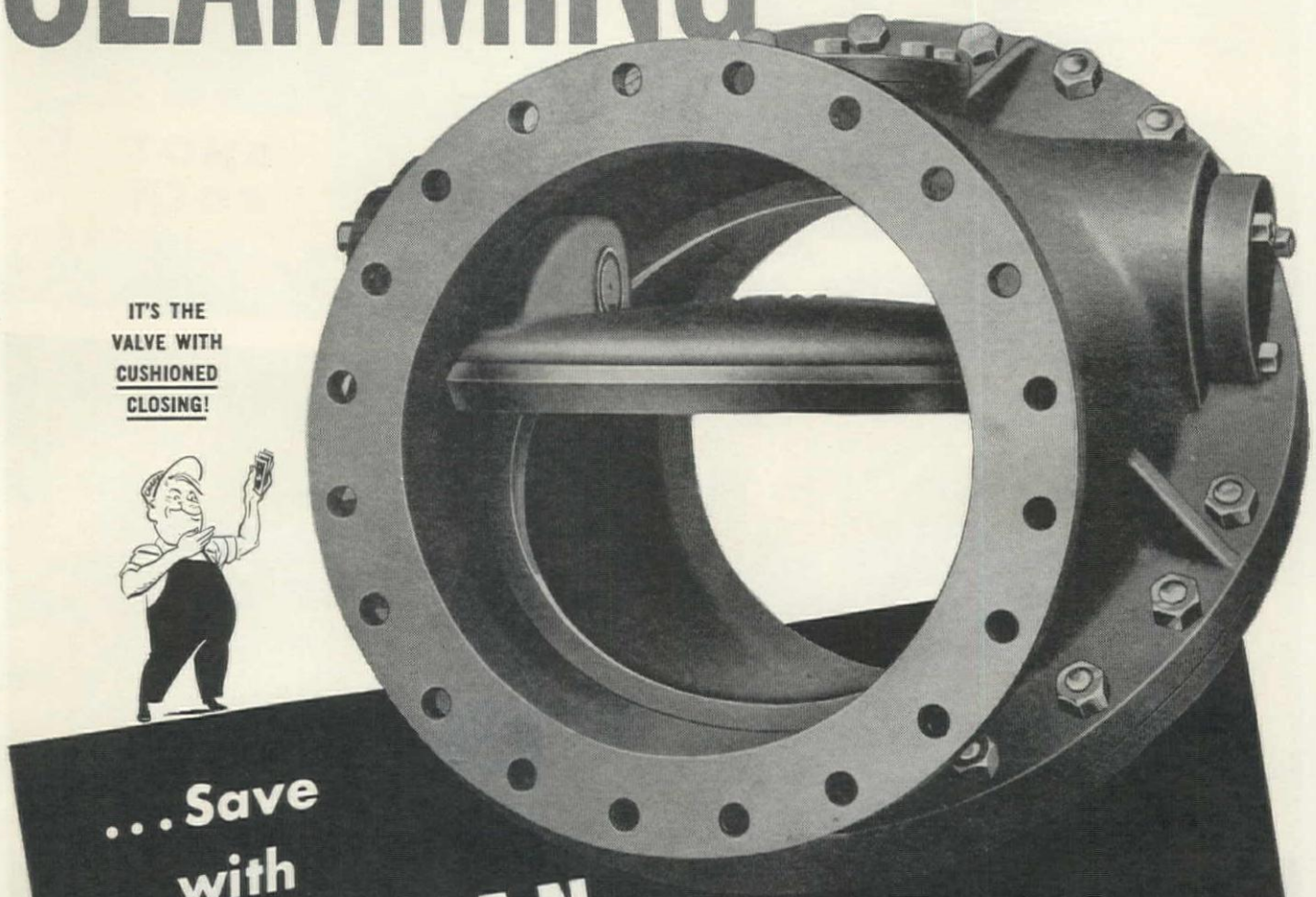
While "resting", this able machine stockpiles crushed rock for Latrobe Construction Co., Latrobe, Pennsylvania. "If I didn't have this TRAXCAVATOR unit, I couldn't keep this quarry working profitably," declares Quarry Sup't. H. A. Harr.

From heavily-reinforced bucket and armored heavy-duty V-Belt drive to sturdy structural steel frame, the T7 TRAXCAVATOR is built for big capacity performance on big, tough jobs. Whether your work calls for stripping, excavating, loading of shot rock or loose materials, TRAXCAVATORS can help you hit production peaks at new low costs.

For complete information on TRAXCAVATORS, contact your TRACKSON-"Caterpillar" Dealer, or write direct to TRACKSON COMPANY, Dept. WC.11, Milwaukee 1, Wisconsin.

TRAXCAVATOR® *The Original Tractor Excavator*

SLAMMING COSTS YOU MONEY!



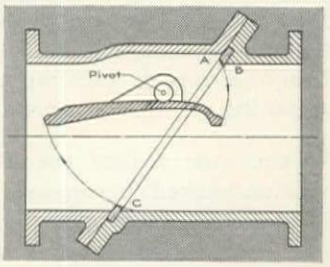
IT'S THE VALVE WITH CUSHIONED CLOSING!

...Save with CHAPMAN TILTING-DISC CHECK VALVES

Switch to Chapman Tilting-Disc Check Valves and you'll eliminate the slamming that causes destructive pipe line stresses — that costs you *plenty* in extra maintenance.

With this check valve, the tilting disc rides smoothly on the flow. It lifts away easily when opening — closes quickly and quietly. There's no slamming — minimum wear on seats, hinge pins and bearings.

Available in iron and steel, for all pressures. Write today for additional information.

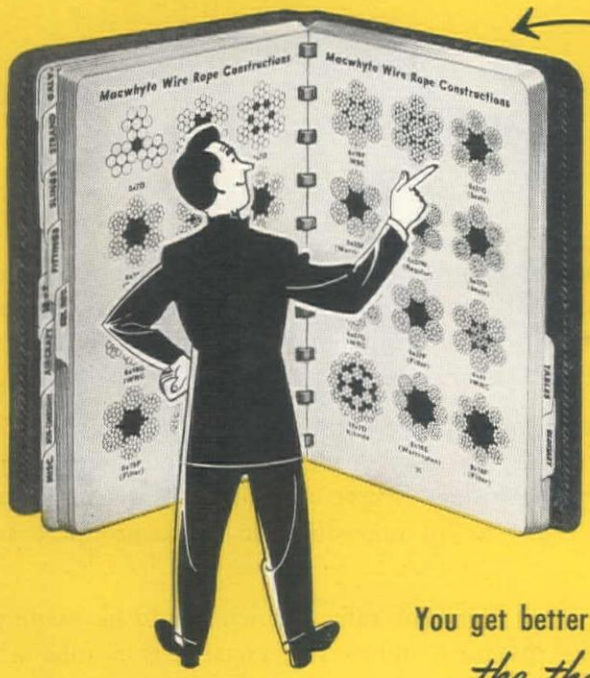


Cross-section of the Chapman Tilting-Disc Check Valve illustrating the way that the balanced disc is supported on the pivot, with arrows showing the travel of the disc. A feature of the design is that the disc seat lifts away from the body seat when opening, and drops into contact when closing, with no sliding or wearing of the seats.

The Chapman Valve Mfg. Co.

INDIAN ORCHARD, MASSACHUSETTS

WHY guess about wire rope selection?



GET the right wire rope for each job!

You get better service when you order the right rope from

the thousand and one wire ropes made by **MACWHYTE**

A Macwhyte representative will gladly supply you with specifications for the correct rope to use on each machine you have. Call your Macwhyte distributor, or write direct to Macwhyte Company for recommendations. Catalog on request.

MACWHYTE COMPANY • Portland • Seattle • San Francisco • Los Angeles

Manufacturers of Monarch Whyte Strand PREformed, Internally Lubricated Wire Rope, ATLAS Braided Wire Rope Slings, Aircraft Cables and Assemblies, Monel Metal and Stainless Steel Wire Rope.

904-L

This Is Really One For The Book!

FEW PEOPLE would expect a blasting cap plant to be one of the safest places to work. Yet Atlas workers, on December 6, 1950, completed five years of making Manasite blasting caps and electric blasting caps without a single lost-time injury! During this period, they produced well over 250,000,000 of these detonators.

The last injury serious enough to send an employe home from work, five years ago, was a wrenched back. The one before that, a bruised ankle. In fact, no lost-time injury has been caused by an explosion in the plant since Atlas converted to Manasite blasting caps and omitted fulminate of mercury as an ingredient in these products some twelve years ago.

Little did anyone realize, then, the new degree of safety which would be made possible in the plant, as well as in the quarries, mines and construction jobs where blasting caps are used. Thanks to pioneering by Atlas research, engineers and experienced production employes, the safety of making and using blasting caps has made a great forward stride. Manasite detonators give greater effectiveness to the safety precautions which must always be followed in handling explosives.

Manasite is typical of Atlas contributions to safer, more effective, and more economical blasting. That's why you can expect to get the *right* answers to blasting problems from Atlas—originator of Manasite detonators and the famous ROCKMASTER "16" Blasting System.

Rockmaster and Manasite: Reg. U. S. Pat. Off.

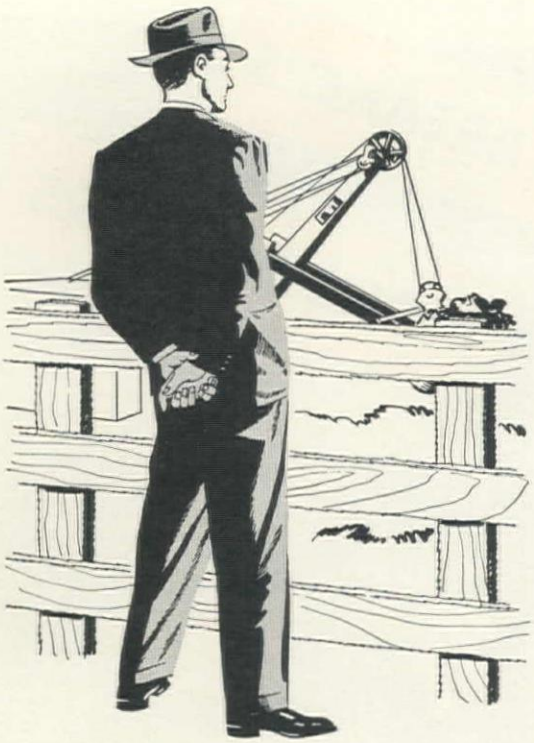
Offices in Principal Cities

ATLAS EXPLOSIVES

"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

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



who's this *Sidewalk Superintendent?*

He's a Gardner-Denver field engineer away from the office—watching construction problems as they turn up. He knows first hand just what you expect construction equipment to do for you.

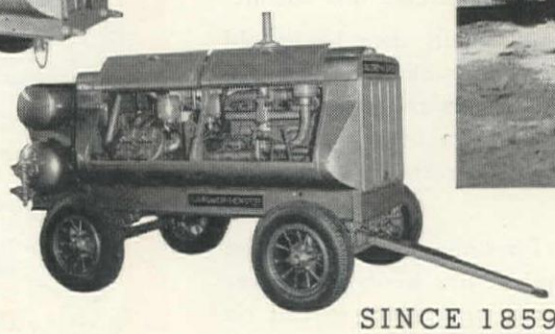
Gardner-Denver Portables, for example, are tops in dependability...

Because they are *all* water-cooled — all the way down the cylinder. You can bank on Gardner-Denver Two-Stage Portable Compressors for steady going regardless of temperature, weather or altitude.

Choose any size Gardner-Denver Portable — from 105 to 500 cubic feet actual capacity—for the best protection against compressed air emergencies.

Bulletins PC-12 and PC-15 give all the facts on diesel and gasoline engine driven models. Write us today!

Model WH-105



Model WH-315

Model WH-500D

SINCE 1859

GARDNER-DENVER

The Quality Leader in Compressors, Pumps and Rock Drills

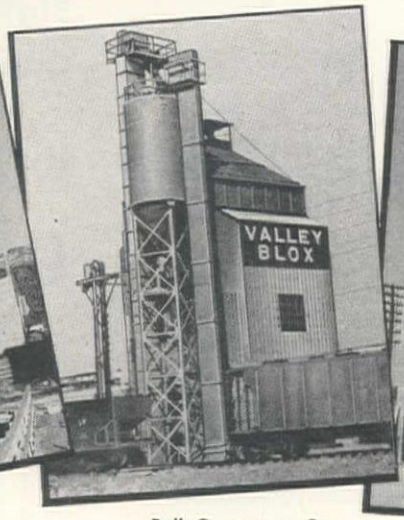
Gardner-Denver Company, Quincy, Illinois

Western Branch Offices:
Butte, Montana; Denver, Colorado; Los Angeles, California; Salt Lake City, Utah; San Francisco, California; Seattle, Washington; Wallace, Idaho; El Paso, Texas.

If You Work With Concrete

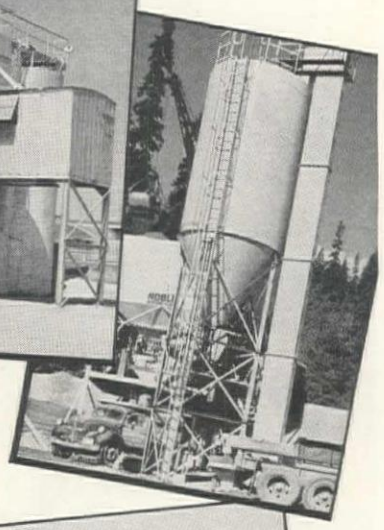
SEE NOBLE FIRST!

McNary Dam Mixing Plant — 900-ton, 6-compartment bin, automatic batcher, with two 7500-bbl. cement silos.



Cinder Block Batching—NOBLE 350-ton, 4-compartment plant with 500-bbl. cement silo, in Virginia.

Bulk Cement — One of 4 NOBLE plants batching and transferring cement for Haliburton Oilwell Cementing Co.

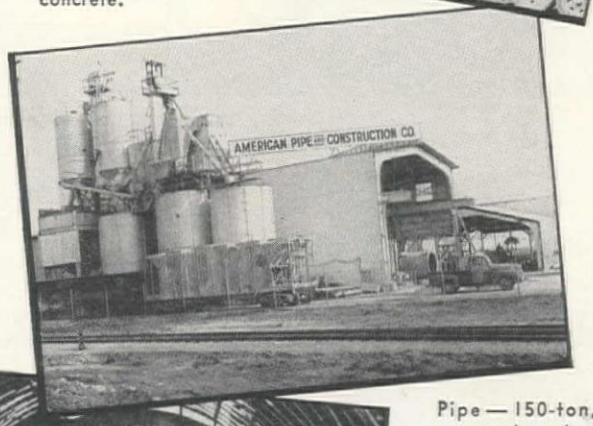


Snoqualmie Pass — Semi-automatic 100-ton plant with 2000-cu. ft. cement silo, batching highway concrete.

No matter what your problem . . .

- batching plants for
  - construction jobs
  - pipe and block making
  - ready mix
  - light or unusual aggregates
- bulk cement storage and transfer
- steel forms for
  - dams
  - tunnels
  - aqueducts
- form jumbos
- belt and screw conveyors, elevators, etc.

. . . we can help you. Take advantage of our concreting experience NOW on estimating, designing and fabricating. Wire, write or phone for NOBLE help TODAY. No obligation.



Pipe — 150-ton, 4-compartment plant with two 2000-cu. ft. silos, first of 5 for Amer. Pipe & Construction.

Oakland Outfall Sewer—NOBLE jumbo and 105" telescoping tunnel form, horsehoe type, Stolte, Inc.

DESIGNERS AND BUILDERS OF

CEMENT AND AGGREGATE BATCHING PLANTS . . . BULK CEMENT PLANTS . . . AGGREGATE BINS AND CEMENT SILOS . . . STEEL FORMS FOR CONCRETE CONSTRUCTION JOBS . . . TUNNEL AND DRILL JUMBOS CONVEYORS AND ELEVATORS . . . WEIGH METERING DEVICES

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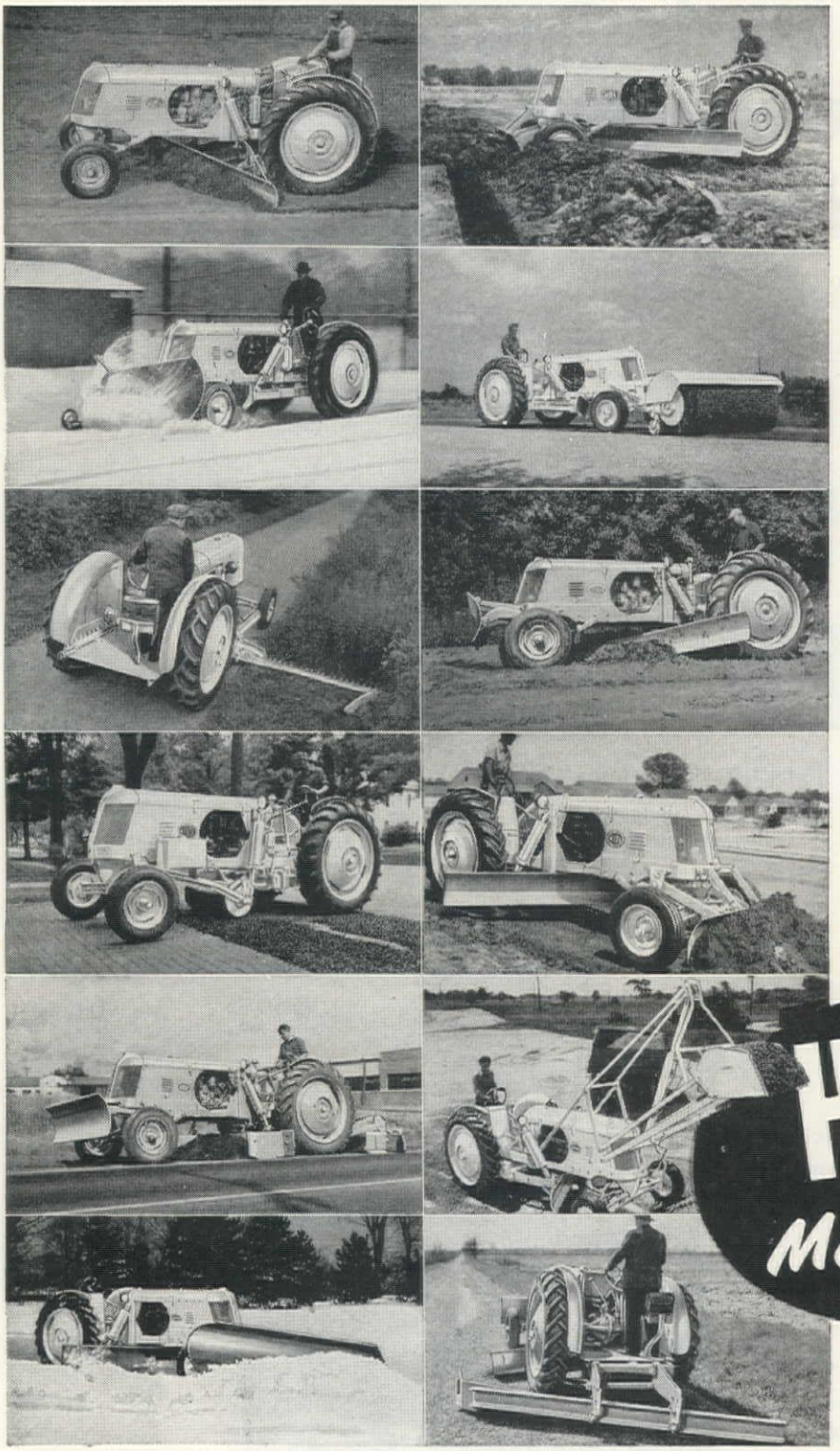

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Weighs 6000 pounds with liquid in tires

Big 42½ H.P. engine

One-third the cost of a big grader

Hydraulic Controls

9 MAINTENANCE MACHINES IN 1

1. GRADER
2. HIGHWAY MOWER
3. BERM LEVELER
4. ROAD PLANER
5. BULLDOZER
6. LIFT-LOADER
7. ONE-WAY BROOM
8. PATCH ROLLER
9. SNOW PLOW

HUBER MAINTAINER

THE HUBER MFG. CO.
Marion, Ohio

See your nearest HUBER Distributor for Maintainers, Rollers and other Road Machinery.

Lee & Thatro Equipment Co.	Los Angeles 21, Calif.
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Contractors' Equipment & Supply Co.	Albuquerque, N. M.
Feenaughty Machinery Co.	Portland 14, Oregon
Feenaughty Machinery Co.	Boise, Idaho
Feenaughty Machinery Co.	Spokane 2, Washington
The O. S. Stapley Co.	Phoenix, Arizona
Feenaughty Machinery Co.	Seattle 4, Washington
Casson Hale Corporation	Hayward, Calif.
Foulger Equipment Co., Inc.	Salt Lake City 8, Utah
The Colorado Builders' Supply Co.	Denver 9, Colorado
The Colorado Builders' Supply Co.	Casper, Wyoming
Montana Powder & Equip. Co.	Helena, Billings, Montana

New! VICTOR CUTTING TORCH

with Stainless Steel Head and Tube Assembly

CTS-400 Series

Rugged stainless steel tip nut, head and tubes.

Uses all standard Victor cutting tips.

New high-capacity, cutting oxygen valve—operated over half million times without detection of wear.

New oxygen and fuel control valves with "O" ring pressure seals—no outmoded packing, no take-ups, no adjustments needed.

Test it *on your severest cutting job . . . see for yourself how fast it cuts, how cool it stays.*

Here's the torch you've been waiting for. Cuts longer and faster than other torches without overheating because mixer and mixer tube are made of high-heat resistant copper alloys—no danger of mixer failures from overheating. Mixer itself is Victor's famous spiral mixer, designed to prevent backfire and flashback.

The stainless steel head and tube assembly is a single unit and can be replaced without buying a complete torch. Comes with either 90° or 75° head. Standard length is 21″; 27″ or longer available on special order.

Call your Victor dealer NOW . . . ask him to demonstrate this new, stainless steel torch on your toughest cutting job.

VICTOR

Welding and Cutting Equipment Since 1910

Welding rods for all uses. Regulators for all gases up to 5000 psi. Machine and hand torches for welding, preheating, cutting, flame hardening and descaling. Portable flame cutting machines. Pneumatic filters and lubricators. Kinmont power positioners. Fluxes. Write today for free descriptive literature.

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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 Last— QUICKER STARTS, SAFER WARM-UPS in any weather!

The oil in your engine may never get this cold! But even in chilly weather, many oils flow sluggishly, placing undue strain on starter and battery. Such oils fail to lubricate properly during warm-ups; may cause expensive damage.

Heavy Duty Tydols, with high V.I., are non-congealing in any weather. They lubricate completely . . . flow freely to protect moving parts the moment the starter is pressed. And winter or summer, in automotive and stationary engines of every type, Heavy Duty Tydols have proved they keep engines cleaner than any other oil. Proved they measurably reduce engine wear.

For extra safety this winter, choose oil that's impervious to weather's extremes . . . oil that *cleans* as it *protects* as it *lubricates*. Get Heavy Duty Tydols to safeguard your engines.

ALL THREE THRIVE ON RUGGED YEAR-ROUND DUTY!

TYDOL HD—For high speed gasoline, butane, diesel-fueled engines in automobiles, busses, trucks, tractors, stationary units under normal Heavy Duty conditions. SAE grades 10, 20, 30, 40, 50. In cans and drums.

TYDOL HD S-1—Higher detergency level than Tydol HD. For every type of engine subjected to frequent cold starts, or to severe and continued overloading. SAE grades 20, 30, 40. Sold in drums.

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Rely on your Associated Representative for expert help on any lubrication problem.

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PLAY BALL with ASSOCIATED!

CLEANS as it PROTECTS as it LUBRICATES

TYDOL HD Compounded Motor Oil

TIDE WATER ASSOCIATED OIL COMPANY

A Traylor TY Reduction Crusher produces better aggregate . . . consistently

NO LIFTING OR CHURNING

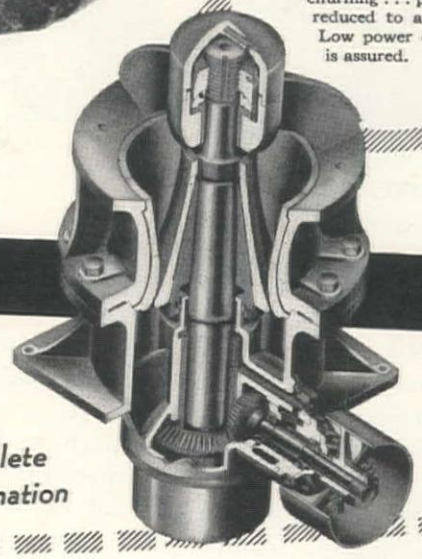
Lifting and churning of material in the crushing chamber is eliminated by a Traylor TY's curved concaves and bell head. Waste fines are reduced to a minimum . . . a uniform cubical product is assured.

NO PACKING OR CHOKING

A Traylor TY's curved crushing surfaces eliminate choking and packing. Each succeeding zone in the crushing chamber has greater capacity than the zone before it. A dependable, steady supply of uniform, cubical aggregate is assured.

LOW POWER COSTS

By elimination of choking and packing . . . lifting and churning . . . power waste is reduced to a minimum. Low power cost per ton is assured.



A Traylor TY Reduction Crusher is *your* best assurance of a steady, dependable supply of uniform, cubical aggregate. Aggregate that will meet the most severe engineering requirements day after day. If you are producing stone that must meet strict specifications, put a Traylor TY Reduction Crusher on the job. Mail the coupon for free bulletin that gives complete information . . . size . . . and capacities . . . to help you select a Traylor TY to meet your needs.

Send For Complete Information

TRAYLOR ENGINEERING & MANUFACTURING CO.
101 MILL ST., ALLENTOWN, PA.

Looks like a Traylor TY Reduction Crusher is just what I need.

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*Address*_____

West Coast Branch: 919 Chester Williams Bldg., Los Angeles, Calif.
Northwest Distr.: Balzer Machinery Co., 2136 So. East 8th Avenue, Portland, Oregon.

Traylor

Jaw, Reduction and Gyratory Crushers · Rod Mills
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A "TRAYLOR" LEADS TO GREATER PROFITS

MODERNIZE FOR MORE DELIVERIES ...AT LOWER COST WITH THE NEW WHITE 3000

GREAT NEW WHITE 3000 saves delivery time for Atkinson-Bell Co., Sacramento, Calif.

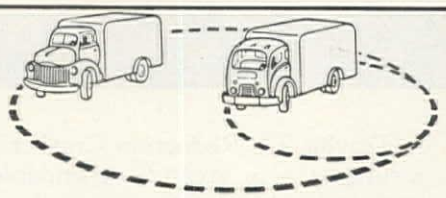
IT'S THE PERFECT ANSWER to lumber and millwork delivery problems! That is the report from all across the nation... wherever lumber dealers have this *new* White 3000 in service!

The *new* White 3000 saves maneuvering time . . . saves driver time... saves loading and unloading time. It is a new approach to reducing your delivery costs.

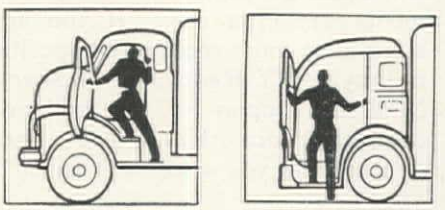
This new White is miles ahead for the specialized delivery needs in the lumber industry because it sets a new standard in truck efficiency.

Its functional design... its new weight distribution principle... its revolutionary approach to reducing truck maintenance costs—these are all exclusive advantages that make the *new* White 3000 a profitable investment that pays dividends for years.

Your White Representative will be glad to demonstrate the advantages of the *new* White 3000 as they apply to your exact needs.



SHORTER TURNING RADIUS SAVES MANEUVERING TIME



BETTER CAB ACCESSIBILITY SAVES DRIVER TIME

THE WHITE MOTOR COMPANY
Cleveland 1, Ohio, U. S. A.

White SUPER POWER 3000

Tips its cab to service

FOR MORE THAN 50 YEARS THE GREATEST NAME IN TRUCKS

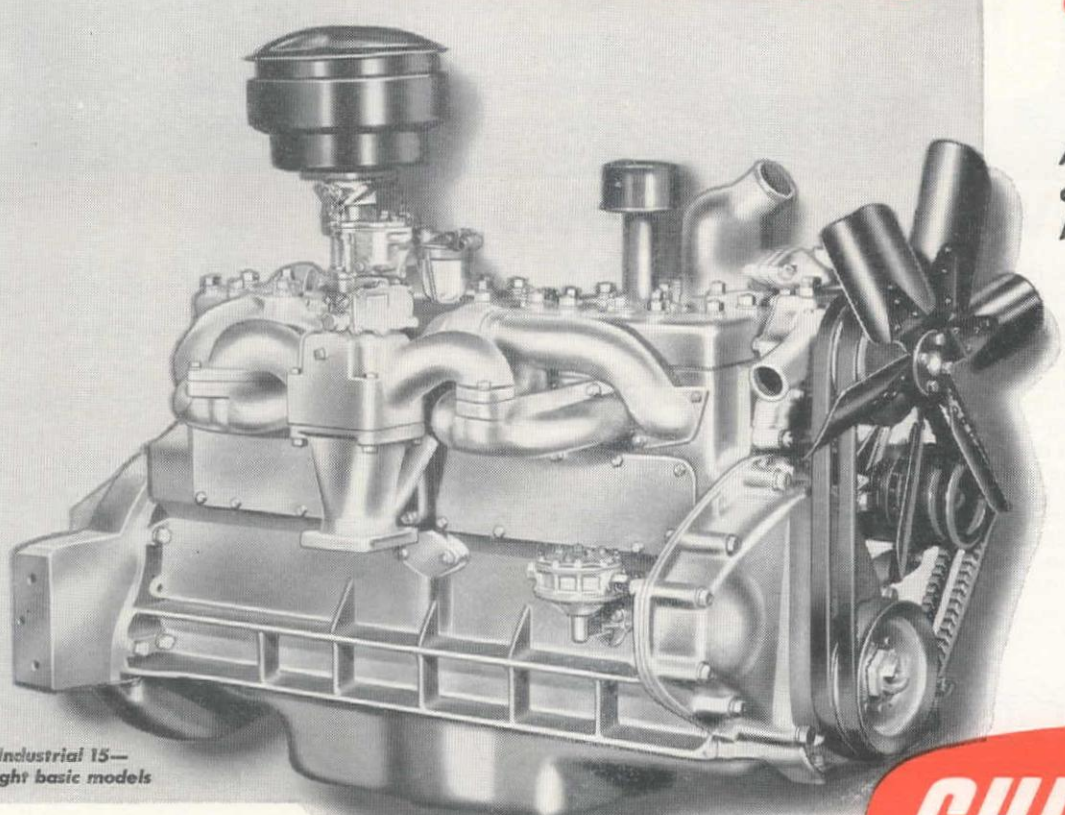
BIGGEST POINTS TO REMEMBER WHEN YOU BUY INDUSTRIAL ENGINES !

High Speed Operation Means
BETTER PERFORMANCE
Chrysler has it!

Mechanical Excellence Means
LOWER MAINTENANCE COST
Chrysler has it!

Large Mass Production Means
LOWER ORIGINAL COST
Chrysler has it!

Nation-wide Service Means
LESS DOWN TIME
Chrysler has it!



rysler Industrial 15—
e of eight basic models

A few of the many outstanding Chrysler Mechanical Features

- All friction surfaces Superfinished by an exclusive Chrysler process.
- Statically and dynamically balanced Crankshaft.
- Sodium cooled Exhaust Valves.
- Stellite Exhaust Valve Seat Inserts.
- Stainless Steel Valve Springs.
- Chrome top Piston Ring.
- Completely waterproofed Ignition.
- By-pass thermostat Cooling System.

Among engineers who have *seen the difference in the field* there is no question about the superior performance and economy of high speed industrial power. Only remaining question is—"Who makes the high speed industrial engine most free from maintenance and most readily adaptable to our equipment at the lowest cost?"

The answer is leading more and more manufacturers to Chrysler, *first* to develop a higher speed engine, continuously *first* with the greatest number of important improvements. A letter of inquiry will bring a qualified engineer to your desk for discussion.

Industrial Engine Division, Chrysler Corporation, Detroit 31, Michigan.

CHRYSLER

HORSEPOWER WITH A PEDIGREE

SEE THE LULL Shoveloader ...IN ACTION at your LULL DISTRIBUTOR

PROVE to YOURSELF that it...

- Digs harder material
- Gets buckets heaping full
- Reaches farther and higher
- Provides greater operator safety
- Works the year around

WORK? YOU SHOULD SEE IT!

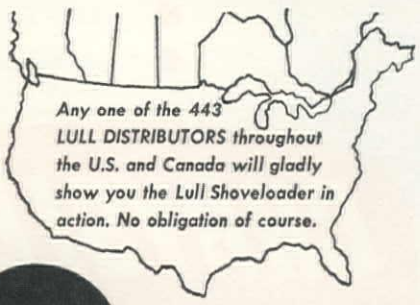
THE LULL SHOVELOADER is the most powerful digger in the industrial wheel-type tractor loader field. With powerful double acting hoisting and bucket control cylinders, it will dig harder material than any other loader in its class. And its natural scooping action actually scoops rather than pushes the dirt into the bucket . . . gives you a heaping full bucket every time. You dig and load more material with less waste motion . . . keep trucks moving.

LOAD FROM THE END of the truck . . . no need to go from one side to the other. The Lull Shoveloader loads easily to the very front of the box. Load pushing, half load hauling, or special maneuvering are completely eliminated!

THE SHOVELOADER OPERATOR IS SAFE . . . Just ask any operator. He will tell you he prefers Shoveloader safety because he is clear of falling rocks and moving mechanism.

MANY ATTACHMENTS are also available for the Lull Shoveloader to make it a continuous worker, month after month, regardless of weather. In addition to a wide range of material buckets, special buckets for pavement ripping and concrete can be mounted quickly when needed. Sweepers, log lifting forks, crane attachments, and bulldozer keep your Shoveloader working the year around. You can put them on in a jiffy.

SEE A LULL SHOVELOADER PERFORMANCE TEST. You owe this to yourself to prove that a Lull Shoveloader is your best buy because it will do more work and earn more profits for you! If you don't know your Lull Distributor, fill in and mail the coupon today. We'll gladly send you his name and there will be no obligation!



Any one of the 443 LULL DISTRIBUTORS throughout the U.S. and Canada will gladly show you the Lull Shoveloader in action. No obligation of course.

SEND COUPON NOW FOR THE LULL DISTRIBUTOR NEAREST YOU!

LULL Manufacturing Company
3612 East 44th Street, Minneapolis 6, Minn.

☐ Please send me name of my nearest LULL distributor.
☐ Send literature only.

Name.....Title.....
Company.....
Address.....
City.....Zone.....State.....

LULL Manufacturing Company
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Designers and Builders of The Largest Line of Allied Equipment for Industrial Wheel Type Tractors

SHOVELOADERS • UNIVERSAL LOADERS • FLUID-DRIVEN SWEEPERS • LULLDOZERS • SHOULDER MAINTAINERS

get more E.P.* per dollar!

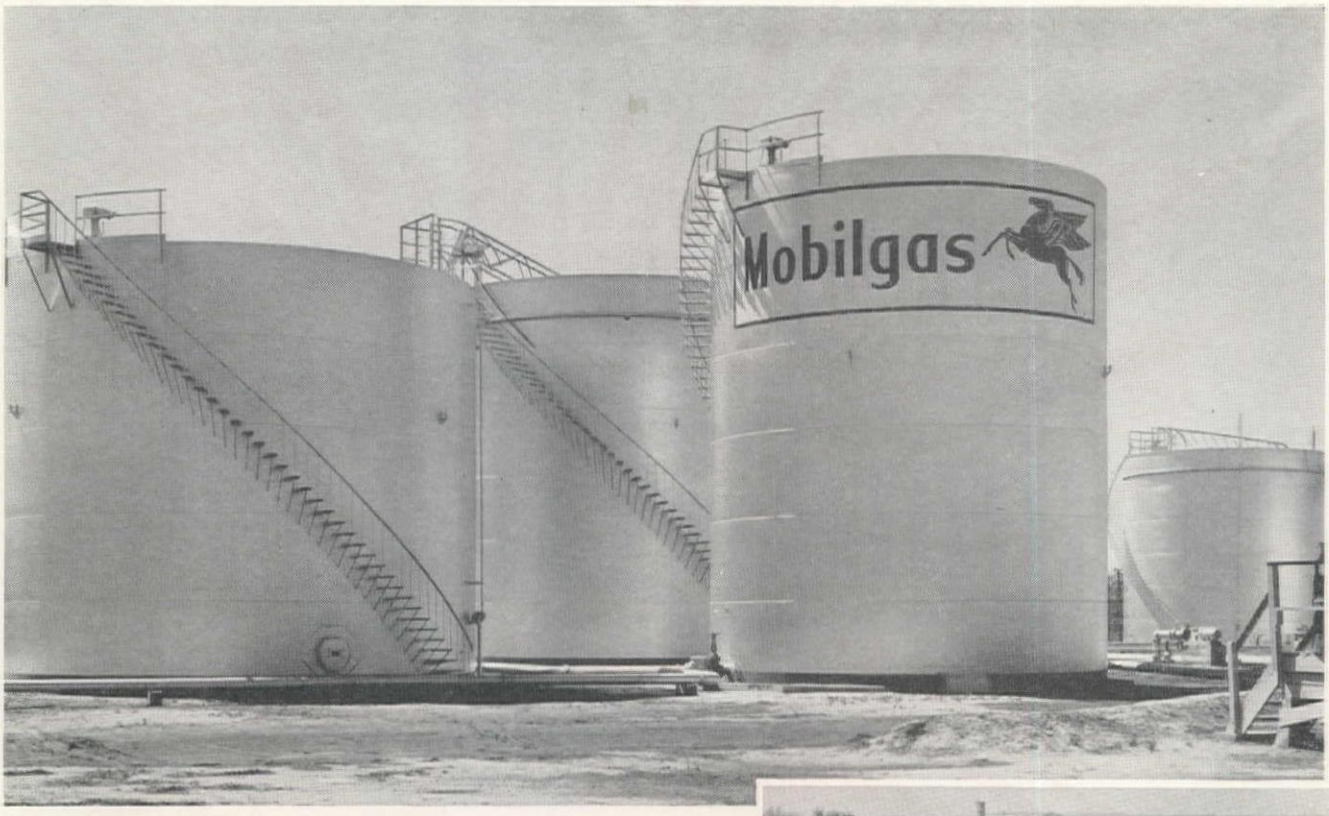
XR50-8

*Explosive Power is what you pay for when you buy explosives. You get more E.P. for your dynamite dollar with Hercules Hercomites® and Gelamites® because these explosives not only give better breakage than older-type explosives, but are more economical to use than extra dynamites and gelatins. And there's a series for practically every mining, quarrying, and construction need.

"Hercomites," for example, come in fast, intermediate, and slow heaving-action types. One series is especially designed for poorly ventilated places. All offer improved water resistance and, like "Gelamites," come in handy Tamptite® cartridges. For full information, write for illustrated booklet, "Hercomites and Gelamites for Lower Blasting Costs."

HERCULES POWDER COMPANY
INCORPORATED

973 Market Street, Wilmington, Delaware



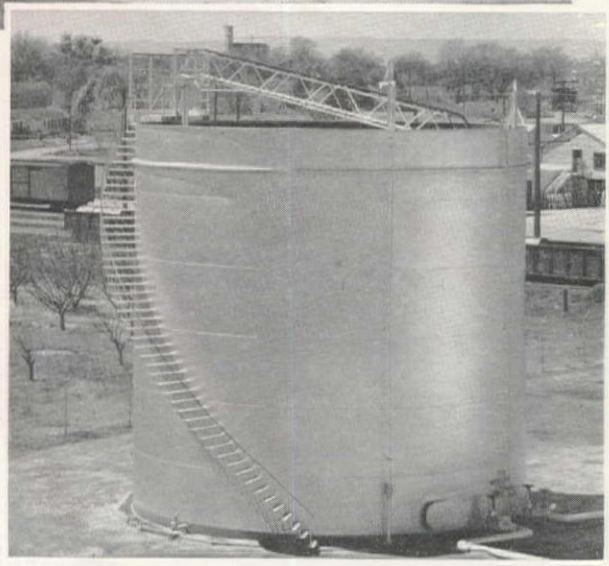
They're protecting the zip in the "flying red horse"

To the Western motorist, the name and symbol shown above are a familiar and welcome sight. Familiar because he sees them at the service stations of the General Petroleum Corp. Welcome because he knows they stand for high-quality gasoline that makes engine starting easy and doesn't knock. To protect these highly important properties of Mobilgas, General Petroleum installed the Horton tanks shown above at its new sub-terminal at Sacramento, Calif.

The light fractions in motor fuel are responsible for its easy starting and anti-knock properties. These fractions are volatile and escape readily from fixed-roof tanks. So General Petroleum keeps them "in" Mobilgas by equipping each gasoline storage tank at Sacramento with a Horton Double-Deck Floating Roof.

There are three reasons why a Horton Double-Deck Floating Roof prevents excessive loss of volatile fractions. *First*, there is no air-vapor mixture under this roof for it floats directly on the liquid. It thereby stops filling evaporation losses and reduces breathing losses. *Second*, the double-deck construction provides air-space insulation that cuts down boiling losses. *Third*, the Horton seal doesn't let vapor escape around the edge of the deck.

Write for Bulletin B for full details about the Horton Double-Deck. Don't let evaporation take the "zip" out of your volatile products.



Above: Close-up view of a 6,500-bbl. tank used to store Mobilgas regular gasoline in the General Petroleum Corporation's new marketing terminal at Sacramento, Calif. The position of the rolling ladder indicates that the tank's Horton Double-Deck roof is floating just below the top of the shell.

CONGRATULATIONS to WESTERN CONSTRUCTION on its twenty-fifth anniversary. May you long continue your splendid work in reporting the growth and development of the vigorous West.

CHICAGO BRIDGE & IRON COMPANY

Atlanta 3.....2183 Healey Building
Birmingham 1.....1598 North Fiftieth Street
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Chicago 4.....McCormick Building
Cleveland 15.....Guildhall Building
Detroit 26.....Lafayette Building
Houston 2.....National Standard Building
Havana.....402 Abreu Building
Los Angeles 17..1544 General Petroleum Building
New York 6.....165 Broadway Building
Philadelphia 3.....1700 Walnut Street Building
Salt Lake City 4.....555 West 17th South Street
San Francisco 4.....1569—200 Bush Street
Seattle 1.....1355 Henry 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

January 1951 Vol. 26, No. 1

A Vigorous Decade Ahead in Building Tomorrow's West

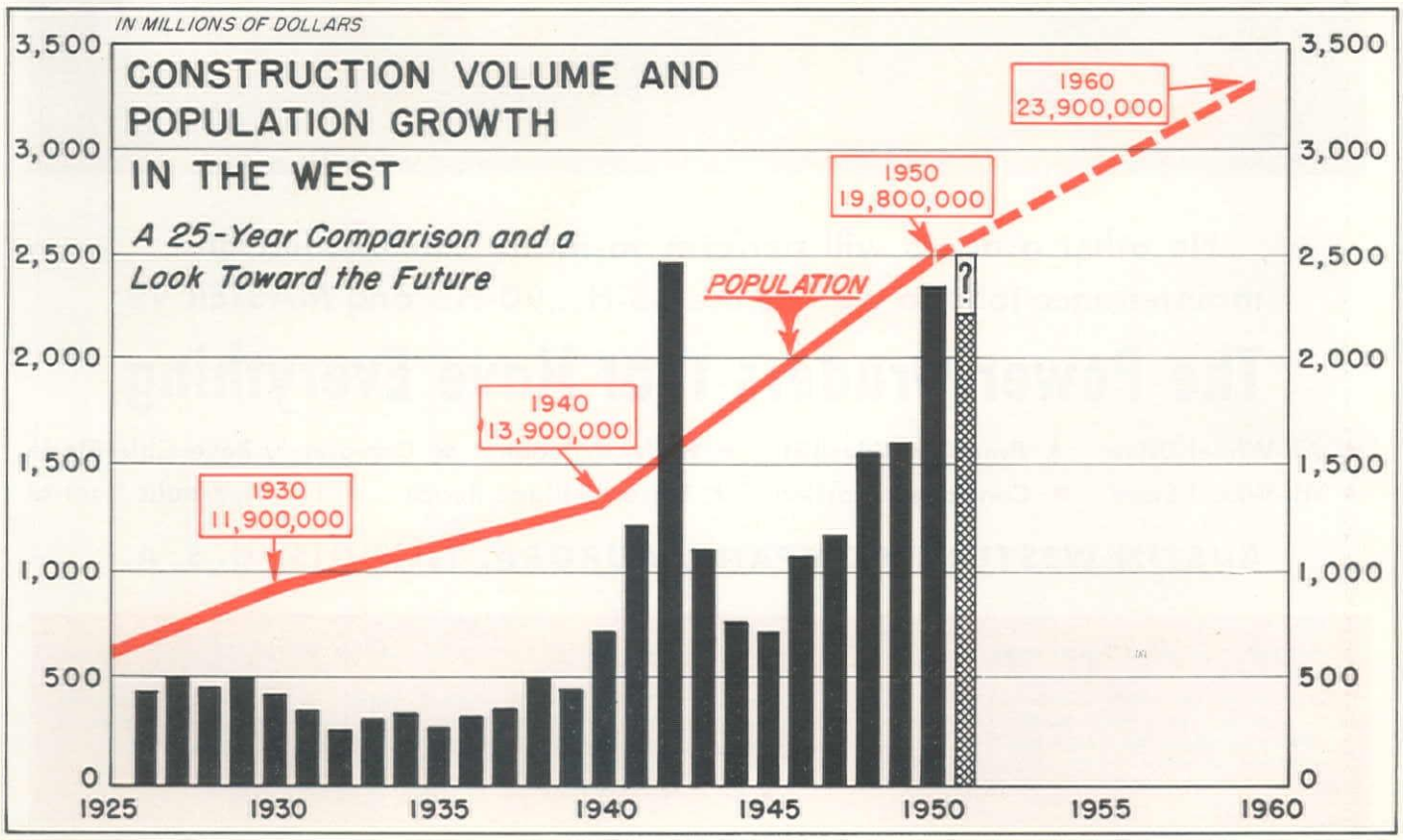
AFTER TWENTY-FIVE years, any record of construction activity begins to indicate trends that permit an appraisal of the past, and a look into the future. Although construction is generally recognized as an industry subject to wide variations, the graphic picture of work in the West shown below illustrates its remarkable growth during the last quarter of a century. In spite of the extremes occasioned by the depression and World War II the pattern shows an upward trend which is several times the rate of the national average.

Starting with a base of about $500,000,000 per year the volume of engineering construction declined to about half of this activity during the early 1930s. It is significant to note that even the record-breaking $48,000,000 contract for Hoover Dam in 1931 failed to produce even a slight reversal in this downward trend, indicating that construction is primarily the aggregate of many small jobs.

Paralleling other industries, construction left bedrock about 1936 and expanded at a slightly accelerating rate for several years, before beginning to show the effect of defense spending in 1940. Suddenly, within two years it skyrocketed to the sharp peak of $2,480,000,000 in 1942. By 1945 the volume had returned to a figure which might be termed "reasonably normal." It is significant that this volume in 1945 was close to the trend-line established during the pre-war years.

It follows a rapid growth during four years (1945-1949) which reflects the pent-up demand for civilian works and the backlog of deferred construction. Finally during 1950 an unprecedented spurt reflects a combination of continued normal growth plus the accelerated military effect. This places the 1950 volume almost equal to the 1942 peak.

Looking for the cause behind this rising curve of construction volume, the most significant and direct force is the phenomenal increase in population (red line). Advancing at a rate several times that of the national average, this has produced an accelerating demand for all of those things provided by the construction industry. This interrelation between population increase in the West and the construction volume not only explains the growth of this industry during the past twenty-five years, but also provides the key for predicting the expanding activity during the next decade. Methods of estimating population growth have become increasingly accurate and they provide the scientific base for the total figure expected by 1960. This shows the continuing growth at a rate several times the national average, with the corresponding assurance that construction activity will rise. Construction in the West during the coming ten years must automatically increase to parallel this population growth.



IN ~~1950~~ 1951

FOR THE ~~13th~~ 14th CONSECUTIVE YEAR

No other graders will perform so many construction and maintenance jobs so well as the 88-H...90-H...and MASTER 99

The Power Graders that Have Everything

★ All-Wheel Drive ★ Precision Sideshift ★ High-Lift Blade ★ Completely Reversible Blade
★ All-Wheel Steer ★ Controlled Traction ★ Extreme Blade Reach ★ Full Hydraulic Control

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ARIZONA—SHRIVER MACHINERY COMPANY.....*Phoenix*
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MONTANA—WESTERN CONSTRUCTION EQUIPMENT CO.....*Billings*
MONTANA—WESTERN CONSTRUCTION EQUIPMENT CO.....*Missoula*
NEVADA—C. D. ROEDER EQUIPMENT COMPANY.....*Reno*
NEW MEXICO—N. C. RIBBLE COMPANY.....*Albuquerque*
OREGON—COLUMBIA EQUIPMENT COMPANY.....*Portland 14*
UTAH—WESTERN MACHINERY COMPANY.....*Salt Lake City 13*
WASHINGTON—COLUMBIA EQUIPMENT COMPANY.....*Seattle*
WYOMING—WILSON EQUIPMENT & SUPPLY COMPANY.....*Cheyenne*

Looking Back Over Our Twenty-Five Years

1926—Volume I, Number 1

WHEN the first immigrants began to move into the West the need for this publication was born. Nature confronted them with a set of physical conditions they had never encountered before. When the Mormons began digging their first irrigation ditches, when the Forty-niners struggled over trail-roads across high mountain passes, and when the builders of the Central Pacific had to haul ties across a hundred miles of desert to the end-of-track, they were forced to solve problems they had never met in the East. These regional problems were to grow and intensify with every addition to population, and with every demand for better living in the West.

Philip Schuyler—He set the editorial sights

A Period of Transition

Twenty-five years ago the West had reached a population which demanded a review of many facilities. The pioneer days were over. Existing water supplies—both domestic and irrigation—needed restudy, power production was inadequate for the growth of homes and industry, highways were outmoded, and community facilities were strained to capacity. Obviously, a period of major construction activity was at hand. Further, the providing of these expanded improvements for the people of the West would stimulate another round of population movement. In its wake would come the demand for industrial growth, with many forms of secondary construction for plants and commercial buildings.

At about this same time the construction industry itself was in a transition period. New machines and field practices were developing. The mule-and-scraper generation was giving way to the machine age of construction. A new era of contracting methods was emerging. Trucks were becoming more common on contracting jobs, following the sale of thousands of surplus Liberty Trucks from World War I. The crawler-type tractor was finding increasing use in construction operations. Pictures from the field in the middle 20's show peculiar combinations of equipment with mule teams and tractors working side by side. Mechanization of construction was advancing.

Suddenly, contractors and members of their organizations felt the need for information on how these new mechanical aids could be operated effectively and adapted to different types of work. No longer was a contractor successful if he had only a working knowledge of men-and-mules. A whole generation of superintendents was suddenly confronted by bosses demanding that they work new kinds of equipment efficiently, and have helpful ideas on new purchases. The construction industry was changing.

In turn, this development was affecting cost figures on all types of work from excavation to concrete finishing. Engineers developed an increasing interest in bid prices. Estimating, both by engineers and contractors, took on a new meaning. Costs of doing unit items of work were being reduced as mechanical power was applied on construction projects. This required engineers to watch bid figures closely, not only to keep in touch with cost trends for design purpose, but also because of the resulting effect on plans for financing future projects. Cost keeping and analysis took on new meanings, both in the engineers' headquarters and the contractor's field office. Construction economics was changing rapidly. The cost of equipping jobs was increasing as power equipment went to work. Items of depreciation, maintenance and operating costs were larger considerations. Contracting was emerging into a business.

A Dedication of Service

This combination of (1) an era of expanding activity and (2) the arrival of mechanization presented the need for a publication to serve the information-hungry construction industry of the West.

Western Construction News began to meet this need with Vol. 1, No. 1 in January 1926.

The editorial page of that first issue carried this announcement of purpose and objectives:

"The rapid development of the Far West includes engineering and construction projects, not only of magnitude but involving problems different in many ways from those encountered elsewhere. The Far West has already taken the lead in hydro-electric development, irrigation, and highway construction, and must of necessity work out its own problems in other lines of construction. We believe, therefore, that there is need for a medium for an exchange of ideas among those interested in all lines of engineering construction, and to this end *Western Construction News* will be devoted."

In the twenty-five years that followed, the editorial plans and efforts have not changed from this simple dedication of service.

1932—Consolidation and growth

Philip Schuyler was selected as the first editor, and what he lacked in publishing experience, he more than made up in engineering and contracting back-

ground, combined with boundless enthusiasm. Proud of his American ancestry, including Gen. Philip Schuyler of the Revolutionary war, he was a nephew of James Dix Schuyler, noted hydraulic engineer of the West, and his own father was a pioneer railroad engineer. While his father was serving as chief engineer of the Mexican Central Railroad, Phil was born in Mexico City in 1880. He had an extended professional career, followed by several years of contracting in the field of water supply and sewerage prior to 1925.

1934—A familiar trade mark

With this broad background he was recommended for the position of the editorship of *Western Construction News* by his close friend, Clyde C. Kennedy, consulting engineer of San Francisco. Although his title was always that of Managing Editor, he was "The Editor" in responsibility, and acceptance throughout the construction industry.

Phil Schuyler was an idealist, as proven by his vigorous sponsoring of a campaign to "Keep the Far West Clean." He had the personality which makes friends and generates enthusiasm in others. He gave freely of his time to engineering organizations, but most of all he took satisfaction in building recognition for *Western Construction News.*

Although he would not have been considered unduly modest, he recognized the need for counsel in his new editorial duties and included Clyde C. Kennedy, E. Court Eaton and Don Partridge on the original staff in the capacity of part-time advisors.

Philip Schuyler died December 11, 1931. He had served almost exactly six years and had developed editorial policies during that formative period that have been retained and expanded in the following nineteen years of growth. Succeeding editors and their periods of service have been:

A. Gilbert Darwin .	December 1931-December 1934
G. E. Bjork	January 1935-April 1935
James I. Ballard . . .	May 1935-December 1940
D. F. Stevens . . .	January 1941-February 1943
John M. Server, Jr. . .	March 1943-January 1950
James I. Ballard	February 1950—

In 1932 the publication was consolidated with *Western Highways Builder,* published in Los Angeles, and about this time became a monthly journal. For two years the magazine continued under the rather cumbersome title of *Western Construction News and Highways Builder.*

In April 1934 the magazine adopted a new front cover which became its well recognized trade mark for the following fifteen years. In July 1950 the cover was modernized and the name of the publication shortened.

A Continuum of Policy

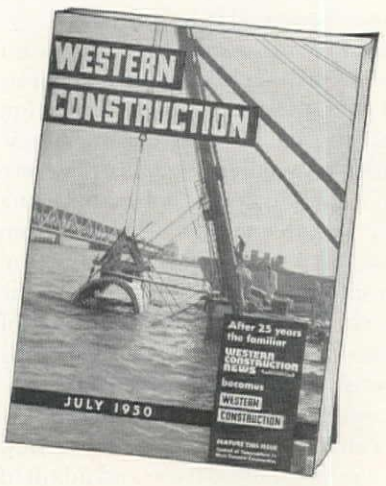
During these twenty-five years the original concept of editorial service has not been altered in any major degree. In common with all types of journalism the editorial content has reflected changes and the evolution of construction activity. There have been years when large dams seemed to dominate the work of engineers and contractors, and then other years would seem to emphasize highway work, aqueducts or bridges. As these developments took place, it has been the editorial responsibility of *Western Construction* to search for and report new ideas in design and new methods employed in field operations. This type of helpful information has been interpreted as to its significance to engineers and contractors, and presented with suitable photographs and drawings. Within the boundaries of the West it has been possible to review the significant projects and developments with articles of adequate length and proper detail.

On matters of strictly technical development, or design theory, it has been the policy to leave this type of subject matter to the engineering society publications. Only when advances in civil engineering design have reached the stage of practical field applications have they been reported.

The Men It Serves

Western Construction has grown to provide a distinctive service to (1) civil engineers with interests centered around the practical application of the science to the design of actual structures, particularly those concerned with directing field construction, and (2) contractors and members of their supervisory staffs who carry out the work indicated by these designs and specifications. Within these two large groups lies the responsibility for engineering construction in the West, including selection of materials and all equipment to bring projects from blue print to actuality.

Titles of these individuals are extremely varied, but functions follow a definite pattern. Engineering titles in government agencies—Federal to municipal—range from that of chief engineer through executive staff to designer, and down through the field force to that of inspector. Frequently consulting engineers are called in to bring an experienced and objective approach to the engineering planning. The work of the consultant may range all the way from expressing opinions on the designs to preparation of complete plans. Following the award of contract, the forces of the constructing organization take over. Such groups will vary from the small operators where the head of the business is his own superintendent, to the large corporation with administrative staff, project managers, superintendents and aids. The aggregate of these functions from chief engineer to foreman represents the construction-industry readership of the West.



1950—A modernization

These are the 12,500 subscribers which *Western Construction* now serves. They will be called upon to design and build projects of increasing size and number, as the West grows during the coming years. The editorial services of this publication will expand to keep pace with their greater achievements.

TWENTY-FIVE YEARS OF WESTERN CONSTRUCTION

1926

Tunney beats Dempsey for heavyweight crown.

HIGHLIGHTS:

Antioch Bridge across upper Suisun Bay opens to traffic . . . Record-head hydro plant for Bucks Creek project on Feather River under construction . . . Construction starts on Vantage Ferry Bridge over Columbia . . . Construction starts on Sunset Tunnel in San Francisco . . . S. P. Railroad double tracks route over Sierra Nevada . . . California makes first use of "Bump-meter" to measure highway roughness . . . Pacoima Dam started as world's highest concrete structure . . . Steel erection begins on Carquinez Bridge . . . Burnside Bridge over Willamette in Portland opens for traffic . . . Longest multiple arch dam in the world completed at Florence Lake . . . Ambursen Dam Co. awarded contract for Stony Gorge Dam . . . Dumbarton Bridge completed over lower San Francisco Bay . . . Contract awarded for multiple dome Coolidge Dam.

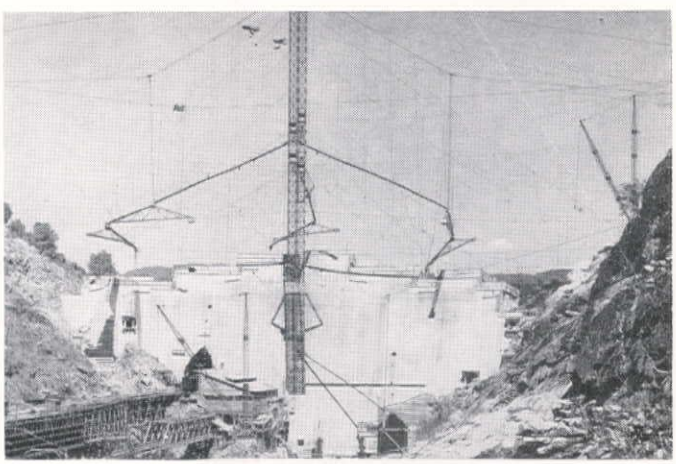
Horsepower on-the-hoof for hauling and excavation work being replaced by dump trucks and gasoline engine powered shovels.

Mulholland

Hewes

PERSONALITIES:

Walker R. Young moves to direct work on Kittitas project . . . *F. W. Hazelwood* starts long service as division engineer, California highway department . . . *E. Q. Sullivan* promoted to division engineer in same organization . . . *Ira R. Browning* becomes state highway engineer of Utah . . . *Wilbur F. McClure*, state engineer of California, dies . . . *Harlan D. Miller*, California bridge engineer, dies . . . *Frank C. Emerson*, state engineer of Wyoming, elected governor of state —first civil engineer in U. S. to receive honor . . . *M. Harvey Slocum* is superintendent of Bent Bros. on Exchequer Dam . . . *L. I. Hewes* directing Western Region affairs of the Bureau of Public Roads . . . *Paul Bailey* named state engineer of California succeeding McClure . . . *Arthur S. Bent* takes office as president of Los Angeles Chamber of Commerce . . . *William Hood*, long-time chief engineer of Southern Pacific, dies . . . *William Mulholland* directs preliminary surveys for an aqueduct from the Colorado River to Los Angeles.



Project of the year—Exchequer Dam, featuring 475-ft. concreting tower and counter-weighted chutes to handle 370,000 cu. yd.

CONTRACTS:

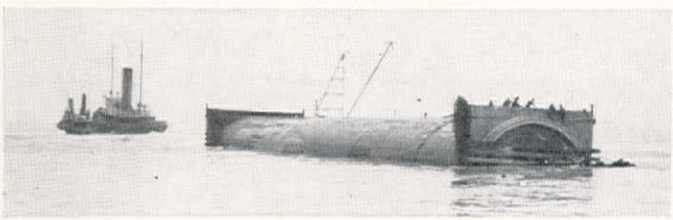
Lafayette Tunnell—EBMUD	Smith Bros., Inc.	$1,101,822
Lancha Plana (Pardee) Dam	Lynn S. Atkinson, Jr.	3,018,378
Paving Pico Boulevard at L.A.	Northern Pacific Const. Co.	1,034,881
Claremont Tunnel—EBMUD	Grier & Mead	1,374,374
Intercepting sewer—Portland	J. F. Shea Co.	2,135,000
Coolidge Dam—Arizona	Atkinson-Spicer	2,268,565

1927-1928

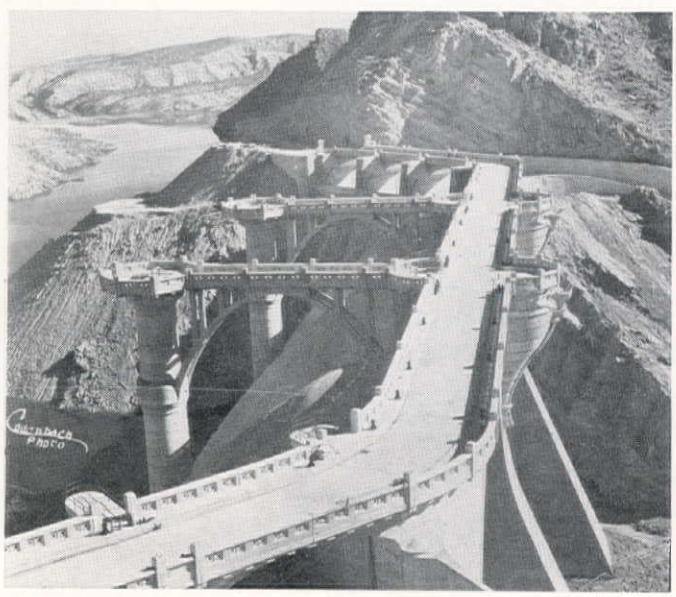
Lindbergh flies Atlantic in "Spirit of St. Louis."

Al Jolson in the first "talkie" picture.

Entire engineering world appalled at the failure of St. Francis Dam and loss of life in Southern California on March 12, 1928.



First subaqueous tunnel in the West built of pre-cast concrete sections, towed to position and sunk—later named Posey Tube.



Arizona's unique multiple-dome dam, named for Pres. Coolidge.

HIGHLIGHTS:

1927—Road-mix highway method coming into prominence . . . Lake Pleasant, highest multiple arch dam, completed in Arizona . . . First highway commission for the state of Arizona is appointed . . . Largest pre-cast concrete pipe in the West (108-in.) installed in Sacramento sewer . . . Phoenix passes ordinance requiring 100% metering of city water . . . Bucyrus and Erie merge to become Bucyrus-Erie Co. . . . Moffat Tunnel holed through on July 7 . . . Los Angeles City Hall completed in March . . . First permanent dam built to hold mining debris at Bullards Bar . . . First of two suspended spans raised into position at Carquinez Bridge. 1928—Chelan hydroelectric project under way in Washington . . . California adopts 2-year highway budget for first time . . . Stoney Gorge Dam under active construction . . . Casting and sinking of sections for Posey Tube under way . . . St. Francis Dam fails on March 12 . . . Mechanical spreading of asphalt for first time on California highways . . . Various engineering reports made and released covering St. Francis Dam failure . . . Oakland-Alameda tunnel named Posey Tube in honor of its chief engineer . . . S. P. Railroad announces plans for Suisun Bay bridge . . . Work on San Mateo bridge is active . . . Partial failure of Lafayette Dam . . . Treatment plant at Grand Canyon reclaims sewage for power and irrigation . . . East Bay Municipal Utility District takes over properties of East Bay Water Co. . . . Filter plant at Sacramento enlarged . . . Bureau of Public Roads adopts policy for pre-qualifying bidders . . . Zion-Mt. Carmel highway in Utah features five tunnels . . . Road equipment show in Los Angeles.

PERSONALITIES:

1927—*Fred Panhorst* moves from Washington highway department to California bridge department . . . *Paul Bailey* resigns as state engineer of California to become chief engineer of Orange County Flood Control District . . . *Edward Hyatt* named state engineer and chief of division of water rights . . . *E. Court Eaton* appointed chief engineer of Los Angeles County Flood Control District . . . *Frank A. Nikirk*, for many years city engineer of San Leandro, goes to Caterpillar Tractor Co. 1928—*W. A. Bechtel* made national president of A.G.C. . . . *Edward R. Bacon* made national president of AED . . . *C. H. Purcell* named state highway engineer of California . . . *Julian Hinds* is resident engineer of Calles Dam in Mexico, with *Grant Bloodgood* in charge of canals . . . *T. E. Stanton* appointed materials engineer, California Division of Highways . . . *William Mulholland* retires as head of Los Angeles Department of Water and Power . . . *H. A. Van Norman* appointed to succeed Mulholland.

Purcell

Nikirk

Panhorst

CONTRACTS:

1927		
Bull Run Dam	Bent Bros.	$ 1,440,375
Lafayette Dam—EBMUD	Geo. Pollock	1,370,685
Bridge River Tunnel (Vancouver, B. C.)	Pacific Engineers, Ltd., & Henry & McFee	1,249,530
Echo Dam	A. Guthrie & Co.	1,125,097
1928		
Owyhee Dam	General Const. Co.	3,198,779
Denny Hill Grading	Geo. Nelson Co.	1,516,974
San Gabriel Dam (Concrete)	McDonald & Kahn	11,250,040

1929-1930

Stock market crash sets off depression.

Miniature golf fad; Bourbon $100 per case.

HIGHLIGHTS:

1929—Officials of Metropolitan Water District meet to talk financing for Colorado River Aqueduct . . . Frog Tanks Dam in Arizona officially re-named Lake Pleasant Dam . . . California Highway Commission acts to abate menace of signs along state highways . . . Sir Francis Drake Hotel in San Francisco completed in record time without fatal accident . . . San Mateo Bridge across San Francisco Bay completed in fourteen months . . . Development of Parshall measuring flume is announced . . . Tacoma installs its first centrifugally cast concrete pipe . . . Bonds voted for Pine Canyon Dam at Pasadena . . . California registration law for civil engineers becomes effective . . . First snow surveys made in mountains of California . . . Site for San Gabriel Dam condemned and construction halted. 1930—Montana introduces first use of traveling bituminous road mixer in the West . . . Basich Bros. establishes record for concrete paving on San Francisco Bayshore Highway . . . Congress approves initial $10,000,000 expenditure for Hoover Dam . . . Construction concludes on highest rock-fill—Salt Springs Dam of P. G. and E. . . . San Francisco buys water system of Spring Valley Water Co. for $40,021,000 . . . Coolidge Dam dedicated in Arizona.

PERSONALITIES:

1929—*Frank E. Weymouth*, chief engineer of J. G. White Co., appointed chief assistant to *H. A. Van Norman* on the Colorado River Aqueduct program . . . *Arthur P. Davis* resigns as chief engineer and general manager of East Bay Municipal Utility District and is succeeded by *Frank Hanna* . . . *Julian Hinds* joins Los Angeles water department, in connection with Colorado River Aqueduct program . . . *Frank E. Bonner* appointed secretary of the Federal Power Commission at Wasington, D. C. . . . *Joseph B. Strauss* appointed chief engineer for Golden Gate Bridge project.

Weymouth

Eckart

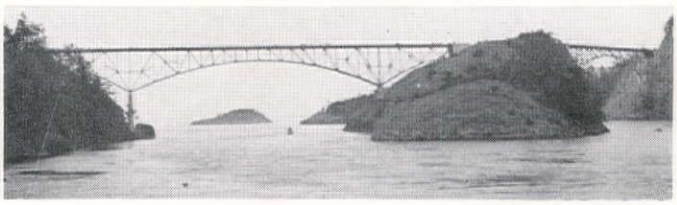
Vail

1930—*Walker R. Young* appointed construction engineer for Hoover Dam project . . . *Ray F. Goudey* takes a position with L. A. Water Department to study reclamation of sewage . . . *J. J. Jessup* appointed city engineer of Los Angeles to succeed *John Shaw* . . . *Nelson A. Eckart* named general manager of the S. F. Water Dept. . . . *Fred J. Klaus* appointed city engineer of Sacramento . . . *Chas. D. Vail* appointed state highway engineer of Colorado.

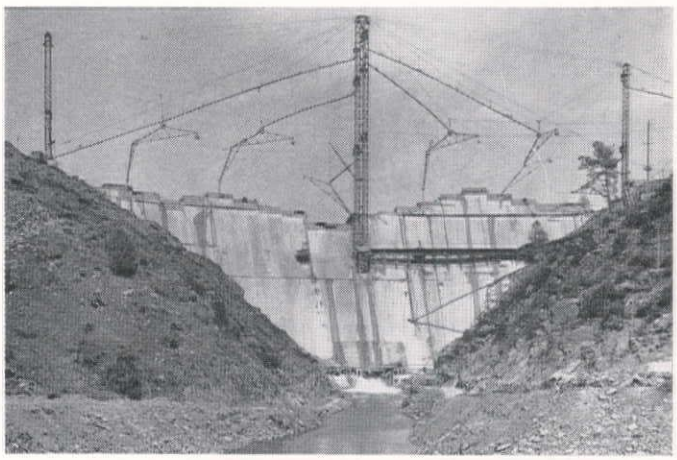
CONTRACTS:

1929		
Cushman Tunnel No. 2	Youdall Const. Co.	$1,737,933
1930		
Concrete Lined Tunnels (Nyssa, Ore.)	T. E. Connolly	$ 982,116
Steel Pipe Line (Seattle, Wash.)	Queen City Const. Co.	1,207,116
Schmidt & Hitchcock Reservoir, Tunnel & Detritor	Schmidt & Hitchcock	2,059,140

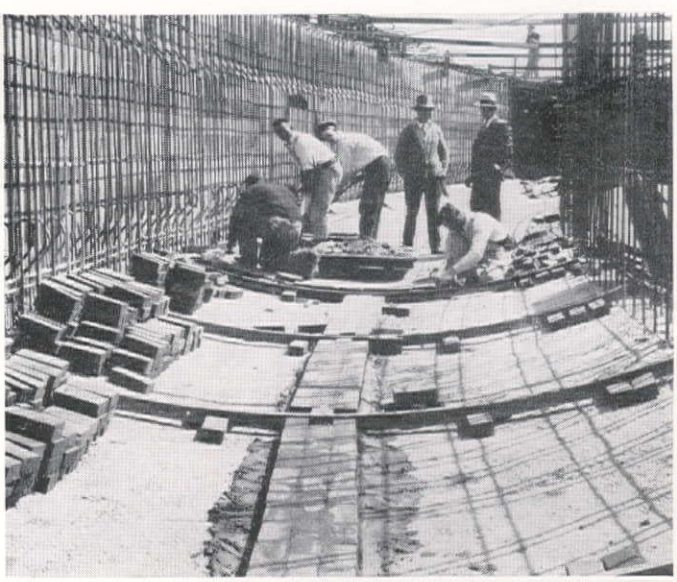
First project built under California's new law for state supervision, provides flood control on Calaveras—named Hogan Dam.



Plans under way for bridges to break traffic barriers at Puget Sound with these structures arched from Whidby Island to the mainland.



Pardee Dam under way to provide main storage for the new water supply of East Bay Municipal Utility District.

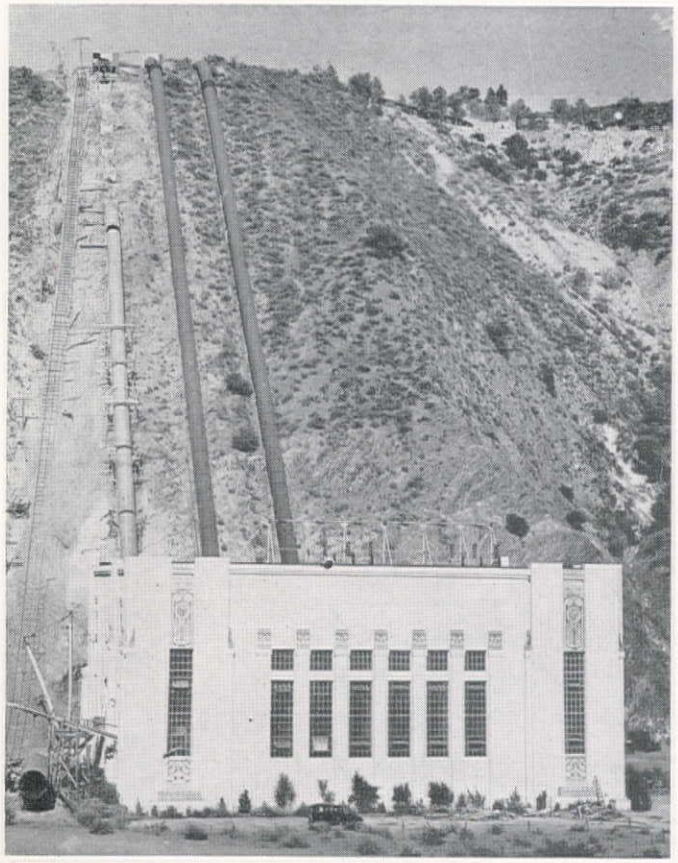


Brick inverts common for the lining of sewers and storm drains.

1931-1932

Wiley Post flies around world in 8 days.

Roosevelt elected; 11,000,000 unemployed.

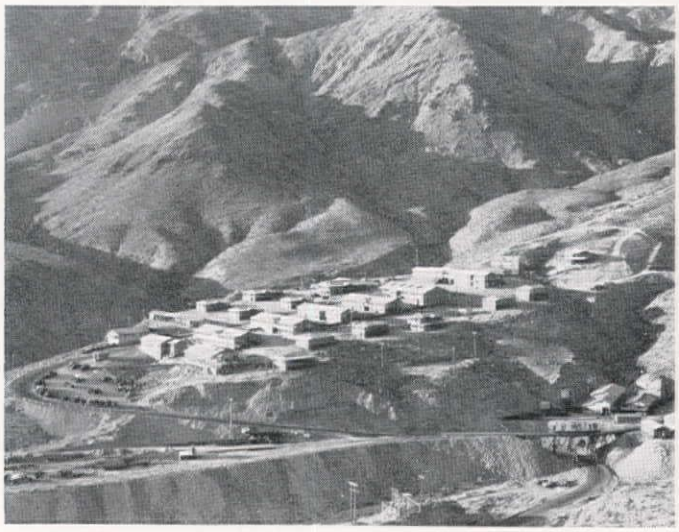


First all-welded penstock in U. S. installed on San Francisquito Plant No. 2 of Los Angeles Dept. of Water and Power.

At Owyhee Dam a board of consulting engineers inspects operations, make plans for Hoover Dam. Left to right—*Frank Banks, J. A. Savage, A. J. Wiley, B. A. Hall, D. C. Henny, Clifford Betts, C. G. Clapp* (contractor's superintendent) and *L. C. Hill.*

HIGHLIGHTS:

1931—San Francisco builds emergency link to East Bay system during critical water shortage . . . Six Companies Inc. organized in February to bid on Hoover Dam . . . Bids for Hoover Dam opened March 4, with Six Companies low at $48,890,995; award made March 11 . . . St. Johns Bridge across the Willamette opens in Portland . . . Work starts on Sunnyvale dirigible base . . . California paving record set at 1,305 tons of asphalt per day . . . Program of $2,000,000 waterworks improvement at Phoenix . . . Route selected for Colorado River Aqueduct. 1932—Definite plans announced for All American Canal project . . . Work starts on Cle Elum Dam in Washington . . . Driving and lining of Hoover Dam tunnels active . . . Testing machine of 4,000,000-lb. capacity completed at University of California . . . General design for San Francisco-Oakland Bay Bridge approved . . . Pine Canyon Dam construction under way, using 2-mi. aerial tram to handle aggregate . . . RFC agrees to buy $40,000,000 of District bonds, insuring two years' construction on Colorado River Aqueduct . . . Proposal of dike to create fresh water arm of Great Salt Lake . . . Call for bids on first work for San Francisco-Oakland Bay Bridge.



Along Colorado River Aqueduct route, contractors build camps in wilderness, illustrating typical Western construction problem.

PERSONALITIES:

1931—*William H. Wattis*, president of Six Companies, dies, and *W. A. Bechtel* elected president . . . *A. J. Wiley*, nationally recognized consulting engineer, dies . . . *T. S. O'Connell* named state engineer of Arizona . . . *William R. Eccles* named state highway engineer of New Mexico . . . *Marsden Manson*, early sponsor of the Hetch Hetchy project, dies . . . *George Pracy* nominated national president of A.W.W.A. 1932—*W. D. Beers* named city engineer of Salt Lake City . . . *R. H. Baldock* appointed state highway engineer for Oregon, succeeding *Roy A. Klein* . . . *Melville Dozier, Jr.*, resigns as manager of Southern California Chapter of A.G.C. . . . *Henry H. Blood*, chairman, Utah State Road Commission, and president of W.A.S.H.O., elected governor of Utah.

Baldock

CONTRACTS:

1931		
Hoover Dam	Six Companies Inc.	$48,890,995
Valley Pipeline—Hetch Hetchy Proj.	Youdall Const. Co.	4,136,479
Cle Elum Dam	Winston Bros.	1,311,534
Tunnel Under First Narrows (Vancouver, B. C.)	Smith Bros. & Wilson	925,639
1932		
Pine Canyon Dam	Bent Bros., Winston Bros., & Wm. C. Crowell	2,407,311
El Capitan Dam	T. E. Connolly & H. W. Rohl	2,332,860
San Gabriel Highway	Guy F. Atkinson Co.	868,899
San Gabriel Rock-Fill Dam No. 1	Constructors, Inc.	11,270,043
Golden Gate Bridge		
Superstructure	McClinic-Marshall Corp.	10,494,000
Cables	John A. Roebling Sons' Co. of Calif.	5,855,000
Piers	Pacific Bridge Corp.	2,935,000
Anchorages & Piers of Approaches	Bridge Builders, Inc.	1,859,854

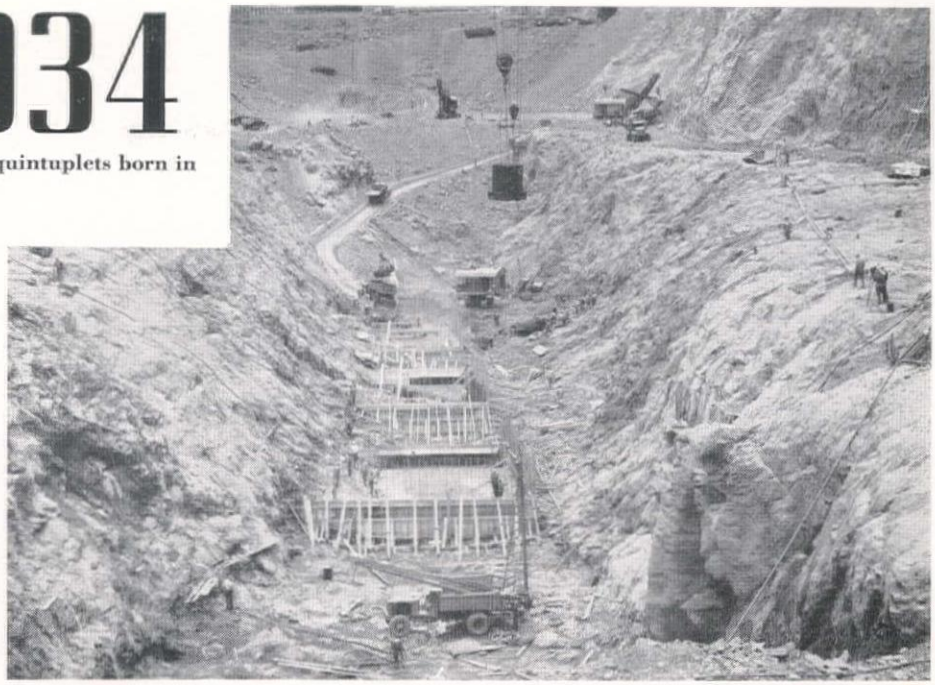
1933-1934

First years of NRA and the "Blue Eagle."

Dionne quintuplets born in Canada.

HIGHLIGHTS:

1933—Construction work active on San Francisco Bay Bridge . . . Concrete for San Francisco Bay Bridge mixed and handled by floating plant . . . Cableways at Hoover Dam feature construction plant . . . Preliminary construction work starts on Bonneville project . . . Construction starts on Colorado River Aqueduct. 1934—Oregon plans five bridges on Coast Highway . . . California votes $170,000,000 bond issue for Central Valley project . . . Coast Range tunnel of Hetch Hetchy aqueduct (28.5 mi.) holed through . . . Substructure for San Francisco Bay Bridge completed during year . . . Plans for adding 85 ft. to O'Shaughnessy Dam announced . . . Gas line 217 mi. long between Douglas and Phoenix . . . Emulsified asphalt receives attention for highway surfacing . . . Pumps for handling concrete being used on several Western jobs . . . Work active on San Gabriel Dam No. 1—largest rock fill . . . All-welded steel frame dormitory at Stanford University.



First bucket of concrete goes into the foundation depths of Hoover Dam. The nation's greatest construction job during the depression years set many records.

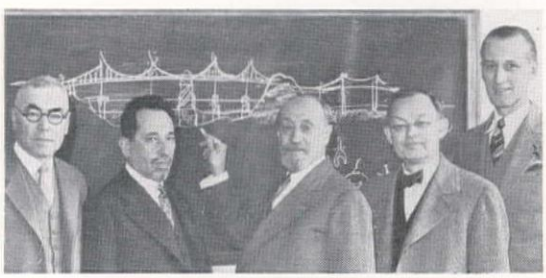
Tractors begin to pull carrying scrapers, which subsequently grew in size and were equipped with rubber-tired wheels.

On the Colorado River Aqueduct, tunnel driving moves ahead on a number of contracts. Many innovations resulted in new records.

Piles go down for extension to Columbia River Jetty.

PERSONALITIES:

1933—*Fred A. Notzli* dies . . . *Lloyd Aldrich* appointed city engineer of Los Angeles . . . *Arthur P. Davis* and *W. A. Bechtel* die . . . *Julian Hinds* promoted to assistant chief engineer, Metropolitan Water Dist. of So. Calif. . . . *B. C. Leadbetter* first to be named a division engineer on Colorado River Aqueduct. 1934—*George B. Herington* resigns as head of A.G.C. in Portland . . . *Roy M. Harris* named state sanitary engineer for Washington . . . *E. O. Wattis*, president of Six Companies Inc. and Utah Construction Co., dies . . . *F. W. Hanna* retires as chief engineer and general manager of EBMUD . . . *K. C. Wright* appointed chief engineer of Utah Road Commission, succeeding *H. S. Kerr* . . . *M. M. O'Shaughnessy*, builder of Hetch Hetchy project, dies October 12.



For the San Francisco Bay Bridge, consultants advising *C. H. Purcell* (left) included *Leon S. Moissieff, Ralph Modjeski, Chas. Derleth, Jr., H. J. Brunnier.*

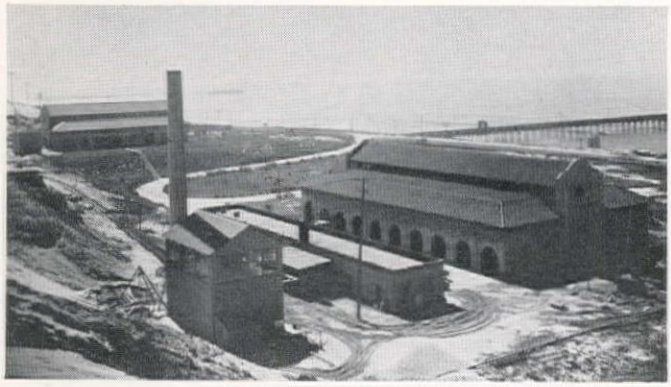
CONTRACTS:

1933		
San Francisco Bay Bridge	Clinton Construction Co.	$1,821,292
San Francisco Bay Bridge	Transbay Construction Co.	6,957,100
Excavating and line Copper Basin, Whipple Mountain and Whitewater tunnels, Colorado River	Walsh Construction Co. and West Construction Co.	4,357,780
		1,051,637
1934		
All-American Canal	W. E. Callahan, H. Gunther and J. P. Shirley	4,859,587
Bonneville Dam powerhouse and navigation lock	General Construction Co. and J. F. Shea	3,895,592
Grand Coulee Dam	M-W-AK	$29,339,301
Parker Dam	Six Companies Inc.	4,239,834

1935-1936

Will Rogers, Wiley Post killed in plane accident.

Duke of Windsor abdicates throne of England.

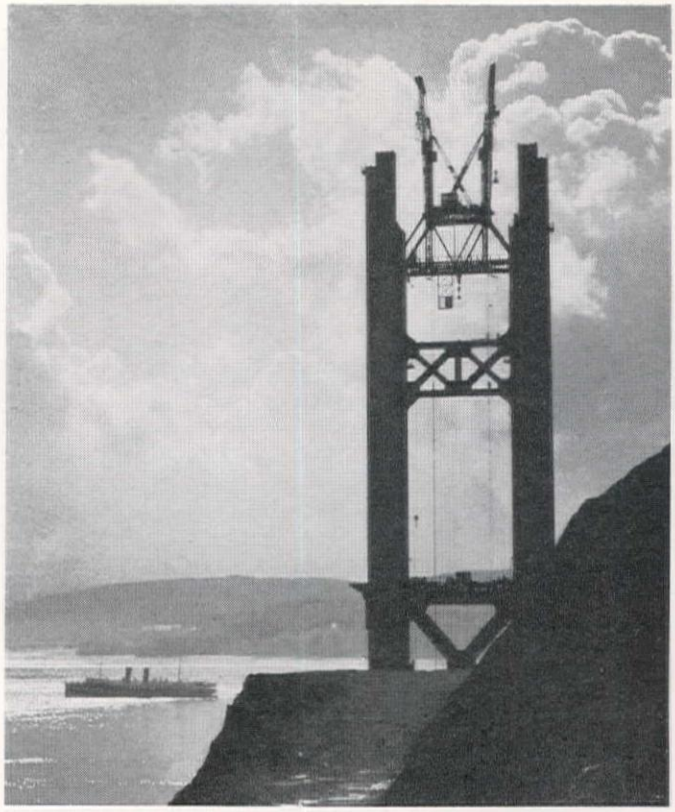


A step in the continuing attack on sewage disposal problems in Los Angeles area—expansion of the Hyperion Treatment Plant.

HIGHLIGHTS:

1935—Cofferdam construction under way at Bonneville Dam . . . Mono Craters Tunnel taps additional water for Los Angeles . . . First large metal-face dam (ElVado) built in New Mexico . . . Floods of water cause delays on San Jacinto tunnel on Colorado River Aqueduct . . . Montana passes law for registration of contractors . . . Cable spinning starts on Bay Bridge . . . Montana has severe earthquake . . . Conduit work in full swing on Colorado River Aqueduct . . . Towers completed for Golden Gate Bridge . . . Penstocks being erected at Hoover Dam . . . Orinda filter plant completed at Oakland. 1936—During past year dredges placed 20,000,000 cu. yd. in Fort Peck dam . . . Plans made to celebrate completion of Hoover Dam . . . Concrete placing at 6,000 cu. yd. per day on Grand Coulee . . . $15,000,000 allotted to start work on Central Valley project . . . San Diego expresses interest in Colorado River Aqueduct . . . The 1,400-ft. cantilever span closed on San Francisco Bay Bridge . . . Hollow-box concrete girders used for county bridges in Washington.

***Governor Martin* receives 75¢ from M-W-AK for tripping first bucket at Grand Coulee Dam.**



Steel goes skyward for the record-breaking 4,200-ft. Golden Gate Bridge span, with cable spinning active during 1936.

PERSONALITIES:

1935—*Grover F. Conroy* appointed state highway engineer of New Mexico . . . *C. H. Howell* named chief engineer of Los Angeles County Flood Control District . . . *George Malone* resigns as state engineer of Nevada . . . *William Mulholland* dies. 1936—*Earl S. Anderson* named first registrar of contractors in California . . . *Dr. Elwood Mead*, Commissioner of Reclamation, dies on January 26 and lake created by Hoover Dam named for him.

Mead

CONTRACTS:

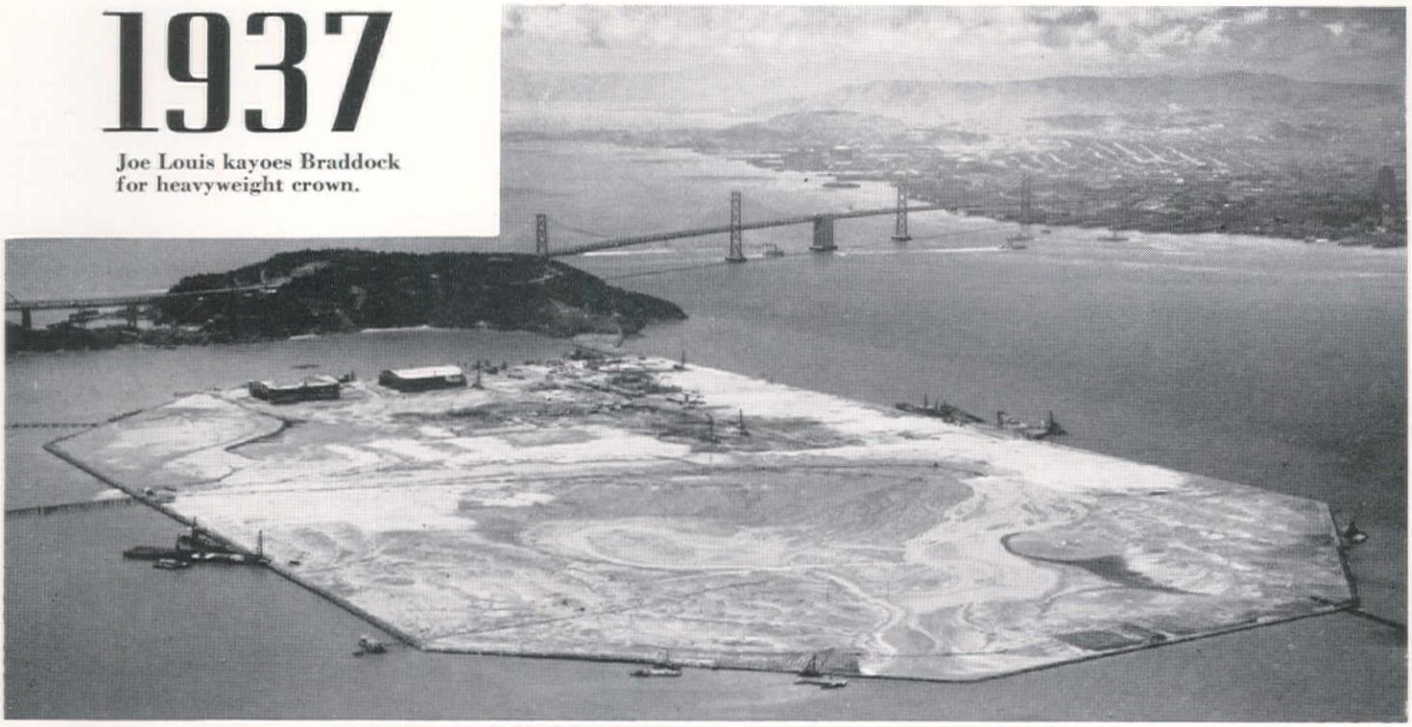
1935		
Enlargement of O'Shaughnessy Dam	Transbay Const. Co.: MacDonald & Kahn Co., Pacific Bridge Co., General Const. Co., J. F. Shea Co. & Morrison-Knudsen	$3,219,965
Imperial Dam & Desilting Works	Morrison-Knudsen, Utah Const. Co. & Winston Bros.	4,374,240
1936		
Bartlett Dam—Ariz. (Multiple arch)	Barrett & Hilp & Macco Const. Co.	2,227,495
Conchos Dam—New Mexico	Griffith Co. & Bent Bros.	4,587,676

Oregon spends $5,500,000 to improve coast highway with five bridges (Coos Bay shown), eliminating state-owned ferries.

Drags and mechanical spreaders replace hand raking methods ahead of the roller on sheet asphalt paving operations.

1937

Joe Louis kayoes Braddock for heavyweight crown.



In San Francisco Bay, the man-made Treasure Island is completed and first buildings go up for Golden Gate International Exposition.

HIGHLIGHTS:

Frozen-earth dam used to stop slide at Grand Coulee . . . Buildings rising on site of Golden Gate International Exposition . . . Safety net is notable feature on steel erection for Golden Gate bridge . . . Record foundation depth of 250 ft. at Parker Dam . . . Asphalt protection for Willamette River revetments used in extensive experiments . . . Vertical sand drains used to stabilize highway fills . . . Contract awarded for construction of Marshall Ford Dam . . . First bids called for Central Valley project . . . Asphalt used in experiment to consolidate Columbia River jetty . . . Radio used to direct snowplows on Washington highway system . . . Golden Gate bridge opened to traffic May 27 . . . Ruby Dam project started on Skagit River . . . Los Angeles County tries asphalt pavement on flood control channels . . . Longest tunnel in Oregon highway system (1,228 ft.) is driven . . . California adopts 11-ft. width for highway traffic lanes . . . Northwest experiments with use of waste liquor from pulp mills to stabilize roads . . . Soil-cement concrete used for first time in the West.

PERSONALITIES:

John C. Page appointed Commissioner of Reclamation . . . *F. W. Panhorst* named bridge engineer for California Division of Highways . . . *E. C. Knowlton* appointed chief engineer of Utah state road commission, succeeding *K. C. Wright* . . . *Ivan C. Crawford*,

Page

Seifried

Crawford

Atkinson

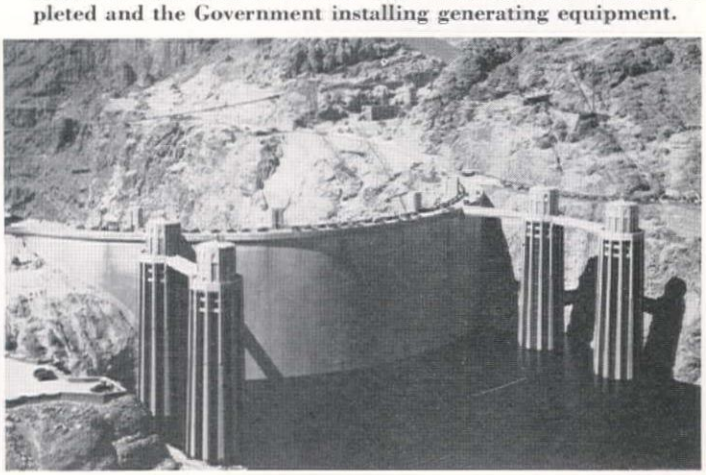
Dean of the College of Engineering at University of Idaho, moves to University of Kansas in a similar capacity . . . *George Atkinson* takes over general supervision of work at Grand Coulee Dam . . . *Frank A. Kittredge* promoted from chief engineer of the National Park Service to regional director . . . *C. F. Seifried* appointed superintendent-engineer for the Wyoming state highway department succeeding *James B. True* . . . *Z. E. Sevison* leaves Wyoming to become state highway engineer of North Dakota.

CONTRACTS:

San Francisco-Oakland Bay Bridge Terminal	MacDonald & Kahn Co., Ltd.	1,658,510
Ruby Dam	Columbia Const. Co.: General Const. Co. & J. F. Shea Co.	3,967,785
Repair Jetty (Columbia River)	Columbia Const. Co.	1,179,183

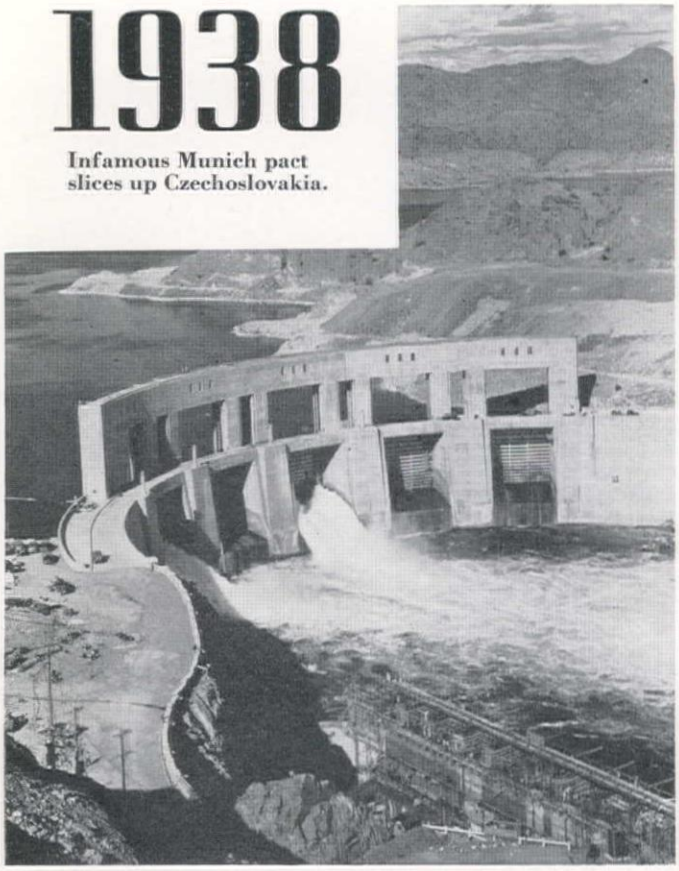
Water supply construction active with this covered reservoir being built by the San Francisco Water Department.

Reservoir fills behind Hoover Dam with contract work completed and the Government installing generating equipment.



1938

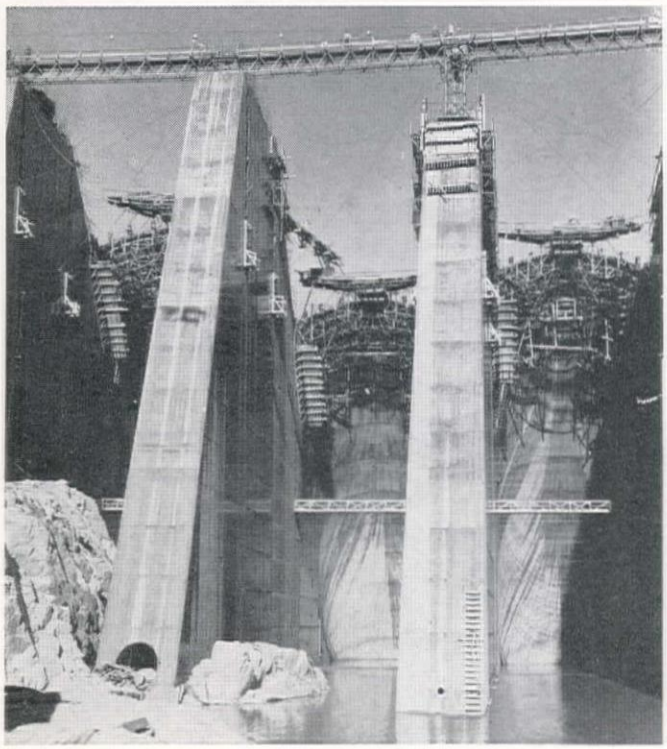
Infamous Munich pact slices up Czechoslovakia.



Parker Dam nears completion after setting record-depth foundation 250 ft. below Colorado River.

CONTRACTS:

Green Mountain Dam	Warner Const. Co., Inc.	$ 4,227,206
Prado Dam	W. E. Callahan Const. Co., J. P. Shirley, Guthrie Marsch Peterson Co., George W. Condon Co.	3,640,795
Shasta Dam	Pacific Constructors, Inc.	35,939,450
Deer Creek Dam	Rohl-Connolly Co.	2,189,096
Grand Coulee Dam	Consolidated Builders, Inc. (MWAK, Henry J. Kaiser, M-K, Utah, MacDonald and Kahn, J. F. Shea, Pac. Bridge, General Const.)	34,442,240



Asphalt lining for flood channels advances from experimental stage to full-scale construction at Los Angeles.

HIGHLIGHTS:

Aerial tramway 4 mi. long installed on Conchas Dam project . . . All-American Canal completed and dedicated . . . Driving 3.4-mi. tunnel on Yakima project . . . Railroad system on San Francisco Bay bridge nears completion . . . Bartlett Dam, record multiple arch under way on Salt River . . . Serious slip at Fort Peck Dam moves 8,000,000 cu. yd. of hydraulic fill . . . First application of coal tar to steel pipe without prime coat . . . 2,000-ft. highway tunnel for new road into Yosemite Valley . . . Severe Los Angeles flood claims 113 lives and sets run-off record . . . Parking meters installed in Portland . . . Salt water removed from man-made Treasure Island . . . Record lock gates (100 ft. high) installed at Bonneville Dam.

PERSONALITIES:

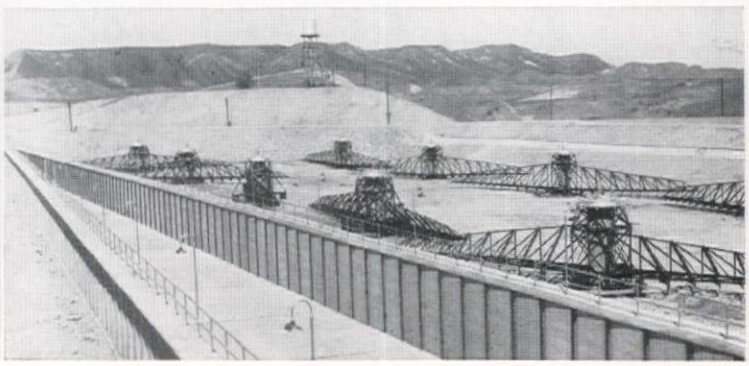
Lowry *Crowe*

Louis C. Hill, widely known consulting engineer, dies . . . *Frank Crowe* appointed general superintendent for Shasta Dam and *Ralph Lowry* is construction engineer for Bureau of Reclamation . . . *Joseph B. Strauss*, chief engineer for Golden Gate bridge, dies . . . *C. S. Pope*, construction engineer for California Division of Highways, dies . . . *R. M. Gillis* appointed construction engineer for California Division of Highways . . . *James Munn*, general superintendent of construction for Colorado River Aqueduct, retires . . . *B. W. Matteson* becomes district engineer of the Bureau of Public Roads at Denver.

Hill *Gillis*

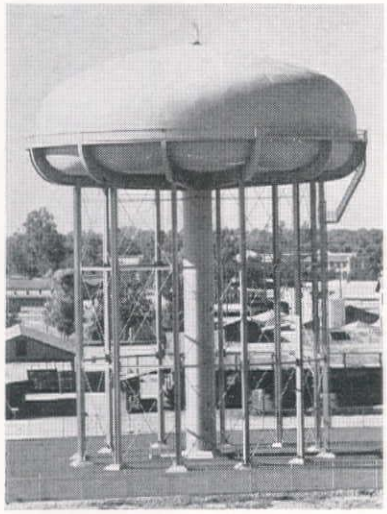
LEFT—World record 286-ft. multiple-arch dam (Bartlett) adds needed storage in Arizona.

BELOW—Desilting works of record size built to clarify Colorado River water before delivery to All American Canal.

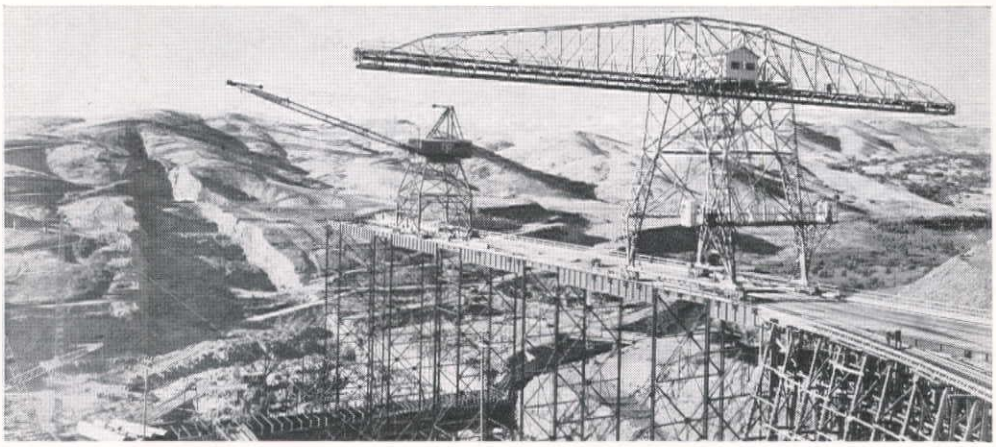


1939

Germany invades Poland, starts war in Europe.



Water tanks take on modern design and larger capacities.



Bids opened for Friant Dam (shown in excavation stage) where construction plant presented excellent example of trestle and gantry-crane concrete handling system.

HIGHLIGHTS:

Dredging completed at Fort Peck Dam, with 122,178,000 cu. yd. fill placed . . . Concreting record of 14,980 cu. yd. placed in one day at Grand Coulee . . . Colorado River Aqueduct completed to terminal reservoir . . . Power plant at Hoover Dam reaches 1,000,000 horsepower capacity . . . Permanente Corporation begins construction on cement plant . . . Head tower 460 ft. high started at Shasta Dam . . . Concrete pontoon bridge under construction at Seattle . . . Absorptive form lining used for first time at Friant Dam . . . Snake River bridge opens at Lewiston, Idaho . . . Bartlett Dam completed in May . . . False-bottom caisson sunk in 120 ft. of swift tide for Tacoma Narrows Bridge . . . Concrete placing begins at Ross (Ruby) Dam . . . 3,600-ft. steel trestle for concreting erected at Grand Coulee.

PERSONALITIES:

C. V. Isbell installed first president of Nevada Chapter, A.G.C. . . . *Ben S. Morrow* appointed city engineer of Portland . . . *Ralph J. Reed*, consulting engineer in Los Angeles, dies . . . *Roy B. Williams* placed in charge of Friant Dam project . . . *Harry W. Bashore* named Assistant Commissioner of Reclamation . . . *James Munn*, widely known construction engineer, dies . . . *James D. Ross* of Seattle Power & Light dies . . . *W. R. Hutchins* appointed state highway engineer of Arizona . . . *Arthur S. Bent*, head of Bent Bros. Construction Co., dies. *Burton G. Dwyre* appointed state highway engineer of New Mexico . . . *Col. Thomas M. Robins* appointed assistant to the Chief of Engineers and made a brigadier general . . . *Howard R. Flint* named director of Idaho State Highway Bureau.

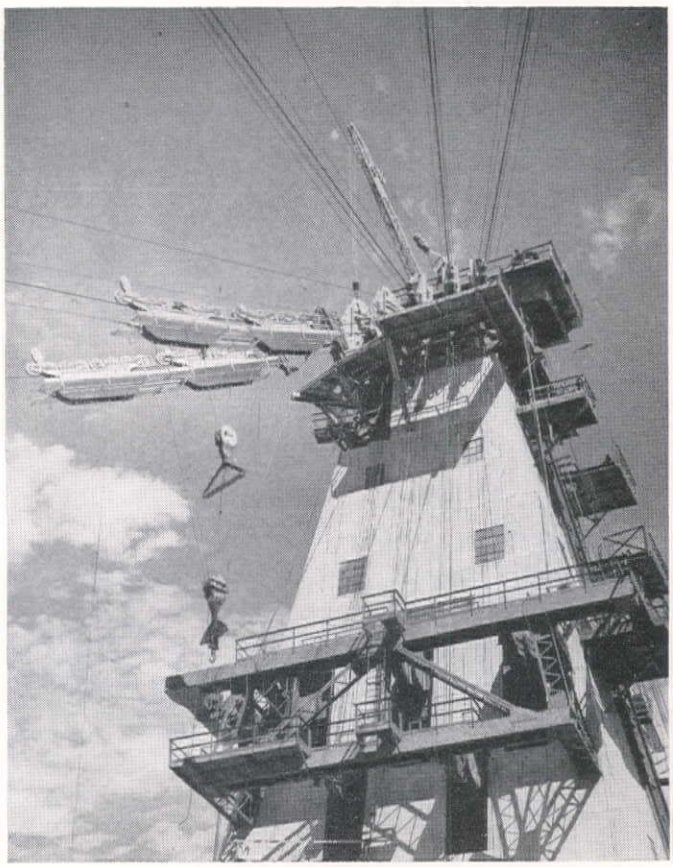
Ross

Robins

CONTRACTS:

1939		
Friant Dam	Griffith Co. and Bent Co.	$8,715,358
Mud Mountain Dam	Guy F. Atkinson Co.	5,334,605
Shasta Dam aggregate	Columbia Construction Co., Inc.	4,413,520
Coachella Canal	Morrison-Knudsen Co., Inc. and M. H. Hasler	2,279,212
Concrete pontoon bridge (Seattle)	Puget Sound Bridge & Dredging Co., J. H. Pomeroy & Co., Parker-Schram Co.	3,253,597

RIGHT—Spectacular 460-ft. head tower supports seven cableways for handling concrete and materials at Shasta Dam.



BELOW—Western airport activity accelerates pre-war program. Typical concrete runway job is shown at Lowry Field, Denver.

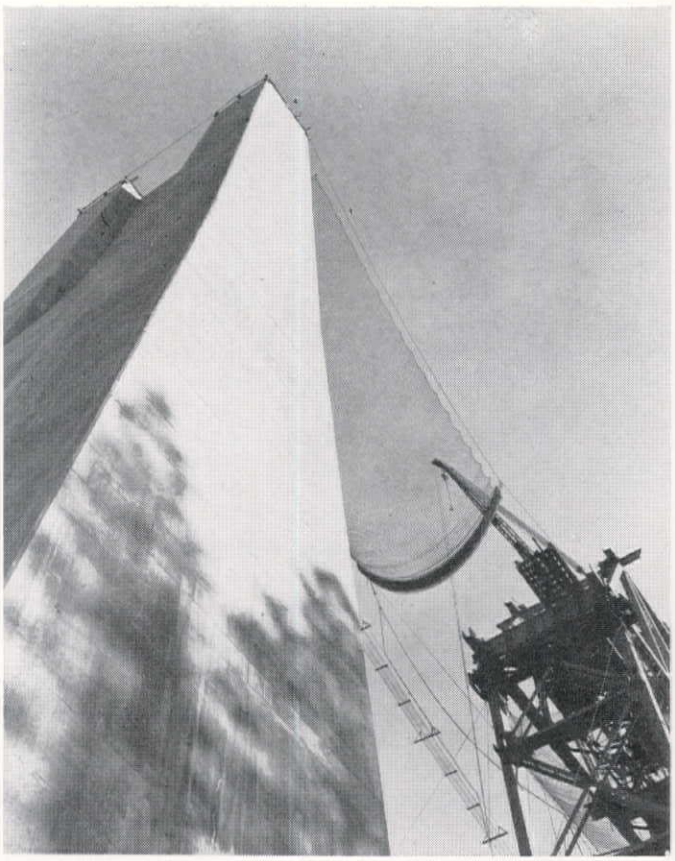
1940-1941

Roosevelt elected for a third term.

Japanese planes attack ships at Pearl Harbor.

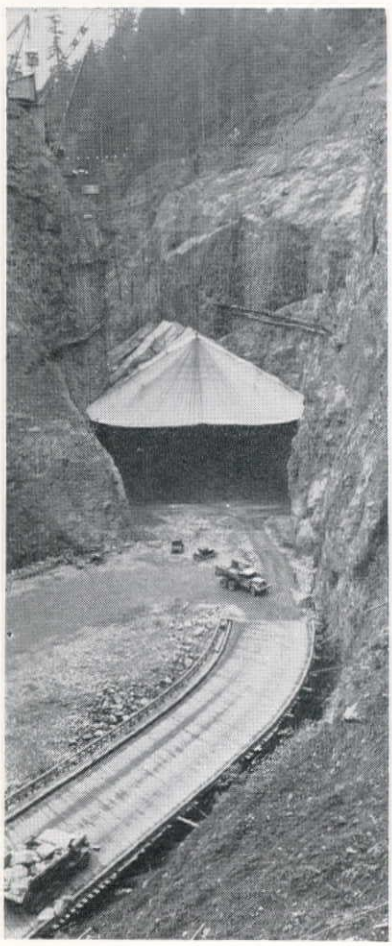
HIGHLIGHTS:

1940—Fourth increase in spillway capacity for Sweetwater Dam at San Diego . . . Federal government refuses claim of more than $5,000,000 by MWAK for extras charged at Grand Coulee . . . Record set by John Austin at Carlton Tunnel with 1,735 ft. driven in March . . . Serious Sacramento River flood . . . World's longest conveyor belt (9.5 mi.) starts moving aggregate to Shasta Dam . . . Concrete pontoon bridge opens at Seattle in July . . . New asphalt specifications incorporate terms of RC, MC and SC . . . Design of Mud Mountain Dam changed from earth to rock fill during construction . . . Trend starts toward use of cost-plus contracts . . . Hansen Dam for flood control near Los Angeles completed and dedicated . . . Los Angeles County Flood Control District makes extensive use of asphalt for lining channels . . . Work rushed to complete Fort Ord in four months' time . . . Tacoma Narrows Bridge fails Nov. 7. 1941—Extensive revisions made in California Division of Highways specifications . . . Core for Mud Mountain Dam placed under large tent . . . Final wind-up under way on Colorado River Aqueduct . . . Six-mile Carlton Tunnel completed . . . Dredge used to place highway fill along Columbia River . . . Absorptive form lining used extensively at Friant Dam . . . Tacoma Bridge claims settled out of court for $4,000,000 . . . The millionth yard of concrete goes into Shasta Dam on May 3.



Safety nets for bridge erection, initiated on Golden Gate project, featured work on bridge across arm of Shasta Dam Reservoir.

A circus tent protects earthfill at Mud Mountain Dam.



PERSONALITIES:

Hughes

1940—*C. D. "Daddy" Marx*, professor emeritus at Stanford University, dies . . . *Raymond F. Walter*, chief engineer of Bureau of Reclamation, dies; *S. O. Harper* appointed chief engineer; *Walker R. Young* named assistant chief engineer . . . *J. A. Terteling*, founder of the well-known construction company, dies . . . *Edward J. Harding*, national manager of A.G.C., dies . . . *Clyde P. Humphrey* named director of highways for Idaho . . . *Glenn B. Woodruff* opens consulting office following direction of design for San Francisco Bay Bridge . . . *Prof. Franklin Thomas* of Cal. Tech. wins Pasadena award as outstanding citizen. 1941—*Frank E. Weymouth*, head of Colorado Aqueduct project, retires in May and dies in August . . . *Julian Hinds* named chief engineer and manager, replacing Frank Weymouth . . . *Don A. McKinnon* resigns as state highway engineer of Montana . . . *William Hughes*, city engineer of Lewiston, wins national A.W.W.A. award.

Tacoma Narrows Bridge fails Nov. 7.

CONTRACTS:

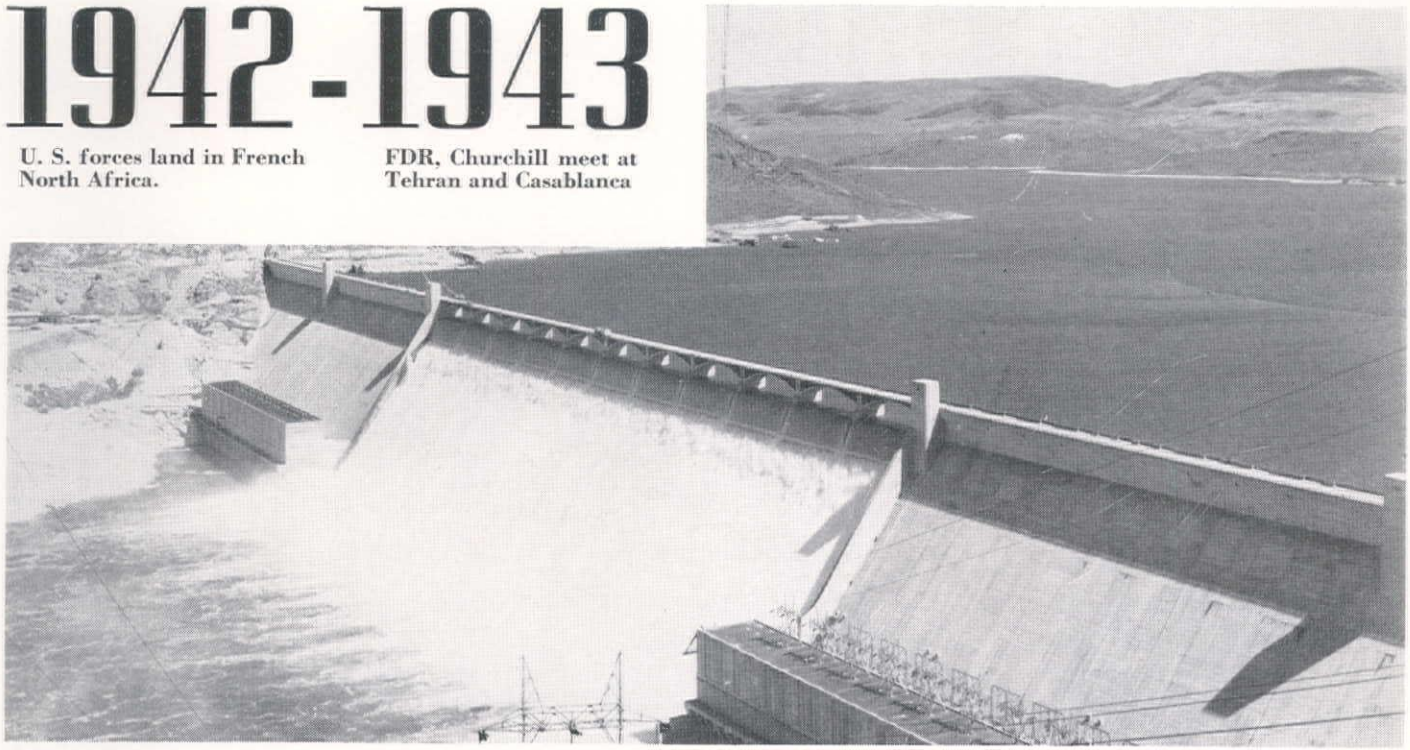
1940		
John Martin (Caddoa) Dam	W. E. Callahan, Gunther & Shirley, Rohl-Connolly Co.	$ 7,160,754
1941		
Santa Fe Dam	Morrison-Knudsen Co., Inc., Winston Bros. Co., J. F. Shea Co., Inc. and Ford J. Twaits Co.	8,837,199
Anderson Ranch Dam	Same joint venturers as above	9,986,203
Santa Maria-Lompoc Project (Army cantonment)	MacDonald & Kahn, Inc. and J. F. Shea Co.	17,382,821

World's first concrete-pontoon bridge 7,800 ft. long built to span Lake Washington at Seattle, opens to traffic July 1940.

1942-1943

U. S. forces land in French North Africa.

FDR, Churchill meet at Tehran and Casablanca

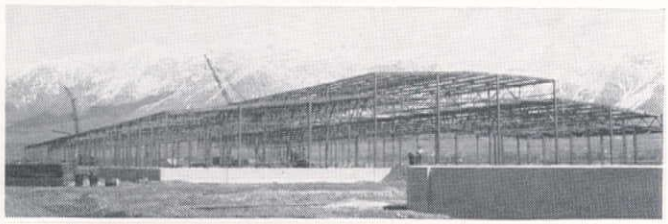


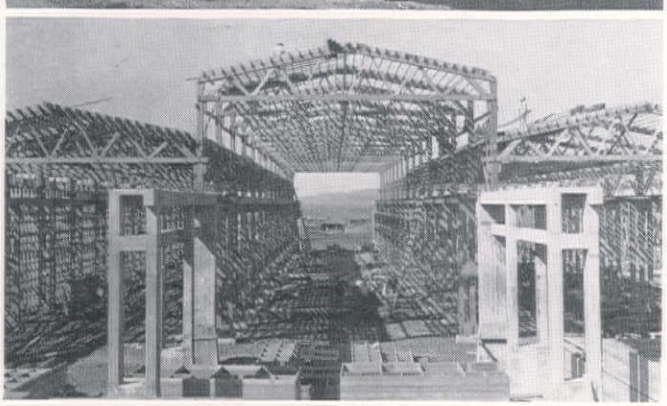
Man-made waterfall starts its cascade as the reservoir spills Columbia River water for the first time at Grand Coulee Dam.

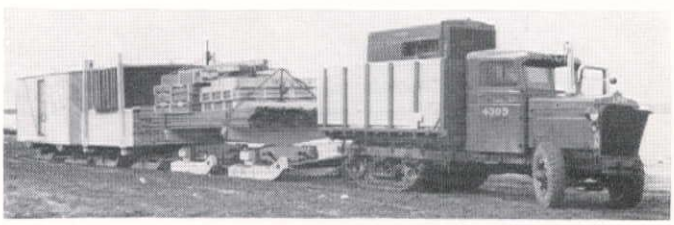
HIGHLIGHTS:

1942—Alcan Highway pioneer road opens . . . Construction under way on steel plant at Geneva, Utah . . . Several articles appear urging contractors to use substitute construction materials . . . Pit River bridge, required by Shasta Dam, nears completion . . . Friant Dam completed . . . Corps of Engineers establishes equipment rental pool . . . Soil cement used extensively on Los Angeles Airport . . . Serious subsidence in Long Beach area initiates engineering studies . . . Parking lot under Union Square in San Francisco in construction stage . . . Contractors turn Grand Coulee Dam over the Bureau of Reclamation. 1943—Pan-American Highway work being rushed . . . Contract awarded for building concrete barges . . . Steel from Tacoma Narrows Bridge being salvaged . . . Geneva steel mill opens for initial production . . . Hangars of timber construction developed to save steel . . . Green Mountain Dam finished . . . First concrete ship launched.

War plants rise at foot of Western mountains, and timber becomes major material to conserve steel at Mare Island Navy Base.







Arctic conditions meet contractors working at wartime speed on Canol Project to develop an oil supply for Alaska bases.

PERSONALITIES:

1942—*J. B. Lippincott*, well-known consulting engineer, dies . . . *James H. Turner* appointed manager and chief engineer of

Turner

Slocum ***Williams***

Bashore

Hetch Hetchy water supply and San Francisco utilities . . . *Harvey Slocum* and *R. B. Williams* extend congratulations on completion of Friant Dam. 1943—*J. D. Galloway*, prominent consulting engineer of San Francisco, dies . . . *Harry W. Bashore* succeeds *John C. Page* as Commissioner of Reclamation . . . *M. H. Knudsen* of Morrison-Knudsen dies . . . *Charles Shea*, closely identified with construction of Hoover Dam, dies.

CONTRACTS:

1942		
Alder Dam	L. E. Dixon & Co.	$5,964,384
Burbank-Western channel	Matich Bros. & E. L. Yeager	1,145,155
1943		
Ross Dam	General Construction Co., J. F. Shea Co., Inc., Morrison-Knudsen Co., Inc.	7,144,933
Airport near Alturas, Calif.	Kuckenberg Construction Co.	1,281,417
Sweetwater Falls Dam	Macco Construction Co.	1,114,890

1944-1945

"D-Day"—Eisenhower leads Normandy invasion.

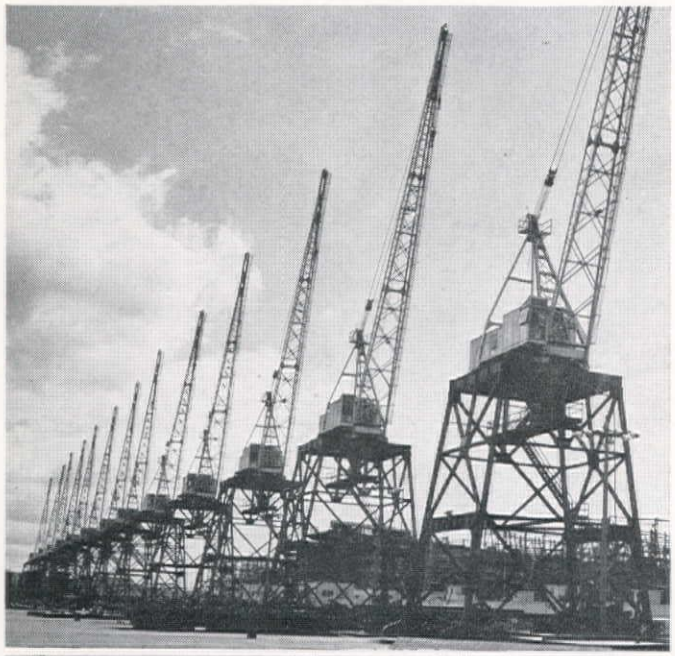
"V-E Day" and "V-J Day": First atomic bomb dropped.

HIGHLIGHTS:

1944—Nisqually project at Tacoma nears completion . . . Elmendorf Field becomes great airbase in Alaska . . . The 13.1-mi. Continental Divide Tunnel on the Colorado-Big Thompson project holes through . . . Anderson Ranch Dam, world's highest earth fill, under construction in Idaho . . . Controversial Canol project completed . . . Portland plans a post-war civic center . . . California highways use open-type surfacing as opposed to current trend toward dense mix. 1945—Santa Fe railroad bridge at Topock sets record depth for pneumatic caisson work . . . Construction preliminaries start on Hungry Horse project . . . Plans shape up for large expansion of Hyperion sewage disposal plant . . . Washington highway funds allocated to counties according to new plan . . . Work progressing on second enlargement to Ross Dam . . . Rubber-tired roller of 100-ton size . . . Repair work undertaken on spillway bucket at Grand Coulee.

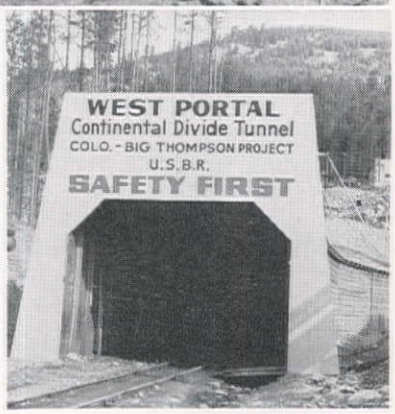
TOP—Shipbuilding by Western contractors continues at record rate as cranes fill the sky at Vanport.

BOTTOM—Naval drydocks at Terminal Island required added protection and the mole is extended with rock and hydraulic fill.



TOP—Alaska begins development of modern highway system and the Robertson River is bridged.

RIGHT—Continental Divide is pierced as contractors hole-through tunnel to deliver water to east slope in Colorado.



PERSONALITIES:

1944—*Samuel B. Morris* named head of Los Angeles Department of Water and Power . . . *W. H. Kirkbride* retires as chief engineer of Southern Pacific system . . . *I. C. Steele* named chief of all engineering for Pacific Gas and Electric Co. . . . *S. O. Harper*, chief engineer of Bureau of Reclamation, retires after 37 years of service. 1945—*Walker R. Young* named chief engineer of Bureau of Reclamation . . . *Harold E. Hedger*, chief engineer, L. A. County Flood Control District, returns to position following war duty . . . *J. L. Burkholder* appointed engineer-manager for San Diego County Water Authority . . . *John L. Savage* retires as chief designing engineer for Bureau of Reclamation after 34 years service . . . *Ford J. Twaits* retires from active participation in his firm . . . *E. G. Cahill*, manager of utilities at San Francisco for 13 years, resigns, and *James H. Turner* is named to post . . . *Ralph G. Wadsworth* becomes city engineer of San Francisco, replacing *John J. Casey* . . . *W. Don Shaw* becomes manager of Southern California A.G.C. Chapter, and *Winfield H. Arata* named secretary-manager of Northern California Chapter.

Young

Steele

Kirkbride

CONTRACTS:

1944		
Muroc Army Air Base	Peter Kiewit Sons' Co., Western Construction Corp., Al Johnson Construction Co...	6,165,271
Magazine storage buildings (Port Chicago)	Barrett & Hilp	5,296,848
Naval supply depot (Stockton)	Ford J. Twaits Co., Morrison-Knudsen Co., Inc. and Ben C. Gerwick	10,608,845
1945		
San Diego pipeline	Grafe-Callahan Construction Co.	2,248,409
San Diego Aqueduct	Guy F. Atkinson Co.	1,164,885
San Diego Aqueduct (pipeline)	United Concrete Pipe Corp.	3,361,088

1946

OPA removes price controls.

HIGHLIGHTS:

San Diego aqueduct extension from Colorado River Aqueduct under way . . . Idaho Power Company outlines plans for Snake River development . . . Model for new Tacoma Narrows bridge built and tested . . . Work begins on Davis Dam . . . Work active on Matilija Dam, which later ran into difficulties . . . Construction under way on Kortes Dam in Wyoming . . . First all-welded steel water tank for the West . . . Roller bearings installed under Los Angeles building in attempt to reduce possible earthquake damage . . . Construction active on Coachella Canal . . . Asphalt used for sub-sealing under concrete pavement . . . Power shortage in Northwest anticipated . . . Longest passenger aerial tramway planned at Palm Springs . . . More underground parking areas considered by San Francisco . . . Corps of Engineers creates districts for Honolulu, Okinawa and Manila . . . Power shortage in Arizona creates emergency . . . Morrison-Knudsen Co. expands operations into China.

PERSONALITIES:

Frank J. Connolly, manager of the largest A.G.C. chapter at Los Angeles, dies . . . *Mark Tuttle* resigns his position as manager of the Intermountain branch of the A.G.C. after twenty years of service . . . *Conde B. McCullough*, assistant state highway engineer of Oregon, and widely known bridge designer, dies . . . *William A. Johnson* becomes president of newly formed Johnson Western Co. . . . *Colonel Ralph Tudor* becomes chief engineer for the China operations established by Morrison-Knudsen . . . *D. L. Cheney*, bituminous engineer for the Montana Highway

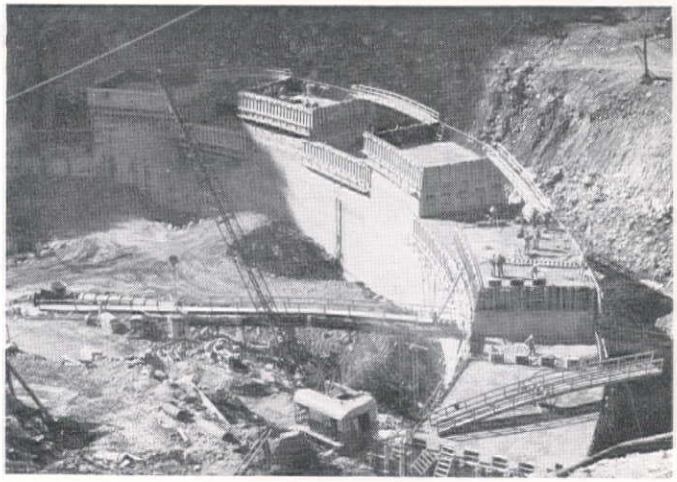
Watrous

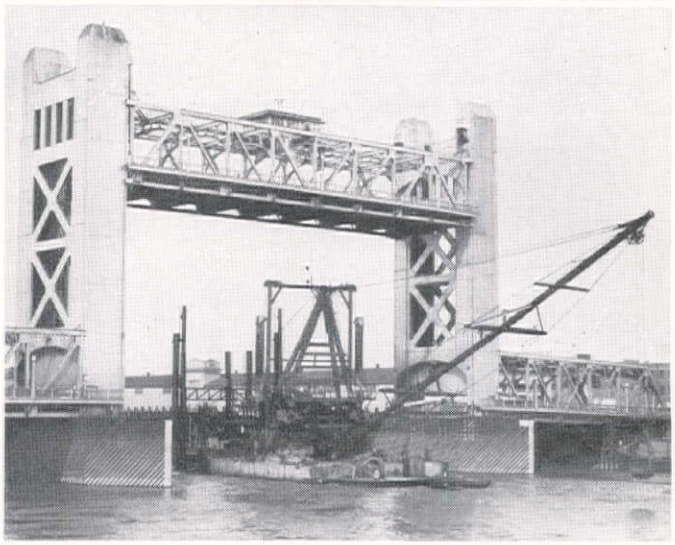
Tudor

Tuttle

Connolly

Department prior to the war, becomes construction manager for large Alaska army housing . . . *Mark U. Watrous* becomes state highway engineer of Colorado . . . *Homer M. Hadley* leaves Portland Cement Assn. to open consulting office in Seattle . . . *Alvin F. Darland* resigns from Tacoma City Light and joins Bureau of Reclamation at Grand Coulee.





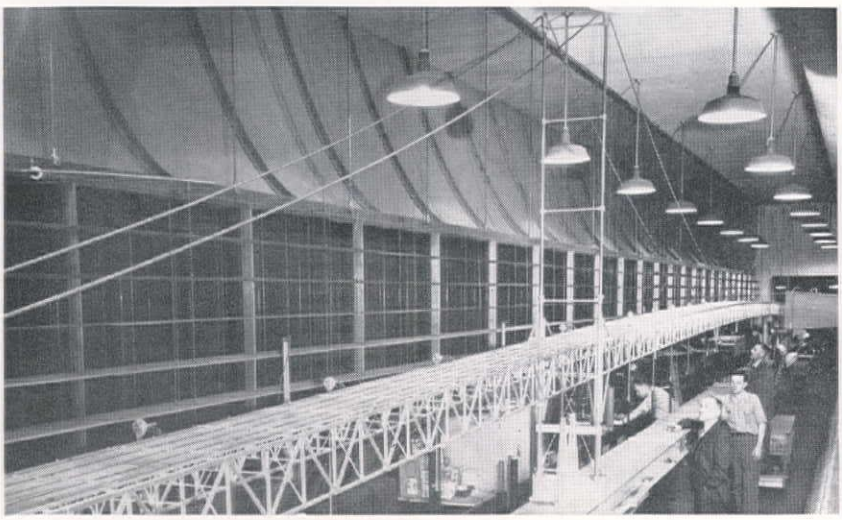
TOP—Matilija Dam, two dams in one (bottom section gravity, top section arch, slip joint between) going up in So. California.

BOTTOM—War veteran returns as Army dredge *Monarch* comes back from the Pacific and moves up the Sacramento River.

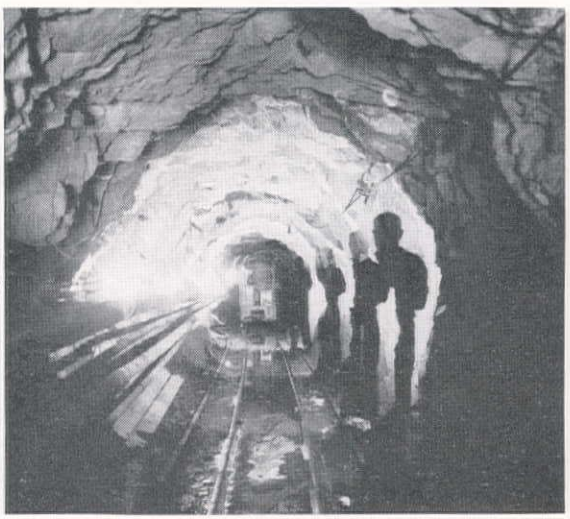
CONTRACTS:

Davis Dam	Utah Construction Co.	$21,462,505
Angostura Dam	Utah Construction Co.	4,237,476
Delta-Mendota Canal	H. A. Everist, Sr.	3,530,067
Potholes (O'Sullivan Dam)	C. F. Lytle Co., Green Const. Co. & Amis Construction Co.	9,359,011
Enders Dam (Nebraska)	Wunderlich Contracting Corp.	4,109,927

A new bridge for Tacoma Narrows is built in model size and tested for resistance to aerodynamic forces at the University of Washington.



Critical water shortage at San Diego Naval Base demands rush work on tunnels.

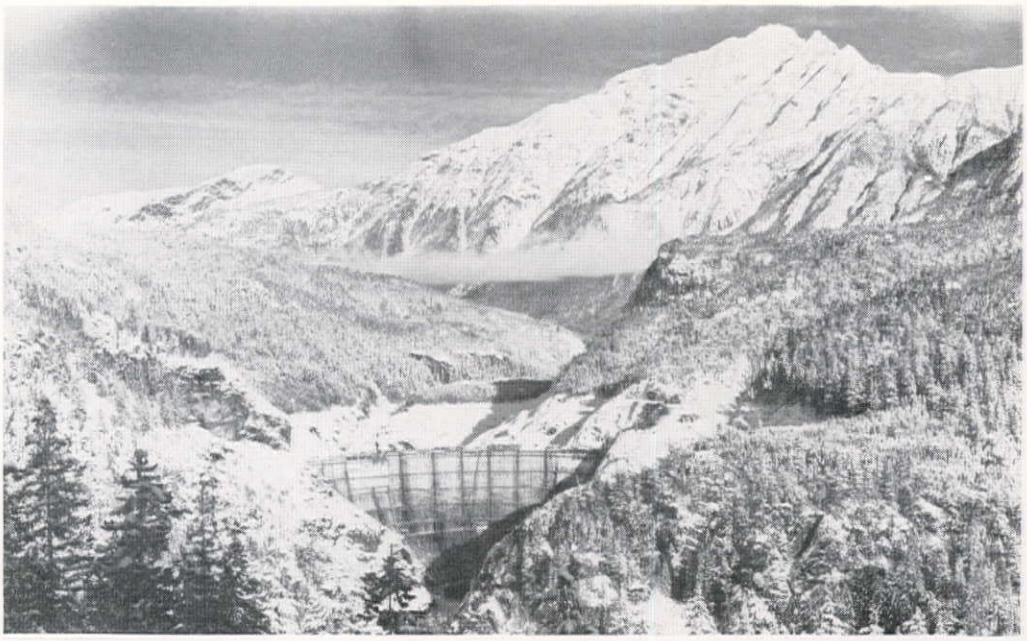


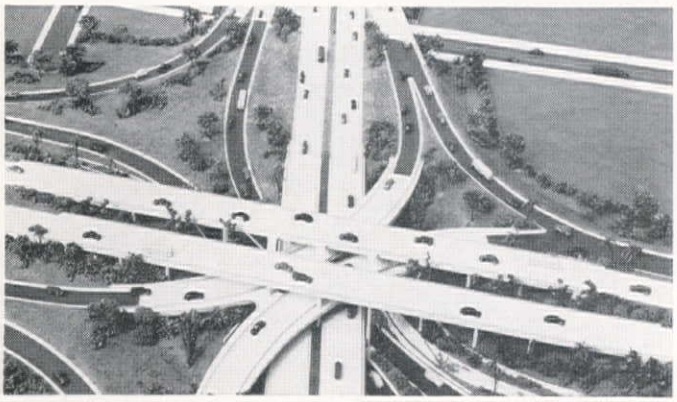
1947

Feminine fashions call for the "new look."

HIGHLIGHTS:

Los Angeles starts plans for Baldwin Hills reservoir . . . Massed equipment moves fill into San Francisco Airport . . . Foundation fault results in changed design at Davis Dam . . . Santa Fe railroad bridge at Topock redecked for vehicles . . . Gas pipeline laid from Texas to California . . . Extensive improvements to Phoenix water supply system . . . Largest Western factory building in the West for General Motors at Los Angeles . . . Pump used to distribute concrete on building job . . . First water passes through Continental Divide tunnel on Colorado-Big Thompson project . . . Second line being added to aqueduct of EBMUD . . . P. G. & E. begins extensive improvements on Mokelumne River power system . . . Large scale experiments on different types of canal lining by Bureau of Reclamation . . . Construction starts on Tracy Pumping plant—a key feature of Central Valley project.



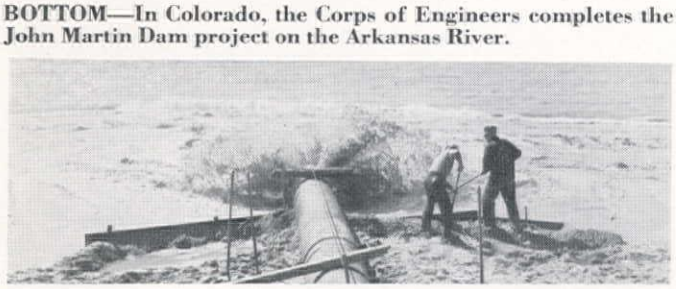


ABOVE—Step by step, Seattle's Ross Dam rises to full height of 540 ft. on Skagit River, takes place among world's highest.

LEFT—Mounting population in the West results in the first four-level grade separation project at Los Angeles.

TOP—Making land for further expansion of the sewage disposal plants serving increasing population in the Los Angeles area.

BOTTOM—In Colorado, the Corps of Engineers completes the John Martin Dam project on the Arkansas River.



PERSONALITIES:

William Holcomb becomes state highway engineer of Nevada . . . *Leon H. Nishkian*, prominent consulting engineer of San Francisco, dies . . . *Wesley R. Nelson* appointed Assistant Commissioner of Reclamation . . . *E. F. Scattergood*, veteran head of Los Angeles power development, dies . . . *J. B. Bonny* becomes general manager of all Morrison-Knudsen operations . . . *W. C. Perkins* named chief engineer of Union Pacific Railroad . . . *E. C. LaRue*, authority on the flow of the Colorado River, dies . . . *A. J. Orselli* named general manager of construction for Bechtel Corp. . . . *Mark R. Kulp*, state reclamation engineer of Idaho, president of Western State Engineers for the year.

Holcomb

Nelson

Kulp

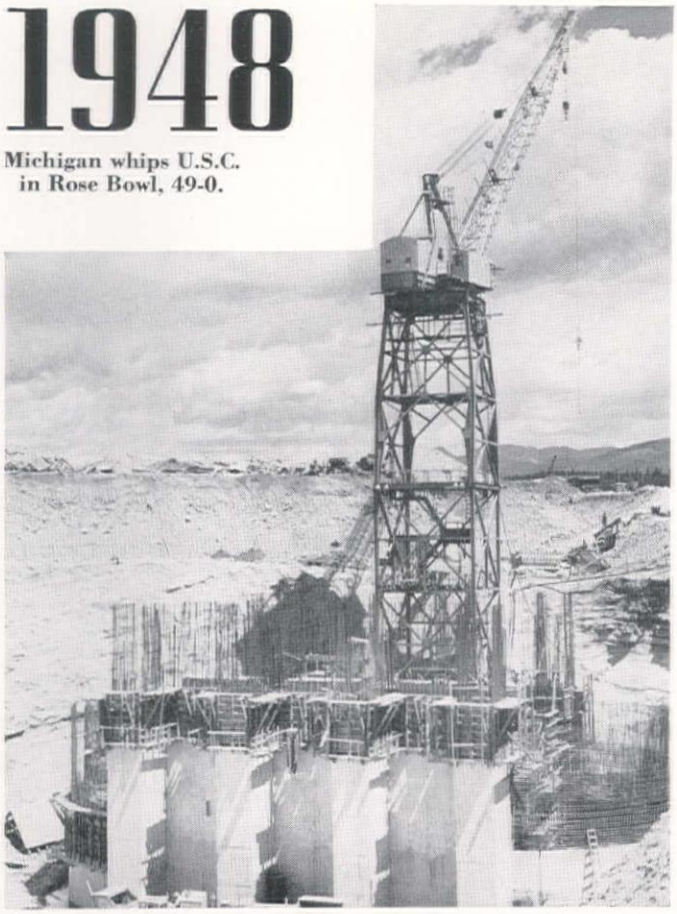
Orselli

CONTRACTS:

Dorena Dam	Guy F. Atkinson, W. E. Kier Const. Co., A. Teichert & Son, Inc., & Bressi-Bevanda Constructors	$ 7,737,570
Estes & Marys Lake Power Plants—Colo.	Morrison-Knudsen Co., Inc. & Peter Kiewit Sons' Co.	2,176,708
Duchesne Tunnel—Utah	Utah Const. Co.	2,539,250
Salt Lake Aqueduct	United Concr. Pipe Corp.	2,221,742
Tracy Pumping Plant	Stolte, Inc., United Concrete Pipe Corp., Ralph A. Bell, Duncanson Harrelson	5,888,695
Boysen Dam	Morrison-Knudsen Co., Inc. & associated contractors	13,899,999
Second Mokelumne Pipeline	Western Pipe & Steel Co. (Sched. II)	4,093,671
	(Sched. III)	2,425,511
Tacoma Narrows Bridge	Bethlehem Pacific Coast Steel Corp.	8,263,903
Mokelumne Aqueduct	Western Pipe & Steel Co.	4,508,532
Los Angeles Flood Control	United Concrete Pipe Corp., Vinnell Co. & Ralph A. Bell	2,469,577

1948

Michigan whips U.S.C. in Rose Bowl, 49-0.



Heart of the Colorado-Big Thompson project is Granby pumping plant to raise water to flow through Continental Divide tunnel.

PERSONALITIES:

Col. Ralph Tudor named chief of engineering organization to study an additional San Francisco Bay crossing . . . *W. A. Bugge* heads Pacific Coast Division of Asphalt Institute . . . *Charles L. Wartelle* resigns as city engineer of Seattle . . . *Scot P. Hart* named state highway engineer of Montana . . . *Walker R. Young* resigns as chief engineer of Bureau of Reclamation . . . *Ralph*

Wood

Bugge

Thomas

Finke

Finke named city engineer of Seattle . . . *Guy W. Harris*, chief engineer of Santa Fe Railroad, retires . . . *Franklin Thomas*, noted Pasadena educator, nominated as 1949 A.S.C.E. president.

CONTRACTS:

Hyperion Sewage Plant (Los Angeles)	Guy F. Atkinson Co.	$ 6,295,000
Tacoma Narrows Bridge (Erection)	Bethlehem Pac. Coast Steel Corp. (Sched. I)	8,263,900
Hungry Horse Dam	General-Shea-Morrison (Joint venture of 9 contractors)	43,431,000
McNary Dam	Guy F. Atkinson Co., J. A. Jones Const. Co., & Ostrander Const. Co.	21,649,000
Grand Coulee Pumping Plant	Peter Kiewit Sons' Co. & Morrison-Knudsen Co., Inc.	13,348,000
North Pt. Sewage Treatment Plant	Morrison-Knudsen Corp., Stolte, Inc., Fred J. Early, Inc., & Haas & Rothschild	8,289,500

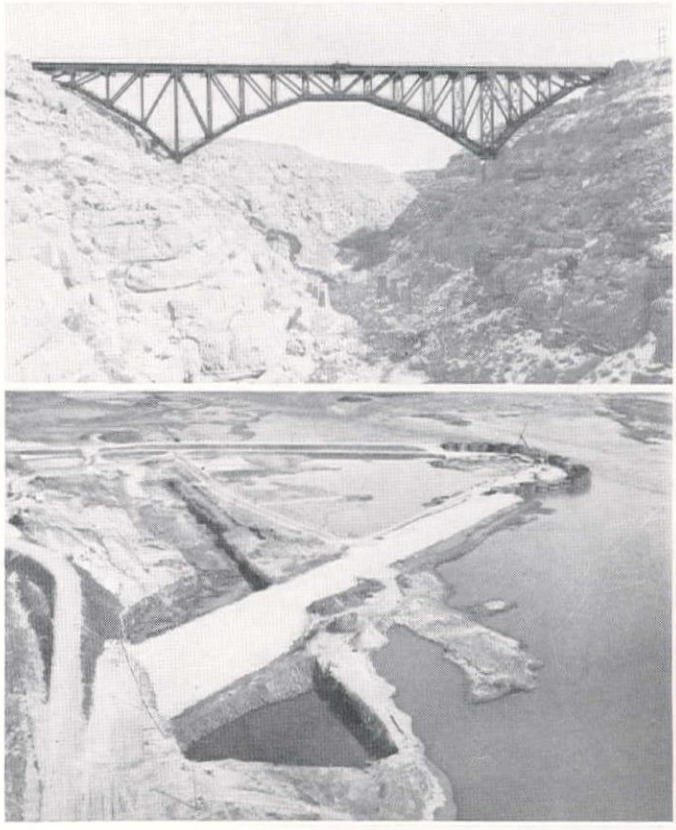
HIGHLIGHTS:

Corps of Engineers recommends $3,000,000,000 Columbia Basin development program . . . Compact signed by states of upper Colorado River basin dividing water among the group . . . A.S.C.E. and A.G.C. form joint cooperative committee . . . Construction preliminaries start for Folsom Dam . . . First major construction work begins on McNary Dam . . . Bacon tunnel holed through on Columbia Basin project . . . World's first four-level grade separation structure in Los Angeles . . . First section of Bayshore freeway completed in San Francisco . . . Los Angeles breakwater extended to record length . . . Extensive rehabilitation starts on Alaska Railroad . . . P. G. & E. completes $20,000,000 Mokelumne River program . . . Serious floods in Pacific Northwest . . . First water delivered for irrigation on Columbia Basin project . . . Diversion completed at Davis Dam site . . . Contract awarded for Hungry Horse Dam . . . Reconstruction begins at Tacoma Narrows bridge . . . Bureau of Reclamation gives approval to huge Arizona project.

Floods in the Northwest particularly severe, with Bonners Ferry covered by the Kootenai River.

TOP—Railroad service to the West improved when the Santa Fe builds modern bridge across Canyon Diablo in Arizona.

BOTTOM—McNary Dam in its first stage with a cofferdam extending out into the Columbia River from the Washington shore.



1949-1950

Washington's most severe earthquake.

U. N. battles the Reds in Korea.

HIGHLIGHTS:

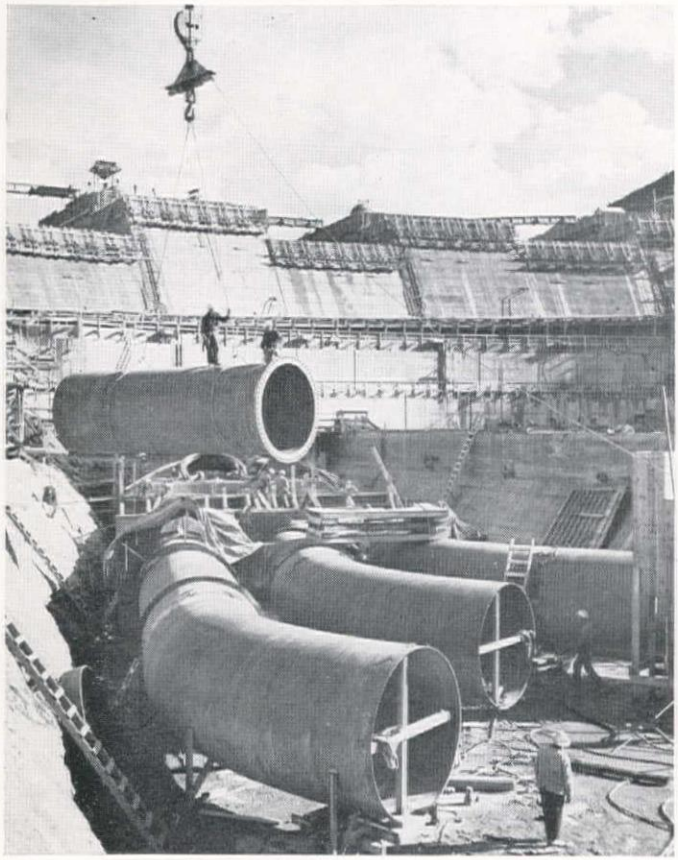
1949—Ross Dam completed and dedicated . . . Land subsidence at Long Beach causes problems in shipyard operation . . . Buried asphalt canal lining developed by Bureau of Reclamation . . . Feather River project of P. G. & E. for $62,000,000 completed ahead of schedule . . . Friant-Kern Canal carries first water . . . Alaska contractors form chapter of A.G.C. . . . Severe earthquake in Northwest . . . First bucket of concrete goes into Hungry Horse Dam. 1950—Washington plans first urban freeway at Vancouver . . . Field test to rejuvenate old asphalt pavements . . . Final diversion of Columbia River at McNary Dam . . . Completion of Super-Inch gas pipeline . . . First prestressed concrete bridge for the West . . . First major contract awarded for Chief Joseph Dam . . . New Tacoma Narrows Bridge completed.

ABOVE—Advancing into the irrigation stage, work on the Columbia Basin Project features siphons and canals.

LEFT—Rising at the site of its ill-fated predecessor, Tacoma Narrows Bridge is ready for cable spinning in 1949.

RIGHT — Record-sized concrete pipe at the Tracy pumping plant convey water for the Delta-Mendota Canal.

BELOW—At Hungry Horse Dam, the penstocks go into place as work is rushed to bring added power to the Northwest.



CONTRACTS:

1949-1950		
Detroit Dam	Consolidated Builders, Inc. (a joint venture)	$28,230,600
Pine Flat Dam	Guy F. Atkinson (joint venture)	24,339,780
McNary Dam (Stage II)	Atkinson-Ostrander-Jones	15,835,540
Big Creek Project (So. Calif. Edison)	Morrison-Knudsen & Bechtel Corp.	19,400,000
Chief Joseph Dam (Stage II)	L. E. Dixon Co. & Arundel Corp.	25,967,920
Lookout Point Dam	Morrison-Knudsen, Peter Kiewit, & Macco Corp.	18,696,000

PERSONALITIES:

1949—*W. A. Bugge* named director of Washington State Highway Dept. . . . *Walter Frickstad* retires as city engineer of Oakland . . . *Col. H. S. Crocker*, consulting engineer of Denver, dies . . . *Reginald H. Thomson*, widely known consultant of Seattle, dies at 92 . . . *R. H. Stalnaker*, equipment engineer, California Division of Highways, retires . . . *W. Chester Morse*, superintendent of Seattle water department, dies . . . *T. H. Dennis* and *S. V. Cortelyou* retire from California Division of Highways. 1950—*L. G. Apperson* succeeds Morrow as city engineer of Portland . . . *George Pollock*, Sacramento contractor, dies . . . *Dr. L. I. Hewes*, chief of Western operations of the Bureau of Public Roads, dies . . . *W. L. Anderson* appointed chief engineer of Utah State Road Commission, succeeding *Roy W. McLeese*, deceased . . . *Frank Banks*, builder of Grand Coulee Dam, retires from Bureau of Reclamation . . . *John S. Longwell*, chief engineer of EBMUD, retires after 25 years of service . . . *Edward Hyatt* retires as state engineer of California after 22 years.

Anderson ***Hyatt*** ***Banks*** ***Thomson***

THE JOINT VENTURE—

Western contractors introduced and perfected this new idea during the past quarter century

By W. E. WASTE, Vice President, Bechtel Corporation

ANY SUMMARY of construction in the Far West during the past quarter century inevitably must assign a position of importance to the evolution of the "joint venture." This was a new tool that Western constructors shaped to their own purposes about 1930 and brought to a high state of utility in the following decade.

From the standpoint of public interest the joint venture was an unofficial "enabling act." Its existence fostered greater efficiency and therefore greater economy in construction costs during the Far West's big decade of resources development—the thirties.

The term "joint venture" defies a tight definition since the pattern changes to suit varying conditions. In practice, however, it is generally a grouping of contractors, either as firms or as individuals, sometimes banded into a partnership and sometimes into a corporation, brought together for the performance of a single construction job or several jobs. This way of doing business differs from normal partnerships and corporations mainly in its temporary nature and the adaptation of group components to the individual requirements of a given project.

Business Teamwork . . .

Although the West—and other parts of the country—certainly benefited from the facts that groups of contractors learned to work as a unit, the joint venture did not evolve from any altruistic impulse on the contractors' part. As often happens in our free society, it developed because a specific situation dictated its own answer.

Twenty years ago a root alliance of constructors was formed which proved the forerunner of most of the later Western joint ventures. Known as Six Companies Inc., it serves as an outstanding example of building teamwork. Its end product was Hoover Dam, often called "man's mightiest work." The changing perspective of time has given it added significance as the curtain raiser on Western construction's "age of giants" . . . Bonneville, Grand Coulee and Shasta Dams, the bridges on San Francisco Bay and other works of magnitude.

If the projects of the thirties were giants, the contractors who undertook Hoover Dam were only mortals blessed with more than their normal share of courage and determination. The group included the West's leading builders and earth movers—men with good backgrounds in railroad, tunnel, bridge and highway work, office buildings and excavating—but they had to pool their resources to raise the $5,000,000 demanded by the bonding companies.

The fact that in the ensuing 20 years members of this group have completed private and public projects valued in the billions, and that several now are counted among the world's most powerful engineering-construction organizations gives strong proof of the success of the joint venture. For as much as any factor, their growth in the era of great public works was made possible by the invention and refinement of this form of business teamwork.

. . . Geared to a Single Job

The members of Six Companies Inc., came together through a combination of earlier friendships and a sequence of planned and accidental contacts. In 1930 W. A. Bechtel was a well-established San Francisco contractor with 32 years experience in railroad work and somewhat less on highways and tunnels. His firm, which included his three sons, had built a rock-filled dam in the Sierra Nevada, and just then was branching out into pipeline construction. Some years previously Mr. Bechtel had met

THE ORIGINAL joint venture to build Hoover Dam included this important group among its executives: (front row left to right) *E. O. Wattis, W. H. Wattis* and *W. A. Bechtel*; (back row) *H. J. Lawler, Charles Shea, S. D. Bechtel, Felix Kahn* and *K. K. Bechtel.*

M-W-AK was the joint venture associated with the building of Grand Coulee Dam and included these executives: (left to right) *H. L. Myer*, general manager; *Silas B. Mason*, chairman of the board; *Guy F. Atkinson*, vice president; *T. J. Walsh*, president, and *E. L. Kier*, secretary.

Henry J. Kaiser on a road job, liked his way of doing things, and had become associated with Kaiser in the operation of a rock plant near Oroville. Mr. Kaiser in turn had earlier dealings with a Boston construction firm named Warren Bros. These three—Warren Bros., principally by its mere agreement to participate, and Bechtel and Kaiser in very active fashion, prepared to bid on the much-discussed Bureau of Reclamation's Colorado River project.

Even before this, Harry Morrison of Morrison-Knudsen Co., Inc., Boise, Idaho, had discussed the big job with Utah Construction Co., railroad builders of Ogden; also with the late Charles A. Shea, a Portland contractor who had a working agreement with another Portland firm, Pacific Bridge Co. Through Leland Cutler of San Francisco, who Mr. Morrison queried about obtaining a surety bond, he then met Felix Kahn of MacDonald & Kahn, builders of hotels and office buildings. These men and firms were the components of the original Morrison-Knudsen line-up.

Before very long the true size of the Hoover Dam job became apparent. The two aspirant groups were active in the same area, and the members of one were favorably acquainted with members of the other, so before either group had been fully organized the two came together under a name suggested by Mr. Kahn—Six Companies Inc. This was a mere two weeks before bids on the dam were due. Actually the Six Companies were eight—W. A. Bechtel Co., Henry J. Kaiser Co., Warren Bros. Company, Morrison-Knudsen Co., Inc., Utah Construction Co., MacDonald & Kahn, Inc., J. F. Shea Co., Inc., and Pacific Bridge Co.

Here was a corporation made up of competitors setting out to do with their combined resources what no one of them could then do alone—to build the world's largest dam. It was, of course, a joint venture in corporate form, geared to a single job from the outset. Probably it was the first of its kind, and certainly the first large-scale "contractors' cooperative." Furthermore, it was an open-handed, hale, hearty and typically Western relationship in every characteristic.

A Broadened Base

Even this abbreviated summary of how Six Companies Inc. was put together points out the economics of the joint venture. In large jobs it permits contractors to spread the risk—a form which allows each participant to keep reserves for contingencies at a reasonable figure. At the same time it reinsures the job for project owners by broadening the experience base and spreading the responsibility among several contractors. From both standpoints the joint venture is directly comparable with the similar practice of insurance carriers on large risks.

Another advantage is in organization—although the first year at Hoover Dam showed that some changes were necessary in the original concept before the plan became fully workable. In theory, and to a large extent in practice, a group was made up of men experienced in the particular requirements of a specific job, and with the latter advent of the sponsorship system, a degree of line organization was obtained equal to that provided by single firms. It was obvious also that a temporary association could be made more flexible than a permanent alliance.

A Sharpened Tool

Every invention has its flaws—imperfections in the original design which must be corrected if the total unit is to operate at maximum efficiency. The joint venture was no exception.

As Six Companies Inc. was originally set up, top direction of actual operations was vested in the Board of Directors, a group of self-made, rugged individualists. Each had his own well-grounded views concerning the best ways to handle construction problems. The result soon showed up in the form of conflicting orders from the top.

The evils of divided authority grew so acute that when General Superintendent Frank Crowe was asked to name the greatest handicap on this toughest of jobs, he snapped: "the Directors!" But confusion was not tolerated very long.

The Board was composed of individualists all right, but they were realists as well—and men of action. Promptly they appointed an Executive Committee and charged it with full responsibility for operations—this just three months after work began. Henry Kaiser was chairman, S. D. Bechtel in charge of administration, purchasing and transportation, Charles Shea and H. J. Lawler over field construction, and Felix Kahn looking after financial and legal matters, feeding and housing. This closely-knit, functionally-sectionalized committee soon put operations in order. So well, in fact, that Hoover Dam was completed almost three full years ahead of the Government's deadline, in the face of tremendous problems posed by floods and weather.

A Step Ahead

The next step in the evolution of the joint venture, and one which eventually replaced direction by a committee, was the development of the "sponsorship" method of job management. This concept, also originating on the Hoover project, appeared when the group members' organizations had grown in size and work capacity.

A "sponsor" was the company chosen to run a common undertaking. As time went on, the "sponsor" often was the firm that lined up a job and obtained the contract. Assistance was on a request basis and might be either substantial or minor. However aid was not offered nor expected unless a real need developed, and this was always a matter for the sponsor to determine. As managing director of a piece of work, the sponsor could call for counsel, manpower or

equipment if he wanted them—but once under way, he had a free hand.

Participation, win or lose, was governed by the financial stake of each venturer. No salaries were drawn by members of the group; earnings were accumulated for later distribution.

The sponsor, aside from costs, received only a participant's return like the others, proportional to his interest in the partnership. But for the service of managing the job, and in many cases for getting the contract and carrying out the work with his own personnel and equipment, the sponsor was offered and was expected to take the highest percentage—certainly an earned reward in view of his responsibilities.

A Single-Purposed Nature

During and after the construction of Hoover Dam the component firms of the Six Companies group, sometimes all together, sometimes in part or with outside concerns, executed a number of contracts that included some of the West's largest public works. On at least one occasion—while the Hoover project was still under construction—members of the original group became associated with joint ventures that met in open competition. This was the case on the bidding for pier construction on the San Francisco-Oakland Bay Bridge.

Transbay Construction Co., which included MacDonald & Kahn, Morrison-Knudsen, Shea and Pacific Bridge, bid against their Bechtel and Kaiser partners. The latter, with Missouri Valley Bridge and Iron Co., Dravo Corporation, and Raymond Concrete Pile Company, formed a corporate joint venture called Bridge Builders, Inc. The Bridge Builders group was awarded the East Bay piers and the entire bridge painting job, and Transbay Construction got the piers for the western crossing.

The bridge contracts came along in 1933. That was just about two years after the original alliance was born, yet the temporary and single-purposed nature of the joint venture already was apparent. Equally characteristic, the early division into separate groups emphasized the versatility of this form of business association. Men and firms teamed up to do some jobs, while they entered into spirited competition for others. There was no compulsion beyond the enthusiastic "selling" of an idea by one member to another. An invitation to join carried with it full freedom to come in or stay out.

An Essential Ingredient

This concept of voluntary participation was an essential ingredient of all joint ventures during the first decade of their existence. Construction teams were assembled through long-standing friendships, with each member fully aware of his teammates' ability to do the job. "Shotgun marriage" groups were discussed in theory, but had never appeared in practice.

They came with construction for defense and war, just before and during World War II. Probably it was a natural consequence of the rapid planning when Government and the construction industry got together to carry out the most complete defense building and war supply program ever conceived. At all events, the armed services on a few occasions strongly urged—if they did not quite demand—the pooling of resources by firms who for all practical purposes were cold strangers.

That a number of war projects were completed successfully by partners with organizations and methods which were foreign to each other was another miracle of this amazing period in American history, and a tribute to the motives of the individual contractors. Now, as the Pentagon prepares for another wave of defense construction, indications are that voluntary groups will be welcomed.

Where will the joint venture go from here? No one can say with certainty of course, but as long as the jobs get bigger and as long as heavy contracting remains a business of large-scale risk—it is reasonable to expect that organized teamwork will have a place in building the projects that will advance—and defend—the civilized world of the future.

Joint Ventures That Set a Pattern

(In the decade following Hoover Dam, a number of important bidding combinations established the general plan for this Western development. Some of the typical examples are listed from the files of *Western Construction*—Editor.)

1931	Hoover Dam $48,890,995	*Six Companies Inc.*
1933	San Francisco Bay Bridge $6,957,100	*Transbay Construction Co.*—MacDonald & Kahn Co.; Pacific Bridge Co.; General Construction Co.; J. F. Shea Co.; Morrison-Knudsen Co., Inc.
1934	Bonneville Dam $8,972,650	*Columbia Construction Co.*—Bechtel Co.; H. J. Kaiser; Morrison-Knudsen Co., Inc.; MacDonald & Kahn Co.; Utah Construction Co.
1934	Grand Coulee Dam (initial stage) $29,339,301	*M-W-AK*—Silas Mason Co.; Walsh Construction Co.; Atkinson-Kier Co.
1937	Ruby (Ross) Dam $3,967,785	*Columbia Construction Co.*—Bechtel Co.; H. J. Kaiser; Morrison-Knudsen Co., Inc.; MacDonald & Kahn Co.; Utah Construction Co.; General Construction Co.; J. F. Shea Co.
1938	Shasta Dam $35,939,450	*Pacific Constructors, Inc.*—L. E. Dixon Co.; Griffith Co.; Metropolitan Construction Co.; American Concrete and Steel Pipe Co.; D. W. Thurston; Lawler & Maguire; Shofner, Gordon and Hinman; W. E. Callahan Co. and Gunther and Shirley Co.; A. Guthrie & Co.; Hunkin-Conkey Co.; The Arundel Corp.; Foley Bros.
1938	Grand Coulee Dam (completion) $34,442,240	*Interior Construction Co.* (renamed *Consolidated Builders, Inc.*)—Silas Mason Co.; Walsh Construction Co.; Atkinson-Kier Co.; Henry J. Kaiser Co.; Morrison-Knudsen Co., Inc.; Utah Construction Co.; MacDonald & Kahn; J. F. Shea Co.; Pacific Bridge Co.; General Construction Co.
1941	Santa Fe Dam (Los Angeles Flood Control) $8,837,199	Morrison-Knudsen Co., Inc.; Winston Bros. Co.; J. F. Shea Co.; Ford J. Twaits.
1941	Granby Dam $5,247,555	W. E. Callahan Construction Co.; Gunther & Shirley Co.; Peter Kiewit Sons' Co.; Geo. W. Condon Co.

THE EQUIPMENT DISTRIBUTOR

His counsel and services have been indispensable to Western contractors

By A. F. SERSANOUS, President, Loggers and Contractors Machinery Co., Portland

HAIL to the construction industry! No single profession has contributed more gloriously to civilization than it has. If we ever have occasion to doubt our importance, all we need do is turn back the pages of time and read of a glamorous record. An endless chain of engineering feats could be traced through the ages, all contributing substantially to the development of men and nations.

In consequence, today we have the Equipment Manufacturer, the Equipment Distributor and the Contractor—an inseparable trio comprising this glorious industry. Throughout the years together they have built a multi-billion dollar business of unrivaled magnitude. Through their engineering science, foresight and fortitude, they have made possible undreamed of projects and unbelievable methods. By reason of their experience and ingenuity, they are adequately prepared to play their part, whatever it may be, in the defense of our free government and in the building of the world.

No part of this triumvirate is more important than the Equipment Distributor and the service he renders. From the oxen and horse era through the development of steam, gas, diesel and electricity, he has been the answer to the contractor's and the manufacturer's prayer, often their drawing board, banker, service depot, sales engineer, indispensable as they make 'em.

Soon after Horace Greeley told young men to "go West" and gold was discovered at Sutter's mill, construction started in earnest on the Pacific Coast. Roads spread everywhere. Buildings grew overnight. Railroads pushed westward, and with them the contractor. Later, with the machine age, came the Equipment Distributor.

Thus from a modest beginning, the turn of the century saw the establishment of several construction machinery firms, destined to play a leading part in the development of distributor history on the Pacific Coast. That their existence was necessary is justified by the fact that, with one exception, they are still serving their industry. Among the pioneers, we find the Smith Booth Usher Company, Garlinghouse Brothers and the Brown-Bevis Company of Los Angeles. In San Francisco, the Edward R. Bacon Company, the older Harron, Rickard & McCone Company and C. A. Garfield Company. In Portland, the Clyde Equipment Company, Howard-Cooper Corporation, Feenaughty Machinery Company and the Loggers and Contractors Machinery Company. In Seattle, the A. H. Cox Company, Pacific Hoist and Derrick Company and Star Machinery Company.

Among the pioneer firms in the Intermountain States are the following. In Salt Lake City, the C. H. Jones Equipment Co., the Lund Machinery Co., and Arnold Machinery Co. In Boise, Bunting Tractor Co. and Intermountain Equipment Co. In Montana, the Hall-Perry Machinery Co. of Butte and the Montana Powder and Equipment Co. of Helena. In Denver, Liberty Truck & Parts Co. and H. W. Moore & Co.

The Rugged Years

However, firms of this nature were not born overnight. The process of their building consumed a period of rugged years, sometimes filled with "blood, sweat and tears" as Winston Churchill might say.

Contractors first bought equipment directly from manufacturers, such as they were at that time, or, in a few cases, through manufacturer's agents. Parts stocks were available only from the factory and there were no "streamliners" or air freights to bring parts to the West. If a machine went haywire, it was shut down and probably the job as well until the "factory man" showed up, if he were ever available, to render a "little service."

Deliveries were something too. Manufacturers, in many cases, had insufficient capital to build in the winter for spring and summer sales. In competition with a world market, the Western contractor fared badly, often at the mercy of a "price advance" in the face of seasonal sales. Naturally, such a situation could portend only one thing—a change. Fortunately, some men with engineering and contractor background began to appreciate the possibilities of the construction equipment field and entered it, followed by a few wide-awake salesmen too. Capital in every case was limited but faith in the future was deep rooted. The West was going to grow and their services were needed. The first real equipment distributors were born.

Edward R. Bacon—1928

Oscar Bjorge—1931

C. E. Baker—1933

A. F. Sersanous—1938

What a struggling lot some of them were. Capital had to be borrowed, organizations built up, something to sell provided, stocks of new merchandise and parts ordered and a place in which to do business found; all, of course, assuming that capital was available. If not, sales contracts were arranged with certain manufacturers whereby these men became their agents and the manufacturer filled the order, financed the deal and paid the agent a commission for his services, but little service was forthcoming to the contractor.

No Better Proving Ground

Then as now, manufacturers and distributors concentrated mutual efforts in studying needs of the contracting profession and building equipment to meet the exigencies of the period. Close cooperation was necessary and the distributor played an important part in translating the contractor's ideas to the manufacturer's engineering staff.

In consequence, the horse era soon gave way to steel-wheeled tractors. However, their lack of traction and slow plodding gait soon gave the idea to a little known Western engineer that a tractor which laid its own tracks, as it rolled along, would build roads faster and cheaper. His foresight and ingenuity gave the West, and the world, its first important contribution to the construction industry—the track-type tractor.

The extension fire-box boiler idea popularized steam shovels in their day and was contributed by an Oregon distributor, alive to the situation.

With the development of the automobile, dirtmoving contractors beseeched distributors to find them a substitute for steel-wheeled equipment. Portability was of paramount importance. "Bob" LeTourneau, in his Stockton, California, blacksmith shop, built the first piece of earthmoving equipment successfully floated on rubber—another Western contribution.

Later years brought from the Pacific Northwest the front power take-off, revolutionizing tractor efficiency. The tractor hoist received its most substantial development in this same area. Here too, the idea of the truck mixer was first introduced. In fact, the West has given to the industry its full share of ingenious ideas, improvements and design, all of which have proven of tremendous importance in building better roads, cheaper. This part of the world provided all types of soil conditions and terrain, from rock that was really rock to dirt and sand, wet and dry. No better proving ground existed anywhere.

In fact, it has been freely said that if a machine will perform profitably west of the Rockies, it will operate satisfactorily anywhere. No manufacturer could have plodded this road alone.

An Anchor to the Windward

In looking back over this period, most distributors can remember the miraculous development of the nation (under the free enterprise system and without the help of bureaucrats) and the development of construction machinery of every type. This resulted in these pioneer institutions finding themselves surrounded by competitors, many after the some order. Competition became the "spice of life" but, from some quarters, too spicy and individualistic for the profitable operation of an equipment business. The need for an association was recognized for the purpose of disseminating business "information among legitimate distributors with the idea of increasing their business efficiency"—an anchor to the windward against the curbstoner and the "fly-by-night" operator.

In answer to that need, the Associated Equipment Distributors organization was founded on January 27, 1920. Morton R. Hunter, president of Hunter Tractor and Machinery Company, Milwaukee, Wisconsin, was the father of the idea. At the Old Colony Club in Chicago, he was joined by ten other distributors in organizing the Association. The late Harry Ferris of the Hofius-Ferris Equipment Company of Spokane and H. C. Legg of Salt Lake City were the only founders participating from the

Tracy W. Harron—1942

F. B. McBath—1946

far West. J. S. Beckwith, of Pittsburgh, was and is the Association's first and oldest living president.

A few of the objectives of the Associated Equipment Distributors were and still are:

"To render the products and services of the construction equipment industry increasingly useful to the public. To raise continually higher the standards of practice in the industry, promoting integrity, honesty, fairness and courtesy in the everyday conduct of business, from which flows mutual confidence and good-will to all concerned."

"To constantly encourage the backing of every sale with service to the customer, and to disclaim any misrepresentation whatsoever of a product offered for sale."

"To further the acceptance and practice of its basic concept—that equitable consideration is due alike the manufacturer, the distributor, and the customer."

"To seek merely the normal reward of business under the American free enterprise system; namely a fair profit margin, plus a safe reserve commensurate with the risks involved."

"To provide a common forum and a central medium for cooperative effort in better business methods and practices."

The need for the organization was quickly proven by the affiliation of many top-flight equipment distributors. Since that time, the construction equipment industry and the "A.E.D.," as the young organization was affectionately dubbed, have grown together in stature and importance.

A. F. Garlinghouse—1948

R. L. Arnold—1951

Western distributors have always been prominent in A.E.D. affairs. The following have served as National President:

Edward R. Bacon, Edwin R. Bacon Company, San Francisco, 1928.

Oscar Bjorge, Clyde Equipment Company, Portland, 1931.

C. E. Baker, Smith Booth Usher Company, Los Angeles, 1933.

A. F. Sersanous, Loggers & Contractors Machinery Co., Portland, 1938.

Tracy W. Harron, Harron, Rickard & McCone Company, San Francisco, 1942.

F. B. McBath, Columbia Equipment Company, Portland, 1946.

A. F. Garlinghouse, Garlinghouse Brothers, Los Angeles, 1948.

Ray L. Arnold, Arnold Machinery Co., Salt Lake City, Utah, 1951.

Again a demonstrated need for this organization was recognized in the N.R.A. days of the "Blue Eagle." With the great depression, the construction equipment industry, along with all others, sank to a new low in business levels. Contractors were idle. Orders were scarce and highly competitive. Many distributors were beginning to feel that "five per cent on something was better than twenty per cent on nothing" and played accordingly. An abnormal chaotic condition sprang up, dogging everyone. In fact, the battle hymn of the industry became:

"Count that day lost whose low, descending sun
Sees prices shot to hell and business done for fun."

Recognizing the depths of despondency into which the nation's business as a whole was descending, the "Great White Father" in 1933 gave us the N.R.A. Again, the "A.E.D." contributed leadership and gave to the industry E. K. Hurst, distributor from South Dakota, as code authority.

During these depression years, some Western distributors found themselves hanging on the ropes, others more prosperous, but none particularly affluent. Business was sliding and costs rising under governmental lashing. Costs of doing business were higher west than east. Then as now, it was necessary to carry larger inventories, maintain larger service organizations, provide larger capital. The contractor demanded such services and competition made such services necessary.

The Challenge Met

World War II gave the Western construction equipment industry its great opportunity to serve the nation and its armed forces. The Pacific Coast, being a springboard to the Orient, was called upon through machinery distributors to render vital war service to contractors on defense work and often to the armed forces themselves, out in the theater of operations.

Capital was expanded. Heavier inventories were carried. Special shops and services provided that contractors might work 'round the clock, free from work stoppages. Trained mechanics were made available to train other mechanics so that machines might be kept rolling.

The distributor became an equipment consultant. His job often involved, in the days of scarcity, locating used equipment and repairing it, that steel might be saved for important war material. Large rental fleets were maintained and made immediately available for defense contractors. Few on the Pacific Coast, after Pearl Harbor, anticipated an emergency period free from attempted invasion. Defense was the all important problem. Without doubt, never before had the construction industry accomplished so much with so little.

When the method of acquiring equipment required documentary evidence of defense need, distributors became liaison personnel, preparing applications for ratings, interpreting regulations and handling a considerable portion of paper work for the contractor.

Many distributor executives served their government as dollar-a-year men, acting on boards and commissions.

The post war period brought to the industry a well earned breathing spell and an opportunity to mend fences and get houses in order for a more competitive era ahead. A seller's market had made order takers out of salesmen. New blood and selling methods had to be devised. Inflated ideas had to burst. The weak had to make way for the strong. Again the equipment industry met the challenge and confidently faces the future.

And what of the future? Who can tell? Certainly there will always be roads to build and contractors to build them. There will always be manufacturers of construction equipment and distributors to serve both them and the contractor.

Come what will, deflation or inflation, war or peace, the construction equipment distributor will play his important and active part, firm in his conviction that his industry is dedicated to service of man and nation, that there is a place in the sun for him and that he who profits most will serve the best.

THE A.G.C. IN THE WEST—

Western contractors have taken leading roles in the activities of their national association

By H. E. FOREMAN, Managing Director, Associated General Contractors of America

THE HISTORY of The Associated General Contractors of America, Inc., now entering upon its fourth decade, cannot be written without emphasis being placed upon the loyalty and support of its Western members. Today more than 25% of its total membership and 20% of its branches and chapters are to be found in the eleven Western States.

Formation of A.G.C., which grew out of a great need for such an organization, came about through a meeting called by the Chamber of Commerce of the United States at Atlantic City on July 15, 1918. The purpose of the meeting was to form the National Federation of Building Industries, now defunct.

It was at once apparent that the proposed federation did not give general contractors the recognition compatible with their position in the industry. As a result, the general contractors present met separately and appointed a committee to form a national organization. D. A. Garber of the North-Eastern Construction Company, New York, was chosen as chairman.

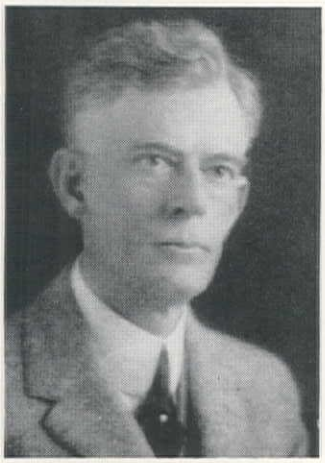
Chairman Garber, who was to become A.G.C.'s first president, issued a call for a convention at the Hotel La-Salle, Chicago, for November 20-21, 1918. In this invitation, he said: "The contractor is now merely an individual with no influence other than his own personality and his own commercial weight. Organized he can serve his own legitimate interests, open the gates for greater prosperity, benefit the country in normal times and serve it royally in emergencies like the present." (It will be recalled that this meeting was only nine days following the Armistice of World War I.)

At this convention, the A.G.C. came into being with 97 members. On March 1, 1919 a headquarters staffed by a secretary and one stenographer was set up. From that small beginning, the association has grown to a nation-wide organization with 112 chapters and branches and 5,713 member companies. The Western States have 22 chapters and branches and 1,503 members.

Although the greatest expansion of A.G.C. into the West did not come about until its second decade, the benefits to general contractors which accrue from membership were immediately recognized on the Pacific Coast. On June 29, 1920 a charter was granted by the national body to the Southern California Chapter of A.G.C. By 1942, this group, located in Los Angeles, received the distinction of being the largest of the chapters and has held that record ever since.

Henry J. Kaiser—1932

Guy F. Atkinson—1939



Arthur S. Bent—1922

Warren A. Bechtel—1928

Six Leaders from the West

Six Westerners have headed A.G.C. since 1922 when Arthur S. Bent, Bent Brothers, Los Angeles, California, was elected president. Warren A. Bechtel, W. A. Bechtel Company, San Francisco, was president in 1928. Henry J. Kaiser, Henry J. Kaiser Company, Oakland, was president in 1932. He was followed by Guy F. Atkinson, Guy F. Atkinson Company, San Francisco, in 1939; H. A. Dick, The Gilpin Construction Company, Portland, Oregon, in 1945, and Adolph Teichert, Jr., A. Teichert & Son, Inc., Sacramento, California, in 1949.

Following the untimely death of Mr. Gayle G. Armstrong, the nominating committee presented the name of A. S. Horner, A. S. Horner Construction Company, Denver, Colorado, as the vice presidential nominee for 1951.

The West has been a popular location for annual

H. A. Dick—1945

Adolph Teichert, Jr.—1949

conventions and association board meetings. Conventions were held in Los Angeles, January 30-31, 1923; Portland, Oregon, January 19-23, 1926; San Francisco, January 26-30, 1931; San Francisco, March 6-11, 1939; and San Francisco, February 27-March 2, 1950.

Board meetings have been held in San Diego, Calif., September 16-18, 1935; Denver, July 1-2, 1946, and Seattle, May 19-21, 1947.

The Roll-call of Western Chapters

Calling the roll by Western States, we find Arizona has one chapter, at Phoenix, with a membership of 63 firms devoted to heavy-highway construction. California has four chapters, the Southern California Chapter at Los Angeles, Central California Chapter at San Francisco, Northern California Chapter, also at San Francisco, and the San Diego Chapter at San Diego. The Central Chapter is predominantly building firms with the others devoted to all forms of construction. The state has a membership of 744.

Colorado is represented by the Colorado Contractors Association having a heavy-highway membership, and the Colorado Building Chapter with a total membership of 97. Both have headquarters in Denver.

Idaho is represented by the Idaho Branch A.G.C. at Boise. Its members are in the building, heavy-highway classification. The state's members number 44.

Montana has the Montana Contractors Association and the Montana Building Chapter, both in Helena. The latter is strictly building, with the first mostly highway and heavy. There are 80 A.G.C. members in the state.

In Nevada are the Southern Nevada Builders Chapter, A.G.C., at Las Vegas, and the Nevada Chapter at Reno. The Nevada Chapter follows all kinds of construction. The state membership is 30 firms.

New Mexico has the Associated Contractors of New Mexico at Santa Fe, highways and heavy firms, and the Associated Building Contractors of New Mexico, Albuquerque, for a total membership of 54.

The Oregon chapter at Portland is divided as the Building Division, Portland Chapter, and the Portland Chapter devoted to all forms of construction. Membership is 135 firms.

Washington leads the Western States in number of units with five, as follows: Eastern Washington Builders Chapter, Spokane; Spokane Chapter, mostly highway and heavy; Tacoma Chapter, A.G.C., at Tacoma, building-heavy-highway; Seattle Chapter, A.G.C., largely building; and Mountain Pacific Chapter, A.G.C., at Seattle, all forms of construction. The state has a membership of 256.

The Intermountain Branch A.G.C. in Utah at Salt Lake City is that state's representative, with 67 members which follow all construction forms.

The A.G.C. of Wyoming, Sheridan, is made up of 33 heavy-highway firms.

Discussions of construction problems of the West are held in the sessions of the Western Chapters Conference, A.G.C., the most recent of which was held in San Francisco, October 30. Forty officials from the eleven Western States attended for a discussion of industrial problems. William C. Tait, San Francisco contractor, presided.

One of the oldest groups within A.G.C. to hold regional discussions is the Pacific Northwest Branch, composed of the states of Oregon, Washington, Idaho and Montana. It generally meets annually. The next convention will be held at the Olympic Hotel in Seattle January 26-27, 1951. The Seattle Chapter A.G.C. will be the host. The 1950 meeting was in Portland, February 10-11.

In addition to the number of presidents that have come from the West, the importance of Western chapters is seen in the number of representatives on the Executive Committee and other important committees of the national organization. Members of the current Executive Committee include Adolph Teichert, Jr., Sacramento, Calif.; John MacLeod, Paramount, Calif., and the late Gayle G. Armstrong, Roswell, New Mexico.

The West is equally well represented on the joint cooperative committees which A.G.C. maintains with the American Society of Civil Engineers, American Institute of Architects, Associated Equipment Distributors, Construction Industry Manufacturers Association, Surety Association of America, American Association of State Highway Officials, National Association of State Aviation Officials, and the recently-formed joint committee for accident prevention with the casualty companies, stock and mutual, handling workmen's compensation insurance.

In addition to those of the eleven Western States, Alaska has an active chapter with 35 members engaged in all forms of construction. R. H. Stock of Stock & Grove, Anchorage, is president and L. A. Moore is manager.

The Pacific Construction Company, Ltd., of Honolulu, Territory of Hawaii, is a member of A.G.C., but there is no chapter there yet.

Activities for Defense

"One of the principal A.G.C. duties during the war period has been to comply with the requests of government agencies for information, counsel and assistance in securing the most efficient use of the industry for the war construction job which has been of unprecedented size, complexity and speed." This is a quotation from the Silver Anniversary brochure of A.G.C. issued in 1944.

In the present war, the A.G.C. is taking a still more active part since its experience in World War II is of incalculable value to government agencies concerned with construction. A Committee on National Defense, headed by A.G.C. President Walter L. Couse of Detroit, Michigan, has been set up to cooperate with government departments on all war time building.

In the 78 reserve construction units sponsored by A.G.C. chapters and branches in the Army Affiliation Program, 24 battalions are from the West. All but one of the Western units have been activated.

ENGINEERING EDUCATION—

Pressures are strong for the undergraduate to specialize but fundamentals still come first

By C. L. ECKEL, Dean, College of Engineering, University of Colorado

ALTHOUGH a considerable number of engineering teachers and practicing engineers advocate the five-year curriculum, the great majority of engineering educators believe that the basic fundamentals of engineering can be taught in four years. A few institutions are now offering five-year engineering curricula, but most Colleges of Engineering are awarding the bachelors degree at the conclusion of four academic years of prescribed study. A discussion of the relative merits of the four-year and five-year curricula will not be attempted here. Suffice it to say that in general, Colleges of Engineering are not ready to adopt the longer curriculum at this time.

The current basic philosophy of engineering education is well summarized in the *Report of the Committee on Engineering Education After the War,* approved by the American Society for Engineering Education in June 1944.

The Committee in its *Report* advocates the development of two stems of study: (a) the scientific-technological and (b) the social-humanistic. It is further suggested that approximately 20% of a student's educational time during the four-year program of study be devoted to a designed sequence in the social-humanistic field of studies.

Naturally the areas of study that constitute the social-humanistic field are not precisely defined. Some schools have attempted to meet this situation by so-called general education studies and others have modified or otherwise adapted existing courses to form a social-humanistic group of studies. Although the practice is questionable, freshman English, which is essentially technical in nature, is often included in this group. In addition to English, Literature, Economics, Philosophy, social studies and free electives of presumed cultural value are included in this group of studies.

The Teacher Is Most Important

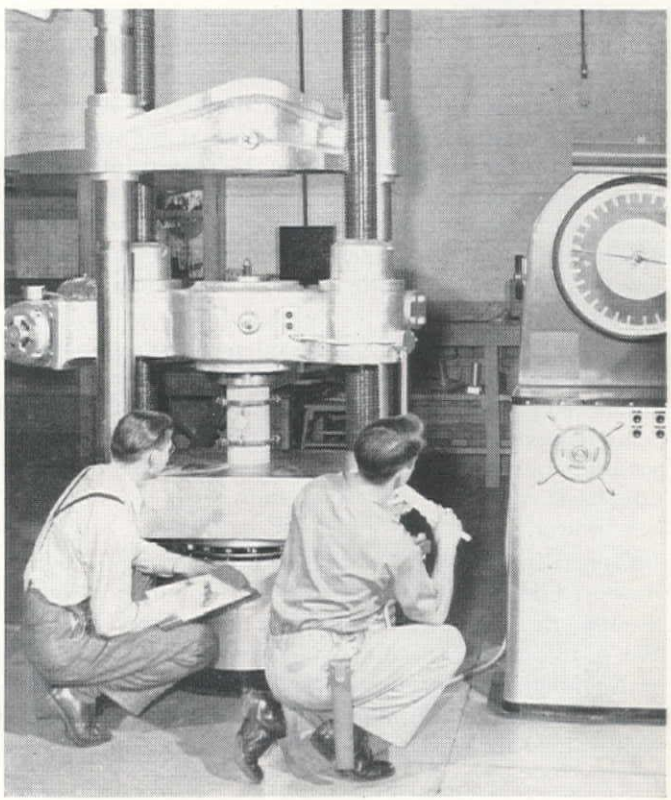
In a discussion of cultural or of social-humanistic values in a curriculum, thinking is usually in terms of subject matter when in fact the teacher is of far greater importance than subject matter. The departments in most Colleges of Engineering must rely on cognate departments in the College of Arts and Sciences for the teaching of these courses, and sometimes there is lack of coordination and cooperation. For example, the Engineering faculty usually specifies a course in Economics with the expectation that the Economics Department will organize a course in fundamental economics particularly adapted to the needs of engineering students. It is expected that basic and general principles of economics will be taught but it is hoped that illustrations carefully chosen from the engineering field will be used. This slight adaptation will go far to inculcate a proper appreciation of the tremendous importance of a proper understanding of the basic principles of economics.

The intent of the so-called general education courses is to liberalize the educational background in some of the more specialized curricula. In general, these courses are taught for freshman and sophomore students and are at once both introductory and terminal because they are not usually considered to be prerequisites for advanced courses in the specialized fields of study. Subject matter usually cuts across recognized departmental lines.

These courses are organized in four general groups—the biological sciences, the humanities, the physical sciences, and the social sciences, and in no way are they to be confused with "survey" courses.

It is presumed that the approach thus suggested provides a better introduction to any of the areas of study than an elementary course in any of the individual subjects in the field. In engineering, the physical sciences are of fundamental importance, consequently an engineering student would be expected to study the biological sciences, the humanities and the social sciences.

Here again there is great difficulty in finding instructors



competent to teach these courses, and as is to be expected, there seems to be wide division of opinion about the merit of the general education courses.

In 1945, after a careful study and analysis of all accredited civil engineering curricula at the time, the Committee on Education of the American Society of Civil Engineers recommended the following disposition of a student's academic time.*

Humanistic-social, including English	20%
Physical Science, including Geology	15%
Drawing	4%
Mathematics, not including Trigonometry	10%
Mechanics, Hydraulics and Mechanics of Materials	11%
Engineering subjects, other than civil	10%
Civil Engineering	30%
	100%

As will be noted 70% of a student's academic time is allocated to fields of study other than civil engineering. With only 30% of the student's time (40 to 45 semester hours) in a four-year curriculum allocated to civil engineering subjects, it seems clear that only basic and fundamental civil engineering subjects can be taught in the limited time available. Obviously, there is little or no time for specialization. This is as it should be. A student who is competent to do graduate work with profit should be encouraged to do so and specialization should come at this stage.

Specialization?

Some Colleges of Engineering, especially those with large enrollments, offer a number of options in their engineering curricula. For instance, some civil engineering curricula may offer options in two or more fields such as construction, irrigation, municipal and sanitary, structural and transportation. The segregation of 10 to 15 hours in a 140-hour curriculum suggests an unwarranted and probably unjustifiable degree of specialization. It seems preferable to offer a balanced curriculum which requires all students to take one or more courses in each of these fields, and then to provide a few technical electives if a choice of study is deemed desirable. Students at the undergraduate level think they know where their deep interest and future opportunity may lie, but generally they do not. Many Colleges of Engineering cannot afford to offer acceptable options in each undergraduate curriculum. For these and perhaps other reasons, a reasonable choice in electives is preferable to undergraduate options.

During the past century, the tendency has been to recognize an increasing number of specialized branches of engineering and this has led to an excessive amount of compartmentation. Actually, it is sometimes difficult for a student of civil engineering to understand why he should take basic courses in electricity and thermodynamics and heat power.

Generally speaking, Colleges of Engineering have been slow to adopt wholeheartedly the recommendations of the 1940 *Report on Aims and Scope of Engineering Education* or to use the procedures suggested by the 1944 *Report on Engineering Education After the War*. Pressures to specialize a student's training so that a four-year graduate is well trained for a particular job are strong and engineering curricula often give evidence of yielding to these pressures. Instead of postponing specialized studies for graduate study, there is still a marked tendency to crowd rather highly specialized subjects into the undergraduate curriculum. Engineering curricula are therefore likely to be quite conventional, and generally they do not adequately emphasize long range professional objectives.

More recently, the philosophy of engineering registration laws and procedures in the various states has been directed toward the concept of the profession of engineering—not separate professions representing branches and specialties—but *one* profession. Many states now have the "engineer in training" provision in their laws. Engineer in Training examinations are usually given approximately at the time of graduation. They are broad and comprehensive and involve a choice of questions that may be expected to show reasonable proficiency in some field of engineering.

Greater Uniformity?

Most Colleges of Engineering grant the bachelor's degree in the various engineering curricula taught at the institution. An interesting exception occurs at the University of California where the bachelor's degree in "Engineering" is granted with no branch designated. The University of California at Los Angeles operates a Department of Engineering with Professors of Engineering (no specialties indicated). A common curriculum is taught with a limited number of electives in the recognized branches of engineering.

It is understood that this curriculum has been accredited by the Engineers Council for Professional Development, and it may be assumed that the choice of electives in a field of engineering provides adequate foundation either for subsequent graduate study in a specialized field of engineering or for satisfactorily meeting the qualifications of "engineer in training."

To summarize, in the technical stem, engineering curricula are likely to be weak in basic science and engineering. They are often lacking in breadth and choice in the social-humanistic stem.

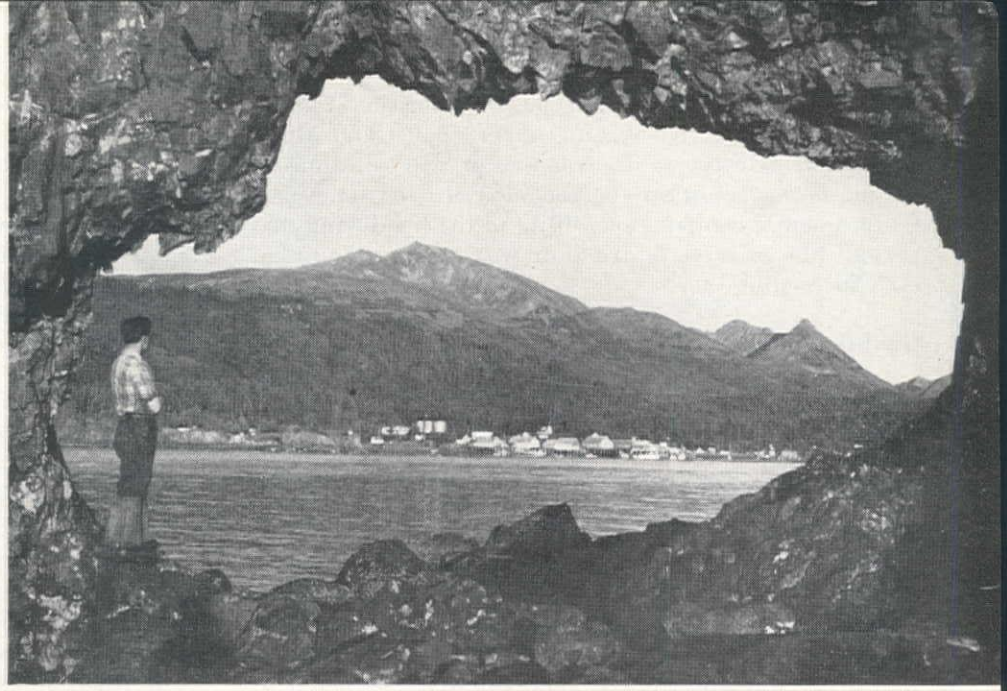
Generally speaking, Colleges of Engineering offer a common freshman year, and departmental specialization begins in the sophomore year. Transfer from one department to another at the end of the sophomore year is quite likely to delay graduation by a semester. Transfer at a later period will invariably add at least an additional year's study. In a number of Colleges of Engineering, the first two years are common for all engineering students. This is a step in the right direction.

Undoubtedly, greater uniformity in the undergraduate curricula would mean improved fundamental background and greater breadth and versatility upon graduation. This type of training is objective and anticipates future accomplishment on the part of the graduate, but thus far there has been lack of initiative and imagination to strike out boldly in an effort to accomplish this broader objective.

A curriculum is, and probably always will be, a compromise that represents the best composite thinking of any engineering faculty at a given time, but an engineering curriculum must be sensitive to changing conditions. It should be dynamic, not static. This is especially true as life becomes more complicated, because Engineers as citizens cannot avoid social responsibility in our complex civilization.

*Proceedings ASCE March 1946, page 387.

The profile of the fastest-growing region under the American Flag is being altered dramatically. More than a quarter of a billion dollars worth of new construction got under way in Alaska during 1950—and there is every indication that total will be surpassed each year during the next decade.



ALASKA—

Construction is the No. 1 industry along the last frontier of the West

By RALPH BROWNE, Assistant General Manager, Alaska Development Board

THE PROFILE OF ALASKA, the fastest-growing region under the American Flag, has been altered dramatically during the past decade. Never before in the 83-year history of the northwestern territory as a possession of the United States has there been such rapid, overall development. Alaska's population has grown from 72,524 persons in 1940 to more than 132,000 in 1950, an increase of 82%, the largest in the nation.

Wartime constructed highways, joining many of Alaska's communities together for the first time, have become important arteries of commerce. Traffic over the Alaska Highway, which gave the Territory its first and only land link with the States, has exceeded all expectations. Dozens of airports have been constructed and improved to make Alaska the most air-minded region in the world. The airplane has been to Alaska what the covered wagon was to the West. Construction of two huge international airports at Anchorage and Fairbanks emphasize Alaska's importance as a crossroads point on world aviation routes. The skyline of many communities has changed with the construction of new industrial, business and housing facilities. In Juneau, Fairbanks and Anchorage the Territory's first skyscraper apartments are under construction. The increasing importance of Alaska as a major defense bastion for the North American continent has resulted in construction and enlargement of military installations.

The Total Will Mount

More than a quarter of a billion dollars worth of new construction—governmental and private—got under way in Alaska during 1950, a new high for the Territory. According to a summary of building activities compiled by the Alaska Development Board, an official agency of the Territorial Government, the year's construction total amounted to $279,172,576. This is almost 39 times as much as the sum America paid when it purchased Alaska from Russia in 1867. Purchase price of the Territory was $7,200,000, or less than two cents per acre.

The largest item going toward making up the total was defense construction, which accounted for $138,000,000. Expenditures for other federal government construction amounted to $77,477,908. The construction program of the territorial government amounted to $2,811,656, while municipal and school district programs were evaluated at $5,664,312. Institutional and co-op. construction amounted to $8,219,000. Private construction reached a new high of $46,999,700.

The 1950 construction boom was centered largely in the Third and Fourth Judicial Divisions, which contain the defense hubs of Anchorage and Fairbanks, where military installations are being enlarged and improved. Of the grand total expended for construction programs, $160,913,627 was spent in the Third Division, and $89,950,224 in the Fourth. The Second Judicial Division, embracing Nome and the Arctic Coast, ranked third with a total expenditure of $14,425,356. Construction of defense installations counted for almost the entire amount expended in that region. In fourth and last place was the First Judicial Division, which encompasses all of Southeastern Alaska, with a total of $13,883,369. It is significant to note that no defense dollars were spent in this region.

Thus, construction became Alaska's No. 1 industry in

1950, followed by fishing ($100,000,000), tourism ($25,000,000), mining ($15,299,000), and timber ($5,000,000). Moreover, there is every indication that it will continue to maintain that position for the next five or ten years. Governmental construction will head the list during that period, but private construction is certain to mount in each succeeding year.

Growing Pains

It is true that many problems face the construction industry in Alaska. Among these are the shortness of the building season, high cost of imported materials, irregular water transportation service owing to frequent maritime union tieups, high cost and availability of labor and others. Efforts by representatives of the construction industry, federal and territorial governments have and are being made to correct or alleviate as many of those problems as possible.

An important step was taken last May when business, industrial and government representatives gathered at Fort Richardson, near Anchorage, to attend a building materials conference. The purpose of the session was to determine the extent of the government construction program during the next five years, the requirements of various building materials by respective agencies, and whether such materials could be produced in the Territory. The meeting revealed there was sufficient demand for certain materials to warrant establishment of new manufacturing plants, including the expansion of existing facilities. Companies interested in building material production now are considering locating plants in Alaska.

The U. S. Bureau of Mines and Bureau of Reclamation have investigated possibilities of establishing a cement manufacturing plant in Alaska. A bill calling for construction of such a plant was introduced at the last session of Congress. The high cost of cement, owing to packaging and the long haul from the Pacific Northwest, has had a detrimental effect on private construction in Interior Alaska. Cement users, however, got a break this year when Permanente Cement Corp. put into operation bulk cement distribution facilities in Anchorage. An appreciable reduction resulted in the price of cement. Studies, however, are continuing regarding location of a cement manufacturing plant in the Territory.

Total federal government expenditures for new construction and maintenance in Alaska during the next six years have been estimated at $780,000,000, or an average of $130,000,000 per year. The bulk of that will be expended by the armed forces. In view of the increasing awareness in Congress of the Territory's importance in the national defense picture, there is a strong likelihood that appropriations for this purpose might even be increased to meet new needs.

"THE AIRPLANE has been to the Territory of Alaska what the covered wagon was to the West."

With the growth of industry and population there is a pressing need for new lines of transportation, as well as improvement of existing facilities. Highway requirements take the first priority. To harvest the bounteous natural resources Alaska contains, new and better roads are necessary.

It already has been demonstrated in Alaska that roads are a prerequisite to development. Where roads have been built, new developments have occurred. It was mentioned earlier that traffic over the Alaska Highway has exceeded all expectations. During the first nine months of 1950 a total of 10,256 vehicles carrying 29,993 passengers entered and left Alaska via the Alaska Highway.

Roads must be built before logging operations for pulp mills, sawmills and other allied timber industries can begin. Roads must be built before rich mineral deposits can be tapped. Roads must be built if new land is to be opened for agricultural development. Roads must be built if Alaska is to cash in on the profitable tourist industry.

Federal and Territorial Government agencies responsible for highway construction and improvements—the Alaska Road Commission, Bureau of Public Roads and Office of the Highway Engineer—are aware of the need for new highways and are planning for the future.

The main Alaska highway system is being improved. The majority of it will be hard-surfaced by the end of 1953. The Kenai Peninsula road system will be linked with the main road system of Alaska when the Turnagain Arm highway is completed in 1951. Construction is under way on a road which will connect the Mount McKinley National Park road system with the Richardson Highway.

While the main rehabilitation program of the Alaska Railroad is almost completed, future extension of rail lines are in the planning stage. Extension of the line from Fairbanks to Haines, about 600 mi., is included in the railroad's expansion program. Discussions pertaining to extension of the Pacific Great Eastern Railway through Northern British Columbia and the Yukon Territory to Alaska have been renewed. Joint economic and other surveys by the Canadian and American Governments to determine the volume of traffic which might be developed if the railway is constructed, are expected to begin in the near future. Costs of this extension have been estimated at $1,000,000,000 and more.

When many of Alaska's airports were built, the twin-engine DC-3 was the workhorse of the North. Today, larger four-engine aircraft operate between Alaska and the States. Present runways in many of the communities have proved to be too short to permit all-year landings by the larger planes. Therefore, extension of many runways is necessary. Air fields and sea-plane landing facilities are required in other communities. The Territorial Department of Aviation, created by the 19th Legislature in 1949, is giving careful consideration to present and future airport needs throughout Alaska.

Power Problems

A program which is certain to have far-reaching beneficial effects to community and industrial development is that now being undertaken by the Bureau of Reclamation. That agency has spent the past three years investigating

the Territory's major low-cost power sites. Their studies reveal Alaska has a potential of 50,000,000,000 kilowatt-hours annually. Many of these sites are power giants capable of producing tremendous quantities of low-cost power, a real attraction to basic industry.

Many communities, particularly Anchorage, are suffering a power shortage, both for commercial and residential use. To alleviate the power shortage in the Anchorage area, Congress last year authorized construction of the Eklutna project, which will have an installed capacity of 30,000 kw. Cost of the project has been estimated at $21,000,000, and engineering work is under way at this time. Other sites which will be considered for construction in the near future include Swan Lake, near Ketchikan; Blue Lake, near Sitka, and Susitna River, near Anchorage. The U. S. Army Engineers also has been conducting a series of power site investigations in the Territory, but has not as yet asked Congress for funds for project construction work.

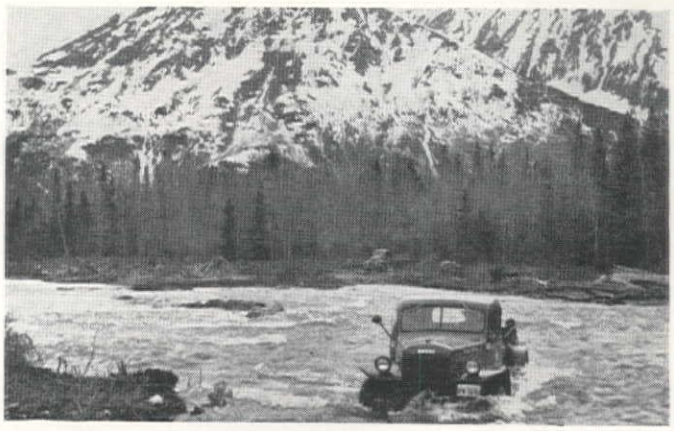
Pipelines Will Be Needed

Explorations in Naval Petroleum Reserve No. 4 are continuing. Geologists have described the 35,000 square-mile reserve as potentially one of the world's most valuable oil lands. Last October the Navy announced the find of two additional oil finds in the reserve. The productive capacity of the new wells, however, has not yet been determined. Prior to the 1950 finds, a gas strike in the field was reported in April 1949. It has been estimated by geologists that daily production of 100,000 barrels of crude would sustain the Arctic field commercially. In the event that petroleum is found in commercial quantities, engineers already have roughed out pipelines, highways and possible railways linking the fields with Interior Alaska, and eventually the ice-free coast of Alaska.

Other pipelines also are being considered. During World War II, when the much-publicized Canol Project was under construction, a network of pipelines was laid down to supply air fields in Interior Alaska and the Yukon with aviation fuel. The main system ran from tidewater at Skagway to Whitehorse, from which point it went northwest to Fairbanks, and southeast to Watson Lake air field. This system has remained in operation since the end of the war. New pipelines, however, are needed to meet increased fuel demands. Two routes have been proposed. One leads from Haines, at the tip of Lynn Canal in Southeastern Alaska, to Fairbanks. The other is from Valdez on the Gulf of Alaska, to Fairbanks. Pipeline surveys are scheduled to determine the most feasible route.

Private Projects in the Offing

While the preceding are government projects, large private developments also are in the offing. Chief among these is the proposed establishment of an aluminum reduction plant in the Skagway area by the Aluminum Corporation of America. The project would involve a total expenditure of about $300,000,000, and would mean a population increase in that area of from 30,000 to 50,000 persons. Property in Skagway proper and nearby Dyea Valley was acquired by ALCOA during early 1950. Construction features involve an 11-mi. tunnel and 4-mi. tunnel through the Coast Range to tap head-waters of the Yukon River; two power plants, each of from 400,000 kw. to 800,000 kw. installed capacity; the largest aluminum reduction plant in the world; docking and unloading



"TO HARVEST the bounteous natural resources Alaska contains, new and better roads are necessary."

facilities, and a townsite to house from 30,000 to 50,000 persons.

Investigations of the U. S. Forest Service indicate the vast timber resources of the Tongass National Forest in Southeastern Alaska can supply forever the timber requirements of at least five large pulp and/or paper mills. Engineering work already has been completed at two sites, one near Sitka and the other near Ketchikan. The plants would cost between $30,000,000 and $40,000,000 each. It is anticipated that actual construction will begin at either one or both sites in the near future. Considerable interest in the remaining sites also is being displayed by large pulp and paper manufacturers.

More Facilities for a Growing Population

The Alaska Public Works program involves a total expenditure of $70,000,000 during the next six years. Construction of schools accounts for $25,227,920 of that amount. The balance will be expended on sewer, water, street, hospital, etc., facilities.

Alaska's problems of flood control and domestic and industrial water supplies, which have received scant attention in the past, will increase as the Territory grows and develops. For some Alaska communities the damage and inconvenience caused by floods now constitutes a major problem. This eventually will prove true at an increasing number of places. The U. S. Army Engineers and other interested agencies are giving the matter their earnest attention in all future planning.

Provision of domestic water supplies for larger towns in Alaska will be of increasing importance. Small creeks, lakes and underground supplies have furnished in the past sufficient water for towns, but these sources may not be adequate to supply the growing population centers of the future. Moreover, as the country develops, stream pollution undoubtedly will increase and will require more rigid control both by communities and respective agencies of the Territorial and Federal governments. Those responsible for municipal water systems soon may be faced with the problem of providing larger water reservoirs, including purification facilities. Furnishing water for new industrial plants will be necessary.

Fortunately, it can be reported that the respective municipal, territorial and federal governments are planning for the future. They realize their actions can either speed or retard the long-delayed development of the soon-to-be State of Alaska. They are ready to meet that challenge.

INGENUITY ON THE JOB—

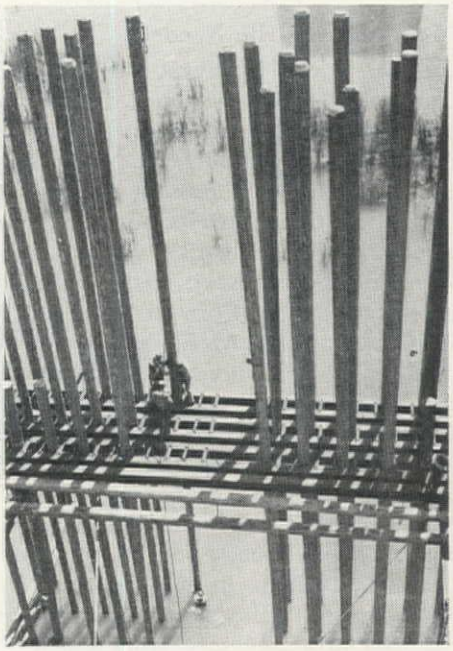
Western conditions force contractors to develop new ideas in attacking construction problems

WESTERN contractors, and their associates among manufacturers and distributors, have been particularly alert in developing methods or machines to meet specific construction problems. Many of these innovations have resulted from the need to overcome problems that result from Western climate, distances or rugged terrain, but others have been concerned with elements of construction common to all types of work in any region of the country. During the last 25 years these contractors and members of their organizations have contributed a major share in advancing the practice of heavy construction, with corresponding reductions in cost, increases in speed and added safety and comfort.

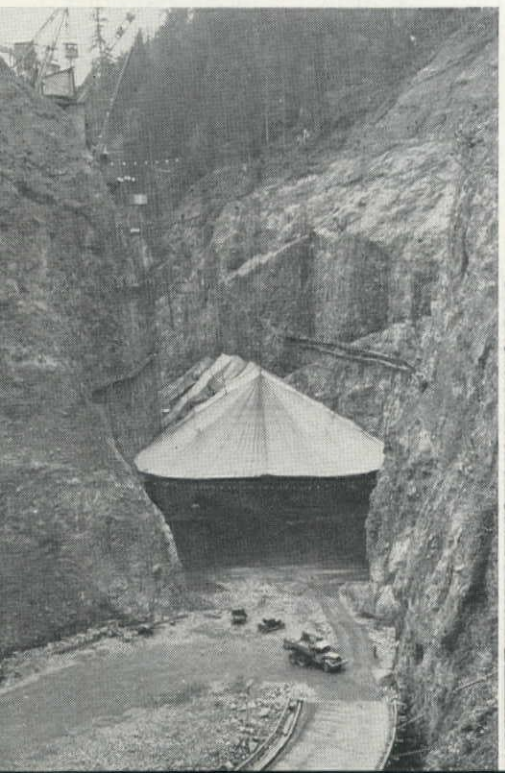
Some typical examples of these innovations and ideas are illustrated in the pictures on these pages. Since they are merely representative and cover only a small part of the total number of original ideas no attempt has been made to indicate credit.

MOISTURE CONTROL demanded by the engineers for the core material going into Mud Mountain Dam, during the winter season in the Northwest, resulted in the contractor employing the unprecedented solution of erecting a large canvas tent (below) for the protection of the fill. Sealing off the bottom of the narrow canyon, the tent enabled the contractor to meet specifications for moisture control.

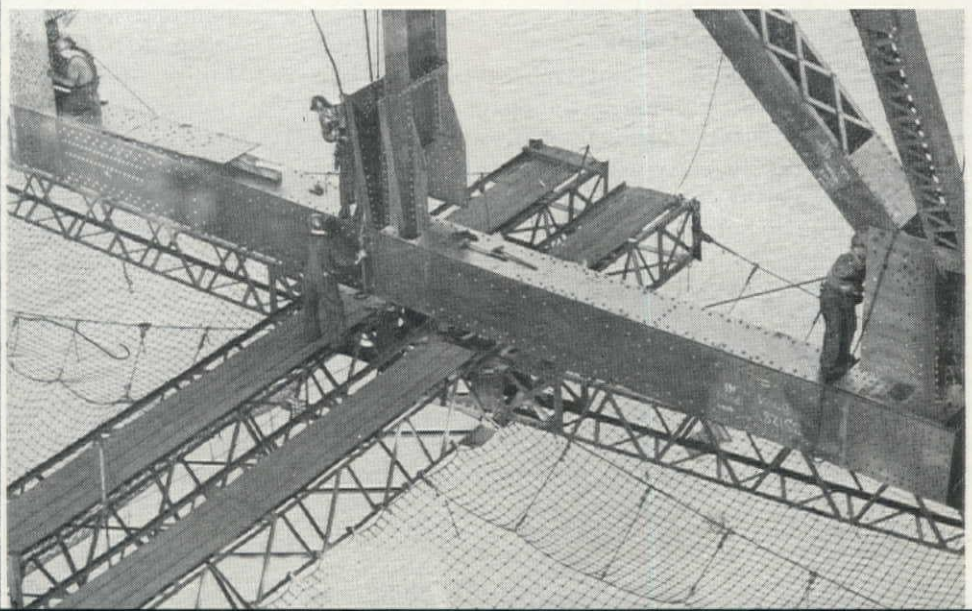
SLIDING GROUND, which was interfering with work at Grand Coulee Dam, was stopped when the contractor installed pipes for circulating brine and froze the moving earth into a temporary ice dam (above). Saving in time and cost by a departure from ordinary methods resulted from this example of ingenuity.

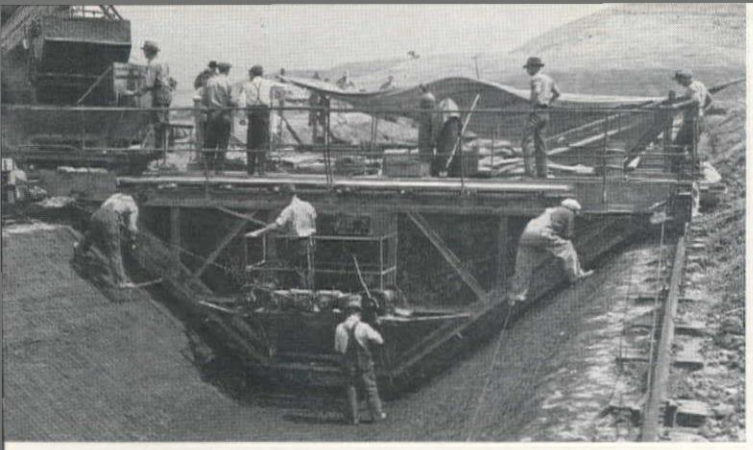


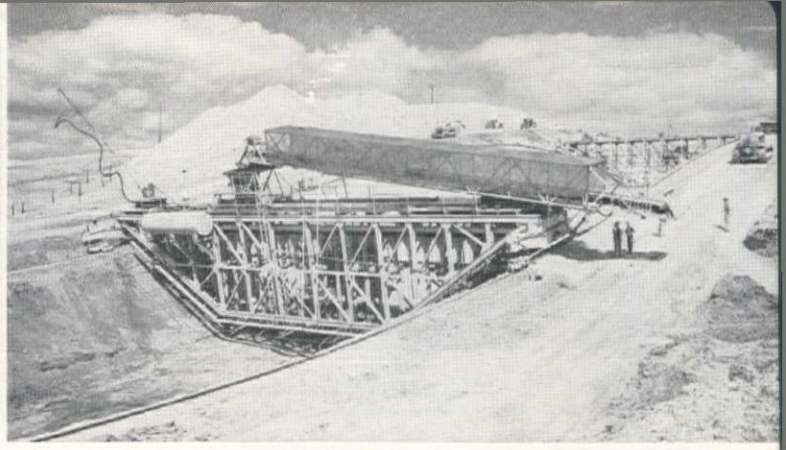
ACCURACY in spotting piles for temporary falsework for a bridge across the Colorado River was made possible by preparing a template. The result placed the piles under the proper areas of the bottom chord for the permanent steel truss and was effective in distributing the load on the temporary supports.



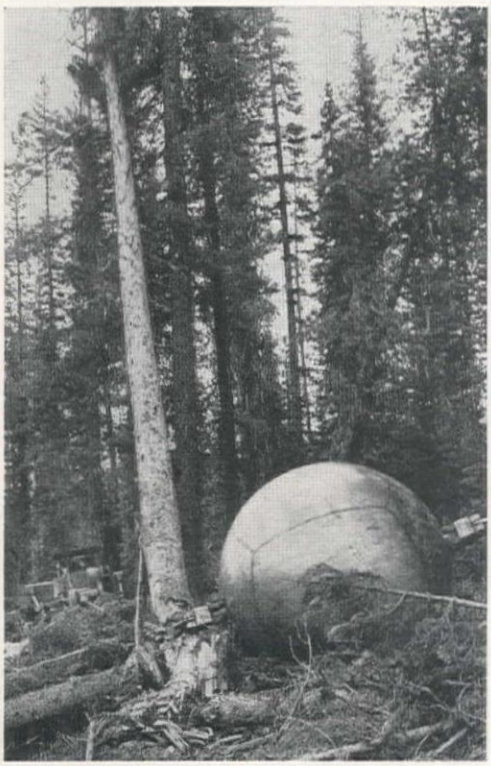
SAFETY during construction is a particularly serious problem in steel erection operations and the introduction of a safety net was an important innovation in the interest of safe working conditions during placing of the stiffening trusses on the Golden Gate Bridge.



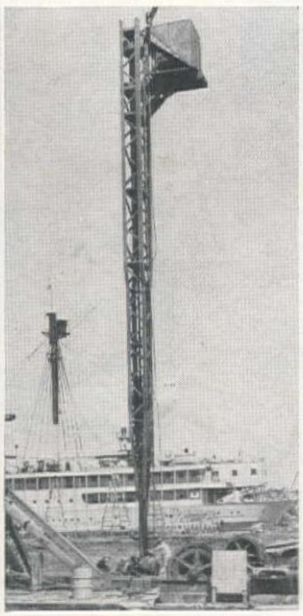




BIG CANALS provide problems calling for special equipment to trim and line miles of channel with economy. Evolution of the most spectacular type of machine is shown: (left) an early model that introduced basic elements on a small scale; (right) giant, completely mechanized unit on the Central Valley project.



RESERVOIR CLEARING in heavy timber has been a hand job until a chain-drag supported on steel balls and pulled by tractors solved the problem of speed and lowered costs at Hungry Horse.

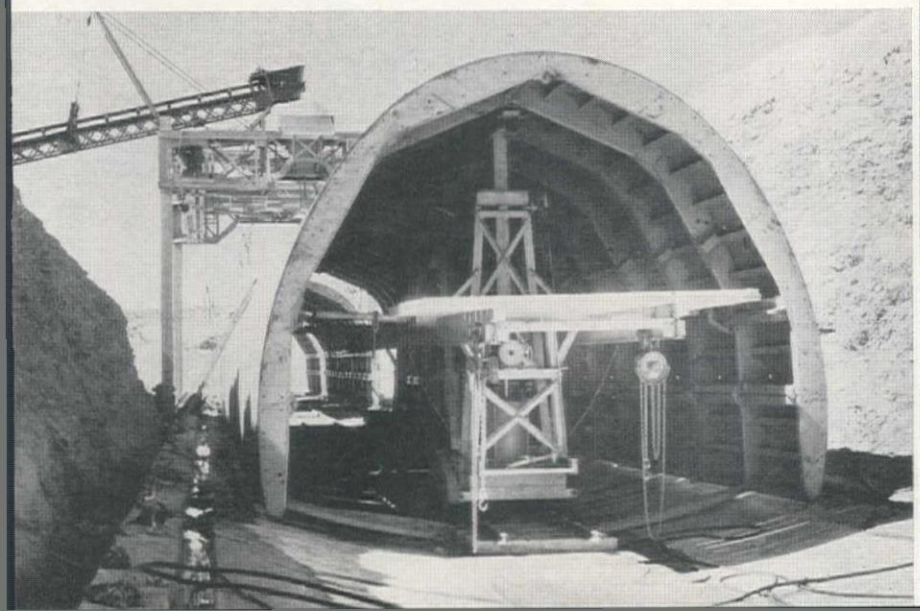


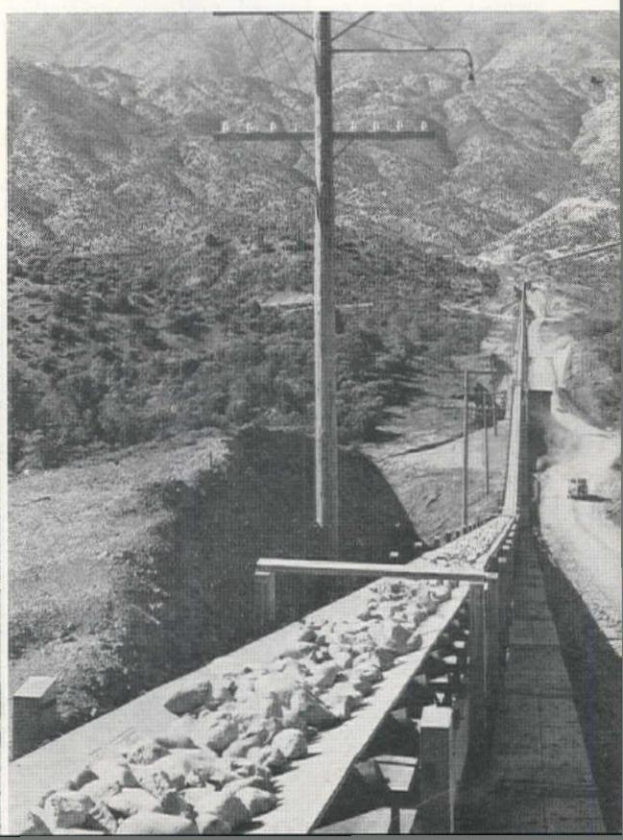
CUTTING OFF timber piles under water for a Navy drydock was speeded by putting a saw at the lower end of a long shaft operated by electric motor. The entire cage supporting the shaft and saw is handled by crane.

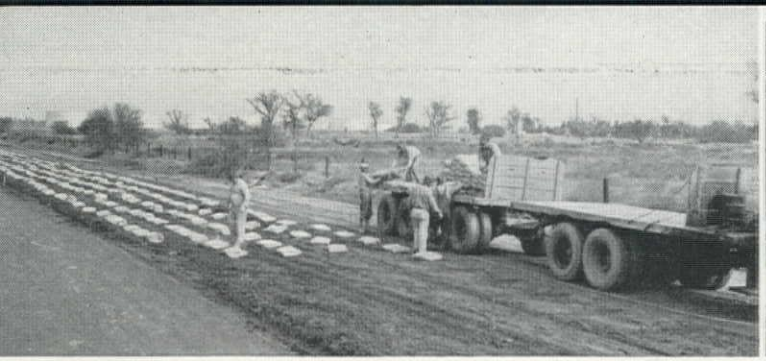
ROUGH and pitted invert in a power-plant tunnel causing serious reduction in flow was an unusual problem solved by building an electrically-powered machine for wet-grinding the concrete smooth.

MOVING MILLIONS of yards of concrete aggregate for Shasta Dam was considered a job for railroad equipment, until Western daring laid out and built the world's longest conveyor belt. This 10-mi. moving rubber trough handled 1,100 tons per hour. Controls permitted handling and stock-piling separate sizes of sand and rock.

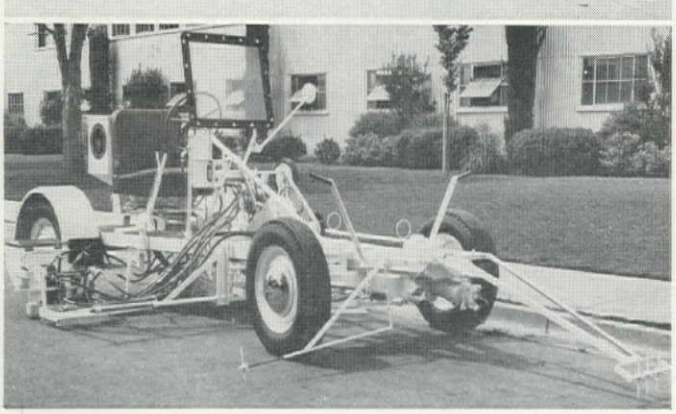
CLOSED CONDUIT sections of the Colorado River Aqueduct were cast with concrete poured in elaborate forms. Supported on the invert, these steel forms (both inside and outside) combined portability, quick set-up and a method for distributing concrete during a long pour.







EVOLUTION OF SOIL-CEMENT highway construction has been featured by improvement in the method of distributing the cement. Not too many years ago it was deposited by sacks (left) and the spacing on the roadbed measured the amount of cement. Sacks were then slit and emptied by hand. Today, bulk cement is accurately measured from the truck (right) and placed in the troughed windrow by screw conveyor. Mixing equipment and methods have also evolved from farm harrows to self-propelled machines.

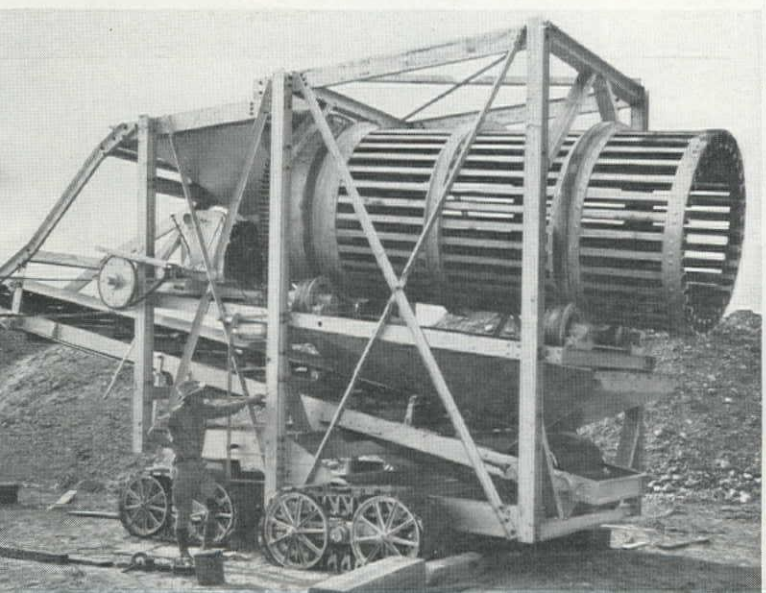


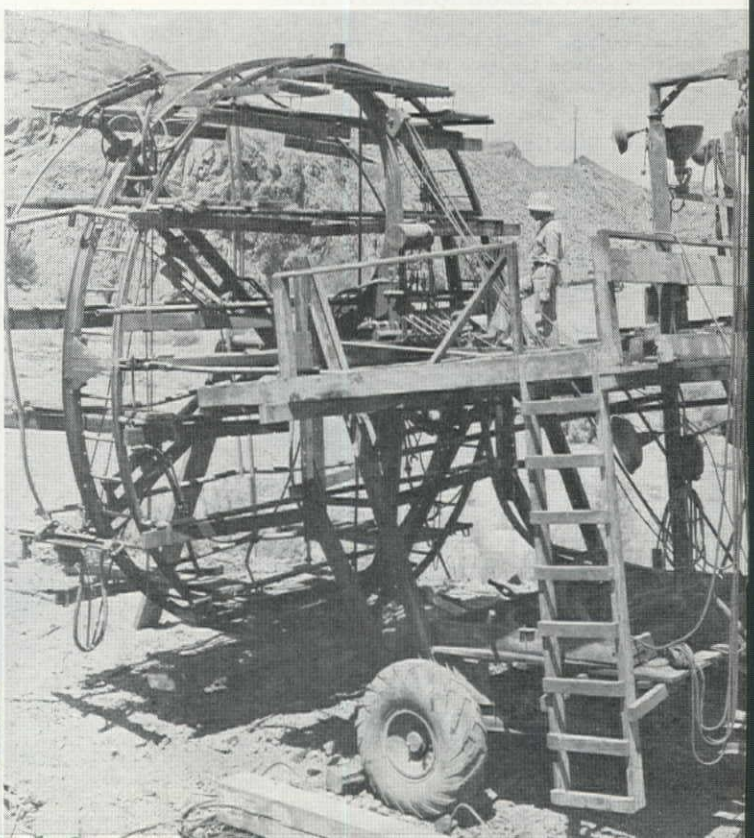
HIGHWAY STRIPING moved out of the hand-work class when early machines like the one shown above (top) were first built some years ago. Every Western state had new ideas for improvements to increase road speed, uniform application and operating comfort until the modern striper looks like the lower model.

PRECAST CONCRETE PIPE gets bigger-and-bigger, which makes Western contractors plan heavier rigs for handling at the casting yard and transporting to trench. From simple trailers these machines have evolved to mechanical giants for handling 65-ton sections of record 15-ft. diameter.

WHEN THE FIRST truck-mounted drill jumbos at Hoover Dam took these machines for tunnel driving off the rails and onto rubber tires it started a new trend in drill-rigs. Many units have been built to meet conditions on various jobs emphasizing tires for fast moving and drills spotted in advantageous positions.

ENGINEERS want cobbles kept out of the impervious zone of earth-fill dams. This portable revolving grizzly is designed to allow loading at the pit by dragline, with the passing material dropping onto the belt conveyor for elevating into trucks.





EQUIPMENT DEVELOPMENT—

The severe operating conditions in the West provide the nation's best proving ground

"EXTREMELY difficult conditions involved in many Western projects have had a marked influence on the design and construction of equipment during the past two decades, and in order to meet these demands it has been necessary for the manufacturers to offer machines of larger capacity than were formerly required by contractors, and more important, to design these machines with higher operating speeds and greater ranges."

This statement from a manufacturer of heavy construction equipment represents the key to the relation between the construction work in this region and the builders of equipment. Many comments from equipment designers and producers emphasize the point that Western contractors know what they need and have demanded machines to meet these requirements. Other comments from equipment designers refer to the West as the proving-ground for equipment, and the graveyard of many ideas and models which were not up to Western needs. Thus, the West and contractors in this region have influenced the development of much construction equipment which is now familiar to the industry throughout the nation.

The West Demands Three Essentials

The character of the region, the projects of unprecedented size, isolated locations, and extremely severe operating conditions have provided the real key to this development. To meet the demands of contractors in the West, there have been three essential specifications for all types of equipment: (1) ruggedness, (2) large capacity and size, and (3) portability.

Ruggedness has been a natural demand based on the fact that almost every Western project involves the excavation and handling of rock. As one manufacturer of rock crushers and screening plants expresses it: "The mountain areas of the West have for many years been known as the graveyard of crushers. This was due to the fact that the rock in that area is extremely hard and tough so that only the strongest and best crushing equipment could survive. Our company has designed especially strong crushing equipment to meet the extremely tough conditions of the West and Northwest."

Every time a broken or inadequate part of a machine was observed and reported by a contractor in the West, this observation passed along through the chain of distributor, Western office and home office, resulted in an improved design to build more ruggedness into the equipment. When these improvements were incorporated to meet Western conditions, the result was a machine just that much more suitable for all needs in the Midwest and East.

Large capacity and size demanded for equipment to be used in this region resulted from the number of projects which involved record yardage, volume of excavation and size of structure, combined with the remoteness of most job sites. If the Midwest contractor secures a job reasonably near an established community and operates from his usual headquarters, with convenient facilities for crews and maintenance work, the factor of job-speed is important, but not compelling. By comparison, if a Western contractor secures a job in a remote mountain area or on a section of desert highway possibly fifty or one hundred miles from even the crudest repair facilities he is eager to get the work done in minimum time, and the size of equipment becomes a major consideration. These are the conditions which tend to make Western contractors add oversize buckets, or put sideboards on trucks, or put pushers behind scrapers to cut loading time and crowd in that extra yard. Everything is done to get the most out of the machines, and on his next job he will be asking the distributor about the next larger-size unit—and so the capacities and sizes go higher and higher.

Portability has been an important requirement for construction equipment in this region, because of long distances and the need for contractors to bid jobs far removed from their normal headquarters. This means that equipment has to be moved speedily from job to job with minimum amount of dismantling. It has not been possible for any Western contractor interested in doing a large volume of work to confine his activities to one area. Years ago, this meant long rail hauls for heavy equipment with necessary dismantling and loading according to railroad regulations. Today, many of these same hauls are made on trailers over the highways with corresponding restrictions on size and weight. In both cases, the more portable the machine the greater saving in time at both ends.

To meet these three general requirements imposed by Western contractors, equipment manufacturers have made contstant improvements to keep pace. These developments are never in complete balance and some feature is always in advance of others. This means designers are always working to improve the weakest link, which will bring the unit up to the capacity provided by its other features.

Some of the major points in this step-by-step evolution will indicate both the processes and the progress.

Better materials

The strength of the materials built into construction equipment has been a matter of continuing improvement among all manufacturers, because the stronger the machine, the better it provides for necessary ruggedness and increased portability through weight reduction. Years ago, the trend moved away from the use of heavy castings to built-up sections of steel. With the development of special steel alloys featuring additional strength or toughness manufacturers added these to meet certain design problems where they would effect an increase in strength with a corresponding reduction in weight.

These sections of steel were first fabricated by riveting,

with a modern trend toward welding as an additional factor in weight reduction.

Better design

Although closely related to the use of better materials, improvements in design are based on the ingenuity of mechanical engineers in shifting the distribution of weight for improved operating characteristics and handling. Without such improvements in design, the use of lighter weight steels could produce machines lacking in balance and shape. The combination of materials and better design has resulted in the improved machines of today.

Power

Twenty-five years ago, construction equipment was emerging from the old era of steam power and advancing into the age of internal combustion engines. This change was a further step in the reduction of weight and had the additional advantage of convenience in operation.

In the West this change was particularly effective since many locations did not provide the source of fuel and water necessary for the economical use of steam power. In fact, Western contractors were among the first to accept this innovation and demand larger and heavier units powered by gasoline or diesel engines. With the gradual reduction in the weight of diesel engines, the economics of using this type of power found increasing favor for construction equipment in this region.

On large size construction jobs the availability of electric power made its use fairly common. For example, on a large dam job usual practice would involve building a transmission line from a commercial source of power to the site, with distribution at lower voltage to all operations. This made power available for compressors, pumps, welders and hand tools.

About 1940, and with accelerating pace during the war, a trend started toward introducing electric power on the smaller size jobs. This was made possible by the development of the modern, portable diesel-electric generator set. With these units it was economical to provide power for lights and tools. Today, electric power is usually available at field headquarters and shops on most medium size jobs. Along with this increase in the availability of power on construction operations has been the expanding use of electric hand tools.

Application of power

With the introduction of gasoline and diesel engines, the application of this type of power to the operations performed by the machine presented new problems. Whereas steam could be applied through separate engine units where needed, the internal combustion engines required extensive use of clutches and friction. Not only did these drives introduce many more mechanical parts, but these operations required more physical effort on the part of the operator. Some clutch levers represented as much as a 50-lb. pull. Further, application of power tended to be unsteady and required greater operating skill.

Use of electric power generated by separate engine provided one the earlier solutions and the more recent development is the adoption of the hydraulic drive, or the torque-converter principle.

Servicing

Because of the punishment taken by construction equipment the ease of servicing and maintenance has always been an important design consideration. Not only the day-to-day oiling and greasing, but the replacement of friction materials and the actual tearing down of the machine itself has provided thought for designers in saving contractors' time and costs on the job. This is a never-ending trend and has been emphasized more recently, particularly on Western projects.

Ease of servicing has gone hand in hand with the necessary dismantling of larger units for speedy moves. Design engineers have recognized the two elements and have endeavored to provide a combination for servicing and dismantling.

Moving

The speed of movement for most construction equipment has advanced from mule-team tempo to that of the fast moving rubber-tired machine. In fact, early railroad equipment was not available except on-the-rails. From this fixed position it next went into broad steel wheels, moving on to crawler treads and finally to rubber. Each move was designed to make the handling of the machine faster as well as to increase the size of the unit.

Manufacturers of construction equipment have been an important factor in the development of large pneumatic tires, forcing the producers of these tires into larger sizes with more rugged treads. Today, construction equipment moves on rubber with speeds which have expanded the capacity of all types of earth-moving units.

Attachments

To provide more efficiency in the use of power plants, as well as to provide a machine that the contractor could use for more than one operation, designers have continually increased the use of attachments and the interchange of these parts. From the tractor with a bulldozer blade on the front and a scraper in tow, to the power shovel which can be converted into a dragline, a derrick and a pile driver, the equipment manufacturers have provided machines of greater utility with corresponding decrease in the cost required to equip any job.

Operators' needs

In all of these developments the needs of the operator have become more and more important. Twenty-five years ago the operator was almost the last consideration in reference to comfort, safety and ease of effort. Today, the effect of operator-fatigue is well understood and the element of comfort is receiving careful consideration.

As part of the attention to operating efficiency is the matter of safety not only for the operator but considering the hazards to other members of the construction crew. Hydraulic and electric controls have done much to reduce the physical effort required in the handling of large construction equipment.

To summarize, the West has provided the conditions and the type of projects which have had a marked influence on the development of construction equipment. Western contractors know equipment, know what it can do, and how to get the most out of it. In fact, they are frequently reminding manufacturers how it can be improved. With the aid of the distributors, and their sales-engineers, the contractors of this Western region have contributed much to the evolution of the equipment that has made possible the building of the modern West.

Announcing the formation of

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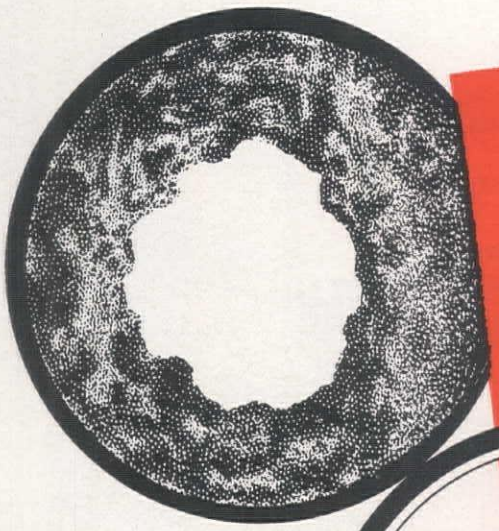

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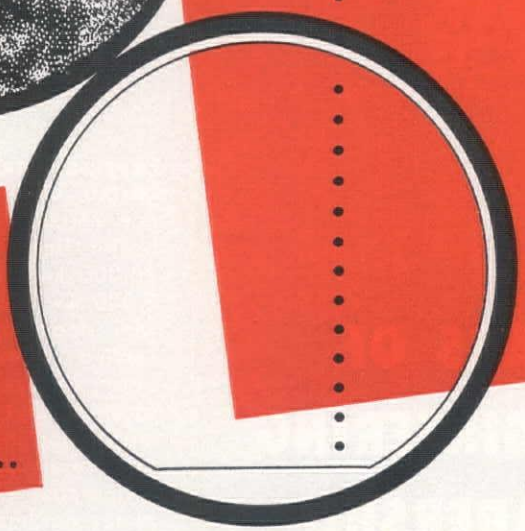

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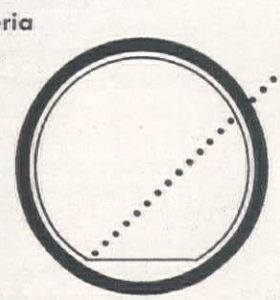

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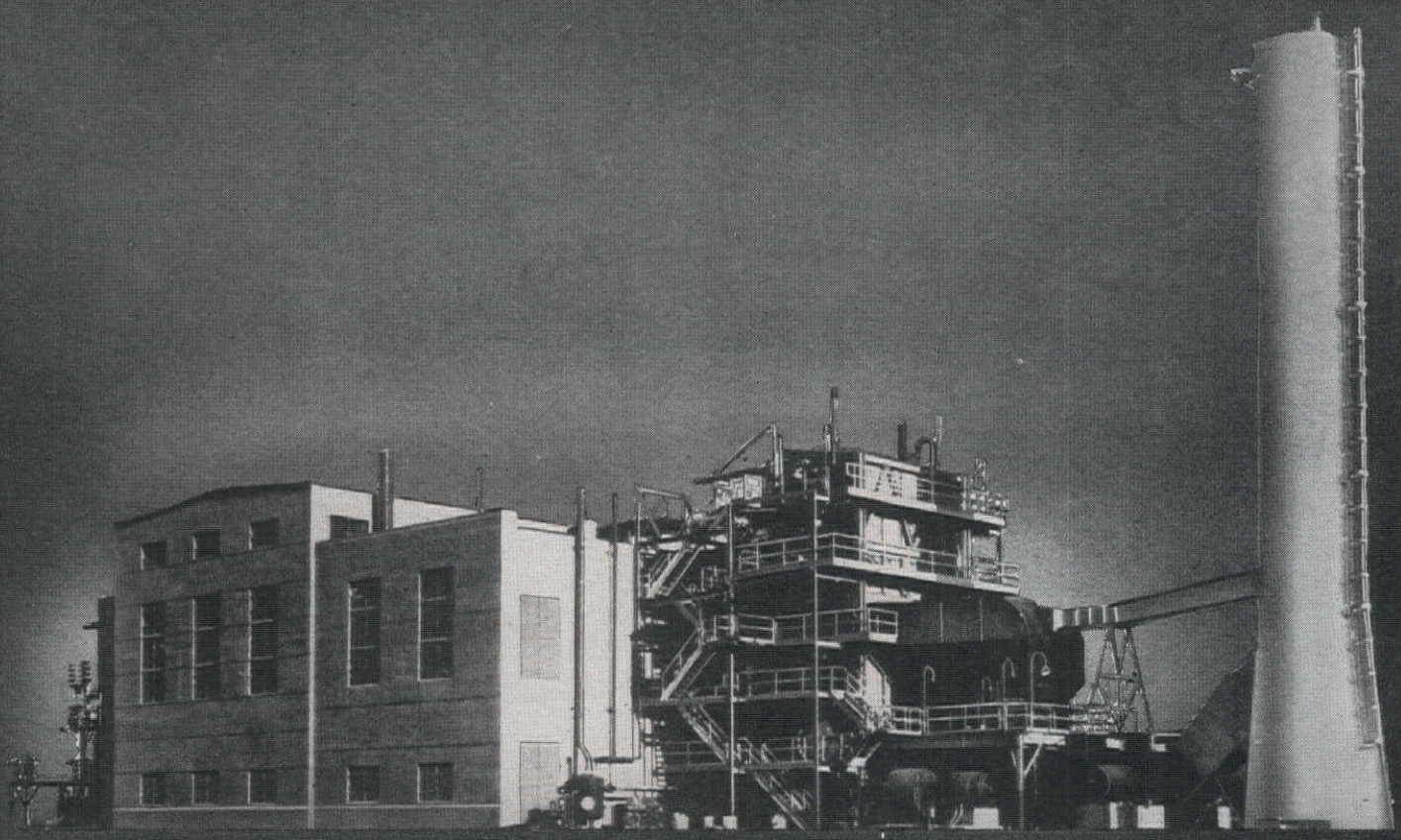

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REPORTS *from the* COURTS

By
HOWARD S. BURNSIDE
Registered Professional Engineer
Attorney at Law

Old Buildings Under New Code

A RECENT California decision which involved personal injuries has considerable importance in the field of building renovation and will be of interest to architects and building inspectors particularly.

Ordinance No. 87000 of the City of Los Angeles amended the "old" building code and provided that every door serving as an exit from an aggregate floor area of more than 1,000 sq. ft. shall conform with the requirement "Doors serving as exits shall open only in the direction of exit and shall be operable from the inside without the use of a key." A section entitled Application to Existing Buildings provided "(a) Maintenance. Any portion of any building * * * which, from any cause, has become a menace to life or limb * * * shall be restored to its original condition * * * or shall be made to conform to the regulations of this Code, or shall be demolished."

Plaintiff was severely burned in a fire which occurred at her place of employment and brought suit against her employer's landlord, the defendant. The defendant's building was in existence at the time Ordinance 87000 was enacted. Testimony at the trial indicated that the only available exit door did not open in the direction of exit and that plaintiff with others, in the confusion of a sudden, rapidly spreading and intense blaze had some difficulty escaping from the building. Judgment for plaintiff.

On appeal the higher court observed "It would seem that (defendant's) * * * contention that the Building Code was to apply only to buildings to be erected after its effective date cannot be sustained. By the express terms of the ordinance in question the old building code is amended in its entirety and everything therein contained which is not contained in the new code is repealed. * * * As the floor area exceeded 1,000 square feet, the door serving as an exit was required to open outward without reference to the use to which the premises were put. * * * The violation of such a legislative enactment may be negligence in itself if the plaintiff is one of a class of persons whom the statute was intended to protect and the harm which has occurred is of the type which it was intended to prevent. * * * (Defendant's) duty to (plaintiff) to provide a proper exit from the premises is thus established by the provisions of the Building Code."[1]

[1] Finnegan v. Royal Realty Co. 218 P. 2nd 17; 35 AC 452.

Forfeiture of Bid Bond Denied by Trial Court

A BID to construct sanitary improvements for the city was accompanied by a bid bond for 10% of the amount of the bid. The bid form furnished by the city was marked to read that a bond in the required amount was attached and "is given as a guarantee that the undersigned will execute the Agreement and furnish the required bonds if awarded the contract and in case of failure to do so within the time provided Surety's liability to the City will be established."

The contractor asked to withdraw his bid and refused to sign the contract whereupon a resolution was adopted by the city to the effect that the bond was forfeited. The city abandoned the project and subsequently another contract was let under other plans and specifications. In an action by the contractor for rescission of the bid and exoneration of the surety, the city sought to establish either a forfeiture of the bond or a case for liquidated damages. (Liquidated damages is a sum of money which parties agree shall represent the value of damages that cannot otherwise be evaluated. They may agree beforehand that certain events will result in liquidated damages arising. Actual damages differ in that they may be determined by proper evidence). Actual damages to the city were not proven at the trial.

The trial court determined that the language applicable to the bid bond was that of a guarantee only and that there was no provision for a forfeiture of the bond. Also, there was no intention or agreement that the penal sum should be treated as liquidated damages. In affirming the decision the Supreme Court said "The declaration is that of guarantee . . . Forfeitures in the nature of a penalty are not favored; and language must be so construed as to avoid a forfeiture if that is possible . . . Municipalities are not exempt from the foregoing rules in dealings with private persons . . . the guarantee measured the city's compensatory right to the extent of the actual damages only and the liability of the surety on the bid bond would thereby be deemed to be 'established' for the actual damage . . . but limited by the sum stated in the bond."[1]

Ordinarily a city may enforce a recovery if a statute or the contract declares a forfeiture, usually as liquidated damages. Here, at the time of bidding there was no such statute and the bid form did not adequately express a forfeiture.

[1] Petrovich v. City of Arcadia, 36 AC 13.

Mechanics Lien Valid To Extent of Work Done

A MECHANICS LIEN is a claim or charge on real property. It is created by statute or constitutional provision as security for reimbursement of one who has furnished materials or services to improve or repair the property. In order to take advantage of any priority accorded the mechanics lien over other liens recorded after commencement of work the staute law must be carefully observed and followed. However, the courts will usually give the statute a liberal construction in order to accomplish the main purpose of providing a suitable remedy to the unpaid materialman or laborer.

In Richter v. Walker[1] where a contractor sought a recovery for work done on a water well the court pointed out that the mechanics lien was valid to the extent of the contractor's work under the contract to drill. No recovery was allowed however for the cost of preparing the claim, this being in the nature of an attorney's fee; nor could the contractor recover the cost of a title search.

[1] Richter v. Walker, 95 ACA 546.

"Collapsible" Corporation Tax Advantage Eliminated

THE "COLLAPSIBLE" corporation has been used in construction as a tax avoidance device. It may be noted in passing that a new provision of the Federal Revenue Act of 1950 is aimed at eliminating the favorable tax consequences sought by the use of this device.

The scheme of the collapsible corporation was to "convert" profits in a project from ordinary income into a capital gain by timely incorporation and liquidation. At the outset, the corporation was created with the necessary capital. Upon completion of work but before disposal of the structure the corporation was liquidated and assets distributed. This resulted in a capital gain. The fair market value of the assets was used to determine the amount of gain. As a long term gain at least 50% of the capital asset increase would not be subject to tax. If the shareholders then disposed of the structure at the same fair market value there was no ordinary income.

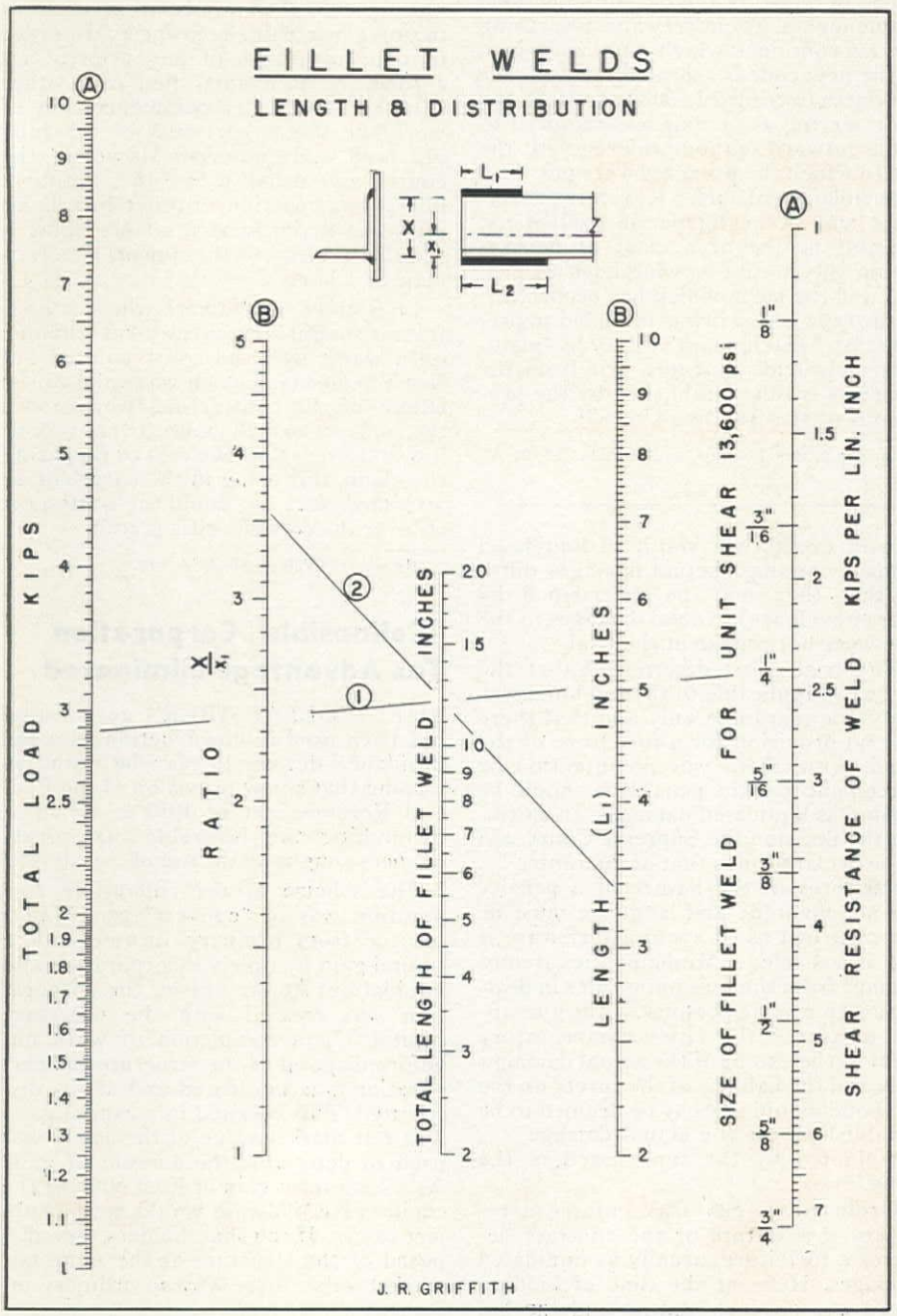
CONSTRUCTION DESIGN CHART

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

CXXVII . . . Length and Distribution of Fillet Welds

IN THE PREPARATION of the accompanying chart, the major thought in mind was to provide a quick means of determining the length and distribution of fillet welds for nonsymmetrical sections such as structural angles. It is also applicable to any symmetrical section within the load limits shown.

The allowable stress per linear inch of fillet weld is conventionally determined by the allowable unit shear taken through the throat of the weld. The AISC specifications allow a unit shear of 13,600 psi. through the throat of the weld, although other specifications may differ from this value. As an example, the 1948 Building Code of Portland, Oregon specifies an allowable unit shear of 13,600 psi. for "high stress filler metal including grades designated as 2, 4, 10 or 15," and a value of 11,300 psi. for "low stress filler metal including grades designated as 20, 30, or 40." In order to allow for possible variations in allowable stress, the right hand scale has been prepared for the allowable load per linear inch of weld. The different weld sizes have been indicated on the basis of an allowable unit shear of 13,600 psi. If the reader has occasion to use the chart for values of unit shear other than 13,600 psi., he can locate the weld sizes on the basis of allowable load per linear inch.



The usual method for determining the distribution of weld in nonsymmetrical sections, is to compute the lengths as inversely proportional to the distance from the neutral axis of the section. The AISC specification states:

> "The rivets or welds at the ends of any member transmitting stresses into that member should preferably have centers of gravity on the gravity axis of the member; otherwise, provision shall be made for the effect of the resulting eccentricity."

Solution of the accompanying chart is accomplished by the use of two straight lines intersecting on the central scale giving the total length of fillet weld. Solution lines have been drawn on the chart for the following example: Given a pair of 3- by 3- by ¼-in. steel angles placed back to back, to be used as tension members, and welded to the stem of a split-T section. It is desired to determine the length and distribution of a ¼-in. fillet weld at each end of each angle for an allowable unit shear through the throat of 13,600 psi. In order to develop the maximum capacity of the angles, on the basis of 20,000 psi., a connection must be provided for a total stress in each angle (1.44 sq. in. in section) of

$$P = 20{,}000 \times 1.44 = 28{,}800 \text{ lb.}$$

The throat area of a ¼-in. fillet weld is

$$0.707 \times 0.25 \text{ sq. in. per linear inch.}$$

Thus the ¼-in. fillet weld has a strength of

$$0.1765 \times 13{,}600 = 2{,}400 \text{ lb. per linear inch of weld.}$$

Solution line (1) has been drawn from a total load of 28.8 kips on the left hand scale, to a ¼-in. fillet weld on the right hand scale. On the central scale it will be seen that a total length of 12 in. is required, or

$$\text{Total length} = \frac{28{,}800}{2{,}400} = 12 \text{ in.}$$

Referring to the AISC Steel Construction, it is seen that for a 3- by 3- by ¼-in. angle, the distance from the back of the angle to the center of gravity is, $X_1 = 0.84$ in. Thus we have the ratio

$$\frac{X}{X_1} = \frac{3.0}{0.84} = 3.57$$

Solution line (2) has been drawn from the ratio

$$\frac{X}{X_1} = 3.57$$

Continued on page 112

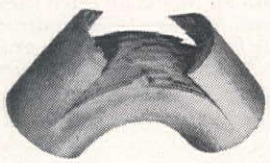
SNOW MELTING for skid-free surfaces

BYERS WROUGHT IRON

FOR MAINTENANCE-FREE PIPE

To protect motorists against the winter hazards of ice and snow, the Oregon State Highway Commission installed a snow melting system on the eight percent highway grade leading into Klamath Falls, Oregon and made additional news by utilizing hot spring water for the heating medium. The system keeps this four lane, 450 feet long section of the Dallas-California highway skid-free in all weather and rolls out a winter "welcome mat" to heavy traffic.

G. S. Paxson, bridge engineer for the OSHC, developed the unique heating system which takes advantage of hot water from natural springs underlying Klamath. A coil of two-inch pipe, submerged in the hot water at the bottom of a 310 foot well, acts as a heat exchanger to warm a mixture of ordinary water and anti-freeze solution. This mixture, after it is pumped through the well-coil where it is heated to not less than 135 degrees, flows into a network of wrought iron pipe imbedded in the concrete panels. These panels contain 15,000 feet of three-fourth-inch Byers Wrought Iron pipe. A thermostatic pump controls the system which melts up to one-inch of snow or one-tenth-inch of ice per hour. Rogers Construction Company handled the installation of the system.



WHY WROUGHT IRON LASTS

This notch-fracture test specimen illustrates the unusual fibrous structure of wrought iron—which is responsible for the unusual corrosion resistance of the material. Tiny threads of glass-like silicate slag, distributed through the body of high-purity iron, halt and disperse corrosive attack, and discourage pitting and penetration. They also anchor the initial protective scale, which shields the underlying metal.

Tapping nature's "teakettle" is a new twist in snow melting systems, but using Byers Wrought Iron pipe for this service is an old established solution to the corrosion problem. Snow melting systems, utilizing Byers Wrought Iron pipe, are currently serving in sidewalks, loading platforms, garage driveways, service station aprons, and in roadways serving both homes and industrial plants.

Wrought iron is ideally suited for this service because of its combination of essential qualities. Its corrosion resistance has been repeatedly proven over periods of many years in identical service conditions. It is easily formed and welded. Its heat emission is high. It expands and contracts at virtually identical rates with concrete. And it has ample mechanical strength to withstand damage during installation periods.

If you would like additional information, write for our Case Study, No. 4 on Snow Melting Systems.

A. M. Byers Company, Pittsburgh, Pa. Established 1864. Boston, New York, Philadelphia, Washington, Atlanta, Chicago, St. Louis, Houston, San Francisco. Export Division: New York, N.Y.

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NEWS OF WESTERN CONSTRUCTION JANUARY 1951

West Will Play Host to Concrete Institute

FOR THE FIRST TIME in its 45-year history, the American Concrete Institute will hold its annual convention on the Pacific Coast. The meeting will be held in San Francisco, Feb. 20-22, 1951, with headquarters at the St. Francis Hotel.

Plans for the convention are being arranged by a committee under the general chairmanship of Harmer E. Davis, Director, Institute of Transportation and Traffic Engineering, University of California, Berkeley. Program for the sessions will be prepared from suggestions made by a local committee for the purpose of including papers which will cover current problems of immediate concern to Western engineers and users of concrete. A special feature of this program will be a session devoted to an open discussion of practical, everyday field problems in the mixing, placing and curing of concrete.

Bureau Forecasts Bid Invitations During 1951

FACILITIES for distribution of water and power to their users will get major attention during this year's construction program of the Bureau of Reclamation. This was indicated in a forecast of construction bid invitations scheduled for issuance by the Bureau during the period until June 30, 1951.

Although the Bureau is famous for its big dams, most of the eight dams included in this fiscal year's new starts are small, designed for river regulation or diversion. The larger activities and expenditures for new work are in canal and electric transmission line construction.

The advance bulletin lists 205 mi. of canals, 451 mi. of lateral and pipe distribution systems, and 1,348 mi. of transmission lines. The Chief Engineer's office expects to issue 41 separate invitations for bids on canal and distribution systems work, and 26 on transmission line work.

Included among the canal construction jobs are 12.4 mi. of the North Poudre supply canal and an 11-mi. section of the St. Vrain supply canal of the Colorado-Big Thompson project. Four invitations will cover 50 mi. of canals for the Columbia Basin project in Washington.

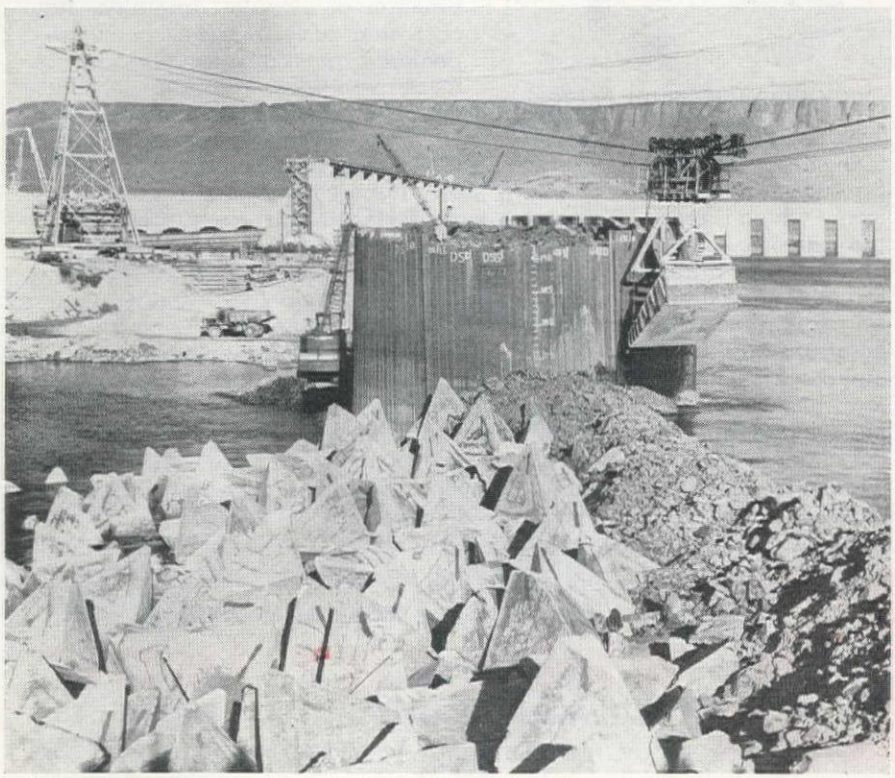
Transmission lines proposed for early action will be located for the most part in the Missouri basin states of South Dakota, Montana, and Wyoming. Most of the mileage is of 115-kv. line, but the range is from 34.5 to 230 kv.

Invitations concerning dam construction include Anchor, in central Wyoming, and Bixby, in western South Dakota. Anchor is planned as a 200-ft. high, 550-ft. long concrete structure. Bixby will be of earthfill 109 ft. high and 9,500 ft. long. Willow Creek dam, in western Colorado, is to be constructed of earthfill, 96 ft. high and 1,000 ft. long. Rattlesnake dam will be a small structure on the Colorado-Big Thompson.

The 22,000-ft. Eklutna tunnel, major feature of the newly-authorized Eklutna project in Alaska, is the subject of another invitation.

GAP CLOSED AT McNARY AS TETRAHEDRON FILL HOLDS FIRM

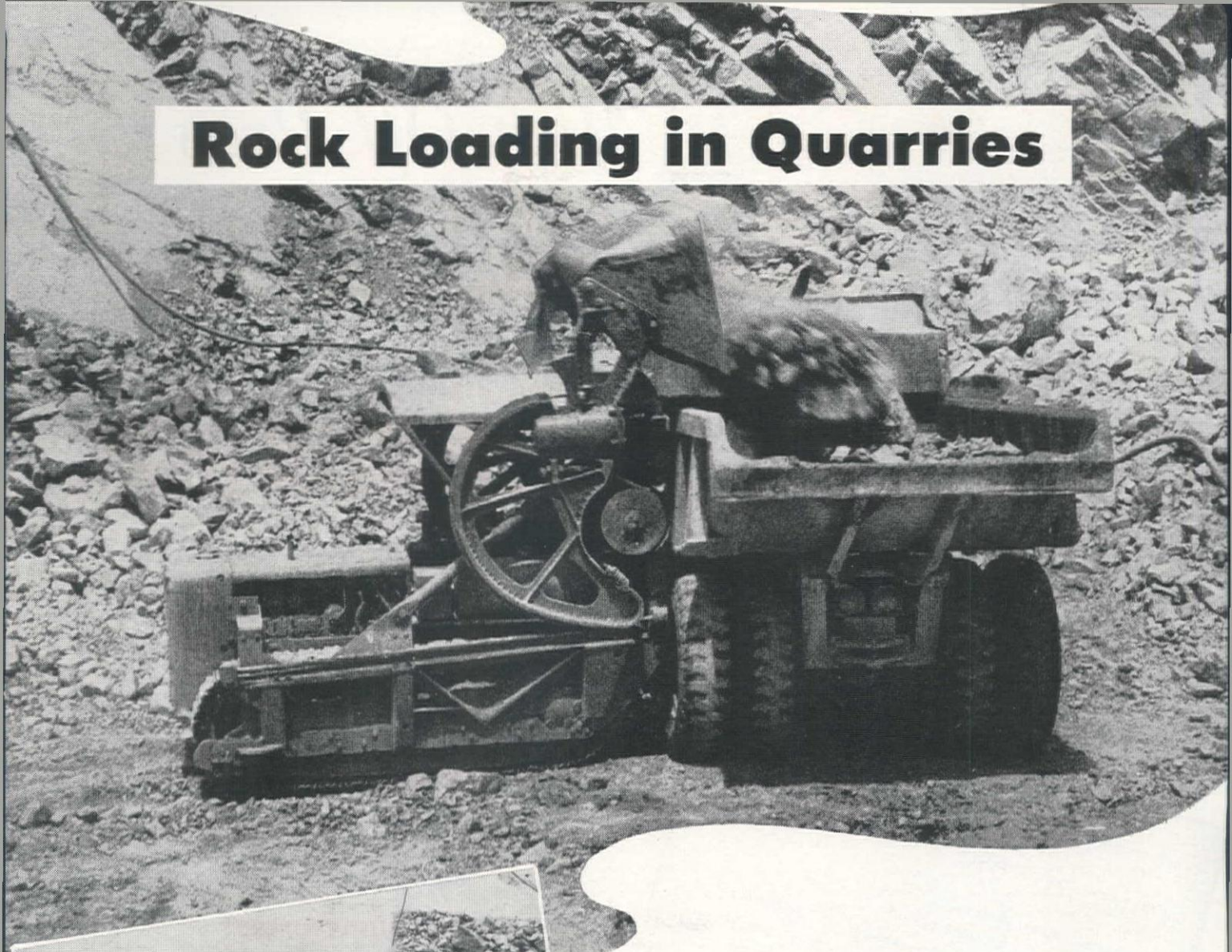
THE MOST DIFFICULT river diversion ever attempted—closure of the Oregon shore cofferdam at McNary Dam on the Columbia River—ended in success late November. More than 2,000 precast concrete tetrahedrons (pyramid-shaped) blocks, each weighing 12 tons, were dropped by cableway into the 240-ft. wide and 80-ft. deep channel to cut off a flow of 100,000 cfs. The upstream face of the diversion dam is being sealed with layers of rock spalls, gravel, sand and clay until all flow is diverted through the spillway section of the dam on the Washington shore. McNary Dam Contractors (Atkinson-Ostrander-Jones) accomplished the job on the Corps of Engineers project. Diversion details were previewed on page 75, October 1950 *Western Construction*.



Truck Highway Proposed From Northwest to Alaska

IMMEDIATE construction of a heavy-duty truck highway from the Pacific Northwest to Alaska to serve the needs of national defense was strongly urged last month following a meeting of the Executive Committee of the Western Highway Institute at San Francisco. The committee, headed by O. R. Craven, Pocatello, Idaho, as chairman, voted support for the project, stressing the uncertainty of world conditions today, particularly in the Far East, as the top reason for all possible speed in building the road. Craven pointed out that at present Alaska can only be reached by sea or air, or over the inadequate 1,523-mi. Alaska Highway that runs from Fairbanks, Alaska, to Dawson Creek, B. C., feeding into the U. S. at Great Falls, Montana.

Rock Loading in Quarries



Hard Rock loading in quarries, mines or on construction jobs is handled easiest, fastest and cheapest by the 104 Eimco RockerShovel.

The 104 is extremely heavy-duty in construction, is easy to operate and is faster in loading than other equipment.

RockerShovels do not turn to dump, thus eliminating the high maintenance of track rollers and track shoes.

There are many other advantages in owning an Eimco 104. Write for more information.

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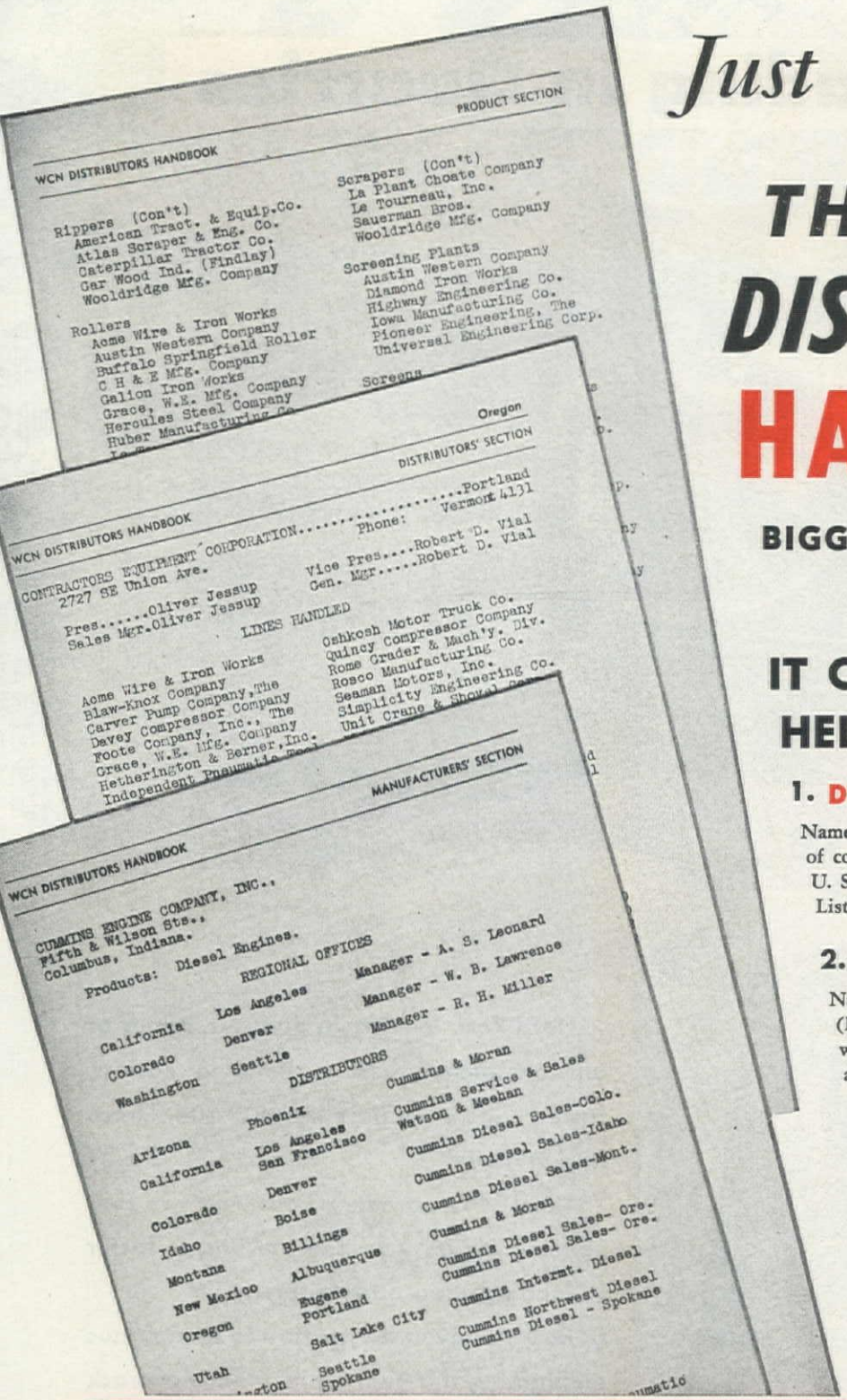

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Names, addresses and phone numbers of distributors of construction equipment in the Western half of the U. S., the lines they handle, names of their branches. Listing is alphabetical by states.

2. MANUFACTURERS

Names of construction equipment manufacturers (listed alphabetically for entire U. S.), together with products, locations of their Western branches, and names of their Western distributors.

3. PRODUCTS

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They're extra sturdy, extra tough . . . *engineered* to do the *big jobs* almost anywhere.

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***FIRST* IN TRUCK-TRAILER TRANSPORT!**

PERSONALLY SPEAKING

William G. Sloan, nationally known Reclamation engineer and author of the original "Sloan Plan" for multi-purpose resource development of the 10-state Missouri River Basin, has been awarded the Department of the Interior Gold Medal for distinguished service, it was announced recently. Sloan retired from active duty December 31.

* * *

George W. Marx, director of the Arizona State health department bureau of sanitation, has been named chairman of the Colorado Basin Engineers' advisory council. The council was organized recently to conduct a pollution control program in the seven states comprising the Colorado River Basin.

* * *

Lt. Col. William R. Shuler has been appointed Los Angeles District Engineer, Corps of Engineers, succeeding **Brig. Gen. Walter D. Luplow,** recently reassigned to command an engineer brigade at Camp Rucker, Ala. Shuler, a native of Texas and a resident of California at the time he was appointed to West Point in 1932, has been assigned to Army duties in Hawaii since 1948. He assumed his new duties in November.

* * *

Chester M. Poor, formerly with Morrison-Knudsen Co., Inc., on work in Kennewick, Wash., is now chief of party with M-K on city paving and sewer work in Ketchikan, Alaska.

* * *

Wheeler S. Edwards, 65, Oakland, Calif., park department civil engineer, has retired after 28 years of service with the city.

* * *

William J. Quinn has been appointed field engineer on the relocation work around Trenton Dam and Swanson Lake, Nebraska, it was recently announced by Ellis L. Armstrong, construction engineer in charge of the $25,000,000 Bureau of Reclamation project. Quinn will be in charge of the construction of 19 mi. of rail line of the CB&Q Railroad between Chicago and Denver, 15 mi. of U. S. Hwy. 34, and 10 mi. of county roads. This work will cost about $7,000,000. Quinn has been with the Bureau continuously for 23 years, and was construction engineer in charge of all operations at Medicine Creek Dam for the past 1½ years.

* * *

Arthur S. Horner, president of the A. S. Horner Construction Co., Denver, has been nominated for vice-president of the Associated General Contractors of America in 1951, AGC President Walter L. Couse announced recently. Horner has been president of the Colorado Contractors Association, chairman of the national association's heavy construction and railroad contractors division, and a member of the executive and other committees. He received a degree in civil engineering from the University of Colorado in 1922. After working as an inspector, engineer, and assistant superintendent on various construction projects after graduation, he established his own company in 1927.

* * *

L. J. Sullivan has been elected to the office of president and general manager of Johnson Western Constructors, it was announced recently by **Wm. A. Johnson,** chairman of the board of directors. Sullivan succeeds **Eldon Smith,** who resigned from the company to accept the executive vice-presidency of the Citizens National Bank, Riverside, Calif. **Nick R. Saunders** remains vice-president in charge of the Gunite Division of the company. **Earl Corkett** has come into the company as a vice-president. The firm is a general, marine, and gunite contractor operating principally in the West with offices in San Pedro, San Diego, and Oakland, Calif.

* * *

J. M. Sturgeon, formerly resident engineer for District V, California Division of Highways, on the Granite Construction Co. contract at Salinas, is now doing amphibian engineering work with the Corps of Engineers at Fort MacArthur, Calif. He is a first lieutenant.

* * *

Ralph C. Jones, supervising highway engineer, federal section in the Denver Division Office, Bureau of Public Roads, retired on November 6 after 36 years with the federal government. Since 1920 he has been with the Bureau of Public Roads at Albuquerque and Phoenix, and since 1925, in Denver.

* * *

Hugh P. Crawford, formerly field engineer on the Klamath Project, Klamath Falls, Ore., for the Bureau of Reclamation, has been transferred to Ephrata, Wash., where he is working in the lateral design section for the Bureau.

* * *

LeRoy B. Russell, senior civil engineer formerly with Sverdrup & Parcel, Inc., consulting engineers, San Francisco, is now engaged in the administration, planning, and design of irrigation networks for the Bureau of Indian Affairs, Washington, D. C.

* * *

C. M. Slusser, formerly city engineer of Ft. Morgan, Colo., has recently joined Miner and Miner, consulting engineers in Greeley.

* * *

Donald R. Alexander is the recently-appointed acting construction engineer in the Bureau of Reclamation's Sacramento Valley District. Alexander joined the bureau in 1936 at Taylor Park Dam in Colorado and has aided in the building of Imperial Dam, Arizona. **William C. Bouett,** formerly principal inspector at Keswick Dam, California, will serve there as acting field engineer, the post vacated by Alexander.

* * *

John S. Marshall, widely known Colorado engineer and president of the Colorado Section of the American Society of Civil Engineers, retired recently from his job as engineer of surveys and plans for the state highway department. Except for a four year period of service with the Corps of Engineers in the last war, Marshall has been with the highway department since 1919.

* * *

Joseph R. Searcy is the 59th employee on the Columbia Basin Project to be called for active duty since the outbreak of the Korean crisis. He left Coulee Dam early in November, bound for Seattle where he will be assigned for active duty with the Seabees. Searcy, 56, was called the "grandpop" of Navy CB's in the Pacific during the last war.

* * *

Edward L. Champion, vice president of Gibbs & Hill, Inc., New York City, since 1940, assumed charge of the company's West Coast activities on December 18, with headquarters in Los Angeles. Champion is a graduate of California Institute of Technology. He returns to California after 25 years of engineering service in the utility and industrial fields in the United States and foreign countries.

CALENDAR OF MEETINGS

Jan. 18-20—Colorado Society of Engineers, annual convention, at Shirley-Savoy Hotel, Denver.

Jan. 19-20—Intermountain Branch of A.G.C., at Hotel Utah, Salt Lake City.

Jan. 24-26—Third California Conference on Street and Highway Problems, at Berkeley campus of University of California. Contact Ralph Wadsworth, City Engineer, San Francisco.

Jan. 25—Idaho Branch of A.G.C., at Hotel Boise, Boise.

Jan. 26-27—Colorado Contractors Association, at Shirley-Savoy Hotel, Denver.

Jan. 26-27—Pacific Northwest Branch of A. G.C. (members from Oregon, Washington, Idaho and Montana), at Olympic Hotel, Seattle, Wash.

Jan. 28-Feb. 1—Associated Equipment Distributors, 32nd annual meeting, at Stevens Hotel, Chicago. Contact F. J. Fitzpatrick, Parker-Danner Co., Hyde Park, Mass.

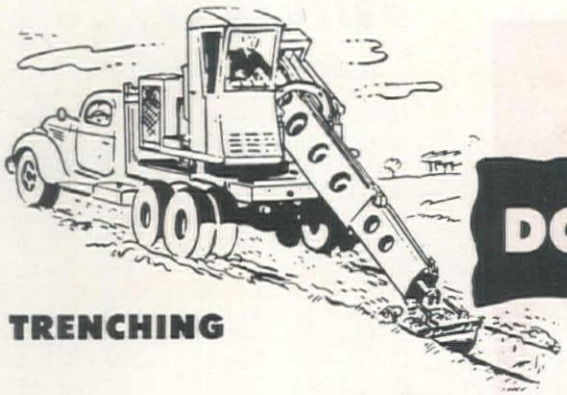
Feb. 20-22—American Concrete Institute, annual national convention, at St. Francis Hotel, San Francisco.

Feb. 26—March 1—Associated General Contractors, annual national convention, at Statler Hotel, Boston, Mass.

Feb. 28-March 1—American Concrete Pressure Pipe Asociation, 2nd annual convention, at Waldorf-Astoria Hotel, New York City.

March 1-3—American Concrete Pipe Association, 43rd annual convention, at Waldorf-Astoria Hotel, New York City.

March 12-14—American Road Builders' Association, annual meeting, at Schroeder Hotel, Milwaukee, Wis.



TRENCHING

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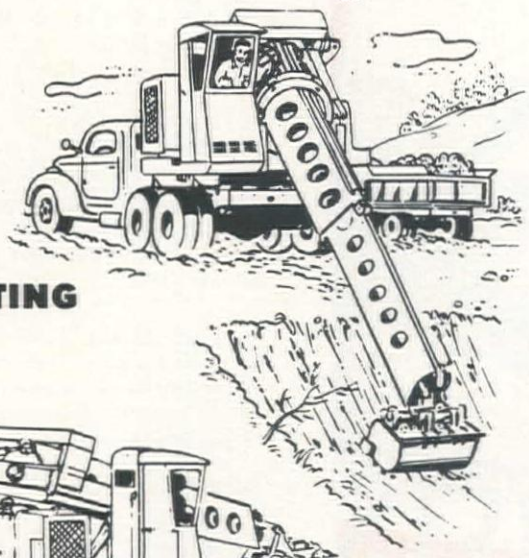

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OBITUARIES . . .

Erle Claypool Caldwell, 75, associated with the construction industry for more than 50 years, died recently in Prineville, Ore. Beginning his construction career with the Denver and Salt Lake Railroad, he ran some of the original surveys across the Rockies and was in charge of construction of many tunnels of the old Moffet Line. In 1916 he became a partner in the L. R. Wattis Co. of Salt Lake City, and then vice president and general manager of Caldwell Construction Co. He built many miles of railroad for the Southern Pacific, the Union Pacific and the Denver & Rio Grande. More recently he has been associated with the Utah Construction Co., the Army Port Contractors of Oakland, and the Macco Construction Co. in the Oakland-San Francisco area.

* * *

Louis F. Erb, 68, deputy registrar of the Contractors State License Board, died in San Francisco on Dec. 16 of a heart attack.

* * *

Paul Clark, associate engineer and structural plan examiner, Seattle city building department, died November 28 after a 5-month illness. A civil engineering graduate of the University of Washington, he had been with the building department for more than 20 years.

* * *

Merle H. Godwin, 53, senior bridge engineer of the California Division of Highways, died suddenly at his home in Sacramento October 28. He was head of the bridge maintenance and investigation section for all structures on the state highway system. At the time of his death he was chairman of the national committee on bridge maintenance of the Highway Research Board.

* * *

D. O. Harrelson, Jr., 76, former president of the Duncanson-Harrelson Co., Richmond, Calif., died October 13 at his home. He retired from the wharf building and heavy construction firm 4 years ago.

* * *

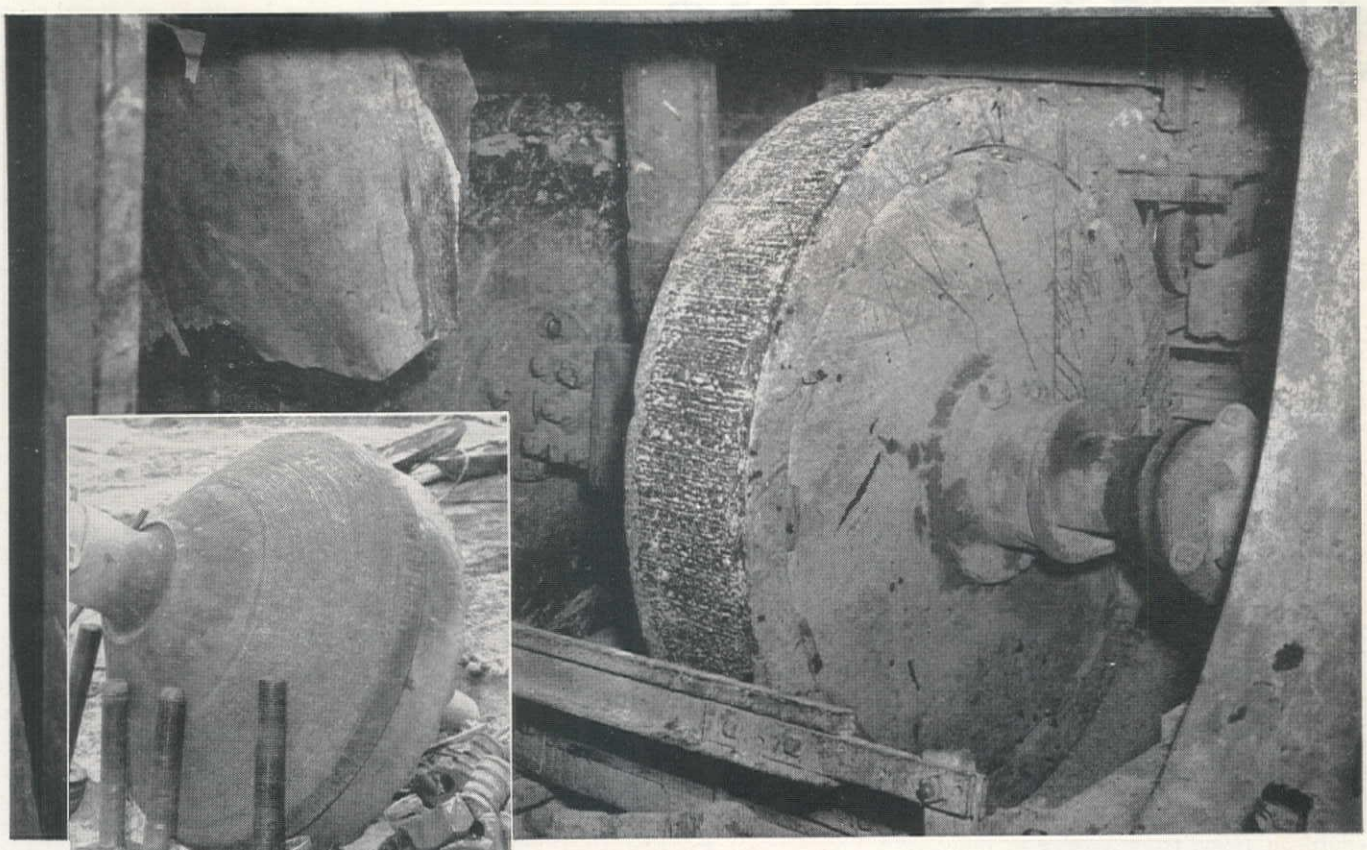
James L. McLaughlin, San Francisco contractor, died at his home on November 24. He had been engaged in contracting in San Francisco since the fire and earthquake of 1906, and built the Ahwahnee Hotel in Yosemite National Park.

* * *

Robert A. Brown, 63, senior highway engineer in charge of design division, Bureau of Public Roads in Coeur d'Alene, Idaho, died recently in Boise. He was associated with the Bureau for 40 years.

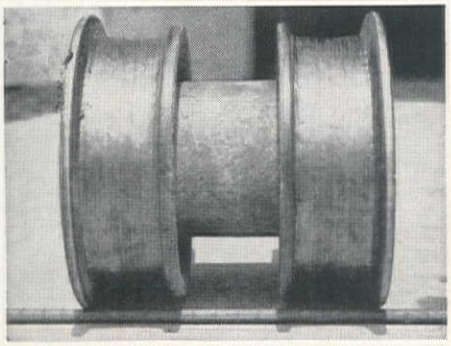
* * *

William H. Petersen, 53, principal structural engineer in the school section of the Division of Architecture for Northern California, died in Sacramento November 11, from a heart attack. At the time of his death he was president of the Central California Structural Engineers' Association.

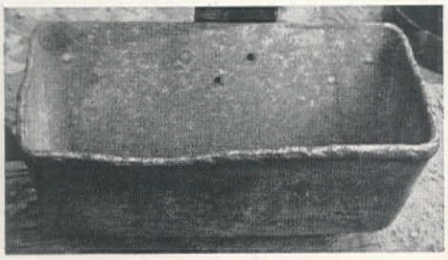


MULLER TIRES last indefinitely when hard-faced occasionally with transverse stringers of Stoody Self-Hardening 21. If badly worn, first rebuild with Stoody Manganese or Stoody High Carbon.

CRUSHERS, including gyratory mantles, jaws and roll types continue to operate when built-up with Stoody Manganese and hard-faced with Stoody Self-Hardening 21. Gyratories and roll types are easily hard-faced automatically.



TRACTOR PARTS, such as rollers, idlers, pads, etc., easily outlive several new parts when wearing areas are kept protected with Stoody 1027. Automatic application cuts costs on many parts.



CONVEYOR BUCKETS When lips are protected with Stoody Self-Hardening, conveyor buckets continue to carry full payloads long after ordinary buckets are reduced to partial efficiency or worn beyond further use.

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SUPERVISING THE JOBS

Jack Myers is general superintendent on the U. S. Pipe and Foundry Co. plant at Decoto, Calif., a $1,000,000 job now under way. For Austin Co., contractor, **Roy Kefauer** is engineer, **Frank F. Lindahl** is general carpenter foreman and **Jack Morgan** is carpenter foreman. **Jack Collinson** is general labor foreman. Work is scheduled for completion August 1951.

* * *

L. W. Stevens is superintendent and **Frank Aime** is assistant superintendent for Carl N. Swenson Co., San Jose, Calif., contractor for the $131,457 construction of sheet aluminum buildings at Mt. Shasta Fish Hatchery.

* * *

Sid Ponath is superintendent, **Wayne Manson** is office manager, and **Carl Bolme** is master mechanic for McLaughlin Construction Co., Great Falls, Mont., on a $3,790,000 contract for surfacing the Richardson Hwy. from Valdez to mile 36, Alaska, by the Alaska Road Commission.

* * *

William J. Rowland is superintendent, **Archie Edmonds** is grade foreman, and **William J. Slate** is bridge foreman for Fredrickson Bros., Emeryville, Calif., on a $946,610 contract for 4.4 mi. grading and plant-mix surfacing on cement treated base on state highway work in Humboldt Co., Calif.

* * *

Cecil Kenyon is superintendent for the Dudley Construction Co., Great Falls, Mont., on a $598,000 contract for state home for the aged at Lewistown, Mont.

* * *

Dick Babler and **Howard McInroe** are superintendents for the Babler Bros. and Rogers Construction Co., Portland, Ore., holder of the $1,884,000 contract for surfacing of 52 mi. of Alaska Hwy. from Big Delta to Sears Creek, Alaska. Work is scheduled to begin April 1951 and be completed October 1952. **Ben Woods** is office manager and **J. Folston** is engineer.

* * *

W. J. Widmer is superintendent, and **H. Havgen** is office manager for joint venturers Morrison-Knudsen Co., Inc., Boise, Idaho, and Peter Kiewit Sons' Co., Omaha, Neb., holders of the $3,582,000 contract for construction of warehouse buildings at Fort Richardson, Alaska.

* * *

Lee H. Gordon is superintendent and **Bert Soucie** is office manager for Kuckenberg Construction Co., Portland, Ore., on the $1,701,000 contract for 2 mi. of Grand Ave. interceptor unit of the Portland sewer project. **Jack Cassidy** is mechanical superintendent. Foremen include **M. C. Henderson, Wallace Powell, Robert Stevens,** and **Elis Anderson.**

* * *

N. W. Axline is job superintendent for Tiffany Construction Co., Phoenix, Ariz., on a $126,800 contract for highway work on East Broadway Road, Phoenix. **A. C. Simson** is plant engineer.

* * *

Lorus Palfreyman is superintendent and **Grant Hicken** is foreman for W. W. Clyde & Co., Springville, Utah, holder of a $344,000 contract for construction of Skull Rock Pass Road in King Canyon, Millard Co., Utah.

* * *

N. W. Pettijohn is project manager and **E. I. Pettijohn** is general superintendent for Pettijohn Engineering Co., Portland, Ore., on construction of the Maupin-Detroit 230-kv. transmission line. **William T. Monahan** is job engineer for the $225,800 contract.

* * *

R. S. "Spatz" Bowsfield, for many years superintendent on outside construction for the V. R. Dennis Construction Co., of San Diego, Calif., has been promoted to full charge of the contractor's quarry, rock plant, and hot mix plant. Bowsfield is one of the best known construction men in the area.

BOWSFIELD

HUXTABLE

F. J. Huxtable is superintendent for the T-S Construction Engineers, Inc., holder of the contract for work on the $5,000,000 May Co. building at Lakewood, Calif., near Los Angeles. **Joe Collins** is assistant superintendent and **J. Dashiell** is foreman. Work began October 16, 1950, and is slated to end in November 1951.

* * *

W. N. Evans, project manager, and **K. L. Parker,** chief engineer; **William Jones,** rigging superintendent; **Mel Prout,** electrical superintendent, and **J. P. Williams,** engineer, have arrived at Chief Joseph damsite to do preparatory work for the recently awarded $25,000,000 contract for second stage construction of Chief Joseph Dam. Members of the contracting firm are the Arundel Corp., Baltimore; L. E. Dixon Co., San Gabriel; Hunkin-Conkey Construction Co., Cleveland, and American Pipe and Construction Co., South Gate.

* * *

Leo Jones is superintendent for Peter Kiewit Sons' Co., Longview, Wash., holder of a $1,352,345 contract for construction of the Cowlitz River Bridge at Kelso, Wash. **Bud Copeland** is concrete superintendent and **Carl Short** is job engineer. **Hank Keith** is job office manager and **Hymie Jonas** is yard foreman.

* * *

M. Sorensen is superintendent for Bennett and White Edmonton Ltd., Edmonton, Alberta, on a $2,348,000 contract for construction of an apartment project in Edmonton, Canada. Other key men include **George Williscroft** and **E. Thordahl.**

* * *

Harold R. Burk and **Fred Lang** are superintendents for H. G. Carl Construction Co., Salem, Ore., on a $285,000 contract for enlarging Richmond and Highland grade schools, Salem.

* * *

Wendell Fedricks is job superintendent and **W. H. McNeal** is general superintendent for Peter Kiewit Sons' Co., Sheridan, Wyo., on a $721,000 contract for 38 mi. of highway work between Idaho Falls and Twin Buttes, Idaho, by Atomic Energy Commission. **Jess Willis, Gene Thurston,** and **Frank Fisher** are foremen. **Francis Evans** is master mechanic.

* * *

Dean P. Stone, job superintendent for the Raymond Concrete Pile Co. on the International Harvester New Parts Depot contract at Milwaukie, Ore., was recently transferred by the firm from the San Francisco Bay Area.

* * *

H. J. "Jack" Kribs is general superintendent and **Charlie Young** is foreman for R. H. Parr & Son of Los Angeles, contract for a $300,000 Department of Employment building for the State, at Long Beach, Calif.

* * *

W. Lenser is superintendent for Louis C. Dunn, Inc., Los Angeles, contractor on the $550,000 new Long Beach store for J. J. Newberry Co. **L. Davis, Jr.** is labor foreman. **Jack E. Wilcox,** Huntington Park, is the excavator.

* * *

R. R. "Dick" Thomas is general superintendent and **Frank Atkinson** is foreman for Malven and Nicholas, Los Angeles, contract holder for $250,000 work on Safeway Store branch, Azusa, Calif.

* * *

Frank Backman is the general construction superintendent and **W. F. Bort** the construction manager for Kaiser Engineers, division of Kaiser Industries, Inc., on the $5,700,000 expansion program at the Mead reduction works of Kaiser Aluminum and Chemical Corp.,

Spokane. The work includes a new potline and carbon baking building, as well as storage tanks and additional buildings.

* * *

C. B. Saunders of San Diego, Calif., was contractor on tennis court construction at the La Jolla, Calif., community center. **Sidney L. Wilson** is superintendent. Work on the project was recently completed (see *Western Construction*, November 1950, pg. 80).

* * *

Joe Doug is superintendent and **Wilbur Purdin** is general superintendent for the Harris Construction Co., Fresno, Calif., holder of the $430,000 contract for construction of frame and stucco school building at Fresno.

* * *

D. R. Peterson is job superintendent for A. V. Peterson, Portland, Ore., on a $533,000 contract for reinforced concrete gymnasium and school addition in Portland. **D. A. Trulsen** is engineer and **Phil Brooks** is carpenter foreman.

* * *

Ray Spangler is superintendent and **Foy Pickering** is general superintendent for Fisher Contracting Co., Phoenix, Ariz., on $284,000 of grading and alignment of the Superior-Miami Highway, Arizona.

* * *

Adolf G. Schmid is superintendent and **Emerson Eames** is project manager for Vinnell Co., Inc., Alhambra, Calif., on a $1,250,000 contract for steel frame building and warehouse at El Segundo, Calif. **A. J. Huber** is general foreman.

* * *

Roy Smith is superintendent and **Andy Gumpertz** is general superintendent for McGuire and Hester, Oakland, Calif., for $277,000 installation of section 2 of Alameda interceptor sewer, by East Bay Municipal Utility District.

* * *

S. O. Ponath is job superintendent and **Wayne Manson** is office manager for McLaughlin, Inc., Great Falls, Mont., holder of a $3,790,000 contract for grading and bituminous surfacing of 34 mi. on section H of the Richardson Hwy. in Alaska. **John McLean** is engineer and **Carl Bolme** is master mechanic.

* * *

E. C. Williams is superintendent for J. A. Terteling & Sons, Inc., Boise, on a $1,043,000 contract for earthwork and concrete lining of Main Canal, Columbia Basin Project. **Roy King** is engineer and **George T. "Duke" Brown** is office manager.

* * *

Nick Badavinus is superintendent and **Joe Penka** is office manager for J. A. Terteling and Sons, Boise, on a $484,000 contract for construction on West Canal, Columbia Basin Project, 6 mi. south of Quincy, Wash.

* * *

Victor J. Scalzo is manager and **Robert J. Scalzo** is project engineer for Thos. Scalzo Co., Seattle, Wash., contractor on $222,000 Des Chutes Basin, Unit No. 2 at Olympia, Wash., involving earthwork, rip-rap, and a bridge. **Primo Raghianti** is job superintendent, and **George Ralph Curtin** is master mechanic.

* * *

Cliff Rhodes is superintendent and **Milton Gerstenberger** is general superintendent for W. J. Disteli, Los Angeles, holder of the $555,000 contract for construction of a school building at Montebello, Calif.

* * *

J. W. Harryman is superintendent for M. J. Brock & Sons, Inc., Los Angeles on a $1,000,000 contract for office and laboratory, and sewage treatment facilities at Arco, Idaho, for the Atomic Energy Commission. **W. W. Lassetter** is job purchasing agent.

* * *

Art Platt is superintendent for W. D. Zavalas, Oroville, Calif., on right-of-way clearing on the Spokane-Hot Springs transmission line in Sanders County, Montana, a $222,925 project.

* * *

Roswell E. Brown is now supervising construction of a dam for S. J. Groves and Sons Co., Shadehill, S. Dak., on the Eden Project in Wyoming.

* * *

Matt Andrews and **John Pehar** are job superintendents for Bosko Construction Co., Los Angeles, on the Valley Boulevard sewer project in Los Angeles. **Pete**

Maich is assistant superintendent; **Pete Kristovich,** purchasing agent; and **Jo Brinton,** foreman, on the $259,323 job.

* * *

Supervising construction for Kenneth Witt, Payson, Utah, on the Lehi elementary school is **Richard A. Massae. Marion Elmer** is carpentry foreman, and **Karl Flygare,** steel foreman on this $573,800 job in Lehi, Utah.

* * *

W. W. Von Canon is job superintendent for Oliver, Blumhagen, Walker, and Von Canon, Sandpoint, Idaho, on a clearing operation on 27.7 mi. of the Lake Pend Orielle section of the Spokane-Hot Springs transmission line. **D. W. Blumhagen** and **D. D. Walker** are construction superintendents for schedules I and II of the $334,790 project, and **Russel Oliver** is construction superintendent for schedule III.

* * *

Jeff McMullen is job superintendent and **Chester Nelson** is superintendent for the Griffith Co., contractor on the San Diego Mission Valley Freeway, Calif. **Ray Preston** is project manager. **Fred Cody** is master mechanic.

* * *

Ole Evans is superintendent for the Griffith Co., contractor on the $4,000,000 Catholic University project in San Diego, Calif.

* * *

Robert J. Kallander is superintendent and **L. E. Frank** is carpenter foreman for M. H. Golden Construction Co. on the $1,000,000 San Diego Federal Building and Loan Co. office building.

* * *

Dale Lockett is superintendent for Central States Construction Co., Inc., San Francisco, Calif., holder of the $380,000 contract for a hospital at Corning, Calif.

* * *

J. M. Heckat is superintendent for O'Connor Brothers, contractors on bridge work between Chico and Red Bluff, U. S. 99, Calif. **M. Spiglemire** is project manager.

* * *

J. D. Patterson is superintendent for Hass Pipeline Construction Co., contractor on sewer and water work for the cities of Mt. Shasta, Chico, Oroville, Yreka, Marysville, and Redding in northern California.

* * *

Walter Webber is superintendent and **Bill Schulz** is assistant superintendent for Todd Building Co., contractor on the $270,000 new school building for Roseburg, Ore.

* * *

F. L. "Pops" Lilley is excavation superintendent for the United Concrete Pipe Corp.-Vinnell Co., Inc., contract for $3,067,000 in work on the Delta-Mendota Canal and Firebaugh Wasteway, Central Valley Project, Calif. **Barney Apgar** is concrete superintendent, and **E. E. "Beachhead" Davis** is bridge superintendent. **H. S. Porter** and **L. J. Tannassy** are engineers, and **L. H. "Herb" Franklin** is office manager. **Phil Stovall** is carpenter superintendent and **Lud Hora** is master mechanic.

* * *

A. J. Sturney is superintendent and **Robert Sturney** is assistant superintendent for Johnson, Drake & Piper, Inc., contractor on the $5,449,000 Tracy, Calif., Vocational Institution building for the California Division of Architecture. **"Buck" Brenner** is office manager, **Lee Rathbone** is engineer, and **"Chuck" Loudon** is carpenter foreman.

* * *

Bob Ewing is superintendent and **John R. Reiff** is project manager for Donald M. Drake Co., Portland, Ore., contractor on the $425,000 Sisters of Mercy hospital addition at Roseburg, Oregon.

* * *

Hal Harris is superintendent for J. D. George Co., on a $59,000 contract for water and sewer line work for Odessa, Texas.

* * *

Ray Parker is superintendent for Jackson and Parker, on $98,000 in road work for Parker Heights, Inc., Odessa, Texas.

* * *

John P. Beck is superintendent and **Kenneth Collins** is project manager for William Collins and Sons, Inc., and Archie Campbell, joint venturers on a 3,000,000-cu. yd. dirt excavation subcontract from Guy H. James Construction

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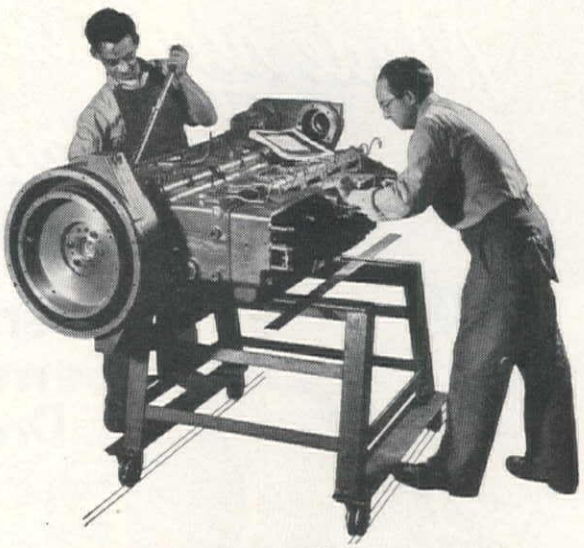

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Co., prime contractor on Stage I work for Oahe Dam, Pierre, South Dakota. **Gaylord Boe** is engineer. Work began July 1950 and is scheduled for completion August 1951.

* * *

Burton C. Walker is job superintendent and **R. W. Brant** is project manager for the Hermann Co., Los Angeles, on a $330,790 construction project of a reinforced concrete building in Pasadena, Calif.

* * *

Henry Harbordt is supervising construction for Robert E. McKee, West Los Angeles, on the $2,000,000 steel and reinforced concrete building for the California Institution for Women at Corona, Calif. **Frank Anding** is chief engineer. **W. L. Eatinger** is in charge of purchasing.

* * *

Hugh Coker is general superintendent for Daley Construction-Acme Materials Company, Phoenix, Ariz., on a $399,843 highway project in Pima County, Arizona. **C. C. Daniels** is job superintendent; **Willis Smith** is equipment superintendent; and **E. R. McCutchan** is grade foreman.

* * *

Supervising construction on the Bismarck and Washburn substations for the Valley Engineering and Construction Co., Grand Forks, N. Dak., is **Oscar J. Schill.** The $253,415 job is a part of the Missouri River Basin Project.

* * *

Woodrow Morrow is superintendent for Fred Hall and Son on $330,000 in highway work north of Waco, Texas, by the Texas Highway Dept.

* * *

F. W. Bellows is superintendent for Tom Connelly, contractor on $37,000 M-K-T Railroad relocation for Whitney Dam, Whitney, Texas.

* * *

H. R. Ward is superintendent for Reynolds and Huff, contractor on $169,000 street and highway work at Tyler, Texas.

* * *

Leslie Massey is superintendent for Cage Bros., contractor on $379,000 grading and highway work from Cisco to Eastland, Texas.

* * *

Turk Wollen is superintendent for Wesley Hall, contractor on $41,000 work for Texas Highway Department at Colorado City.

Construction Design Chart

. . . Continued from page 98

through the intersection on the central scale giving a required length of $L_1 = 3.36$ in. By formula we would have

$$L_1 = \frac{L}{X/X_1} = \frac{12}{3.57} = 3.36 \text{ in.}$$

The length of the weld on the other side of the angle would then be $L_2 = 12 - 3.36 = 8.64$ in.

NEW BOOKS . . .

THE FONTANA PROJECT — A technical report published by the Tennessee Valley Authority, Knoxville, Tennessee. 706 pages, 6 x 9. Price $2.50.

This review covers the planning, design, construction and initial operation of the Fontana project on the Little Tennessee River by the TVA. The report covers in detail preliminary investigations for the project, including geology and river flow; dam and powerhouse design; construction methods, including construction plant, river diversion, employee housing and access facilities; relocations and adjustments in the reservoir area; initial operations; and a complete summary of the project costs. The book should be of interest to all engineers and contractors engaged in the building of large dams.

* * *

PROCEDURE HANDBOOK OF ARC WELDING DESIGN AND PRACTICE—Published by the Lincoln Electric Company, 12818 Coit Road, Cleveland, Ohio. 1,200 pages, 6 x 9. Price $2.00.

This is the ninth edition of a famous book on arc welding practice. New design data have been included to make the handbook more helpful to designers of welded machines and structures. Latest procedures are given for welding all metals and alloys commonly welded with manual open arc and hidden arc welding as well as automatic and semi-automatic hidden arc welding. A new chapter on weldability has been written to present a comprehensive survey of this important subject. The section on structural design has been enlarged and revised to include more information on welded rigid framing. The machine design information in the handbook has also been enlarged to include more information on the welded design of machine tools. A new chapter has been added on welded design data. This chapter presents the fundamentals of welded design for both machinery and structures. More than 1,300 illustrations and drawings are included in the handbook.

* * *

ELEMENTARY THEORY AND DESIGN OF FLEXURAL MEMBERS — By Jamison Vawter and James G. Clark. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 215 pages, 6 x 9. Price $4.00.

This book presents the basic theory of flexure as applied to the design of members in bending. The major structural materials—steel, timber and concrete—are covered. Although separate chapters treat the use of different materials, this book shows that the same basic laws govern any of the common materials, indicating that there are no fundamental differences in the analysis if the material is applicable. However, certain special peculiarities of the various materials are taken into consideration. For instance, in the chapter on reinforced concrete, mention is made of the effects of time yield in order to agree with present specifications.

Contracts . . .

A Summary of Bids and Awards For Major Projects in the West

Alaska

$532,382—**City Electric Co.,** Anchorage—Low bid for construction of outside utilities for A.A.C.S. facilities at Elmendorf air force base; by Corps of Engineers.

$1,358,006—**Max J. Kuney Co.,** 120 Ralph St., Spokane, Wash.—Contract for construction of Section B-1, Seward-Anchorage highway; by Bureau of Public Roads.

$430,456—**Keil & Peterman Co.,** Seward—Contract for construction of Alaska forest highway, consisting of grading Glacier highway; by Bureau of Public Roads.

$1,054,413—**Manson Construction & Engineering Co., and Osberg Construction Co.,** 821 Alaskan Way, Seattle, Wash.—Contract for construction of Section A-1, Seward-Anchorage highway; by Bureau of Public Roads.

$4,224,445—**Morrison-Knudsen Co., Inc., and Peter Kiewit Sons' Co.,** Hoge Bldg., Seattle, Wash.—Low bid for construction of central heating and power plant at Eielson air force base; by Corps of Engineers.

$3,699,900—**Patti-MacDonald Construction Co.,** 3829 W. Pine Blvd., St. Louis, Mo.—Low bid for construction of 35 eight-family buildings at Fort Richardson; by Corps of Engineers.

$287,000—**Seattle Construction Co.,** 101 Nickerson St., Seattle, Wash.—Low bid for construction of a railroad bridge and approaches spanning 20-Mile River at Portage; by Alaska Railroad.

$206,496—**J. J. Badraun,** 109 N. 122nd St., Seattle, Wash.—Contract for construction of the Lowe and Indian River bridges; by Alaska Road Commission.

Arizona

$308,846—**H. L. Royden,** P. O. Box 3707, Phoenix—Contract for construction of a portion of the Topock-Kingman highway; by State Highway Commission.

California

$1,386,029—**O. E. Anderson,** 1075 N. 10th St., San Jose—Contract for construction of a technical high school, San Jose; by San Jose Board of Education.

$303,975—**P. & J. Artukovich,** 13305 S. San Pedro St., Los Angeles—Contract for construction of Section 3 of the Alameda Interceptor; by East Bay Municipal Utility District.

$3,634,000—**Clinton Construction Co.,** 923 Folsom St., San Francisco—Contract for construction of the 13-story University of California Merical Sciences Building, at 3rd and Parnassus Ave., San Francisco; by Board of Regents.

$617,931—**L. A. & R. S. Crow,** 1234 S. Rosemead Blvd., El Monte—Contract for grading and surfacing in Riverside County between Temecula and Antelope Rd.

$941,740—**Davies, Keusder & Brown,** 4915 Exposition Blvd., Los Angeles—Low bid for construction of a 566-ft. steel clear-span transit shed, completing the new Los Angeles terminals for American President Lines; by Los Angeles Harbor Commission.

$278,831—**Chas. J. Dorfman,** 124 N. La Brea Ave., Los Angeles—Contract for construction of trunk line sewers in Santa Clara County; by Santa Clara County Sanitation District.

$1,508,000—**Haas & Rothschild,** 274 Brannan St., San Francisco—Contract for construction of 180,000 sq. ft. annex to the Public Works building in Sacramento.

$308,813—**J. E. Haddock, Ltd.,** 3538 E. Foothill Blvd., Pasadena—Contract for construction of two bridges and road connections for the Hollywood Freeway at Van Ness Ave., in Los Angeles.

$223,917—**Harms Brothers,** 5261 Stockton Blvd., Sacramento—Contract for constructing and surfacing roads in Lassen Volcanic National Park; by Bureau of Public Roads.

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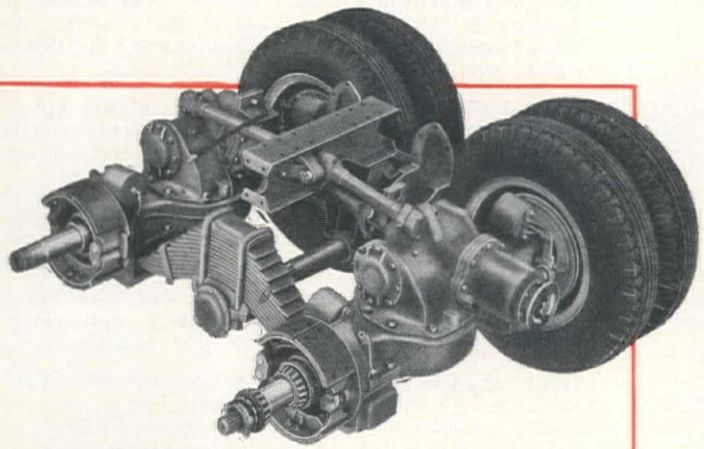

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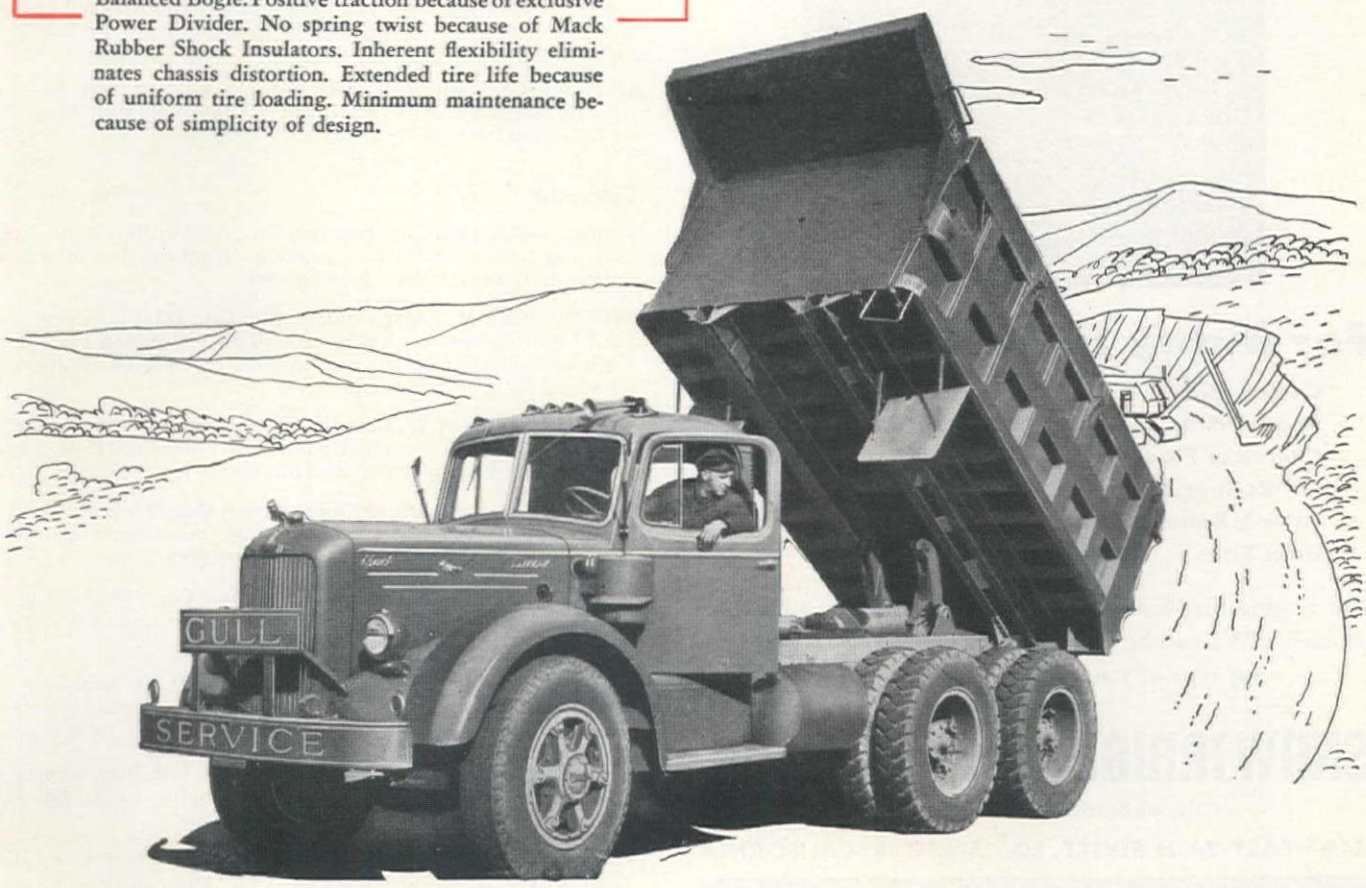

$520,735—**R. V. Lloyd & Co.,** Box 391, Coachella, Calif.—Low bid for construction of earthwork, pipe lines and structures for the Coachella Valley Distribution System in the vicinity of Mecca; by Bureau of Reclamation.

$2,397,533—**H. Mayson,** 9315 Hooper Ave., Los Angeles—Low bid for construction of receiving and treatment unit for Napa State Hospital in Imola.

$127,068—**Nevada Constructors, Inc.,** P. O. Box 313, Reno, Nev. —Contract for highway improvements in Monterey County on the Carmel Valley Road.

$2,305,600—**Parker, Steffens & Pearce,** 135 S. Park St., San Francisco—Contract for construction of 5-story, 107,000 sq. ft. Salinas Valley Memorial Hospital.

$179,935—**Rice Brothers, Inc.,** P. O. Box 1489, Marysville—Contract for highway improvements in Tulare County, including Lovers Lane and Ben Maddox Way.

$387,781—**A. Teichert & Son,** P. O. Box 1113, Sacramento—Contract for highway improvements in Yolo County, four bridges to be constructed and 0.8 mi. of ramps and detours to be constructed and surfaced.

$2,000,000—**T-S Construction Engineers, Inc., Ford J. Twaits, Inc., and Morrison-Knudsen Co.** (as joint venturers), 449 S. Beaudry St., Los Angeles—Contract for construction of a 10-story medical office building in Los Angeles; by Wilshire Medical Properties, Inc.

$956,067—**Winston Bros. Co.,** 1532 S. California Ave., Monrovia —Contract for construction of five reinforced concrete bridges for overcrossings and two pedestrian undercrossings for the Harbor Freeway at 5th and 6th Sts., Los Angeles.

$1,112,920—**Winston Bros. Co.,** 1532 S. California Ave., Monrovia—Contract for paving and grading and structures for Santa Ana Freeway, Los Angeles.

$369,668—**Clyde W. Wood and Sons, Inc.,** 6900 Tujunga Ave., North Hollywood—Contract for highway improvements in San Diego County between Wildwood Glen and Decanso Junction.

$1,019,935—**Granite Construction Co.,** Box 900, Watsonville—Low bid for construction of concrete lining, roof and control works for Sutro Reservoir, San Francisco; by City and County of San Francisco Public Utilities Commission.

$100,246—**Griffith Co.,** 1060 S. Broadway, Los Angeles—Contract for construction of concrete sidewalks, driveways and curbs in the Terminal Island district, Los Angeles harbor; by Los Angeles City Harbor Department.

$110,480—**Gene Richards, Inc.,** 383 Thorne Ave., Fresno—Contract for highway improvements in Fresno County on Shaw Ave.; by State Division of Highways.

Colorado

$496,411—**Colorado Constructors, Inc.,** 725 W. 39th Ave., Denver —Contract for 0.809 miles of grading, structures and oil processing on the Valley Highway in Denver.

$415,319—**Guy M. Elder Construction Co.,** 171 Vallejo St., Denver—Contract for construction of 10,000,000-gallon reservoir at the north side filter plant in Denver; by Board of Water Commissioners.

$516,516—**Malcolm W. Larson,** 4080 Galpago, Denver—Contract for construction of the Brighton-Hoyt-Brush, 115-kv. transmission line; by Bureau of Reclamation.

$134,545—**Domenic Leone Construction Co.,** 818 Oak St., Trinidad—Contract for 1.37 mi. of grading and structures on State Highway 10 between Durango and Hesperus.

$1,507,974—**Mead & Mount Construction Co.,** 240 Railway Exchange Bldg., Denver—Contract for construction of 6-story addition to Colorado State Hospital, Pueblo.

$489,955—**Northwestern Engineering Co.,** P. O. Box 567, Denver—Low bid for surfacing and stabilization of Trail Ridge Road in Larimer and Grand Counties; by Bureau of Public Roads.

$126,069—**Summit Construction Co.,** P. O. Box 1609, Rapid City, S. Dak.—Low bid for grading and surfacing Cedar Pass-Pinnacles highway; by Bureau of Public Roads.

$1,691,262—**Winston Bros. Co.,** 1470 Northwestern Bank Bldg., Minneapolis, Minn.—Contract for construction of Bald Mountain

pressure tunnel and access roads in the Colorado-Big Thompson Project; by Bureau of Reclamation.

$742,808—**C. L. Hubner Co.,** 4000 York St., Denver—Contract for grading and structures on proposed relocation of State Highway No. 185, located in Douglas County; by State Highway Department.

Hawaii

$395,000—**American Construction Co.,** 410 Rusk Bldg., Houston, Tex.—Contract for construction of a sea wall at the Ala Wai boat harbor; by Territorial Harbor Board.

$1,359,000—**Hawaiian Dredging Co.,** Honolulu—Contract for construction of Hilo, Hawaii, housing project; by Hawaii Housing Authority.

Idaho

$120,420—**Morrison-Knudsen Co., Inc.,** Box 1518, Boise—Low bid for reconstruction of .701 mi. of Capitol Blvd. in Boise.

$18,500,000—**Morrison-Knudsen Co., Inc.,** Box 1518, Boise—Contract for construction of C. J. Strike dam and power plant on the Snake River near Mountain Home; by Idaho Power Co.

$200,054—**Rockwell & Monroe Line Construction Co.,** Waterville, Wash.—Low bid for construction of a 115-kv. transmission line from Sandpoint to Bonners Ferry; by Bonneville Power Administration.

$225,975—**Union Construction Co.,** P. O. Box 1261, Missoula, Mont.—Contract for completion of grading and surfacing of the Salmon-Montana line highway.

Montana

$367,691—**S. Birch & Sons,** 314 Ford Bldg., Great Falls—Contract for grading, surfacing and structures on 8.793 mi. of the Vaughn-Conrad highway.

$401,983—**Kiely Construction Co.,** P. O. Box 65, Butte—Contract for grading, surfacing and oiling of 5 mi. of the Virginia City-Ennis Road.

$105,595—**Albert Lalonde Co.,** Sidney—Contract for graveling and surfacing of Hysham-Southeast highway in Treasure County.

$185,864—**W. P. Roscoe Co.,** Billings—Contract for construction of a timber bridge over Blue Creek and a concrete and steel bridge over Yellowstone River on the Billings-South highway.

Nevada

$214,311—**Dodge Construction, Inc.,** Fallon—Contract for construction of a portion of the secondary highway from the Calif.-Nevada line at Grapevine Canyon to a junction with U. S. 95 near Sarcobatus.

$129,221—**Dodge Construction, Inc.,** Fallon—Contract for construction of a portion of the secondary highway system in Lander County.

$137,636—**Isbell Construction Co.,** P. O. Box 2351, Reno—Contract for construction of a portion of the secondary highway system in Humboldt County.

$132,542—**Silver State Construction Co., Inc.,** Fallon—Contract for construction of a portion of state highway system in Eureka County.

New Mexico

$1,847,175—**Lembke Construction Co.,** P. O. Box 144, Albuquerque—Low bid for construction of a 200-bed hospital in Santa Fe.

$624,419—**Reynolds Electrical & Engineering Co., Inc.,** 718 N. Piedras St., El Paso, Tex.—Low bid for construction of 115-kv. transmission line, Socorro-Albuquerque; by Bureau of Reclamation.

$1,594,388—**Skousen-Hise Contracting Co.,** Albuquerque—Contract for construction of 7.95 mi. of four-lane highway on U. S. 66 from the Albuquerque city limits through Tijeras Canyon.

$122,672—**Skousen-Hise Contracting Co.,** Albuquerque—Contract for reconstruction of Belen-Veguita highway in Valencia County.

$116,376—**Wheeler & Trotz Co.,** Albuquerque—Contract for highway reconstruction on Clayton-Nara Visa road in Union County.

Oregon

$509,302—**Berke Brothers,** 7923 N.E. Halsey St., Portland—Low bid for grading and topping of Willow Creek-Boardman section of the Columbia River highway.

$787,736—**General Construction Co.,** P. O. Box 3860, Portland—Contract for construction of Marion Street Bridge approaches over Willamette River.

$180,864—**R. A. Heintz Construction Co.,** 8101 N.E. Union Ave., Portland—Low bid for grading, surfacing and oiling of Sams Creek-Snider Creek section of the Sams Valley secondary highway near Gold Hill.

$677,600—**Lee Hoffman,** 535 S.E. Water St., Portland—Low bid for fabrication and erection of the superstructure for a steel truss and girder span railroad bridge at the upper crossing of the Middle Fork, Willamette River; by Corps of Engineers.

$440,229—**Roy L. Houck,** 1585 N. 20th St., Salem—Contract for grading, paving and structures on Canyonville section, Pacific highway.

$480,774—**Kuckenburg Construction Co.,** 11104 N.E. Holman St., Portland—Low bid for construction of sewer lines in the East Glisan Greeley unit of the sewage treatment project in Portland; by City.

$444,705—**Lindstrom Bros., Inc.,** 7335 N.E. Broadway, Portland—Contract for construction of roadbed on Payette spur, Old Oregon Trail, and bridge over Snake River.

$218,998—**Penrod Construction Co.,** Hudson, Colo.—Contract for clearing areas in Detroit Dam reservoir on North Santiam River; by Corps of Engineers.

$130,041—**R & M Construction Co.,** Central Point—Contract for construction of structures and approaches on the Holland Loop highway in Josephine County.

$324,176—**The Shea Company,** 2801 W. Mission Rd., Alhambra, Calif.—Contract for construction of diversion tunnel and railroad relocation on the North Santiam River in connection with construction of Big Cliff dam; by Corps of Engineers.

$245,700—**Spada Brothers,** 8507 N.E. Columbia Blvd., Portland—Contract for surfacing and oiling 6.98 mi. of the Warner secondary highway near Lakeview.

$110,240—**Porter W. Yett,** 6500 N.E. Ainsworth St., Portland—Low bid for resurfacing Yamhill River-Salt Creek section of Dallas Coast highway.

$298,775—**Coos Bay Dredging Co.,** Coos Bay—Low bid for highway construction on Cedar Point-Coquille section of the Oregon Coast highway.

Utah

$100,778—**L. T. Johnson Construction Co.,** 709 Wall Ave., Ogden—Contract for highway construction from Trenton to Newton in Cache County.

Washington

$208,510—**Henshaw Bros.,** 4006 N.E. Davis St., Portland, Ore.—Contract for construction of station facilities at four points along the relocated Spokane, Portland & Seattle railway line; by Corps of Engineers.

$149,866—**Peter Kiewit Sons' Co.,** Seattle—Low bid for construction of main drainage system in the Columbia Basin project near Quincy; by Corps of Engineers.

$1,337,000—**Mowat Construction Co.,** 2833 Eastlake, Seattle—Contract for construction of Baker Heights Addition in Everett.

$996,587—**Osberg Construction Co.,** 1132 N. 128th, Seattle—Low bid for completion of the extension of the McCord Field north-south runway; by Corps of Engineers.

$136,104—**Riverside Sand & Gravel Co.,** Yakima—Contract for grading and surfacing 11 mi. of county road west of Yakima; by County Commission.

$674,821—**Smith & White Co.,** Seattle—Contract for construction

of 234-kv. transmission line, Grand Coulee-Columbia No. 4; by Bonneville Power Administration.

$1,154,203—**Sound Construction & Engineering Co.,** 1300 Aloha St., Seattle—Low bid for construction of a 2-story health instrument control and development laboratory at the plutonium plant at Richland; by General Electric Co.

$1,550,000—**Strand & Sons,** 3939 University Way, Seattle—Low bid for construction of the David T. Denny junior high school building, Seattle.

$1,369,200—**Strand & Sons,** 3939 University Way, Seattle—Low bid for construction of the Catherine Blaine junior high school and recreation project in Seattle.

$2,175,315—**United Concrete Pipe Corp. and Ralph A. Bell,** P. O. Box 425, Baldwin Park, Calif.—Low bid for construction of the Frenchman Hills tunnel south of Quincy on the Columbia Basin west canal; by Bureau of Reclamation.

$440,003—**Valley Construction Co.,** 1515 N. Belt, Spokane—Contract for construction of Section E of the Spokane sewage disposal system; by City.

$178,672—**Waale-Camplan Co.,** 2100 S.W. Jefferson St., Portland, Ore.—Low bid for military construction of an undisclosed nature near Richland; by Corps of Engineers.

$393,854—**Northwest Construction Co.,** 3950 N.W. 6th Ave., Seattle—Contract for clearing, grading and draining 2.4 mi. of the Pacific Highway from the Toutle River north; by Department of Highways.

Wyoming

$252,900—**R. N. Campsey Construction Co.,** 2520 Leyden St., Denver, Colo.—Contract for construction of Seminoe-Sinclair 115-kv. transmission line; by Bureau of Reclamation.

$231,474—**Hopkins and McPherson, Inc.,** P. O. Box 977, Laramie—Low bid for miscellaneous work on 11.28 mi. of the Huntley-Table Mountain road in Goshen County, including a span bridge over Horse Creek.

NEWS of DISTRIBUTORS AND FACTORY BRANCHES

C. O. RELEPHORD is the newly-appointed Los Angeles Branch manager for the Pump Division of the *Byron Jackson Co.* He comes to California from the Houston, Texas, office where he has been active in the analysis of technical applications of pumps for the oil industry. His territory comprises several Western states, Mexico, and the Far East.

☆ ☆ ☆

P. D. HERMANN, executive secretary of the *Associated Equipment Distributors,* announced recently that registrations for the 32nd Annual Meeting, to be held Jan. 28-Feb. 1 at the Stevens Hotel in Chicago, have already passed the 1,600 mark. This figure, representing 425 distributor companies and more than 200 manufacturer companies, gives indication that attendance at the 1951 meeting may equal last year's record-breaking total of 1,700 registrants. According to Convention Committee Chairman F. J. FITZPATRICK of *Parker-Danner Co.,* Hyde Park, Mass., the 1951 program will feature several distributor forums and a joint distributor-manufacturer panel, the latter to be held at the closing session. Highlighting the social activities will be the traditional Early Birds' breakfast and the president's reception on Jan. 29, and the birthday party on Jan. 30. New officers and regional directors for 1951 will be inducted at the luncheon on Jan. 31.

☆ ☆ ☆

Early in December a new GMC diesel truck service training program was inaugurated by *General Motors,* using mobile training units. These courses, which last five days each, are limited to 12 students per group and are directed at experienced mechanics. Cutaway engines, working models, engine sub-assemblies, special tools, visual aids, and all other necessary training equipment make each mobile unit a complete, self-contained training center. The new schools triple the capacity of the General Motors diesel training program. The two-week training schools at Oakland, Calif., and the General Motors Institute in Flint, Mich., which have already graduated over 1,000 diesel mechanics for GMC dealerships, will be continued. The mobile units are expected to remain in some cities for several weeks to run all the courses necessary for the large number of mechanics anticipated.

☆ ☆ ☆

Four Wheel Drive Auto Co. announces the appointment of H. G. ENGEL, formerly manager of the company's Western Sales Zone, to the position of office sales manager. V. M. ANDERSON leaves his post as

ANDERSON

ENGEL

district sales supervisor in northern Illinois to fill the vacated zone managership. Engel, who has been selling FWD trucks for 27 years, has made a special study of the maintenance problems of dirt and

gravel roads. The FWD Model HG road maintainer was the result of his pioneering work and was named the "HG" in his honor. Anderson has been active in the company's sales work since joining FWD in 1936.

☆ ☆ ☆

W. H. HUDSON is president, and his son, JACK W. HUDSON, is vice president of the newly-formed *Hudson Corp.*, distributor of contractors' supplies in the San Diego area, and formerly known as Hudson-Tucker, Inc. The company handles, among other lines, Chicago Pneumatics. JOHN GRAYSON and DOUGLAS KEITH are the sales engineers.

☆ ☆ ☆

R. G. LeTourneau, Inc. appoints NAT COMEWELL district sales representative for Nebraska, South Dakota and Kansas, with headquarters in Omaha.

☆ ☆ ☆

INSPECTING blueprints for B. F. Goodrich Company's new 100,000-sq. ft. tire and tube warehouse in Los Angeles, are: l. to r., W. P. Whitlock, project engineer; L. T. Greiner, Pacific Coast manager of replacement tire sales, and L. R. Keltner, manager of the Los Angeles plant.

☆ ☆ ☆

JERRY MULLER, formerly with Chown Electric Supply Co. of Portland, has recently joined the sales staff of *Sylvania Electric Products, Inc.* He will cover Oregon for the full line of lighting products manufactured by the company. ROBERT "BOB" STEUBER has also been added to the sales staff of Sylvania, according to C. A. DICKINSON, regional manager. Steuber, who was formerly with the General Electric Supply Co., is a specialist in lamp sales. He will cover western Washington and Oregon and will make his headquarters at the Seattle offices. DON R. SMOCK, a salesman for the company, has recently moved from Twin Falls to Coeur d'Alene, Idaho, and will cover eastern Washington, Idaho and Montana.

☆ ☆ ☆

Thermal Industrial Engineering Co. of Denver—FRANK T. SETTLE, president—is the new district representative for the *Johnson Corp.* of Three Rivers, Mich., manufacturer of steam specialties and boiler room equipment. Territory will include Colorado, Montana, eastern Wyo-

Continued on page 122

NEWS of DISTRIBUTORS AND FACTORY BRANCHES

Continued from page 121

ming, western Nebraska, western Kansas and northern New Mexico. The Denver company has specialized in boiler equipment and is particularly qualified to handle the Johnson high temperature boiler feed system and the Johnson Electrap. These two products represent a basically different approach to the handling of condensate, which the manufacturer reports can achieve considerable savings in fuel and power.

☆ ☆ ☆

CLINE

E. L. CLINE is the recently-named Western Division sales manager of the *J. D. Adams Manufacturing Co.* of Indianapolis. Cline, who joined the company in 1926, has recently served as district manager for the states of Texas, Louisiana, Arkansas, Missouri, Kansas and Oklahoma. In his new capacity he is in charge of sales activities in all states west of the Mississippi, plus Wisconsin, part of Illinois and the upper peninsula of Michigan.

☆ ☆ ☆

BOB HARRISON, previously field service engineer for the *Edward R. Bacon Co.*, advances to the position of shop superintendent at the company's Oakland, Calif., plant. This plant is the site of the major portion of ERBCO's shop service and repair work.

NEWS of MANUFACTURERS

J. J. CARLSON advances to the post of general sales manager of *Kaiser Steel Corp.*, with headquarters at the Oakland, Calif., home office. Carlson joined Kaiser in 1944 after several years with Inland Steel Co. He transferred to Oakland in the spring of 1950 after serving for three years as manager of sales for the Southern California district.

☆ ☆ ☆

The election of A. R. KELSO as vice president of *Mack Trucks, Inc.*, was announced recently by E. D. BRANSOME, chairman and president. At the same time Kelso was named vice president and a director of *Mack Manufacturing Corp.*, the parent company's wholly-owned manufacturing subsidiary. He will be in charge of manufacturing and production at all Mack plants and will make his headquarters at Allentown, Pa., site of the company's main assembly plant.

☆ ☆ ☆

WILLIAM WALLACE MEIN, president of *Calaveras Cement Co.*, announces that his company is investing $600,000 in new equipment at its plant in San Andreas, Calif. This will provide larger shipments of cement during the spring and summer of 1951.

☆ ☆ ☆

C. EDWIN PONKEY is the newly-appointed general manager of *International Derrick and Equipment Co.*, Columbus, Ohio, Division. Ponkey, who resigned as vice president of Sheldrick Manufacturing Corp. to accept his new position, succeeds FERGUSON BARNES, resigned.

☆ ☆ ☆

ROBERT K. SPOFFORD, formerly with the Okonite Co., is now director of purchases for *John A. Roebling's Sons Co.* of Trenton, N. J. In his new position, Spofford is in charge of the procurement of materials used in the manufacture of wire rope, electrical wire and cable, woven wire fabrics, cold-rolled steel and related products.

☆ ☆ ☆

Twin Disc Clutch Co., Racine, Wis., announces the appointment of PAUL W. WAHLER as service manager and ROBERT A. HARMON as dealer sales supervisor, with headquarters in Racine. Wahler, who joined the engineering department of the company in 1937, has served recently as district service engineer in the New Or-

leans area and as assistant district manager on the West Coast. Harmon has been connected with sales engineering since joining Twin Disc more than three years ago.

☆ ☆ ☆

J. N. FORKER, vice president and general manager of the Tar Products Division of *Koppers Co., Inc.*, of Pittsburgh, has retired after 35 years with the company. FRED C. FOY, formerly head of the sales department, succeeds Forker, and COOKE BAUSMAN, JR., has been appointed acting manager of the sales department. Forker is widely known here and abroad among men in the steel, tar processing, and chemical industries. Foy, a native of San Francisco, came to Koppers from J. Walter Thompson Co., where he served as vice president and manager of its Detroit office.

☆ ☆ ☆

S. E. BIGGS and JAMES A. BARDSLEY have been elected vice presidents of the *Trailmobile Co.*, manufacturer of commercial truck-trailers. Biggs heads up the company's manufacturing operations in its plants in Cincinnati, Springfield, Mo., Berkeley, Calif., and Windsor, Canada. Bardsley is in charge of Pacific Coast

BARDSLEY BIGGS

operations, with headquarters in Berkeley. Since taking over the West Coast operation in 1949, he has integrated sales and service outlets to provide faster and better servicing, increased the sales staff, and trained the personnel to analyze customer transportation requirements and relate them to the various trailer types.

☆ ☆ ☆

Worthington Pump and Machinery Corp., Harrison, N. J., has announced two promotions. M. M. LAWLER is now assistant vice president in addition to his present post as manager of the Air Conditioning and Refrigeration Sales Division. LOUIS G. HILKEMEIER has been appointed chief engineer of the Construction Equipment Division at Dunellen. Formerly a construction machinery engineer with the Chain Belt Co. of Milwaukee, Hilkemeier has served as chairman of the technical committee of the Truck Mixer Manufacturers' Bureau.

☆ ☆ ☆

JOSEPH A. CONLON, formerly district sales manager for the Chicago branch of the *United States Rubber Co.*, has been appointed manager of allied sales for the mechanical goods division, with headquarters in New York. EDWIN D. MEADE, formerly manager of Western railway sales, replaces Conlon in Chicago. Conlon

Continued on page 124

NEWS of MANUFACTURERS

Continued from page 123

began his career with the company in 1930 as a salesman in its Los Angeles branch, working his way up through various sales and merchandising positions. Meade joined the company in 1935 at the New York branch.

☆ ☆ ☆

HOWARD L. TIMMS, formerly with Massey-Harris of Racine, Wis., is the new general manager of *Harnischfeger Corporation's* two plants at Escanaba, Mich., which manufacture P&H AC Arc Welders and P&H Truck Cranes.

☆ ☆ ☆

ARTHUR CRANDELL GREEN, vice president of the *Goodman Manufacturing Co.* of Chicago, died on October 31.

☆ ☆ ☆

CHARLES E. SMART is the newly-elected president of *W. & L. E. Gurley* of Troy, N. Y., manufacturer of engineering and surveying instruments, succeeding C. I. DAY, deceased. LESTER C. HIGBEE, general sales manager, has been named secretary, the post formerly held by Smart.

☆ ☆ ☆

WILEY

HERBERT A. WILEY, JR., is now factory manager of the Pittsburg, Calif., factory of *Pioneer Rubber Mills*. Wiley joins the company after 13 years with the Goodyear Tire & Rubber Co., where he served in many posts, covering all phases of rubber development, engineering and sales.

☆ ☆ ☆

CHARLES O. AYERS is the new sales promotion manager of the *Lull Manufacturing Co.* of Minneapolis, manufacturer of materials handling units and a large line of equipment for industrial wheel tractors.

☆ ☆ ☆

M. O. STOCKLAND, director of sales of the *Four Wheel Drive Auto Co.*, has announced the appointment of CLARENCE PIEHL as his executive assistant. Piehl, who has been with the company since 1930, was manager of the cost department before his promotion. Named to that position at the age of 23, he was one of the youngest department managers in the company's history. His studies of various cost systems and the application of new methods to his department have made him an outstanding authority on industrial cost methods. DOUGLAS FROST has been appointed cost department manager to succeed Piehl, according to an announcement by DONALD M. RUSSELL, director of the accounting division. Frost has been with the company since 1941 and has been serving as senior cost clerk for the past two years.

UNIT BID SUMMARY

Dam . . .

Falcon Dam—Rolled Earth Fill Five Miles Long

Texas and Chihauhau, Mexico—Rio Grande River 75 mi. downstream from Laredo — International Boundary and Water Commission, United States and Mexico. C. F. Lytle Company, et al (Falcon Dam Constructors), was low bidder for construction of Falcon Dam and Power Plant. Schedule One covers work items allocated to the United States section for performance, and Schedule Two covers those items in the Mexican section. Bids under Schedule One were based on English units of measurement, in United States currency, and bids under Schedule Two were based on metric units of measurement and in Mexican currency. Contractors had the option of submitting two bids for each schedule: the (a) bid covers work in either schedule irrespective of the contractor on the other schedule, and the (b) bid was contingent on the other schedule being awarded to a designated affiliate. Both (a) and (b) bids could be submitted.

Falcon Dam is of rolled earth fill construction and has a total axial length of 26,294 ft., of which 10,133 is in the United States and 16,161 is in Mexico. The maximum dam height is 150 ft. and the crest width is 35 ft. The spillway is located through the United States abutment about 1,400 ft. from the left bank of the river, and is of conventional design with gated overflow crest and a long chute section which terminates in a 600-ft. wide stilling basin. The United States outlet works consist of a concrete gravity dam, 120 ft. high, containing three gated control openings leading to the penstocks. The Mexican outlet works consist of a conventional type tower intake structure from which a 22-ft. diam. conduit and penstock passes under the dam. The lower end of the penstock terminates in three 13-ft. diam. manifold pipes leading to the powerhouse. Provision is made in both intakes for bypassing irrigation flow to the river. Two powerhouses, each 85 ft. wide, 200 ft. long, and 125 ft. high, will be built, one on each side of the river. Each powerhouse contains three vertical shaft, Francis type turbines to develop 14,750 hp. at a rated head of 100 ft. and speed of 163.6 rpm., and three 3-phase, 60-cycle generators rated at 10,500 kw., 6,900 volts. The two power plants will be interconnected for transfer of electrical energy from one plant to the other, but each has a centralized control room and the facilities of each are separate and independent. Under Schedule One, covering work in the United States, the following bids were received:

(1) C. F. Lytle Company, et al	(a)	$8,600,980
(Falcon Dam Constructors)	(b)	7,801,064
(2) List and Clark Construction Co.	(a)	8,471,507
(3) H. B. Zachry Co., & Brown & Root, Inc.	(a)	9,408,780
	(b)	8,625,149
(4) Guy F. Atkinson Co.	(a)	10,129,433
	(b)	9,792,533
— Grafe-Shirley-Cunningham	(a)	$9,947,050
— J. A. Jones Construction Co., Chas. H. Tompkins Co., Inc., Wunderlich Contracting Co., Wright Contracting Co.	(a)	12,161,635
— Utah Construction Co.	(a)	12,940,693
— L. P. Reed, Inc.	(a)	17,250,045

		1		2	3		4	
		(a) Unit	(b) Unit	(a) Unit	(a) Unit	(b) Unit	(a) Unit	(b) Unit
470,000	cu. yd. excav., common, for foundation	.40	.36	.30	.24	.24	.45	.35
129,000	cu. yd. excav., common, for spillway	.98	.89	.50	1.22	1.12	1.06	.96
739,000	cu. yd. excav., rock, for spillway	.98	.89	.60	1.22	1.12	1.06	.96
6,400	cu. yd. excav., all classes for cut-off trenches	9.00	8.13	1.50	13.50	13.50	10.50	10.50
320,000	excav., common, for U. S. power system	.91	.836	.50	1.00	.90	.86	.76
441,000	cu. yd. excav., rock, for U. S. power system	.91	.836	.60	1.00	.90	.86	.76
20,000	sq. yd. furn. and applying bitum.-protective coating to foundation surfaces	1.20	1.11	.75	1.15	1.15	.25	.25
6,000	sq. yd. applying conc. protective coating to foundation surfaces	2.40	2.18	1.00	1.10	1.10	3.00	3.00
3,000	lb. placing reinf. fabric	.20	.164	.10	.09	.09	.17	.17
55,000	cu. yd. backfill	.40	.36	.30	.66	.66	.20	.20
65,000	cu. yd. excav., common, stripping Chapeno borrow area	.38	.34	.28	.33	.33	.16	.16
1,270,000	cu. yd. excav., common, in Chapeno borrow area and transportation to dam embank.	.38	.34	.25	.34	.29	.42	.32
1,021,000	cu. yd. earth fill in dam embankment, Zone 1	.10	.09	.20	.16	.11	.16	.16
23,000	cu. yd. spec. competn. of earth fill in embank.	3.20	2.88	2.00	3.55	3.55	3.10	3.10
630,000	cu. yd. sand and gravel fill in embank., Zone 2	.10	.09	.15	.11	.11	.08	.08
140,000	cu. yd. rock fill on downstream slope of dam embank., Zone 3	.30	.27	.10	.33	.33	.10	.10
130,000	cu. yd. loading and placing riprap from stock piles	.90	.82	1.50	1.53	1.53	.80	.80
3,100	lin. ft. drilling grout holes in stage betw. depths of 0 ft. and 35 ft.	2.40	2.18	2.00	5.47	5.47	2.10	2.10
2,200	lin. ft. drilling grout holes in stage between depts of 35 ft. and 60 ft.	2.40	2.18	4.00	6.12	6.12	2.50	2.50
1,300	lin. ft. drilling grout holes in stage between depths of 60 ft. and 110 ft.	2.40	2.18	6.00	7.43	7.43	2.80	2.80
11,500	lb. furn. and placing metal pipe and fittings for foundation grouting and drainage	.60	.54	.50	.55	.55	.55	.55
5,000	lb. placing metal pipe and fittings for contraction joint grouting	.35	.32	.30	.65	.65	.50	.50
1,850	cu. ft. pressure grouting	2.40	2.18	2.00	2.73	2.73	2.00	2.00
2,750	cu. ft. pressure grouting with packers	2.70	2.45	3.00	4.04	4.04	2.50	2.50
440	cu. ft. pressure grouting contraction joints and cooling systems	4.25	3.85	5.00	9.51	9.51	3.00	3.00
3,200	lin. ft. drilling drainage holes not more than 50 ft. deep	4.75	4.31	5.00	8.20	8.20	3.20	3.20
2,350	lin. ft. furn. 8-in. diam. sew. pipe and const. emb. toe drains with uncemented joints embedded in gravel	2.00	1.80	2.00	1.31	1.31	1.20	1.20
1,200	lin. ft. furn. 10-in. diam. sewer pipe and const. embankment toe drains with uncemented joints embedded in gravel	2.00	1.80	2.50	1.42	1.42	1.40	1.40
21,000	lin. ft. furn. 6-in. diam. sewer pipe and const. drains with uncemented joints embedded in gravel	1.50	1.36	1.80	1.53	1.53	1.40	1.40
18,000	lin. ft. furn. 8-in. diam. sewer pipe and constr. drains with uncemented joints embedded in gravel	2.00	1.80	2.00	1.64	1.64	1.70	1.70
250	lin. ft. furn. and laying 8-in. diam. sewer-pipe drains with cemented joints	2.00	1.80	4.00	1.97	1.97	1.80	1.80
150	lin. ft. furn. and laying 10-in. diam. sewer-pipe drains with cemented joints	2.50	2.27	4.25	2.08	2.08	2.50	2.50
1,400	lin. ft. furn. and laying 24-in. diam. sewer pipe drains with cemented joints	9.00	8.16	5.00	4.92	4.92	7.50	7.50
130	lin. ft. furn. and laying 24-in. diam. 14-gage corrugated metal pipe	6.00	5.40	4.50	4.92	4.92	10.00	10.00
51,400	lin. ft. drilling holes for anchor bars and grouting bars in place	1.30	1.18	1.00	1.37	1.37	.60	.60

Continued on next page

A MILE A DAY

another MULTIFOOTE record!

WILLIAMS PAVING CO., does it again!

- **5302 Lineal Feet**
- **7069.3 Square Yards**
- **9 in. x 12 ft. Slab**
- **13½ Hours—One MultiFoote Single Drum Paver—One MultiFoote DuoMix Paver**

THIS is a record for two paving machines on the Pennsylvania Turnpike and is, we believe, *a Record* for two Paving Machines anywhere in the United States, or the world for that matter.

This Record was made by Williams Paving Co. of Norfolk, Va., and is the second record established by this concern with MultiFoote Pavers.

At another time, using a single MultiFoote DuoMix Paver on the eastern section of the Turnpike, Williams Paving Company established a Record for a single machine by placing 3547 lineal feet of 12 ft. slab 9 in. thick in 13 hours.

Good organization and equipment that keeps a-running mean high output at low cost. MultiFoote simplicity of design means easier upkeep and less down time. MultiFoote positive, easy operation means speed in charging, speed in discharging and speedy bucket action. MultiFoote high output is proved.

Plan on a full Blaw-Knox Package from Batcher to Finisher. Ask for details. One responsibility and coordinated equipment means profit.

THE FOOTE COMPANY, INC.
Subsidiary of Blaw-Knox Co.
Nunda, New York

MULTIFOOTE PAVER

FOR EVERY PLACE CONCRETE MUST BE POURED

A BLAW-KNOX PRODUCT — FROM FORMS TO PAVER TO FINISHER... ALL YOUR PAVING EQUIPMENT — IN ONE PACKAGE from BLAW-KNOX

		1		2	3		4	
		(a) Unit	(b) Unit	(a) Unit	(a) Unit	(b) Unit	(a) Unit	(b) Unit
15,650,000	lb. placing reinforcement bars	.035	.031	.04	.055	.054	.045	.045
47,800	cu. yd. conc. in U. S. intake struct. below elev. 312.5	12.65	11.65	17.40	11.66	10.50	15.82	15.82
3,900	cu. yd. conc. in U. S. intake struct. above elev. 312.5	19.00	17.25	22.90	17.50	15.75	24.00	24.00
2,650	cu. yd. conc. in trashrack struct.	35.00	31.70	32.80	37.16	33.40	48.00	48.00
26,200	cu. yd. conc. in spillway struct. below bridge seats	14.00	12.70	17.40	12.57	11.50	27.50	27.50
4,600	cu. yd. conc. in spillway bridges, tower and superstructure	53.00	48.00	52.40	49.19	44.20	60.00	60.00
420	cu. yd. conc. in slope paving of inlets to spillway and U. S. intake structs.	13.00	11.80	26.00	14.76	13.30	30.00	30.00
26,300	cu. yd. conc. in floor lining of inlets to spillway and U. S. intake structs., and in spillway chute floor	12.00	10.90	21.40	12.57	11.30	22.50	22.50
29,000	cu. yd. conc. in spillway stilling basin floor	12.00	10.90	17.40	11.59	10.40	21.50	21.50
27,800	cu. yd. conc. in cantilever and counterforted walls	34.00	30.85	32.40	37.60	33.85	32.50	32.50
550	cu. yd. conc. in gravity wall	17.00	15.40	26.00	12.46	11.20	21.00	21.00
720	cu. yd. conc. in access gallery and drainage and water-line gallery	39.00	35.40	36.00	67.77	61.00	54.00	54.00
3,200	cu. yd. conc. in encasement for penstocks and outlet pipes	21.25	19.25	31.00	26.23	23.60	34.00	34.00
2,500	cu. yd. mass conc. in power-plant struct.	9.00	8.15	17.40	12.68	11.40	11.00	11.00
7,600	cu. yd. first-stage conc. in power-plant substructure	21.00	19.00	32.40	18.58	16.70	29.50	29.50
8,000	cu. yd. first-stage conc. in power-plant intermediate struct.	51.00	46.25	36.00	68.86	62.00	62.50	62.50
1,600	cu. yd. first-stage conc. in power-plant superstructure	102.00	92.50	41.00	87.44	78.50	115.00	115.00
80	cu. yd. conc. in power-plant stairs and landings	125.00	113.50	56.00	125.70	113.00	150.00	150.00
3,100	cu. yd. second-stage conc. in power-plant struct.	25.00	23.65	33.50	17.49	15.75	29.50	29.50
100	cu. yd. conc. in paved gutter	38.00	34.50	36.00	21.31	19.20	60.00	60.00
555	cu. yd. conc. in curbs for dam embank.	46.00	41.80	36.00	21.86	19.70	70.00	70.00
400	cu. yd. conc. in blockouts	67.00	60.75	56.00	109.30	99.00	135.00	135.00
33,800	cu. yd. cooling concrete	1.00	.91	.75	.71	.64	.35	.35
38,800	lb. placing metal tubing and fittings for conc. cooling system	.26	.24	.25	.44	.44	.38	.38
6,330	sq. ft. furn. and placing preformed dehydrated cork joint filler	2.00	1.80	2.00	2.19	2.19	2.25	2.25
8,470	sq. ft. furn. and placing preformed bituminous joint filler	.60	.50	1.00	1.42	1.42	.70	.70
5,100	sq. ft. furn. and placing preformed plastic joint filler	1.00	.91	1.50	1.64	1.64	1.30	1.30
600	lin. ft. construct control joints	3.00	2.72	2.00	2.73	2.73	2.50	2.50
3,400	sq. ft. furn. placing and removing temporary joint filler	2.00	1.81	1.00	2.19	2.19	.60	.60
600	lin. ft. const. asph. seals in U. S. intake struct.	6.00	5.44	3.00	10.93	10.93	11.00	11.00
200	lin. ft. const. asph. seals in U. S. power plant	6.00	5.44	3.00	10.93	10.93	11.00	11.00
950	lin. ft. placing rubber water stops	3.00	2.72	2.00	2.73	2.73	2.00	2.00
70	lin. ft. installing rubber joint strips with metal straps	4.00	3.80	4.00	3.28	3.28	2.50	2.50
130	lin. ft. installing rubber joint strips without metal straps	3.00	2.70	4.00	2.19	2.19	2.00	2.00
300	lin. ft. furn. and placing metal grout groove covers	2.00	1.80	3.00	2.19	2.19	1.50	1.50
6,100	lin. ft. furn. and placing shaped metal seals	2.30	2.09	2.50	2.19	2.19	2.80	2.80
3,900	lin. ft. furn. and placing straight metal seals	1.90	1.72	2.00	2.19	2.19	1.50	1.50
350	sq. ft. furn. and placing coal-tar-saturated-felt roofing	.50	.46	2.00	.44	.44	.70	.70
1,000	lin. ft. furn. and installing felt base flashing and metal counter-flashing at walls, curbs, and foundation pads for roofing and membrane waterproofing	1.40	1.27	2.50	2.19	2.19	.60	.60
1,800	sq. ft. furn. and placing deck insulation	.80	.73	1.50	.66	.66	.60	.60
15,700	sq. ft. furn. and placing membrane waterprfg.	.70	.63	1.00	.44	.44	.32	.32
450	lin. ft. furn. and installing metal base flashing and metal counterflashing at walls and curbs for membrane waterproofing	2.00	1.82	2.50	2.19	2.19	1.25	1.25
320	cu. yd. conc. in power plant cover slabs	18.00	16.30	50.00	20.77	20.77	35.00	35.00
500	sq. yd. furn. and applying 2-coat asphalt emulsion dampproofing	.80	.73	1.00	2.84	2.84	2.10	2.10
1,760	sq. yd. uncolored bonded-conc. finish on floors and stairs	4.00	3.60	1.50	5.47	5.47	7.50	7.50
1,370	sq. yd. colored bonded-conc. finish on floors and on stair landings	6.00	5.40	1.50	5.47	5.47	8.00	8.00
90	sq. yd. colored bonded-conc. finish on stairs	8.00	7.30	1.50	9.84	9.84	22.00	22.00
1,100	lin. ft. colored bonded-conc. wall bases around floors and stair landings	.70	.63	1.50	2.19	2.19	1.70	1.70
190	lin. ft. colored bonded-conc. wall bases along stairs	1.50	1.40	1.50	3.28	3.28	3.25	3.25
130	lin. ft. colored bonded-conc. finish on curbs around stair landings and along stairs	1.50	1.40	1.50	3.28	3.28	3.25	3.25
180	lin. ft. colored bonded-conc. finish on curbs along floors and balcony	1.50	1.40	1.50	2.73	2.73	2.20	2.20
310	sq. ft. installing metal and glass partitions	1.00	.90	1.50	1.42	1.42	2.20	2.20
50	lin. ft. installing metal toilet-stall partitions, urinal partitions and toilet-room partitions	4.00	3.62	5.00	1.42	1.42	11.00	11.00
729,000	installing frames and guides for fixed-wheel and bulkhead gates	.09	.082	.06	.11	.10	.10	.10
2,800,000	lb. installing fixed-wheel gates, gate erection mast, and metalwork for gate counterweights and erection mast	.06	.054	.06	.055	.045	.065	.065
21,000	lb. installing bulkhead gates	.06	.054	.06	.055	.045	.09	.09
60,000	lb. installing gate hoists for penstock fixed-wheel gates	.09	.082	.10	.055	.045	.07	.07
1,043,000	lb. installing gate hoists for spillway fixed-wheel gates	.08	.073	.07	.055	.045	.045	.045
59,000	lb. installing trashrack guides and bearing plates	.09	.082	.08	.09	.08	.10	.10
220,000	lb. installing trashracks	.05	.045	.05	.04	.03	.045	.045
110,000	lb. installing stop-log guides	.09	.082	.08	.09	.08	.11	.11
31,700	sq. ft. painting stop-logs and lifting beams and frames	.30	.27	.10	.35	.35	.32	.32
384,000	lb. installing cranes	.04	.036	.09	.04	.03	.07	.07
103,000	lb. installing track rails on concrete	.05	.045	.05	.055	.045	.05	.05
250,000	lb. erecting struct. steel framework in power plant	.06	.054	.05	.055	.045	.045	.045
129,000	lb. installing hollow-jet valves	.05	.045	.08	.04	.03	.075	.075

Continued on next page

		1		2	3		4	
		(a) Unit	(b) Unit	(a) Unit	(a) Unit	(b) Unit	(a) Unit	(b) Unit
17,000	lb. installing motor driven pumps	.14	.127	.10	.04	.04	.12	.12
129,000	lb. furn. and installing metal pipe, fittings, and valves less than 6 in. in diam.	.40	.363	.50	.42	.41	.55	.55
294,000	lb. furn. and installing metal pipe, fittings, and valves 6 in. and larger in diam.	.36	.327	.50	.33	.32	.45	.45
1,500	lb. installing service and fire hose cabinets	.30	.272	.25	.27	.27	.45	.45
1,685,000	lb. installing penstocks and outlet pipes	.09	.082	.06	.087	.078	.055	.055
16,000	lb. installing embedded metal frames for openings in floors, decks, and walls	.14	.127	.10	.35	.34	.21	.21
10,500	lb. installing floor plates, gratings, and metal covers	.04	.036	.05	.05	.04	.11	.11
1,000	sq. ft. installing steel swinging doors	3.50	3.17	1.00	1.80	1.80	1.70	1.70
100	sq. ft installing steel fire doors	2.00	1.81	1.50	3.66	3.66	2.80	2.80
750	sq. ft. installing steel rolling doors	1.00	.90	2.00	1.80	1.80	1.10	1.10
970	sq. ft. furn. and installing steel-sash windows on embedded tubular metal frames	4.00	3.60	3.00	5.47	5.47	2.80	2.80
160	sq. ft. furn. and installing steel-sash windows in concrete grooves	4.00	3.60	3.00	4.92	4.92	2.80	2.80
600	lb. furn. and installing steel louvers in exterior walls	1.50	1.36	1.00	.60	.60	1.50	1.50
51,000	lb. installing steel handrails	.25	.227	.20	.25	.24	.22	.22
32,000	lb. installing metal stairways	.20	.18	.15	.25	.24	.22	.22
900	lin. ft. furn. and installing aluminum safety nosings	3.00	2.72	2.00	3.00	3.00	2.20	2.20
700	lb. installing ventilators	.50	.45	.50	.22	.22	.45	.45
6,000	lb. furn. and installing slotted metal inserts	.50	.45	.25	.71	.71	.80	.80
600	lin. ft. furn. and installing wire inserts	.10	.09	1.00	1.42	1.42	1.10	1.10
91,000	lb. installing anchor bolts	.30	.272	.10	.35	.35	.25	.25
35,000	lb. installing miscellaneous metalwork	.25	.227	.20	.33	.33	.30	.30
3,500	lb. installing plumbing fixtures, storage water heaters, and elect. drinking water coolers	.40	.36	.20	.33	.33	60	.60
1	kitchen assembly, installing kitchen assembly	700.00	635.00	500.00	220.00	220.00	$1,000	$1,000
27,250	lin. ft. installing embedded elect. metal conduit 1¼ in. or less in diam.	1.20	1.10	.50	1.09	1.09	.75	.75
6,000	lin. ft. installing embedded elect. metal conduit 1½ in. or larger, but less than 3 in. in diam.	1.00	.91	.60	1.53	1.53	1.10	1.10
860	lin. ft. installing embedded elect. metal conduit 3 in. or larger in diam.	3.00	2.70	1.50	1.97	1.97	2.20	2.20
1,500	lin. ft. installing embedded elect. non-metallic conduit	2.00	1.82	1.00	1.75	1.75	1.10	1.10
5,000	lb. installing ground wires and ground rods	.75	.68	.50	.77	.77	.75	.75
500	lin. ft. installing and connecting single conductor, 5,000 volt insulated trench lay cable	3.00	2.72	2.00	3.28	3.28	1.10	1.10
4	standards installing series lighting system standards and fixtures on roadway and parking areas	70.00	63.00	100.00	82.00	82.00	90.00	90.00
5,600	cu. yd. stabilized base course surfacing	2.50	2.27	3.00	3.06	3.06	2.60	2.60
1,850	cu. yd. aggregate for asphalt surface treatment	2 50	2.30	4.50	4.15	4.15	5.20	5.20
38,500	gal. furn. and placing asph. for asph. surface treatment	.30	.272	.20	.19	.19	.14	.14
15,600	lin. ft. erecting guardrail	1.20	1.09	2.00	2.08	2.08	.80	.80
40	lin. ft. drilling 4-in. min. diam. holes for settlement apparatus	7.00	6.35	10.00	4.10	4.10	12.00	12.00
15	cu. yd. trenches for test apparatus	10.00	9.00	20.00	9.84	9.84	12.00	12.00
1,600	lb. installing settlement apparatus in dam	1.00	.91	2.00	1.64	1.64	.60	.60
85	points installing surface settlement points on dam	14.00	13.00	5.00	5.00	5.00	13.00	13.00
3,000	ton transporting matls. of all kinds for the Commission and its agents, other than the contractor under Sched. No. 1 betw. the railhead at Rio Grande City, Texas and the dam site in either direction	12.00	10.88	7.00	11.42	11.42	9.00	9.00
1,000	ton unloading and storing matls. in storage bldgs. at Rio Grande City, Texas, for the Commission and its agents, other than the contractor under Sched. No. 1	7.00	6.35	5.00	4.54	4.54	5.00	5.00
1,000	ton loading matls. from storage bldgs. at Rio Grande City, Texas, for the Commission and its agents, other than the contractor under Sched. No. 1 and transportation to the dam site	12.00	10.88	7.00	9.45	9.42	9.00	9.00

Highway and Street . . .

Grading, Plant-mix Surfacing and Structures on 6-Lane Santa Ana Freeway in Los Angeles

California—Los Angeles County—State. Winston Brothers Co., Monrovia, Calif., was low bidder before the Division of Highways for construction of part of the 6-lane Santa Ana Freeway and structures. Unit bids were as follows:

(1)	Winston Brothers Co.	$1,112,920	
(2)	J. E. Haddock, Ltd.	1,162,527	
(3)	United Concrete Pipe Corp., and Ralph A. Bell	1,185,732	
(4)	Webb & White	1,188,122	
(5)	Griffith Co.	$1,202,518	
(6)	Guy F. Atkinson	1,208,500	
—	Peter Kiewit & Sons' Co.	1,234,450	
—	N. M. Ball Sons and Erickson, Philips and Weisburg	1,245,779	

		(1)	(2)	(3)	(4)	(5)	(6)
2,000	cu. yd. removing conc.	3.00	6.00	4.00	2.50	3.80	5.00
Lump sum,	clearing and grubbing	$3,000	$9,250	$10,000	$7,500	$8,000	$3,233
355,000	cu. yd. roadway excav.	.26	.35	.33	.25	.44	.40
5,600	cu. yd. struct. excav. (bridges)	1.20	2.35	1.20	1.30	1.60	1.50
8,000	cu. yd. struct. backfill (bridges)	2.00	1.80	2.00	1.60	1.60	2.00
13,500	cu. yd. struct. excav.	2.30	1.75	1.70	2.00	2.00	1.50
9,000,000	sta. yd. overhaul	.002	.002	.0035	.004	.003	.003
36,000	sq. yd. compacting orig. ground	.05	.04	.04	.05	.03	.03
21,500	sq. yd. preparing slopes (eros. control)	.08	.075	.16	.12	.09	.15
11,600	sq. yd. cultivating (prep. landscaping)	.05	.04	.10	.10	.08	.10
49,000	ton I. B. M.	1.20	1.15	1.00	1.35	1.08	1.10
Lump sum,	dev. wat. supply and furn. wat. equip.	$4,000	$5,000	$5,000	$3,000	$4,000	$2,000
15,000	M. gal. applying water	1.20	1.20	1.20	1.20	1.45	1.50
Lump sum,	finishing roadway	$1,000	$1,000	$1,500	$1,200	$2,000	$2,000
28,500	sq. yd. mix. and compact. (C.T.S.)	.23	.185	.18	.24	.21	.24
1,600	bbl. Portland cement (C.T.S.)	3.75	3.20	4.00	3.50	3.45	3.20
47	ton asph. emuls. (cur. sl., pt. bdr. & sl. ct.)	30.00	45.00	34.00	42.00	45.00	30.00

Continued on next page

It's not just a rugged truck—
It's not just a powerful crane—
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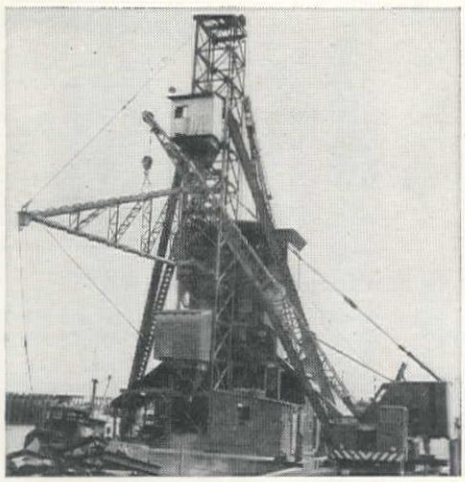
It's a BAY CITY built CRANEMOBILE

This is the famous 25 ton capacity CRANEMOBILE that is getting big jobs done in a hurry!



Merritt, Chapman & Scott Corp., New York contractors, use their CraneMobile on the Annapolis side of the new Delaware Memorial Bridge at Sandy Point, Md. Like Merritt, Chapman & Scott, repeat BAY CITY buyers, contractors throughout the country like CraneMobile's *big* performance on *big* jobs.

When you buy a CraneMobile you get a compact, complete unit for the most efficient handling of heavy loads, high lifts and long reaches. Both crane and carrier are designed and built by Bay City. The carrier is specially engineered and ruggedly built to meet difficult operating conditions. The crane is designed for high performance and easy operation in every detail from the pin-connected boom to the full length cast alloy steel base. With capacity to 25 tons, the *big* CraneMobile handles *big* jobs, unusual loads, and long reaches with ease. See for yourself why contractors prefer the Bay City built CraneMobile. Make your own comparison.

For latest catalog see your nearest dealer or write BAY CITY SHOVELS, INC., BAY CITY, MICHIGAN.

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Feenaughty Machinery Company
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SPOKANE
Feenaughty Machinery Company
N. 715 Division Street

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Feenaughty Machinery Company
600 Front Street

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Neil E. Grimes, Inc.
821 N. Main Street

SALT LAKE CITY
C. H. Jones Equipment Company
1595 So. Second, W.

PHOENIX
Western Machinery Company
124 E. Buchanan Street

11,000 ton untr. rock base	1.60	1.65	1.40	1.70	1.60	2.00
40 ton liquid asph., SC-2	21.00	22.50	24.00	32.00	20.00	23.00
7,800 ton mineral aggr. (P.M.S.)	3.50	4.15	3.50	4.00	3.25	4.00
410 ton paving asph. (P.M.S.)	13.00	4.15	17.00	16.00	16.00	20.00
210 lin. ft. placing plant-mixed curbs	.30	.50	.50	.50	.55	1.30
6,550 cu. yd. Cl. "B" P.C.C. (pavement)	11.00	10.75	10.50	12.00	11.00	11.00
5,300 ea. pavement tie bolt assemblies	.55	.55	.50	.60	.55	.50
9,000 cu. yd. Cl. "A" P.C.C. (struct.)	40.00	42.00	47.00	43.00	42.50	44.00
452 lin. ft. rubber waterstops	2.00	2.00	2.50	2.20	2.00	2.00
4,500 lin. ft. cast-in-place conc. piling (drilled holes)	3.00	3.15	3.00	3.00	3.10	3.50
1,890,000 lb. bar reinf. steel	.095	.09	.085	.10	.095	.09
45,700 lb. miscl. iron and steel	.30	.33	.35	.30	.28	.30
1,570 lin. ft. steel railing	7.00	7.00	7.00	6.50	7.00	7.00
134 lin. ft. pipe handrail (wall type)	3.50	3.80	3.00	3.20	3.50	3.50
187 lin. ft. pipe handrail (post type)	6.00	7.60	6.00	6.00	6.00	7.00
472 lin. ft. 18-in. welded steel pipe	9.00	8.00	4.00	9.00	8.50	7.00
12,900 lb. railroad rails	.15	.16	.07	.16	.13	.15
1,850 cu. yd. Cl. "A" P.C.C. (curbs, gutters and sidewalks)	24.00	24.00	25.00	23.00	23.00	25.00
1,000 lin. ft. timber guard railing	2.80	2.75	3.00	3.00	2.70	3.00
350 lin. ft. metal plate guard railing	3.00	2.75	3.00	4.00	3.10	3.00
8,046 lin. ft. 72-in. chain link fence	2.20	1.75	2.00	2.00	2.00	2.00
2 ea. walk gates	60.00	50.00	70.00	75.00	40.00	100.00
825 lin. ft. salv. exist. chain link fence	.16	.35	.50	.50	.35	.40
825 lin. ft. reconstr. salv'gd. chain link fence	.60	.75	.80	.80	.70	.80
450 lin. ft. 12-in. R.C.P. culverts	2.70	2.80	2.50	2.60	2.50	2.50
250 lin. ft. 15-in. R.C.P. culverts	3.30	3.50	3.00	3.00	3.00	3.50
650 lin. ft. 18-in. R.C.P. culverts	4.00	4.15	4.00	3.80	3.70	4.00
660 lin. ft. 18-in. R.C.P. siphons	4.00	4.40	4.00	4.00	3.70	4.00
600 lin. ft. 21-in. R.C.P. culverts	4.60	4.90	4.50	4.50	4.20	5.00
72 lin. ft. 24-in. R.C.P. culverts	5.50	5.80	5.50	5.25	5.00	5.50
550 lin. ft. 33-in. R.C.P. culverts	8.00	8.30	8.00	7.50	7.20	7.00
160 lin. ft. 36-in. R.C.P. culverts	9.00	9.20	9.00	8.50	8.00	8.00
600 lin. ft. 60-in. R.C.P. siphons	19.00	21.00	18.00	20.00	21.00	19.00
72 lin. ft. 63-in. R.C.P. siphons	20.00	22.00	20.00	22.00	24.50	20.00
400 lin. ft. 72-in. R.C.P. siphons	24.00	26.00	24.00	28.00	24.50	25.00
16 cu. yd. Cl. "C" P.C.C. (pipe reinf.)	17.00	24.00	17.00	20.00	15.00	20.00
4 lin. ft. pipe shaft manholes	14.00	15.00	14.00	20.00	16.00	15.00
13 ea. adjust exist. manholes to grade	27.00	18.00	30.00	50.00	17.00	50.00
1 ea. horizontal reflector unit	7.00	8.00	8.00	10.00	9.00	10.00
150 lin. ft. 6-in. vitrified clay pipe (std. str.)	1.10	2.25	1.50	2.00	1.20	1.50
1,350 lin. ft. 8-in. vitrified clay pipe (extra str.)	1.50	2.00	1.70	2.20	1.50	2.00
375 lin. ft. 15-in. vitrified clay pipe (extra str.)	3.80	4.20	3.50	6.00	3.50	3.00
13 ea. brick manholes (sanitary sewer)	300.00	300.00	300.00	350.00	200.00	400.00
82 ea. house connection caps	17.00	15.00	25.00	10.00	13.00	20.00
Lump sum, electrical equip.	$12,000	$12,000	$12,000	$15,000	$13,000	$11,000
Lump sum, drainage equip.	450.00	550.00	$1,000	$2,000	500.00	$1,500

Base Preparation and 55 Mi. of Road-mix Asphaltic Surfacing

New Mexico—Curry County—State. G. I. Martin, Albuquerque, was low bidder for 55 mi. of roadmix surfacing of the Weber City-Clovis highway. Unit bids were as follows:

(1) G. I. Martin $311,341
(2) Henry Thygesen & Co. 312,609
(3) Skousen-Hise Co. 314,082
(4) Wheeler & Trotz 330,922
(5) Brown Construction Co. $352,241
— Armstrong & Armstrong 372,516
(6) Engineer's estimate 382,503

	(1)	(2)	(3)	(4)	(5)	(6)
319,660 ton mile haul	.07	.05	.06	.05	.06	.06
1,480 hr. rolling—steel tired roller	5.00	5.00	6.00	5.00	6.00	5.00
2,090 hr. rolling—pneumatic tired roller	3.00	4.25	3.50	3.75	4.00	4.00
51,740 ton leveling course	.70	.87	.90	1.10	.81	.75
7,790 M. gal. watering	3.50	2.00	1.00	1.75	1.00	2.00
21,250 ton sand for mixing with base course matl.	.25	.46	.25	.80	.40	.50
15,820 bbl. cutback asphalt Type MC-3	5.20	5.00	5.40	5.40	6.00	7.00
55.427 mi. mixing and processing sand with base course	500.00	470.00	425.00	600.00	600.00	750.00
6,340 bbl. 210-250 penetration asphalt	5.35	5.00	5.65	5.70	6.00	7.00
11,630 ton cover material	3.00	4.00	4.00	3.50	5.00	5.00
55,427 mi. asphalt processed base	500.00	480.00	500.00	300.00	600.00	500.00

Concrete Curbs, Gutters and Incidental Work

Nevada—Ormsby County—State Planning Board. John L. Savage, Carson City, with the low bid of $6,882, was awarded a contract for construction of curbs, gutters, sidewalks, driveways, and incidental work around the State Office Building, Carson City. Unit bids were as follows:

(1) John L. Savage $6,882
(2) Walker Boudwin Construction Co. 7,585
(3) Silver State Construction Co. $7,941
(4) Dodge Construction, Inc. 7,953

	(1)	(2)	(3)	(4)
220 cu. yd. structure excav.	1.50	1.60	2.00	2.00
20 cu. yd. backfill	2.00	3.00	2.00	1.00
147 cu. yd. selected material surface	2.00	3.85	3.00	1.75
1 cu. yd. special Class A concrete	38.00	50.00	80.00	55.00
30 lb. reinforcing steel	.20	.22	.20	.20
46 lin. ft. 12-in. reinf. conc. pipe	3.10	3.72	3.00	3.00
70 cu. yd. special Class A conc. curb and gutter	30.00	36.20	34.00	35.00
128 cu. yd. special Class A conc. sidewalk and driveway	30.38	29.60	34.00	35.00
214 lb. structural steel	.20	.267	.30	.50

Grading, Excavation and Structural Steel Bridge

Washington—Skagit County—State. General Construction Co., Seattle, was low bidder and awarded the contract for construction of 1.9 mi. of the concrete to Sauk Valley Road. Unit bids were received as follows:

(1) General Construction Co. $548,636
(2) Cascade Contractors 550,242
(3) M. P. Butler 563,375
(4) Bay Construction, Inc. 570,621
(5) Guy F. Atkinson Co. 617,520
(6) Morrison-Knudsen Co., Inc. $619,304
— Paul Jarvis, Inc. 626,100
— N. Fiorito Co. 666,398
— Osberg Construction Co. and Manson Construction and Engineering Co. 686,513

	(1)	(2)	(3)	(4)	(5)	(6)
Lump sum, clearing and grubbing	$3,000	$3,000	$3,000	$3,000	$4,000	.085
11.89 acres clearing	600.00	600.00	600.00	600.00	800.00	611.00
10.73 acres grubbing	500.00	500.00	500.00	500.00	700.00	845.00
148,425 cu. yd. common excav., incl. haul of 600 ft.	.59	.60	.40	.59	.36	.58
45,236 cu. yd. solid rock excav., incl. haul of 600 ft.	.59	.60	1.50	.59	1.40	1.57
1,424.2 M. cu. yd. sta. overhaul	5.00	5.00	5.00	5.00	8.00	6.00
148,240 cu. yd. sta. overhaul	.015	.015	.03	.015	.02	.025
115 cu. yd. struct. excav.	3.00	3.00	3.00	3.00	4.00	4.30

Continued on next page

"You Build for your own and your country's future when you save..."

BENJAMIN F. FAIRLESS

President, U. S. Steel Corporation

"A free economy, such as ours, is built on the savings of the people. And the future security of America depends on the initiative and the growth of every citizen. We in U. S. Steel encourage our employees to join the Payroll Savings Plan, and we are proud that the National Tube Company, one of our subsidiaries, was the first of the large industrial companies of the nation in 1950 to have more than 80% of its employees participating. Remember, you build for your own and your country's future when you save."

Mr. Fairless is not expressing a personal opinion, nor is he speaking for other far-seeing executives when he tells you that our economy is built on the savings of the people and a man builds for his own and his country's future when he saves.

Actually, Mr. Fairless is merely putting in words the thoughts and action of the millions of employed men and women who *now hold* more than 50 billion dollars in U.S. Savings Bonds.

$50,000,000,000! Who *sold* all those bonds to millions of people? The answer is, nobody sold them.

80% of the employees of the National Tube Company . . . 75% of the employees of Carnegie-Illinois Steel Company . . . thousands of employees of other U.S. Steel subsidiaries . . . more than 8 million employees of other companies bought U.S. Savings Bonds and are buying them every month on the easy, automatic Payroll Savings Plan. Their employers merely offered these men and women an opportunity to save for their future. There was no pressure, no emotional appeal.

How does employee participation in *your* Payroll Savings Plan match up with the 80% of National Tube, the 75% of Carnegie-Illinois? Or, perhaps you are one of the relatively few large companies that do not have a Plan? In either case, wire or write, Savings Bond Division, U.S. Treasury Department, Suite 700, Washington Bldg., Washington, D.C. Your State Director is ready to help you with a package plan—application blanks, promotional material, practical suggestions and all the personal assistance you may desire.

The U. S. Government does not pay for this advertising. The Treasury Department thanks, for their patriotic donation, the G. M. Basford Company and

WESTERN CONSTRUCTION

609 Mission St., San Francisco 5, Calif.

95.6 sta. (100 ft.) finishing roadway	12.00	12.00	15.00	12.00	10.00	17.95
114 cu. yd. gravel backfill for foundations, in place	4.00	4.00	3.00	4.00	5.00	3.10
8,775 cu. yd. selected roadway borrow, in place	.60	.60	.75	.60	.66	1.85
3,200 lin. ft. standard beam guard rail in place	2.50	2.50	3.00	2.50	2.80	3.00
56 only guard posts, in place	10.00	10.00	8.00	10.00	12.00	9.15
26.5 cu. yd. concrete Class A, in place	50.00	60.00	70.00	75.00	75.00	55.00
3,380 lb. steel reinforcing bars, in place	.12	.12	.11	.15	.20	.11
147 lin. ft. plain conc. culv. pipe, 12-in. diam., in pl.	2.50	2.50	1.75	2.50	2.00	1.20
141 lin. ft. std. reinf. conc. culv. pipe, 18-in. diam., in place	5.00	5.00	4.00	5.00	4.00	2.95
99 lin. ft. std. reinf. conc. culv. pipe, 30-in. diam., in place	9.00	9.00	7.50	9.00	7.00	6.00
70 lin. ft. bit. ct. corr. met. culv. pipe T #2, #14 ga., 24-in. diam., in place	6.50	6.50	6.00	6.50	8.00	5.80
350 lin. ft. bit. ct. corr. met. culv. pipe T #2, #14 ga., 30-in. diam. in place	8.50	8.50	8.00	8.50	9.00	7.50
80 lin. ft. bit. ct. corr. met. culv. pipe T #2, #12 ga., 36-in. diam., in place	13.00	13.00	12.50	13.00	13.00	11.20
254 lin. ft. bit. ct. corr. met. culv. pipe T #2, #10 ga., 60-in. diam., in place	29.00	29.00	27.00	29.00	32.00	23.85
BRIDGE						
Lump sum, clearing and grubbing	$5,500	.....	$3,000	250.00	$1,000	622.00
230 cu. yd. unclassified excav. incl. haul	2.00	7.00	2.00	3.00	4.00	1.80
970 cu. yd. structure excavation	10.00	7.00	18.00	6.00	13.00	8.00
500 cu. yd. concrete Class A in place	65.00	60.00	60.00	54.40	90.00	73.00
860 cu. yd. concrete Class F in place	40.00	28.00	40.00	25.50	55.00	34.00
117,000 lb. steel reinf. bars in place	.12	.12	.10	.1325	.13	.12
1,274,000 lb. structural carbon steel in place	.195	.21	.195	.2325	.213	.21
28,500 lb. cast steel in place	.40	.41	.32	.3725	.50	.35
3,500 lb. forged steel in place	.60	.53	.65	.65	.60	.50
12 only bridge drains complete in place	70.00	60.00	55.00	30.00	60.00	63.50
900 lin. ft. metal bridge rail in place	11.00	10.50	10.00	10.50	12.50	11.20
96 lin. ft. reinf. conc. bridge railing in place	10.00	9.00	10.00	12.00	12.00	9.75
Force account, drilling and grouting abutments	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000

Excavation, Haul, Culverts, and Road-mix Asphalt Surface

Nevada-Esmeralda and Nye Counties—State. Dodge Construction, Inc., Fallon, Nev., with the low bid of $214,310, was awarded the contract for construction of 20 mi. of state highway from the California-Nevada state line at Grapevine Canyon to junction with U. S. 95 near Sarcobatus. Units bids were as follows:

(1)	Dodge Construction, Inc.	$214,310	
(2)	Silver State Construction Co.	215,556	
(3)	Wells Cargo, Inc.	227,609	
(4)	Hoops Construction Co.	235,127	
(5)	Foster & McHarg	235,130	
(6)	Isbell Construction Co.	$245,668	
—	H. B. Adair Construction Co.	263,335	
—	Basich Bros. Construction Co.	279,924	
—	Rogers & Rogers	283,345	

	(1)	(2)	(3)	(4)	(5)	(6)
241,480 cu. yd. roadway excav.	.18	.19	.21	.18	.26	.20
140 cu. yd. drainage excav.	.50	.25	.70	1.00	1.00	1.00
30 sta. V-type ditches	5.00	5.00	5.00	5.00	5.00	5.00
615,730 yd. sta. overhaul	.015	.01	.015	.01	.005	.015
7,610 yd. mi. overhaul	.15	.20	.17	.15	.20	.20
1,240 cu. yd. struct. excav.	1.50	1.00	1.00	1.00	1.50	1.00
930 cu. yd. backfill	1.00	1.00	1.25	.50	1.50	.75
10,400 M. gal. water	.75	.50	.70	1.00	1.00	1.60
334 hr. power roller	5.00	4.00	6.00	6.00	5.00	6.00
16,687 ft. hr. tamping roller	.25	.40	.50	.50	.50	.50
62,490 ton gravel surface	.49	.49	.55	.50	.65	.65
162 ton liquid asph., Type MC-2 (seal)	31.50	33.00	32.00	36.00	29.00	35.00
1,778 ton liquid asph., Type SC-3 (rdmx.)	29.00	30.00	28.00	30.00	26.50	29.00
21.42 mi. roadmix	500.00	900.00	500.00	500.00	500.00	650.00
370 sq. yd. roadmix intersections	.20	.20	.20	.30	.20	.25
3,472 lin. ft. 29-in. x 18-in. corru. metal arch pipe (12 gage)	6.25	5.50	5.95	6.50	6.50	6.15
178 lin. ft. 36-in. x 22-in. corru. metal arch pipe (12 gage)	7.50	7.00	7.25	8.00	9.50	8.00
90 lin. ft. 43-in. x 27-in. corru. metal arch pipe (10 gage)	11.00	10.00	10.00	14.00	12.00	11.50
460 cu. yd. grouted hand-laid riprap	20.00	20.00	25.00	25.00	15.00	20.00
209 ea. culvert markers and guide posts	5.00	6.00	5.00	6.00	6.00	6.00
96 ea. right-of-way markers	6.00	6.00	6.00	6.00	6.00	8.00

WEST VIRGINIA SOLVING ROAD BUDGET PROBLEM WITH SEAMAN MIXERS!


The Charleston Gazette

To Get More Roads

Charleston Gazette in editorial points to Seaman as answer to road system extension . . .

The Charleston Gazette, quite properly, does not mention the SEAMAN by name, calling it only a "road-building machine," but the story is about seven SEAMAN MIXERS now in use by West Virginia. In part, here's what the Gazette says:

"Here is an answer to the prayers of those dwellers in West Virginia hills who are harassed by their inability to get in and out the greater part of the year. Our many miles of dirt roads — often no better than mud roads — are the cause of continual complaints . . .

"We have gone into the matter of the road building machine and have found much to recommend it — low price, low cost of operation and speed in road construction. The result of the investigation was startling.

"The machine goes over the old road . . . mixes the old material and applies a binder, lays it back down and smoothes it out. A following roller compacts it and the job is done.

" . . . It is stated that the cost of construction of this type of road is approximately one-fourth that of the old method . . ." West Virginia's experience with the SEAMAN MIXER is duplicated the country over. The SEAMAN *is by far the best answer* to high quality, low cost stabilized roads.

The SEAMAN SELF-PROPELLED MIXER 7 ft. mixing width. Gasoline or Diesel powered.


The SEAMAN SELF-PROPELLED TRAV-L-PLANT. Like the Self-Propelled Mixer except for addition of spray bar, pump, pump tachometer fifth wheel assembly and meter for precision control of bitumen or water application. 7 ft. mixing width. Gasoline or diesel powered.

Here's a Bulletin describing the SEAMAN Self-Propelled Mixer and the TRAV-L-PLANT. Sent to you FREE on request. Ask for "Self-Propelled Bulletin."

SEAMAN MOTORS, INC.

285 N. 25th ST., MILWAUKEE, WIS.

NEW EQUIPMENT

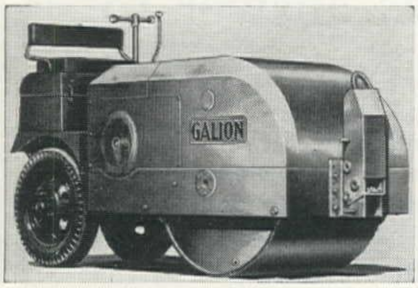
MORE COMPLETE INFORMATION about any of the new equipment or products briefly described on the following pages may be obtained at no charge. Send your request to Equipment Service, Western Construction, 609 Mission St., San Francisco 5, Calif. For quicker service, designate items by number.

****

101

Variable Weight Portable Roller

Features claimed: Improvements of the Galion Portable Roller are hydraulic power steering, spur gear final drive, constant-



mesh transmission, over-center Twin Disc forward and reverse clutches, hydraulically operated towing hitch which folds back compactly against roller housing when not in use. Compression under roll, without water ballast, is 130 lb. per lin. in., increased to 192 lb. per in. with ballast. The roller is 48 in. diam. and 42 in. wide.

Manufacturer: The Galion Iron Works and Mfg. Co., Galion, Ohio.

102

Plaster-Mortar Mixer Has Easy Tilt Arrangement

Features claimed: Through action produced by the paddle shaft drive, the loaded drum on this 6-cu. ft. plaster-mortar mixer tends to tilt itself when released for discharge. Drum also tilts in opposite direction for quick, easy cleaning. Four non-clogging mixing blades, positioned at 90 deg. around shaft for uniform action, are slotted for radial and longitudinal adjustment. Blades scour the drum on each revolution for end-to-end mixing and rapid discharge.

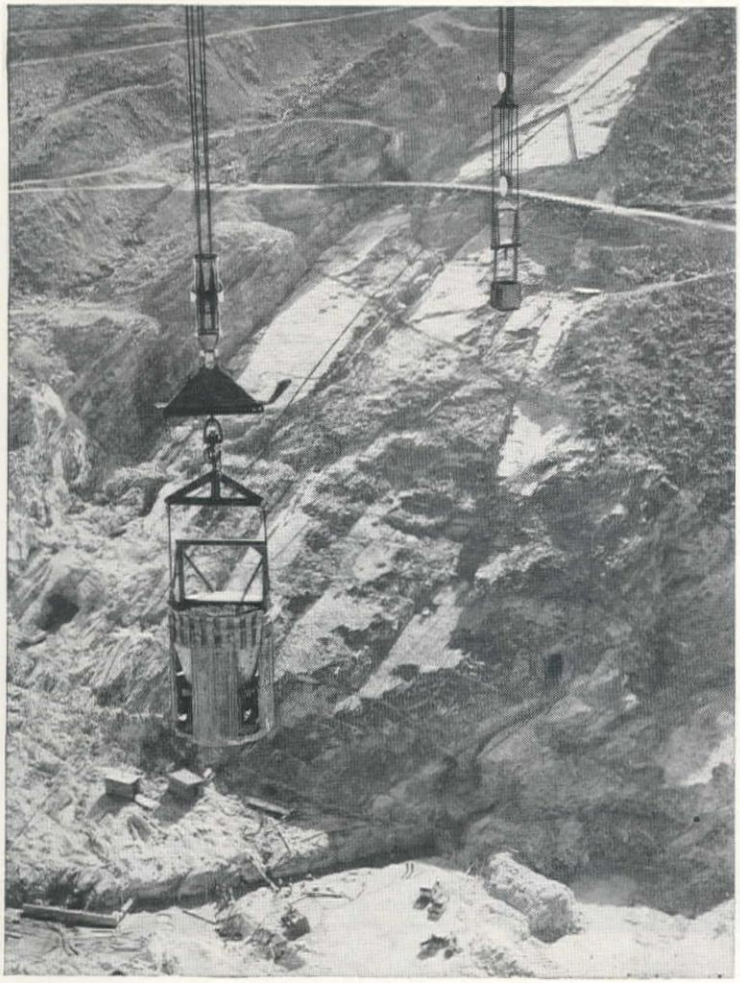
Manufacturer: Koehring Co., Milwaukee 16, Wis.

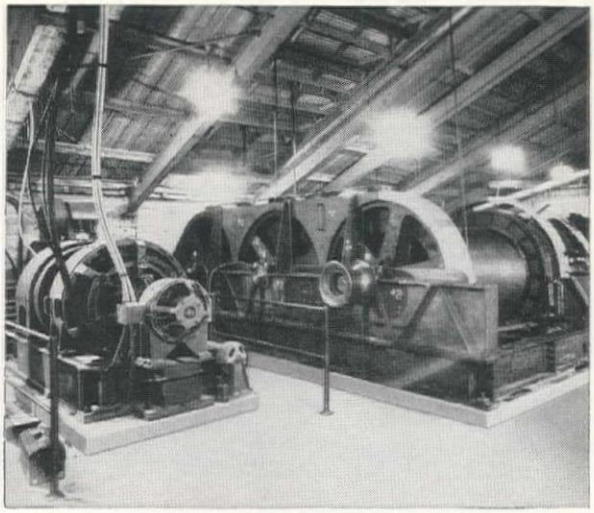
103

Hoe-Type Ditch Trencher Mounted on a Tractor

Features claimed: This digger works behind a tractor with a hydraulic pump, independently mounted, operated from the

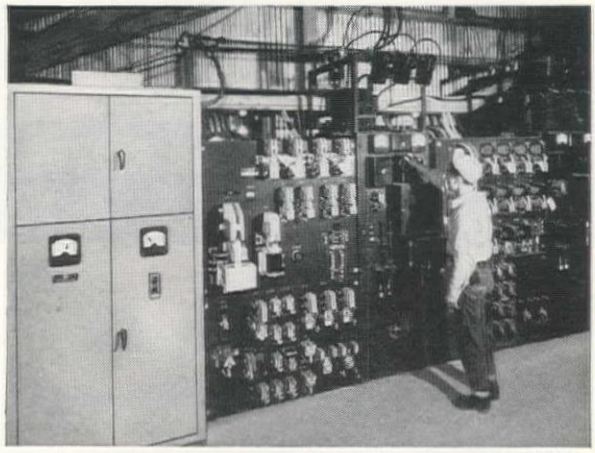
power take-off shaft of the tractor. All digger motions are hydraulically operated. It has a below surface reach of 8 ft. and a 10-ft. digging reach behind the tractor with a 140-deg. swinging arc. The bucket can be raised high enough so as to load any standard size dump truck. The standard hoe-type shovel cuts an 18-in. wide trench





▲ Aerial cableway hoist room showing hoist drums and one of three General Electric motor-generator sets used to drive the powerful G-E 500-hp hoist motors.

◀ Concrete in 8-cubic-yard buckets is moved nearly half a mile on a G-E powered aerial cableway for placing concrete in the construction of Hungry Horse Dam.



Attendant adjusts voltage on G-E switchboard panel. At left is G-E Cabinetrol. Installation provides variable voltage for smooth, accurate speed control of cableway hoists.

BIG LIFT carries concrete across a canyon ... Electrically

G-E Powered Aerial Cableways Vital Link in Concrete Placing at Hungry Horse Dam

Carrying 2,900,000 cubic yards of concrete across a half-mile canyon! It's only one of the big jobs at which the General Shea Morrison Construction Company works night-and-day to complete Hungry Horse Dam on schedule for the Bureau of Reclamation. But they're licking this and the many other problems that face them on the Flathead River site in northwestern Montana. Their answer lies in the use of co-ordinated electric equipment—G-E substations, motors, motor-generators, Cabinetrol*, and switchgear, carefully integrated into one complete system.

Construction equipment electrified by General Electric can provide *you* with new on-the-job flexibility, speed, and safety. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

**Reg. trade-mark of General Electric Co.*

Ask him Today!

Whether you buy or build construction equipment, your G-E representative can show you how to do a better job—at lower cost—by complete electrification. Write him now, and he'll call on you at your convenience.

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

Electrified Construction
BETTER PRODUCT
LOWER COST

GENERAL ELECTRIC

664-14

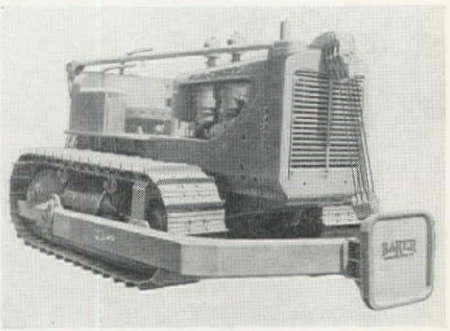
and has a capacity of 3½ cu. ft. The entire unit can be installed on or removed from a tractor in 15 to 20 min.

Manufacturer: Sherman Products, Inc., 3200 W. 14 Mile Road, Royal Oak, Mich.

104

Pusher for HD-19 Tractor Floats with Scraper Pusher Block

Features claimed: Available as a complete unit or as an attachment, the new Baker pusher weighs 725 lb. complete, is



heavily reinforced, sturdily constructed, and designed to work with practically all types of scraper push plates. The pusher floats with the pusher block of the scraper, whether high on a fill or low in a deep cut.

Manufacturer: The Baker Manufacturing Company, Springfield, Ill.

105

Twin-Helix Auger Made to Fit Power-driven Boring Machines

Features claimed: Known as the Pengo Earth Auger, the twin-helix auger is made to fit the Highway Earth Boring Machine and all other popular makes by means of adapters. Each half helix is equipped with a shank plate, provided with replaceable cutting points of abrasion-resistant alloy steel. The twin-helix design eliminates back thrust against the side of the hole. Nine sizes are manufactured, to 36-in. diam.

Manufacturer: Petersen Engineering Co., 4126 26th St., San Francisco, Calif.

106

Uniquely Designed Welder's Scaling Hammer

Features claimed: The hammer features a multi-point hammering surface which speeds de-scaling by loosening scale over

a larger surface with each tap, and a hollow ground head, providing effective weld-scraper action for removing spatter. A slagging pick accurately removes slag from weld pockets and corners.

Manufacturer: Jack Churchward Welding Accessories, North Haven, Conn.

107

Use and Re-use These Corrugated Steel Stakes

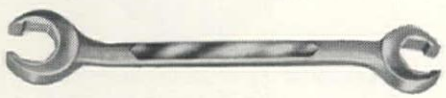
Features claimed: These stakes of rigid corrugated steel can be re-used indefinitely for concrete form work in the construction industry. Of a special design on which patents now are pending, the stakes are formed and pointed for easy driving through gravel or hard formations that would shatter ordinary wood stakes. Predrilled nail holes allow ready attachment of horizontal formers. Five sizes are standard production to accommodate footing forms of most types, as well as roadbeds, curbs and sidewalks—14-, 18-, 24-, 30- and 36-in., priced at less than a cent per inch. Special sizes are made to order. Dealer inquiries invited.

Manufacturer: Walter B. Snook Enterprises, 751 XJ Loma Verde Avenue, Palo Alto, Calif.

108

New Flare Nut Wrenches With Hex Openings

Features claimed: Ideal for fuel, hydraulic and gas lines, the wrenches are made with hex openings for better bite and to prevent turning the comers on soft brass nuts usually found on copper lines. The tools are drop-forged from high alloy steel and fully heat treated with chrome plate finish.



Manufacturer: Owatonna Tool Co., Owatonna, Minn.

109

High Capacity Bolt Cutter For Building Contractors

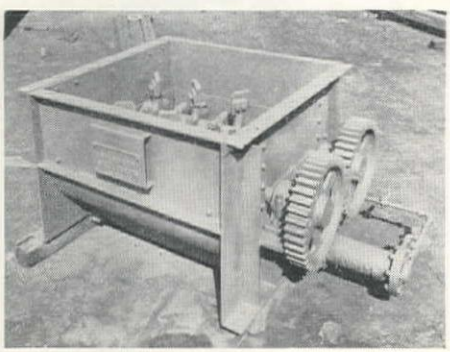
Features claimed: The Manco 15 costs 25% less and weighs 60% less than conventional cutters of the same capacity. Advantages of the 15-in. cutter include none of the adjustments necessary with standard cutters, since the formed steel handles will not yield under pressure. The tool is ideal for cutting No. 9 form wire quickly and economically.

Manufacturer: Manco Mfg. Co., Bradley, Ill.

110

Twin Shaft Asphalt Mixer With Sectionalized Lining

Features claimed: The "Standard" twin shaft asphalt mixer incorporates an advanced principle of sectionalized lining for easier and more economical replacement. Instead of being one solid piece, the lining surface consists of several sections bolted to the welded steel body from the outside. No holes or bolts extend through to the wearing surface. The machine features



roller bearings rather than sleeve bearings, and is available in two models.

Manufacturer: Standard Steel Corp., Los Angeles.

111

Self-Propelled Hydra Hammer (A Miniature Pile Driver)

Features claimed: This multi-purpose tool is basically a miniature pile driver with adapting tools to enable it to do several types of work economically and speedily. The technique of operation can be learned in one hour, and the tool is completely self-propelled. There is no lost time at the job, since the tower can be elevated from travel position to operating position immediately. The 400-lb. hammer is lifted hydraulically and released in a free fall, eliminating shock. Actual tests have proved that the one-man SP Hydra Hammer is capable of

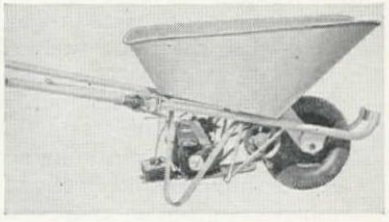
cutting asphalt faster than two men by the conventional methods. Season or weather have no effect on the efficiency of the tool in cutting and breaking asphalt and concrete. The hammer does patch work on concrete quickly and with only half the cost of conventional equipment.

Manufacturer: Ottawa Steel Products, Inc., Industrial Division, Ottawa, Kansas.

112

Self-Powered Wheelbarrow Pulls Full Load up 40% Grade

Features claimed: An air-cooled engine mounted beneath the wheelbarrow bed sup-



plies the power by friction on the tire tread. All controls are on the right handle. Power is sufficient to pull a full load up a 40% grade, and speed on the level is at walking pace.

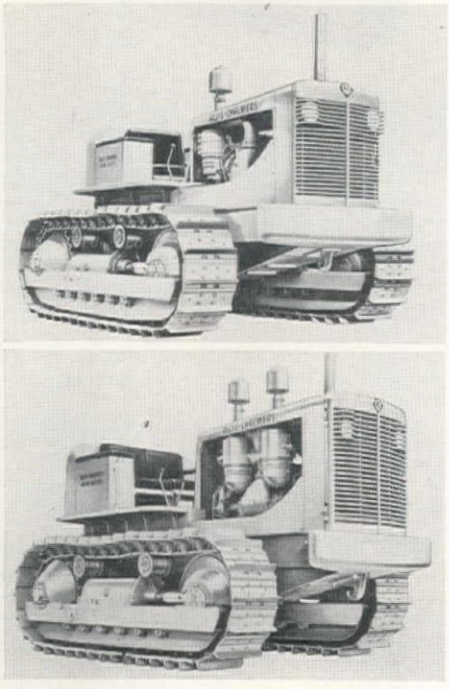
Manufacturer: S and S Vending Machine Co., San Jose, Calif.

113

Two New Crawler Tractors by Allis-Chalmers

Features claimed: The HD-9 weighs 18,500 lb., and has a drawbar rating of 70 hp. The larger HD-15 weighs 27,500 lb., and

develops 102 hp. Both have six speeds forward and three reverse. Features common to both models include a constant mesh transmission with separate reverse gears for a forward-reverse shift in any speed with one control lever, power by GM 2-cycle diesels, and unit assembly construction. The assembly design enables servicemen to remove and install each unit in the power train—engine, clutch, transmission, steering clutch and final drive—without disturbing related assemblies. Other major benefits include "Positive Seals" in the final drive, truck wheels, idlers, and support rollers. By retaining grease for a period of 1,000 hours, these spring loaded seals make it possible for owners to operate the new tractors for six months, on a 40-hr. work week basis, without further lubrication of the track assembly. Other features which add to the ease and efficiency of operation include: an adjustable seat, boosted steering, convenient grouping of controls, self-energizing brakes, and a tapered cowl for better visibility.



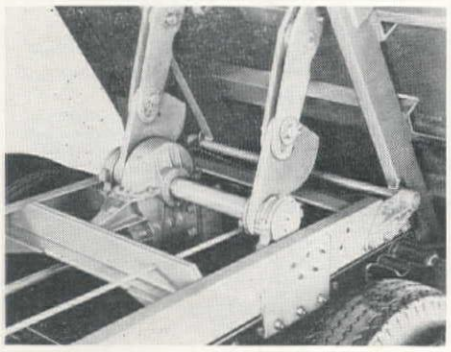
Top—The HD-9. Bottom—The HD-15.

Manufacturer: Tractor Division, Allis-Chalmers Mfg. Co., Milwaukee 1, Wisc.

114

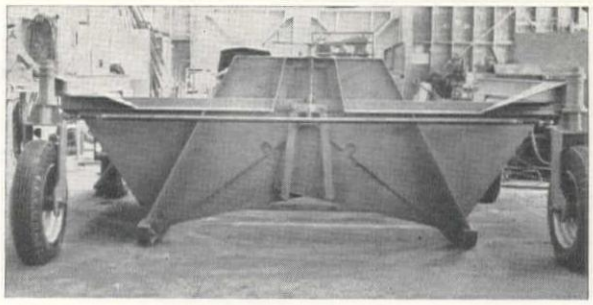
Dump Truck Mechanical Hoist Has Power Up, Power Down

Features claimed: The DUBE Mechanical Hoist has no hydraulic fluid to congeal in the winter or thin out under summer heat. It gives top performance in any weather, operating with equal efficiency at



115

Accurate Aggregate Windrow Shaper with Adjustable Strike-off Opening



Features claimed: For accurately shaping aggregate windrows in road construction the Parsons Win-Ro Equalizer has an adjustable strike-off opening which may be adjusted, without tools, to shape windrows from 7.6 to 2.25 cu. ft. per lin. ft. Once set, it accurately meaures the aggregate to conform to specified amount. Adequate surge capacity insures constant feed. The unit will shape sub-base, finish course, or hot-mix and saves material by preventing over-run. It saves motor grader time by insuring that there will be no doubling back to fill low spots or to pick up excess.

Manufacturer: Engineering Sales Service, Inc., Boise, Idaho.

70 deg. below zero F., or 120 deg. F. above zero. The unit gives a 55 to 60-degree dumping angle, and takes power to lift the load from the truck engine through conventional power take-off to a speed reducer and Cone worm and gear set.

Manufacturer: Detroit Mechanical Hoist Corporation, Detroit, Michigan.

116

Little Giant Pump Has Big Wellpoint Capacity

Features claimed: The new "Complete" wellpoint pump fits all sizes and types of wellpoint systems, and has a special outlet for jetting. It is powered by a Wisconsin air-cooled V.P. 4 gasoline engine.

Manufacturer: Complete Machinery and Equipment Co., Inc., Long Island City, N. Y.

117

Rock Plant Designed for "Crush and Travel" Operations

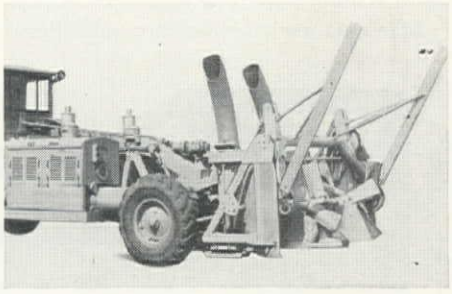
Features claimed: Named the Model CSE Traveler, the plant consists of jaw crusher, shovel loading hopper with reciprocating feeder and trap grate, feed conveyor, one-deck inclined gyrating screen, delivery conveyor, return bucket elevator, and power unit mounted on a steel gooseneck truck with pneumatic tires. The CSE is designed to produce accurately sized material for road building and maintenance with a single crusher in a closed circuit. Four sizes are available with 916, 1016, 1020, or 1024 jaw crushers in either bronze or roller bearing types. The plants are designed for crush and travel operations where production requirements are moderate. Compact design with minimum weight and high portability permit them to operate in out-of-the-way locations wherever gravel is available. The complete series of Traveler plants includes the CSE, CS, and TS, for single-pass gravel plants that screen out finished pit run, crush the oversize, and blend the natural with the crushed material in the loading operation.

Manufacturer: Universal Engineering Corp., Cedar Rapids, Iowa, Division of Pettibone-Mulliken Corp. of Chicago.

118

Rotary Snow Plow Attachment For Caterpillar Graders

Features claimed: The Sno-Flyr can be delivered in package form, ready for mounting on the grader by the local Caterpillar dealer. Hitch assemblies, engine mounting frames, drive assemblies, and controls are included in the package. No factory mounting is necessary. The attachment gives fast, economical snow removal, plus additional auxiliary engine power for countless other jobs.

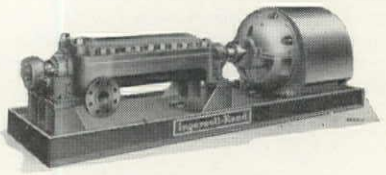


Manufacturer: Wm. Bros Boiler and Mfg. Co., Minneapolis, Minn.

119

In-Line High Head Multi-Stage Centrifugal Pumps

Features claimed: The multi-stage centrifugal pumps for high-pressure applications to 1,200 psi. at capacities to 1,600 gpm. are known as the Class HMTA, and are built in 3, 4, 5 and 6-in. sizes with from 3 to 9 stages. The features of its new design are cylindrical bore, horizontally-split casing and compact rotor assembly. The rotor assembly is composed of the shaft, impellers, and channel rings, containing multiple volutes and fluid passages, as well as the renewable wearing parts for each stage. The entire rotor assembly is quickly and easily removed from and installed in the smooth-bore casing, since there are no mating ring fits or delicate alignment problems.



Manufacturer: Ingersoll-Rand Co., Phillipsburg, N. J.

120

Bulldozers, Gradebuilders and Root Rippers for HD-20 Tractor

Features claimed: Specifically built to work with the HD-20, the new Baker bulldozers, gradebuilders and root rippers are available in both hydraulic and cable-controlled models. Short linkage between the blade control lever and hydraulic control

valve give fingertip control. The short hydraulic linkage enables the operator to feel the changes in blade position and maintain full positive control with greater ease. Short linkage also assures the maintenance of a high level of control sensitivity over the long working life of the equipment.

Manufacturer: The Baker Mfg. Co., Springfield, Ill.

121

Universal Electric Impact Wrench For Heavy-Duty Nut Setting

Features claimed: Designed for heavy-duty nut setting on trucks and heavy equipment, the reversible 5/8-in. Thor Silver Line wrench features the same basically designed mechanism used in the 3/8-in.

"Packy." All vital parts are larger, including the motor, striking mechanism, and a newly designed cage with steel inserts to insure long lasting service. The tool weighs 12 lb., measures 11¾-in. overall, operates at 2,000 rpm. and delivers 1,850 impact blows per minute.

Manufacturer: Independent Pneumatic Tool Co., 175 State St., Aurora, Ill.

122

Laboratory Test Engine Available As Package Unit

Features claimed: A complete package unit suitable for laboratory test purposes in trade schools and universities has been made available by Caterpillar Tractor Co. The unit is a Cat D311 Laboratory Test Engine listed as 6F7090, and consists of the D311 engine, gasoline starting engine, heat exchanger, water-cooled manifold, stub shaft, and thermometer wells. With this equipment, the engine may be placed on the laboratory floor for connection to whatever dynamometer or other engine loading device schools may have available.

Manufacturer: Caterpillar Tractor Co., San Leandro, Calif.

123

Vapor Steam Cleaner with Automatic Pressure Check

Features claimed: Fully automatic, protected system on this heavy-duty steam cleaning machine enables one-man operation while at the same time accelerating the cleaning process. At the snap of a switch a spark is generated which ignites the burner and puts the machine in action. Action is instantaneous, a full operating pressure being generated within 90 seconds. System is protected from excessive pressures at three independent points. The "General" is available in stationary or portable models of 100- or 200-gal. capacities.

Manufacturer: General Equipment Division, Sterod Manufacturing Co., 444 Frelinghuysen Ave., Newark 5, N. J.

NEW LITERATURE

YOU MAY OBTAIN any of the publications reviewed below. Send your request to Western Construction, 609 Mission St., San Francisco 5, Calif. The literature is free, unless otherwise indicated. Please designate the desired items by number.
★★★★★★★★★★★★★★★★★★★★★★★★★★

124

Big Job Compaction

The use of giant rubber-tired rollers for "big job" compaction is described in two new folders published by the **Wm. Bros Boiler and Mfg. Co.**, Minneapolis, Minn. A "New Trends in Compaction" folder illustrates the complete line of Bros pneumatic-tire rollers, ranging from 7-ton Model 34 to the 50-ton Roll-O-Pactor. A diagrammatic drawing describes wheel action of the exclusive patented and copyrighted Bros Wobble-Wheel design.

125

Locknuts

The **Industrial Fasteners Institute**, Cleveland 15, Ohio, has available an 18-page 2-color booklet giving the history and present uses of locknuts. Outstanding feature of the booklet is the supply of halftone engravings of sectional drawings describing all different principles of nut fastening. These have been included with interesting and highly readable text material.

126

Masonry Drill

A catalog is now available describing the **New England Carbide Tool Co.**, Cambridge, Mass., Cyclo-Twist double-spiral fluted drill in extra lengths up to 36 in. The extra-length drills are available from 3/16 to 1-in. diam. The important feature is the fact that the two spiral flutes run from both cutting edges to the shank end, regardless of length. This feature, coupled with the fact that the drill body is the same diameter as the carbide, positively expels the dust as it drills. This saves removing the drill to clean out the hole. Also, it maintains uniform drilling rate and more holes per sharpening of the carbide cutting edges.

127

Snow Plow Wax

A catalog sheet describing the new Snow-Rem, snow plow wax with silicone, is announced by the manufacturer, **Speco, Inc.**, Cleveland 9, Ohio. The addition of silicone to Snow-Rem, the bulletin states, increases daily plow mileage and gives more miles per application of wax.

128

Plastic Pipe

Carlon Products Corp., Cleveland, Ohio, has available five different 4-page, illustrated catalogs describing Carlon E, EF, and T plastic pipe, and Carlon C plastic tubing, and a general brochure entitled "Carlon Plastic Pipe." Included in the brochure are six types of flexible and rigid plastic pipe and tubing recommended for a wide variety of applications ranging from drainage and sewage handling to the transmission of hydrofluoric acid.

129

How to Torch Weld

"How to Weld with Heliarc Torches" is the newly revised 28-page booklet containing information on welding, surfacing, and hard-facing of many commercially used metals, published by **Union Carbide and Carbon Corp.**, New York. Chapters are included on fundamentals, description of Heliarc equipment, welding preparations, torch instructions, and complete welding data for aluminum, stainless steel, magnesium, copper and copper alloys, plain carbon and low alloy steels, cast iron, and nickel and Monel.

130

Masonry Expansion Bolts

The **U. S. Expansion Bolt Co.**, York, Pa., has available a folder entitled "Quick Facts about USE Multi-Unit," caulk type machine bolt anchors, used with any standard machine bolt or threaded rod for anchoring in all types of masonry. Permits complete expansion before work is lifted into place and bolt fastened, the folder continues, and when caulked, the soft lead flows to fill the shallowest irregularities of anchor hole without crushing the masonry.

131

Lightweight Aggregates

A general brochure, 8 pages in two colors, on Permalite Lightweight Aggregates is available from the **Great Lakes Carbon Corp.**, New York 17, N. Y. The booklet is separated into two main sections; Permalite Lightweight Plaster and Permalite Lightweight Insulating Concrete. In the plaster section, such data as advantages and uses are included, including recommended

mixes and applications. Fireproofing is thoroughly covered. In the section on Permalite Lightweight Insulating Concrete, such data as the advantages, uses, typical applications, and complete technical data are included.

132

Diesel Conversion

The Detroit Diesel Engine Division of **General Motors** has a booklet available describing a new option on Series 71 diesel engines which enables them to burn natural gas in accordance with true diesel high-compression principles. The option is available both on new engines leaving the factory and on engines already in use. For the latter a factory-engineered kit is available for the changeover. The changeover permits the engines to burn either natural gas with a pilot charge of diesel fuel or diesel fuel alone. There is no interference with the operation of the unit as a straight diesel fuel engine when required.

133

Wellpoints

The **John W. Stang Corp.**, Bell, Calif., engineer and manufacturer in the field of unwatering equipment, has released an 80-page book on Stang Wellpoint System. Quoting from the Foreword, "Each detail of an unwatering program, from blueprint stage to final installation, is analyzed, planned, and supervised by Stang engineers and wellpoint technicians in collaboration with project personnel." "Wellpoints have proven effective in any type of pervious or semi-pervious soils including sand, gravel, or stratified mixed materials. Stang wellpoint equipment has even successfully unwatered quicksand where 85% of the material passed through a 200 mesh screen. The wellpoint unwatering method eliminates the need for expensive sheeting and sumping operations which still leave the ground wet. The banks of the excavation remain stable on steep slopes without sloughing, and hydrostatic pressure at the bottom is reduced, eliminating the possibility of boils." "A cross-section of representative types of construction projects, pre-drained with Stang wellpoint equipment, has been included to illustrate the wide applications of wellpoint unwatering."

134

Wood Veneer

Flexwood, a wood veneer 1/85th of an inch thick, and glued under pressure to cotton backing, is described in a profusely illustrated brochure issued by **United States Plywood Corp.**, New York, N. Y. Flexwood, offered in a wide variety of veneers is shown solving many difficult architectural problems.

135

Hand Torches

Air Reduction Pacific Co., San Francisco 4, Calif., has released a 36-page illustrated catalog containing detailed information on Airco's complete line of welding and cutting torches, outfits, tips, and accessories. Extensive charts showing correlation of tip, mixer, extension, and torch contain complete data for each component part.

136

Tamping Rollers

The complete line of medium and giant weight tamping rollers manufactured by the **Wm. Bros Boiler and Mfg. Co.**, Minneapolis 14, Minn., is described in a new folder. The 6 medium weight "M" series models are sheepfoot types with pressures from 108 to 315 psi., and the 4 giant weight "G" series models have diamond shaped

feet, in single or double drum types, for heavy compaction work. Foot pressures of the "G" series tampers range from 296 psi. to 740 psi.

137

Defense Welding Manual

The **Eutectic Welding Alloys Corp.**, New York 13, N. Y., has available the first in the "Eutectic" National Defense Service Series of free technical handbooks on the latest developments in welding materials and techniques. This manual, 44 pages, was published in response to the demand for details on the newest advances in "Eutectic" Low Temperature Welding Alloys, with special reference to applications for defense production and maintenance. Impending materials shortages and the company's reputation for recearch are credited for the wide-spread interest in new applications of these unique products.

138

Concrete Forming System

Symons Clamp and Mfg. Co., Chicago 39, Ill., announces its latest 4-page bulletin describing and illustrating in condensed form its forming system for concrete wall construction. Erecting and stripping advantages are explained in short factual manner. The system and what it consists of is described, including panels, two way form tie, connecting bolt, tightening wedge, wale tie and wale plate, corners, and fillers. Assembly details and standard sizes are explained. Detailed information is given on the wood, plywood, plywood with magnesium frames and all magnesium forms. In addition, Symons Form System Service is explained including its rental with purchase option, the availability of hardware and fittings, and the complete engineering service that is available to all customers.

139

Materials Handling

A 20-page, 2-color book with over 50 illustrations showing Lorain cranes on the job in many types of industries, handling many types of material, has been published by **The Thew Shovel Co.**, Lorain, Ohio. No product description is included, so that every page may be filled with ideas on outdoor material handling, including sheet steel, sand, scrap, pulpwood, sugar cane, paper, tires, and airplanes.

140

Pipeliner Construction

A 12-page bulletin published by **The Thew Shovel Co.**, Lorain, Ohio, features the application of Lorain power shovels and cranes to pipeline construction. Special attention is given to the Lorain "Pipeliner," a specially designed hoe with wide gage crawlers to straddle pipeline ditches. Application of other types of Lorain equipment such as clamshells, draglines, and cranes is also depicted. The story of the use of rubber-tire Lorain Moto-Cranes for pipelining and how they can roll long distances quickly to widely separated spreads is also included.

141

Portable Air Compressor

The **Worthington Pump and Machinery Corp.**, Harrison, N. J., has released a bulletin on the two-staged, air-cooled, 30 cfm. capacity compressor with maximum operating pressure of 150 psi. It is equipped with ASME air receiver, oil bath air cleaner, and protective V-belt guard. Features include: circumferential cooling fins, tube and fin air-cooled intercooler, positive by-pass unloader to hold inlet valve open during idling period, aluminum low pressure piston, and cast iron high pressure piston.

142

Engine-Driven Welder

The **Lincoln Electric Co.**, Cleveland 1, Ohio, has released a 2-page bulletin on the Lincoln "Shield-Arc SAE" engine-driven welder in two models, 300 and 400 amp. Featured are photographs of the unit, general description, and specifications.

143

Brick and Tile

"Brick and Tile Engineering," a new volume of engineering data on brick and tile construction, has been published by the **Structural Clay Products Institute**, Washington 6, D. C. The handbook of design was written by Harry C. Plummer, Director of Engineering and Technology for the Institute. The volume is a revised edition of two books previously published by the Institute, "Brick Engineering" and "Tile Engineering," and contains the best and latest engineering information on clay masonry construction now available anywhere. The book describes the origin, manufacture, types and properties of structural clay products and the properties and design of brick and tile walls. Chapters are devoted to discussions of brick and tile wall sections and details, mortar, design of chimneys and fireplaces, and fireproofing and furring. General specifications for masonry construction are reviewed, along with bonds and patterns of brick and tile walls. A special chapter is devoted to the advantages of modular coordination in building with brick

and tile. The 392-page volume is available from Structural Clay Products Institute, 1520 18th Street, N.W., Washington 6, D. C., at $5.00 per copy.

144

Concrete Blocks

The **Monsanto Chemical Co.**, St. Louis 4, Mo., has available a 4-page bulletin describing its liquid wetting agent "Santomerse S" and its use in the manufacture of concrete blocks. Denser, stronger, more uniform products are said to result from the addition to the mix of small amounts of the wetting agent, which permits the use of less water by increasing efficiency.

145

For Portable Heat

Aeroil Products Co., Inc., South Hackensack, N. J., has available a 60-page illustrated catalog of its line of oil burning, gas burning, and electrically heated portable industrial equipment. Practically every type of large and small industrial aids and equipment requiring heat is described in the comprehensive catalog.

146

Portable Gravel Plant

A bulletin describing the Universal 293QS TwinDual Gravel King has been released by **Universal Engineering Corp.**, division of Pettibone-Mulliken Corp., 600 C Avenue N. W., Cedar Rapids, Iowa. The Gravel King is a complete portable gravel crushing, screening and loading plant with three stages of crushing and two screening operations. Unit features a scalping screen which by-passes pit run material of finish size directly to a delivery conveyor; further, material not requiring primary crushing by-passes the jaw crusher and is routed directly to the roll crushers. Various product combinations available in the plant are illustrated.

147

Zoning Earthmoving Equipment

The profit advantage of properly zoning heavy earthmoving equipment for efficient production is illustrated and described in a 12-pg. booklet, "Caterpillar Equipment Zoned for Profit," which presents profitable experience by contractors, engineers, governmental bodies, and other owners in the proper application of machines for high-speed hauling, middle-speed hauling, and power operations. Published by **Caterpillar Tractor Co.**, Peoria 8, Ill.

148

Roof Savers

How to prolong the life of a roof and repair accidental damage is told in this publication issued by **Johns-Manville**, 22 East 40th St., New York 16, N. Y. Recommendations apply to commercial, industrial, residential and farm buildings. Entitled "Roof Savers," the folder includes a discussion of why roofs wear out; an illustrated explanation of the principal ingredients used in roof savers and what each contributes; suggestions on application; and data on container sizes, weights and coverage.

149

Heavy-duty Electric Machine

Marion Power Shovel Co. of Marion, Ohio, is announcing the publication of Bulletin No. 401 which outlines the design and operating features of the 93-M Ward-Leonard Electric machine. Built for heavy-duty service on long-term jobs in construction, quarrying, metal mining, coal

and construction, this machine incorporates Marion Ward-Leonard electric controls for all major operating motions, including hoisting, swinging, propelling, and crowding.

150

Forest Resources

"America's Strength Grows in Her Forests" is an attractive 8-pg. manual designed to create interest in an understanding of the forest resources of the United States. Manual forest fire prevention and improved woodland management are stressed in this teacher's manual for 1950-51, published by **American Forest Products Industries, Inc.**, 1319 Eighteenth St., N.W., Washington 6, D. C.

151

Construction Equipment

"Building with Caterpillar" is the title of a new publication illustrating some of the construction jobs where the company's matched equipment strongly predominates. This 32-pg. booklet contains first-hand information and illustrations on road construction and maintenance, dam building, airport and railroad maintenance, pit and quarry work, mining, pipeline jobs, crushing, road mix, health and sanitation, erection work, drilling, logging and stream control. Published by **Caterpillar Tractor Co.**, Peoria 8, Ill.

152

Flexible Hose Lines

Bulletin No. 113 on flexible hose lines with detachable, reusable fittings has been completed by **Aeroquip Corp.**, Jackson, Mich. Bulletin contains much valuable information on industrial hose and fittings specifications as well as instructions on assembling fittings to hose lines. Also included is detailed information on self-sealing couplings and breakaway couplings.

153

Tractor Equipment

A 19-pg. catalog of tractor equipment for attachment to International tractors has been made available by **Isaacson Iron Works**, 2917 E. Marginal Way, Seattle, Wash. The company's line of tractor equipment consists of dozers, power units, clearing blades, scrapers, rooters, winches, logging arches, and tamping rollers. These are available as individual units or in combinations. Hydraulic or cable operation is offered on each unit.

154

Specialty Pumps

A full line of pumps for handling corrosive and non-corrosive liquids, solids carrying liquids, and dry and semi-dry materials is presented in a condensed catalog issued by **Yoemans Brothers Co.**, Chicago.

155

Diesels

International Harvester Co., Chicago, Ill., has available a new and colorful folder describing its line of diesel engines and power units.

156

Wire Rope for Excavators

"Wire Rope for Excavators," published by **John A. Roebling's Sons Co.**, Trenton, N. J., includes a unique feature being presented in print for the first time. Under the heading of "Recommendations" in the

Space is sold as advertisers' inches. All advertisements in this section are ⅛ in. short of contracted space to allow for borders and composition.

CLASSIFIED SECTION

Rates are $6.50 a column inch. Copy should be sent in by the 10th of preceding month if proofs are required; by the 15th if no proofs are required.

catalog is a listing of actual recommendations for specified usages, including the wire rope code.

157

Gear Sets

Cone-Drive Gears, Division of **Michigan Tool Co.**, has released a 4-page bulletin on standard Cone-Drive speed reducers and gear sets ranging between 5:1 and 70:1 ratios, and from .05 up to 555 hp. capacity. Standardization—for economy and easy service both of component parts and complete units—is emphasized.

158

Carbureted Engines

International Harvester Co., Chicago, Ill., has a new folder, complete with specifications and on the job illustrations now available on its line of carbureted engines.

159

Flame Hardening Catalog

A flame hardening apparatus catalog has been announced by **Air Reduction Sales Co.**, a division of Air Reduction Co., Inc., 60 E. 42nd St., New York 17, N. Y. Descriptions and illustrations of latest flame hardening equipment are contained in the 20-pg. catalog. It includes a section on "Tips for the Production Flame Hardening of Special Shapes." Gas control equipment and pipeline systems are discussed.

160

Pocket Electrode Guide

Now being distributed is a 56-page electrode guide, covering all **Harnischfeger Corp.**, Milwaukee, Wis., P&H Welding Electrodes. Of pocket size for easy reference, the electrode guide has page tabs marking the various classifications of electrodes. A helpful feature is the 2-page comparative chart which lists corresponding types of electrodes.

161

Universal Joints

The 1951 **Curtis Universal Joint Co., Inc.**, catalog is now available. Highlights of the catalog are: How to select universal joints, static torque tests, efficiency curves on angle of operation, frictional heat loss curves, and dynamometer tests and specications.

162

New Scraper

The new **Caterpillar** No. 80 scraper is pictured and described in detail in a new folder just released. Specifications for the No. 25 cable control are also listed. The 8-page folder features scraper pictures both close up and in the field.

INDEX TO ADVERTISERS
★ IN THIS ISSUE ★