

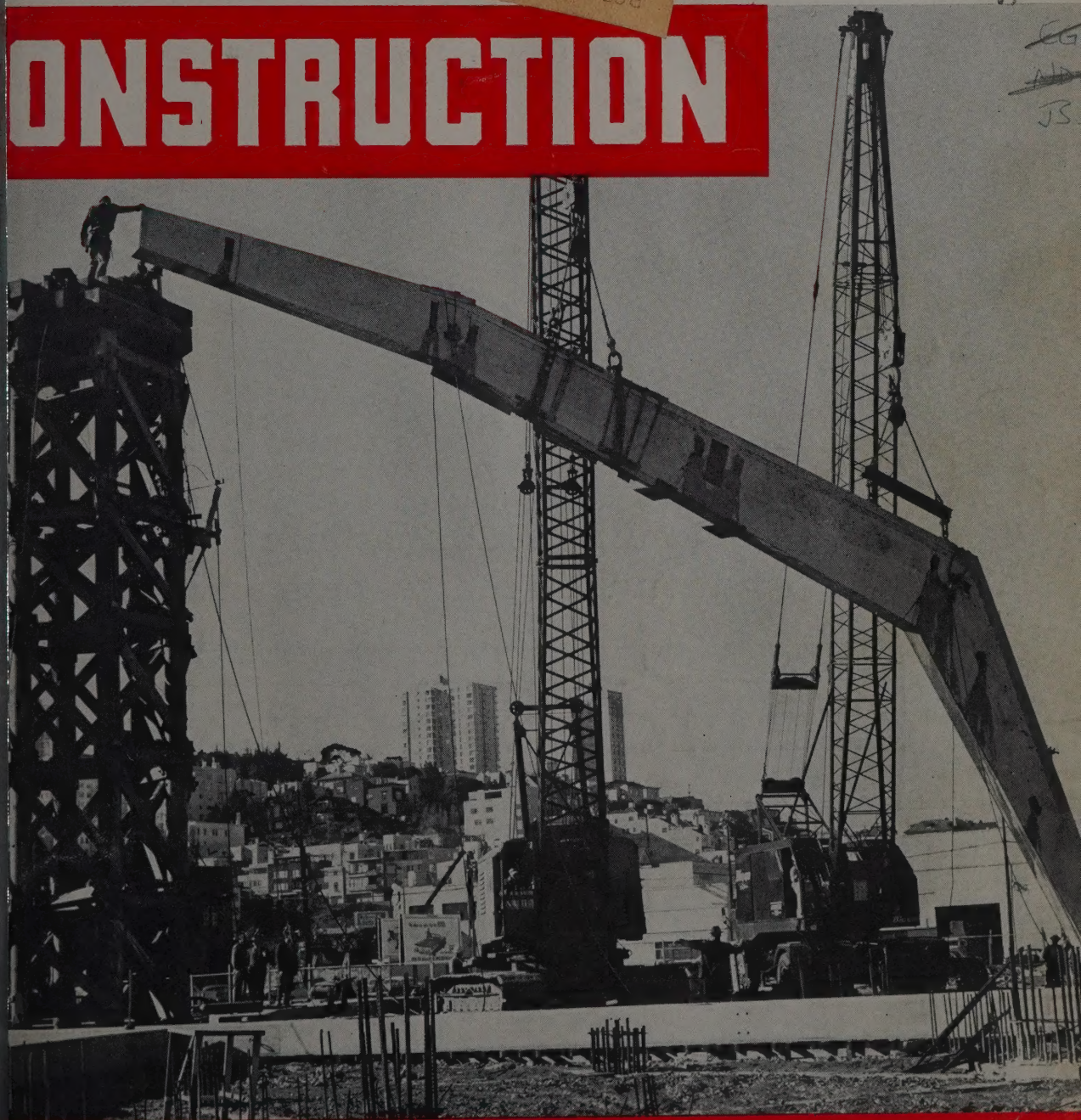
WESTERN

CONSTRUCTION

APR 16 1958

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INDEX COPY
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APRIL 1958

Blasting methods and costs using ammonium nitrate . . . page 31

A school for operators of construction equipment . . . page 34

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The Texaco Simplified Lubrication Plan is saving maintenance dollars on this big power house project. This impressive excavation is over 4,000 feet long and between 40 and 90 feet deep.

Up-to-date, streamlined lubrication method pays significant dividends in maintenance savings:

TEXACO SIMPLIFIED LUBRICATION PLAN

Plan can reduce lubricant inventory and improve lubrication. It can mean more productive manhours, less repair costs, less time lost

If you are using more than six lubricants for your major lubricating jobs, chances are your maintenance costs are a lot higher than they should be. Storage problems, handling costs, and the dangers of misapplication are often costly results of stocking more lubricants than you need.

Texaco Plan cuts number of lubricants needed

Specifically tailored to your operation by your local Texaco Lubrication Engineer, this new plan can cut your requirements to not more than six lubricants for *all* your major lubrication needs. Yet the Plan is simple to put into action; it works smoothly; and above all, it will save you a significant amount of money.

Get the complete story

Your nearest Texaco Lubrication Engineer can give you complete information on the Simplified Lubrication Plan. 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.



LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

... for more details, circle No. 1 on Reader Service Postcard

Picked for the TOUGH JOBS!

19
NORTHWESTS
for
J. E. HADDOCK, LTD.,
Pasadena,
Calif.



J. E. HADDOCK, LTD., has tackled one of the toughest highway jobs in California. This is the famed Conejo Grade near Camarillo, Calif. Eighty percent of the material is basalt rock calling for blasting and some cuts are 600 ft. deep. The 5 mile job of six lane divided freeway must be completed in 400 days and the \$5-million contract is being handled in two 10-hour shifts per day.

It is significant that two Northwests were selected to be added to the J. E. Haddock fleet of Northwest equipment. This makes 19 Northwests that J. E. Haddock, Ltd., has bought over the years. It is repeat orders like this that testify to Northwest dependability. Steady hour after hour, day after day operation is the secret of big yardage—and profitable operation.

Your Northwest is always ready to go. We hear it everywhere and Northwest owners will tell you so. Northwest owners get the output you are looking for. Follow the repeat order buyers and make your next machine a Northwest.



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135 South LaSalle Street
Chicago 3, Illinois



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WESTERN

CONSTRUCTION



April
1958

Vol. 33 No. 4

Blasting with ammonium nitrate 31

The use of fertilizer grade nitrate can cut blasting costs considerably in many situations, provided you know the practical do's and don'ts.

School for heavy equipment operators 34

At Weiser, Idaho, courses are given in operation and maintenance of construction equipment, with practice on several makes.

Erection of 56-ton precast concrete arches 37

Coordination among three cranes was needed to erect six of the largest concrete arches ever made. Each is 80 ft. long.

ASPHALT PLANTS—Inspection and control 44

Part two of what inspectors and plant crews should know about the practical aspects of asphalt plants—by Vaughn Marker.

Montana bridge will save 125 mi. 56

Construction of a bridge over the Missouri River above Fort Peck Dam at a remote site will split 250-mi. unbridged section.

How Western contractors save time with planes 62

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FRONT COVER—Standing atop a temporary falsework column, a workman positions the end of a 56-ton concrete arch, one of six erected for unusual hexagonal building. Article begins on page 37.

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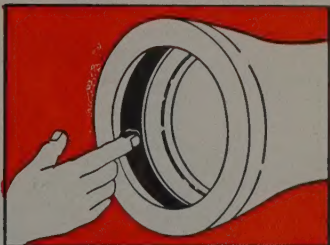
"SHECKS, WE DIDN'T NEED YORE MUSCLES,
 AUNT BEANY... A LI'L PUSH FROM
 ANY ONE OF US PUTS IT TOGETHER."

U. S. **TYTON** JOINT

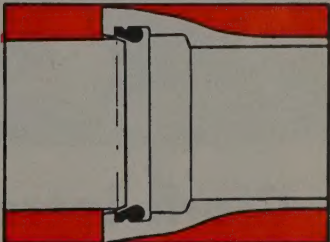
ONLY FOUR SIMPLE ACTIONS



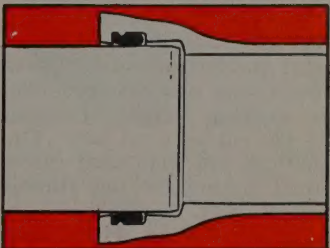
Insert gasket with groove over bead in
 gasket seat



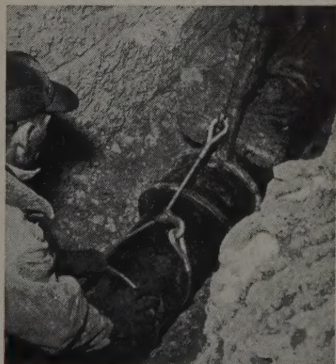
Wipe a film of special lubricant over
 inside of gasket



Insert plain end of pipe until it
 contacts gasket



Force plain end to bottom of socket...
 the job's done!



8" Tyton Joint pipe for water main
 addition in Colorado.

INDUSTRIAL SERVICE

CAST  IRON

NEW EQUIPMENT

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



Clark introduces most powerful dozer

The Construction Machinery Division of **Clark Equipment Co.** announces the availability of the most powerful production model dozer ever built—its new 600-hp., 104,000-lb. working weight Michigan Model 480 rubber-tired unit. The machine has just completed extensive field testing on the Illinois Tollway Project.

Nearly 27 ft. long, 14 ft. wide and 11 ft. 8 in. high, the Model 480 has a top speed of 28 mi. per hr., both forward and reverse. It is powered by a 12-cylinder Cummins turbocharged diesel engine. The 52-ton dozer has four 33.5x33—26-ply tires.

With 600 horsepower spread across a 14-ft. blade you get tremendous dozing and push-loading ability. Working alone it can push the largest scraper now used. And a high horsepower-to-weight ratio permits fast acceleration, high speeds and short cycle times.

In a series of tests on the Model 480 as it push-loaded various makes and models of scrapers in different soils on the McCarthy-Mass-Dillon Construction Co.'s sections of the Illinois Tollway Project, loading

sand up a 3 to 5% grade took less than a minute. Material boiled over the sides of the pan in 13 seconds in most materials.

Charles Ellis, Clark field engineer, explains the significance of the tests:

"When push-loading with the Model 480, material packs into the scraper bowl at about the rate of one pay yard a second in good working conditions. In tougher loading, such as sand, the Model 480 virtually matches the pushing ability of today's largest crawler working in topsoil. The operators didn't know we were making the

time studies. These runs were (to them) just another series of loads for the fill. They weren't trying for any records." Howard Leonard, equipment superintendent for McCarthy-Mass-Dillon, says: "We run the 480 in second gear behind the scrapers and shift it into third as the scrapers leave the cut area. That's going at a speed of about 10 mph. Scrapers run in second throughout the loading cycle. The faster they run, the more the load keeps alive; and the easier it is to pack dirt into every corner of the bowl. The scrapers shift into third when they raise their pans."

Circle No. 151

Loader has rear wheel steering

Many advancements in operating and safety features are incorporated in a new 4-wheel drive, rear-wheel-steer tractor in the 1¾-cu. yd. class, manufactured by **J. I. Case Co.**

Engineered, built and powered by Case, the new unit, designated as the W-9 Terraload'r is the fore-runner of a complete new series of heavy-duty rubber tired industrial loaders to be introduced by Case

in the near future. Three interchangeable buckets are available for the W-9: a 1⅜-cu. yd. (heaped) heavy-duty digging bucket; 1¾-cu. yd. standard material bucket; and 2¾-cu. yd. light material bucket.

Outstanding new design feature is the use of short, rigid lift arms, pivoted forward of the operator's position. This, together with a low center of gravity and extra wide



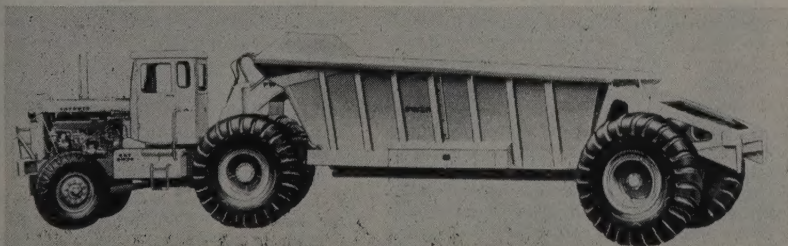
wheel tread (74¾ in.), is said to give the W-9 exceptional side-stability, as well as longer forward-reach in all positions. (Forward-reach at 7-ft. dump height is 62½ in.) Location of the lift-arm pivot, and elimination of all linkage in back of the bucket, are also said to offer important safety advantages, since the operator has unobstructed visibility in all directions, and can easily get on or off the machine, regardless of whether the boom is up or down. In addition, there is no danger of the operator's arm being caught in the lifting mechanism.

A 42.5-gpm. hydraulic pump, operating at 1,800 rpm., gives the

W-9 a breakout force of 11,000 lb. at ground level, and a lifting capacity of 5,500 lb. with bucket in carry position. The hydraulic system is designed with a minimum of hose, tubing and fittings and is provided with a full flow micron filter. All piping connections are SAE straight thread O-rings, to eliminate oil leaks.

The W-9 is powered by a 251-cu. in. high torque Case industrial engine, (diesel or gasoline), equipped with Torqmatic drive, which includes a 3-speed constant mesh Planetary gear transmission and a hydraulic torque converter with 3.5 to 1 conversion ratio.

... Circle No. 152



Athey offers 40-ton trailer

Entirely new is the bottom-dump trailer now in production at Athey Products Corp. Called the PW20, the 40-ton capacity trailer has several advances unique in bottom-dump design.

The PW20 is made of T-1 steel, the high-strength high-alloy steel developed by United States Steel Corp. The use of T-1 steel eliminates "dead weight" and greatly increases the trailer capacity in ratio to its own weight. Capacity (80,000 lb.) is almost four times the trailer weight.

Another outstanding feature is the exclusive rear (or 3rd) door design. This rear door opens simultaneously with the bottom doors and permits material to flow smoothly out to the rear. Together with high (5-ft.) rear clearance, this rear door design eliminates "hang up" and the need for pusher units at the dump fill. The PW20 rides out over the dumped load.

Steep 18-deg. side angles and big 15 ft. 10½ in. x 6-ft. bottom doors give less funneling action during dumping, allow for handling of

over-size material and permit clean, quick dumps every load.

The PW20 can spread or windrow loads as well as dump instantly. An air release opens the doors instantly or under hydraulic pressure for controlled dumps. When closed, the doors are locked with a positive mechanical latch which relieves the hydraulic system of all load.

Matched to the Caterpillar DW20 Tractor, the PW20 has speeds up to 32.1 mph., can make 90-deg. turns in 38 ft. 4 in. and gives wide-based stability for safe, fast hauling. Tires are interchangeable between the tractor and trailer.

... Circle No. 153

Low-cost roller Has Unitrol control

Low-cost General all-purpose roller provides an inexpensive way to roll asphalt, paving and black-top. The roller offers for the first time a Unitrol control system. A

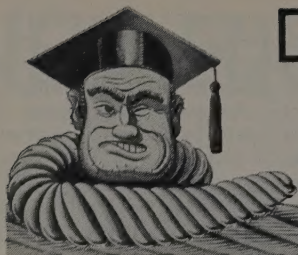


single operating lever controls four functions: forward, reverse, throttle and brake. A special automatic transmission functions smoothly and provides instant response to the fingertip Unitrol control system. The new roller features a patented double lock brake that is applied automatically as the control lever is moved into neutral. Power for the 1-ton roller is supplied by a 4-hp. gasoline engine with 6-1 gear reduction. The complete unit, including the Unitrol control system and automatic transmission, sells for \$995.00 f.o.b. Thorofare, New Jersey. Manufactured by General Engines Co., Inc.

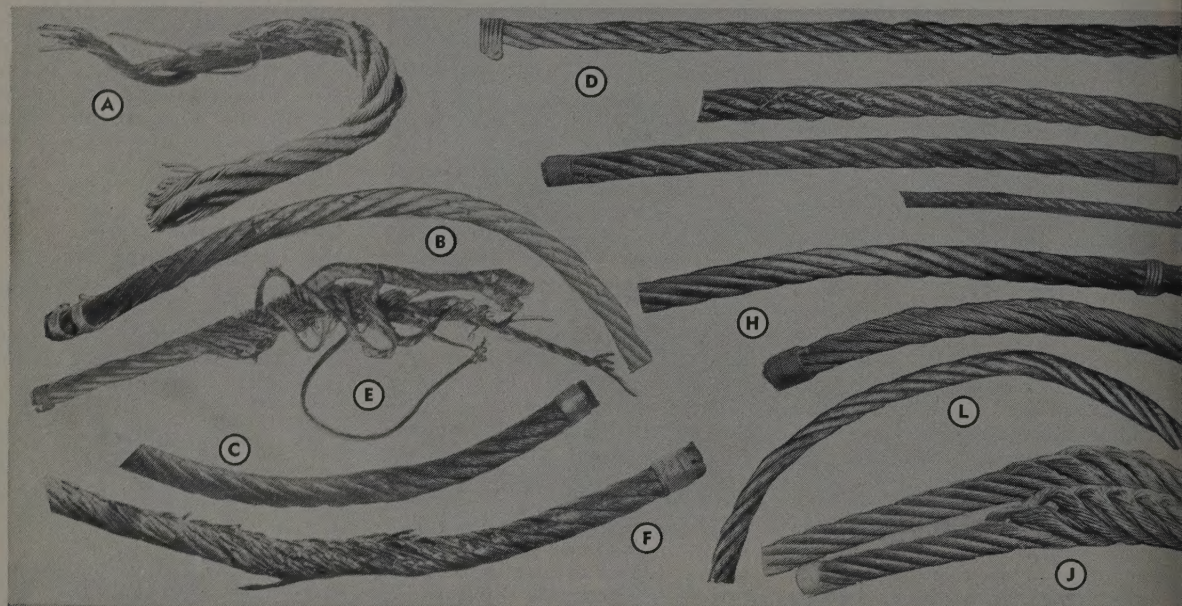
... Circle No. 154

Pneumatic nailer cuts operator fatigue

Fox Nailer Corp.'s semi-automatic nailer has been introduced as a pneumatic hammer attachment



Tuffy Wire Rope



Guard Against these Cripplers and Killers of Wire Rope

Pictured above are some of the results of wire rope abuses. They quickly ruin wire rope efficiency or end rope life abruptly, long before you have had the service you paid for. Even the best wire rope is a sitting duck for these enemies. When you avoid or minimize them, you make real gains in longer rope life, better service and greater economy. Remember, your Tuffy distributor will be glad to work with you against these and other wire rope hazards.

Here are the "case histories" of the untimely wire-rope fatalities and injuries shown in the picture:

A. Mangled in a wedge socket: Here's a result of improper socketing. It was caused by using a poorly designed or worn-out wedge socket. Failure at the dead end can damage other sections of the rope, too.

B. Rusty road to ruin: Rust—No. 1 enemy of steel—takes a heavy toll in wire rope life. An insidious, silent type of killer, rust often does irreparable damage before it's even noticed. The one-strand break shown here resulted when the rope was allowed to become rustbound through lack of lubrication. Tests show that, with other conditions ideal, properly lubricated rope has up to 10 times the life expectancy of dry rope.

C. The crushing blow: The Sunday punch for this piece of wire rope was delivered by a tractor cleat—just one of many crushing injuries caused by rope being run over or banged into by hard, sharp objects. Even the toughest wire rope is no match for this kind of mistreatment.

D. Strangled by a misfit: When the bearing surface of a sheave is too small for the rope diameter, pinching action quickly destroys the rope—especially when it's overloaded. The victim shown here was knocked out in just 1½ hours of service.

E. Apparent suicide: This rope jumped out of sheave and was soon destroyed by pulling around the shaft. Actually it was a case of sudden slack which threw the rope out of the sheave.

F. End of the line came quickly for this rope as the result of operating over a sheave that did not turn. Note the exceptionally heavy abrasion on one side of the rope. Sheaves should be checked thoroughly and often.

G. Victim of the "bends": Excessive bending of wire rope accelerates wear. Generally, more flexible ropes are used as bending stresses increase (with decrease in tread diameter of sheave or drum). If a rope is operated on a sheave too small for its bending characteristics, early failure is certain. Through an exhaustive series of bend-

ing tests, Union Wire Rope engineers have compiled data that you can use to assure getting the rope construction that will give you the longest service life. Ask about it.

H. On the "blink" from a kink: This open kink resulted from mishandling of rope. Guard against kinks by proper winding on the drum. Never pull a loop smaller. Always enlarge it, then straighten out the rope.

I.-L. Crushed and worn from "beatings on the drum": Even under normal operating conditions, drum wear gives wire rope severe punishment. This wear concentrates at the cross-over points and at the flange. Excessive drum crushing results from operating on small drums, excessive loading and poor winding. Smooth drums are not recommended. Here are typical "drum beatings":

I. Cross-over wear.

J. Cross-over crushing on drum.

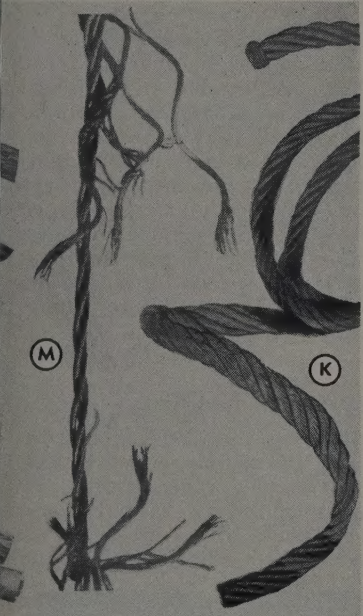
K. Drum crushing from poor winding.

L. Drum-crushing from small drum.

Although drum wear cannot be eliminated, its effects can be greatly reduced. Under properly engineered procedures, two and three times the service can be obtained from the same line by improving drum conditions. Union Wire Rope engineers will help you with this problem. Get in touch with us for more information.

Tips

Be Sure You Use **BALANCED** Wire Rope



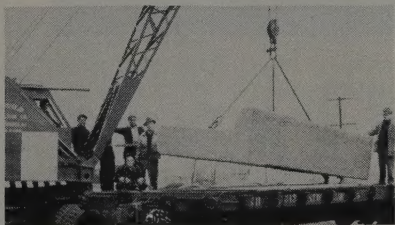
A. Overloaded — soon exploded: The rated capacity of a wire rope is based on the breaking strength (catalog) divided by a safety factor applicable to the type of service or use. The grade of steel, type of construction and size of the rope determine tensile strength. It must be properly related to the loads it will carry, or costly and dangerous early failures are likely to occur.

You hear a lot about extra strength in wire rope. There is no trick to designing wire rope with very high strength. But — there is nothing to be gained if high strength is put in to the exclusion or subordination of other qualities that are just as important as excessive strength.

For example: the life of a dragline depends on its resistance to abrasion. When it breaks, as a result of continued exceptionally hard digging in abrasive materials, the owner finds maintenance cost of the dragline increasing. Hard-drawn rope tends to act as a spring. As wear progresses, it arches over the crown of the strand. Repeated flexing of this too-strong arched wire causes early failure. So the drag rope must meet a condition where strength is not the major factor in resisting abrasion.

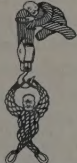
Every one of the Tuffy Special Purpose Ropes has a different ratio of strength to other properties necessary for longest life, most efficient operation and lowest maintenance expense. Your Union Wire Rope distributor has the **BALANCED** rope for every application.

Tuffy Special-Purpose Ropes are tailored & BALANCED for special uses



Tuffy BALANCED Slings & Hoist Lines

Top-performing team in every type of materials handling. Tuffy Slings are made of a patented, machine-braided fabric; stays extra flexible, can't be seriously hurt by knotting or kinking. Tuffy Hoist Line is a special construction of super flexibility and toughness.



Tuffy BALANCED Scraper Rope

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



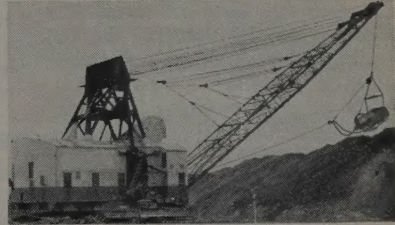
How Your Tuffy Distributor Can Help You Save Money

Condition of equipment is a big factor in longer rope life and greater economy. Your Tuffy distributor will help you check your equipment and operating conditions to make sure everything is in your favor for getting greatest service from your wire rope. Get in touch with him. And ask him to put your name on his mailing list for **FREE Tuffy Educational Bulletins.**



Tuffy BALANCED Dozer Rope

Built to give you longer service with less downtime. 150' reels of 1/2" or 9/16" mounted on your dozers allow you to cut off worn sections without wasting good rope. Put Tuffy Dozer Rope on the job and watch costs go down!



Tuffy BALANCED Dragline Rope

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



union Wire Rope corp.



2146 Manchester Ave.

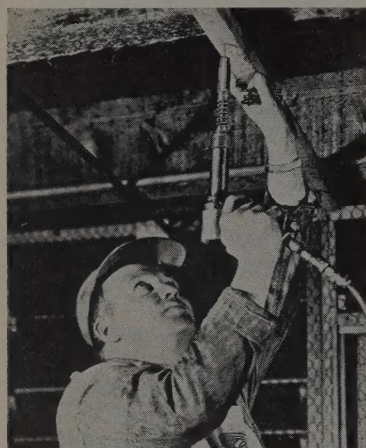
SUBSIDIARY **AMCO** STEEL CORPORATION

Kansas City 26, Mo.

Specialists in high carbon wire, wire rope, braided wire fabric, stress relieved wire and strand.

... for more details, circle No. 16 on Reader Service Postcard

that greatly reduces fatigue and expenses in many nailing operations. Extensive job tests with this versa-

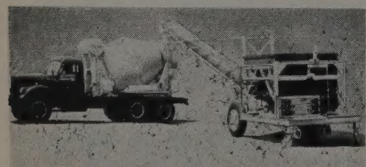


tile nailer have been made on overhead nailing of furring strips with 12d and 16d common nails; plaster-board and soft acoustical ceiling material, with 6d cement coated nails; heavy crates and hardwood pallets with hardened twist nails; prefabricated aluminum buildings with hardened screw nails; and mud sills nailed into concrete with hardened concrete nails. The nailer is attached to a pneumatic hammer in ten seconds or less. The operator just places the nail in the nozzle; the nailer starts and finishes the nailing operation. The hammer weighs less than 1 lb.

... Circle No. 155

Challenge introduces portable batch plant

The Challenge Runabout, a portable unit with its self contained conveyor belt and hopper scale, will batch from 30 to 45 cu. yd. of aggregate per hour, serve also as a traveling conveyor for stockpiling at the rate of 350 ft. per min. Introduced by Cook Bros. Equipment Co., the entire unit has been engineered for easy maneuverability. One man can operate the Runabout and move it around from job to job. It is light in weight, yet engineered and built for years of dependable service. A unique feature of the Runabout batch plant is the downward tilt of the conveyor boom when the unit is hitched in position for tow-



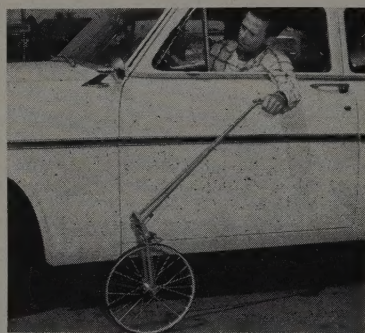
ing. This brings the overall height down to a mere 9 ft. 9 in. to allow the entire unit to pass easily under bridges or viaducts.

The unit has a 3½-cu. yd. hopper capacity, and is equipped with a Fairbanks-Morse scale with separate over and under indicator.

... Circle No. 156

Rolatape measures while you drive

Accurate measurements can now be taken conveniently from a moving vehicle with Rolatape Model 400 measuring wheel with extended handle. The specially designed handle enables the driver to guide the

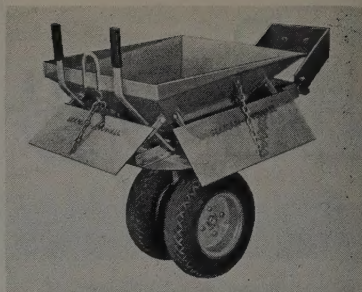


measuring wheel with ease while operating the car at a moderate speed. This feature is especially useful for taking long distance measurements, where measuring on foot is impractical or inconvenient. Complete unit is sturdily constructed and finely balanced, permitting driver to guide the wheel with a minimum of effort. Scientifically calibrated wheel and special counting mechanism assure accurate measurements, which are recorded in feet automatically up to a distance of nearly 19 mi. Special stand enables driver to park measuring wheel in upright position without leaving the car. Rolatape, Inc.

... Circle No. 157

Budget spreader

Seaman-Andwall Corp. has added to their 1958 line of highway construction equipment a new materials spreader. The new spreader, known as the Century Junior, while designed for modest budgets, is highly versatile. Its use ranges from conventional chip or sand spreading on fresh bituminous or tar application to highly controlled spreading of abrasives, salt or calcium chlorides in ice control. Self-powered, the spreading mechanism, a spinner, is driven through special gears by the rubber tired wheels.

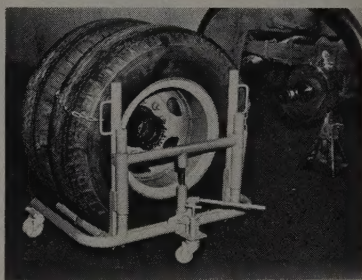


Spread can be adjusted to any direction, left, right, rear or a full 270 deg. Adjustable wings prevent spraying on passing cars. Volumetric control is obtained through lever operated gates and bridging of materials is prevented by an agitator at the bottom of the hopper. The hopper is large for spreaders of this type, holding 2 cu. ft. of material. A special hitch provides quick easy bolting to any dump truck.

... Circle No. 158

Easy wheel handling

Handling wheel loads up to 2,600 lb. is a line of four models of Salsbury Hercules Wheel Dollies recently introduced by Salsbury Corp. These wheel dollies are used for removing, replacing, lifting and



transporting heavy single or dual wheels. They feature 4-in. swivel wheels for straight line maneuverability, three-point suspension for uneven floors and a specially designed 2-in. leveling adjustment screw for horizontal alignment. Heavy duty models are equipped with hydraulic jacks. Individual lifting arm rollers allow wheels to rotate separately. Advantages claimed for the Salsbury Hercules Wheel Dollies are elimination of greased tin methods of manual handling, quick and accurate alignment of wheels to axle, elimination of damage to grease retainers, and savings in time and manpower.

... Circle No. 159

(Turn to page 117 for more New Equipment. For best manuals on welding see page 110.)

Can Construction be Taught Management

A FINE WESTERN IDEA of vital interest to the construction industry has been well tested and is now ready for searching appraisal.

Three years ago the Engineering Department of UCLA organized and sponsored the first "Construction Industry Conference". Construction was believed to be lacking in management techniques, as compared to the manufacturing industries. The conference was intended to be the means by which our industry could study itself along this line of deficiency and learn how it could borrow and adapt better management practices.

Few will argue that construction operations frequently lack in the pre-planning and job management that produce the high degree of efficiency, cost control, staff organization and lines of communication found in the manufacturing industries. There are obvious reasons. Construction is non-repetitive; it is not a production line operation and each project is a different design carried out under different job conditions. But, in spite of these differences, there are plenty of ideas that can be borrowed and adapted.

A logical means to effect improvement is a working conference properly programmed and attended by those with common interests eager to learn these industrial techniques. This was the sound idea of the Engineering Department at UCLA.

After three conferences (the second at UC) the formula for securing the right audience and adequate speakers has not been achieved. There is too much of value in the basic idea to discard it at this time, but the whole idea needs re-study if it is to experience adequate and substantial growth.

First, the audience: If secured by the dragnet technique, it is large and could be considered representative of the entire industry, but will have many divergent interests. Programming is complex and many attending are disappointed since the treatment must be general rather than specific. On the other

hand, if selected groups are invited, the audience lacks industry-wide breadth and is narrow in interests. Decision on the desirable audience is the first step in the re-evaluation.

Second, the speakers: They represent the key to success or failure. Being qualified to discuss industrial planning, management and controls is not enough. They must receive expert advance coaching on the audience and the need to present direct and tangible suggestions. A speaker who has a good industrial background but no idea of construction work or its problems had better be left off the program. Speakers must make the logical adaptations from industry to construction clear and precise. Even speakers from within the construction industry have failed to sense the audience and its needs.

Lastly, the interplay: Assuming the speakers stimulate real interest among the audience, the principal advantage will be in a subsequent exchange of ideas. The more exchange the better. Large and diversified groups can only be expected to address a few formal questions to the speaker. Small and select groups should develop a lively interchange.

The three conferences to date have failed to show improvement in these directions. Audiences have represented extremely diverse interests, all within the framework of the construction industry but having little in common at the day-to-day level. The speakers, in turn, have been qualified but not coached to reach the audience. Failure to provide time for discussion, particularly in small groups where interests could be sharply defined, is a further disappointment to those attending.

A re-appraisal is in order.

The West has always been noted for accepting innovations in construction and for the open-mindedness of its contractors in their willingness to try new ideas and machines. They will have an equally open mind on the idea of using superior management methods. But a re-study of objectives and a refinement in the arrangements for future conferences will be necessary if the benefits are equal to the value of the basic concept.

Jim Ballard

APRIL 1958



Blasting with ammonium nitrate

One of the fastest growing developments in the construction industry of the West is the use of fertilizer grade nitrate as a blasting agent. Here is a review of recommended methods for its correct use, with detailed cost figures.

SEVERAL YEARS AGO, in the field of strip coal mining, experiments were carried out in an effort to reduce explosive costs. One idea that was tried was the use of straight ammonium nitrate, which was thought to be a rather poor explosive, plus a booster and such sensitizing agents as carbon black or lamp black.

To get maximum confinement, a plastic bag which would conform to the size of the hole was used. This idea was patented and is still used in some areas.

The results of these early tests far exceeded expectations and the new blasting method spread quickly throughout the strip mining industry. Little headway was made, however, in construction because

of the belief that a hole 9 in. in diameter or larger had to be used in order to accommodate the plastic bag. But, in 1955, many users started pouring loose ammonium nitrate prills into the hole without

EDITOR'S NOTE

We wish to thank Monsanto Chemical Co. of St. Louis, Mo., for furnishing photographs and information used for the preparation of this article.

bagging it. This worked perfectly well, provided No. 2 fuel was used as a sensitizing agent. Savings were made in holes as small as 2½ in. in diameter.

Another factor which encouraged the use of fertilizer grade ammonium nitrate in the construction

industry was the introduction of high speed large diameter rotary drills. It is cheaper to drill a large hole per unit of work with a rotary drill than a small hole. Small size high explosives lose much of their effect in a large hole though, so the introduction of a bulky low-cost explosive which worked well in a fairly large hole coincided nicely with the development of the large size drills, in the range of 6 to 10 in.

Ammonium nitrate is relatively hard to detonate, however, in small holes. In holes from 3 to 6 in. in diameter it becomes necessary to use continuous column detonation. Several of the best methods will be discussed later in this article.

A lot of study has been devoted to determining the proper amount of fuel oil to use. Chemically, a ratio of 6% of fuel oil by weight of ammonium nitrate is oxygen balanced. However, 5% seems to be most effective in field use. Quantities of fuel oil above this have a damping effect. The oil is poured uniformly over the top of

the opened bag and is allowed time to drain through the bag. The use of 8-10% oil by weight allows a safety factor provided 30 min. is allowed for the excess to drain off the prills. The prills will hold the right amount of oil if allowed to drain for this length of time.

Comparative costs

The low cost of ammonium nitrate compared to other blasting agents is the main reason, of course, that its use has increased so swiftly. About 500,000,000 lb. was used in 1957, a figure five times greater than that 5 yr. ago.

Commonly used fixed explosives average in price anywhere from 9 to 18¢ per lb. Waterproof explosives run about 14 to 22¢ per lb. The cost of ammonium nitrate plus fuel oil is 4¢ per lb. at the most.

The cost reduction per cu. yd. of rock is even more impressive. A study of jobs now in progress showed that where dynamite cost was 21¢ per yd., ammonium nitrate plus fuel oil was 5.6¢ per cu. yd. Where dynamite cost was 16¢ per cu. yd. of rock, ammonium nitrate plus fuel oil was 4¢ per cu. yd. Where dynamite costs were 14¢ per

cu. yd., ammonium nitrate plus fuel oil was only 2.4¢ per cu. yd.

Spacings and delays

When you are using ammonium nitrate and fuel oil for the first time, try the same powder factor, burden and spacing as before. This will serve as a comparison and as a starting point to find further savings which are usually attainable by loading more heavily and moving out on spacing.

The saving in drilling when using larger holes can often amount to 20% of the drilling cost on the job. The nitrate is so inexpensive that heavy loading in a hole is often the best way to achieve maximum breakage at minimum cost.

The high gas production creates substantial breakage by milling action of rock against rock when appropriate delay systems are used. If delay systems are not used, the gas is wasted in throwing instead of breaking the rock. When continuous detonation is used there is no excessive throwing even though the stemming is half the usual and the hole is heavily loaded.

Technical representatives from Monsanto Chemical Co. are avail-

able to assist in planning an efficient delay system.

One of the biggest factors in the growth of nitrate as an explosive is its remarkable safety. It can be shipped at a low freight rate and can be stored in almost any place that is dry and out of the weather. Fixed explosives need expensive bulletproof magazines at all places of use. However, with nitrate the hazard from sparks and cigarette fires is almost nonexistent while the danger of detonation from shock is totally eliminated.

Contractors also find its ready availability an advantage. Most small town fertilizer stores carry it.

It is virtually impossible to detonate nitrate if it is unconfined. If a blast is set off under a reasonable amount of it, it simply scatters or burns slowly.

One danger is present always: This material is so safe that the workmen often get careless and forget that any explosive is unpredictable to some degree. When it does detonate, it is just as dangerous as any explosive. Almost every explosives accident on record points to careless or thoughtless practice that could have been easily avoided.

If a mass of ammonium nitrate is on fire, lowering of the mass temperature is important. Steam should not be used to extinguish the fire; flooding with cold water is the safest measure. Keep some distance from the burning mass as combustion products may be toxic when produced under these conditions.

Detonation methods and costs

Although continuous column detonation has become almost standard, considerable experimentation is still being carried out in this field, and there are plenty of variations on the main theme. For example, on an access road contract in connection with the Glen Canyon Dam project, one contractor loaded 50-ft. deep holes 6½ in. in diameter with a half and half mixture of ammonium nitrate and blasting powder.

On the Kings River project the contractor placed 50 to 100 lb. of 60% extra dynamite gelatin at the bottom. Primacord strung with gelatin in 1¼x8-in. sticks was brought up from the bottom to the top of each hole. The prills were soaked with 10% by weight of diesel oil. On a highway project in southern Oregon, about 25 lb. of gelatin was placed at the bottom of the 50-ft. deep holes, then about 15 ft.



HANDLING NITRATE requires no costly safety precautions. The hazard from sparks or cigarettes is almost nonexistent and the danger from shock is eliminated. Shipping rates are low. It can be stored in any dry place—no bulletproof magazines needed.

of nitrate, then about 10 lb. of gelatin, then more nitrate. Bare Primacord was brought up from the bottom, and about 1 gal. of diesel fuel was added to every 80-lb. sack of nitrate. (WESTERN CONSTRUCTION—Aug. 1957, p. 27; Nov. 1957, p. 28-40.)

All these methods were satisfactory, but despite the fact that every project has special conditions, it is obvious that some standardization is desirable. The following set of basic recommendations is based on a study of a great many projects both in construction and strip mining.

For illustration consider a hole 30 ft. deep and 6¼ in. in diameter and the costs of the various ways of loading it.

METHOD 1: 60% gelatin and electric blasting cap. The cost of loading this hole would be about \$46.43. The explosive cost for blasting hard rock will average between 14 and 18¢ per cu. yd. This is probably the best method for holes filled with water to the collar. However, in holes only partially filled with water, ammonium nitrate can be used above the water level with substantial savings.

It is useful to remember that in a hole 6¼ in. in diameter, a 14-in. column of 60% gelatin costs \$2.56. A 14-in. column of ammonium nitrate, fuel oil, Primacord and primer will average only about 70¢.

METHOD 2: Ammonium nitrate plus 10% by weight of 60% gelatin. The cost of loading the hole varies from \$13.62 to \$13.82 depending on whether electric blasting caps or Primacord is used. The explosive cost per cu. yd. after blasting hard rock will average between 6 and 9¢. This method is satisfactory where the convenience of extra fast loading is desired and also where the overburden is so soft that good shatter is not a major requirement. However, considering that the cost per hole could be lowered more than \$2.00, other methods should be considered.

METHOD 3: Ammonium nitrate plus 3% minimum by weight of 60% gelatin strung on 50 grain Primacord. Cost of loading the hole is \$10.86. Explosives cost per cu. yd. after blasting hard rock averages between 4 and 5¢.

Although this method gives a good shatter and a high gas yield, there is quite a bit of inconvenience involved in stringing 60% gelatin sticks on 50 grain Primacord. In addition, the end results of a detonation made by this method leave something to be desired when com-

pared to the next method.

METHOD 4: Ammonium nitrate plus 400 grain Primacord attached to 50 grain Primacord. Cost of loading the hole by this method is about \$10.78. An effective detonation rate of about 6,000 meters per sec. gives excellent shatter and high gas yield. The explosives cost per cu. yd. after blasting hard rock averages between 2.5 and 4¢.

It should be remembered that compared to dynamite 400 grain Primacord as a detonator is less sensitive to shock and flame, is less bulky, detonates at a much greater velocity, has no toxic effect whatsoever, and requires less labor to attach it as a detonator considering its per unit of effect.

The primary reason for recommending 400 grain Primacord as a detonator is efficiency. This effectiveness overshadows all cases where it does cost a few cents more. However, it is more sensitive to adverse conditions, and it should be introduced by persons experienced in its use.

It is true that some detonators can be purchased as low as 14¢ per

lb. However, when balancing cost versus effect, they are not actually the most economical. If you balance cost against work done, continuous column detonation gives you most for your money.

Conclusion

There are cases in which the use of dynamite as a detonator is preferable to 400 grain Primacord. In a dry hole, larger than 9 in. in diameter, in easy shooting, a continuous column detonator can be a waste of labor. In hard shooting or in a hole smaller than 9 in., continuous column is almost always the best method.

Although ammonium nitrate is limited to dry holes and because of its high gas production should not be used in tunnels or other confined spaces, its use in the construction industry is bound to continue spreading. A thorough familiarization with the proper usage of ammonium nitrate as a blasting agent is essential if a contractor wishes to remain in a favorable competitive position.



FUEL OIL is a good sensitizing agent for ammonium nitrate and can simply be poured into a bag as shown. About 30 min. should be allowed for the excess oil to drain off.

School for training operators of heavy equipment



Sitting in the driver's seat on tractors, graders, shovels or asphalt paver, with an instructor by his side, each student gets training on several makes of machines. Class work makes up the rest of the courses at the Western National School of Heavy Equipment Operation, Weiser, Idaho.

SEVENTH-THIRTY in the morning. Dark is just fading into morning at the classroom windows, but the roomfull of earnest young men pay no attention to it. They bend over "Crane Course Test Number 2", on their desks, writing up the answers, true or false. As an observer representing WESTERN CONSTRUCTION I'm in the back row. Just for luck I reach for the test sheet and take pot shots at the answers. I give another look at the students. Age 23 to 45 is my guess.

"Time's up," says the instructor, and he collects the papers. Then he asks for the verbal questions. Each student has prepared a question, which he reads, and gives the right answer—he thinks. Somebody disagrees, and tells him.

I listen to fascinating facts about draglines, suspended loads, and the strange quirks of steel cable. I find out, for instance, that you always put the U-bend of a cable clamp on the live side, and the cap on the dead end. To pay out a coil of rope, you lay a loop to the left, then a loop to the right, and it won't kink. It's that simple.

"Class dismissed," says the crane instructor, putting eraser to blackboard. "We will get out in the field now." Too bad, thinks I, more of that knowing talk would sound good for an hour yet.

Out in the hallway come other classes from various doors, and no loitering. They've got their overshoes and jackets on and they head straight for the bus that runs them out to the work project.

The big mahogany panel on the wall says "Western National School of Heavy Equipment Operation,"

and shows the names of sixty-odd contractors and equipment distributors who made the institution possible. The beginning was in May 1957, and the place is Weiser, Idaho. It's Weezer, pardner, and you better smile if you call it Wizer. To find yourself on the map, look 70 miles northwest of Boise, in the Snake River Valley where it funnels into Hell's Canyon, deepest gorge on the Western Hemisphere.

"Good morning," says a fifty-ish man coming out of the office marked "Private". This is Mr. Shaw, who founded also America's first and original school of earth moving, at Charlotte, North Carolina, just over two years ago. Before that he owned a parcel delivery, sold motorcycles, ran a car-driving school, raised a big family, and then had this good idea; a school to teach the art of moving earth. He says anybody who keeps

trying is liable to hatch the idea of his lifetime.

Shaw shows me all around his academy. This is Slocum Hall, a four-story solid stone building on the campus of Weiser High school, made available by the school board and remodeled by the business men of the town, on a long lease rental arrangement.

I meet Joe Patterson, school manager and director of education. He spent years in the construction equipment industry. And there is Mrs. Billie Jack, general secretary, with a lot of efficiency behind a sunny smile. And I run into three or four of the instructors: Elton Pigg, Clifford Faulkner, Keith Herrick, and Jay Fisher.

Upstairs I visit the student living quarters, a number of study-sleeping rooms with spring bunks and mattresses (free with tuition), scattered books, letters from home, pictures of girls, wives, children.



GRADUATING CLASS represents men from farm, factory and construction. They are ready for jobs as equipment operators after the usual 4-week course. Instructors are in the first row.

ownstair classrooms are furnished with one-arm desk chairs, blackboards, reference books, a movie projector and screen.

There are four offices with quality looking office machines and facilities, and a big press camera with all the attachments. Mr. Shaw himself takes hundreds of pictures of machines, people, and scenes. Downstairs a cafeteria is all ready to operate, but just now the students are boarding downtown.

We stop at Joe Patterson's desk. Give the writing man statistics, "Patterson," says Mr. Shaw. "Everybody is Mister around here, except Mrs. Jack, that is."

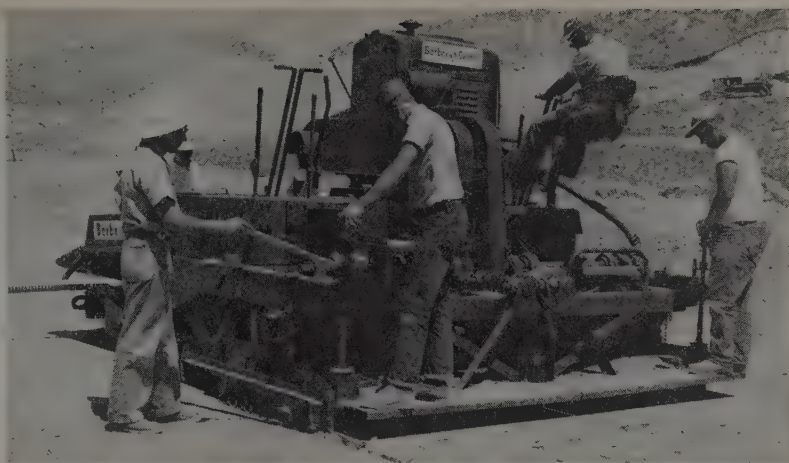
"Our two schools together have graduated about 1,400 students of earth moving machine operation," the young Mr. Patterson tells me. This Weiser school, in operation since last May, is gaining right along. Next month we'll have 30 students registered, and before too long we'll average 40. Our pattern of growth is the same as it was in Charlotte. Our total output here Weiser will be 200 counting the present class. We've had students in this school from 23 states and Canada. The average age is 30. The youngest was 17 and the oldest 63. "We don't know for sure but we believe about two thirds of our graduates land jobs within a few days to a few weeks, in an industry that pays high wages, mind you." "Let's go," says Mr. Shaw, breezing by. "If you want any more figures I've got 'em." So we climb into his car and right away I get a surprise.

I had supposed that a school teaching the art of earth moving could own a quarter section or so of land, preferably hills, and start throwing dirt back and forth. But no. This school, WNSHEO for short, has real jobs to work on, almost entirely.

The school's jobs are assigned and agreed upon by a town committee representing the city council, the county commissioners, the school board, the neighboring highway district, the chamber of commerce, and WNSHEO.

"Now get this right," says Mr. Shaw. "The school does no jobs for private individuals, and it does no jobs of any kind that could possibly be financed and let out to contractors. If we did, we would be in trouble up to here, right now."

We arrive at the project. The school, under temporary direction of the Army Engineers, is moving, not mountains, but the Weiser



LATEST ADDITION to the courses offered is one on asphalt finisher operation. Instructor points to adjustments being made by students. Sand is being used to simulate the laying of asphalt.



MOTOR GRADER instruction in the basic 4-week course trains for operation, care and preventive maintenance. A 2-week advanced course is also offered for men with some experience.



TEAMWORK ON pusher-loading is practiced by two students under the watchful eye of the instructor. Safety practices are emphasized on operations, and Red Cross training is given.



DRAGLINE INSTRUCTION is combined with shovel and crane in one 8-week course. All courses require classroom work and a 2-hr. study period every evening.

River. They are excavating a canal about 100 yd. wide and a quarter mile long, taking an oxbow bend out of the stream, to keep it in its channel and out of town. This job will take several weeks. Their next project is something big too: 4.5 mi. of standard highway that will become part of the state system.

Construction equipment is roaring and rooting all over the place. These machines are steam cleaned frequently, and you can easily read the names: Le Tourneau-Westinghouse, International, P. & H. Harnischfeger, Link-Belt Speeder, Galion Iron Works, Austin-Western, Allis-Chalmers, Caterpillar. And back on the campus I had seen a Barber-Greene paving machine. "Our students get practice and practical knowledge on several makes of equipment, not just one," says Mr. Shaw.

The instruction system is simple and logical, just what you would expect. The student sits on the operator's seat, controls under hand (and foot) and the instructor stands behind him, commending correct moves and correcting wrong ones.



LEARNING TO operate equipment under close conditions, these students are handling two bulldozers near a shovel. One course is available in equipment field maintenance.

A student in a four-week course, for instance, gets 225 instruction hours; an eight-week course gives him 450 hours; a two-week course, 110 hours. This includes time in the study hall—2 hours a day, 7 to 9 p.m.

Each student puts in full time in the field. When he is not actually operating a machine, he is standing by with his instructor watching the other fellow, seeing his adroit precision or his clumsy groping.

Right here is where you spot the man most likely to succeed. Some of them are deeply engrossed in text books, while not on the machines; some are intently watching the machines; but alas I saw two or three idling away their time. When report cards are down on final rating day, take one guess who is most likely to foot the list, and you know without asking who will get the gold stars and the good jobs.

You develop style and dexterity with heavy machines, just as you do with a typewriter. An experienced observer can spot a dub or an expert a half mile off. Mr. Shaw says his ambition is to turn out students who can be spotted as National School products, at a glance.

If you want to know who these earth moving men are, just ask Mrs. Jack for a look at the student register. First off you spot a salmon fisherman, then a dish washer, and a farmer—a lot of farmers. Here is a logger, a truck driver, an Air Force engine mechanic. Next comes powder monkey; a dredge operator, a timber worker, and a school teacher. Meet the four college men, on the job now. They were sent by an equipment manufacturer, to learn machine operation, to become better machine salesmen.

Better still than checking the list, would be a visit with a couple or three students, at random. So the next morning I spot one, sit-

ting on a log by the salamander (it's winter, you know) reading a text book. His name is Ervin Bobo, Course III (Cranes) and he lives at Indian Valley, Idaho. Worked for many years in the Payette National Forest, as alternate ranger, foreman, smoke chaser, and lookout tower man. "I own a ranch too," he said, "but I don't want to farm till I'm old." I guessed him for \$9. "How did I happen to come here? That's easy. I was a boss, and the boys under me, running cats and brush cutters, were making more dough than I was. But it took them ten years to get there. I can jump ten years right here in this school. My eight weeks is going to cost me about \$900. The day I graduate, I'll make more for take-home than I did before, and I'll get my 900 bucks back in a year, to boot."

My next random selection was a man watching the back hoe. His name is Gordon Stolorow, also of Idaho (Burley) and also Crane Course III. "I was running a small truck business," he told me, "and I was leveling some land, and I worked on land clearing jobs. I just happened to read a little newspaper story about this school. So I wrote a card to them but didn't wait for the answer. I just came here. I took the Grader Course (II) and now I'm on Cranes. You can get courses here for \$400, but I'm taking a combination, costing me \$1,150. The safety training here is worth a lot. They don't have any accidents here. Just one man got his finger injured. Construction accidents cost millions of dollars, and I know that. I got a First Aid card myself." He patted his pocket.

Every student will give you a different story about himself and how he happened to come here. But they all add up to the same thing: They want to learn to earn money. At the same time, there is plenty of school spirit. But it's all work and no rah! rah!



Erection of biggest precast arches

SIX OF THE LARGEST precast arches ever made have been placed in position for an unusual hexagonal building now under construction in San Francisco. Each arch weighs 56 tons, is 18 in. thick, 80 ft. long (horizontal projection) and varies in depth from 2 ft. 9 in. to 1 ft. 6 in.

One end of each arch rests on a center falsework column (making the incomplete structure resemble a giant spider) and the shell is being constructed by lifting into

position 96 triangular concrete panels, each weighing 12 tons.

The structure is the Longshoremen's Memorial Association Bldg. Jacks & Irvine is general contractor, with Ben C. Gerwick subcontractor on the erection of the arches and the casting and erection of the roof panels. The unusual structure, designed by architect Henry Hill, with Isadore Thompson as structural engineer, offers emphatic evidence that despite the spectacular advances made in recent years by

prestressing there is still plenty of room to exercise engineering imagination with conventionally reinforced precast concrete.

Erecting the arches

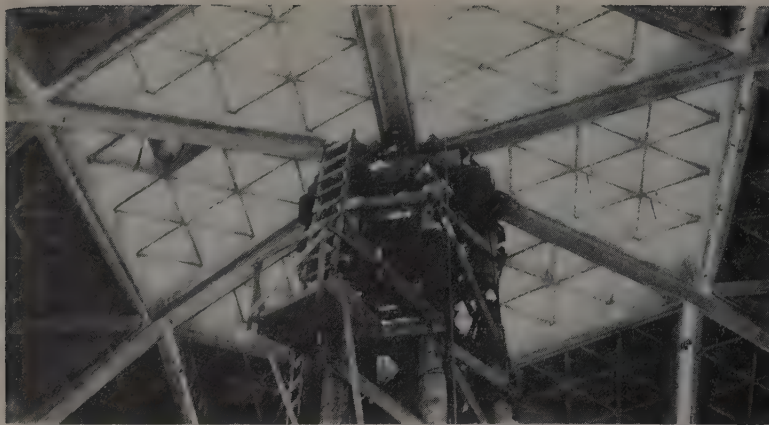
The erection of concrete members of such size posed some tricky erection problems. The designers did their part by specifying lightweight aggregate. Pacific Coast Aggregates Haydite was used, reducing the weight of the concrete to 102 lb. per cu. ft. Of course, the forming and pouring of concrete made with lightweight aggregate is more difficult than with standard aggregates, mainly because of the tendency of the light aggregate to float to the top during handling and vibration, but in this case the savings in weight was plenty of compensation.

In order to reduce movement to an absolute minimum the arches were cast on the ground in a radial pattern directly beneath their final position, with the exception that they were about 10 ft. out from the center to leave room for the falsework support. The center temporary support, 48-ft. high, was constructed by driving 70-ft. piles to 30 tons bearing capacity. The six piles are cross braced with 3 x 12s and 3 x 8s, fastened with 3/4-in. bolts. The top is a flat platform of 12 x 12s. The tower is guyed with 7/8-in. cables in 6 directions.

For lifting the arches Gerwick used a 60-ton Manitowoc 3900 crawler crane with an 80-ft. boom, a 50-ton American truck crane with a 70-ft. boom, and a 35-ton Lorain truck crane with a 50-ft. boom. The



LIFTING required careful teamwork by three crane operators to compensate for the shifting weight as the arches were rotated upward from the ground to final position.



LOOKING UPWARD from underneath the structure reveals the unusual pattern formed by the triangular roof panels. Panels are joined by small steel clips, visible at right.



ROOF PANELS are lifted at three points. The lower two connections are made through chain hoists which are operated by a man riding on the panel to give it the proper pitch.

cranes were connected to the members at three points using simple slings over a floating sheave. In order to make sure that no crane would be overloaded during a lift, the pickup points were located accurately by surveying methods.

The lift was planned so that the cranes would not have to walk with the load. The outriggers on each machine were fully extended and the wheels blocked.

As the arches were lifted from the ground and rotated to the proper position, the weight slowly shifted from one crane to another. Gerwick's Howard Harris, standing in a place easily seen by the 3 operators, coordinated the 6 lifts. During the lifting process, it was necessary for the rigs to boom up about 1 ft. and then swing to the left about 10 ft. to bring the upper end of the arch to a rest on top of the falsework tower in the center.

After each arch was in position, a cable was run from the top of the tower to the toe of the arch, to give the tower additional support and

to prevent the arch from sliding outward. The arches were shored from the side by pile struts braced between clips bolted to the member and deadmen in the ground consisting of driven piles.

On the platform at the top of the falsework tower the arches rested on wooden wedges. For this purpose 6 wedges were made 12 in. wide, 27½ in. long and varying in thickness from 1 to 7 in. The wedges permit fine adjustments to be made in the height of the high end of the arches. The arches are simply raised by small jacks on top of the tower and the wedges moved inward or outward the proper distance.

As soon as an arch was erected it was connected to the previously erected arch by a steel beam fastened to it approximately at the midpoint, adding greatly to the overall stability.

Once all 6 were in place, the lower ends of each pair were connected by tie plates 1½ in. thick by 10 in. wide by 160 ft. long. The tie

plates arrived on the job in 30-ft. lengths. Each field-welded joint was X-rayed to assure its structural soundness.

The 96 conventionally-reinforced triangular roof panels were cast in Petaluma at the Ben C. Gerwick, Inc., yard and barged 30 mi. to the site. Gerwick's Petaluma yard, designed primarily for prestressing work, is one of the largest in the West. Basalite is the lightweight aggregate used for the panels. They are triangular in shape, 20 ft. on each side, monolithically cast. Of beam and slab design, they are 2 in. thick, with the exterior beams 3 ft. 4 in. deep and the interior beams 1 ft. 8 in. deep. From beneath the intersecting beams form a pattern of smaller triangles.

Starting at the apex of the structure, the roof panels are put in place in successive circular layers. To keep the load on the arches from becoming unbalanced, the cranes continually move around the structure, placing only one panel in any bay at a time.

The falsework used to support the panels consists of 18 triangular towers constructed of 4-in. pipe.

One problem with erecting the panels is that they are inclined at different degrees for each successive layer. For instance, the first panel placed at the top of the structure were inclined only 6 deg. from the horizontal, but the last circle of panels placed will be inclined at 71 deg. from the horizontal. To lift the panels Gerwick is using a triangular strongback fabricated from 6-in. pipe. The lifting line is connected to the strongback by a three-part cable, one at each corner. Two of the cables pass through chain hoists. By manipulating the hoists, a man riding on the panel can adjust the slope of the panel the desired amount. The panels fit together by means of steel clips protruding from their sides.

Each layer of panels placed introduces additional stress in the tie bars connecting the ends of the arches. The deflection at the top of the structure is then removed by jacking at the tie bars. Blackhawk 50-ton hydraulic jacks manually operated are being used.

Personnel

George Irvine is superintendent for the general contractor, Jacks & Irvine. For Ben C. Gerwick, Bill Goss is superintendent, and Les Holden is iron worker foreman. Manufacture of precast units was supervised by Jack Weiss.

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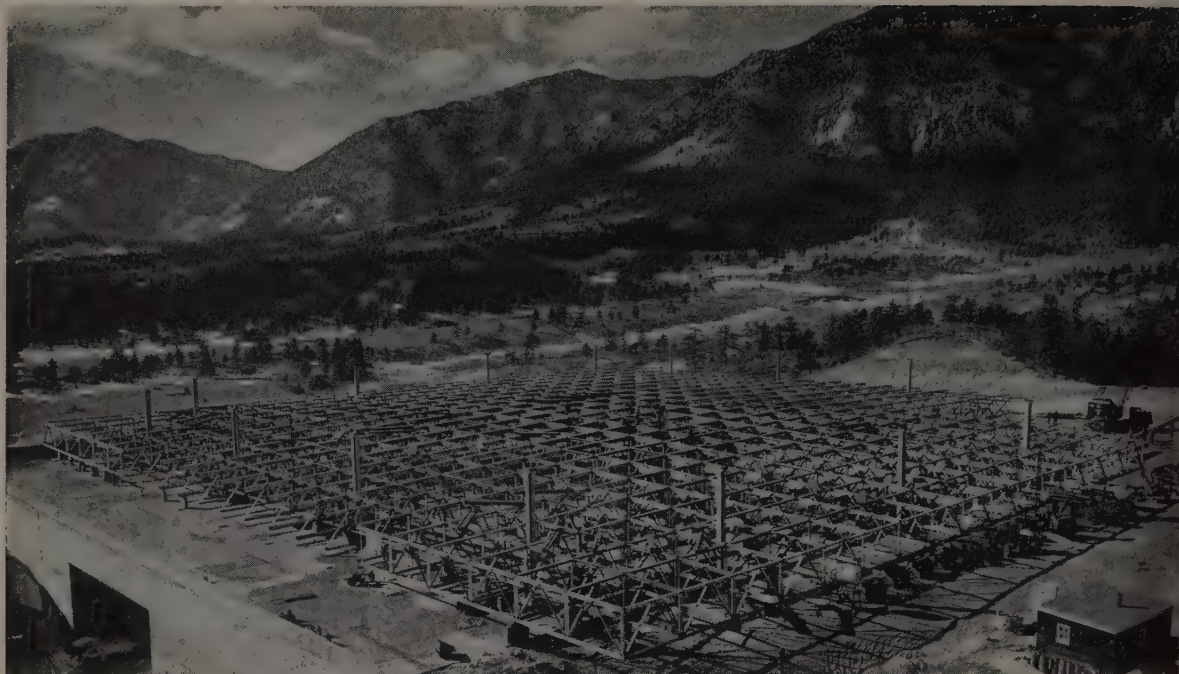
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Lift-slab jacks raise roof truss

AN UNUSUAL application of the lift-slab method was successfully completed in January at the Air Force Academy near Colorado Springs, Colorado, when a 1,150-ton, 308-ft. square roof truss was raised into place. Subcontractor for the lifting was Vagtborg Lift-slab Corporation, well-known in the West for its work with concrete slab buildings. Steelwork contrac-

tor is U. S. Steel's American Bridge Division.

The huge steel grid was assembled on the floor of the building, the cadet dining hall, and jacked upward 24 ft. on 16 steel columns, each weighing 9 tons. A total of 24 of Vagtborg's special 75-ton jacks were used, one on top of each of eight columns, two on top of the other eight. The jacks were

controlled from four central consoles through hydraulic lines. On the first day the roof was raised a few inches, on the second about 9 ft., and the third about 15 ft. Actual jacking time required totaled only 6 hr.

The truss was raised about 1 inch above its final height and supported by temporary timbers at the columns while column connections were being welded into place. Then the truss was lowered to its final position.

Another unusual feature of the job is the use of a stainless steel ball and socket on the top of each column to support the roof. The entire roof will float freely on the 6-in. diameter hemispheres, permitting minor movements.

The roof truss varies in depth from 8½ ft. to 11 ft. 8½ in. In assembling the roof at the site, 27 welders used almost 15,000 lb. of welding rod. Welders used high-speed Lincoln Electric Jetweld 2, E-6027, downhand iron powder electrodes.

Prime contractor on the building is Donlinger & Sons. The structure was designed by Skidmore, Owings and Merrill for the Air Force Academy Construction Agency.



SUPERVISING the unusual lift are (l. to r.) Otto Nass, Vagtborg hoisting engineer operating the console, Carl Fornstrom, Vagtborg vice president, and Louis Hack, American Bridge superintendent.

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ASPHALT PLANTS — inspection and control

The final chapter of a two-part article discussing what the inspector and plant crew should know about asphalt plants. Stressed this month are the screens and bins, the sampler, the scales, the batching sequence, the pugmill, and the differences between batch plants and continuous plants. Reprints of the combined articles are available on request.

By **VAUGHN MARKER**

District Engineer
The Asphalt Institute
San Francisco, Calif.

ONE RELATION between the screens and the bins is important for the inspector to be aware of, especially in the case of the No. 1 or fines bin. A natural phenomenon of any screening operation on a flat deck is that in the direction of flow of material over the screens, the finer particles of material in a given size fraction fall to the near side of the bin while the coarser particles of the same size fraction fall to the far side. The particle size distribution gradually changes from fine to coarse across the bin. This distribution is fairly uniform through the depth of the material in that bin. When the material is withdrawn from the bin by opening the gate at the bottom, the stream of material is made up of predominantly fine material at one edge and coarse at the other.

The reason that it is important for the inspector as well as the contractor to realize this relationship between the screens and the bin is that in most cases samples are withdrawn from the bin gates in order to make sieve analyses. In taking the sample for future testing, if the inspector is not careful it is entirely possible for him to obtain a sample that is not representative of the material in the bin. If the device

used to take the sample is inserted into only one edge of the stream of material flowing from the bin, the inspector obtains only a fraction or a portion of the material which he wishes to test. Needless to say, if the sample is not representative of all of the material in the bin, all subsequent work with that sample is a complete waste of time. As stated before, this factor is of the greatest importance in the case of the material in the No. 1, or fines, bin since this is the material of greatest surface area variation and, therefore, the greatest asphalt demand.

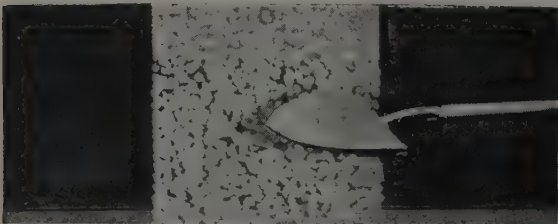
To aid in the taking of good samples, it is strongly recommended that a sampling device with a long restricted opening be used so that it may be inserted into the flow of material without being filled immediately. (Below, right.) This allows the sampler sufficient time to position the sampling device to obtain a representative sample. Using a shovel or frying pan should be discouraged since the problem of obtaining representative samples is greatly complicated.

The general dimensions of the device recommended are given on accompanying drawing. A suitable handle can be welded to the side or the end, depending on which configuration is best adapted to any given asphalt plant. The handle connection should be made

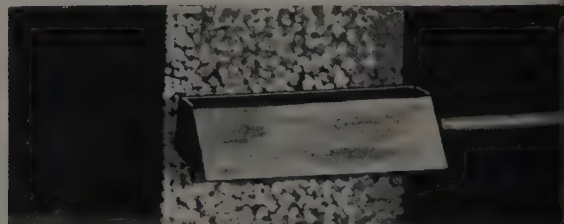
slightly above the midpoint of the side or end to minimize the possibility of tipping while in use and for ease of handling. A further word of advice in fabricating such a device is to limit the metal to that gauge, not heavier than No. 10 or lighter than approximately No. 18 gauge. Anything heavier than a No. 10 gauge makes the device too heavy to handle satisfactorily and anything lighter than No. 18 gauge makes it too flimsy. Each device should be constructed to fit the plant from which it is desired to obtain samples, with the prime considerations being the size of the receptacle and the dimensions of the clear opening. For the fine and intermediate bins, the clear opening should not be greater than $\frac{3}{4}$ in. It is strongly recommended that a device made for a given plant be left with that plant for future use by other inspectors.

From the sieve analysis of the material withdrawn from the bins of the plant, the bin proportions that will ultimately be used in making the batch are determined. Once these weights are determined and set up on the plant scales, every effort should be made to keep them constant. If the original tests are trustworthy and subsequent grading analyses show variations, chances are that the trouble lies somewhere before the material gets into the bins. All possible sources of trouble should be checked from the stockpile to the bins before a change in the batch proportions is made to correct grading variations. Constant change in the batch proportions will tend to magnify the non-uniformity of the mix rather than to eliminate it.

In discussing the functioning and the problems that arise in the bins, the bin gates, screen deck, the drier and the dust collection system, it



WRONG When aggregate is passed over a screen the fines tend to drop through immediately and accumulate on one side of the hopper. A sample taken with a shovel, frying pan, or other small container will not be representative.



RIGHT The device shown above will obtain a representative sample because it reaches across the flow of material. The sampler's restricted opening prevents it from filling all at once and gives the inspector time to position it properly.



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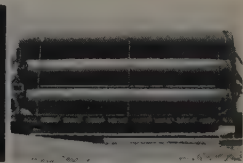
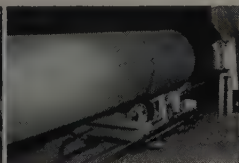
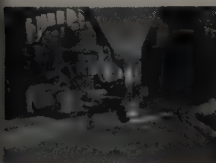
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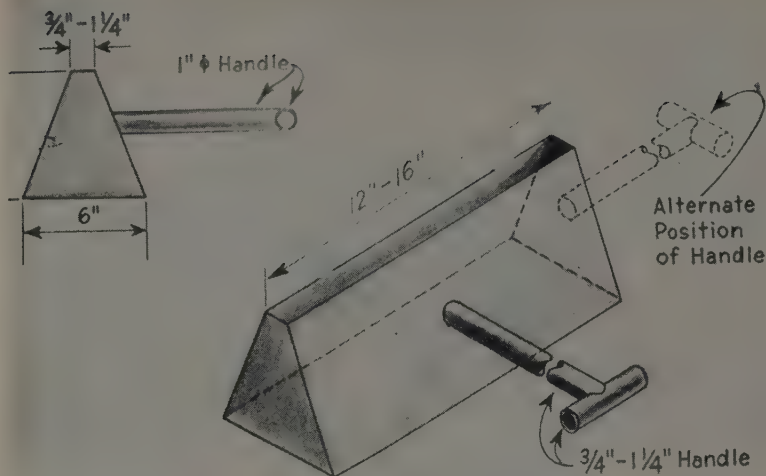


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RECOMMENDED SAMPLER can be made on the job, with the handle on the side or end as desired. Handle should be connected above midpoint to lessen the tendency to tip. When making the sampler if metal between No. 10 and No. 18 gage is used it will be sturdy enough and yet not too heavy. For sampling fines the top opening should be about $\frac{3}{4}$ in.

can readily be seen where the problems occur. As stated earlier, however, no matter where the problems manifest themselves, the cause for those problems usually can be traced back to the cold feed of the plant. Before any vast changes are made in any portion or component of the plant itself, the cold feed should be checked to see if the cause can be corrected at that point.

Probably the most common cause of failure in asphaltic paving mixtures is incorrect asphalt content. The reasons for incorrect asphalt content can stem from inaccurate scales (both asphalt and aggregate), variation in aggregate grading, porosity of aggregate or poor interpretation of preliminary test results. Constant attention must be paid, however, to the lever systems of the scales on the asphalt plant to be sure that they are functioning properly.

The plant scales

The purpose of plant scales is to weigh out the batch constituents. The aggregate hopper has a separate scale system as does the asphalt bucket. The indicating heads for the scale systems can be one of two types, a springless dial or the beam type. Regardless of the type of indicating head, all scale systems have the same general parts, namely, levers, supports and the indicator. Any bind or drag on the lever systems of the scales will cause the scale dial to give an erroneous indication. One of the common causes for scale malfunction

is the build-up of asphalt, dust, etc., or corrosion and dulling on the knife edges in the lever system. Besides these possibilities, particles of aggregate can lodge in the scale supports and obstruct the free movement of the levers.

In some instances, it has been found that the asphalt bucket or the weigh hopper for the aggregate did not swing freely at all times. It is imperative that the asphalt scales as well as the aggregate scales be checked daily by the inspector to see that the indicating heads are functioning properly, that is, the needle zeros, and that the scale levers and knife edges move freely. On occasion, with a new plant installation, the plant settles during the first 24 to 48 hours of its erection, or after the first filling of the bins, causing the weigh hopper to bind against some part of the plant itself. Of course, if the weigh hopper is rubbing on any plant component or is being supported by one of the structural members, the indicated weight for the material in that weigh hopper will be incorrect.

The sequence of batching

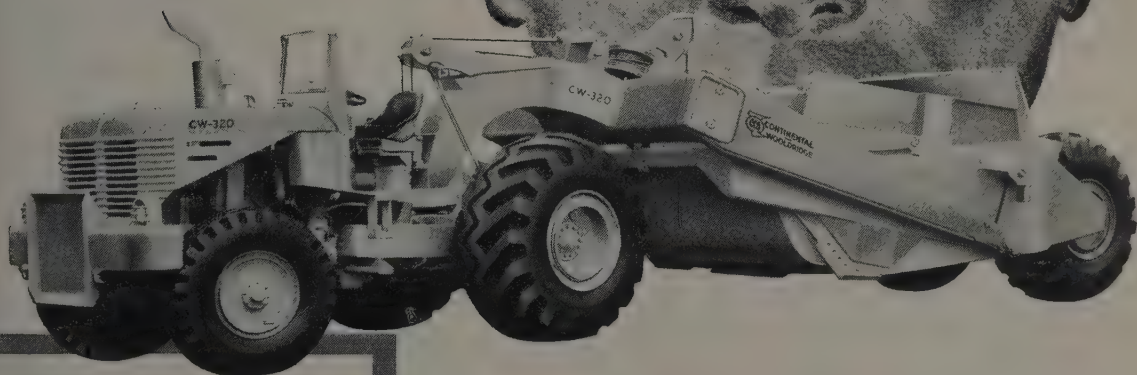
Aggregate is withdrawn from the hot plant bins in the proper proportions and deposited in the weigh hopper prior to mixing. The thing of interest to both the contractor and the inspector at this stage of production is the sequence of batching. Under most conditions, the coarsest aggregate should be withdrawn first for deposition

in the weigh hopper. Next should come the middle-sized aggregate and, third, the sand. In no situation should the sand bin be the first in the sequence of bin withdrawal. There are two major reasons for this. In the first place, if the sand is withdrawn first it naturally is deposited on the bottom of the weigh hopper with the coarse aggregate on top. When the weigh hopper is opened to the pugmill the first material to leave the weigh hopper is the sand, which falls directly to the bottom of the pugmill. If, by chance, the pugmill is worn so that there is an excessive clearance between the paddle tips and the liner, the sand can lay in a dead area below the reach of the paddle tips and never be mixed during the mixing cycle.

On the other hand, however, if the coarse aggregate is withdrawn from the plant bins first, it is deposited at the bottom of the weigh hopper and subsequently reaches the pugmill first. If coarse aggregate is deposited in the bottom of the pugmill first, there is less of an opportunity for the material to remain dead at this point and not be mixed. It is easier for the paddle tips to reach the coarse aggregate particles and provide a scouring action at the bottom of the pugmill to provide more thorough mixing of the entire mass. Under certain conditions, in order to vary the distribution of fine material throughout the mixture, it is sometimes wise to withdraw the middle-sized aggregate first from the plant bins, coarse size second and the sand third. Under no conditions, however, should the sand be withdrawn first.

Another situation which arises that influences the sequence of bin withdrawals is somewhat more obscure and does not happen too frequently. In the event that the aggregate being used in the mixture is light weight or of low specific gravity, a much larger volume of material is withdrawn from the plant bins for the same weight. This can cause a problem of insufficient capacity in the weigh hopper to accommodate the entire batch that is withdrawn from the plant bins. In this case, if the sand is on the bottom of the weigh hopper, the middle-sized aggregate on top of that and the coarse aggregate on top of all, it has been found that there may be insufficient head room to the entire mass of material in the weigh hopper. This causes the coarse aggregate to rub against the

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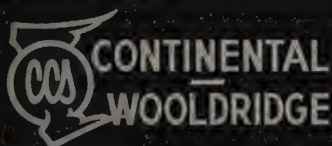


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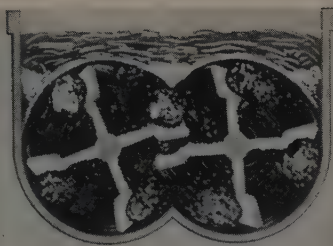
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bin gates, thereby preventing further flow of material from the bins. This results in an insufficient amount of coarse aggregate in the batch and at the same time an inaccurate reading on the indicating head of the scale system. If, on the other hand, the coarse aggregate is withdrawn first and settles to the bottom, the middle-sized aggregate second, the smaller particles of the middle-sized portion of the mix tend to infiltrate the coarser particles and the sand, in turn, tends to infiltrate the middle-sized rock, thereby allowing more efficient utilization of the volume available in the weigh hopper.

It is significant to note that both of the problems that can occur in the weigh hopper tend to indicate that the coarse aggregate bins should be withdrawn first. This eliminates any necessity for the sand bin to be the first in the sequence of withdrawal from the plant bins.

The pugmill timer

At this point in the production flow line, most specifications require a timing device of some sort to indicate the length of time that the material remains in the pugmill mixer. This is the sole function of such a device. It should be of interest to the inspector to note exactly when the timing device begins its operation. Most plants are equipped in such a manner that the timing cycle starts immediately upon the opening of the weigh hopper gate to allow material to fall into the pugmill. This means that the timing cycle is progressing before the material has actually entered the pugmill. It normally takes approximately 5 sec. for all the material to fall from the weigh hopper into the pugmill. These 5 sec. should not be included insofar as the actual mixing time is concerned. Mixing time should be computed only after all the materials have been introduced into the pugmill. From this, it can be seen that if the timer is set for a 30-sec. mix, the actual mixing time will be approximately 25 sec. even though the timing light has gone off at the end of the 30 sec. set into the device. In most cases, this need not be considered a critical item to the inspector as long as he realizes what is happening. The actual mixing time should be only that length of time necessary for complete coating of the aggregate particles with asphalt and to provide a uniform, homogen-



THE PUGMILL MIXER'S only function is to mix together the materials placed in it; it will not correct improper proportioning of material. The above drawing shows an overloaded pugmill. The material floating at the top will emerge only partially mixed.

ous mixture. The shorter the time that the mixture remains in the pugmill to produce a uniform mix, the better off the mix will be. The longer the mix remains in the pugmill being agitated at elevated temperatures, the harder the asphalt becomes and, theoretically, the shorter the service life of the finished pavement.

Dry mixing cycle

There is diversity of opinion as to the necessity for dry mixing the aggregate prior to introducing the asphalt. An argument against dry mixing is that there is degradation of the aggregate under the severe agitation and mixing action in the pugmill. This degradation is probably accentuated by the lack of the lubrication afforded by the asphalt in its liquid mixing state. On the other hand, it is contended that dry mixing will more effectively insure a uniform homogeneous aggregate mixture. It is the writer's opinion, however, that a satisfactory mixture can be produced without the dry mixing cycle, with most aggregates, and the resulting saving of time will be reflected by greater production.

The pugmill mixer

The pugmill mixer has only one function, namely, to mix the constituents that have been introduced into it. This portion of the plant can be likened to the Mixmaster that the housewife uses in making a cake. All it will do is mix the ingredients that are fed to it. It is not capable of making any material in itself. It is very important, then, that by the time the materials have reached the pugmill, they be in exactly the proper proportions to give the desired product.

While the pugmills in the batch type plant and the continuous type

plant operate a little bit differently, their purpose is the same. The problems that occur in each are similar. Normally, the main thing to watch in the pugmill is the gap between the paddle tips and the liner. If this clearance becomes excessive through wear, it is very possible for dead space to develop in the pugmill in which the material will not become properly mixed. This condition will be obvious to the inspector when the pugmill gates are opened to deposit the material into the truck, because the first material leaving the pugmill will be light in color and obviously without a thorough coating of asphalt. When this condition is encountered, the pugmill should be repaired to eliminate the dead spots.

A very important thing for both the inspector and the contractor to realize is that a pugmill should not be overloaded. It has a certain capacity as far as mixing is concerned and is not designed to mix much over that capacity. With the pugmill at rest and with the proper-sized batch within it, the level of the material should be just above the paddle shafts. With a proper size batch and the pugmill operating, it should be possible to see just the tips of the paddles as they come around the top of their periphery. In no instance should the depth of material in the pugmill, during operation, be such that the paddle tips are visible. If this condition occurs, the material that is above the top of the pugmill paddles has a tendency to merely float above that level and never get thoroughly mixed. Under most conditions, if batch sizes are kept at the capacity recommended by the manufacturer of the plant, little difficulty should be experienced. If, however, that material being mixed is of extremely light weight, it is again possible to overfill the pugmill because of the much larger volume for the same weight as a normal heavy aggregate.

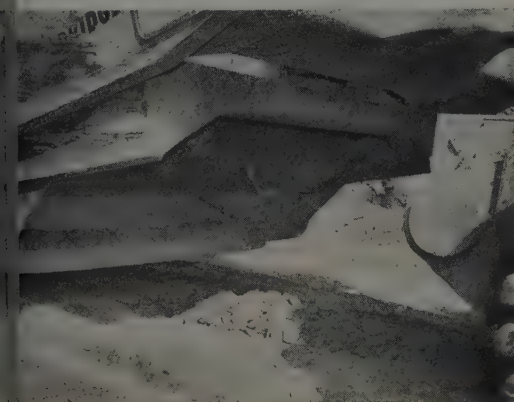
Points to watch for

One thing that the inspector must be on the watch for continually is to see that the level of material in the hot bins of the asphalt plant remains at a satisfactory operational level. If one bin is overflowing and aggregate is coming out the vents to the ground, the contractor is running an inefficient operation in that the material that he has expensively treated to bring

(Continued on page 52)

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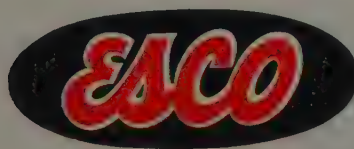


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ASPHALT PLANTS

(Continued from page 48)

to the hot plant bins is not available to him. On the other hand, if a plant bin is starving for lack of material, it may occur, on occasion, that the plant man will take material from another bin to make up the deficiency that is caused by the bin that is starving. In this case, all measures of control over the make-up of the final mix can be considered lost. This is a problem that, while occurring in the plant bins themselves, is actually caused by an unbalanced or non-uniform situation back in the cold feed. This is a common occurrence and one that the inspector should be on the watch for at all times. The proper solution to this problem is to readjust the cold feed gates to allow the proper amount of each

size of material to reach the hot plant bins.

During the batching and mixing phase of production of hot asphaltic concrete, the inspector, of course, should be on the watch at all times to see that leakage does not occur from any of the gates involved, nor from the asphalt system. The bin gates should close tightly so that no more material falls from them after they are closed and, likewise, the weigh hopper gates should function in the same manner. The asphalt distribution system should be such that no leakage occurs after the valves are closed. In some cases, the asphalt seal on the ends of the pugmill shafts will deteriorate and allow asphalt to leak from the pugmill around the shafts. When this condition occurs, the contractor should be informed that the pugmill seals

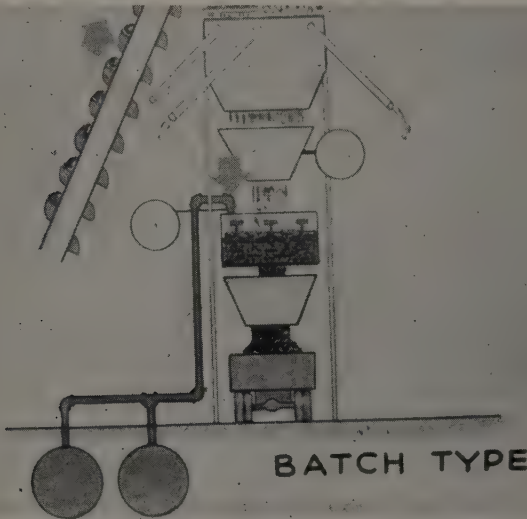
must be replaced before further operation of the plant.

Batch plants and continuous plants

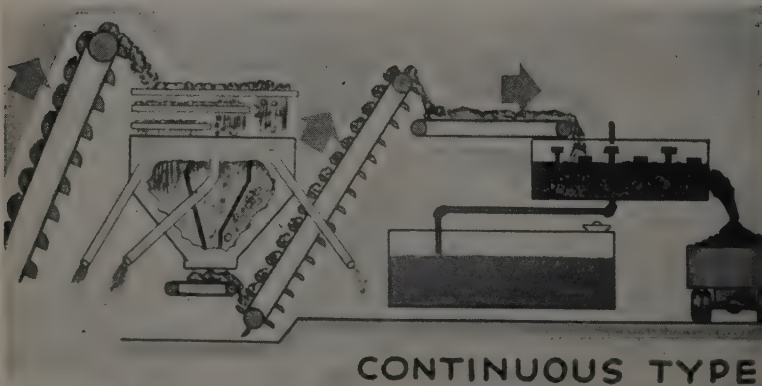
As stated earlier, the principal difference between batch plant operation and continuous plant operation is in the method of proportioning the materials. The batch plant depends upon weighing the material a batch at a time while a continuous plant depends upon continuous volumetric proportioning. In order to withdraw the material from the bins of the continuous mix plant and the asphalt from the storage tank properly, it is mandatory that the entire plant be calibrated. Once the calibration is complete for a given set of conditions, the feed can usually be set to produce the desired results.

Under normal operating conditions, with everything functioning satisfactorily, both the continuous and the batch type plants are capable of producing an excellent, high quality asphaltic concrete mixture. It is imperative, however, in the case of the continuous plant that if any discrepancy arises, every portion of the system be checked immediately. For example, it is very important that the feeders from the bins be interlocked, one with the other, so that they maintain a constant ratio of the material being fed. Likewise, the asphalt metering pump should be interlocked with the feeders so that a constant ratio will be maintained between the aggregate and the asphalt. In the case of mechanical feeders, a mechanical interlocking system is possible and functions satisfactorily. If, however, the feeders are driven electrically, it is important that they all be on the same electrical circuit so that any variation in voltage will reflect equally among them all.

In addition to the interlocking of the feeders, it is quite important that the bins of the continuous plant be equipped with some device that will stop the plant entirely in the event the level of aggregate in the plant bins themselves reaches a point such that the material cannot be struck off uniformly as it leaves the gate. If the level of material in the bins falls below the strike-off level of the gate itself, a variable amount of material will be fed to the mixer and all control of gradation in the finished mix will be lost. Likewise, a similar device or system should be in the asphalt storage tank so that if the level of the stored asphalt falls be-



BATCH PLANTS depend upon weighing the asphalt and each size of aggregate before introducing them into the pugmill for mixing. Each day the scales should be checked to see that the needles zero and the parts move freely. Bin gates should close securely to eliminate leakage.



CONTINUOUS PLANTS depend upon a steady flow into the pugmill of the right proportions of aggregates and asphalt. Each bin gate is set at an opening which allows material to feed at the proper rate. Feeders should be calibrated and interlocked to maintain correct ratios.



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low the inlet of the suction line taking asphalt to the plant, the entire plant operation will be shut down. All of these systems should be operating satisfactorily before the continuous mix plant is allowed to run. (Specifications will normally cover requirements for these control features on continuous plants.)

There is little difference between the operation of a batch type plant and a continuous type plant. With the exception of the few items listed above pertaining to the continuous plant only, all of the items previously discussed will pertain to both types of plants. If the inspector is aware of the principles governing one, he will be well-equipped to perform inspection on the other.

All specifications allow a working temperature range in the production of hot asphaltic concrete. The specific temperature which is desired at the point of paving normally dictates what the mixing temperature at the plant should be. The mixing temperature as dictated at this point can be influenced by many things, such as the weather, the length of haul, and other things. The methods of laying or placing the mixture on the job often influence mixing temperature. In many cases, the mix temperature can be held a little higher in the cooler morning hours and then allowed to be lower during the warmer afternoon period. The desirable mixing temperature in all cases, however, should be based on roadway placing requirements.

One of the more important phases of asphalt plant control is close cooperation between the plant inspector, paving inspector and the engineer in charge of the over-all work. Many times a situation or condition that denotes some unsatisfactory condition at the plant will arise on the roadway and be noted by the paving inspector. It is important that this information be relayed to the plant inspector as quickly as possible so that he may make the necessary corrections at the plant.

The plant inspector should periodically inspect the beds of the trucks hauling the mix from the plant to the roadway. Normally, after a load has been dumped from a truck and it has returned to the plant, the driver will spray the bed with fuel oil or diesel oil or some other compound in order to minimize the possibility of the subsequent load sticking to the

truck. This is normal operation and is satisfactory, providing an excess amount of the lubricating material is not used. In all cases with this procedure, the truck bed should be raised and the gate opened so that the excess liquid can drain out before the next load of mix is dumped into it. In addition to this, the plant inspector should make sure that trucks are properly equipped with tarpaulins in order to cover the mix during transit. The purpose of the tarp is to minimize the amount of heat loss between the plant and the street.

Storage of asphalt

Among the routine duties of the plant inspector is keeping a check on the stored asphalt. The temperature of the stored asphalt should be somewhere near the mixing temperature of the finished mix and should be checked frequently. In addition, the inspector should gage the level of stored asphalt in the storage tanks occasionally in order to provide a check on the actual amount of asphalt that is being used in the mix. Normally, this gaging or tank stabling can be done once in the morning and once in the evening to obtain sufficient information. In other instances, however, it is necessary to take these tank stabbings more frequently.

Another thing of relative importance concerning the asphalt storage tanks is for the inspector to note whether or not the return line of the asphalt circulating system discharges the asphalt below the level of that stored in the tank. If the asphalt plant storage tanks allow the returning asphalt in the circulation system to be sprayed out into the hot air above the level of the stored asphalt, this, in effect, provides a miniature air-blowing still for the asphalt. Asphalt sprayed into a medium of hot air in thin films has a tendency to oxidize and thereby become harder. The effect is to reduce the durability or service life of the pavement after construction. In order to prevent this, the circulation return line to the storage tank should discharge the asphalt below the level of the stored material.

This, however, poses another problem. At the end of the day's run, when the plant is to be shut down, it is necessary to clear the asphalt from the circulating system. If both ends of the pipe are below the stored level of the asphalt, this is impossible to do. One

solution is to cut a slit or two at the top of the circulating line just within the asphalt storage tank. This prevents the asphalt from being sprayed out into the open air when it is returned to the tank, yet when the asphalt pump is reversed at the end of the day's run, in order to clear the lines, the suction is broken at the slots and the pump can clear the lines satisfactorily. Asphalt allowed to remain in the pipes of the circulating system overnight will harden due to the drop in temperature and very effectively plug those lines so that asphalt cannot be pumped through the following morning.

Checking the mix by eye

The plant inspector's duties do not end with the completion of the mixing cycle and the checking of the trucks. He should make frequent visual checks of the mix as it is being discharged from the pugmill to the truck and also the complete truck load as it leaves the plant. Any serious non-uniformity of the mix will probably be visible. As a matter of fact, the inspector should attempt to see as many of the finished loads leave the plant as possible. Usually the first indication of any serious discrepancy in the production system will come as a result of visual observation.

Some of the common causes for any visible non-uniformity in the completed mix are as follows:

1. Insufficient mixing time.
2. Poor distribution of asphalt across the pugmill.
3. Poor distribution of fines in the pugmill.
4. Insufficient aggregate temperature.
5. Excessive aggregate temperature.
6. Worn paddles and liners in the pugmill—or—
7. Some combination of the above.

The end product that the inspector and producer are striving for is an asphaltic mixture of uniformly graded aggregate having a constant asphalt content uniformly distributed, mixed at a minimum temperature to allow thorough coating of the aggregate particles with the asphalt and yet hot enough to allow for proper handling on the roadway. This is a pretty tall order for both the inspector and the producer. It behooves both to pay constant attention to the small details of producing a mixture in order to get the most satisfactory product.



Four more improvements in the Barber-Greene Finisher

Four new improvements give the Barber-Greene Finisher faster speed, faster travel, lower maintenance cost and increased power.

Improving the Barber-Greene Finisher is not something new. Scores of major improvements have been embodied in its design since it was first released to the field 20 years ago.

These improvements have been incorporated without spectacular announcements or fanfare. They have all been based on vast experience. In fact, the Barber-Greene Finisher is now paving its second million miles, which is many times the mileage and tonnage records of all other asphalt paving machines in the world combined.

These are all proven, sound improvements developed from experiences in laying every type of mix, in virtually all conditions. Machines embodying this group of design changes are now in production and are designated as the Model 879-B.

Latest improvements include:

NEW TRANSMISSION—Provides both higher operating and travel speeds. The new transmission still provides 12 forward speeds giving a wider range of operation.

HIGHER SPEED TAMPER—This new design permits faster laying speeds and reduces maintenance costs.

NEW CRAWLERS—Precision-drilled pads and larger pins will further decrease maintenance costs.

NEW POWER UNIT—20% more power. This means pushing even bigger trucks, handling even steeper grades, greater reserve for high altitude, and higher speeds of operation.

Note To Barber-Greene Finisher Owners

These latest improvements, as well as many previous improvements, can be incorporated in your old machine. Necessary parts are now made up in kit form for each modification separately. A folder describing the various kits is available.

Barber-Greene

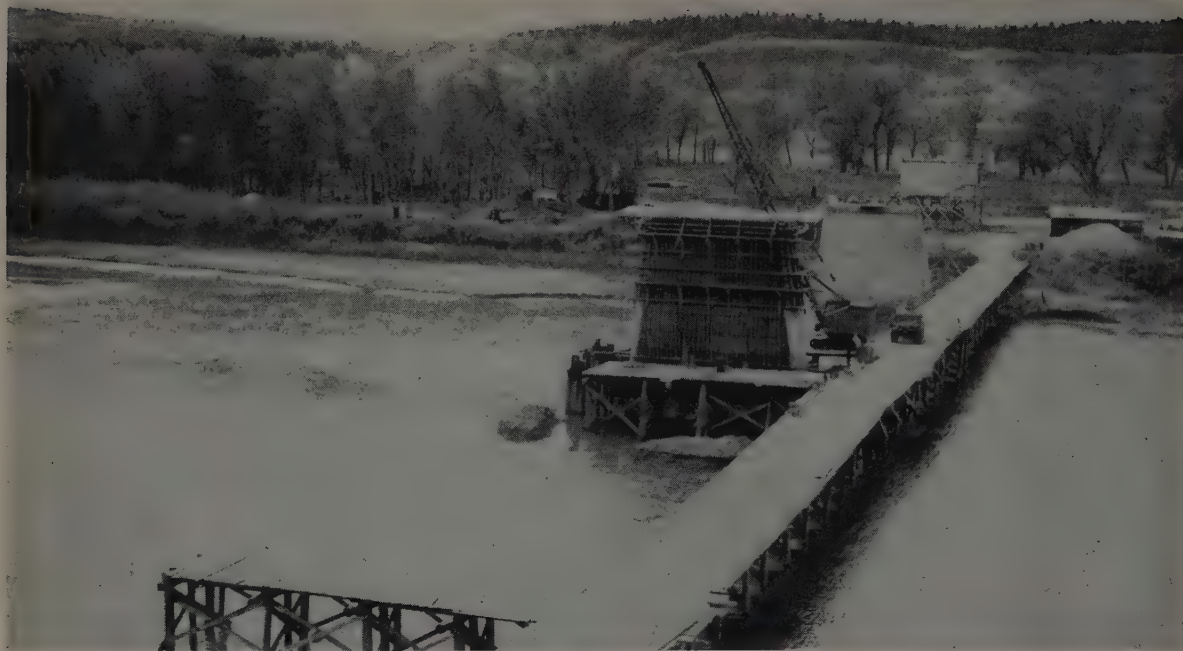
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Bridging the Missouri saves miles

Montana highway link will halve the 250 bridgeless miles of the Missouri River, cutting distance from Billings to Malta from 542 to 208 miles. Contract at remote site carried out by N. A. Nelson Construction Co.

WESTERN HIGHWAY and construction problems are well illustrated in the project which will bridge the Missouri River north of Grassrange, Montana. The \$718,051 contract for the 700-ft. plate girder structure is being carried out for the Montana Highway Commission by N. A. Nelson Construction Co. of Sheridan, Wyo. Foundation work was completed last season with structural steel delivery promised for this coming June and completion date set for November 30.

Need for the structure

Any highway map of Montana will indicate that there is no bridge crossing of the Missouri River between Fort Peck Dam and an old county bridge at Fort Benton. This represents a river distance of almost 250 mi.

U. S. Highway 2 runs north of the river and the towns of Malta and Havre are in this general area. South of the river State Route 18 runs east and west connecting at

Grassrange with U. S. 87 which turns west at that point to Lewistown.

The bridge now under construction and the sections of connecting highway will provide a vital link in the Montana state highway system. Prior to the completion of this project highway travel between Billings and Malta was required to go either east or west to the existing bridge crossings. A couple of ferries handled local traffic across the river but the connecting roads were relatively unimproved. Following completion of the project the highway distance between Billings and Malta will be reduced by 225 mi.

The same situation affected the construction program for the bridge since the contractor had to truck in all materials to the job site, a distance of 31 mi. from the nearest rail head at the town of Roy. This access route consisted of about 10 mi. of partially graveled road and 21 mi. which would properly be classed as only a trail through heavy

gumbo material which could only be traveled during dry weather.

General design features

The bridge consists of four continuous steel girder spans with lengths of 144, 180, 180 and 144 ft. The alignment is straight and the grade is 3.5% up to the south. A 25-ft. concrete tower span at each end provides a total distance of 698 ft. for the completed structure. Design calls for a standard H20-S16 load and the deck will have a 28-ft. clear roadway between safety curbs.

The principal construction problem was represented by the foundation work for the river piers. The northern pier called for 70 untreated timber piles with an estimated length of 25 ft. The other two piers did not require piles.

Low point of the river channel is at elev. 2245 with a low water elevation of 2255.5 and a high water recorded at elev. 2276.

Construction procedure

Considering the nearest town was Lewistown, over 60 mi. from the site, the contractor elected to provide a camp for trailer houses at the site. Since no facilities existed it was necessary to drill a well for

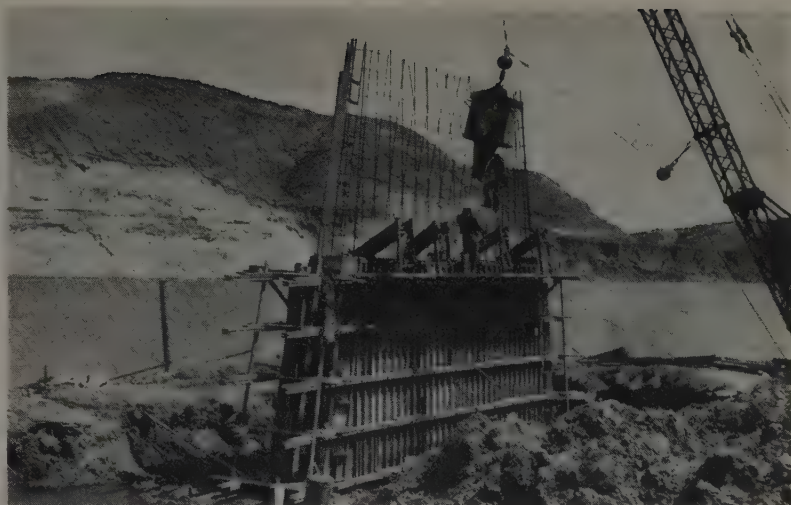
water supply and to lay water and sewer lines for the 12 unit trailer court. A light plant was also provided.

In addition the contractor built a 30 x 36-ft. shed on the south side of the river which enclosed two 3-bag concrete mixers and an 18-yd. three-compartment aggregate bin. This shed also provided cement storage. A steam boiler completed the concreting set-up required for heating aggregate and water to take care of concrete placing during the late fall and early winter of 1957.

Concrete placing from this mixing plant on the shore called for the use of power buggies to deliver the mix at the pier locations where it was placed by crane and concrete bucket.

Aggregate problems

Proper aggregate also involved a problem. Material was produced from the river bank, downstream from the bridge site. However, this natural deposit developed a severe shortage in the $\frac{3}{4}$ to $1\frac{1}{2}$ -in. aggregate. It was necessary to make up



PIER 3 NEAR the south shore did not require the trestle during early stages. Height from bottom of footing to top of concrete is 56 ft. Steel nose angle is provided on upstream edge because ice and drift are heavy.

this shortage by having this size trucked in from Lewistown, a distance of 68 mi. to the site.

The major construction preliminary was the building of a temporary timber trestle across the river along the upstream side of the bridge to provide access across the river and to each of the pier locations. This construction trestle was designed with 3-pile bents and 12-ft. spans. The timber caps were 10x12 in. and the four lines of 10x12 timber stringers were planked with 3-in. decking. This temporary structure cost about \$24,500.

At each of the river piers the timber trestle was provided with 12-ft. turn-outs located on each side of the pier. This arrangement made it possible for two cranes to be working at the same time on a pier and still leave the trestle open for transporting materials and supplies to the north side where work on the tower span was carried on simultaneously with river work.

Cribs and cofferdams

Cribs for the river plates were approximately 20x56 ft. in section and consisted of two lines of 12-in. steel walers spaced at $7\frac{1}{2}$ ft. with five intermediate steel struts. All footings were pumped out and concrete placed in the dry except for the footing at pier 4. This pier had the lowest depth with a bottom at elev. 2289.9, about 16 ft. below the lowest point of the river channel.

At this pier the excavation had been carried down to the final grade when difficulty was encountered in holding the water to this level through leakage in the cofferdam. It was agreed to change the

procedure by eliminating pumping and placing an underwater concrete seal. The loose material was cleared from the excavation and a Class S concrete mix was used in placing this underwater seal. The result was a satisfactory solution to the construction problem.

Forms for the concrete piers were built on the job of $\frac{3}{4}$ -in. plywood backed with 2x4 studs for 12-in. centers and using 2x6 walers.

Crew and personnel

A major problem for the contracting management was the maintaining of an adequate crew with proper experience for this type of construction. The location was not conducive to attracting experienced help. The contractor went to extreme efforts to recruit help and used all the local supply available. During the footing excavations for the main river piers two 8-hr. shifts were worked, but otherwise the working day was a single 8-hr. shift, 6 days a week.

Earl Rook is general superintendent on the job for the N. A. Nelson Construction Co. Francis Rook is carpenter and labor foreman.

For the Montana State Highway Commission, Max E. Lawrence is project engineer. Albert W. Jones is bridge engineer. Fred Quinnell, Jr. is State Highway Engineer of Montana. Information for this article describing the foundation construction operations was provided by S. D. Larson, assistant bridge engineer, construction. The photographs were provided by N. A. Nelson.



CONCRETE FOR the piers was handled in buckets by Lorain and Northwest cranes. Plywood forms were built on the job.

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PHIL BIGHAM
County Engineer
Barton County, Kansas

Phil Bigham



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Loading Trucks from Windrows... Tons per Hour	5	150 ft.	327	192	207
	6	150 ft.	313	192	178
	7	100 ft.	390	262	240
	8	100 ft.	394	274	253
Overall Average...Tons per Hour			371	267	237

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Western contractors on the wing

Long distances in the West put emphasis on the advantages of using company airplanes. From inspecting the site for bidding, to transporting supervisory personnel and light cargo, these business planes are a modern tool of contracting in the West.

A COUPLE of years ago, L. A. Longley and his two sons who operate the Longley Construction Co. in Las Vegas, Nev., decided to do something about the many hours they were spending on the road supervising various jobs they had under way. Although none knew how to fly, the Longleys purchased a single-engine Cessna and began learning. Today, they fly close to 400 hr. a year in their Beechcraft Bonanza business plane, supervising jobs in Utah, Arizona and California, as well as Nevada.

"If there is a utility construction job within 400 mi. of Las Vegas, we can bid on it," says Longley matter of factly.

The same story could be told by construction men throughout the Western states where distances between jobs are long and transportation often difficult. They have found the airplane to be a practical and necessary addition to their company equipment. The construction industry nationally ranks right along with the petroleum and manufacturing industries as a major user of business aircraft.

There are over 26,000 business planes being flown today—forming the largest air fleet in the world. Since 1946, hours flown by business planes have soared five-fold. And according to all current surveys, business aviation will continue to expand rapidly, with 38,000 planes forecast for 1964 and 60,000 for 1975. Ownership of these planes is not restricted to the giants of

industry. In fact, planes are often more important to small or middle-size firms because time and mobility generally mean the difference between failure and success.

Probably one of the earliest users of business aircraft is T. M. Page, president of the T. M. Page Corporation, an excavating, grading and construction firm located in Monrovia, Calif. Page has used single-engine aircraft in his construction business since 1923 and has owned planes since 1932. "Mine



LEE CONSTRUCTION CO., San Leandro, Calif., and Reno, Nev., uses this Beechcraft Twin-Bonanza business plane for transportation of executives, estimators and supervisors, as well as light cargo destined for the jobsite. Shown boarding the plane are Vice President Robert E. Lee, left, and his father, President U. B. Lee.

is a one-man business and a plane has been necessary for me to keep in contact," he says.

In a 200-mi. railroad job from Cotton to Yuma, Ariz., for the Southern Pacific, his company built 101 bridges. Page had three landing strips graded along the railroad, so he could bring in parts for the construction crews and keep a personal check on progress of the project.

Until recent months, 90% of the aircraft purchased by small and medium size firms were single-engine planes. However, light and medium-size twin-engine planes are gaining in favor because of their twin-engine reliability, capacity and speed.

Edward O. Earl, president of San Xavier Materials, Inc. and San Xavier Rock and Sand Co., both of Tucson, Ariz., started aviation operations nine years ago with a single-engine type and in 1955 stepped up to a medium size twin-engine plane, a six-place Beechcraft Twin-Bonanza. Included in the uses Earl makes of his aircraft are trouble-shooting, transportation of engineers and other personnel and the transportation of small parts to job sites.

William Hibbs, chief engineer and vice president of the construction firm, also adds extra productive hours to his working day by doing his own flying of the company plane. According to Earl, Hibbs often trims several days off the time needed to accomplish a single job out in the field.

Looking over job sites before preparing bids, keeping tabs on jobs in progress, making purchasing trips and routine business calls keep Earl out in the field much of the time. But with the enthusiasm of one who likes home cooking, Earl reveals happily that: "I nearly always manage to get home in time for lunch and dinner. I practically never have to eat a meal out."

As an example of the flexible mobility he realizes through the use of his plane, Earl points out that he flies to Phoenix, a distance of 125 mi., about once a week. "If I leave in the morning, I'm back home for lunch," he says, "and if I make the trip in the afternoon, I return for dinner."

Another flying construction man, Roy S. Isbell, seconds this idea of a company airplane allowing officials to spend more time with their families. Isbell is president of Isbell Construction Co., Reno, Nev.,

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Whyte Strand wire ropes are PREformed to eliminate any internal stresses in manufacture. This

is particularly important in shovel service, where rough use and reverse bends subject *any* wire rope to severe flexing and bending strains as it curves around sheaves and drums.

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a corporation he and his brothers direct, which often has projects under way in Nevada, Arizona, New Mexico, California and Washington. "I almost never have to spend my nights away from home now," he points out. "That's a great benefit from personal aircraft ownership."

Another firm using a twin-engine Twin-Bonanza is Lee Construction Co., San Leandro, Calif., and Reno. One of the principal uses U. B. Lee and his son Robert E. Lee make of the plane is preparing bids for new jobs. Not only does the plane fly estimators around the territory but gives them an excellent aerial view of areas where proposed jobs will be.

"We conduct much of our coordinating work on projects with the plane," Lee says. "This gives supervisors a chance to keep better informed as to progress of various jobs." The plane is used, too, for light cargo destined for "out on the job."

Many companies adapt their business to utilize aircraft to the fullest. Typical is Paul J. Meichtry of Pacoima, Calif. His six-year-old firm, the Meichtry Construction Co., does industrial, commercial and custom residential contract building and custom residential speculative building. He took to the air in 1953 with a 1948 Stinson Station Wagon, traded it for a Ryan Navion and then last year purchased a used Beechcraft Bonanza, a four-place, single-engine plane with tricycle landing gear.

"I settled on the Bonanza for our operation because of its short field capabilities and long range safety, speed and comfort," says Meichtry. "For example, when we go into an undeveloped area, the first thing that is done is the scratching out of a dirt airstrip. At Portal Heights in Antelope Valley, I used the undeveloped dirt streets to land on until I could cut out a more suitable strip. The two streets I used for six months demanded a good, short-field aircraft since one was level for only 800 ft. The other was 1,400 ft. long but rose in elevation 60 ft. in its length.

"Our plane is used in daily supervisory trips to various job sites, expediting vital materials and personnel as well as surveying future expansion areas and job sites being bid," says Meichtry. "Converting our business to aircraft was accomplished in a relatively short period of time by concentration on jobs that could be serviced by aircraft,"



ONE OF THE EARLIEST users of planes in the construction business was T. M. Page, president of T. M. Page Corp., Monrovia, Calif. Page started using aircraft in his work in 1923 and has been a proponent of business aviation since. He flies a single-engine, four-place Beechcraft Bonanza.



THE CONSTRUCTION INDUSTRY has become one of the principal users of business aircraft since planes enable a firm's officials to supervise distant projects without long, overnight trips. Planes can often be landed alongside the projects.

he adds. "The construction business is very adaptable."

Earth-bound Western contractors all have their transportation problems — whether it's fighting traffic in California, creeping through mountains in Colorado or sweltering through long stretches of desert in New Mexico.

Officials of the Gibson & Roberts Construction Co. in Spokane, Wash., were driving between 50,000 and 60,000 mi. a year in their general contracting work. As partner Frank Gibson says, "Figuring 50 miles an hour and 8 hours a day, this mileage equaled 125 days or 5 months a year seated behind a steering wheel."

So, in 1953 Gibson took up flying. Today, Gibson, W. J. Roberts and Virg Messenger of this construction firm fly nearly 700 hr. a year in two company-owned planes, a Beechcraft Bonanza and a Piper Super Cub. It takes them about 5 hr. to fly to Glen Canyon Dam, Ariz., in their 200-mph. Bonanza — 25 to 30 hr. to drive there.

With a company plane, officials can reach trouble spots before a minor problem becomes an expen-

sive major one. They also can go when and where they want. Layovers and timetables can be forgotten.

Business flying is a safe means of travel. Statistics show it to be 16 times safer than auto travel.

California leads the country in number of aircraft registered — 7,420. This represents almost half of the 15,204 planes located in the eleven Western states. Figures for the other states are: Arizona, 825; Colorado, 907; Idaho, 646; Montana, 917; Nevada, 287; New Mexico, 548; Oregon, 1,286; Utah, 365; and Washington, 1,638.

Flying construction men, many with over a decade of aircraft experience behind them now, see the day coming in the not-too-far future when a plane will be a part of every company's equipment. Meanwhile, they plan to utilize to the fullest the greatest tool they have found for getting and staying ahead of competition—the company airplane.

Material for this article was prepared at the request of WESTERN CONSTRUCTION by the Beech Aircraft Corp. of Wichita, Kan.

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TURBOCHARGERS—

Aids to equipment at higher altitudes

Diesel engine efficiency and power can be maintained up to 12,000-ft. elevation by the modern turbo-charger.

WESTERN CONSTRUCTION equipment, which is often used at high altitudes, can operate most efficiently if aided by a device that is best described as being "full of hot air."

The device is the turbocharger, which utilizes normally-wasted energy of exhaust gases. These gases turn a turbine inside the turbocharger. The turbine spins an impeller which blows more air into the intake manifold and engine cylinders. This extra air helps the engine burn more fuel more efficiently.

How it works

How the turbocharger helps at higher altitudes can be best explained by showing what happens to naturally aspirated or Roots charged engines as they work at increasing elevations. Higher altitude means less dense air, and thinner air means less efficient combustion. Lower efficiency in combustion means loss in power.

Most engine manufacturers (and all engine users) are aware of this power loss. One manufacturer, Cummins Engine Co., recommends that its naturally aspirated, and Roots charged engines be derated 3% in maximum power for each 1,000-ft. increase in altitude. This is the same rate as air density decreases.

In 1951 Cummins began experiments to overcome the high-altitude power loss on their line of high speed diesel engines. These experiments centered on the turbocharger.

Maintaining sea-level power

One of the best characteristics of a turbocharged engine is its ability to maintain sea-level power at high altitudes. There is no mechanical connection between the turbo-

charger and the engine. Therefore, as altitude increases and air becomes thinner, the turbine and impeller rotate more rapidly. This forces a larger volume of the less-dense air into the engine cylinders, maintaining maximum power as altitude increases.

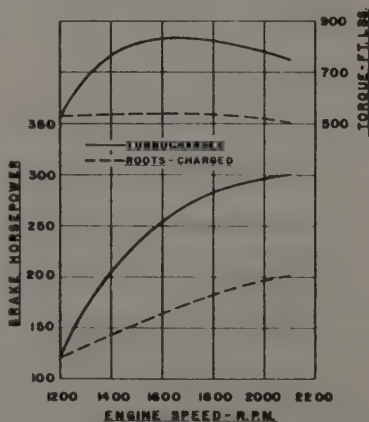
Cummins has developed turbochargers efficient enough to allow engine operation up to 12,000 ft. without derating. But a naturally aspirated or Roots charged engine would give 36% less power at 12,000 ft. than at sea level.

The chart shows this power difference. A turbocharged engine (solid line) rated at 300 hp. would continue to develop this power at 12,000 ft. But a Roots charged engine (dotted line) rated at 300 hp. would only develop about 200 hp. at that same elevation.

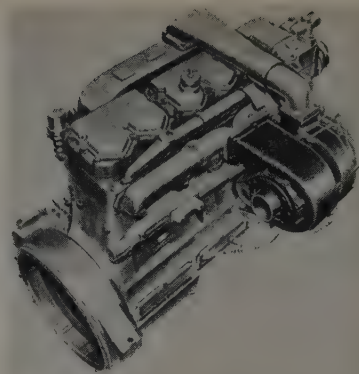
Turbocharging provides other benefits too. A major advantage is more power without an increase in engine size and weight. A turbocharged engine also generally gives improved fuel economy.

Makes engines smaller

The less-weight-per-horsepower and more-power-per-inch features of turbocharged engines help in many types of construction equipment. More size and weight can be built into the actual work-perform-



AT 12,000 FT. elevation the engine's performance with turbocharger will produce 300 hp., while the Roots-charged engine will only reach 200 hp. at the same engine speed.



A GOOD example of turbocharging benefits is this Cummins NT engine which was introduced at 150 hp. naturally aspirated. Improvements raised its horsepower to 210 and the addition of the turbocharger, shown on the side, increased its output to 335 hp.

ing parts of the equipment. Bigger, faster, more economical construction equipment can be built with little or no increase in engine compartment size.

The Cummins NT Turbodiesel engine is a good example of the benefits of turbocharging. This engine was introduced as a 150-hp. naturally aspirated engine. Improvements raised the naturally aspirated horsepower to 210. Turbocharging increased horsepower to 335, which represents an 83% increase over the original engine. And laboratory work indicates that the power limit is not yet in sight. A larger size engine, when released for production in the near future, is expected to have two and one-half times more power than the original naturally aspirated model.

Turbocharging is not merely a matter of sucking in more air and watching engine power increase. Like any other engine improvement it presents its own peculiar problems. Chief problem of turbocharging was power lag and excessive smoking when the engine was accelerated from zero or light load to full power.

Acceleration lag

When a turbocharged engine is accelerated in this way there is a time lag between injection of additional fuel and the arrival in the cylinders of the additional air necessary to completely burn this additional fuel. The reason is that additional fuel must be injected and burned to increase the quantity and temperature of exhaust gas. This, in turn, increases turbine speed, delivering more air to the

cylinders to completely burn the additional fuel of acceleration.

At the beginning of Cummins' turbocharger program in 1951, it took 17 sec. for exhaust smoke to clean and full power to develop when an engine rated at 150% of naturally aspirated power was suddenly accelerated from idle to maximum fuel delivery. Before release to production, this lag had been cut to 4 to 5 sec. Tests established that acceptable smoke and almost no power lag resulted in up to 140% of naturally aspirated power when the turbocharged engines were suddenly accelerated from idle to full power.

Many things helped reduce this acceleration time, but the major improvement was in more efficient turbochargers, and the better matching of turbochargers to engines and manifolding.

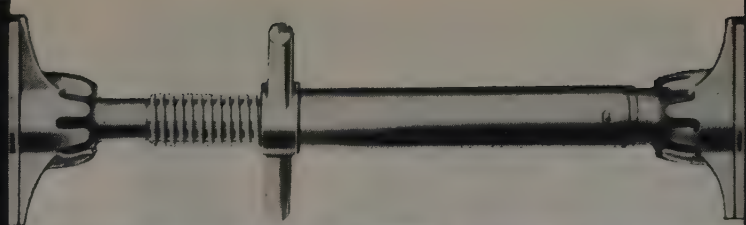
Aneroid control

Most important recent development is the aneroid control. This device keeps the amount of fuel delivered to the engine cylinders in proper proportion to the amount of air in the cylinders. The aneroid control responds to intake manifold pressure, which is directly related to the amount of air in the engine cylinders. Aneroid control has, for all practical purposes, eliminated air delivery lag and excessive smoking.

These improvements were important to all turbocharged engine operators, but of vital importance to anyone operating at high altitudes. The less dense air at altitudes compounds acceleration problems. Therefore the aneroid control is an absolute necessity for high altitude efficiency.

Aneroid control developments and other experiments are continuing at Cummins. The company now manufactures its own turbochargers and is continuing experiments to reduce the weight and inertia of the turbocharger rotor assembly.

What's the future for turbocharging? In a S. A. E. paper, N. M. Reiners, Cummins' vice president of research, and W. D. Schwab, administrator-research, said, "The knowledge we have learned from our research and actual field experience to date reveals that we are actually only on the threshold and have only partially realized the potential increase in horsepower output and improvement in fuel consumption that turbocharging offers."



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WESTERN CONSTRUCTION—April 1958

A ten-point safety program for industrial projects

IF YOU WANT to brag about a good safety record after your next industrial plant or refinery job, plan your safety program *before* the job begins. With the ground rules laid out ahead of time, you can concentrate on enforcing safety regulations during the job—and better your chance for an accident-free record.

This is the advice of the National Constructors Association, a group of leading engineering and building firms engaged in engineering and construction of chemical plants, petroleum refineries, steel mills and power plants. To help matters along the NCA has drawn up a ten-point schedule for organizing and enforcing job-site safety. With modifications for conditions particular to the job, it can be adapted to any size project.

Here's how the NCA suggests you go about planning your safety program:

Conference with client

Before starting the job, sit down with your client and lay the general framework for the safety program. Specifically, these items should be discussed:

- client's and contractor's safety regulations;
- fire permits;
- hot work permits;
- smoking rules;
- whom to call in case of fire;
- plant security;
- speed limits and parking;
- sanitary facilities;
- dumping facilities;
- use of client's medical facilities.

Assigning responsibilities

Prime responsibility for accident prevention rests with the job superintendent, but on all except the smallest jobs he should have the assistance of a safety engineer. On large projects a safety committee should be appointed, to include these personnel: job superintendent, safety engineer, field engineer, assistant superintendent, craft foreman (rotate), craftsman (rotate), office manager.

One member of the committee should be made chairman and one secretary. Minutes of all meetings should be recorded and distributed

to members of the committee and the home office.

The craft general foreman is responsible to the job superintendent for accident prevention measures in his craft. The foreman is responsible to the craft general foreman for the accident prevention measures of his subordinates.

Medical arrangements

At the start of each job arrangements should be made for first aid, medical, hospital and ambulance facilities. Services of a competent full-time registered nurse should be obtained when necessary. A list of doctors for various types of injuries (eye, bone and general) should be decided upon. (Insurance carriers can help in this respect.)

Indoctrination

The safety engineer should meet with new employees when they are hired and present each with a copy of the employee's safety rules booklet. He should outline the safety program and inform them that one of the conditions of employment is strict adherence to the rules. Employees should be instructed to report all injuries immediately to the foreman and to get first aid for all cuts, bruises and scratches no matter how slight they may be.

At the time of work assignments, the foreman should instruct workmen concerning any specific hazards such as blasting, gases, chemicals, etc.

Protective equipment

At the time of employment each employee should receive safety equipment required for his work. When additional equipment is required it should be issued from the tool room on supervisor's authorization and employee's signature. The job superintendent or safety engineer should determine the protective equipment necessary for the project.

Fire prevention

Ample fire protection should be provided for the project. This

might be done through arrangements with the client's fire department, the closest city fire department or an on-the-job fire brigade. It may be necessary to provide water reservoirs and some fire fighting equipment.

A definite procedure for welding and burning should be set up and maintained where work must be done in hazardous areas. Generally the best way to control welding and burning is through a permit system.

Reporting accidents

Once a job has begun the success of the safety program will depend on enforcing the safety regulations and the reporting and investigation of accidents and unsafe conditions. All accidents should be investigated immediately to determine the cause, and corrective measures taken promptly to prevent a recurrence of similar injuries. The investigation and report should be made by the immediate supervisor and approved by the job superintendent.

A record should be kept of all first aid treatments, (including subcontractor's personnel) and an Injury Report made out for all injuries which require a doctor's care or result in lost time.

Inspections

Besides prompt investigation into the cause of every accident, daily safety inspections should be made by the job superintendent and the safety engineer. The safety committee should make weekly inspections. Less frequent inspections will be made by the central office safety engineer, the insurance carrier's safety engineer and state inspectors.

Safety meetings

A meeting of supervisory personnel and the safety committee should be held regularly—preferably once a week—to plan and review job safety.

The craft foremen should conduct weekly five-minute safety meetings with their work gangs.

Promoting safety

Making every worker on the job safety-conscious is one of the best ways of preventing accidents. This can be done through use of posters, safety signs, bulletin board displays, films and safety talks.

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Add up the thousands of dollars a TD-18 4-In-1 can save you, in price and wages. Measure the huge, tough-job advantages of exclusive pry-over-shoe break-out action. See what it means to command the built-in performance protection of exclusive, shock-swallowing Hydro-Spring. See your International Drott distributor for a demonstration!

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EARTHMIVING—

Eighth of a series—Drilling and blasting

By **RICHARD BENNETT**

Construction Consultant
Saratoga, California

ARTICLES 5, 6, and 7 of this series dealt with power shovels and rock trucks. Of no less importance is the reduction of solid rock into practical handling and hauling size. A complete treatise on this one subject would be large book size.

Too many contractors pay too little attention to their blasting operations. They just leave it all up to "Old Bill," because Old Bill has been flirting with Dinah Mite all his life and he knows all the answers. But today's bid prices are so low, due to competition, that no contractor can afford not to use every possible means to reduce rock excavation costs.

Drilling and blasting is both an

art and a science. The design of drilling and blasting patterns requires the services of an engineer skilled in blasting techniques. The old job-trained blaster acquired much experience and "feel" of how to handle various rocks and job situations. Combine the skills of both and you will get minimum job costs.

Through use of job planning techniques based upon prior studies rock production on some jobs has been increased over 100%, with no additional equipment, due almost entirely to improved blasting. In some of these cases Old Bill's apparent savings were false economy. Similar cost reductions are readily apparent on many jobs.

Complex rock formations are found on most highway jobs and this complexity is a deciding factor

in the proper selection of drilling equipment, drill patterns, and type of explosives to be used. Most of the rocks encountered range from the softer shales and sandstones through the medium limestones to the harder granites. Stratification may be horizontal, vertical, tilted, folded or solid, and may give a complete change within the same cut.

In rock excavation, lower costs start with job studies which are best when applied as a part of everyday operations, with each worker realizing that they are routine—nobody is being "watched". The entire job operates on the principle, "There is a better way".

Highway blasts are generally of major proportions unless in critical areas of nearby structures and homes. An entire cut may be blasted at once. This requires competent drill and blast pattern design and good job control to secure minimum unit costs.

For blasting control, a commonly used report form is shown. It has multiple use, either for a single

Job No.		BLASTING REPORT		Date
Loc. area				Report No.
Pattern designer		Blasting foreman		Job Mgr.
Borehole diam. ins.		Total holes		Blast series No.
Non-restricted	Restricted	Vibration factor		Sound factor
Formation		Stratification		Ave. thickness strata
Ave. depthholes ft.		Subdrilling ft.		Blast pattern
Spacing		Burden		Number rows
Total cu. yds.		Lbs. exp. per cu. yd.		Total lbs. exp.
Stemming		Detonation method		Power source
Type explosives		Size explosives		Manufacturer
Preblast inspection		Yes	No	If yes - describe
Complaints		Yes	No	If yes - describe
COST SUMMARY				Totals
Drilling - labor, equipment and supplies				\$
Explosives and supplies - kind, amount				\$
Charging holes - labor, equipment, supplies				\$
Drilling and blasting cost per cubic yard				\$
Power shovel size		Production - cubic yards per hour		
Blast results - sound, vibration, throw control, fragmentation, secondary blasting, back-break, etc.				
Remarks:				

row or for all holes in one blast. An appropriate type of form is used for drilling operations control. The drawing shows a portion of design considerations for a typical blasting pattern—for one row of holes with field instructions for Driller and Blaster. This is the first and major step of cost reduction control—this is job planning at its best.

The blasting pattern must be completely designed for the entire cut before drilling starts. It is the main factor in job control. Once it is approved it becomes official job instructions. It is impossible to prescribe a set pattern to be used as a yardstick. Most published patterns show all holes evenly spaced, same hole diameter, same depth, same charges, same everything, but it just doesn't work out that way on the job.

Most job engineers in charge of blasting provide themselves with a complete series of patterns cover-

ing their experiences. These recorded experiences show trends and results in various formations, along with the type of drills, drill bits, drill steel, explosives, charging explosives, stemming, instant and delay detonation, vibration, depth of borehole, diameter of borehole, rock face profile, subdrilling, throw control, slope control, fragmentation, blasting machine, sound control, back-break control, and other factors which must be given attention.

Blasting pattern designers require job cross section notes for their work. A cross section is generally plotted for each line of holes at right angles to centerline of cut as shown in the drawing. The blast pattern plan and profile show the exact location, depth, bit size and angle of each hole. In mountain work the cut may be deep on one side and shallow on the other. The blast pattern designer will note such circumstances and may pro-

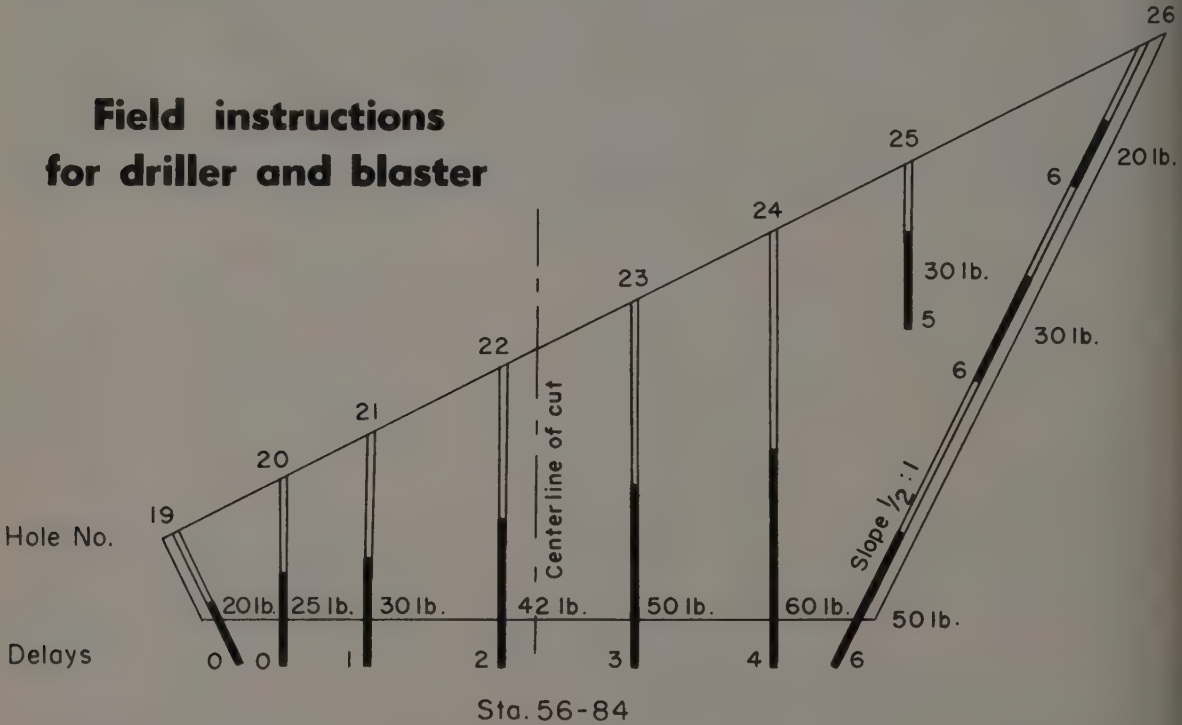
vide smaller holes with closer spacings in the shallow areas and larger holes with greater spacings in the deep cut portions.

When properly designed and controlled, blasting operations may be safely and economically carried on in nearly all situations—in open country or in restricted areas.

At least one man in the contractor's organization, preferably one with engineering training, should become a specialist in designing blasting patterns, taking into consideration all factors which affect blasting economy. Such work actually takes little time once he is proficient in the techniques. His designs become "job orders". Production goes up, unit costs go down.

Few contractors can properly set up this system of blasting control due to lack of trained help, lack of time, or both. Therefore, they often turn to outside supplemental help such as construction consultants to help them out.

Field instructions for driller and blaster



Hole No.	19	20	21	22	23	24	25	26
Feet from $\mathcal{C}$	22	15	10	2	6	14	22	36.5
Size hole (in.)	2	2	3	3	3	3	3	3
Depth (ft.)	8	10	13	17.5	21	25	10	40
Lbs. Explosives	20	25	30	42	50	60	30	100

ALASKA Newsletter

By CLIFFORD S. CERNICK, Anchorage

BREAKUP TIME—It's breakup time again in Alaska. What's breakup? It's the same thing most of you know as spring. But, in Alaska, spring sets in with such a vengeance that a stronger term was needed. And breakup fits—because things are "broken up" for several weeks. Roads which have withstood the heaviest loads under winter travel conditions suddenly fall to pieces—become, in some cases, bottomless bogs. Each year the same pattern manifests itself during breakup. Breakup each year brings trouble for construction men. And many, many headaches.

WATER, WATER EVERYWHERE—In a land where the snow gets deep there's trouble in the spring when it melts in a hurry. At Bethel, on the Kuskokwim, natives keep moving their houses back from the river bank, large portions of which are gulped up each breakup time by rampaging waters. Surface transportation comes to a creeping halt during breakup. Alaska's tundra—or muskeg—thaws to a series of gooey hog wallows that won't support the weight of a golf. Many airfields, highly serviceable during sub-zero cold, are treacherous and dangerous during breakup time. Sourdoughs in puntless trapline cabins along hundreds of Alaska rivers these days are observing the annual spectacle of ice-choked rivers, disappearing riverbanks and the warm temperatures that make breakup time somewhat bearable.

WELCOME, SWEET SPRINGTIME—For most construction crafts, Alaska's spectacular springtime is a time for rejoicing, even though nobody expects to get much construction done. For one thing, paychecks will start rolling in again for the first time after a work-less winter, in the case of most northern construction stiff. For another, breakup time is traditionally the time when Alaskan wage contracts are renegotiated—and since the spiral of wages has never gone anywhere but up—breakup time means more greenbacks in the pay envelope.

AUTOMATIC INCREASE—Typical of the brighter side of spring in Alaska from the construction stiff's

viewpoint is the automatic 4½% wage increase that went into effect on March 1 for seven major construction crafts. The seven crafts are members of the AFL-CIO building and construction trades council of Alaska and include laborers, plasterers and cement masons, operating engineers, teamsters, bricklayers, iron workers and lathers. The pay boosts—which went into effect without recourse to negotiation, by the way—are being made in accordance with an agreement between the crafts named and the Alaska Chapter of the Associated General Contractors. Under the new wage scales, some typical straight-time hourly wages are: bulldozer operator, \$4.31; heavy duty mechanic, \$4.39; swamper, \$3.82; laborers, \$3.81.

UNEMPLOYMENT AT PEAK—To prevent anybody from assuming that wage rates are rising because of a labor shortage, I'll hasten to add that there are now more than 8,000 able-bodied men in Alaska without work—most of whom know a thing or two about construction. At Juneau, employment officials issued a gloomy bulletin to the effect that unemployment in the Territory has climbed to its highest point in three years. Approximately 17% of Alaska's labor force lacked jobs in January—a situation that has not altered greatly since that time.

NEW RADAR STATION—Some alleviation of Alaska's current unemployment no doubt will take place when the annual spring hiring gets into high gear. Another hope expressed by employment officials is that missile and radar base construction will take up the slack which has been forecast in Alaska construction for 1958. One of the major projects that may be in the cards this year is a \$250,000,000 missile detector site. Washington news reports declared that a survey team has been sent to Alaska to check areas suitable for the detection site. The base itself, according to these reports, will cost between \$50,000,000 and \$60,000,000 and the remaining \$200,000,000 will be for detection equipment. No official source has yet confirmed the Washington news stories, nor has there been any

confirmation as yet with regard to persistent reports that a string of missile launching bases is scheduled for the Territory.

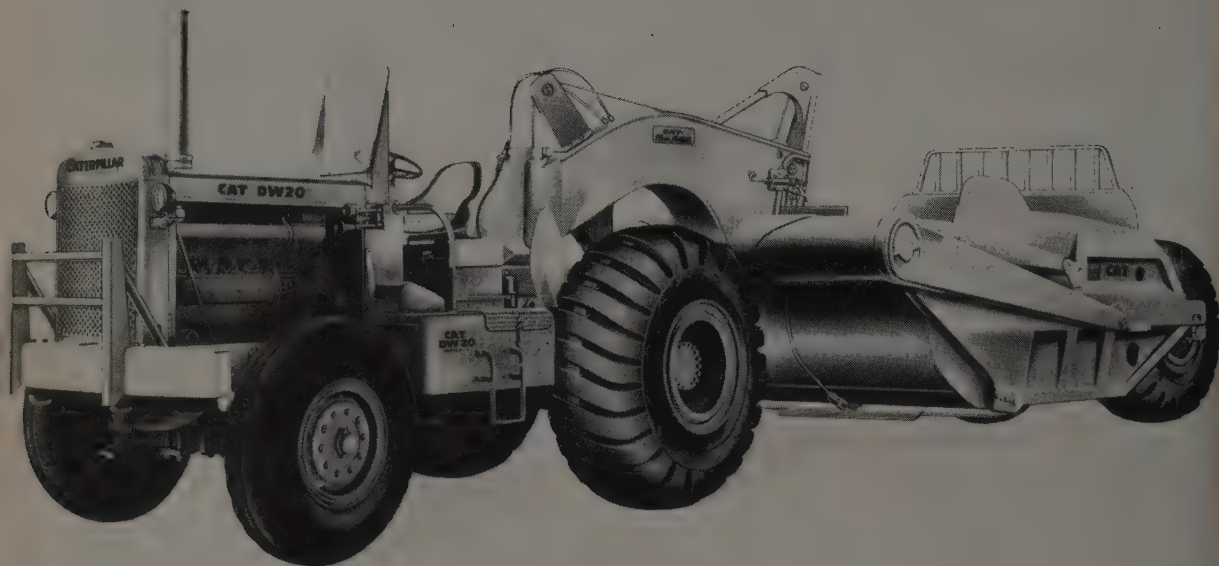
MILITARY CONSTRUCTION—Military construction in the Anchorage area alone during 1958 will amount to between \$14,000,000 and \$20,000,000, the Army Engineer District has announced. New projects will comprise all but \$7,000,000 of this total under present tentative schedules announced by Col. P. V. Kieffer, Jr., Alaska district engineer. Most of the new construction planned is at Fort Richardson where additional housing facilities are required.

BATTLE OF THE BARRACKS—No sooner had the Engineer District announced plans for construction of new family quarters at Fort Richardson than Anchorage landlords made moves to block the program. Landlords in Alaska's largest city are irate about the military housing construction proposal because they feel the military housing needs can be taken care of by presently unoccupied apartment units in the Anchorage area. As a matter of fact, landlords moaned to the press they now have more than 700 vacant apartments. M. G. Gebhart, executive director of the Alaska Housing Authority, confirmed the landlords' plight. "Sufficient vacancies exist in present standard rental units to provide for military families, therefore, additional construction of on-base facilities would harm the communities and would cost additional taxpayers' dollars," Gebhart said. It remains to be seen whether the protests will actually bring a halt to the military housing now projected.

CONSTRUCTION NEWS NUGGETS—A new junior high school for Anchorage, costing \$2,800,000, is scheduled for construction, with the completion date set for the fall of 1959 . . . A new senior high school for Anchorage also is being considered, but this is still in the "talking" stage . . . A policy on road building has been adopted in Juneau by the Alaska highway and public works board under which Alaskan municipalities would pay 10% of the total cost of constructing highway projects within municipal boundaries . . . An Anchorage firm has invested \$100,000 to set up a prestressed concrete plant, the first in Alaska, to serve contractors and other builders.

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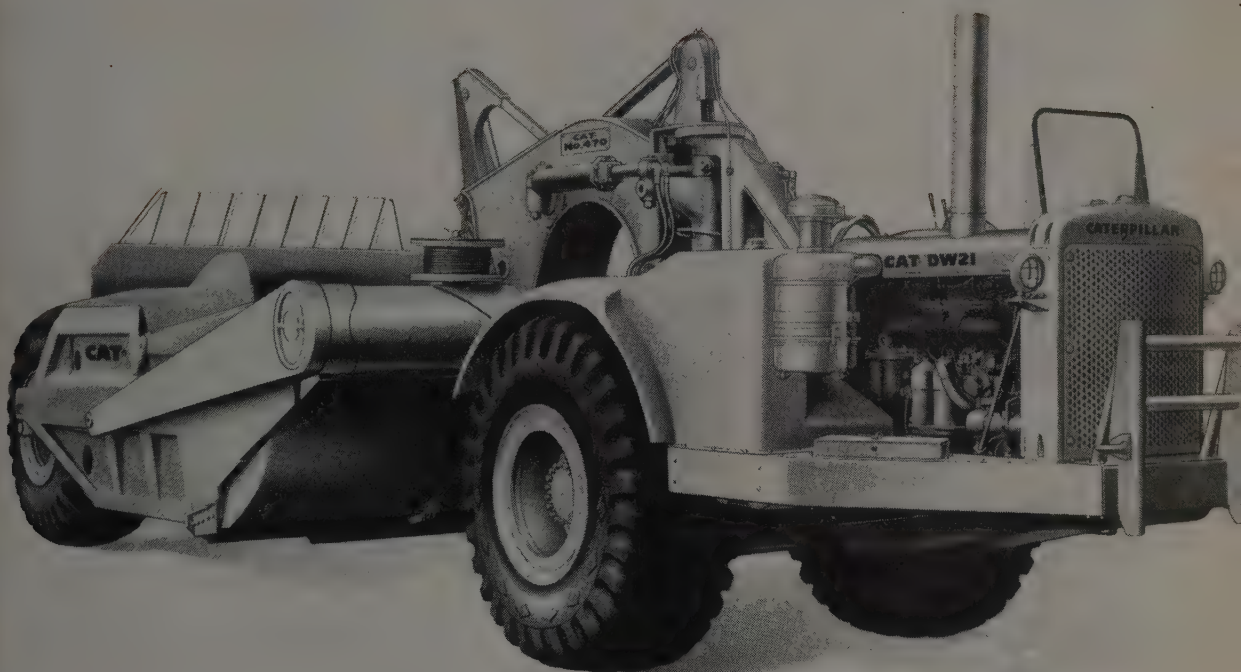
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New Torque—28% torque rise!

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Snake River controversy continues

THE FEDERAL POWER Commission has denied an application by Pacific Northwest Power Co. for a license for a proposed hydroelectric project, consisting of the Mountain Sheep and Pleasant Valley developments on the Snake River in Idaho and Oregon.

The Commission concluded that the proposed project was not "best adapted" to a comprehensive plan for developing the river. The FPC also indicated that any combination of projects in the Middle Snake Basin which includes a high dam at the Nez Perce site would be superior to one which does not. The proposed Mountain Sheep-Pleasant Valley project would preclude construction and operation of the Nez Perce dam on the Snake River below the confluence of the Salmon River.

The FPC's staff, in a brief filed March 1957, recommended denial of Pacific Northwest's application, concluding instead that there was an urgent need for flood control storage by a high dam at the Nez Perce site. However, FPC Presiding Examiner Edward B. Marsh, who conducted hearings on Pacific

Northwest's application, filed a decision last July which would have granted a license to the company for the proposed Mountain Sheep-Pleasant Valley project.

The Commission said that it was "readily apparent" from reports by the U. S. Army Corps of Engineers (House Document 531 and Senate Document 51) and from those prepared by the FPC staff that "any combination of projects which includes Nez Perce is consistently superior to any combination of projects which does not include Nez Perce." Nez Perce, the FPC said, together with existing storage and that under construction in the Snake Basin above the mouth of the Salmon, would supply all of the storage needed to control the flows of the Salmon and the Middle Snake above the Nez Perce site for the prevention of flood damage downstream on the Columbia, for economic power development, and for other beneficial public purposes. In addition, the FPC said that it was apparent from the record that the Nez Perce development would be economically feasible for private financing and con-

struction as well as for federal financing and construction.

Following this FPC decision the Pacific Northwest Power Co. made application for a rehearing of its proposal to build the Mountain Sheep and Pleasant Valley hydroelectric project. The four-utility group said it was asking for the rehearing because of "errors and omissions" by the Commission.

PNP contended that the "basic error" in the Commission's decision was failure to recognize the risk of destroying a vital fish resource at such a high dam as Nez Perce. The company termed this to be "the prime issue involved in proper development of the Middle Snake River."

Washington will set new highway record

WASHINGTON HIGHWAY construction contracts are expected to set a new high in 1958 of around \$66,000,000, according to W. A. Bugge, Director of Highways.

The 1957 total, a record for any one year for highway construction contracts, was \$45,895,829.

Present plans call for the largest single highway construction project in Washington's history, the Seattle Freeway, to be gotten under way during 1958. The first contract will call for construction of the piers on the Lake Washington Ship Canal Bridge. More work is planned to be begun during 1958 on extension of the Alaskan Way viaduct south in Seattle and paving is expected to be put under contract on the Bellingham freeway.

Construction work on the Ritzville Bypass—a new alignment of U. S. 10 to the east of Ritzville north to Tokio—is scheduled to begin in 1958 also.

Right-of-way purchase is scheduled during 1958 for land on which to build the proposed Yakima Freeway east of the center of the city and just west of the Yakima River. This section of highway is currently planned to be on the route of the new section of Interstate highway between Ellensburg and Pendleton.



PRIEST RAPIDS DAM ONE-THIRD COMPLETE

WITH THE PROJECT more than one-third complete, work continues ahead of schedule at Priest Rapids Dam on the Columbia River in central Washington. In upper left area, protected from the river by cofferdams, the first 11 of the dam's 22 spillway bays are under construction. Water intake structures of the 1,025-ft. powerhouse are shown in center, and the large structure at the right will house the left-bank fish passage facilities. In right foreground is the conveyor belt that moves aggregate to the concrete batch plant. Merritt-Chapman & Scott Corp. is building the dam and power plant under a \$92,000,000 contract for the Public Utility District of Grant County. Consulting Engineers: Harza Engineering Co. of Chicago.

Symons Forms Ganged for Anchor Walls



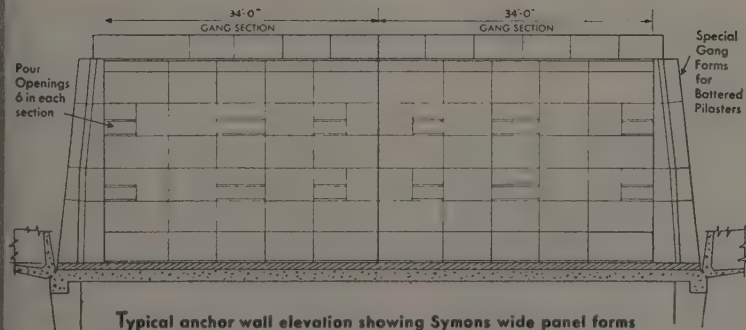
ASSEMBLY COST ONLY 5c A SQ. FT.

Modern forming methods answer the need of the jet age on the new TWA hangar at New York's International Airport. Symons 4 x 6 and 4 x 8 foot panels ganged in units 34 feet wide by 27½ feet high were used for forming the 28 anchorage walls which straddle the full 80 foot roof width of the main building.

By using this method of forming, the contractor, Grove, Shepherd, Wilson & Kruege, Inc., poured the hangar in place at the cost of a precast structure. Panels were assembled on the ground at a cost of only 5¢ a square foot. It took about 15 minutes for a crane to tilt a gang form off the slab and inch it into place on the roof. 15,000 square feet of Symons wide panel forms were used in this gang forming operation. Symons wide panel forms have steel struts and 2 x 4 cross members to strengthen the panel and minimize deflection during pouring. Tie holes in the steel struts allow insertion and removal of special ties. Any strength tie may be used, including Williams removable end ties. Individual panels are built in 6' and 8' lengths and 30", 36" and 48" widths.

Project Manager, A. R. Maxwell, working closely with the local Symons forming engineer, devised this fast, efficient method of forming. This type service is available to all contractors, as well as the preparation from your plans, complete form layouts, bill of materials and recommendations for the best and least costly method of forming—there's no charge or obligation.

Symons Forms Shores and Column Clamps may be rented with purchase option—rentals to apply on purchase price. For more information on Symons products and service send for our FREE catalog.



Typical anchor wall elevation showing Symons wide panel forms ganged into units 34 feet wide by 27½ feet high. There are a total of 28 cable anchor walls on roof of the main building.

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Bloodgood appointed chief engineer

Bureau of Reclamation names construction engineer to top post.

GRANT BLOODGOOD has been appointed Chief Engineer of the Bureau of Reclamation. The position also carries the title of Assistant Commissioner. He succeeds L. N. McClellan who retired Feb. 28. Well known to the construction industry throughout the West, Bloodgood had served on the Boulder

Canyon Project, All American Canal, Gila Project, and elements of the Central Valley Project, before moving into the Denver headquarters in 1946 as chief of the Construction Engineering Division. He later held the title of Chief Construction Engineer and was made Associate Chief Engineer in 1954.

E. G. Nielsen, has been named

Associate Chief Engineer, moving from his recent position of Assistant Commissioner in Washington.

Bloodgood is an engineering graduate from the University of Nebraska in 1920. He immediately went to work for the Bureau of Reclamation on the North Platte and Riverton projects in Nebraska and Wyoming. He was in private engineering work from 1925 to 1929, including the location and construction of a canal and later a system for a 40,000-ac. irrigation project in Mexico. He returned to the Bureau in 1929, working on the Riverton Project and later going to the Boulder Canyon Project where he was in charge of layout and estimates during construction of Hoover Dam and Powerplant.



LIMA Roadpacker speeds freeway construction near Colfax, California

Proper consolidation plays a large part in the speed with which McCammon-Wunderlich Co. and Wunderlich Contracting Co., Palo Alto, California, are completing their \$3,650,000 state freeway contract on U.S. 40 east of Colfax.

These prominent contractors have been using the Lima Roadpacker, a big favorite for highway and airport construction throughout the country. It has no equal for fast, uniform consolidation by the vibratory method of single course macadam bases, gravel subbases and soil-cement bases.

The Roadpacker is equipped with six

420-lb. hydraulically driven shoes for effective vibrating and tamping action. These oscillate approximately $\frac{1}{4}$ in. at the right frequency for best consolidation of any base material. The force is applied vertically to prevent shoving the material being stabilized. The sole plate is designed for both forward and backward operation.

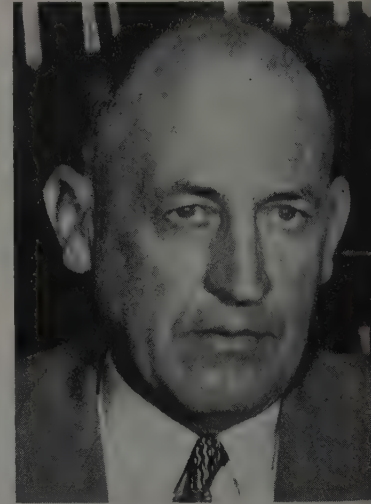
Working widths, easily varied by up-folding one or both of the end shoes, range from 8 ft., 9 in., with four shoes, to 13 ft., 1 in., with six shoes. The shoes are raised and lowered hydraulically.

Reno Equipment Sales Company, 1510 W. 4th Street, Reno, Nevada; Feenaghty Machinery Company, 112 S.E. Belmont Street, Portland 14, Oregon; Feenaghty Machinery Company, 600 Front Street, Boise, Idaho; Faris-Moritz Equipment Company, 5790 Colorado Blvd., Denver, Colorado; Evans Engine & Equipment Company, 4300 11th Avenue, N.W., Seattle 7, Washington; Bay Cities Equipment, Inc., 2792 Cypress Street, Oakland 7, California; Bay Cities Equipment, Inc., 1178 West San Carlos Street, San Jose, California; M. C., Ribble Company, 1304 North Fourth Street, Albuquerque, New Mexico; Smith Booth Usher Company, 2001 Santa Fe Avenue, Los Angeles 54, California; Heiner Equipment Company, 501 West Seventh, South, Salt Lake City, Utah; Hall-Perry Machinery Company, 902 Central Avenue, Billings, Montana; Hall-Perry Machinery Company, 812 East Iron Street, Butte, Montana; Hall-Perry Machinery Company, 1116 - 15th Street, North, Great Falls, Montana; Hall-Perry Machinery Company, 127 East Main Street, Missoula, Montana; Modern Machinery Company, Inc., East 4412 Trent Avenue, Spokane 10, Washington; Evans Engine & Equipment Co., Inc., Post Road—Box 894, Anchorage, Alaska; Shasta Truck & Equipment Sales, South 99 Highway, Redding, California; Western Machinery Company, 820 North 17th Avenue, Phoenix, Arizona; Western Machinery Company, 1111 West St. Mary's Road, Tucson, Arizona.

LIMA Construction Equipment Division, Lima, Ohio
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... for more details, circle No. 44 on Reader Service Postcard



Grant Bloodgood

His military service with the Corps of Engineers in World War II included 37 months overseas in the Persian Gulf Command and the European Theater of operations. He was awarded the Army Legion of Merit in 1944. He was Commander of the 334th Engineer Regiment when mustered out of service in December 1945.

Nielsen obtained his degree in engineering from the University of Iowa in 1926. After working with private utilities and the Public Service Commission of Missouri, he joined the Bureau of Reclamation as assistant engineer in 1934.

He returned to Denver in 1942 and in 1945 became head of the Hydrology Division, and later regional planning engineer at Boulder City, Nev., for the Lower Colorado River area. In 1952 he was named regional director. He has been assistant commissioner since 1955.

REGISTER OF DAMS

REGISTER OF DAMS IN THE UNITED STATES. *Sponsored by the United States Committee of the International Commission on Large Dams; prepared by T. W. Mermel, chairman, Committee on the Register of Dams. 444 pages, 8½x11, 314 illustrations, McGraw-Hill. \$12.50.*

This ready reference manual provides essential statistics on over 2,800 important dams in the United States. For each dam, it gives the name, location, structural data, ownership, by whom the engineering was performed and who were the construction contractors. Providing uniform reference to and comparison of statistics on dams, it enables one to visualize both the magnitude of any structure and the importance of its engineering accomplishments.

For quick, convenient reference, the dams are alphabetically listed by name, and a cross reference of reservoir names (which may be different from the names of the dams) is provided. Pictures of over 300 dams are included.

Details are available from McGraw-Hill's Book Information Service, 327 West 41st Street, New York 36, N. Y.

Highway bid prices rise at slow rate

BID PRICES on highway construction contracts have risen only a fraction of the rates of increase in the cost of materials, equipment and labor, the Senate Roads Subcommittee was told by Fred W. Heldenfels, Jr., president of Associated General Contractors. Highway construction today is "probably the best buy the public receives for its tax money," Heldenfels said in testifying at a public hearing on the progress of the long-range highway program.

"The very keen competition among highway contractors during the past year has kept bid prices for construction work at a most economical level," he explained, adding that this "will certainly permit many more miles of highways to be constructed from funds available."

Figures released by Federal High

way Administrator Bertram D. Tallamy show the index of average bid prices on federal-aid highway construction rose only four-tenths of 1% for the fourth quarter of 1957 over the previous quarter.

"This almost negligible increase in view of the continuing and much greater rises in cost of the major construction components — materials, equipment and labor—gives a most favorable indication of the efficiency and ability of the highway contractor to do the job," Heldenfels commented. "The same index of bid prices shows a 1.9% in-

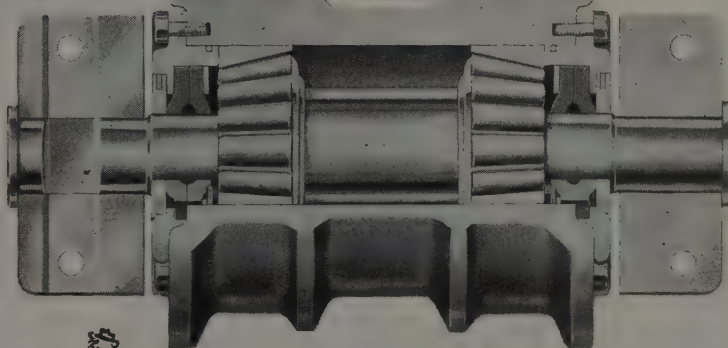
crease in composite mile cost from the last quarter to the same period a year ago. Compared to the 4.5% increase in labor wage rates (excluding fringe benefits and effects of certain restrictive practices), the nearly 8% increase in cost of construction machinery, and about a 6% rise in the cost of steel and cement over the same period of time, the 1.9% construction cost rise is considered remarkable. We believe it is a forceful example of the ability of the construction industry to meet the challenge of the great public works program."



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- ☐ Precision built to a fraction of 1/1000 of an inch tolerance
- ☐ One-piece shell is double heat-treated . . . tempered to specified hardness
- ☐ All integral parts machined and fitted by experienced craftsmen

- ☐ Save on lubricants . . . reduce friction . . . conserve horsepower
- ☐ Add extra life to tractor's roller flanges and track
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WESTERN CONSTRUCTION—April 1958

Hawaii Report

ALAN GOODFADER

Honolulu, Hawaii

NO DENT IN BOOM—Hawaii's four-week-old sugar strike apparently has made no dent yet in the Territory's boom in construction. Although governmental officials are starting to worry about losses in taxes and some neighbor island businesses have slowed, no cutbacks in planned construction have been reported yet. The strike has had one effect on the construction industry, however. It has stopped movement of cane, a wallboard made from sugar waste by the Flintkote Co. in Hilo.

NO LABOR SHORTAGE—A shortage of construction workers feared for the Territory about this time has not developed, a panel of experts has found. However, the experts warned that it may still come this summer. If it does, governmental agencies may have to reschedule some of the building projects planned here later this year.

PAY RISING—Thirty-three hundred construction workers have received a 10c an hr. across the board raise here. And they will get another Aug. 15. The raise was granted to 1,700 members of the United Brotherhood of Carpenters and Joiners, 700 Operating Engineers, and 900 Construction and General Laborers' union members. The carpenters' basic wage is now \$2.65 an hour, that of construction laborers is \$1.95 and that of common laborers is \$1.75. The raise also applies to some 350 to 400 workers on the \$21,000,000 Schofield Barracks housing job.

MORE COMING—And still more pay raises may be in the works soon. AFL-CIO metal trades workers at the Honolulu Iron Works are seeking a 31c an hr. raise when their contract expires March 17. The firm is the major construction metal fabricating firm here.

NEW CONTRACTORS' CHIEF—A. A. Carswell, construction division vice president and a director of Hawaiian Dredging & Construction, is the new president of the General Contractors Assn. of Hawaii. He succeeds Robert E. Black of E. E. Black, Ltd. Carswell has headed Hawaiian Dredging's land construction activity since 1946. Before that he won a

Meritorious Civilian Service Award from the Navy for his work as a project manager for Turner Construction Co. of New York. Turner, Hawaiian Dredging, and the Raymond Concrete Pile Co. combined to do \$1,125,000,000 worth of naval base construction from California to Manila between 1939 and 1943.

GETS \$23,000,000 CONTRACT—Hawaiian Dredging & Construction has combined with J. H. Pomeroy Co. International to sign on for a \$23,481,000 port development contract for the kingdom of Kuwait on the Persian Gulf. Enroute to start work is the Hawaiian Dredging giant dredge Walter F. Dillingham. To be dredged are a harbor entrance and anchorage. Also part of the contract are almost a mile and a half of wharves, buildings, and cargo handling facilities. Engineering and supervisory personnel for the project will come from here. Construction workers will be recruited on the site. The job is expected to take several years. Pomeroy has over-all direction of the work.

TERRITORY LISTS PLANS—The Territorial Highway Department has listed month-by-month schedules for more than \$12,500,000 in Oahu highway projects this year. Included are 10 contracts including 13 projects totaling 10.6 mi. The cost estimate is for construction only. The schedule: April, two projects on Likelike Highway (the Wilson Tunnel approach road) and one on Lunalilo Freeway will be awarded under a single contract, 2.6 mi.; Nuuanu Highway, Laimi to Coelho section, and Makapu Road, 1.1-mi. extension along the Kalaheo Canal. May, widening of Moanalua Road through Ft. Shafter, 0.6 mi., and Palama-Fort section of Vineyard Thoroughfare, 0.9 mi. June, Barber's Point Naval Station access road from Vineyard Thoroughfare, 0.9 mi. October, one contract combining Nuuanu-to-Pele section of the Lunalilo Freeway, 0.5 mi., and the Beretania-to Kuakini unit of Nuuanu Highway, 0.7 mi. This includes a 3-level grade separation. November, paving of windward approach road to Wilson Tunnel, 2.4 mi.

NEW METHOD—The Honolulu Board of Water Supply is switching to prestressed concrete for its reservoir construction. Reservoirs of a 500,000-gal. capacity and larger will be built of prestressed concrete sections instead of the conventional reinforced concrete, according to Edward J. Morgan, BWS manager and chief engineer. The new method is expected to cut construction costs, Morgan said.

SAND RUCKUS MAY END—Oahu construction firms now under fire from local residents because they have been removing sand from local beaches may have a new source soon. Negotiations are reported nearing completion on a deal that will give Oahu contractors a 20-yr. supply of sand from the Island of Molokai. Negotiations are being carried on by the Molokai Ranch Co. and Honolulu Construction & Draying Co. The ranch firm owns a 2½-mi. long beach on West Molokai which would furnish sand to HC&D. HC&D will have to build a road and wharf to handle the sand, which would be barged to Oahu. At present, sand for Oahu cement mixers is scraped from local beaches. But residents here have threatened court action if the beaches are denuded.

NEW BUILDING PLANNED—The Territorial Highway Department will advertise for bids in March or April for a \$1,000,000 headquarters building scheduled for occupancy early next year. It would gather all the department's scattered offices under one roof. Five stories high, the building is to have precast prestressed concrete beams and girders.

LOW BIDDERS—M. Sonomura won a contract for construction at Konawaena School, Hawaii, recently with a low bid of \$279,416. In Honolulu recently, low bidders on public works jobs were: A. L. Ho, improvements to Waianae water system, \$322,557; K. Nagata, Ltd., construction of Aliamanu Intermediate School, \$574,094, and State Construction Co., addition to Alva A. Scott Elementary School, Aiea, \$168,770.

PLANT REACTIVATED—The Waiālae Tile Co., Ltd., has incorporated to do business at the former Wilsonite Brick Co. plant here. James Y. Marn is president, and Edward K. C. Dang is vice president.

MASSEY-FERGUSON PRESENTS



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The Work Bull 303 with 500 Loader
and Davis Backhoe



The Work Bull 202 with
Matched Davis Loader and Backhoe



The Work Bull 1001
Multi-Purpose Tractor Loader



The Work Bull Fork Lift

Here's Massey-Ferguson Industrial Division's new line of industrial champions in the light and medium equipment field. All are designed to replace high-inventory, single-purpose machines—and at a fraction of the cost. Multiple, quick-change attachments are **POWER-MATCHED** to the basic tractor. You pick the power you need—and add the attachments you want. All from the same source. It will be the best investment you ever made in equipment!

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WORK BULL 1001

Multi-Purpose Tractor Loader is convertible into eight different machines. You can change it in the field from a loader ($\frac{3}{4}$ cubic yard payload capacity) to a pick-up street sweeper, to a fork lift, angle dozer, crane, rotary broom, backhoe, or scarifier. This unit features 52 h. p. engine, instant reversing (without shifting), 43° bucket roll back at ground level, load-shock absorber, power steering, and torque converter.

New

WORK BULL 202

Utility Industrial Tractor has 40 h. p., high-torque engine with amazing lugging power at low speeds. New industrial design permits extra maneuverability, vision, and control. It has more POWER-MATCHED attachments than any other tractor. Attachments include the famous Davis Loader-Backhoe and the Auburn Trencher. It beats anything in its price range.

New

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Medium Range Industrial Tractor is designed for tough assignments that demand more power, more weight, and reserve stamina. It has 52 h. p. engine, instant reversing, torque converter, power steering, and new double-disc brakes.

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Power-Matched Attachments for the Work

Bull 202 and 303 tractors include a scarifier-scraper, post hole digger, mower, multi-purpose rear blade, soil scoop, cable layer, tipping trailer, cordwood saw, and telescoping wagon chassis.

New

WORK BULL 500 LOADER

Work Bull 500 Loader with $\frac{3}{4}$ cubic yard payload capacity is specially matched to the Work Bull 303. It has direct line "bull-dozer" type thrust, but telescopic reach. Extra versatility is provided by pick-up street sweeper, crane, angle dozer, rotary broom fork lift, and scarifier attachments. Davis Backhoe also fits directly to the loader frame.

New

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Work Bull Fork Lift has the power, stability, and flotation to be labeled the best material-handling device for either off or on hard surfaces. Controls are located at operator's finger-tips. It is equipped so you can make quick changeover from one attachment to the other without additional hydraulics. Attachments include standard tines, block forks with side-shift adjustment, hydraulic bucket, log hook, dozer blade, scrap grapp, 20' extension mast, bottled gas load clamp, and cotton bale clamp.

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DAVIS LOADER-BACKHOE

Davis Loader-Backhoe — The famous Davis Loader and Backhoe are specially matched to Work Bull 202. Loader attaches directly to the tractor which also has built-in pump drive and mounting. The Davis Backhoe fits directly to loader frame and can be attached or detached in less than five minutes. It is the only machine that can dig flush alongside a building — as well as do normal digging jobs. The Davis Loader, likewise, is highly versatile with many easy-to-change attachments.

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Write for this free copy of the 28-page, fully illustrated brochure
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Work Bull 1001 has
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"MANY PEOPLE think cancer is incurable. They're wrong and I can prove it! So can 800,000 other Americans like me.

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"He explained that, thanks to my habit of having yearly check-ups, my doctor had caught the cancer in its early stage. It was localized and it could be completely removed by surgery. So, here I am as hale and hearty as if I'd never had cancer!"

That was 15 years ago, when only 1 out of 4 persons with cancer was being cured. Today, thanks to improved methods of treatment, and earlier diagnosis, 1 person in 3 is being saved.

And with present knowledge, it can be 1 in 2, if everyone observes two simple precautions: Have a health checkup annually. Keep alert for cancer's seven danger signals.

Progress in the American Cancer Society's fight against cancer depends on the dollars donated for its broad, nation-wide program of research, education and service to the stricken.

Help to swell the ranks of people saved from cancer. Fight Cancer with a Checkup and a Check. Send a check *now* to "Cancer," care of your local post office.

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Building booms in the West

POPULATION GROWTH in the West continues to exert its pressure on the need for all building activity with particular emphasis on schools, commercial buildings and industrial plants. An imposing list of new projects can be assembled without having to dip below the \$1,000,000 cost figure. Below that figure the number increases many fold. The following is an indication of the number and typical building projects with plans well advanced or now under way in areas of the West.

Ground was broken last month for a \$5,000,000 high school in Reseda, Calif. with the Crown Construction Co. building the first phase of the project which is scheduled for opening next February.

A \$2,500,000 expansion program is scheduled for later this year by the Oregon Metallurgical Corp., at Albany, Ore. The firm specializes in castings and gorgings for non-ferrous metals.

The Los Angeles City Council has taken action in closing streets which will make way for a new \$33,000,000 Federal office building to be built near the present Civic Center. The structure is to be built by private capital under an agreement for a 25-year lease-purchase plan with the Federal Government.

Trans World Airlines has started construction on a \$5,000,000 maintenance facility building at the International Airport at Los Angeles. The structure and the facilities will be planned to serve the TWA's future fleet of 60 jet planes as well as the present planes of the company. The structure will be a 490x350-ft. hangar with adjacent administration buildings. Designed by Holmes & Narver, Inc., the construction is being carried out by Diversified Builders, a subsidiary of Macco Corp.

In San Diego an apartment house development with a total cost of \$13,000,000 has been started on Point Loma. Loma Palisades will include all necessary community facilities and the structures will be multiple-unit apartments all of 2-story height.

Financed by a recent bond issue in Garden Grove, a new high school plant to cost \$3,000,000 is being designed with construction scheduled for completion in September 1959. A \$3,500,000 addition to the Hotel Miramar in Santa Monica will be started shortly. The work

will consist of building an 11-story addition of steel and concrete construction.

In Portland, a \$2,000,000 warehouse will be built on the West bank of the Willamette River opposite Swan Island. The structure will have a 485,000-sq. ft. area and is scheduled for completion in November. Located on reclaimed land the project will include a loading dock, 1,250 ft. long.

Taking advantage of the new ordinance permitting higher buildings in Los Angeles a \$13,000,000 project has been announced for the corner of 6th and Spring St. The building will be headquarters for the California Bank and will have a height of 18 stories, although the total height will be approximately that of a 22-story building because of the increased height of each floor. C. L. Peck Construction & Realty Co. are general contractors on the project.

The San Diego Gas & Electric Company has requested permission from the State of California to build a \$24,000,000 power plant. Located on the shores of San Diego Bay, the project is scheduled for completion in 1960 and will have a 130,000-kw. capacity. Preliminary work estimated to cost \$2,000,000 will be carried on during the present year.

A \$3,000,000 junior high school plant is under way in Western San Fernando Valley for the Los Angeles school system. Contract for \$2,225,000 was awarded to Paul W. Speer, Inc. for the project which will consist of 17 buildings located on a 20-acre site.

A project which would add almost 1,200 low-rent housing units in San Francisco is being pushed by the San Francisco Housing Authority. The project would be based on Federal aid with a total construction cost of about \$18,000,000.

Plans have been approved for a \$25,000,000 addition to the Civic Center in Los Angeles. County supervisors have requested the bid call to be made as soon as specifications can be prepared.

An ultra modern skyscraper 21 stories high is scheduled to start this spring in the Miracle Mile of Wilshire Boulevard in Los Angeles. This structure representing part of a \$10,000,000 project will rise to a height of 280 ft. and will be of steel frame with glass exterior.

**Plan Room opens
to serve So. Calif.**

THE OPENING of The Plan Room in Los Angeles makes available a convenient and needed service to the construction industry. The inauguration of this new service which opened Jan. 1 at 1417 Georgia St. was brought about as the result of a survey of conditions in the area for the past four years. With the continued increase in construction projects in the Southern California area, the need for adequate facilities became apparent.

The Plan Room occupies an entire floor of the 5-story building and offers the majority of the plans on jobs being bid. Plans are separated so that more than one trade may use them simultaneously. The room provides a quiet place to work, with ample room for making take-offs.

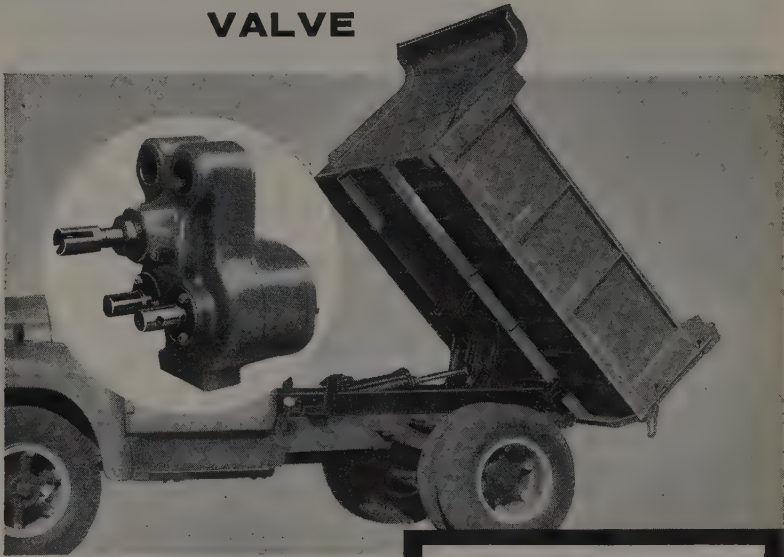
Further information may be obtained from The Plan Room, 1417 Georgia Street, Los Angeles 15, Calif.

**Low bids and
contract awards
ARIZONA**

Tovrea Construction Co. of Phoenix submitted a low bid of \$863,357 for 3.9 mi. of road construction west of the Maricopa-Pinal County line, westerly on State Rte. 84 toward Gila Bend in Maricopa County. A low bid of \$779,507 was submitted by Wallace & Wallace of Phoenix for 4 mi. of grading and surfacing near Gila Bend in Maricopa County. Southern Industries, Inc. of Phoenix submitted a low bid of \$612,447 for 5.7 mi. of grading and surfacing on State Route 84 toward Casa Grande in Maricopa County. Martin Construction Co. of Tucson submitted a low bid of \$426,639 for 3 mi. of grading, surfacing and other work on the Sonoita-Mountain View Highway in Pima County. A low bid of \$397,819 was submitted by Tom L. Mulcaire of Cottonwood for 3.3 mi. of grading and surfacing east of Globe on the Globe-Show Low Highway in Gila County.

A low bid of \$103,374 was submitted by Emery Harper Construction Co. of Phoenix for 5 mi. of grading and surfacing on State

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4 cu. yd. cap., 4-wheel drive
with Torqmatic transmission.



MODEL 154

2 cu. yd. cap., 4-wheel drive
with Torqmatic transmission.



MODEL 104

1 1/2 cu. yd. cap., 4-wheel drive
with Torqmatic transmission.

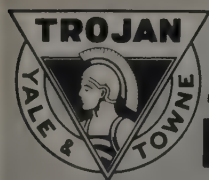


MODEL LHM-75

1 1/4 cu. yd. cap., 2-wheel drive
with torque converter.



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2 & 4 Wheel Drive Front-End Loaders

CONTRACTORS MACHINERY DIV., THE YALE & TOWNE MANUFACTURING COMPANY, BATAVIA, NEW YORK; SAN LEANDRO, CALIFORNIA

. . . for more details, circle No. 50 on Reader Service Postcard
WESTERN CONSTRUCTION—April 1958

Route 177 northwest of Winkelman in Pinal County.

CALIFORNIA

E. L. Yeager Co., E. L. Yeager Construction Co., Inc., Bert C. Altfillisch, Altfillisch Construction Co. and **Lowe & Watson** of Riverside submitted a low bid of \$3,772,336 for 7.9 mi. of grading and paving and construction of eight bridges south of Trabuco Creek and north of Niguel Road in Orange County. A low bid of \$1,053,446 was submitted by **Rothschild, Raffin and Weirick** of San Francisco for grading and surfacing approaches and renovations and connections with newly constructed Valona Interchange structures to be constructed north of Carquinez Strait Bridge in Contra Costa and Solano counties. **N. M. Saliba Co.,** Gardena, submitted a low bid of \$779,988 for construction of three bridges in Dairy Valley, Routes 174 and 175 in Los Angeles County. A low bid of \$778,348 was submitted by **Dicco, Inc.** of Bakersfield for 7.9 mi. of grading and surfacing in Lindsay, Tulare County. **Claude C. Wood Co.,** Lodi, submitted a low bid of \$227,103 for 5.1 mi. of widening and shoulders to be graded and surfaced, between Lodi and Route 97 in San Joaquin County. **Stecker & Scott and Spirite & Conn Co.** of Sun Valley received a \$411,376 contract for 1.3 mi. of grading and surfacing south of Ricardo in Kern County. **Stecker & Scott** of Sun Valley submitted a low bid of \$195,332 for 3.9 mi. of grading and surfacing at five locations north of Shoshone and south of San Bernardino County line in Inyo and San Bernardino counties. **Granite Construction Co.,** Watsonville, received a \$234,342 contract for 3.9 mi. of 2-lane highway to be graded and surfaced and a portion of the highway to be widened between east side of Yolo Bypass and Broderick in Yolo County.

COLORADO

Roberts Construction Co. and **Western Paving Co.** of Denver submitted a low bid of \$2,012,744 for 12.9 mi. of grading, structures and paving on State Highway 2 in Weld and Morgan counties. **H. and E. Lowdermilk** of Englewood received a \$1,055,566 contract for grading, structures and surfacing 6.5 mi. of State Highway 10 in Archuleta County. A low bid of \$319,324 was submitted by **Harri-**

son Construction Co. of Denver for 3.1 mi. of grading, structures and surfacing on State Highway 149 between Wagon Wheel Gap and Creede in Mineral County.

IDAHO

W. R. Cahoon Construction Co., Pocatello, submitted a low bid of \$773,047 for construction of buildings and other facilities for the Shield Test Pool Facility in the Aircraft Nuclear Propulsion area of the National Reactor Testing Station. A \$127,527 contract was received by **Wangsgaard Construction Co.** of Logan, Utah for construction of the roadway and gravel surfacing of 7 mi. of the Robin-Hawkins Valley Road in Bannock County.

NEVADA

Dodge Construction, Inc. of Fallon received two contracts for roadwork in Pershing and Nye counties: \$317,088 for construction of a portion of U. S. Highway 40 at Mill City in Pershing County and \$205,205 for construction of a portion of the State Highway System, from California-Nevada State Line to Lathrop Wells on State Route 29 in Nye County. Two contracts were received by **Silver State Construction Co.** of Fallon for highway work in Churchill and Lyon counties: \$187,388 for grading and surfacing on State Route 3 between Yerington and 10 mi. south in Lyon County and \$186,463 for 1.9 mi. of grading and surfacing on State Route 1-A between State Route 2 in Fallon and 2 mi. north in Churchill County.

OREGON

Darkenwald Construction Co., Inc., and **Harms Bros.** of Sacramento, submitted a low bid of \$1,635,781 for 3.9 mi. of grading and surfacing the Thomas Creek-Cape Ferrello section of the Oregon Coast Highway north of Brookings in Curry County. A low bid of \$603,772 was submitted by **Warren Northwest, Inc.,** Portland, for 6 mi. of grading and paving Myrtle Creek-Fords Bridge section of the Pacific Highway in Douglas County. **Hudspeth Pine, Inc.,** Prineville, submitted a low bid of \$199,413 for 3.2 mi. of grading and surfacing the Richardson-Eugene Highway, west of Eugene in Lane County.

UTAH

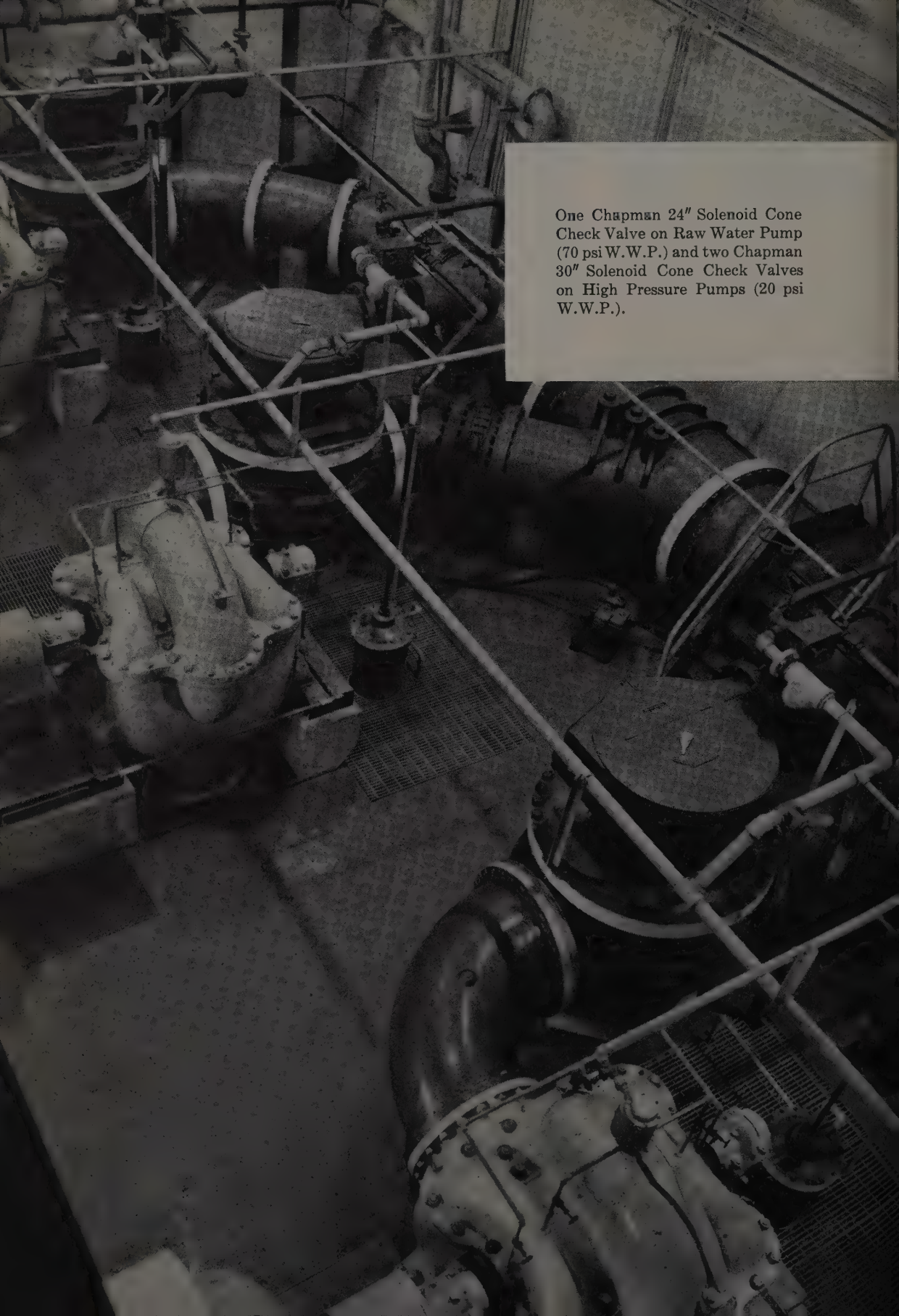
Howard Construction Co., Salt Lake City, received a \$1,669,800 contract for construction of a Senior High School in Pleasant Grove. **W. W. Clyde Co.** of Springville submitted a low bid of \$1,073,466 for construction of a bridge over 20-ft. span, Wasatch County. **Jack B. Parson, Smithfield,** submitted a low bid of \$972,725 for construction of a plant mix. bit. surfaced road in Box Elder County. A low bid of \$478,228 was submitted by **Theo Wood Construction Co.** of Salt Lake City for grading and surfacing on U. S. 89, north of Kanab for 4.2 mi. toward Mt. Carmel Junction in Kane County.

WASHINGTON

L. W. Vail Co., Pasco, received a \$450,378 contract for 10.5 mi. of grading and surfacing in and near Kennewick in Benton County. **Walter G. Meyers & Son** of Spokane received a \$203,765 contract for construction of the Naches River Bridge in Yakima County. **Henry Hagman,** Spokane, received a \$306,261 contract for constructing twin bridges for State Highway 2 across the Wenatchee River at Dryden. A \$292,958 contract was received by **Lockyear & White, Inc.,** Longview, for constructing a bridge over the Green River and over the Green River overflow in the same area of State Highway 5-A, at Kent. **Hannan Bros. Co.,** Portland, Oregon, received a \$293,354 contract for undercrossing at Burnt Bridge Creek north of Vancouver. **General Construction Co.,** Seattle, received a \$111,955 contract for constructing the Columbia River Bridge at Longview in Cowlitz County.

ALASKA

Cheney-Birch of Seattle, Wash. received a \$810,160 contract for construction of additional paving, roads and ground work at Fort Richardson. **Lease Co.** of Seattle, Wash. received a \$324,699 contract for construction of a heavy support shop for Army Nike installations at Fort Richardson. A \$390,146 contract was received by **Industrial & Commercial Construction Co.** of Fairbanks for construction of a heavy support shop for Ladd Nike installations in the Fairbanks area. **The Tuttle Co.** of Arcadia, Calif. submitted a low bid of \$411,875 for providing survey services for the U. S. Army Engineer District in central Alaska.



One Chapman 24" Solenoid Cone Check Valve on Raw Water Pump (70 psi W.W.P.) and two Chapman 30" Solenoid Cone Check Valves on High Pressure Pumps (20 psi W.W.P.).

The **CHAPMAN** *Part* *of the New* *Filtration Plant* *in Trenton, New Jersey*



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Mayor Donal J. Connolly
Trenton, New Jersey
Director of Public Works

J. N. L. Reid
Trenton, New Jersey
Chief Operator of Water Dept.

The water department of Trenton has an extensive improvement program well advanced. The new filtration plant is a notable phase. Donal J. Connolly, Mayor and Director of Public Works, plans to make the water supply system of that city one of the best in the country.

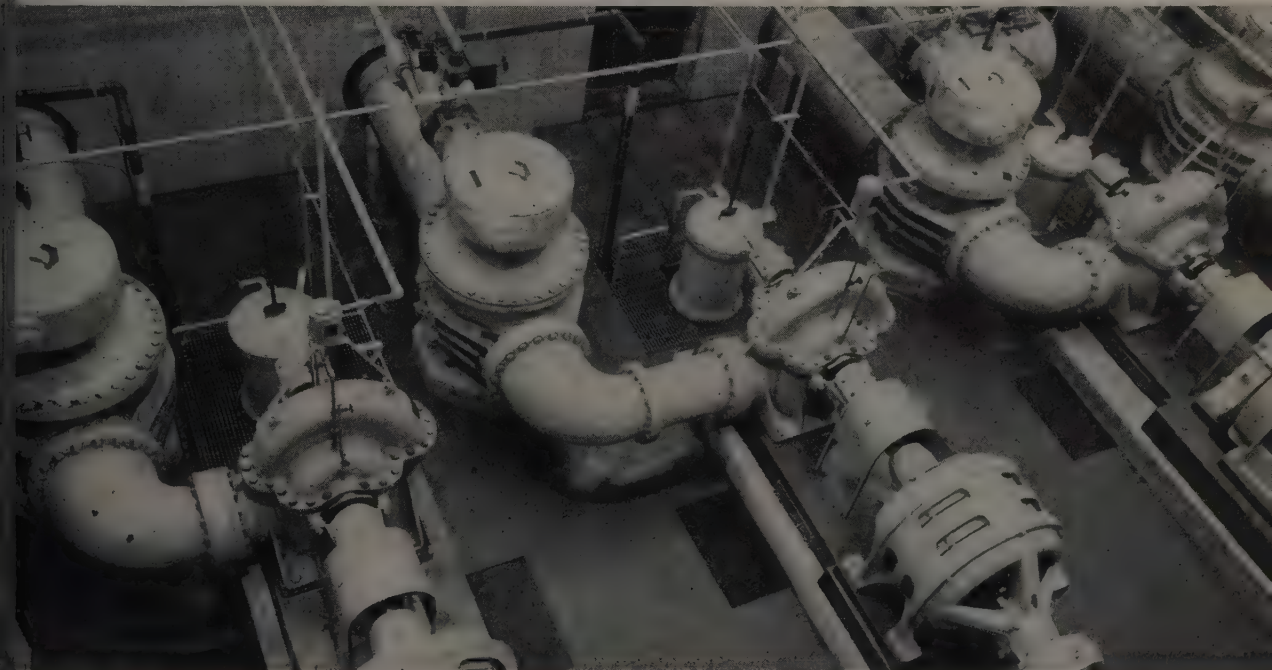
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Three Chapman 24" Solenoid Cone Check Valves on High Service Pumps (70 psi W.W.P.) and one Chapman 30" Solenoid Cone Check Valve on

ENGINEERS and CONTRACTORS

Stanley Kimball, E. R. Ordway, and Sam Ruvkun, three recently elected vice presidents of Henry J. Kaiser Co., have been assigned to key executive positions in the company's newly organized Heavy Construction Division. In making the announcement, George Havas, Division general manager, said Kimball will be responsible for the heavy construction activities of the Division.

Lauren W. Grayson, chief engineer and general manager of the Public Service Department of Glendale, Calif., has been nominated vice president of the American Water Works Association. A member of AWWA since 1933, Grayson has been active on many of its committees. Among his other professional activities is membership in the American Society of Civil Engineers.

Lt. Col. Bruce W. Reagan, who recently returned from Korea, has been assigned to the Sacramento District office of the Corps of Engineers. He replaces Lt. Col. Paul A. Loop. Colonel Reagan will be assistant district engineer for administration.

Johannessen & Girand, consulting engineers of Phoenix, Ariz., announce the election of their chief engineer Frank W. Bromley to partnership in the firm. William N. Woodruff, a member of the firm since 1952, and Robert L. Norton, who joined the organization in 1951, were also elected to partnership.

Holmes & Narver, Inc., Los Angeles engineers and constructors, recently made a basic organizational change involving separation of the firm's engineering and construction responsibilities, according to James T. Holmes, president. Thomas W. Burt, formerly vice president in charge of the combined activity, becomes vice chairman of the board. David L. Narver, Jr. steps up to vice president, engineering. In charge of the newly formed con-

struction division will be D. C. Van Dine, former manager of engineering and construction. He was promoted to vice president, construction.

Carl F. Lind, San Joaquin County Flood Control Engineer, of Stockton, Calif., succeeds Don G. Evans (resigned) as district engineer at Los Angeles for The Asphalt Institute. Richard S. Titera of Whittier moves in as assistant after eight years with the Los An-

Carl
Lind



geles County Road Department. Both men are registered civil engineers, and under the supervision of B. A. Vallerga, division managing engineer at San Francisco, will handle engineering advisory matters in Southern California and Arizona.

Samuel M. Black, former county engineer of Monterey County, Calif. at Salinas, recently accepted the post as director of public works for the County of Fresno, Calif.

Glenn K. McKenzie, Portland, chief of the relocations section of the Portland District, Corps of Engineers, is retiring after more than 23 years of federal service. He joined the Portland District in 1934 as a surveyman and progressed through various steps to his present position. During World War II he had charge of construction of a number of military airfields in Idaho, Oregon and Washington.

H. D. Mills, State Highway Engineer of Nevada, was chosen Western regional vice president of the American Road Builders Association at its national convention recently held in Chicago.

Fred L. Klein, 69, assistant chief, Western Bridge Design, Region 7 headquarters, an employee of the Bureau of Public Roads, San Francisco, died suddenly of a heart attack at his home in Berkeley, Calif.

Carl S. Hamilton, supervising bridge engineer on State-owned toll bridges in California, died suddenly at his home in Oakland. Coming to the San Francisco Bay area in 1922, Hamilton pursued his engineering career on several projects including the Posey Tube, followed by two years on bridge construction with the Bureau of Public Roads. His service with the California Division of Highways dates from August 1929.

Ernest E. East, 77, retired engineer, died at Pasadena, Calif. after a long illness. In 1912 he was one of the first engineers hired by the California Highway Commission. An associate member of the American Society of Civil Engineers and a charter member of the American Right-of-Way Association, East is said to be the first to recommend a freeway network, and suggested that highways be designed to accommodate four to six lanes and be divided by a central barrier.

Lyman F. Copeland, retired regional bridge engineer for the U. S. Bureau of Public Roads, died in Denver at the age of 73. Copeland was widely known and respected as an engineer of unusual ability in the application of structural theory to highway bridge problems. A past president of the Colorado Section of the American Society of Civil Engineers, he was a life member of that organization.

CALENDAR

Apr. 20-25—American Water Works Association, annual conference, Dallas, Tex.

May 8-10—Material Handling and Industrial Packaging Show, Great Western Exhibit Center, Los Angeles, Calif.

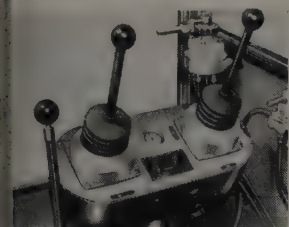
June 15-18—Western Area Public Works Conference, San Diego, Calif.

June 22-28—American Society of Civil Engineers, national convention, Portland, Ore.

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SOUTHERN IDAHO EQUIPMENT CO.
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SUPERVISING the jobs

C. Tom Moyer, project manager, Darwin Lind, general superintendent, and Glen Toy, project engineer, are head men working for Morrison, Kaiser, Puget Sound and General on the joint venture's \$14,000,000 award for construction of Hood Canal floating bridge structure, unit 1, comprising two pontoons, shore piers, and structural transfer spans for floating bridge, Jefferson and Kitsap counties, Wash. Office manager is Ralph Smith. Bob Westermann is office engineer.

Other key personnel are Benny Ostrum, marine and rigging superintendent, Dave J. Stewart and Art Bateman, shift superintendents; Leo Lefester, master mechanic; Lee Lowery, chief electrician; Bob Young, shop superintendent, and Bill Porter, plant superintendent. Construction started in January and is expected to be finished the spring of 1960.

* * *

W. D. Hale, president, and W. S. Christensen, vice president of Mountain States Construction Co., acting as general manager and general foreman, respectively, are in charge of their company's contract for grading and surfacing on 4.1 mi. of U. S. Highway 3 on Mc-

Cammon-east in Bannock County, Idaho. Work on the \$136,778 job has just started with expectation that it will be finished by mid-August.

* * *

James Sheeks is supervising a \$1,300,000 job for Secrest & Fish, contractor constructing a reinforced concrete, 49,000-sq. ft. building on Pomona College campus, Claremont, Calif. Assisting as foreman is Jess Littlejohn. Earmarked for November completion, the job started Jan. 20.

* * *

K. E. Pass, project manager, R. P. Brodie, superintendent, F. E. Robie, office manager, John Owen, grade foreman, and L. E. Rasmussen, structure foreman, will comprise the chief personnel for the construction of 8.8 mi. of 4-lane highway and 11 bridges, east end of Donner Lake to west of Boca, on U.S. 40, Nevada County, Calif. Doing the work at a cost of \$7,620,605, Fredrickson & Watson Construction Co. and Ransome Company expect to start May 1 and have the job complete the end of October 1959.

* * *

Ken Rose is job superintendent

on a 10-mi. realignment, clearing, grading and plantmix surfacing job on the Globe-Show Low highway in Gila County, Ariz., a \$1,571,799 contract awarded to Isbell Construction Co. Other top Isbell men here are Ralph Kriesse, grade foreman, Harold Watt, plant foreman, and Jim Evans, timekeeper. The work will be finished about September.

* * *

Frank Arentz, project manager and engineer, and Jim Rinaudo, job superintendent, are in charge of a Claude C. Wood Co. \$484,968, 5.9 mi. job of grading, and plantmix surface on cement treated base and imported base material, east of Murphys and west of Big Tress in Calaveras County, Calif. Orville O'Reilly is rock plant and hot plant superintendent, and Ralph Miller is master mechanic. Under way since February, the job is scheduled for October completion.

* * *

Jesse Black, general superintendent, assisted by George Wiggers, bridge superintendent; Carrol Gresham, paving foreman; and Roy Bennett, excavation foreman, is in charge of a \$941,621 contract recently awarded to J. E. Haddock, Ltd. Job got started in February and consists of 3 mi. of grading and surfacing and bridge construction between Route 26 in West Covina and Paramount Ave., Azusa, Calif. Haddock expects to be finished here by the end of the year.

* * *

M. J. Ruddy, Jr., project manager, LeRoy Morse, project superintendent, and Fred H. Sattler, chief engineer, are the head men

DIRECTING WORK OF THE ALASKAN WAY VIADUCT IN SEATTLE

CONSTRUCTION on the Alaskan Way viaduct (Western Construction, Oct. 1956), which marches its double-decked roadway on concrete legs down the length of Seattle's Embarcadero, is over 75% complete in the final phase of construction, which brings it down to ground level and makes juncture with the yet-to-come Spokane Street crossing. Next contract up for bid is for the link with the Spokane Street structure and the structure itself. Support columns on the last of the elevated roadway

are completed and deck pouring is proceeding at the rate of one 3-span section every two weeks, each a length of 188 ft. 10 in. Rumsey & Co. and Morrison-Knudsen Co., Inc., joint venture, is the contractor, with John Rumsey, Jr. (left) as project manager, and Robert P. Nesser (center) as project superintendent. On the right in picture is P. C. Leonard, resident engineer on the project for the Washington Department of Highways.



on a highway contract under way in San Joaquin County, Calif. Timekeeper is **Ray Peck, Jr.** This is a \$435,885 job which went to **M. J. Ruddy & Son** and consists of 3.4 mi. of grading, surfacing and structures on Route 5-A, B, Highway 50. Work started Feb. 3 and will be finished Aug. 31.

* * *

Jay Row, superintendent, assisted by **Fred Sawyer**, has charge of \$2,576,412 worth of highway construction in Solano and Yolo counties, Calif. for **Gordon H. Ball & Gordon H. Ball, Inc.** and **Ball & Simpson**. Other key men on this job which consists of 13.6 mi. of grading, surfacing and bridge construction on Route 90-A, B, are **Bob Ferguson**, field engineer, **Audry Anderson**, master mechanic, and **Hommer Holmes**, materials clerk. Under way since January, it is expected the job will be finished about October.

* * *

Ben Lowdermilk is acting as superintendent for **H. & E. Lowdermilk, Inc.** successful bidder on 6.5 mi. of grading, stabilization and structures on highway from Piedra River west to Pagos Springs, Colo. Work on the \$1,055,567 project started in February and will be finished in September.

* * *

Paul L. Kaiser, general superintendent for **James Stewart Co.**, is in charge of a recent contract award in the amount of \$2,500,000 for the renovation of two buildings at Convair Plant 1, General Dynamics Corp., San Diego, Calif. Work started the first of March with **W. G. Krier** in the general super-

intendent spot. Project engineer is **Bill Weipert**; field engineer, **Fred C. Eberle**. April 1959 is the scheduled completion date.

* * *

Forrest Larson is superintending a grading and sub-base contract recently awarded **Siegrist Construction Co.** on a low bid of \$165,862. Work covers 6 mi. of grading, stabilizing and structures on S.H. 66 in Weld County, Colo. Labor foreman on the job, now in the finishing stage, is **Fred Brewer**.

* * *

Harold P. Stewart is supervising 15.3 mi. of grading and surfacing on Route 507, north of Fallon, Nev., for **Wells-Stewart Construction Co., Inc.** Timekeeper is **Lawrence Pace**, and **Willard Stewart** is grade foreman on this work, which has been under way since February earmarked for July completion. Bid price \$486,289.

* * *

Manuel Passmore, general superintendent, **J. J. Malloy**, engineer, and **C. F. Hoplinger**, office manager, are key men for **The Fluor Corporation**, successful bidder on the \$1,000,000 sulphuric acid plant under construction since February in Anacortes, Wash. for the **Allied Chemical & Dye Corp.** Fluor expects to have the job done by June.

* * *

Alvin F. Connerley is supervising **W. R. Cahoon Construction Co.**'s recent award for grading, surfacing and construction of two bridges at the north entrance of Yellowstone National Park, Wyo. The \$193,000 job has been under way since February and will be finished the end of June.

Jan Cipar, project manager, **John Dean**, project engineer, and **Fred Platz**, superintendent, key personnel for **Pacific Bridge Co.**, are employed on a 3-span reinforced concrete arch bridge approximately 1,000 ft. long now under construction on the north fork of the Feather River in Butte County, Calif. Work on the bridge started in February and will probably continue up to August 1959.

* * *

Ray Lynch, bridge superintendent for **Imperial Paving Co.**, has charge of construction of a 4-span continuous steel girder bridge with concrete piers founded on steel piling being erected in Quay County, N. Mex. Known as **Logan Bridge**, the \$247,655 structure started Feb. 10 and will be finished about Sept. 1.

* * *

Fred Michel is superintending **Anderson Bridge Construction Co.**'s \$663,622 contract for erection of **Snokomish River bridge** in Washington. **Burton S. Brewer** is carpenter foreman, and **Axel Malmstrom** is labor foreman. Under construction since the first of February, the job is expected to be finished by the end of the year.

* * *

William V. Tayce is general project manager, while **H. E. Weaver** is superintendent of construction for **James I. Barnes Construction Co.**, holder of the \$3,137,180 contract for a 5-story office building of prestressed lift-slab construction for the California Division of Highways at Los Angeles, Calif. General foreman is **L. B. Westfall**, and **W. M. Flanders** has charge of purchasing. Job has been going since February and will be finished about October 1959.

* * *

C. Vernon Glidden is supervising the construction of **Sandy River bridge** and approaches near Troutdale, Ore. Carpenter and pile foreman is **George Verschingell**; labor foreman is **Alfred Wendell**. The reinforced concrete and steel span has been under way since March and is earmarked for December completion. Contract price \$293,337.

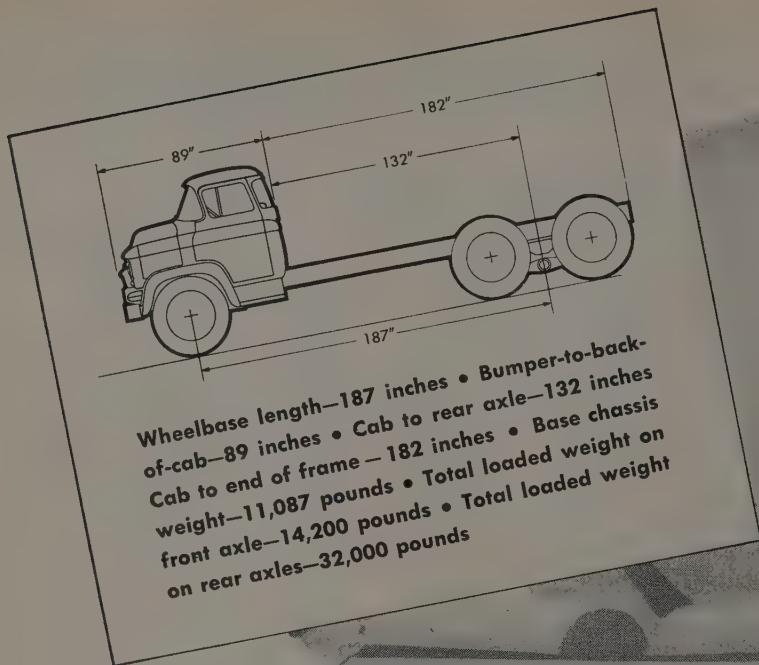
* * *

Joe W. Hunter, project manager, and **W. A. Saucerman**, project superintendent, head the construction crew working on reactor building, central building and utilities at **AEC's National Reactor Testing Station** in Idaho. This \$334,716 contract got under way in March and will be completed about Oct. 1.

SUPERVISING THE PRIEST RAPID DAM PROJECT

ROBERT J. JENKS (left), project manager for **Merritt-Chapman & Scott** on the \$92,000,000 Priest Rapids hydro project under construction on the Columbia River in central Washington for the Grant County Public Utility District. **Harza Engineering Corp.** designed the dam and is supervising its construction. In the center is **William L. Scarce**, Harza's office engineer. On the right is **Russell H. Hoffman**, noted dam builder, and **M-C&S's** general superintendent for the project, which was reviewed in **WESTERN CONSTRUCTION**, August 1957, p. 23-25.





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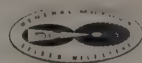
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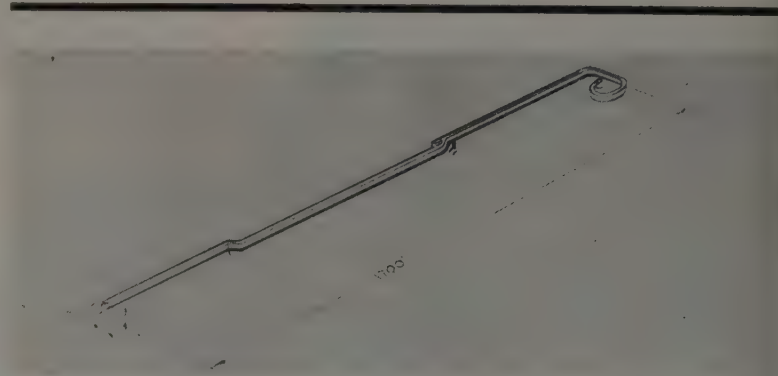
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CONSTRUCTION BRIEFS



Tunnel for atomic blast

INFORMATION RELEASED by the Atomic Energy Commission gives details on the construction of tunnels for last September's deep underground atomic detonation and for other experimental detonations at the Nevada Test Site. The deep underground nuclear test, code-named Rainier, was described by the AEC as an attempt to contain a full-scale nuclear detonation and thus avoid producing fallout.

An unusual design was specified for the main tunnel which contained the device. Driven in a mesa on the northern edge of Yucca Basin at the Nevada Test Site, the 2,000-ft. long tunnel was designed with a hook at its end. This was done so the explosive force would seal off the non-curved portion of the tunnel nearest the detonation before gases and fission fragments could be vented around the curve of the hook.

Contract for construction of the tunnels was awarded to E. C. Nickel Construction Co., Arcadia, Calif.

In the main tunnel, 2,056 lin. ft. were excavated with a diameter of approximately 8 ft. Specifications called for two smaller tunnels of 330 and 238 lin. ft. respectively bringing total excavation to 6,036 cu. yd. The two smaller tunnels were used for small-scale experimental detonations.

Rock was tuff, a type of stratified volcanic detritus, with both hard and soft layers of volcanic ash. Some formations were encountered which were comparable in hardness to limestone or granite.

Tunneling crews used Atlas Copco BBC-22 air leg rock drills equipped with Sandvik Coromant drill steels. Total burn footage drilled was 69,300 ft. Drill steel life averaged about 4,620 ft. per steel. Compressed air furnished by two Atlas Copco CT-6 compressors, driven by Deutz Diesels. Haulage was done by two D-70 Scoot-Crete Muck Carriers, equipped with Duetz one-cylinder motors. Mucking was with an Eimco 12B mucker.

Huge tarp beats weather

AN OVERSIZE tarpaulin made of vinyl-coated nylon is beating the elements at The Dalles Dam powerhouse and making it possible to work inside the structure even though one end is missing. Con-

struction of the powerhouse walls and roof is still under way so that one end of the powerhouse is open to the elements and will be until the summer of 1958. Without some means of closure, frost accumula-

tion, condensed moisture and blowing dust would damage operating generators as well as those still under construction. Moreover, because some phases of general construction cannot proceed at low temperatures, zero weather, such as occurred last winter at The Dalles, would cause delays in generator construction and result in substantial loss to the Government in power revenue.

To cover this 60 x 80-ft. opening by any type of rigid construction would have involved substantial and expensive structural members to withstand the wind pressure anticipated.

It was determined that a large tarpaulin would do the job if a non-shrink material of sufficient strength could be found which would also be fire-resistant, and provided that the tarpaulin could be kept from flapping excessively during periods of strong wind.

The material finally selected was vinyl-coated nylon having a tensile strength of over 200 lb. a lineal inch and virtually tear-proof. To facilitate fabrication and installation, the curtain was designed to consist of two halves laced together vertically at the center of the powerhouse with the joint covered by a "weatherflap."

Sealing of the edges at the top sides was accomplished by turning the material back on itself and sewing to form loops, running pipes through the looped material, and clamping the pipes to a roof girder and to the powerhouse walls.

The bottom was secured by means of lacing the curtain to planks bolted on edge to the floor which arrangement permits some vertical movement but still maintains a seal.

To prevent flapping and over-stressing of the curtain material during high winds both the inside and outside surfaces of the curtain were guyed from 32 points to the powerhouse walls using a total of 64 lines. To strengthen the curtain and reduce stretch due to guying tension, 2-in. wide nylon webbing was sewn to the curtain at each 2-ft. level for the entire width of the curtain. Steel D rings for attachment of the guy lines were secured to the nylon webbing at 12-ft. intervals along the webbing. The guys consist of 7/16-in. nylon rope which material is particularly suitable due to its high breaking strength and to its great elasticity which keeps the guys taut under all conditions of wind pressure and temperature variations.

The curtain was fabricated and installed by the North Coast Canvas Products Co. of Portland, Ore., under subcontract to Gunther-Shirley-Lane of Palo Alto, Calif., the powerhouse equipment installation contractor.

Cost of the installation to the Government was about \$6,000 but a recovery of perhaps \$1,000 is ex-

pected to be realized for materials salvaged. The \$5,000 net cost is less than 1/4 the estimated cost for rigid materials.

The Dalles Dam is being constructed by the U. S. Army Engineer District, Portland, under the supervision of Colonel Jackson Graham, District Engineer, and Hubert B. Elder, resident engineer.



Helicopter aids building job

MORE than 100 tons of heating and ventilating equipment were spotted on the 12-ac. roof of Convair's new Atlas missile factory last month in a helicopter operation. The lift, by a single Sikorsky S-58 helicopter, required approximately seventy 1/4-mi. flights across the grounds of the \$40,000,000 plant which McNeil is building for Convair north of San Diego, Calif.

The airlift was conducted by Rotor-Aids, Inc. of Ventura, California, operators of a fleet of helicopters in Southern California, the Gulf of Mexico and Alaska.

The work was performed for Bovee & Crail, heating and plumbing subcontractor. General contractor is McNeil Construction Co. of Los Angeles.

Use of the helicopter to spot 3,400-lb. heating units on the flat, metal-covered roof of the factory building was not only faster, but had the units been lifted atop the building by crane and moved into position by conventional equipment it would have necessitated reinforcing of the roof.

Overall supervision of the job was by Project Superintendent Emil Erlandson and Vice President Tho-

mas J. O'Hara, Jr., McNeil Construction Company.

The airlift, much of it conducted during light rainfall, consisted of picking up cargo stockpiled on a parking lot, carrying it across the grounds to the factory, and lowering it slowly while a crew of riggers hand-jockeyed the units into position.

Cargo included 38 of the heating units; 56 exhaust fans, weighing 600 lb. and packaged in blocks of three; and 22 tons of pipe. Gross weight of the cargo was 206,800 lb.

R. H. Kwiatowski, Sikorsky Aircraft sales representative, said the job was the first airlift of this magnitude in connection with construction of a building.

The Convair-Astronautics plant includes the factory building, with 537,000 sq. ft. of floor space; two six-story administration and engineering buildings; an open-court engineering laboratory building, and several other structures. Total space exceeds 1,000,000 sq. ft.

The Astronautics Division, which has been occupying space in the Convair-San Diego plant are moving more than 7,000 employees into the new quarters.



An efficient batch plant and dependable Mack dumpers—two important factors in the modern paving methods used by L. G. DeFelice & Son of North Haven, Connecticut. Ten Mack dumpers supplied the dry mix for the two dual-drum pavers.

On the Connecticut Turnpike...

job time slashed by efficient

L. G. DeFelice & Son finished their section of the Connecticut Turnpike well ahead of schedule . . . thanks to efficient batch-haul paving. Their record for a 10-hour day was 1566 cubic yards—enough concrete for 4255 linear feet of 10-inch, 12-foot pavement. Their daily average over the five-mile, six-lane stretch was almost as high. The job was done with ten Mack dumpers supplying two dual-drum pavers working tandem, with wire fabric

laid on the five-inch pour of the first pave

Comments Joe DeLucia, project superintendent for DeFelice, "This job kept the Macks hustling. But they never let us down. We figure that our investment in paving equipment and crews is too big to gamble with trucks that can't keep going. On the vital hauling jobs, we rely on Macks."

The medium-sized Mack dumpers used for the important batch hauling were equipped with Mac



Each Mack dumper carried five $1\frac{1}{4}$ -yard batches. First batch dumped by opening tail gate. Air-operated batch boards, designed by Equipment Supervisor Felix DiGiusto, speeded dumping of the other four batches. Quickly removable batch boards convert trucks to conventional dumpers with a 10-yard capacity.

atch-haul paving

druplex transmissions, four-wheel drive Mack
anced Bogies with Power Divider, economical
horsepower Magnadyne gasoline engines, and
er steering.

o find out how you can do more work at lower
with fewer trucks, call in your Mack repre-
ative. Mack Trucks, Inc., Los Angeles,
ver, San Francisco, Seattle, Portland, Salt
e City, Albuquerque.



MACK
first name for
TRUCKS

The best manuals on welding

There are many manufacturers of welding equipment and supplies, and they publish a tremendous number of manuals, catalogs, and folders. Here is a brief roundup of some of the best.

How to operate a National welder and cutter

A 24-page booklet with large type and pictures has been published by the **National Welding Equipment Co.** describing the correct method of operating its welders and cutters. Each step of operation from setting up the oxygen and acetylene cylinders to lighting the flame is clearly described. Included in the booklet is a valuable list of 14 safety suggestions, a chart giving for each metal thickness the proper nozzle, gas regulation, gas consumption, and tip drill size, a selector chart giving for each thickness of metal the proper cutting tip and cleaners for each tip drill size.

... Circle No. 160

Hardsurfacing manual

Two comprehensive booklets are available describing products manufactured by **Victor Equipment Co.** The catalog covers the Victor line of flame cutting and welding equipment. The Victor Hardsurfacing Manual shows how Victor automatic rod reduces labor and downtime. Included is a chart which gives for each rod the various uses, the impact and abrasion resistance characteristics, and the methods of application. Standard coil size is 22½-in. inside diameter, 4 in. wide, and weighs 100 lb.

... Circle No. 161

How To Get Better Welds

An excellent 60-page manual titled "How To Get Better Welds" has been published by **Hobart Brothers Co.**, one of the world's largest builders of welders and equipment. The manual covers such topics as types of joints, essentials of proper welding procedures, welding symbols, causes of common troubles, definition of welding terms, factors to consider in selecting electrodes, how to select the right electrode, and a review of Hobart electrodes and accessories. The free manual includes brief reviews of three other Hobart publications

for which a charge is made. These are Modern Arc Welding Procedures and Practice, \$3.00; Lessons in Arc Welding, \$1.00; and Practical Design for Arc Welding, \$3.50. One page of the booklet is devoted to a description of the Hobart non-profit school of arc welding.

... Circle No. 162

Hard surfacing information

A group of 4-page folders is available from **Rankin Mfg. Co.**, manufacturer of hard surfacing rods and wear-resisting materials. Form B5 shows the Ranite line of hardsurfacing rods, their general characteristics, suggested uses and some general information as to proper methods and applications. Form C3 contains a very valuable comparison chart of all the products made by the many manufacturers in the hardfacing field. Form 1501 lists 101 wear points where hardsurfacing saves money

Welding equipment display

A \$2,500,000 display, the largest collection of welding equipment and accessories ever gathered under one roof, will be unveiled at Kiel Auditorium, St. Louis, Mo., on April 15, for a 3-day showing.

The exhibition, sponsored by the **American Welding Society** with 128 companies participating, will break all previous records for size. Accompanying the show will be a week-long technical session from April 14 to 18 at the Hotel Statler in St. Louis where 63 papers will be presented in 21 sessions. Over 3,000 products, covering every phase of welding, will be on display. About 1,000 welding engineers and representatives of manufacturers will be present to answer visitors' questions.

for contractors. It also contains information about hardsurfacing check lists which are available from Rankin.

... Circle No. 163

Three booklets from Alloy Rods Co.

HARD SURFACING FOLDER—A hardsurfacing file folder containing individual data sheets for all types of hard surfacing—manual, semi-automatic, automatic—is available from **Alloy Rods Co.** Listed are such items as resistance to specific wear conditions, hardness values, techniques, anchorage tables, chemical analyses and physical properties.

... Circle No. 164

WELDING HIGH TENSILE STEELS—**Alloy Rods Co.** has available a 64-page reference guide designed to acquaint fabricators with the many types of trade names in special purpose low-alloy hardness of steels and the proper electrode necessary to provide welds of 100% joint efficiency. Each chapter contains the various steels, their manufacturer, chemical composition, welding techniques and the recommended electrode for each type.

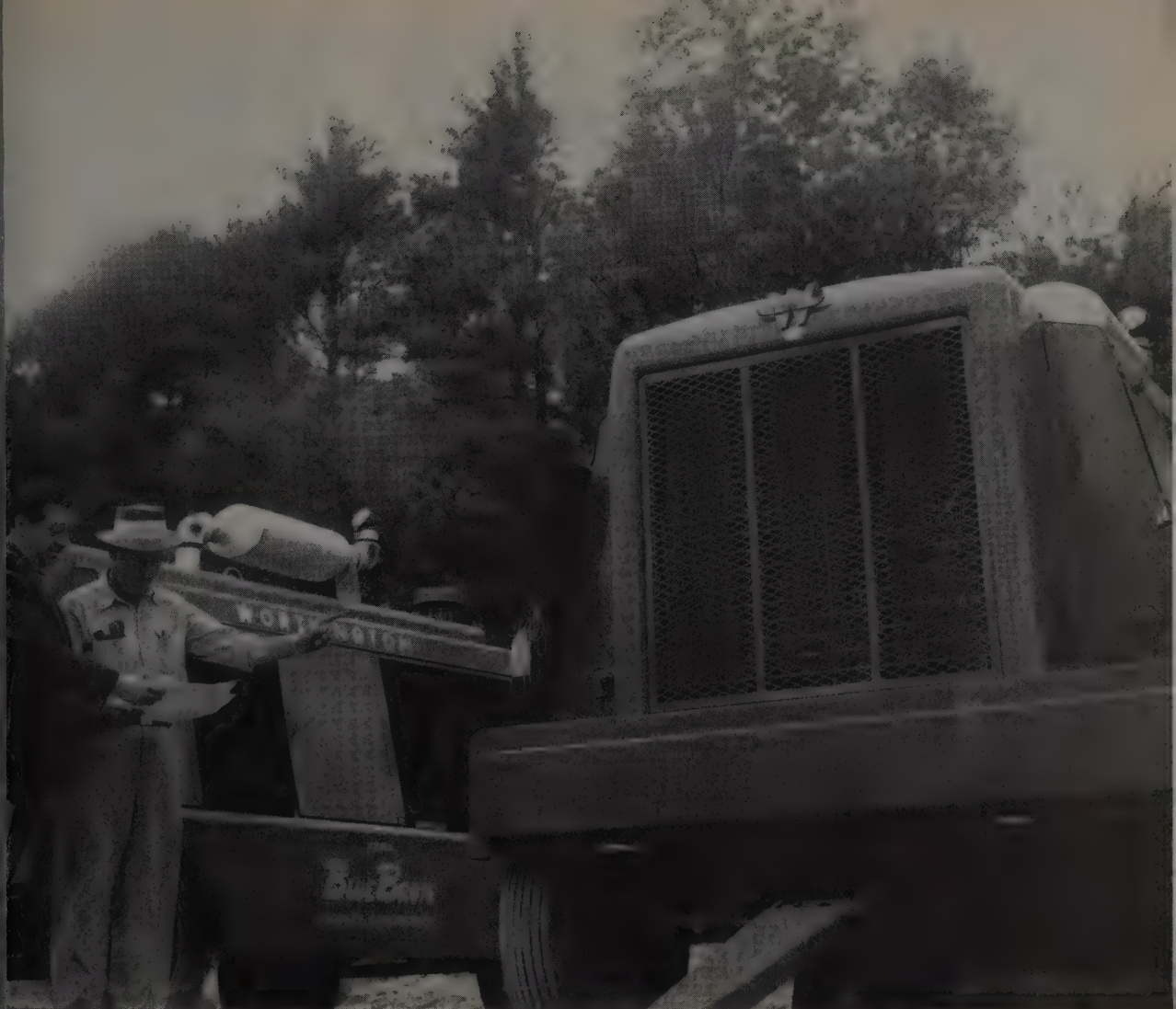
... Circle No. 165

ELECTRODE SELECTOR GUIDE, also published by **Alloy Rods Co.**, is an electrode selector guide containing a complete listing of ASTM steel classifications and the recommended electrode for welding each grade. All the information in this 40-page pocket manual is arranged in tabular form for quick reference for taking the guessing out of electrode selection.

... Circle No. 166

Lincoln Jetweld-Fleetweld

A 36-page pocket size booklet is available from the **Lincoln Electric Co.** entitled "Jetwelding and Fleetwelding." The booklet contains procedures for making butt welds and fillet welds at the lowest possible cost, including procedures for welding sheet metal. Data in-



does your compressor have A CLUTCH? (MOST DON'T)

*exclusive Over/Under
design of a BLUE BRUTE
ROTARY gives you this
important advantage...
and many more besides!*

The clutch on a Blue Brute lets you warm up the engine *without the compressor being engaged*. This valuable Blue Brute feature eases engine strain, makes for easier starting and cuts your maintenance costs to a minimum. The clutch also permits you to work on the engine without being bothered by compressor load. It will pay you to look into the many other time and money saving features that *only a Worthington Blue Brute Rotary can offer*. Phone us for a demonstration. Blue Brutes are available in 125', 210', 315' and 600' sizes.

60-3

Western Equipment Co.
1360 West First Avenue
Eugene, Oregon
Phone: Diamond 4-4265

Western Equipment Co.
2244 N. W. Savier Street
Portland, Oregon
Phone: Capitol 8-4128

... for more details, circle No. 60 on Reader Service Postcard

clude electrode, size, current, melt-off rate, arc speed, the number of passes, speed of joint per hour, and the pounds of electrode per foot for the various thicknesses of plate, when welded with the different types of edge preparation. The booklet also contains useful general information on welding procedures. Also available from Lincoln is bulletin on automatic hard-surfacing which contains descriptive information about hardsurfacing with alloy fluxes in mild steel wire. Various types of fluxes are described and suggestions are given for procedures to obtain various types of deposit. . . . **Circle No. 167**

American Welding Society manuals

The American Welding Society, Inc., a non-profit organization devoted to advancing the science and art of welding, has available for a nominal charge a group of excellent manuals.

STANDARD WELDING SYMBOLS—This 70-page manual contains detailed rules for using standard symbols denoting welds made by any welding process on engineering drawings. A single-sheet summary of the symbols and rules is included. Price is \$2.00.

SPECS FOR ARC-WELDING ELECTRODES—A 21-page booklet giving specifications describing standard operating characteristics, properties and dimensions of the ten classifications of mild steel electrodes for shielded metal arc welding carbon and some low-alloy steels. Full data is given for each classification which will assist in the selection of the more suitable electrode for a given application. Price is 40 cents.

FILIER COMPARISON CHARTS—This 21-page set of charts supplies the answer to the problem of how to identify brands, how to classify a certain brand, how to determine if one manufacturer's brand comes within the same classification as another's and finally, how to discover who manufactures a certain brand. Sixty-one manufacturers cooperated to make this the most comprehensive work on the subject ever produced. Price is \$2.00.

SAFETY IN WELDING—A complete set of rules for the installation and operation of welding equipment in a practical, yet safe

manner. The 44-page manual discusses the use of gas, arc and resistance welding equipment, protective clothing and the use of goggles, helmets and hand shields, in fire prevention. Included is a 2-page bibliography of safety publications. Price is 50 cents.

INSPECTION HANDBOOK—An excellent 139-page illustrated manual for inspectors of manual metal-arc welding. The handbook discusses not only the general duties and responsibilities of the inspector but presents anything he needs to know about the welding process, various welding procedures, and the many techniques for testing welds. Price is \$2.00.

SPECS FOR BUILDING CONSTRUCTION—This 68-page illustrated, indexed handbook is a complete set of regulations recommended by the Society for adoption by municipalities as part of their building codes to cover the application of arc and gas welding in building construction. This handbook forms the basis of welding requirements in practically every large city in the country. The price is \$2.50.

SPECS FOR BRIDGES—An 86-page illustrated, indexed manual covers the standard specifications used in the design, construction and inspection of welded highway and railroad bridges. Price is \$3.00.

Because of the charge for these publications please write directly to the American Welding Society at 33 West 39th Street, New York 18 N. Y., for your copies.

Index of publications

Air Reduction Pacific Co. has available a very valuable 20-page booklet entitled **Publications and Audio Visual List**. The publication contains brief reviews of many manuals and booklets available from Air Reduction concerning safety, basic product data, technical reprints from journals, text books, exercises and lectures, motion pictures and slides. A special section covers the many informative, educational and reference pamphlets available from the American Welding Society. Well over 100 publications available from Air Reduction are described, not including the AWS booklets.

. . . **Circle No. 168**

Data on welding equipment

Miller Electric Mfg. Co., Inc., has made available a set of 33 data

sheets giving specifications, photographs and price lists of the firm's full line of welding equipment. Special attention is called to a new series of gasoline engine-driven welder-power plants.

. . . **Circle No. 169**

How multiple welding units cut costs

Caterpillar Tractor Co., in addition to folders describing their various pieces of welding equipment, has available an article entitled, **Multiple Welding Unit Cuts Costs in Field**. The 9-page article is complete with cost figures which show the extent of several types of savings which result from the use of multiple units. The section on tractor-mounted welders is concerned mainly with pipeline construction and its characteristic "stringer bead," "hot pass" and "finish" operation. The cost savings which result from using a tractor-mounted welder breaks down into three main categories: maintenance and repair, fuel, and labor.

. . . **Circle No. 170**

Welding guide

The 1958 edition of **Eutectic Welding Alloys Corp.**'s 180-page pocket-sized welding data book is now available. Featuring simplified welding procedures for every base metal, this volume covers 120 welding rods, electrodes, and welding compounds. The book is a guide to improved torch and metallic arc welding, brazing and soldering. Useful "how-to-weld" information is given for fabrication, maintenance, repair and salvage, overlaying for wear and corrosion resistance and welding of dirty, rusted parts. Other information includes weld preparation steps, lowest possible application base metal heats, and the best torch adjustments and electrode position and manipulation.

. . . **Circle No. 171**

Engineering Essentials for Welders

The American Institute of Steel Construction, Inc., is offering a 24-page article entitled, "Engineering Essentials for Welders" which originally appeared in the **Welding Journal**. With many drawings and photographs the article discusses the engineering aspects of welding which are of interest to welders and those immediately responsible for fabrication and erection of welded structures. It is felt that a better job results if those re-

responsible for construction understand some of the theories behind the practices. Described in simple language are such engineering ideas as force, stress, elasticity, strain, bending moment, shear, torsion, fatigue, and others. The article is clearly written and a careful reading of it will enable a man without a technical education to better understand basic engineering concepts. . . . Circle No. 172

Stoody hardfacing guide book

The Stoody Company has published a very fine 50-page manual on hardfacing applications for equipment used in earth moving and road building, rock products, cement, mining, dredging, brick and clay. The manual has closeup drawings of over 100 wear points on construction equipment and shows how hardfacing material should be applied, what type it should be, how much should be applied, tips on proper procedures and amperages for arc welding. Included are brief specifications of stoody hardfacing alloys. The information in the manual is very clearly presented and is reduced to just the how-to-do-it field essentials. The manual's index contains nearly 300 items. . . . Circle No. 173

Simplified electrode selector

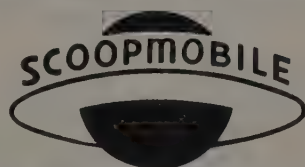
A 20-page simplified reference for selection, description, and the identification of the correct electrode for any application is available from Metal & Thermit Corporation. The 2-color booklet is punched for notebook insertion and lists the company's complete line of mild steel, low alloy, stainless steel, aluminum, aluminum bronze and hardsurfacing electrodes. Complete physical properties, chemical analysis and description are given for each, as well as the listing of competitive electrodes. . . . Circle No. 174

Welding clad steels

A 20-page manual devoted to the subject of welding clad steels has been made available by Lukens Steel Co. Cladding is usually added to improve the corrosion resistance of the primary metal, and it is important that welded joints retain this same characteristic. The Lukens manual is well written, fully illustrated with drawings, photographs and charts, and explores all aspects of the problem. . . . Circle No. 175

LOADING SHOT ROCK

takes **EXTRA POWER**



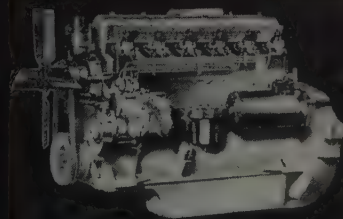
does it easily with

WAUKESHA Diesel

● Tough stuff to load—that shot rock! Takes a real loader with an engine that can pour on the power. With its Waukesha Diesel, and 100% breakout bucket action, this 1½ cu. yd. LD 5P Scoopmobile handles a lot of yardage for Bowman Sand & Gravel Co., Albany, Oregon—steadily, smoothly, quickly. Four-wheel planetary drive gives power to spare. Power steering, power shift forward and reverse transmission, and 4-wheel power brakes lighten the work of the operator. Waukesha Diesels also give you easy starting, quick warm-up, snappy acceleration, with high fuel economy and most economical upkeep.

372

POWERING the SCOOPMOBILE



Waukesha 190-DLC Diesel—Six cylinders, 3¾ x 4-inch, 265 cubic inch displacement. Send for descriptive bulletin 1411.

WAUKESHA MOTOR COMPANY, WAUKESHA, WISCONSIN

NEW YORK

TULSA

LOS ANGELES

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

NEW LITERATURE

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

How to "jump" a guy derrick

Here is an excellent "how to" folder for steel erectors pondering the best method of "jumping" a guy derrick. "Jumping" is, of course, raising the derrick from floor to floor on a building construction project without using other lifting equipment. Most experienced riggers have used variations of the jumping method described, or perhaps entirely different methods. However, this folder illustrates and lists in detail each of the three steps in a basic system which has proved efficient over the years on a variety of jobs. Published by **American Hoist and Derrick Co.** . . . Circle No. 176

Prestressed concrete data

Leap's (Leap Concrete, Inc.) 36-page collection of prestressed concrete data should prove of great value to anyone contemplating the use or manufacture of prestressed concrete. Bound in heavy cardboard, the catalog includes data on standard building sections including dimensions, physical properties, and a table of loadings for double tees, channels, and joists. Publication contains numerous diagrams and photographs. . . . Circle No. 177

Concrete pile suggestions

Raymond Concrete Pile Co. has published a brochure entitled "Raymond Cylinder Piles of Prestressed Concrete." The 20-page catalog, describes and illustrates the manufacture, versatility, and economic applications of prestressed concrete cylinder piles and related prestressed products. Information is given on the merits of the prestressed piles for foundations of bridges, waterfront, and off-shore structures. Numerous photographs of installations and drawings of suggested designs are shown in the brochure. . . . Circle No. 178

Kohler engines illustrated

"Kohler Engines in Action," a 28-page profusely illustrated catalog of engines manufactured by Kohler Co., is now available. The catalog contains complete descrip-

Construction handbook

Now available to architects, engineers, contractors, and purchasing agents is a new and enlarged pocket-sized Construction Data Handbook. Published by the **A. C. Horn Co.**, a subsidiary of Sun Chemical Corp., the handbook contains 160 pages with detailed information on almost 100 Horn construction and maintenance specialties. Its over 30 construction tables, guides, and time-saving charts will help solve many building maintenance, construction and engineering problems. Three streamlined indexes make for quick reference. . . . Circle No. 179

tions and specifications of all models and variations in the Kohler line, including the 3.6-hp. K90, the 6.6-hp. K160, the 12.5-hp. K330, and the 24-hp. K660. Also illustrated are a variety of applications of various models—on snow removers, concrete vibrators and pavement rollers. . . . Circle No. 180

Catalog on Universal line

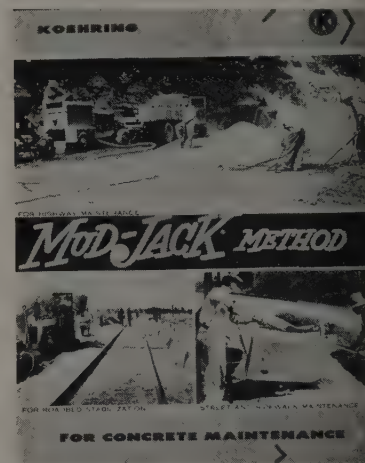
Universal Engineering Corp., 625 "C" Ave., Northwest, Cedar Rapids, Iowa, announces publication of a condensed catalog on its product line. A 20-page brochure illustrates and gives specifications on the manufacturer's line of crushing, screening, washing, loading, feeding and conveying equipment. . . . Circle No. 181

Drafting and engineering helps

A free booklet showing 59 shortcuts to speed drafting and computation work may be had by writing to the Reader Service Division of **Frederick Post Co.**, 3650 N. Avondale Ave., Chicago 18, Ill. "Time Saving Tips for the Draftsman and Engineer" is clearly written and well illustrated. The booklet includes: "Drafting Shortcuts," "Engineering Data Tips," "Board Timesavers," and "Calculating Ideas." . . . Circle No. 182

Mud-jacking catalog by Koehring

The economical mud-jack method of preventing concrete slab failure and raising sunken areas to their original grade is covered in



a 16-page catalog released by Koehring Division. Application of the mud-jacking method is fully explained in the 2-color catalog with words, 45 illustrations and diagrams. Particular emphasis is placed on slab preparation and consistency of the slurry used. . . . Circle No. 183

Blast with Joy

If you're interested in rotary blast hole drills, you'll want to see **Joy Manufacturing Co.'s** free bulletin which gives full data on their new Model 125 rotary blast hole drilling rig. Model 125 is equipped with Duo-Flow, an efficient feed mechanism consisting of a combination mechanical and high torque reversible hydraulic motor and air compressor. The 125 also features a heavy duty oil bath type rotary table, double drum type drawworks mounted on a common shaft, hydraulically raised and lowered mast for fast rig-up and tear-down plus proximity controls which give the operator complete control of the rig without moving from the operator's position. The rig is either truck or trailer mounted with power provided by truck engine or auxiliary. . . . Circle No. 184

NEW EQUIPMENT

(Continued from Page 24)

For more information on items described in this section, circle the corresponding numbers on reply postcard.

Another grader from Gallon

The Gallon Iron Works & Mfg. Co. has added to their line of motor graders the extra heavy-duty model 160. The rugged model has a 6-cylinder, 4-cycle, 160-hp. Cummins diesel engine. Total weight is 30,020 lb. with scarifier. The high-arched, box-type, single member frame is extra strong, weighing 134 lb. per ft.



Model 160 has a constant-mesh transmission, with six overlapping forward speeds varying from 1.3 to 22.6 mph. and high and low reverse speeds. Transmission and final drive are engineered to ratios which reduce stress, wear and maintenance to a minimum. A special ceramic-metallic-faced engine clutch is an important feature of the grader. This Morlife clutch is not affected by heat or cold, and gives full-load power delivery at all times. This simple dry-type clutch does not require a cooling system, with the result that servicing is greatly reduced.

... Circle No. 192

Bituminous distributor rugged, economical

Municipal Supply Co. has come out with a revolutionary bituminous distributor called the Thrifline. The distributor has been designed to do an economical job of heating and applying all types of bituminous material. Described as the answer to requests from both large and small contractors for "a rugged, all-purpose distributor at a reasonable price, operation of the unit is extremely simple. Two controls perform all functions: distribution, suck-back, hand spraying,



filling, circulating and transferring. The "easy-flo" piping system, equipped with leakless valves, is only 5 ft. in length. Fire proof burner boxes, completely enclosed, are designed to snuff out the type of burner box fire that has always given distributor operators trouble. Standard equipment includes a 36-hp., air-cooled engine and a 375-gal. per min. pump.

... Circle No. 193

Gas chain saw easy to handle

Competitively priced yet with quality construction is the direct drive gas chain saw introduced by the Porter-Cable Machine Co. Model 534 is designed for compactness, portability and power that will last over long periods of operation. Designed and engineered to tackle the toughest cutting job, the new model has outstanding power and stamina. Available with 14, 16, 20, or 24-in. bar sizes, the saw has a rugged 4½-hp. engine and the combination of engine and chain provides fast, clean cutting with minimum vibration. Operating features include a fast, dependable recoil starter, an automatic centrifugal clutch that prevents

SCAFFOLDING

SALES — RENTALS

SHORING

SIDEWALK BRIDGES HOIST TOWERS

FOR GREATER SAFETY...EFFICIENCY...ECONOMY



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1695 Mission Street, San Francisco 3, California HEMlock 1-4276
420 Eighth Avenue, N., Seattle, Washington Phone: Seneca 7142

North Sacramento, Calif. Capitol Scaffolding & Equip. Co., 417 E. El Camero
Portland, Ore. James A. C. Tait Co., 316 S. E. Madison St.
Salt Lake City, Utah Standard Builders Supply Co., 2627 S. Second West St.
Spokane, Washington Allied Industries, Inc., 1028 East First St.
Tacoma, Wash. Evergreen-Stone Co., 3323 S. Tacoma Way
Yakima, Wash. Johnny's Rental Service, 1601 South First St.
Wenatchee, Wash. Columbia Concrete Pipe Co., Foot of Ninth St.

Here's why **TWINS**



Euclid Twin-Power Protects Your Profit Margin



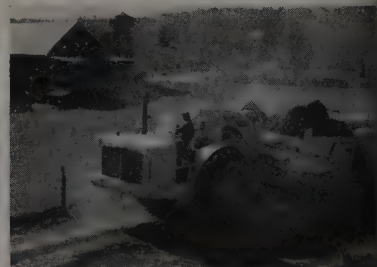
21% faster than single engine units

In loading ripped and shot rock for the 1,300,000 yd. U. S. Highway job at Meacham, Oregon, two "Twins" saved better than 6 cents a yard over single engine rigs for Rogers Construction Co.



"Couldn't be done with scrapers"

In Delaware, Barney Zinick tackled a million yard riverbank stabilization and bridge approach project with 5 Euclid "Twins"—moved 4000 yds. per shift over a 3000' haul—although the Corps of Engineers figured it would be a dragline job.



Handles complete road job

The first rubber-tired scraper for R. L. Eatherly Construction Co. of Nashville was a Euclid "Twin". In 4 weeks this one rig handled all earthmoving, grading and surfacing (50,000 yds.) for a state road connecting U. S. 70 with Oak Ridge.



Only "Twins" could operate

Heavy rain did not stop "Twins" from loading clay and sand for L.W. Edison's 2 million yard expressway project at Grand Rapids, Michigan. This contractor rates the "Twin" as the most efficient scraper available today.



Averaged 350 yds. per hour

Bidding on "Twin" performance, N. A. Degerstrom beat 23 contractors and wet weather . . . moved 14,500 yds. in 31 working hours on one section of the 900,000 yd. job near Davenport, Washington.



Self-load at 10,000 ft. elevation

Two "Twins" are stripping overburden at J. R. Simplot Company's phosphate mines in Idaho. They self-load, climb 50-60% adverse grades on the return, and move as much as 300 pay yards per 50 minute hour.

e moving the cheapest dirt!

"EUC" TS-24 outperforms any other scraper

Combine two engines (300 h.p. in front and 218 in back), two synchronized Torqmatic Drives, all wheel drive, and job-proved Euclid hydraulic scraper operation with 24 yd. struck capacity and you have the most productive scraper in the field today . . . the TS-24 Euclid "Twin".

Many other design features like 4-section cutting blade, extra-strength construction, easy-loading bowl design, planetary drive axles, NoSpin differentials and 27.00 x 33 tires (33.5 x 33 optional) contribute to the unmatched performance of "Twins".

On job after job—small grading work to big yardage projects—Euclid Twin-Power Scrapers have moved dirt at lower cost than other scrapers. They can do the same

on your jobs and protect your profit margin in spite of rising costs. Your dealer has job studies with actual production and cost data that will be helpful—just ask for "Twin Facts".

Be sure to check your dealer's schedule for showing the new color film "Memo to the Winning Contractor"—in less than half an hour you'll "visit" a wide range of jobs and see for yourself why "Twins" give you a big edge in bidding.



0% more payloads

Working with single engine scrapers at the Jackson, Alabama Lock and Dam project, a "Twin" bulld through adverse material that delayed other scrapers, and moved almost third more payloads.



42 "Twins" on Toll Road

On the Illinois Toll Road where bidding competition was keen, eight contractors have put a total of 42 "Twins" to work. "Twin" performance is helping overcome wet weather conditions that stop other scrapers.



3500 yds. in 10 hours

For expansion of Vancouver Island airport runways, Hassel Bros. Ltd. used two "Twins" . . . overcame weather delays and adverse conditions. . . moved 7,000 yds. in a 10 hour shift, self-loading clay and gravel.

EUCLID DIVISION, GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

**Your Euclid Dealer offers
the best equipment investment**

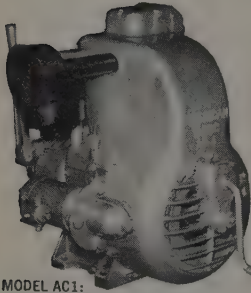


EUCLID EQUIPMENT

FOR MOVING EARTH, ROCK, COAL AND ORE

LIGHTWEIGHT CHAMPIONS

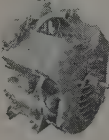
by America's largest manufacturer
of AIR-COOLED DIESELS



MODEL AC1:
Air-cooled, one-cylinder, four-cycle.
6.5 BHP @ 1800 RPM. Wt.: 220 lbs.



MODEL KBA-605:
7.5 KW permanent magnet generator mounted to AC2 diesel engine. Wt.: 550 lbs.



MODEL AC2:
Air-cooled, two-cylinder, four-cycle V-type 14 BHP @ 1800 RPM. Wt.: 350 lbs.

AMERICAN MARC Inc. is the acknowledged leader in the field of lightweight, air-cooled diesel prime movers for all uses requiring 6.5 to 15 BHP. Prominent in the American MARC line is the new permanent magnet generator, available from 3 to 7.5 KW output. (AC or DC, and industrial three-phase). American MARC also manufactures rotating armature generators, refrigeration power units and diesel pumping units of various capacities for industrial and marine installations.

AMERICAN MARC INC.

DIESEL  ENGINES

1601 West Florence Ave.

Dept. WC-48

Inglewood, California

Telephone OR 8-7174

6-104

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are your bending methods up to date?



LEARN HOW OTHERS ARE DOING IT NOW

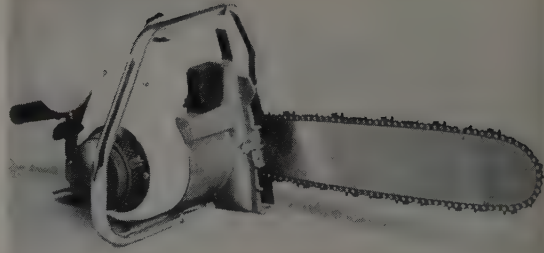
You will see how other people use ram — rotary — roll benders in their plants. 36 pages written in layman's language... with in-plant pictures. Also letters from users.

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WALLACE SUPPLIES MFG. CO.

1804 W. Cornelia Ave. • Chicago 13, Illinois

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stalling, a complete wrap-around handle that assures maximum comfort and perfect balance with minimum fatigue in all cutting positions. A free 48-page catalog is available on request. ... Circle No. 194

Hobbs dump features built-in teamwork

During pilot-model tests on the redesigned Hobbs Schonrock cable dump trailer, payloads weighing up to 69,000 lb. were heaped into the trailer box and each construction member was strain-gauge tested with the trailer in all dumping positions. Then it was put through a grueling test that crammed years of work and abuse into 80,000 mi. of continuous on-the-job hauling. Test results showed faster, better performance, and rugged endurance in the new design. Where does the new dump get all its spunk? Company officials claim it's a matter of teamwork—every part performing in close cooperation with every other part. A good example of this shows up in the box and under-

produce sand more efficiently... use



ESTIMATING sand- and sized aggregate-production costs? Make your bids more competitive—specify CF&I Grinding Rods.

With CF&I Grinding Rods, you get these benefits:

- **Even wear**—because end taper is held to a minimum.
- **Superior hardness and bending resistance**—because CF&I Rods are made from special analysis steel.
- **Increased grinding efficiency**—because CF&I Rods are machine-straightened with ends cut exactly square.
- **Quick delivery**—from CF&I's centrally-located Colorado mill. Add up these benefits and you get long service life and economy in your grinding operations.

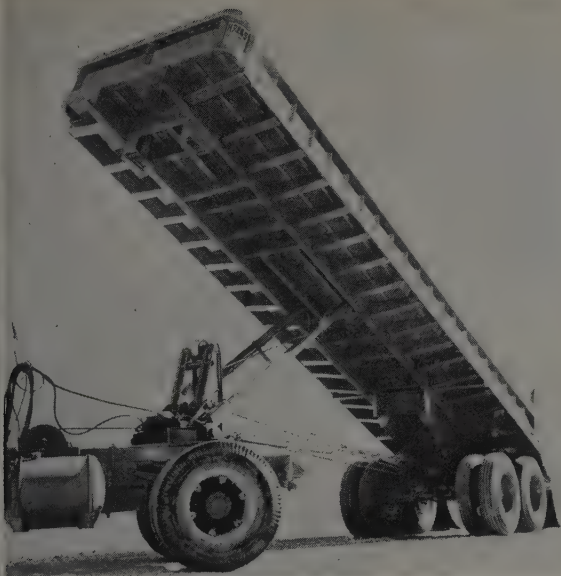
CF&I also makes Wire Rope and Industrial Screens for the sand and gravel industry. Get full details and quotations on any CF&I product from the nearest office listed below.

CF&I GRINDING RODS

THE COLORADO FUEL AND IRON CORPORATION

Albuquerque • Amarillo • Billings • Boise • Butte • Chicago • Denver • El Paso • Ft. Worth • Houston • Kansas City • Lincoln (Neb.) • Los Angeles • New Orleans • Oakland • Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City • San Francisco • San Leandro • Seattle • Spokane • Wichita 5804

... for more details, circle No. 66 on Reader Service Postcard

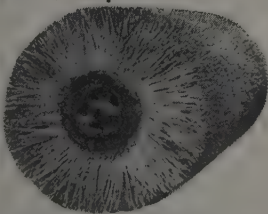


construction. Cross members have been lowered to fit between the dual center beams and channel outriggers, between the center beams and the side rails. Tops of the center beams, cross members and outriggers form a flush support for the trailer box, thus each construction member carries its full share of the load. Available in single and tandem axle models. **Hobbs Trailers.**
... Circle No. 195

GMC highway tractor most powerful in its weight class

Standards in lightness of weight and economy are being set by **General Motors Corp.**'s new highway tractor. The GMC model DR862 has air suspension which eliminates most road shocks and vibrations before they reach the cab and chassis. This in turn has permitted the liberal substitution of aluminum for steel because less structural rigidity is needed for long cab and chassis lift. Weighing only 11,000 lb. complete with fifth wheel, 100 gal. of fuel, ICC equipment and driver, the new tractor is more than half a ton under the weight of previous models of the same GCW rating. The economy offered in the unit is supplemented by the use of the CM 6-71 diesel engine that develops 190 hp. at 2,000 rpm.
... Circle No. 196

Fast, expert service on SWEEPER REFILLING!

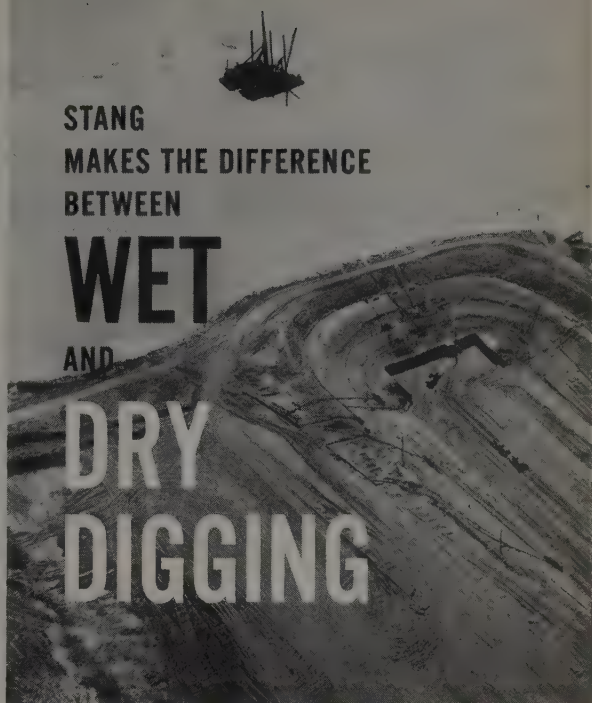


NEW CORES available for most popular machines. FIBRES & WIRE. All sizes and lengths available from stock.



PACIFIC COAST BRUSH CO.
2030 E. 7th Street, Los Angeles 21, Calif.

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April 1958—WESTERN CONSTRUCTION



STANG
MAKES THE DIFFERENCE
BETWEEN
WET
AND
DRY
DIGGING

Deas Island Tunnel approaches DUG IN THE DRY—thanks to Stang dewatering

On any project, you can depend on Stang to start the job right—IN THE DRY. Remember, the responsible handling of water, in any situation, is Stang's sole business. Don't fight water, and lose time and money doing it. For the practical, economical answer to all your water problems, call on **water-handling specialists** ... call on **STANG!**

CONTRACTORS FOR THE APPROACHES:
Peter Kiewit Sons Co. of Canada,
Raymond International Co. and
B. C. Bridge & Dredging Co.

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Please send me your free 100 page Brochure, "The Stang Wellpoint System."

Name _____
Company _____
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Cut cost of concrete floor forms up to 40%



with new SPANALL telescopic girders!



SAVE TIME, AND TROUBLE, too! Rent girders that can be adjusted to any desired span from four to 34 feet! SPANALL facilitates craftsmen's work because space is open underneath. No more "forests" of timber shores.

EASY TO INSTALL... flange of SPANALL beams fits directly on bearing surface. Lightweight SPANALL sections can be moved by hand—no special equipment needed. They slide out to exact length you want, lock in place simply by tightening bolt. Easy-to-follow booklet tells you how far apart SPANALL sections should be for different loads and span lengths.

SIMPLE TO STRIP. When floor-

ing concrete above has set, loosen bolt, slide SPANALL units together and remove. SPANALL sections can be re-used as often as job requires.

FIND OUT FOR YOURSELF how you can save time and money on your next job by renting SPANALL... complete free engineering service available. Call us for an estimate.

SPANALL OF THE PACIFIC

8907 Railroad Ave., Oakland, Calif.

Sales agents: W. J. Burke & Co., in San Francisco, Oakland, Los Angeles, San Diego, Sacramento, Portland and Seattle.

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



ELECTRIC PLANT NEWS



On-site cement plant operates with Onan power

35KW Onan Electric Plant powers 15 H.P., 5 H.P. and two 2 H.P. motors, vibrator, controls, welder and lights

It's a completely electrified operation... even to electric lights in the mobile office nearby... yet this bulk cement plant is far distant from the utility highline. The Onan heavy-duty, water-cooled electric plant runs continuously during working hours with a minimum of servicing. It has the capacity to provide electricity for miscellaneous lights, tools, motors and communications, too.

Other A.C. models: 500 to 75,000 watts. Also D.C. and battery charging units.



Series 35ED Onan Plant, powered by 8-cylinder gasoline engine, provides all the electricity needed. Trailer mounted, it is easily moved from site to site. Weatherproof housing.

See your Onan distributor or write for literature

D. W. ONAN & SONS, INC.

3990A University Ave. S.E., Minneapolis 14, Minnesota

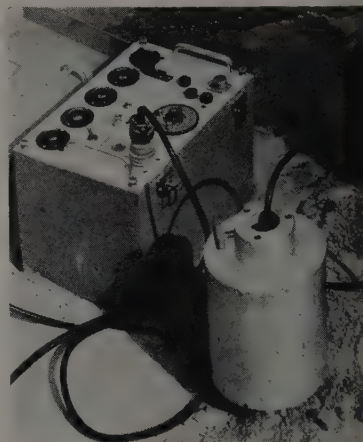
ELECTRIC PLANTS • AIR-COOLED ENGINES • KAS KOOLER • GENERATORS

... for more details, circle No. 70 on Reader Service Postcard



Portable radioactivity instrument measures moisture and density in two minutes

The d/M-Gauge is a new, completely portable field instrument recently announced by Nuclear-Chicago Corp. for rapidly measuring moisture content or density in a wide range of materials, including soils and earth fills. Simplicity of operation and speed of measurement are primary advantages of the new system. Time-consuming laboratory procedures necessary with conventional methods have been eliminated; the d/M-Gauge can obtain accurate moisture or density determinations in two minutes—less than 1/10th the time required by other systems. An outstanding feature of the system is the substantial volume of material analyzed in a single operation. The probes normally measure a spherical volume



of material with an average diameter of 14 in. Moisture or density measurements can be made at any depth within a material, ranging from the top 12 in. to 60 ft. below the surface. Accuracy of the system is within 2 lb. per cu. ft. for density determinations over the range from 50 to 150 lb. per cu. ft. Moisture determinations are accurate to within 3/4 lb. per cu. ft. over the range from 0% to 100% moisture content. The d/M-Gauge makes possible continuous studies of the same volume of material over an extended period of time by use of an access tube which is driven into the material and left in place for future measurements. Since the sample of material is chemically and physically unchanged by the testing process, such measurements provide an accurate basis for determining the effects of purely environmental changes on a particular volume of material.

... Circle No. 197

Outrigger adds tons to crane capacity

A revolutionary outrigger system that adds tons of bonus capacity over ordinary systems is a feature of American Hoist & Derrick Co.'s air controlled, 40-ton capacity truck crane. The American 500 series, as the machine is designated, has been designed to strip easily and quickly

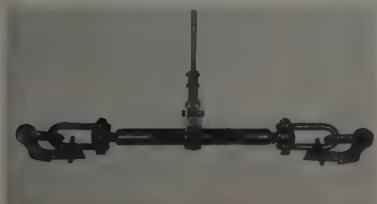


for over-highway travel, yet provide high capacity (40 tons rated) on the job. To accomplish this, the 500 is equipped with a new outrigger system that permits substantial weight reductions in the carrier while providing a solid, steady foundation at five points, for the powerful, massive crane upper works and deep section boom needed for a crane of this capacity. The system features extremely deep center sections that swing out from the carrier, rather than sliding out, and which are locked into position. These sections are slightly longer than ordinary outriggers and are located almost directly under the rotating base of the machine.

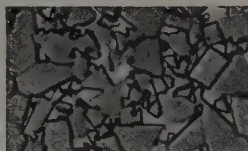
... Circle No. 198

Simplex steamboat ratchets

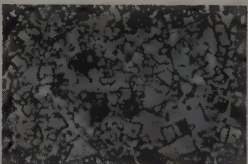
Designed for work on cofferdams, and concrete and steel construction requiring falsework or framing, is the addition to the Sim-



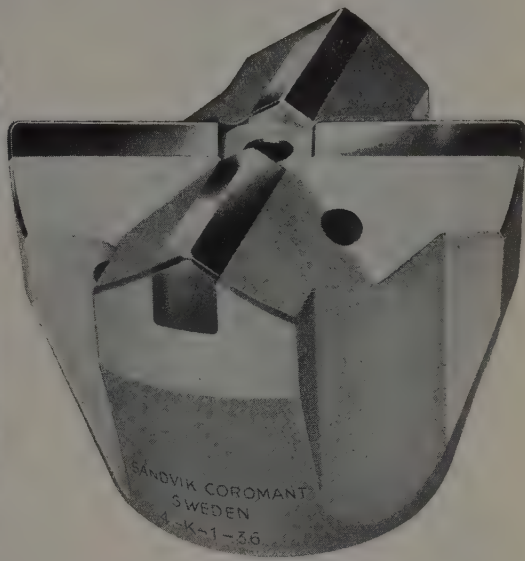
Longer bit life—with *new* Sandvik Coromant X-Bits



Sandvik Coromant Tungsten Carbide. (Microphoto) Uniformity of size, even distribution of grain are marked. Free from porosity and impurities—therefore stronger, longer-lived.



Low quality Tungsten Carbide. (Microphoto) Black marks are contaminations caused by deficient production control. They weaken the carbide, reduce its working life.



NEXT time you buy bits, specify Sandvik Coromant because they give you more footage per bit, lower drilling costs. Here's why:

- 1 Only first-quality tungsten carbide is used—as shown in the microphotos above. This means less wear, longer life and a better job.
- 2 the bodies are precision-made of high quality alloy steel—tough enough to take the strain throughout the extra-long bit life.
- 3 the bigger Sandvik Coromant bits are all of X-design, which prevents rifling. No wonder Sandvik Coromant inserts are the most widely used in the world, drilling more than one billion feet every year.

THESE STANDARD SIZES ARE AVAILABLE

	SHOULDER TYPE	THREAD	DIAMETERS AVAILABLE (IN INCHES)	
		$\frac{3}{8}$ " F	$1\frac{1}{2}$	
		1" H	$1\frac{1}{2}$, $1\frac{3}{8}$, $1\frac{1}{2}$ and $1\frac{7}{8}$	
		$1\frac{1}{8}$ " D	$2, 2\frac{1}{8}, 2\frac{1}{4}, 2\frac{3}{8}, 2\frac{1}{2}, 2\frac{3}{4}$ and 3	
		$1\frac{1}{8}$ " K	$3, 3\frac{1}{2}, 4$ and $4\frac{1}{2}$	
BOTTOMING TYPE		$1\frac{1}{4}$ " Rope	$1\frac{7}{8}, 2, 2\frac{1}{4}, 2\frac{1}{2}, 2\frac{3}{4}$ and 3	
		2" Rope	$3\frac{1}{2}, 4, 4\frac{1}{2}$ and 5	
		400	$2, 2\frac{1}{4}$ and $2\frac{1}{2}$	
		600	$2\frac{1}{2}, 2\frac{3}{4}, 3$ and $3\frac{1}{2}$	

The sizes underlined are X-shaped bits

SANDVIK COROMANT bits are supplied through Atlas Copco, the world's largest manufacturer of rock drills, who also supply Sandvik Coromant integral steels—the most widely used in the world—cross bits from $1\frac{1}{2}$ " to $2\frac{1}{2}$ " and extension steel equipment.

Write, phone or cable today for further details to any of the addresses below:

Atlas Copco

EASTERN — P.O. Box 2568 Paterson 25, N.J. Phone — Armory 4-3310
 PACIFIC — 930 Brittan Avenue, San Carlos, Calif. Phone — Lytell 1-0375
 CANADA — Montreal Airport, Quebec. Phone — Melrose 1-1871
 MEXICO — Apartado Postal 56, Torreon, Coahuila. Phone — 39-07

DST.79

... for more details, circle No. 71 on Reader Service Postcard

TWIN FACTS



a report on the
cost-cutting performance
of Euclid "Twins"

Twins move the cheapest dirt!

An Oregon highway job involved 1,300,000 yards of excavation. Despite having to move ripped and shot rock weighing 3000 pounds per bank yard, the contractor used a spread of two Euclid 24-yard "Twins" and two 21-yard single engine scrapers push loaded by 300 h.p. crawlers. The 1800' haul followed the centerline of the new road over incomplete fills of minus 12%, plus 14%, and minus 12% grades.



Time study and weight figures for the two types of scrapers working under the same conditions show over 50% more production for the Twin-Power Scraper. Each "Twin" moved 143 bank yards per 50 minute hour while the single engine rig moved only 91 yards. This higher "Twin" production cut costs by better than six cents per yard!

For more details on this job, ask your Euclid dealer for Twin Facts No. 23 . . . he can show you why Euclid "Twins" give you a bidding advantage.

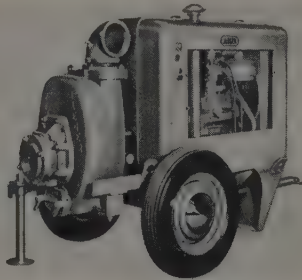
EUCLID DIVISION, General Motors Corp., Cleveland 17, O.

. . . for more details, circle No. 72

plex line of "steamboat ratchets" by Templeton, Kenly and Co. Available in 15-ton and 20-ton capacities, features of the new jack include: removable end linkages achieved by bolt joint, rather than fixed linkage joint, to provide greater flexibility of use; various type linkage methods can be interchanged as desired to provide a wider range of applications; the jack can be used without linkage, permitting special hook-ups through screw eyes, for special jobs. Five model, in weights from 96 to 132 lb. available. . . . Circle No. 199

Dual-duty pressure and dewatering pump

Specially designed for pumping large volumes of water at high heads, this Jaeger Model 6 PH can pump 1,050 gal. per min. at 60 lb. for pressure service, or handle 100,000 gal. per hr. at 10-ft. suction



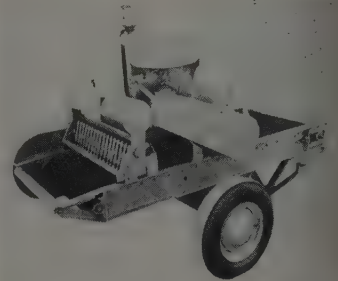
lift as a dewatering pump. It offers a double advantage on well-point work: High pressure to jet in wellpoints, and then big volume

to dewater them. The 6 PH self-primers rapidly and holds prime indefinitely. Shaft is in high capacity ball bearing and has the Jaeger Lubri-Seal which is not only positively lubricated for long life but is accessible for inspection without dismantling the pump. Other special features are safety switches for high radiator temperature and low oil pressure, and complete 6-volt electric starting as standard equipment. The Jaeger Machine Co.

. . . Circle No. 200

Portable form cleaner offers speed, efficiency

Important savings result from the speed and thoroughness with which steel forms are cleaned by Economy Forms Corp.'s portable power-driven cleaner. Known as



the EFCO, the form cleaner works equally well on all steel panels not exceeding 30 in. in width. In operation, the forms are simply loaded on a conveyor belt which pulls them under a rapidly rotating steel wire brush. The forms are automatically cleaned and oiled, and



COMPLETE COVERAGE in the small crane and excavator field has been accomplished by Little Giant Crane and Shovel, Inc. with their three new models, rated at 7, 10½, to 15-ton capacities. All sizes feature the Ball Bearing Turntable. Distinctive improvements incorporated on all models include relocated controls, special hydraulic track shoe adjustment, and cut teeth on swing pinions and bull gears. Pictured is the Model 32, a 10½-ton truck mounted crane. . . . Circle No. 201

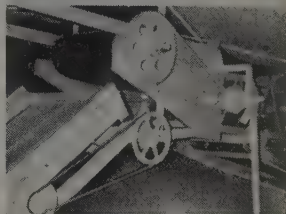


KOLMAN

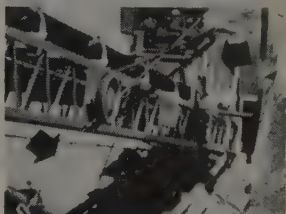
**COMPLETELY PORTABLE
CONVEYOR-SCREEN PLANT**
CONVEYOR • SCREEN • TRAP • FEEDER

Peter Kiewit Sons' Company's 50'x36" Kolman
Portable Conveyor-Screen Plant in Operation

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



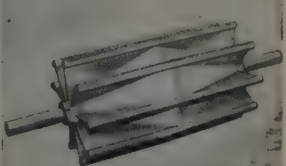
Head pulley clutch permits op-
eration of screen while convey-
or or belt is idle.



Motor-to-ground controls ex-
tend throttle and clutch for
easy one-man operation.



Bar type head pulley elimi-
nates the necessity of lagging.
Extended shaft.



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

MAN-SIZE 36" Kolman a Brute for Production!

Contractors through the country are finding that the KOLMAN Model 101 Conveyor-Screen Plant comes through with top production under the severest operating conditions.

Take Peter Kiewit Sons' Company, for example. Pictured here is their 50'x36" KOLMAN Portable Conveyor-Screen Plant on a highway construction job in Montana. This "man-size" unit is capable of loading out these 15-ton trucks with highway base course material in less than a minute. It's a brute for production.

LOOK AT THESE FEATURES

Included on this plant is the Model SB-80 Kolman single-deck Vibrating Screen—over 10 square feet of vigorous screening power. The International gasoline engine is equipped with "motor-to-ground" controls enabling the operator to control the throttle and clutch from the ground. The conveyor drive assembly includes Head Pulley Clutch so operators can conveniently stop and start the belt from the head end of the conveyor near the trucks. The screen can be in operation at all times, greatly increasing screening efficiency.

For top loading performance, the plant is equipped with KOLMAN'S Portable Feeder Trap Combination. The trap is designed to facilitate loading with bulldozer and various other means. The reciprocating plate feeder is built into the trap, so both are an integral part of the conveyor and completely portable. In addition, Wing Walls extend from the sides of the trap to prevent material from working in around the conveyor tail section. The complete plant is fully portable with no disassembly whatever. The vibrating screen folds under the end of the conveyor

for towing without removing any of the drive assembly.

The KOLMAN 101 Conveyor-Screen plant can put an end to your loading and screening problems, too. Belt widths from 18" to 42", lengths to 60 feet. Write today for full details.

SEE YOUR NEAREST DEALER

CALIFORNIA
LOS ANGELES, BAKERSFIELD, SAN DIEGO, SANTA BARBARA—Brown-Bevis Industrial Equip. Co.
OAKLAND—Spears-Wells Machinery Co.
COLORADO
DENVER—Faris-Moritz Equipment Co.
IDAHO
BOISE, POCATELLO—Intermountain Equipment Co.
MONTANA
BUTTE, BILLINGS, GREAT FALLS and MISSOULA—Hall-Perry Machinery Co.
NEW MEXICO
ALBUQUERQUE—Construction Machinery Co.
NEVADA
ELKO—A-D Machinery Co., 251 W. Commercial St.
OREGON
PORTLAND—Balzer Machinery Co.
UTAH
SALT LAKE—Rasmussen Equipment & Supply Co.
WASHINGTON
SEATTLE—Sahlberg Equip., Inc. 5950 4th Ave. So.
SPOKANE—Intermountain Equipment Co.
WYOMING
CHEYENNE, CASPER, ROCK SPRINGS and SHERIDAN—Worham Machinery Co.
ALASKA
FAIRBANKS, ANCHORAGE—The Carrington Co.
Western Representative
S. A. MADRID, 1739 32nd Ave., San Francisco 22

SEND this coupon for FREE literature

KOLMAN Manufacturing Co.

5670 W. 12th St.

Sioux Falls, S. D.

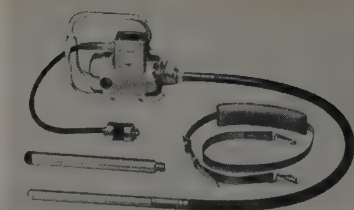
... for more details, circle No. 73 on Reader Service Postcard

the clean forms emerge from the far end of the conveyor belt ready for reuse. The machine is geared to clean forms at the rate of 42 lin. ft. per min. The cleaner is trailer mounted, thus easily moved from job to job.

... Circle No. 202

Lightweight vibrator has 3/4-hp. motor

Viberette, an internal concrete vibrator designed for pre-stress, laboratory and building construction, has been announced by Viber Co. Viberette features a powerful



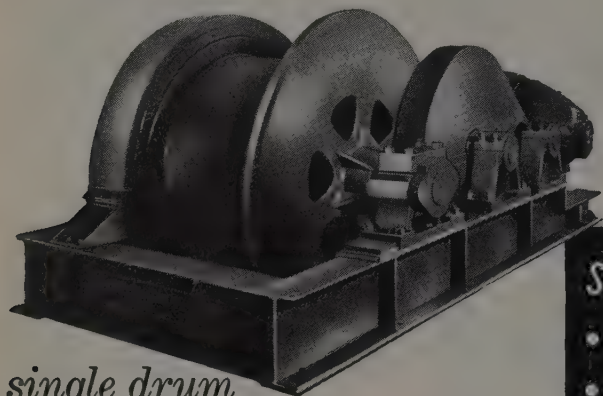
3/4-hp. motor of latest design plus new lightweight, small diameter flexible drives with smooth outer surface and double reinforcement internally. Drives may be had in

lengths from 1 ft. to 20 ft. High speed, low amplitude, small diameter heads 1 in. and 1 5/16 in. are interchangeable. Quick release drive connection makes it easy to change to various shaft lengths and head sizes.

... Circle No. 203

Crane hoist attachment for Econmobile

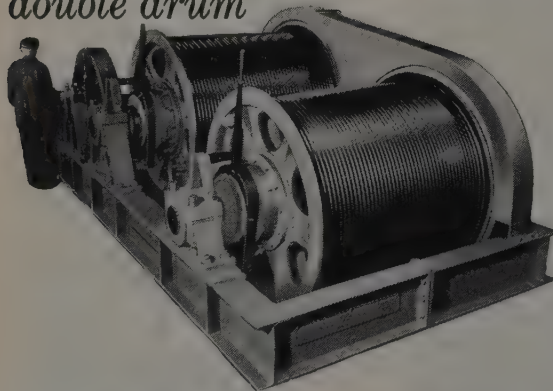
Greater versatility has been added to American Road Equipment Co.'s Econmobile, a job-site



single drum

SPECIAL CARPULLERS

double drum



Specify
• load
• speed
• special conditions

For your
Special
Carpuller
consult
Superior-
Lidgerwood-
Mundy—They
Know How

Write for
New 24 page
Bulletin C-616

Superior—Lidgerwood—Mundy Corporation

MAIN OFFICE AND WORKS—SUPERIOR, WISCONSIN
Pacific Coast Representative: GEORGE E. SWETT & COMPANY

100 Howard Street, San Francisco 5, California

... for more details, circle No. 74 on Reader Service Postcard

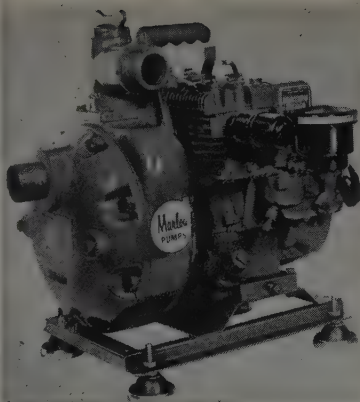


materials handling vehicle, by adding a new type crane hoist attachment. The crane hoist is 12 ft. 6 in. long. When used with the Econmobile it gives a hoisting height of 32 ft. in the retracted position. In this position the crane hook is 12 in. ahead of the front tires of the vehicle. In the extended position the crane can hoist 28 ft. off the ground and 12 ft. 4 in. ahead of the front wheels. Capacity in the retracted position is 1,500 lb. and in the extended position it is 1,000 lb. At the ground level position the crane hoist can reach 18 ft. ahead of the wheels to pick up steel, lumber, scaffolding, etc., from stacked materials.

... Circle No. 204

Fast-priming utility pump

One of the world's largest manufacturers of self-priming, centrifugal pumps, Marlow Pumps, has come up with a new line of self-priming pumps for construction and utility service. The new units are available in two sizes—a 1 1/2-in. pump weighing only 49 3/4 lb., and a 2-in. unit which tips the scales at only 52 1/2 lb. A hard-fitting handle, located at the center of balance, makes carrying easy. These



pumps are designed to eliminate the need of a check valve. A self-lubricating, long-life Remite mechanical shaft seal eliminates leakage. The new pump incorporates a completely new, improved defuser priming system, that permits rapid priming with a minimum of water in the pump case. . . . Circle No. 205

Portable belt conveyor with hydraulic drive

Push button control of a hydraulic transmission system is a feature of E. F. Marsh Engineering Co.'s Tubular Frame Portable Conveyor. The hydraulic system is used to drive the conveyor belt as well as to raise and lower the conveyor to the desired elevation. Maintenance is reduced by eliminating universal shaft and roller chain drives. Conveyor is available in 18, 24, and 30-in. belt widths and lengths range from 30 to 60 ft. in 5-ft. increments. Power unit, gas or electric, is mounted at convenient waist height on the truck assembly. . . . Circle No. 206

Versatile Moto-Bug

Ability to carry 3,000 lb. in an 18-cu. ft. hopper or when used as a platform carrier is one of the many features incorporated in Kwik-Mix Co.'s Moto-Bug. As a forklift (at 15-in. load center) the new model will raise 1,500 lb. to 7 ft. Opera-



with REALOCK FENCE

Installation and maintenance problems are minimized, when a Realock Fence marks boundary lines on "Right-of-Way" applications.

You can have Realock erection crews do the job, or elect to do it yourself. Our engineers will assist you in planning every detail to ensure that the fence you order will be exactly right for your needs. We'll tailor-make it for quick, proper installation.

And, your Realock Fence will *stay* virtually maintenance-free. Strong posts are set in concrete. Steel fabric is hot galvanized after fabrication. Aluminum fabric is also available for use with steel or aluminum framework. Other non-ferrous metal fabrics can be made to order.

Realock Fence is available in a wide variety of types . . . in light or heavy construction . . . with barbed or knuckled selvages . . . in all standard heights . . . with or without barbed wire tops.

For additional information contact our sales and engineering office at Wickwire Spencer Steel Division of CF&I, Buffalo, N.Y., or our local office listed below.

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Salt Lake City • San Jose • San Leandro • Seattle • Spokane

5764



REALOCK FENCE

THE COLORADO FUEL AND IRON CORPORATION

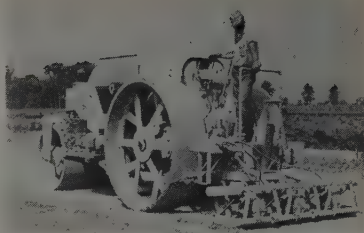
. . . for more details, circle No. 75 on Reader Service Postcard

tor can tilt the forklift mast 10 deg. back, 2 deg. forward. Carrying a full load, the "Bug" can climb a 25% grade, turn in an 84-in. radius if a forklift, 82 in. if equipped as a hopper or platform carrier. A direct drive to the power flow transmission eliminates shifting, reduces vibration and allows a 12-mph. forward or reverse speed. Low relative weight (only 1,175 lb. as a hopper carrier) combined with high maneuverability, increases the number of job applications of the new model.

... Circle No. 207

Combination 3-wheel roller and electric compactor

The Galion Iron Works & Mfg. Co. is offering a super-compaction machine which provides both static and dynamic compactive effort. It is a combination of the Galion Chief or Warrior Roll-O-Matic 3-wheel roller with a Jackson electric vibrator compactor. This two-in-one machine provides simultaneously, the compressing action of massive roller weight plus the consolidating action of vibration produced by 4,200 three-ton blows per min. The compactive effort is so effective that the most rigid Federal and State density specs are often attained in one pass per lift.



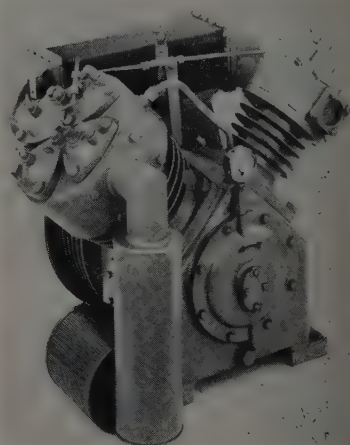
The compactor workhead is made up of three 26-in. wide steel plate shoes, individually vibrated by a heavy-duty electric motor mounted on each shoe. The shoes are securely suspended from a heavy box-type frame in a manner that allows them to float on the surface being compacted. This complete unit is connected to the rear of the roller, and is raised for traveling or use of the roller alone, by hydraulic power controlled from the operator's platform.

... Circle No. 208

Atlas Copco compressors

Atlas Copco have broadened their range of air compressors for mining and construction use to include units delivering all the way from 45 to 3,220 cfm., with the recent addition of an NT series. Especially designed to meet auxil-

iary air tool requirements, or to serve as an extra-capacity or off-shift air supply, the new NT series comprises four models in the 45-to-110 cfm. range. Units can be in-



stalled as either stationary or portable air plants. All are air-cooled, two-stage, single-acting machines with cylinders placed in a "V" arrangement on the crankcase. Delivered for direct coupling or V-belt drive, NT's also are available for mounting on a standard jeep, with drive arranged to the power take-off. Illustrated catalog literature is available. ... Circle No. 209

FUND OF EXPERIENCE

You depend on your architect because he has *experience*. Enjoy the same confidence when you buy Builder's Risk Insurance. See National Surety Corporation for a reliable **FUND OF EXPERIENCE** to protect you during the entire period of construction. Be certain! Be protected by

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WESTERN CONSTRUCTION—April 1958



LIMA

Lima Austin-Western Model 101-S Plant, owned by C. W. Allen, Wilburton, Okla., producing gravel filter for Table Rock Dam on White River.

LIMA Austin-Western 101-S Plant Speeds Dam Project in Missouri

This high-capacity Model 101-S Plant is being used to produce gravel filter for the slope of Table Rock Dam, on White River, near Branson, Mo. Using river-bed gravel, the plant turns out an average of 100 cu. yds. per hr. of material ranging in size from 3 in. down to fine sand.

This portable crushing and screening plant sets a new high standard for high production and low maintenance. While intended primarily for gravel operation, it performs equally well in quarry service when combined with a portable primary. Standard equipment includes a 10 x 36-in. primary jaw crusher, a 30 x 20-in.

roll crusher, 30-in. conveyors, and a 4 x 12-ft. inclined, positive-throw type vibrating screen. It may be had with either a shovel-loading hopper or a swivel drive for feed conveyor. It is a completely self-contained unit that can be transported over most highways without special permit.

Make your next crushing and screening plant a Lima Austin-Western for all-around economy and greater returns on the investment. Call on your nearest distributor for full information. Or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

Edward R. Bacon Company.....San Francisco, California
Columbia Equipment Company...Portland, Ore.; Seattle, Spokane, Washington
N. C. Ribble Company.....Albuquerque, New Mexico
Smith Booth Usher Company.....Los Angeles, California
Western Machinery Company.....Salt Lake City, Utah
Western Machinery Company.....San Francisco, California

Keremi Tractor & Equipment Company.....Cheyenne, Casper, Wyoming
Hall-Perry Machinery Company...Billings, Butte, Great Falls, Missoula, Montana
Engineering Sales Service, Inc.....Boise, Idaho
Macdonald Equipment Company.....Denver, Colorado
Graid Equipment Company.....Reno, Nevada
Western Machinery Company.....Phoenix, Tucson, Arizona

LIMA AUSTIN-WESTERN

BALDWIN · LIMA · HAMILTON

CONSTRUCTION EQUIPMENT DIVISION • LIMA, OHIO

Crushing, Screening and Washing Equipment

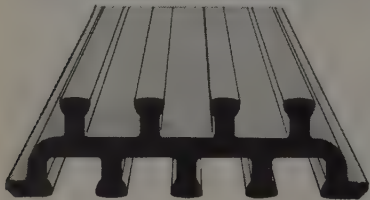
5824



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LABYRINTH® WATERSTOPS

**A SOUND INVESTMENT
FOR CONCRETE CONSTRUCTION!**



LABYRINTH AVAILABLE IN 2, 3 or 4 rib.

ON YOUR CONSTRUCTION:

1. Consider the investment in design, materials and labor (to mention a few).
2. Then consider how important safe, secure *watertight* concrete joints are.
3. Thorough watertightness *can* be secured by installing Labyrinth Waterstops—a dividend that makes the low initial cost of the product insignificant when compared to your total investment—and one that insures watertight concrete joints for years!

- Corrugated ribs grip concrete, insure an everlasting bond between joints.
- Finest polyvinyl plastic resists chemical action, aging, severe weather.
- Takes just seconds to nail to form ... easy to cut and splice on location (prefabricated fittings available).
- There's a Water Seal product for every type of concrete work!

If your aim is to stop water seepage, stop it effectively with Water Seals' Waterstops!

WATER SEALS, INC.

Chicago 6, Illinois by:

THOMAS CONCRETE ACCESSORY CO.

5341 Sheila St.
Los Angeles 23, Calif.

HYDRO PRODUCTS CO.

1350 Old County Road
Belmont, Calif.

CHAS. R. WATTS CO.

4121 Sixth Ave., N.W.
Seattle, Wash.

PLASTI-SPRAY CO.

353 S. State
Orem, Utah

BAKER-THOMAS-WOOLSEY

300 S. Twelfth St.
Phoenix, Ariz.

E. W. ZUCK

1238 N.W. Glisan St.
Portland 9, Ore.

... for more details, circle No. 78



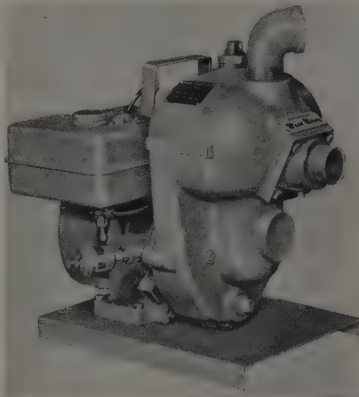
Steam cleaner carries own water supply

High pressure steam cleaning when you're far from water and electric power is no problem with Malsbary Manufacturing Co.'s trailer-mounted Model 250 HPC cleaner because it carries its own supply. With two 150-gal. water tanks, located fore and aft of the cleaner, capacity is sufficient for 1½ to 1¾ hr. of steam cleaning at 200 psi. An equalizing device maintains uniform water level in

both tanks so the load on the trailer is always evenly distributed. Model 250 HPC gives the operator several choices. A hot solution to 300 psi. for removal of hard-sticking material or cold water to 300 psi. for rapid removal of caked dirt is available. For melting and removing ice and frozen mud, 200-deg. F. hot water to 300 psi. can be had. Low pressure wet steam for heating and thawing, or low pressure warm water for washing equipment is available also. ... Circle No. 210

Lightweight pump wears and wears

Aluminum construction makes a lightweight out of Worthington Corp.'s new self-priming contractors' pump, the first model of a



complete new line by that company. Total weight of Model 4M is only 45 lb. But light construction will have no effect on length of service since all parts subject to wear are made of cast iron and steel. Another feature of the engine driven, AGC rated, centrifugal pump is an exclusive recirculation port design which eliminates valves and permits renewal of internal clearance. An informative bulletin is available.

... Circle No. 211

Greater densities through "thumping"

A tow-type vibratory roller for grade, base and surface consolidation is announced by Bros Inc. Named the Vibra-Pactor, the machine features a static (gross) weight of 4½ tons and a controlled variable vibratory force equal to a range from 7½ tons to 10½ tons. Vibratory frequency range is 1,100 to 1,300 vibrations per min. Of special importance is the roller's quarter-inch amplitude—the distance



the drum is raised from the ground each revolution. This "thumping" or impact force combined with the drum weight helps achieve densities in excess of standard AASHTO requirements in heavy cohesive subgrade and embankment materials. Drum diameter of the Vibra-Pactor is 48 in.; rolling width is 66 in. The machine is powered by a 40-hp gasoline engine. ... Circle No. 212



TONS FOR PENNIES

Four-yard bites, fast cycle time made faster by electric swing and the power and strength for the toughest digging enable the Marion 111-M to move tons for pennies. Now bigger, stronger and better than ever, the 111-M is proving this on hundreds of jobs all over the world, including this New England toll road project. Look for the 111-M in mines, quarries and heavy construction everywhere. Ask your Marion Distributor for complete information.

TODAY'S MARIONS GIVE YOU MORE IN SUSTAINED, LOW-COST PERFORMANCE

You get



MARION POWER SHOVEL CO. • MARION, OHIO
A Division of Universal Marion Corporation

Send me information about MARION yard shovels, yard
hoes and ton cranes (☐ crawler mounted ☐ truck mounted)
☐ Have a salesman call.

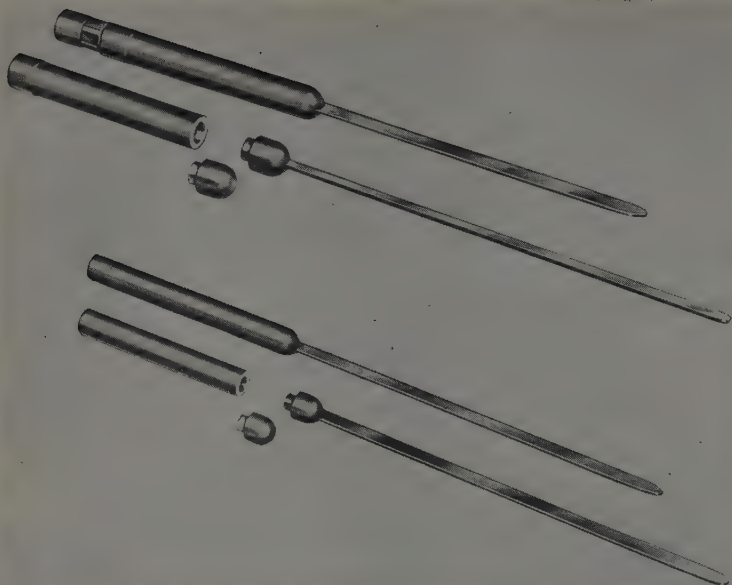
Name Title

Company

Street

City Zone State

Shovel Capacity	AVAILABLE AS . . .			
	Hoe	Crawler Crane	Truck Crane	Special Crane
¾	Yes	Yes	Yes	---
1	Yes	Yes	Yes	---
1½	Yes	Yes	---	Yes
2½	Yes	Yes	---	Yes
3	---	Yes	---	---
4	---	Yes	---	---



Where standard vibrators fail Sabres do the job

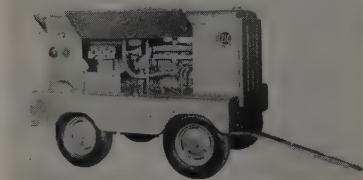
A device to vibrate concrete in extremely confined areas has been developed and engineered by Dart Manufacturing Co. These Sabre blades come in varying lengths (20 and 22-in.) and attach readily to Dart vibrators. Light in weight (17 lb.), they are engineered of high

grade spring steel for long life. Operating up to 10,000 rpm. at high cycle or 14,000 rpm. at 60 cycle, the slender blades easily offer full force, amplitude and frequency for close work in prestressed concrete or in any restricted area where normal vibrators cannot do the job. Sabres are easily removed for normal submersion use of the vibrator.

... Circle No. 213

Gardner-Denver adds compressor

Gardner-Denver Co. has added another model (RP210) to its line of rotary portable air compressors. Retained in the new units is a clutch between the engine and the compressor, a design feature of all previous models. For cold weather, the engine starts freely, and warm engine water circulates through the compressor oil cooler and reservoir. Thus, warm, free-flowing oil is sup-



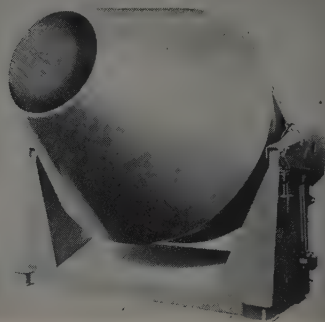
plied to the compressor as soon as it starts turning. An oil pump assures positive oil flow for compres-

sor lubrication and cooling, independent of receiver pressure, under all operating conditions. RP210 is powered by either gasoline or diesel engine and is available on two- or four-wheel mountings, or on wood skids.

... Circle No. 214

Mixer offers light weight, simplified design

Simplified design, a weight that is equal to about half that of comparable mixers, and low price are three features of a new line of Koehring-Johnson spindle type tilting mixers. Manufactured by C. S. Johnson Co., the new mixers will be built in 2, 4, 6 and 7½-cu. yd. sizes. The mixer drum rotates on a spindle which is an integral part



of the tilting yoke. All drum roller paths, roller path idlers, and guide rollers have been eliminated. Heavy-duty tapered roller bearings that support the drum on the spindle, in a cantilever fashion, are fully enclosed to keep out dirt, dust and water. Anti-friction bearings permit an unusually free rolling action, eliminating the need for excessively large mixer motor sizes. A 50-deg. tilting angle ensures the complete discharge of a full batch in 10 to 12 sec.

... Circle No. 215



PROFIT-BUILT by ABC...for MORE earning power!

... AS MUCH AS ONE TON MORE EACH TRIP

This revolutionary hard-working aluminum hauler features a new section design which adds 4 to 6 inches to the width and permits a payload gain of more than 1800 pounds.

Its unique, interlocking construction and integral flooring can be designed to meet special size hauler requirements. This

13' dump 10-12 yd. body weighs only 1350 pounds.
Call or write for information.

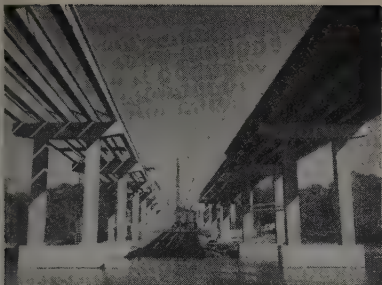


Aluminum body corporation

Washington Blvd. at Vail, Montebello, Calif. (E. Los Angeles)
Mailing Address:
P.O. Box 28, Montebello, Calif. • RAYmond 3-4621
Trailers • Truck Bodies • Dump Truck Bodies
Sleeper Cabs • Edbro Front Mount Hoists

... for more details, circle No. 80 on Reader Service Postcard

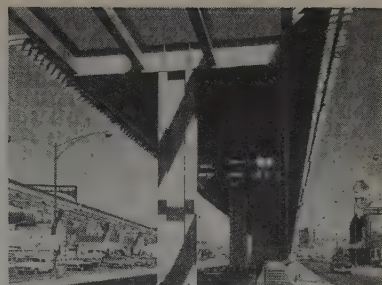
WESTERN CONSTRUCTION—April 1958



Illinois Toll Highway



Chicago-Calumet Skyway



Chicago-Calumet Skyway



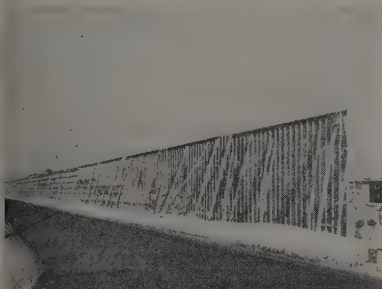
Illinois Toll Highway



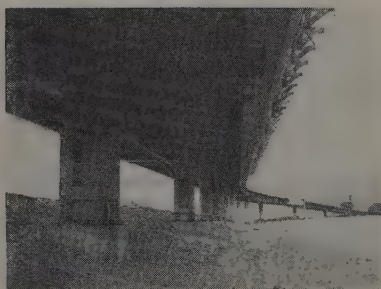
Illinois Toll Highway



Illinois Toll Highway



Chicago-Calumet Skyway



Chicago-Calumet Skyway



Chicago-Calumet Skyway

SUPERIOR ACCESSORIES For Bridge Abutments, Approaches, Grade Separations, Interchanges, and Decks

Various types of Superior Accessories provided money-saving forming in the bridges and related jobs pictured above. With the increasingly keen competition for this type of work, contractors have discovered that the efficient forming methods of SUPERIOR Accessories offer all-important bidding advantages. Some of these accessories are shown below.

Whenever you are planning form work . . . Superior's experienced engineering service is available to prepare form layouts, estimates and quotations. This comprehensive service is offered without charge.

Write for NEW 6-PAGE BULLETIN describing the Superior items for use in form work in the general field of bridges, both structural steel and prestressed concrete.

Photo Credits—Illinois Toll Highway Comm.; Kenny Const. Co.; J. M. Corbett Co.



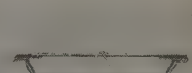
HEAVY-DUTY
SCREED SUPPORTS



SCREED
CHAIRS



PLATE HANGER FRAME



PRESCON HANGER



CONE-FAST COIL TIE



NUT WASHER ASSEMBLY

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PACIFIC COAST PLANT
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San Leandro, Calif.

News of DISTRIBUTORS



NEWLY OPENED facilities of Cummins Idaho, Inc. on East Highway 30, Boise, Idaho, include six truck bays, enclosed chassis dynamometer, and an enclosed engine dynamometer. The building has a shop area of 2,400 sq. ft., a 2,000-sq. ft. parts section, and office space of 1,000 sq. ft., according to *Ray Schwartz*, president of Cummins Idaho, Inc. The distributorship handles Cummins engines and parts exclusively. Each year since 1953 Cummins engines have powered more than half of the new diesel trucks registered in the United States.

Caldwell buys Cam plant; adds line

Caldwell, Inc., Los Angeles, recently purchased Cam Manufacturing Co. of San Fernando, Calif., and will manufacture and distribute asphalt paving tools under the

Asphalt Tool Division, according to George T. Reber, president of Caldwell. Reber also reports that his company is now distributor for Ditch Witch trenchers manufactured by Charles Machine Works, Inc., Perry, Okla.

Interstate used equipment listing

Interstate Tractor & Equipment Co., Portland, Ore., announces the publication of a new used equipment catalogue. The 20-page booklet, titled "Interstate Used Equipment Missile," describes in detail the units to be disposed of and indicates recent price reductions.

News from Sahlberg Equipment

Two lines recently acquired by Sahlberg Equipment Co., Inc., are Kolman Manufacturing Co. and Walter Motor Truck Co. The Seattle distributing firm is headed by A. J. Sahlberg, Sr. Vice President is A. J. Sahlberg, Jr. The service department is headed by "Chuck" Faler, and Paul Boschee is parts manager.

Arizona distributor remodels

Lee Redman Equipment Co. reports a new look at their headquarters located at 610 S. 19th Ave., Phoenix, Ariz., brought about by remodeled show room and offices. Officers of the distributing firm are Lee Redman, president; Ralph Lang, vice president and general manager, and Jerome W. Koepke, secretary-treasurer.

Manitou EQUIPMENT CO.

5602 First Avenue South • Seattle 8, Washington

Phone PArkway 5-9010

TWX SE 750-U

Now serving Western Washington
as well as Oregon
For Manitowoc Engineering Corporation

Parts — Sales — Service

... for more details, circle No. 82 on Reader Service Postcard

Rasmussen adds compressor line

Rasmussen Equipment Co., of Salt Lake City, Utah, recently added the Smith air compressor to the list of lines handled by them. The company has also increased its warehouse facilities in the area.

Santa Fe takes on three

Max O. Eggerts, president of Santa Fe Equipment Co., Los Angeles, announces his firm has added several new equipment lines in recent months: Seaman-Gunnison Corp.; Standard Steel Works, and Miller Spreader Corp. Besides these accounts, Santa Fe is Southern California distributor for such well known manufacturers as Thew Shovel Co., Huber-Warco Co., Owen Bucket Co., Barber-Greene Co., and others.

Equipment display by Superior

John M. Hazelett, manager of Superior Equipment Co., announces that for the benefit of those who missed the 1958 Case TerraTrac "Tractorama" recently, the big new line of wheel and crawler tractors can still be seen at their showroom at 2402 So. 19th Ave., Phoenix, Ariz. Any tractor user who would like a particular piece of equipment demonstrated, or who wishes personally to operate a machine, is advised to contact Superior for an appointment.

Spears Wells adds three new lines

New lines recently added by Spears Wells Machinery Co., Oakland, Calif., are the Unit Crane & Shovel Corp., manufacturer of $\frac{3}{8}$ -yd. to $\frac{3}{4}$ -yd. shovels, hoes, and 35-ton cranes; Wylie Manufacturing Co., which makes Heat-A-Mix, Patchmobile and Roadmaster asphalt equipment; and Davis Engineering, Inc., hydraulic truck and wagon crane manufacturer.

Salt Lake firm takes prize

Lang Construction Equipment Co., Salt Lake City, Utah, took third place among all Barber-Greene dealers in their "Top Ten" sales awards for the year 1957. While attending a mangers' meeting of distributors at Barber-Greene Co. in Aurora, Ill., H. A. Christiansen, president, and J. Robert Lang, executive vice president of Lang Construction Equipment Co., were presented with an appropriate bronze plaque by H. A. Barber, president of Barber-Greene. Lang has been a Barber-Greene distributor since May 1957.



Westerners honored and elected at AED convention

At the 1958 annual convention of the Associated Equipment Distributors in Chicago a special award was presented to A. Freeman Sersanous, (above, right) president of Loggers and Contractors Machinery Co. of Portland. The presentation was made by Julian S. Gilman of Minneapolis, Minn. at the annual banquet attended by 2,000 delegates. The plaque was from the Past Presidents Association of AED, and these words were inscribed: "His wisdom, good humor and kindness have forged friendships that will brighten our memories for years to come." Sersanous was president of AED in 1938 and is the founder of the Past Presidents Association.

National officers from the West



Cooper

Mayer

elected at the convention were: F. R. Cooper, president of Howard Cooper Corp., Portland, who was elected vice president, and Herbert J. Mayer, executive vice president of Western Machinery Co., San Francisco, who was elected Director of Region II.

Lang just recently took on an additional account. Butler Bin Co. appointed them distributor in Utah, southwestern Wyoming, southeastern Idaho, and eastern Nevada. Butler is a leading manufacturer of concrete mixing plants, aggregate and cement storage and handling equipment, etc.

Six-state pump representation

Hein-Werner Corp. of Waukesha, Wis., announces the appointment of F. Somers Peterson Co., San Francisco and Los Angeles, as exclusive representative in California, Oregon, Washington, Idaho, Nevada, and Arizona, for its newly introduced line of hydraulic pumps, valves and motors for industrial and mobile use. Ample stocks will be warehoused at San Francisco and Los Angeles to ser-

vice hydraulic equipment distributors and original equipment manufacturers in the 6-state area.

News from Arnold Machinery Co.

Arnold Machinery Co., Salt Lake City, Utah, was recently appointed exclusive distributor in Utah and Idaho for the complete line of Ferguson rollers manufactured and sold by the Shovel Supply Co. of Dallas, Tex. Arnold also reports two personnel changes within the organization: Jerry Brown has moved from the operations department to the position of floor salesman, and Harold Lang has transferred from the warehouse to the materials handling department. An expert splicer has been employed also to do custom work for the trade in the recently established wire rope sling department.



WHERE TO BUY Gorman-Rupp Contractors' Pumps

These distributors offer the full line of Gorman-Rupp Contractors' Pumps. Most have rental service, too.

Andrews and Andrews Equip.

Portland

Andrews Equipment Service of Washington

Spokane

Bay Cities Equipment Co.

Oakland and San Jose

Brown-Bevis Industrial Equip. Co.

Bakersfield

The Harry Cornelius Co.

Albuquerque

Delta Tractor Co.

Stockton

Paul Droscher Sales

Redding

Faris-Moritz Equip. Co.

Denver

Flaherty Manufacturing Co.

Pocatello

Industrial Tractor Sales

N. Sacramento

The Lang Co.

Salt Lake City

Mid-State Truck & Mach. Co.

Wenatchee

Northern Commercial Co.

Seattle

Pacific Hoist & Derrick Co.

Seattle

Reno Equipment Sales Co.

Reno

Shasta Truck & Equip. Sales

Redding

Standard Machinery Co.

San Francisco

Starline Equipment Co.

Boise

Studer Tractor & Equip. Co.

Casper, Wyoming

Western Construction Equip. Co.

Billings and Great Falls

Western Equipment Co.

Portland and Eugene

COMPLETELY REMODELED quarters of Stanco Mfgs. & Sales Co. at 1666 Ninth St., Santa Monica, Calif. Former location was at 1931 Pontius Ave., West Los Angeles. Stanco's new and larger quarters provide in addition to general offices, a display area, service department, stock room and warehouse. Headed by *Herman Stayner*, president, with *Peter Frank* as general manager, the firm is national distributor for Hiab hydraulic truck cranes; Flygt portable submersible drainers, and Pionjar portable rock drilling and breaking machines, all of Swedish manufacture.

New outlets in West for Buck

Exclusive franchises to handle Buck automatic hoisting machines have been awarded to construction equipment dealers in three new areas in the West, according to Steward T. Buck, president of Buck Equipment Corp., Cincinnati, Ohio. The three new dealers are: Monty Machinery Co., Great Falls, Mont., Lund Machinery Co., Salt Lake City, Utah, and Wortham Machinery Co., Casper, Wyo. All the dealers will have Buck

equipment in stock and will represent the manufacturer on an exclusive basis. Buck manufactures portable hoisting machines which are available as a trailer-mounted unit of a truck-mounted machine, called the "Pelican."

GM Diesel names distributor

The GM Detroit Diesel Engine Division has named Williams & Lane, Inc., of Berkeley, Calif., as distributor of General Motors 2-cycle diesel engines in the San

VULCAN

...the **PILE EXTRACTORS**
you can depend on for

SPEED-

jobs get done faster, better.

ECONOMY-

efficient, balanced design, sturdy construction assures enduring economical performance.

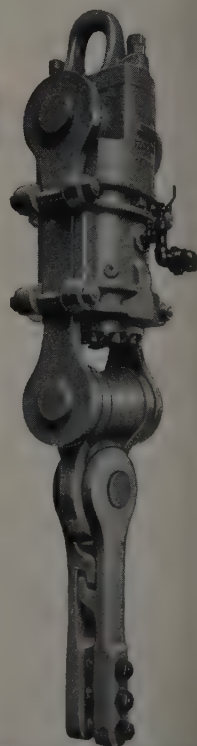
EASY OPERATION-

simple in design, it is easy to operate—pulls sheet steel, wood, concrete, H-beam and pipe piles with the greatest of ease.



Manufacturers of Pile Driving Hammers and Piling Extractors Since 1852

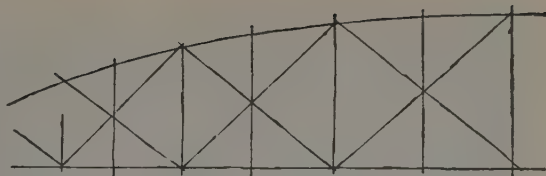
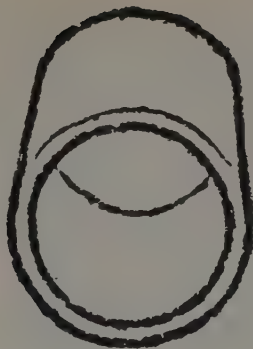
VULCAN IRON WORKS INC. 327 North Bell Avenue, Chicago, U.S.A.



... for more details, circle No. 83

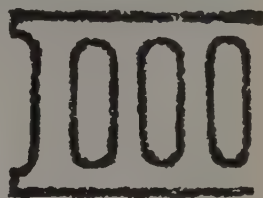
... for more details, circle No. 84 on Reader Service Postcard
WESTERN CONSTRUCTION—April 1958

concrete pipe

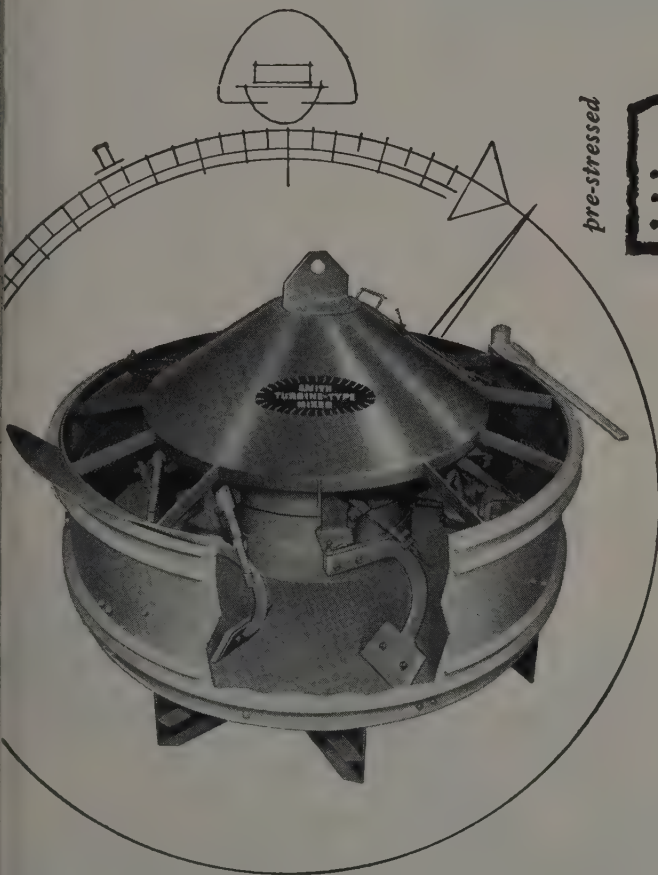


New Performance Standards FOR ALL THREE:

pre-stressed



concrete block



This is the phenomenal new mixer being talked about in dozens of industries — the mixer with an entirely different principle. "LIVE MIX" is the answer. Mixing is done in a doughnut-shaped drum. There is no "dead center" area. Blades set up a braiding action which breaks down centrifugal forces. As a result the Smith Turbine-Type Mixer mixes at a peripheral rate of six hundred feet per minute!

unbelievably fast

Regardless of your application, you can figure on a *practical* operating speed *several times faster* than conventional design mixers.

Besides tremendous speed, the new Smith gives your product a combination of three significant advantages

- | | | |
|------------------------|-------------------------|----------------------|
| 1.
Greater strength | 2.
Better uniformity | 3.
Higher density |
|------------------------|-------------------------|----------------------|

Data is available for both heavyweight and lightweight concrete mixes. Write for details.

Since 1900, the pioneer designer and foremost manufacturer of the world's finest mixers.

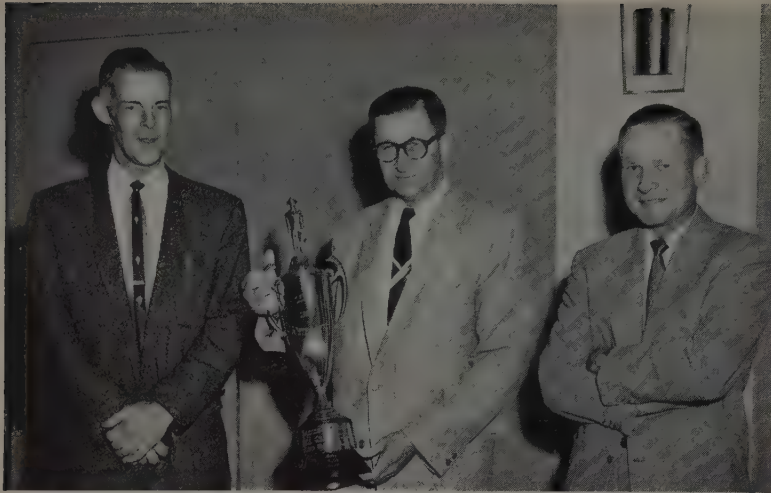
THE T. L. SMITH COMPANY • Milwaukee, Wisconsin • Lufkin, Texas

Affiliated with Essick Manufacturing Company, Los Angeles, Calif.

AB-4043-1P



... for more details, circle No. 85 on Reader Service Postcard



JOE GILL, White Motor Co. distributor in Long Beach, Calif., receives the White President's Cup Award for top achievement in new truck sales. All branches and distributors throughout the eleven Western states competed. The cup was presented to the winning distributor team which included (l. to r.) **Dick Riordan**, salesman, Gill, and **Paul Fischer**, salesman. White's Denver branch took the branch primary award, with the following personnel participating in the contest: **Dick Cochran**, branch manager; **Larry Lynch**, territory manager, and the following salesmen, **Bill Flanagan**, **Mel Jansen**, **Ed Brennan**, **Cecil Bickford**, and **Earl Robinson**.

Francisco Bay and Northern California area. The company is a new corporation formed to handle Detroit Division's line of indus-

trial, marine and truck diesels exclusively. The business is located in Berkeley at 1077 Eastshore Highway where complete parts and ser-

vice facilities have been established. Heading the new company is **James R. Williams**, president; **N. L. Lane**, vice president; and **W. M. Glader**, treasurer. All are well known in the diesel industry and bring to the company a wide experience in the application and service of GM diesel engines.

Gridley Equipment gets Marlow

Gridley Equipment Co., Los Angeles, has been appointed a distributor for Marlow Pumps, Division of Bell & Gossett Co., Midland Park, N. J.

Another Rental outlet

E. E. Dionne, president of A. H. Cox & Co., Seattle, Wash., announces the opening of another branch operation of Rental Machinery Co., a division of Cox. The new branch is located at 2411 Hewitt Ave. in Everett. The Rental Machinery Co. has three other locations, two in Seattle and one in Tacoma, and is the largest rental machinery firm in the Pacific Northwest. **Kyle Hesse**, manager of Rental, is directing operations.

Ferguson

Gasoline or diesel power, torque converter, 2-speed transmission, hydraulic steering, dual controls, 60" rolling width.

8-12 TON TANDEM ROLLER





Self-propelled rubber-tired rollers in 10, 12 and 25 ton sizes.

WRITE FOR BROCHURE No. 105

ROLLERS FOR EVERY PURPOSE

SHOVEL SUPPLY COMPANY

4900 HINES BLVD. • P. O. BOX 1369 • DALLAS, TEXAS

Seeking new ways and means of reducing costs in '58?

Autocar Brings Hauling Costs Down to Earth!

When you search for soft spots in your business operation with an eye for decreasing net costs, take a long, hard look at your present transportation equipment... then compare it with the facts of the efficient, rugged Autocar Diesel!

Your Autocar man has them — facts about first costs, operating costs, maintenance, every cost you'll encounter — facts that you can apply now and save money just like the big change over to Autocar has saved money for so many other truck operators throughout the west!

Why not get together with your Autocar man today and get more of those costs over to the *profit* side of the sheet this year!

THE WHITE MOTOR COMPANY
Autocar Division
EXTON, PA.

Sales & Service Facilities Everywhere

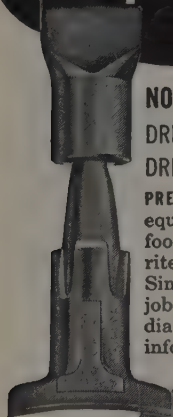


One of American Pipe and Construction Company's Autocars takes on another load of concrete pipe at their Los Angeles plant. American Pipe's 15 Autocars which were added to their fleet in 1957 are used to transport concrete pipe throughout Oregon, California and Arizona, are equipped with 200 hp. Cummins Diesel Engines, Fuller 5-speed main transmissions, SQW rear axles and 10:00 x 22, 12 ply tires. With their rugged Autocars, American Pipe uses Page and Page attachments.

... for more details, circle No. 87 on Reader Service Postcard

EASY TO REPLACE
ON THE JOB

Tamprite Tips



NO WELDING!

DRIVE OFF WORN TIPS

DRIVE ON NEW TIPS

PREVENT COSTLY DELAYS by equipping your sheep foot rollers with Tamprite Tips and Shanks. Simple to replace on the job. Available for immediate delivery. Write for information.

PATENT NO.
2,119,941



LOS ANGELES
STEEL CASTING CO.

6100 So. Boyle Avenue, Los Angeles 58, California

... for more details, circle No. 88



LINE-UP of 20 Scoopmobiles recently purchased by the Oregon State Highway Commission from Mixermobile Manufacturers, Inc. Sold through Nelson Equipment Co., Portland distributor, the unit is a Model H, 3-wheel tow-and-go, with 1 1/4-yd. scoops.

Balzer adds Eugene representative

Earl C. Tullar has been appointed resident representative in Eugene for Balzer Machinery Co. of Portland, Ore. Tullar, who has been in the equipment business most of his business life in and

around southern and central Oregon, will handle Balzer's lines in this territory.

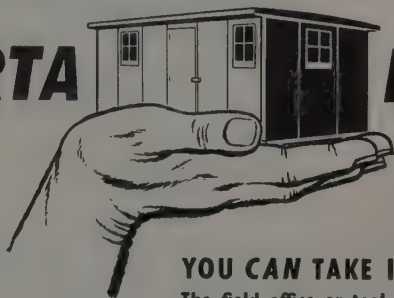
Columbia Equipment adds four

Three new lines have been taken on since the first of the year by Columbia Equipment Co., Portland, Seattle and Spokane, according to Jim Wahoske, executive vice president. The company will distribute the line of snow plow equipment manufactured by The Root Spring & Scraper Co., Kalamazoo, Mich., as well as the Jersey spreader line manufactured by Tractor Spreader Co., Hassenbrook Heights, N. J. And recently Columbia completed a contract with the Badger Division of Warner & Swasey Co. for handling the Hopto line of hydraulic excavators manufactured in Winona, Minn.

Hamilton Engine names Henry

The appointment of Francis D. Henry of Eugene as sales representative for Hamilton Engine Sales, Inc., of Portland, is announced by Gordon A. Kalk, manager of the company. Henry, who has had long experience in the equipment and machinery business, will cover southern Oregon and the Eugene area, representing Allis-Chalmers, Twin Disc clutches, reduction gears, etc., Schramm air compressors and tools, and other Hamilton accounts.

PORTA HOUSE



YOU CAN TAKE IT WITH YOU!

The field office or tool shed that you can move on a pick-up truck. Pays for itself on the first job.

Quickly assembled and disassembled by unskilled labor.

SIZES: 9' or 12' widths—to any length (in 3' modules)

(9x6, 9x9, 9x12, 9x15, 9x18, etc.—to any length)

(12x12, 12x15, 12x18, 12x24, etc.—to any length)

Light, watertight, strong.

Mass produced cheaper than you can build it!

Rental arrangements if you wish.

Write or phone collect.

**AVAILABLE
IMMEDIATELY**

Plan to include
Porta Houses in
all future jobs.



Manufactured and Distributed by
RIDGELY K. DODGE

6767 Broadway Terrace • Oakland 11, Calif.
Olympic 2-7237



... for more details, circle No. 89 on Reader Service Postcard

A New Western Construction Reader Service

The Product Data You Want in a Quick Easy Way

In this issue, **WESTERN CONSTRUCTION** provides you with convenient **READER SERVICE POSTCARDS**, bound in every copy. Use them to get more information on equipment and materials, latest catalogs, bulletins and literature—the product data you want in a quick, easy way.

Each advertisement in **WESTERN CONSTRUCTION** is marked with a key number. Every item in the regular “New Equipment” and “New Literature” sections is keyed with a number. To obtain valuable information, free of charge, from manufacturers of construction equipment, materials and supplies, all you need do is:

- (1) Check the numbers on the postcard corresponding to the advertisements and items that interest you.
- (2) Tear out the postcard along the perforated line.....
- (3) Sign, date and mail. No addressing required. No postage required.

These **READER SERVICE POSTCARDS** are provided for **YOUR CONVENIENCE**. Use them every month and send in as many inquiries as you wish. They will receive our prompt attention.

**WESTERN
CONSTRUCTION**

MANUFACTURERS

Fruehauf promotes Roseboom

Harris E. Roseboom was recently made assistant branch manager at the San Francisco Bay area factory branch of Fruehauf Trailer Co. in Oakland, Calif. Roseboom transferred from Los Angeles headquarters where he filled the capacity of



Harris E.
Roseboom

regional business manager for the Pacific Coast area comprising nine factory branches. He has served Fruehauf at various locations as branch office manager for the past eleven years, including Oakland where he also was salesman, and Northern California used trailer sales manager.

Mesick gets Western appointment

Appointment of Herman H. Mesick as manager of the Southern California-Arizona wholesale territory of White Motor Co. is announced by Wilson D. Patterson, vice president in charge of White's Pacific Coast region. With 24 years in the trucking industry, Mesick joined White two years ago as a special sales representative. He will headquarter at the Los Angeles branch office.

Bob Webb transfers to S. F.

Robert Webb recently transferred from the Chicago Bridge & Iron Co. Salt Lake City plant to CB&I's San Francisco sales office at 100 Bush St.

Painter new prexy of gravel firms

S. Keith Painter is the newly elected president of Century Rock Products Co., Pasadena, Calif., and of Star Rock Products Co. At the same time he was elected chairman of the board of Crown Rock Products Co., of Admixtures, Inc., and of five affiliated Ready-Mixt cor-

porations located in San Gabriel, Calif. E. O. Rodeffer, founder of the companies, has been elected chairman of the board of the rock companies, but will continue as president of the Ready-Mixt companies and of Admixtures.

American Pipe buys plant

American Pipe & Construction Co. announces the purchase of pipe manufacturing equipment previously operated by California Concrete Products Co., and will continue the manufacture of concrete pipe products at California's previous plant at 1660 Monterey Road, San Jose, Calif. The new line will be correlated with that now manufactured by American Pipe at its plant in Hayward, Calif.

C.I.T. Corp. names sales manager

F. L. Conrad is appointed sales manager for the Portland, Ore., division of C.I.T. Corporation, it is announced by Thomas E. Lenihan, president. Conrad joined the company in 1939 as a field representative in the Portland area. The Portland division is directed by Carl H. Anderson, assistant vice president.

Carroll made M-M gen. sales mgr.

M. E. Carroll, director of field sales, has been promoted to general sales manager of Minneapolis-Moline Co. Carroll joined M-M in Peoria, Ill., in 1936. Following important assignments in various lo-



KEN LINDSAY (left) receives surprise "Oscar" plaque from G. W. Van Keppel when dealers for Iowa Manufacturing Co. turn the tables on him at annual dealer meeting in Chicago. It is at this meeting that Lindsay regularly awards an "Oscar" to the Iowa dealer who has made the greatest sales effort in the promotion of Cedarapids equipment during the preceding year. The dealers presented the award to Lindsay "in recognition of the great service he has done for them and for his untiring efforts to promote the welfare of the industry."

cations, he was brought to the firm's home office in Minneapolis, Minn., as district sales manager in 1954, and in June 1956 he was named director of field sales.

Tom Petersen receives promotion

Announcement is made by Ralph A. Ratcliff, district sales manager of The Duff-Norton Manufacturing Co. at San Francisco, of the



Tom Petersen

appointment of Tom B. Petersen as assistant district sales manager for Northern California, Oregon, Washington, western Idaho, and Nevada. He will also represent the Coffin Hoist Division of Duff-Norton in the same area. Petersen has been an employee of the firm since 1952.

CIMA elects new officers

Construction Industry Manufacturers Assn. announces the election of the following officers to serve through 1958: President—Boyd S. Oberlink, group vice president of Allis-Chalmers Manufacturing Co.; 1st vice president—G. A. Gilbertson, president of The Frank G. Hough Co.; 2nd vice president—Henry Barnhart, vice president and general manager of Construction Equipment Division, Baldwin-Lima-Hamilton Corp.; treasurer—Ray McLean, president of Th. Jaeger Machine Co.

Seven new members elected to serve on the CIMA board of directors for three years are: Donald V. Buttenheim, publisher and president, Buttenheim-Dix Publishing Co.; W. K. Cox, manager-sales promotion, Caterpillar Tractor Co.; John F. Harrison, president, Buffalo-Springfield Roller Co., Division of Koehring Co.; E. H. Holt, vice president of sales, Barber-Greene Co.; Kenneth Lindsay, executive vice president, Iowa Manufacturing Co.; Frederick Salditt, vice president, Harnischfeger Corporation; and A. K. Thomas, assistant to vice president, Construction Machinery Section, Chain Belt Co.

(Continued on page 146)

UNIT PRICES

Selected abstracts for Western projects

HIGHWAY—2.1 mi. of highway in California

California—Riverside County—State. A \$174,117 contract has been awarded to California Asphalt Co. for 2.1 mi. to be graded and surfaced with plant-mixed surfacing on cement treated base.

1) California Asphalt Co.	\$174,117
2) E. L. Yeager Co.	185,595
Ednic Inc.	187,138
Fontana Inc.	210,161

	(1)	(2)
90 cu. yd. Removing concrete	\$ 10.00	\$ 5.00
ump Sum Clearing & grubbing	3,500.00	8,500.00
3,350 M gal. Furnishing & applying water	1.00	1.00
35,000 sq. yd. Compacting original ground	.05	.05
27,500 cu. yd. Roadway excavation	.50	.45
1,200 cu. yd. Structure excavation	1.00	1.90
1,480 cu. yd. Structure backfill	3.00	2.85
120 cu. yd. Ditch & channel excavation	1.00	2.00
20,000 sta. yd. Overhaul	.02	.005
10,000 cu. yd. Imported base material	.80	.95
36,000 sq. yd. Mix, spread & compact. CTB	.18	.17
1,800 bbl. Portland cement	4.00	4.10
14 ton Asph. emul. (pt. bndr. & fog sl. ct.) ..	60.00	65.00
48 ton Asph. emul., high visc. type ..		
70 ton (med. fine sl. ct.)	45.00	37.50
500 ton Lig. asph., SC-2 (prime coat)	32.50	32.50
1,000 ton Paving asphalt (PMS)	4.25	5.25
1,000 ton Mineral aggr. (PMS)	4.25	5.25
25 sq. yd. Placing PMS spillway downdrains ..	5.00	4.00
3,600 lin. ft. Placing PMS dikes	.20	.35
430 ton Screenings (med. fine sl. ct.)	4.25	3.75
185 cu. yd. Class A concrete (structures)	55.00	50.00
20,500 lb. Bar reinforcing steel	.13	.145
750 cu. yd. Class B conc. (curbs & gutters) ..	30.00	24.50
112 ea. Gde. posts, culv. mrks & horiz. ..		
reflec. units	5.50	10.00
72 lin. ft. 42 in. RCP (standard strength) ..	17.00	17.00
142 lin. ft. 12 in. CMP (16 gage)	3.25	3.65
108 lin. ft. 18 in. CMP (16 gage)	4.30	4.50
228 lin. ft. 24 in. CMP (14 gage)	5.50	7.00
72 lin. ft. 29 in. x 18 in. CMP arch ..		
(14 gage)	6.50	7.15
1 ea. Entrance taper for 12 in. ..		
metal pipe	75.00	75.00
18 lin. ft. 12 in. CMP downdrains	5.00	4.50
ump Sum Finishing roadway	2,500.00	1,500.00
100 lin. ft. Raised traffic bars	3.00	2.75
16 ea. Remove & replant palm trees ..	100.00	75.00

21,800 lb. Cast steel & forgings,		
transition spans	.70	.80
2,180 lb. Bronze plates & bushings	3.00	4.50
273,100 lb. Cast steel vertical guide		
roller tracks	.53	.62
310,700 lb. Cast steel horizontal guide roller, ..		
tracks & rack gears	.60	.77
448,720 lb. Struct. carbon steel, misc., ..		
pontoons & superstructures	.60	.60
170,000 lb. Pontoon walkways, struct. carbon ..		
st. & grat. galvanized	.60	.54
9,614 lin. ft. Ladders, galvanized	5.00	5.30
84,130 lin. ft. Galvanized steel anchor strand ..		
1 1/2 in. diameter	7.00	4.50
133,600 lb. Cast steel, pontoon cable		
anchorage	.50	.62
619,000 lb. Structural carbon steel, ..		
pontoon cable anchorages ..	.39	.25
42 ea. Placing anchors	8,500.00	9,600.00
100 hr. Leveling anchor sites	186.00	75.00
71,750 lb. High strength bolts in ..		
pontoon joints	.90	1.50
2,600 lin. ft. Rubber seals, pontoon joints ..	4.50	4.15
199,860 lb. Cast steel, washers, ..		
pontoon joints	.45	.39
300 ea. Bridge drains	72.00	58.50
4,150 lin. ft. Standard galvanized steel pipe, ..		
4 in. diameter	7.00	8.40
1,670 lin. ft. Cement-asbestos drain pipe, ..		
6 in. diameter	4.40	5.40
3,316 lin. ft. Aluminum bridge railings, ..		
pontoons & transition spans ..	15.00	16.00
1,136 lin. ft. Aluminum curb, pontoons ..	8.00	10.00
1,694 lin. ft. Std. galvanized steel pipe rail, ..		
2 1/2 in. dia. pontoons	7.00	7.75
321 mbm. Timber & lumber, ..		
creosote treated	378.00	525.00
227,600 lb. Machinery	.85	.69
Lump sum Mechanical equipment	54,200.00	48,000.00
Lump sum Electrical equip., incl. traffic ..		
gates & warning signals	470,810.00	450,000.00
568 lin. ft. Median curb	4.50	7.75
Lump sum Operator, machinery & ..		
generator houses	74,500.00	77,500.00
29,000 sq. yd. Waterproofing	.90	1.15
2,450 lin. ft. Furnishing steel piling	7.50	8.25
66 ea. Driving steel piles first 10 ft., ..	126.00	45.00
660 lin. ft. Driving steel piles over 10 ft., ..	2.80	.75
Lump sum Shoring & cribs or ..		
extra excavation	118,400.00	530,000.00
500 cu. yd. Structure excavation ..		
(piers 3 & 4)	3.95	19.50
Est. Furnishing admixtures ..		
est. \$50,000.00	50,000.00	50,000.00

HIGHWAY—Construction of 7.2 mi. of road in Utah

Utah—Garfield County—State. Whiting and Haymond Constructors have received a \$308,472 contract for 7.2 mi. of road mixed bituminous surfaced road and 2 concrete structures over a 20-ft. span.

(1) Whiting and Haymond Constructors	\$308,472
(2) H. J. Wimmer and Harris-Bethers ..	320,649
Wheelwright Construction Co.	334,812
W. W. Clyde & Co.	335,114

BRIDGE — Hood canal bridge to be built in Washington.

Washington—Jefferson and Kitsap counties—State. A \$14,226,690 contract has been awarded to Morrison-Kaiser-Puget Sound-General for the construction of a floating bridge.

1) Morrison-Kaiser-Puget Sound-General	\$14,226,690
2) Halverson, Montag, Hoffman, Austin & Babler ..	14,356,034
Peter Kiewit Sons Co.	14,363,788
Pacific Bridge, Fruin-Colon & McLaughlin ..	15,052,779

	(1)	(2)
40,000 cu. yd. Concrete, Class AS, pontoons ..	\$ 125.00	\$ 110.00
1,290 cu. yd. Concrete, Class LT, pontoons ..	105.00	115.00
8,295 cu. yd. Concrete, Class A, ..		
(pontoon superstructure) ..	122.00	110.00
3,482 cu. yd. Concrete, Class LT, ..		
(pontoon superstructure) ..	138.00	125.00
5,130 cu. yd. Concrete, Class B, anchors ..	110.00	100.00
13,490 cu. yd. Concrete, Class G, anchors ..	19.00	25.00
906 cu. yd. Concrete, Class E, (pier shafts & ..		
(leveling course)	46.00	90.00
1,904 cu. yd. Concrete, Class H, (seals) ..	33.00	50.00
14,060 lin. ft. Reinforced concrete bridge ..		
railing superstructure	8.00	8.00
12,120 lin. ft. Reinforced concrete pontoon ..		
parapet, Type I	13.00	7.00
1,120 lin. ft. Reinforced concrete pontoon ..		
parapet, Type II	7.00	8.00
800 bbl. Portland cement added (or ..		
deducted) in concrete mixes ..	5.00	4.50
1 bbl. Extra for furnishing high-early ..		
strength cement	1.00	1.50
340 ton Gravel ballast	23.00	9.00
5,886,000 lb. Steel reinforcing bars	.14	.136
3,280,000 lin. ft. Prestressing reinforcement, ..		
3/4 in. round strand	.15	.30
371,700 lb. Struct. low alloy steel, trans. ..		
span trusses & towers	.29	.34
1,333,700 lb. Struct. carbon steel, trans. span ..		
trusses, string & towers ..	.29	.34
20,150 sq. ft. Steel bridge decking, ..		
transition spans	7.00	8.50

	(1)	(2)
954 ton Bituminous mat., type MC-3	\$ 40.00	\$ 35.60
168 ton Bit. mat. type MC-1 or MC-2	40.00	35.60
110 ton Bituminous material, type BC-4 ..	43.00	35.60
256 gal. Bit. additive (Commercial grade) ..	2.50	1.75
7,224 mi. Scarifying and mixing	800.00	700.00
1,280 ton Cover material, type "A"	3.50	4.00
1,280 ton Cover mat. type "A" (in stockpile) ..	2.25	2.50
42,800 ton Gravel surface, type "B"	.62	.75
64,200 ton Gravel base course	.57	.70
99,500 cu. yd. Unclassified roadway excavation ..	.30	.30
26,600 cu. yd. Imported borrow	.25	.30
225,000 sta. yd. Class "A" overhaul	.012	.02
8,000 yd. mi. Class "B" overhaul	.15	.15
4,400 1000 gal. Watering	1.00	2.50
1,210 hr. Rolling, tamping roller	8.50	10.00
290 hr. Rolling, pneum. tire or power roller ..	7.50	8.00
152 lin. ft. 15 in. C.M. pipe	3.75	4.00
837 lin. ft. 18 in. C.M. pipe	4.00	8.00
1,603 lin. ft. 24 in. C.M. pipe	6.50	6.00
314 lin. ft. 30 in. C.M. pipe	7.75	7.00
238 lin. ft. 36 in. C.M. pipe	12.50	11.00
48 lin. ft. 72 in. C.M. pipe, paved invert. ..	35.00	40.00
136 lin. ft. C.M. Pipe-arches 22 in. x 13 in. ..	4.50	4.00
112 lin. ft. C.M. Pipe-arches 29 in. x 18 in. ..	7.00	5.50
108 lin. ft. C.M. Pipe-arches 36 in. x 22 in. ..	8.50	10.00
60 lin. ft. 96 in. Struc. Plate Pipe 10-8 Gage ..		
(Paved Invert)	63.00	62.45
52 lin. ft. Struc. Plate Pipe-Arch ..		
12 ft. 6 in. x 7 ft. 11 in. Gage ..		
(Paved Invert)	98.00	102.00
72 lin. ft. Struc. Plate Pipe-Arch ..		
16 ft. 7 in. x 10 ft. 1 in. 5 Gage ..		
(Paved Invert)	140.00	138.00
74 lin. ft. Relaying 18 in. C.M. Pipe	2.00	2.00

27 SELF-PRIMERS

and Barnes
pumps prime
without fail!

27 self-priming centrifugal models meet most construction needs—designed for any power source—deliver 2500 to 90,000 g.p.h.—all available from one source of supply nearby! All proved in our Blue Ribbon Quality Test Booth. All Barnes Blue Ribbon quality!

For any
power source!



BARNES

Barnes Manufacturing Co.
Mansfield, Ohio Dept. L-48

Get handy Construction Pump Selector
FREE from any of these Barnes distributors:

Central Equipment Co., Berkeley, Calif.
Rasmussen Equipment Co., Salt Lake City, Utah
Larson Equipment Co., Los Angeles, Calif.
Lowry Equipment Co., Redding, Calif.
The Rix Co., San Francisco, Calif.

... for more details, circle No. 90 on Reader Service Postcard

NEW FOR YOUR CONVENIENCE...

FLEXCO "25-PAK"

TWENTY-FIVE COMPLETE
SETS OF FLEXCO HD BELT
FASTENERS NOW AVAILABLE
IN ONE EASY-TO-HANDLE
ECONOMY BULK PACKAGE



Standard shipping carton contains four "25-PAK" boxes of one size fastener. Keep a supply of "25-PAKS" on hand... easy to store and inventory. Sturdy boxes and shipping cartons have many uses!

There's no need now to carry several 10-set boxes to the job—every "25-PAK" box contains 25 complete sets of FLEXCO fasteners (bottom plates, top plates, clips, nuts and bolts)... enough FLEXCO fasteners to join common belt widths (for example: one "25-PAK", size 1½/2, will join a 36" belt).

Our savings from bulk-packaging are passed on to you. Label on each "25-PAK" box has chart indicating the number of FLEXCO HD fasteners to use for given belt widths.

Ask your FLEXCO distributor or write to us for additional information.

Flexible **STEEL LACING COMPANY**
4704 LEXINGTON ST. • CHICAGO 44, ILL.

FOR THE SPLICE OF A LIFETIME!

... for more details, circle No. 91 on Reader Service Postcard

77 lin. ft.	Relaying 30 in. C.M. Pipe.....	2.50	4.00
32 lin. ft.	Relaying 36 in. C.M. Pipe.....	3.00	5.00
113 cu. yd.	Concrete Class "A".....	88.00	70.00
2 cu. yd.	Concrete Class "AA".....	110.00	100.00
11,000 lb.	Reinforcing Steel.....	.145	.15
1,800 cu. yd.	Excavation for Structures, Unclassified.....	2.00	2.00
1,078 lin. ft.	Deep Beam Highway Guard Rail (Concrete Posts).....	3.80	3.11
1,500 cu. yd.	Loose Rip Rap.....	.75	.30
2,150 cu. yd.	Small Ditch Excavation.....	6.50	5.00
165 hr.	Mechanical Tamping.....	7.00	7.00
230 ea.	Guide Posts.....	.29	.23
27,900 lin. ft.	Right of Way Fence, Type "B".....	35.00	25.00
4 ea.	10 ft. Gates.....	40.00	30.00
6 ea.	14 ft. Gates.....	45.00	35.00
4 ea.	16 ft. Gates.....	7.00	5.00
88 ea.	Right of Way Markers.....	30.00	50.00
2 ea.	F. A. P. Markers.....	1000.00	1000.00
Lump sum	Furnishing Water Equipment.....	1000.00	1000.00
Lump sum	Furnishing Construction Signs.....	1000.00	1000.00

(1) Concrete Structure—34.23 ft. O. to O.
Station 438+90

240 cu. yd.	Excavation for Structures, Unclassified.....	2.00	1.00
257 cu. yd.	Concrete, Class "A".....	74.00	60.00
40,000 lb.	Reinforcing Steel.....	.145	.18

(1) Concrete Structure—29.4 ft. O. to O.
Station 551+00

190 cu. yd.	Excavation for Structures, Unclassified.....	2.00	2.00
162 cu. yd.	Concrete, Class "A".....	74.00	60.00
24,600 lb.	Reinforcing Steel.....	.145	.20

HIGHWAY—7.3 mi. of road to be constructed in Washington.

Washington—Yakima County—State. A \$679,611 contract has been awarded to C. E. Oneal, Inc. for the construction of 7.3 mi. of highway from Parker to Wapato. It is to be noted that there was a total of 201 bidders on this project with a bid range from \$679,611 (awardee) to \$886,950.

(1) C. E. Oneal, Inc.		\$679,611	
(2) John P. Hopkins		687,762	
Pieler Construction Co.		703,022	
Washington Asphalt Co.		703,840	

	(1)	(2)
Lump sum	Clearing and grubbing.....	\$4,000.00 \$1,800.00
19,970 cu. yd.	Common excavation.....	.28 .22
3,355 cu. yd.	Common ditch excavation.....	.75 .80
145,385 cu. yd.	Common borrow.....	.30 .27
99,420 unit	Overhaul.....	.35 .35
1,650 cu. yd.	Structure excavation.....	2.00 .90
137,840 cu. yd.	Embankment compaction.....	.02 .03
1,365 hr.	Smooth wheeled power roller.....	6.00 5.75
1,415 hr.	Pneumatic tired roller.....	6.00 5.00
326 hr.	Mechanical tamper.....	5.00 5.50
12,095 lin. ft.	Slope treatment Class "B".....	.12 .10
389 sta. yd.	Finishing roadway.....	10.00 8.98
8,760 M gal.	Water.....	1.00 1.00
76,500 ton	Ballast.....	.72 .74
49,110 ton	Crushed surfacing top course.....	.98 .89
52,180 ton	Crushed surfacing base course.....	.86 .84
10,000 ton	Maintenance rock ½ in. minus in stockpile.....	.85 .945
5,000 ton	Sand ¾ in. - 0 in. stockpile.....	.90 1.57
7.2 mi.	Bituminous surface treatment Class A processing and finishing.....	200.00 210.00
349 ton	Asphalt cement MC-3.....	47.00 49.35
2,605 cu. yd.	Mineral aggregate from stockpile.....	1.60 1.68
4,100 ton	Crushed cover stone in stockpile.....	.80 .78
2,500 ton	Bituminous surface treatment Class C crushed screenings ½ in. - ¾ in. in stockpile.....	.90 1.15
700 ton	Crushed screenings ¾ in. - 0 in. stockpile.....	.90 1.15
7.3 mi.	Asphaltic concrete pavement preparation of untreated roadway.....	100.00 105.00
213 ton	Asphalt cement MC-3 prime coat.....	47.00 49.35
1,160 cu. yd.	Prime coat aggregate.....	2.85 2.58
44 ton	Asphalt cement for tack coat.....	50.00 57.75
28,205 ton	Class "B".....	5.84 6.09
123 ton	Mineral filler.....	26.00 36.75
520 lin. ft.	Type A precast traffic curb.....	2.10 2.00
3,390 lin. ft.	Type C precast traffic curb.....	2.20 2.00
113 ea.	Precast traffic buttons.....	3.70 2.00
7 cu. yd.	Concrete Class "C".....	90.00 55.00
200 cu. yd.	Concrete Class "E".....	30.00 55.00
44,960 lb.	Steel reinforcing bars.....	.13 .135
922 lin. ft.	Plain concrete culvert pipe 12 in. dia.....	2.15 1.50
222 lin. ft.	Standard reinf. concrete culv. pipe 12 in. dia.....	2.70 2.65
738 lin. ft.	Standard reinf. concrete culv. pipe 18 in. dia.....	3.90 3.75
411 lin. ft.	Standard reinf. concrete culv. pipe 24 in. dia.....	6.00 5.75
45 lin. ft.	Standard reinf. concrete culv. pipe 30 in. dia.....	8.60 8.10
176 lin. ft.	Standard reinf. concrete culv. pipe 36 in. dia.....	9.65 11.00
104 lin. ft.	Asbestos cement pressure pipe class 150 8 in. dia.....	4.50 3.55
108 lin. ft.	Asbestos cement pressure pipe class 150 12 in. dia.....	6.50 5.84
177 lin. ft.	Relaying concrete culvert pipe 12 in. dia.....	2.00 1.50

1.290 mi.	Scarifying and mixing (24 ft. width)	1,200.00	936.00
0.450 mi.	Scarifying and mixing (32 ft. width)	1,500.00	1,170.00
0.140 mi.	Scarifying and mixing (70 ft. width)	2,500.00	2,400.00
375 ton	Cover material, Type "A"	4.00	3.00
14,530 ton	Gravel surface, Type "B"	.95	1.50
10,590 ton	Gravel base course	.85	1.30
174,660 cu. yd.	Unclassified roadway excavation	.21	.32
1,440,000 cu. yd.	Imported borrow	.26	.27
7,716,510 cu. yd.	Class "A" overhaul	.015	.01
2,717,050 cu. yd.	Class "B" overhaul	.11	.12
54,266 M gal.	Watering	1.00	1.40
11,005 hr.	Rolling tamping roller	7.00	11.25
105 hr.	Rolling, pneumatic tire or power roller	7.00	9.00
4,000 hr.	Pneumatic tired roller (50 tons)	12.00	14.00
1,000 hr.	Self propelled pneumatic tired roller	7.00	8.00
280 lin. ft.	12 in. C.M. pipe (perforated)	4.25	2.80
8 in. ft.	12 in. C.M. pipe	4.25	3.50
96 lin. ft.	C.M. pipe over 22 in. x 13 in.	5.50	4.25
2,040 lin. ft.	12 in. reinforced concrete pipe	2.75	2.60
51 lin. ft.	15 in. reinforced concrete pipe	3.50	4.00
1,559 lin. ft.	18 in. reinforced concrete pipe	4.50	4.20
6,773 lin. ft.	24 in. reinforced concrete pipe	6.50	6.00
193 lin. ft.	36 in. reinforced concrete pipe	13.00	11.50
183 lin. ft.	60 in. reinforced concrete pipe	35.00	34.00
21 ea.	18 in. reinforced concrete end sections	50.00	50.00
54 ea.	24 in. reinforced concrete end sections	70.00	60.00
1 ea.	36 in. reinforced concrete end section	150.00	142.00
300 cu. yd.	Concrete, Class "A"	60.00	53.00
120 cu. yd.	Concrete, Class "AA"	125.00	88.00
72,000 lb.	Reinforcing steel	.15	.14
12,000 lb.	Structural steel	.23	.25
6,501 cu. yd.	Excavation for structures, Unclassified	2.00	1.00
6,030 cu. yd.	Small ditch excavation	1.00	1.00
30,000 cu. yd.	Excavating and stockpiling Topsoil	.30	.30
70 cu. yd.	Granular backfill	3.00	2.90
709 hr.	Mechanical tamping	7.00	6.50
1,080 ea.	Removal of trees	20.00	4.70
20 ea.	Moving mail boxes	10.00	7.00
	Reconstructing cleanout, manholes & man. boxes	50.00	30.00
600 sq. yd.	Removal of existing sidewalk	.50	.60
26 ea.	Guide posts	7.50	8.60
124 ea.	Removal of water markers	8.00	8.00
48,740 lin. ft.	Chain link fence 5 ft. high (includes line posts)	1.75	1.75
Lump sum	Furnishing water equipment	10,000.00	2,500.00
Lump sum	Furnishing construction signs	10,000.00	6,000.00

Utah—Davis County—State. Tiago Construction Co. has been awarded a \$1,351,505 contract for the construction of 4.5 mi. of roadway to be graded and drained.

(1)	2,900 ton	Plant mix bituminous surface,		(1)	(2)
		Type "A"	\$ 4.00	\$	4.00
(2)	210 ton	Bituminous material, Type MC-3	40.00		31.50
	67 ton	Bituminous material, Type MC-1 or MC-2	40.00		34.00
	18 ton	Bituminous material, Type RC-1 or RC-2	40.00		47.00
	160 ton	Bituminous material, Type 85-100 Penetration	30.00		29.00
	35 ton	Bituminous material, Type RC-4	42.00		35.00
	67 gal.	Bituminous additive (Commercial Grade)	3.00		2.00

145

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POSITIONS

COMMONWEALTH OF AUSTRALIA THE SNOWY MOUNTAINS HYDRO-ELECTRIC AUTHORITY INVITES APPLICATIONS for the position of **CHIEF CIVIL ENGINEER** Salary—£3,800 (Australian)

Applicants must possess recognized professional qualifications and have wide experience in the investigation, design, and construction of major civil engineering works.

The Chief Civil Engineer is directly responsible to the Authority for the management and conduct of the Authority's civil engineering activities, including the co-ordination and integration of the work of the Civil Design Division, the Major Contracts Division, and the Scientific Services Division.

Only those with successful experience in high executive positions and with proven engineering and administrative ability will be considered.

Information on superannuation, leave and other conditions of service is available on application to Liaison Officer, Snowy Mountains Hydro-Electric Authority, c/o U.S. Bureau of Reclamation, Federal Center, Bldg. 53, Denver 2, Colorado.

Headquarters of the Authority is at Cooma, New South Wales, where housing on a rental basis will be available for the successful applicant on taking up duty.

Applications, stating name, age, marital status, present position and salary, together with full and detailed particulars of past experience, should be addressed to the Business Manager, Snowy Mountains Hydro-Electric Authority, Post Office Box 332, Cooma North, N.S.W., Australia. Applications close on 18th April, 1958.

WANTED, for permanent position, Civil Engineer with recent responsible experience in Hydrology, Hydraulics and Earthfill Dam Design. Write or call George S. Nolte, 3850 Middlefield Road, Palo Alto, California. DA 6-2440.

FOR SALE

FOR SALE Model 160 Buckeye Trencher 20 inch buckets, gas engine, truck loading conveyor, 21 feet digging depth. Practically new, has only dug 20,000 feet of ditch. Price \$17,500. Warner Brothers Construction Co., Inc., 5505 Vance Street, Arvada, Colorado. Phone Harrison 4 1918.

FOR SALE Six Cat 8A Angledozer. Wholesale Prices

J. F. England's Sons, Inc., Box 490, Phone FI-2-0118, Rapid City, South Dakota.

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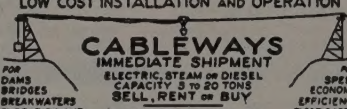
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H. L. Priest is Symons N. W. rep

Herb L. Priest is appointed Northwest sales representative for the complete line of concrete forms and forming hardware produced by Symons Clamp & Mfg. Co. Priest, formerly general manager of Concrete Forms, Inc., has opened a new warehouse-office in Portland in space formerly occupied by that firm at 318 N. E. Couch when it was a distributor for Symons products.

Paxton-Mitchell buys Reisser

Paxton-Mitchell Co. of Omaha has purchased the assets of the Reisser Corporation, Blair, Neb., James L. Paxton, Jr., president of the parent company, recently announced. The Reisser company will be renamed Jebco, Inc. Principal product of the company is the Elegrader, an attachment for Adams No. 660, 610, 550 and 440, and Caterpillar No. 12 motor graders. Jebco also makes a roading axle called a Dolly Crane used to equalize axle weight on the Model C Tournapull. Plant manager of the new division will be Ira Trachtenbarg. James R. "Jim" Walkley will be sales manager.

Stan Wagner made general mgr.

Stan Wagner has been appointed general manager of Mixermobile Manufacturers, Inc., Portland, Ore., according to announcement by Gus Wagner, president. The firm is best known for the manufacturing and distribution of the Scoopmobile line of self-propelled loaders. The new general manager literally grew up in the Scoopmobile plant, where during his school vacations he worked on the assembly line and numerous other production jobs. "Boots" Dirksen has been appointed general sales manager.

G-E opens 2-way radio sales outlet

Frederick I. Deetkin has been named district manager for a new two-way radio sales office established in San Rafael, Calif., by General Electric Communications Department. From the office at 2052 Fourth St., Deetkin will handle the sale of G-E mobile communication equipment to construction firms, trucking companies, etc. Deetkin has had 22 years experience with General Electric in the radio field, most of it in the San Francisco area.

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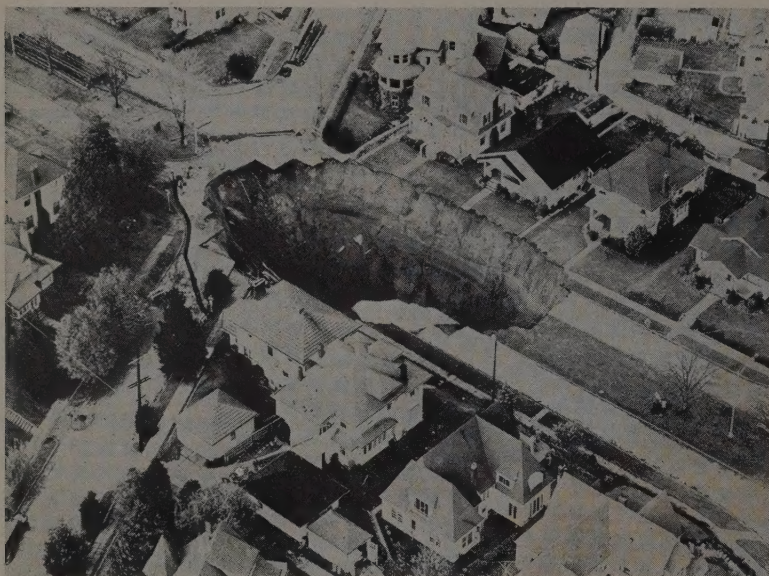
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HELLO, CITY ENGINEER? I'D LIKE TO REPORT A CHUCK-HOLE . . .

Last month we briefly discussed chuck-holes, citing several outstanding Western examples, including the recent one in Seattle pictured above. If you write asking why we talked about chuck-holes last month and printed the picture this month, we'll return your letter unopened.

Translation of key words and phrases

According to Dun & Bradstreet, Inc., somewhere around 2,000 construction firms failed in 1957. The causes were listed as incompetence, lack of experience, neglect, fraud, disaster, etc. Strangely, semantic difficulties were not mentioned. Nevertheless, we feel that many problems in the construction industry are due to verbal obstacles, the shortcomings of the language itself, the inability of the members of the construction team to communicate with one another with precision and without misunderstanding. Accordingly, we have gone to the trouble of preparing the table below, which translates into meaningful English some of the common words and phrases used by most engineers.

What the engineer says:

"It's hard for me to explain this to a person without a technical background."

"Trust me and I'll trust you."

"Maybe."

"It won't work."

"Make another pour like that and I'll shut the job down."

"Yes."

"I'm not hard to please."

"Sorry, we can't accept gifts."

What he means:

"Your guess is as good as mine."

"Trust me."

"No."

"Why didn't I think of that?"

"My wife bawled me out again, my raise didn't come through, and my shoes are too tight."

"No."

"Memorize the specs."

"Put it in my car."

A joke

NURSE: Congratulations! You are the father of triplets!

CONTRACTOR: Good grief! I've exceeded my estimate again.

(If there's anything we can't stand it's smart-aleck nurses. She should be offering the poor devil tranquilizers instead of congratulations. But you've got to hand it to the contractor for making a clever answer to a statement which would thoroughly disorganize most people. The point of his remark revolves around the word "estimate." In the course of his work as a contractor he continually predicts the consequences of certain actions, and by his words to the nurse he means to imply that he had made a prediction in the present situation which was exceeded by 200%. By adding the word "again" he suggests that he habitually exceeds his estimates, particularly in the field of construction costs. Whether this is in fact the case is rather doubtful. Such statements are usually made by contractors to throw other contractors off the scent.

This raises the question of whether he suspected the nurse of being a contractor who might be competing against him for the next job. His remark may have been designed to lead her to believe that he was nearly bankrupt, which would improve his chances of submitting a lower estimate than hers. Although it is common knowledge that contractors are both suspicious and cautious, we may be going too far in suggesting that he mistrusted the nurse. It may be that there were other contractors present whom he was trying to mislead, and was in reality quite fond of the nurse and often confided in her.

If other contractors were present, you may be sure that it was not to offer consolation. They were there in the hope that during the long vigil he would break down and say something about costs.

Nevertheless, the nurse strikes us as a smart-aleck. We hope she has triplets herself someday so she'll find out how funny it is.)

. . . The Editors