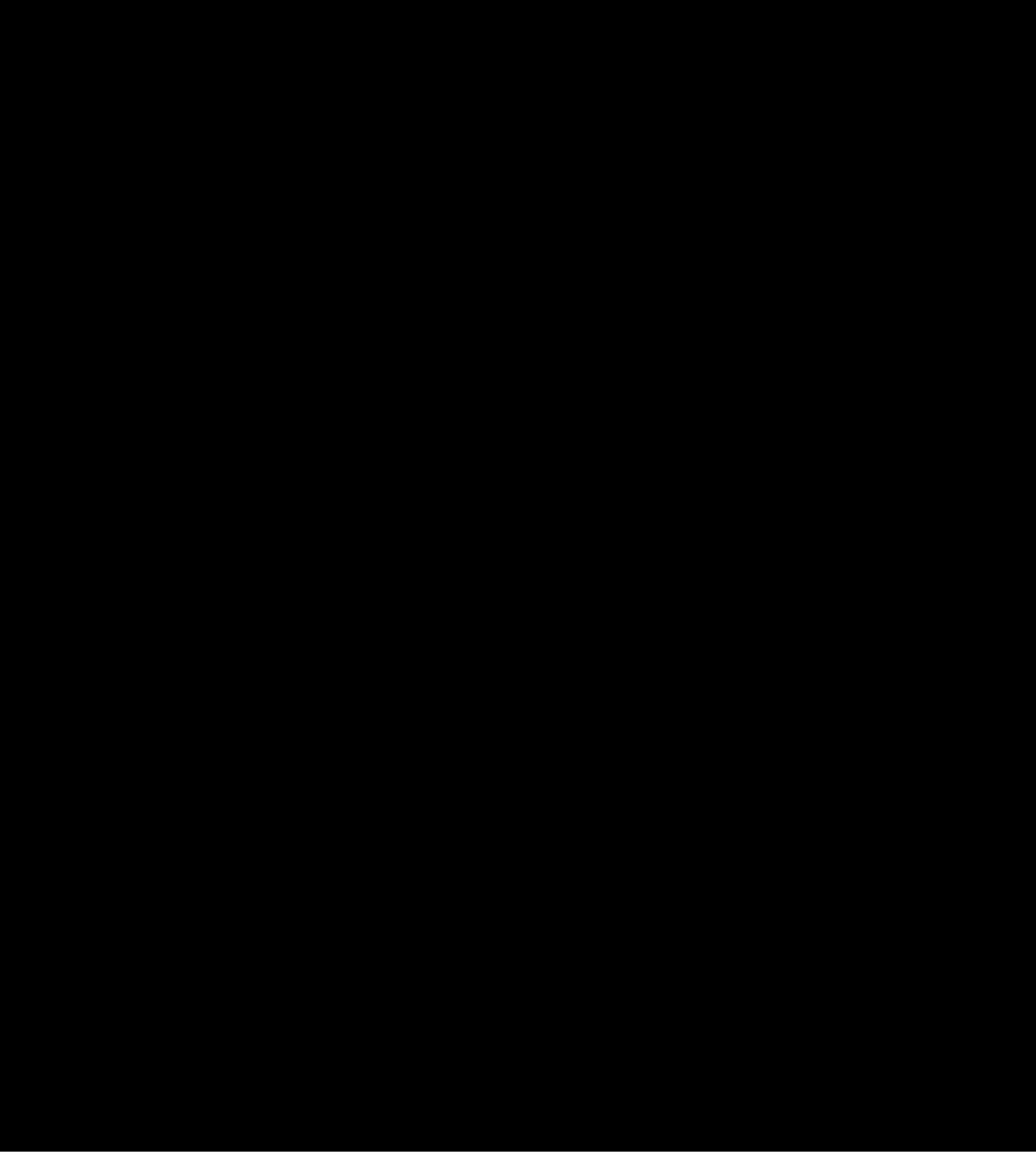




Red Lead Guards Against Rust On Famous Bridges

THE new North State Street Bridge, now nearing completion, is among the prominent landmarks in downtown Chicago. This double leaf trunnion bascule bridge will be very similar in appearance to the Wabash Avenue Bridge which was awarded first prize by the American Institute of Steel Construction as the most beautiful bridge of its kind, costing over one million dollars, when it was completed in 1930. This new bridge and other bridges built and maintained by the City of Chicago are protected by a priming coat of red lead paint.

Although the clear span of 210 feet is 22 feet shorter than the Wabash Avenue Bridge, the greater width ranks it among the largest bridges of its kind. It represents an investment of approximately 3.5 million dollars. More than seven million pounds of structural steel have gone into its building. Each of the movable leaves, shown in raised position in the photograph on the cover, will weigh about 8,400,000 pounds when completed.

The new bridge measures 307½ feet from anchor column to anchor column and has a clear span between masonry of 210 feet, overall width of 108 feet with two roadways 36 feet wide, separated by a center island 5 feet wide, and two sidewalks with clear widths of 11 feet each. It has three trusses of the so-called railing height type, the top chord rising above the bridge deck to a height about equal to that of the railings.

A factor that contributes greatly to the wearing out of a bridge is the frequency with which it has to be opened, and this same factor greatly affects the usefulness of the bridge to the public. The old bridge provided 16.5 feet vertical clearance for a width of barely 50 feet at right angles to the general channel, and the truss chords sloped downward sharply from that height almost to water level at the piers. Consequently, it had to be opened frequently and was always in



Painters applying one of the two red lead undercoats specified for the first repainting of the San Francisco-Oakland Bay Bridge shown at left.

WIDE WORLD
PHOTOS

danger of being damaged. The new bridge provides 20 feet vertical clearance for a width of 100 feet and 16.5 feet clearance for nearly 160 feet, permitting free passage of tugs and barges without opening the bridge and interrupting street traffic. Navigating conditions are also improved by a change in the channel alignment, which formerly had a pronounced bend at this point.

The bridge is designed to carry a continuous line of 50 ton street cars in each direction, a load of 125 lb. per square foot on the roadways and 100 lbs. on the sidewalks. It is capable of carrying the heaviest vehicles that will be developed for years to come.

This up-to-date multi-million dollar structure is protected with a coat of red lead priming paint formulated according to City of Chicago specifications. The specifications for this bridge called for a shop coat of red lead and spot painting with red lead after erection.

The City of Chicago specification for red lead priming paint contains 77.5% pigment and 22.5% vehicle

by weight. The pigment consists of 99.7% red lead (95% grade) and 0.3% aluminum di-stearate. The vehicle consists of a mixture of 44.2% raw linseed oil, 23.8% heat treated linseed oil of 22 Gardner viscosity, 30% mineral spirits and 2.0% drier.

The bridge is being constructed under the supervision of O. E. Hewitt, Commissioner of Public Works, W. W. DeBerard, City Engineer and Stephen J. Michuda, City Bridge and Viaduct Engineer.

The reliable red-lead-in-oil type primer formulation used by the Department of Public Works of the City of Chicago is used by the majority of cities and states throughout the country to protect iron and steel structures of all kinds.

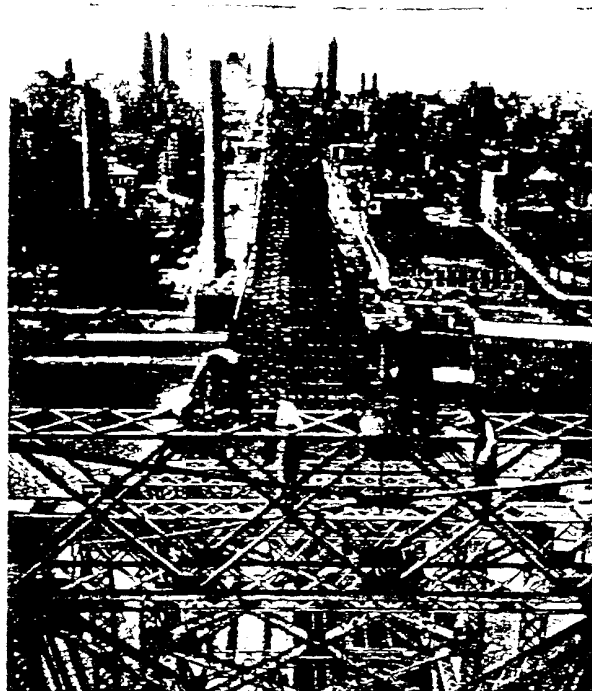
While Chicago's North State Street Bridge displays its first suit of red armor for warding off the always vicious dragon rust, the veteran Queensboro Bridge in New York City is having its ornate and complicated cantilever structure redressed with another protective film of rust inhibitive red-lead-in-oil and a topcoat of tinted white-lead-in-oil paint. Since rearm-

ing this one-and-a-half mile steel giant against the ravages of an industrialized city environment is a tremendous task requiring the application of 25,000 gallons of red lead primer by scores of painters. It is fortunate that the paint system has an expected protective life of from eight to ten years.

Another beautiful and world renowned structure protected by an undercoat of red lead is the San Francisco-Oakland Bay Bridge. This bridge, the longest on earth, consists of a combination of a cantilever-truss span and two complete suspension bridges placed end to end. The total length of the bridge, without approaches, measures 41½ miles.

The repainting of this bridge with a three coat system has been in progress for the past eleven years. When this job is finished it will be time to start all over again. The present repainting includes two coats of red lead primer.

Applying red lead to New York's Queensboro Bridge. The top coat will be a grey tinted white lead-oil paint.



WEEK
APRIL

Lead Protects Concrete From Acid Attack

PENICILLIN has become a magic word in medicine since Alexander Fleming, a British physician, first discovered it in the middle of the last century. But even this antibiotic with miraculous healing powers couldn't cure an ill that created a serious threat to its manufacture.

The Heyden Chemical Corporation

is one of the prominent companies which pioneered in the commercial manufacture of penicillin. They are currently producing a large proportion of this drug which contributes so much to man's protection against disease.

In the course of penicillin manufacture, sulfuric acid must be kept avail-

able for use in various processes. The acid is diluted and stored at room temperature in two 650-gal. glass-lined tanks from where it is conducted through pipe lines to reaction vessels. Leaks that developed in the conveying lines and fittings of a material other than lead permitted sulfuric acid to drip onto the concrete floor supporting the heavy acid-filled vessels. Despite frequent repairs and attempts at neutralizing the acid attack, the concrete continued to deteriorate and weaken.

Since any leakage of sulfuric acid onto concrete floors is difficult to neutralize, the engineers at Heyden Chemical Corporation adopted an intelligent and simple method of protecting their concrete flooring from the corrosive action of the acid. They decided to take advantage of the time-tested reputation for sulfuric acid resistance established by the metal lead, as long ago as 1746 when it was first used in chambers for burning saltpeter and brimstone to make sulfuric acid. They installed underneath the two acid tanks and their fittings a



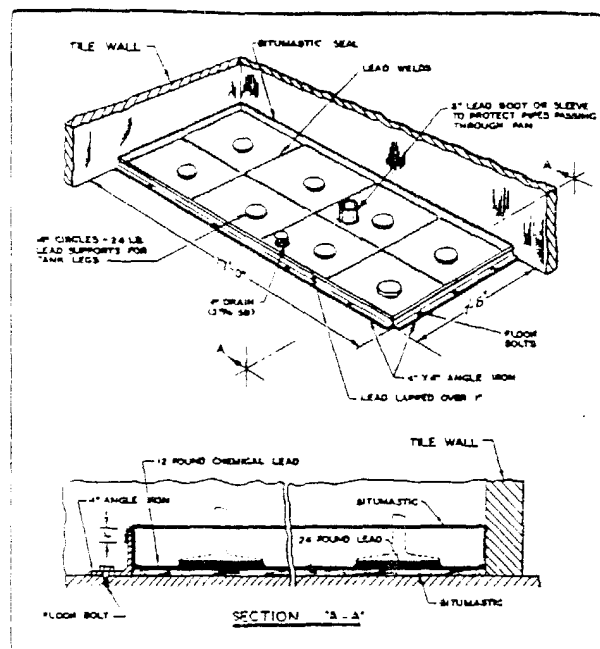
A sheet lead pan installed under acid tanks to isolate them from the concrete floor. The wet spots are the result of periodic wetting down of the concrete.

FRANCIS
AL LEIGH

shallow rectangular lead pan to retain any dripping acid, keeping it away from the concrete.

The large lead pan under the acid tanks shown in the illustration consists of four sections of 12-lb. chemical lead burned together to form a continuous sheet 7½ ft. wide and 17 ft. long. All the seams are lapped 2 in. A bitumastic layer protects the pan from direct contact with the concrete flooring. To make the 4-in. high retaining walls, separate sections of 12-lb. lead were burned on, then turned up and lapped over the upper edge of a 4-in. angle frame in front and on one side. In back and on the other side, the edges are turned up against the walls. As an added protection against vibration, the heavy tanks are supported on eight circles of 24-lb. lead, 14 in. in diameter. The pan is graded to a drain where any acid leaking from the fittings can be washed away. For added rigidity the floor drain is constructed of 4-in. pipe made of 3 per cent antimonial lead. Pipe lines passing through the pan and concrete floor are guarded against splashing and overflowing liquids by a ¼-in. soft lead boot or sleeve, 6 in. high and 6 in. inside diameter extending up from the base of the pan.

A detail of the lead pan installed under sulphuric acid tanks in the plant of the Herden Chemical Co.



Lead was the obvious choice for this installation because of its acknowledged resistance to sulfuric acid and its ease of installation and repair as well as for a reason peculiar to lead and its alloys—the high salvage value of the metal itself. The latter property, particularly in the face of rising material costs, is becoming an

increasingly more significant factor in the selection of metal for use in chemical construction. Because only its shape is altered and not its internal structure or physical characteristics and because it is easily remelted, lead has a salvage or scrap value which usually closely approximates its original cost.

Lead Weatherproofs Fasteners For Corrugated Asbestos Roofing

L EAD'S usefulness as a sealing material has long been recognized and new methods of utilizing this valuable property are constantly being developed. A series of new type fasteners for asbestos corrugated roofing was recently developed by the H. & B. Enterprise Corp., Trenton, N. J. They have licensed the Keasbey and Mattison Co., manufacturers of asbestos corrugated roofing, to market these new fasteners under the trade name, "Top-Side" Fasteners.

These fasteners eliminate the customary expense and inconvenience of scaffolding and workmen beneath the roof because the entire installation is completed from the outside roof surface. A threaded steel rod, curved on one end to grip the supporting cross

pieces under the roof, is inserted through a drilled hole from above and turned so that the hook end firmly grips the leg of the cross beam purlin. Then a lead seal and tab cast in one piece and a steel washer are slipped on and bolted down. After drawing up tight and forcing the lead seal into the recess around the bolt, the excess length of bolt is snapped off and the remaining end covered with the lead tab. In this manner the nut, washer, and bolt are covered with a protective lead sealing cap. The lead seal forms a permanent complete seal for the hole through the asbestos corrugated sheets while the tab portion provides a non-corrosive permanent covering for the raw steel broken end of the fastener bolt as well as protecting the

nut and washer from atmospheric corrosion. Thus each fastener is permanently weather proofed making the separate step of cementing bolt heads unnecessary.

An important consideration with asbestos corrugated roofing is the provision of a means for overcoming vibration without violating sound construction practices. Here again one of lead's unique properties qualifies it. The springing action of the fastener coupled with lead's ability to absorb vibration maintains the correct degree of flexibility in the entire installation. As a matter of interest many large buildings are protected against vibration damage due to rumbling trains and traffic by supporting them on lead-asbestos anti-vibration mats.



Left. The threaded steel rod is inserted into the hole in the asbestos roofing and hooked to the cross beam. Center. The lead seal and tab in place and the entire unit bolted together. Right. After folding the lead tab over the bolt it is hammered down.

To minimize corrosion due to galvanic action or adverse atmospheric conditions, the steel fasteners and bolts are frequently lead coated. "Top-Side" Fasteners are made from the following metals: steel, monel, brass, phosphor bronze, and stainless.

The Fastener is a typical example of an installation which makes use of lead's durability and softness. For years, lead headed nails have been used for fastening and, at the same time, weather-sealing galvanized sheet

metal. As the name implies, lead headed nails are ordinary nails with soft lead cast around the head. When they are driven home, the soft lead shoulder flattens out permanently, sealing the nail hole against moisture.

The sealing ability and durability of lead also lends itself to the sealing of caskets where a permanent, tight seal is imperative. A method of applying lead in this manner has been in use for many years by the National Casket Company.

There are many more examples which illustrate the versatility of lead's applicability as a sealing compound. The most common and probably one of the earliest uses of lead for this purpose is as a calking material. Here lead's ability to "give" under stress while retaining an effective seal has prevented the loss of millions of gallons of water and untold thousands of dollars due to property damage caused by broken water mains.

Lead Powder For Powder Metallurgy

LEAD powder, one of the newer forms in which this versatile metal is supplied to industry, is finding increasingly greater application in the fast growing powder metallurgical field. Probably the most important applications today are in the manufacture of leaded-bronze bearings and bushings, copper-lead bearings, iron-lead bearings, and friction devices.

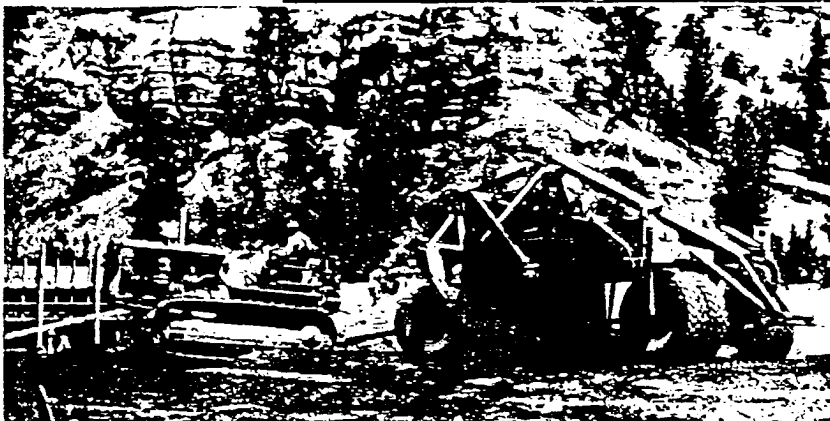
The lead powder used for these purposes is granular in shape and produced by the atomization process wherein molten lead is forced through a small orifice and broken into small particles by a stream of compressed air, inert gas or steam blowing counter-current to the molten lead. Available particle size ranges from -100 to 350 mesh or in other words, in the case of 350 mesh, small enough to pass through a screen having 350 openings to the linear inch. A mixture of the various sizes is also available.

Flake lead powder, which has been

Heavy tractor equipped with all-metal "Velvetouch" clutches and steering brakes and at right, a variety of "Velvetouch" items in which lead powder is an important component.



S. K. WELLMAN & CO.





Parts made from metal powders. Left of center are leaded cast iron and right of center, leaded bronze parts. The cup-like centerpiece is a combination of the two, the cup, leaded cast iron and the flange, leaded bronze.

used commercially for a much longer time than the granular shape, is used primarily as a paint pigment and is produced by ball milling. It is not generally used in powder metallurgy.

In the production of bearings and bushings, it is generally agreed that the addition of lead to the metallic constituents of the piece provides advantages, such as conformability, imbeddability and anti-frictional properties, that add to the efficiency and life of the bearing. However, in most instances the mixing and casting of lead with metals having a much higher melting point and lower density is a difficult operation and one that requires a great amount of care and supervision. For this reason the advantages of lead in many instances are more readily realized when powder metallurgy methods are employed.

Many types of copper-base bearings and bushings incorporating lead powder for the advantages it imparts to the piece are produced in this manner. Some, like the bronzes contain tin and from 4 to 6 per cent lead and others like the straight copper-lead bearings contain up to 45 per cent lead. This last is particularly difficult to cast and by using the powders some of the fundamental obstacles, such as gassing and severe segregation, are detoured.

A growing tendency is the use of iron-lead bearings containing up to 10 per cent lead, an alloy that would be

practically impossible by any other method than powder metallurgy. The addition of lead not only adds to efficiency of the bearing but also inhibits corrosion of the iron.

Lead powder is also an important component in the manufacture of

powdered metal facings for clutches and brakes, the lead providing anti-friction properties as well as conformability and imbeddability. One common mix for facings is, in per cent, 73 copper, 14 lead, 7 tin and 6 graphite. It would be difficult to cast such an alloy without segregation.

These all-metal facings have been used with considerable success on heavy machinery of all types, such as heavy earthmoving equipment, tractors and oil field equipment. They have also been recently introduced into the passenger car and light truck field. Because they are all metal, they provide longer life and will not deteriorate from exposure to oil or water.

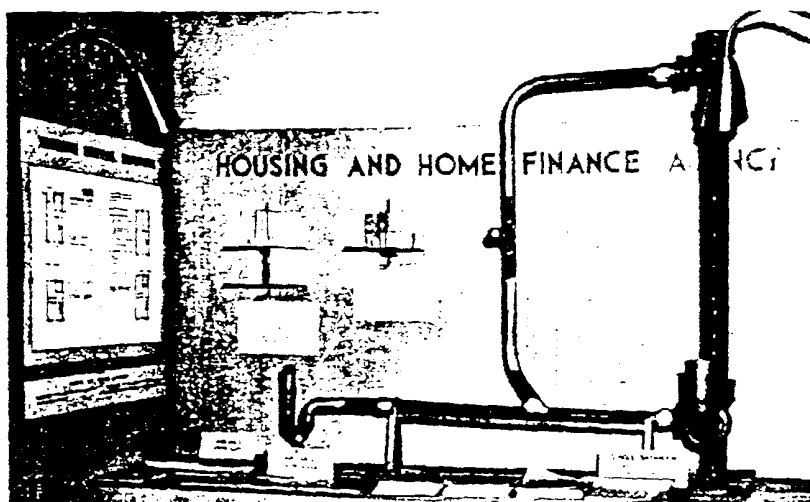
Lead powder is also an ideal material for testing dies. Its softness will reflect even minute irregularities in the structure of the die. It has the added advantage of high green strength which permits considerable handling for inspection purposes.

Another important use for lead powder is in greases used on open gears and bearings.

Federal Housing And Home Finance Agency Exhibits Lead Plumbing

Shown below is an exhibit of lead plumbing displayed at the 1948 Conference of the American Municipal Association held in Washington, D.C.

December 12-15, 1948. The roughing-in was prepared in accordance with the Uniform Plumbing Code for Housing, issued by H.H.F.A.



A Portfolio of American Landmarks

No. 43

COOPERSTOWN, New York, famed for its connection with the great American novelist, James Fenimore Cooper, has in recent years become doubly important to the American scene by reason of its association with America's national sport, baseball. It is here that many of baseball's immortals are enshrined for all present and future baseball fans to marvel at and to compare with their present-day idols.

These two American traditions are placed in a perfect setting of comfortable stability enhanced by the charm of many old buildings that date back almost to the beginning of the community in 1787. Several of these beautifully proportioned houses were



The Griffin House, the oldest house in Cooperstown shows the characteristic whiteness of self-cleaning pure white lead paint.

designed and built by the founder of the town, the author's father, William Cooper, and there is little doubt that they were originally painted with pure

white lead and oil paint which is still the standard paint maintenance material specified for use on many of them today.

Prentice Cottage, built in 1801, another of the Cooperstown landmarks painted with pure white lead and oil paint.



The John Worthington house, built in 1802, is one of the earliest examples of the Greek revival in America. Familiarly known as "The White House" for many years it is still painted with lead paint.



THIS IS NO. 43 OF A SERIES REPRESENTATIVE OF THE MANY AMERICAN LANDMARKS IN VARIOUS SECTIONS OF THE COUNTRY THAT ARE PRESERVED FOR THE FUTURE WITH PURE WHITE LEAD AND OIL PAINT. MANY OF THEM HAVE ALWAYS BEEN PROTECTED WITH THIS RELIABLE MATERIAL ACCORDING TO AVAILABLE RECORDS.

Lead Reducing Bends Ideal For Large Housing Projects

ONE of the largest privately financed apartment building programs in recent years has been under way for some time in New York City. Upon completion of this program, there will be available a total of 12,500 multi-story apartment units divided into three projects.

The largest of these is Stuyvesant Town with 8,755 units, followed by Peter Cooper Village with 2,495 units and Riverton Apartments with 1,232 units. All are located in the borough of Manhattan, N. Y., and all are being financed by the Metropolitan Life Insurance Co.

As can be imagined, the installation of utilities in these projects was a tremendous undertaking. An example of the quantity of materials that was needed in just the plumbing waste and vent systems, was the use of over 12,500 lead bends and stubs for connecting the water closets to the cast-iron stacks. In projects of this size and height the use of lead connections between fixtures and rigid piping provides the safety factor that prevents the destruction of these materials in the event of building movement or settlement.

To keep a constant flow of plumb-



A general view of Stuyvesant Town and Peter Cooper Village, together totaling over ten thousand living units.

ing materials ready for installation, completely equipped plumbing shops were set up to service each of the projects and the lead work was prefabricated in these shops. Extra-heavy lead reducing bends with 4-in. inlets and 3-in. outlets were used on all but the basement floors; here, 4-in. lead stubs were used. All upper floor bathrooms wasted into 3-in. connections to cast iron stacks.

To avoid a pocket for substances passing through the lead reducing bends, the reduction in diameter from 4 in. to 3 in. occurs near the outlet end and only on the top and sides, leaving the bottom, when in an installed position, perfectly smooth and straight.

The plumbing contractor on all three of these projects was the J. L. Murphy Co. of New York City.



The lead shop on the site of Stuyvesant Town and lead reducing bends in place in the Riverton Apartment project.

A. F. KORMAN



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