



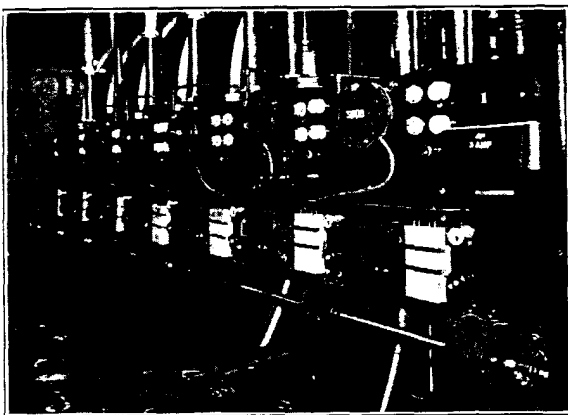
Lead Pneumatic Tubes Are Used for British Government Communication



Receiving and despatching room, pneumatic tube center, British War Office

FOR a great many years the British Post Office Department has successfully used lead-alloy pneumatic tubes for inter-Department communication. The main or "street" tubes through which the "carrier" is transported, are installed underground running from building to building, being laid in iron pipe for mechanical protection. Lead was selected for the tubes for much the same reasons that it has been used for water service pipes so universally for centuries. Its durability in underground conditions is remarkable; it is easily bent as required; very satisfactory smooth joints can be made in it; and the interior surface becomes highly polished by the passage of the "carrier."

Street tubes are composed of 99 per cent lead.

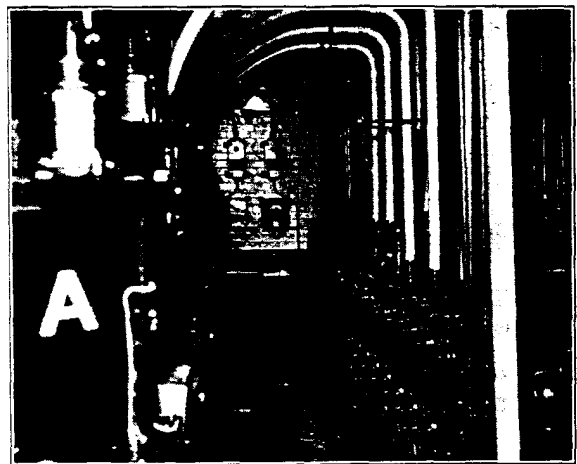


Control board for automatic rotary switches, British War Office

0.5 per cent tin and 0.5 per cent antimony. They are made in the following sizes and weights:

STREET TUBES		
<i>Inside Diameter</i>	<i>Length</i>	<i>Weight per Yd.</i>
1½ in.	25 ft.	16½ lb.
2¼ in.	28 ft.	24 lb.
3 in.	19 ft.	36 lb.

Street tubes necessarily require care in manufacture and handling so that passage of the "carrier" will not be impeded. After manufacture a mandrel is run through to assure a smooth, undented interior. The tubes are shipped straight in wooden crates. They must withstand internal hydraulic pressure of 30 lb. per sq. in. The "carriers" are made of gutta percha tubes covered with baize or felt and closed at one end with a wad of felt. The felt head is approximately the same diameter as the lead tube but



Automatic rotary switches for street tubes, British War Office

the body of the "carrier" is slightly smaller. The baize covering the body extends beyond the open end to make a sort of skirt.

Maximum length of pneumatic tube that has been successfully used by the Post Office is 4073 yd., a little more than two miles. Demonstrating the permanence of this type of installation is a lead tube laid 52 years ago and still operating.

The air pressures used are 10 lb. per sq. in. pressure gage and 6½ lb. per sq. in. vacuum gage.

Attractive Lead Work on a Small Building

THIS picture and the cover illustration indicate that it is not only on monumental buildings and expensive residences that lead work finds a place. It has helped make of this little real estate office in Garden City, Long Island, a suburb of New York, a most attractive and inviting place. It lends the tasteful and homelike air of the community to this place of business.

At the rear is a leaded bay window crowned with an ornamental lead frieze. The combination makes a complete and happy architectural feature. Atop the round roof is a lead finial and the roof flashing on this little building is lead. Thus lead has not only added to the attractiveness of the building but, because of its great permanence, has precluded any possibility of leaky flashing.



WURTS BROS.
Leaded window with ornamental lead frieze and lead flashing on Mr. Heine's small office building

The soft gray color of lead is ideal for metal work on a house of any type because it harmonizes with any building material. Also it will not stain the white painted brick walls. As flashing, lead's softness and flexibility make it easy to install and to dress down into place. When roofing repairs are necessary it is easy to bend lead flashing up, make the repairs, and then bend it back into place again. This can't be conveniently done with more rigid metals. Aside from lead's great natural durability, lead flashing has a greater thickness, and consequently proportionately longer life, than other flashing material.

The little office was designed by Roger E. Heine, who occupies it; The Rohan Co. Inc., constructed it and F. C. Irwin did the lead work.

Lead Anti-Vibration Pads for a Private Residence

LEAD-ASBESTOS anti-vibration pads are installed under the column footings of a beautiful residence on the northeast corner of Fifth Avenue and 71st Street, New York. They successfully isolate the building from vibration set up by passing traffic which would otherwise be transmitted up through the building frame and cause considerable annoyance to the occupants. It is the same method used for a number of years principally under buildings in close proximity to railway tracks and in railroad terminals.

However, Fifth Avenue traffic is heavy, caused both by automobiles and busses, and causes an appreciable amount of vibration. Similar conditions exist in many places due to this kind of traffic, or to street-cars,

subways, trucks or other vehicles. When the occupants' comfort is given the utmost consideration, architects find it advisable to use lead-asbestos mats. They are the only type of vibration isolating pad capable of standing building loads and lasting as long as the building when exposed to moisture in the ground. They are constructed of two layers of $\frac{3}{8}$ in. asbestos separated by a layer of galvanized steel and sandwiched between and completely enclosed in sheet lead $\frac{1}{8}$ in. thick.

Warren & Wetmore, New York, were architects for the residence pictured, and H. G. Balcom the consulting structural engineer.

Other applications of these pads have been described in LEAD, Vol. I, Nos. 1, 3, 5, 7, and Vol. II, Nos. 2 and 5.



WURTS BROS.
A Fifth Avenue residence, New York, which rests on lead-asbestos anti-vibration pads

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More Applications of Lead on Kings County Hospital

THE November, 1932, issue of LEAD described in some detail the beautiful and extensive hard lead spandrel installation on the Kings County Hospital, Brooklyn, N. Y. In addition to the spandrels and mullions lead was put to a multitude of other uses, so that this building is a fine example of the adaptability of lead to all kinds of architectural requirements.

At the tops of the oriel and corner bays described in the previous article are 3 lb. hard lead batten roofs. Seams are loose-locked and one fold filled with Vulcatex Non-Hardening Compound to provide for expansion and contraction. The roofs of the corner bays terminate in finials formed from hard lead sheet and supported internally with steel braces. Corbels under the oriel bays are also covered with hard lead. An ornamental cresting stamped from hard lead sheet surmounts the central tower, and the cresting culminates in hard lead finials at each end. At its center a spire rises constructed of hard lead sheet and surmounted by a weather vane. Sheets on the lower part of the spire are laid diagonally and the construction is batten type, which makes an attractive pattern. The towers on the two wings of the building are crowned with lead-covered and lead-roofed cupolas.



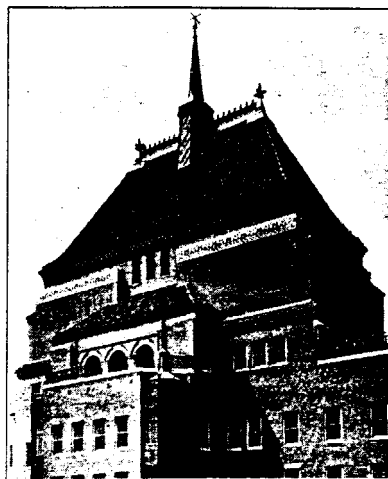
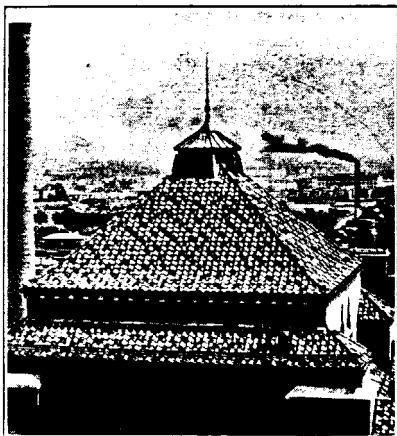
Kings County Hospital, Brooklyn, N. Y.

Hanging gutters are of 4 lb. hard lead. Built-in gutters are lined with hard lead sheet, all seams being loose-locked and filled with Vulcatex, and with the lap in the direction of flow. Leader-heads are cast hard lead. Counter flashing of 4 lb. soft lead was built into the masonry and installed in no greater than 8 ft. lengths with loose-locked seams. Ventilating louvres on the towers were covered with hard lead.

Marquises over several of the building's entrances are hard lead. In their construction batten roofs of 3 lb. hard lead sheet were used. These were laid over wood sheathing and metal frames. The ornamental borders were stamped from 4 lb. hard lead sheet. All of the lead roofing was laid over 40 lb. building felt.

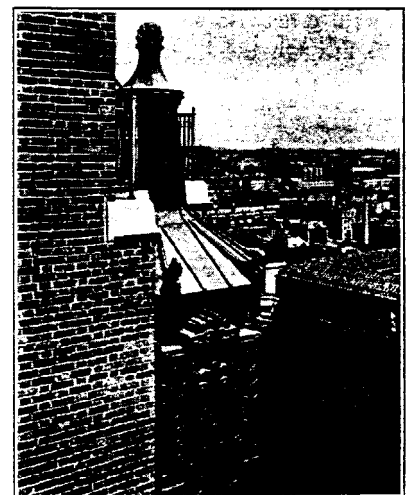
In the course of the years to come all the lead exposed to the atmosphere on the Kings County Hospital will acquire a soft gray patina on its surface that will become increasingly beautiful. This is a point frequently overlooked by architects in selecting a metal for decorative and utilitarian applications. Although some of the newer metals and alloys in building construction may appear bright and shiny when first applied they haven't the prop-

A hard lead covered cupola and hard lead hanging gutters. Lead flashing also visible



Hard lead spire, cresting, finials, spandrels and louvres

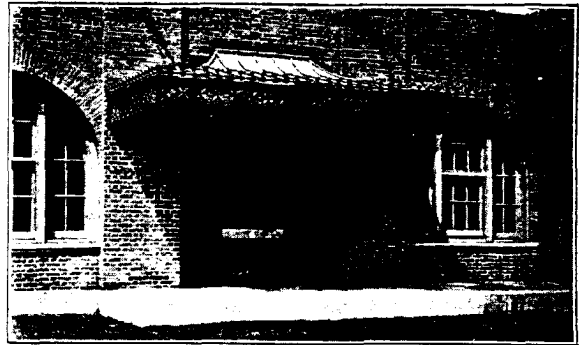
Hard lead spandrel and finial



PHOTOS BY WURTS BROS.

erty of developing a patina with age on outside exposure. Through centuries of use the beautiful results to be anticipated with lead are a foregone conclusion. The patina acquired by lead is as genuine as the metal itself and the architect can feel complete satisfaction from having avoided the selection of substitutes in any form.

The architects were Le Roy P. Ward, Inc.; the sheet metal contractor Sobel & Kraus, Inc., both of New York; and the ornamental stamping was done by Wm. J. Kelly of Brooklyn, N. Y.



Hard lead marquise, Kings County Hospital

Lead, the Supreme Lubricant in Wire Drawing

By C. L. MANTELL, Ph.D.*

USUAL practice of cold drawing tubing, wire, rod, or related shapes ordinarily involves preliminary annealing and pickling of the billets, drawing of the shape, re-annealing, pickling, and drawing, and so on in a cyclic process until the desired size, as far as all dimensions are concerned, is reached. In this method, for every reduction of size there must be an accompanying annealing and pickling of the article being worked. These operations add markedly to the final cost of the finished object.

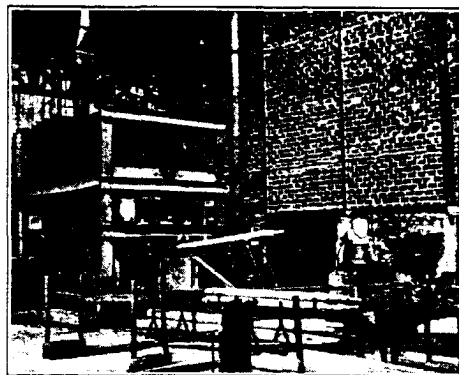
When ordinary steels are cold drawn or cold pressed, good lubrication between the worked surface and the die is very necessary, otherwise seizing, tearing, or scratching will occur. In the case of nickel alloy, chrome alloy and related steels, lubrication ordinarily considered excellent does not always suffice to prevent seizing or tearing of the article being worked.

The Dudzele process is applied in a number of plants in the United States, England, France, Germany and other industrial European countries. It consists of applying a lead coating to the surface of the shape being worked, in such a way that the coating is exceptionally adherent. After a preliminary treatment in a bath containing a mercury salt, very satisfactory coatings can be made by hot dipping in molten lead. With its lead coating, the article may be drawn to an extent utterly impossible with an uncoated article

of the same piece. The coating acts in the nature of a cushion when drawing takes place. It permits drawing of the alloy or steel underneath the lead coating. The lead acts as a solid lubricant of such high viscosity that it rubs off only very slightly from the worked surface, despite the very high pressure set up between the latter and the die. The coating remains intact after a considerable number of successive drawing operations.

At the conclusion of the cold working, the lead coating is removed by chemical means in a suitable bath which rapidly takes off the lead without attacking the metal underneath. The lead is completely and absolutely removed, as determined by any of the most sensitive chemical tests. The delead tube or article may be then annealed in the usual way and finished.

The process has been applied to low and high carbon steels, chrome-molybdenum steels, 18 chromium 8 nickel, 16 chromium 10 nickel, 25 chromium 20 nickel, nickel silver, cupro-nickel, bronzes, and other difficult alloys. Generally in working of these metals, each reduction in size necessitates an annealing and pickling operation; with the Dudzele process anywhere from four to a dozen draws may be made without annealing or pickling. Thus the lubricating effect of lead is used to reduce the cost of cold drawing operations. The process is protected by United States, Canadian, and European patents, but is available to manufacturers on a license basis.



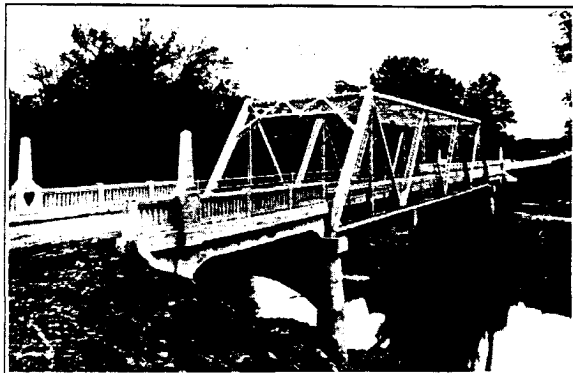
Lead coating tubes for cold drawing by the Dudzele process

* Consulting Engineer, Pratt Institute, Brooklyn, N. Y.

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Highway Departments Overwhelmingly Favor Lead Primers

A STUDY of the paint specifications of all State Highway Departments in the United States, from which copies of specifications could be obtained, has just been completed by the Lead Industries Association. The study covers 45 States, only Alabama, Delaware and Wyoming being omitted. These specifications are prepared by trained engineers well



EWING GALLOWAY

Pure lead paints are predominantly specified by State Highway Departments for priming steel bridges

versed in the qualities of the materials from which they may choose and responsible for the construction and maintenance of hundreds of bridges, mile upon mile of guard rail fences, and a vast number of other steel and timber structures. The average opinion of such a group of well informed men re-

vealed by the survey, based as it is upon years of experience with all kinds of paint, should be a valuable guide to paint users and mixed paint manufacturers everywhere.

Of the 45 sets of specifications covered, 41 are definite as to the paints to be used for priming or shop coats on structural steel. Thirty-two require pure red lead paint and five more include it as optional. Pure blue lead paint is optional in four States. The evidence in this case is overwhelming and shows why pure red lead paint is so often referred to as the standard paint for structural steel.

No State allows the use of any paint for priming or shop coat on structural steel that is not either pure red lead, pure blue lead, or a high proportion of either, and those which are not pure lead paints are so few as to be negligible.

The importance of proper priming coats can not be over-estimated because, however good the finish coats may be, they can not adhere if the priming coat fails. Lead paints make ideal primers because they adhere tenaciously to the metal surface and are tough and elastic enough to prevent cracking or peeling when the metal expands and contracts with temperature changes.

Note—A 16-page mimeographed report giving in detail State Highway Departments' Specifications regarding paint pigments may be obtained from the Lead Industries Association at a nominal cost of \$1.00.

Painting Interiors with White Lead for Efficiency

MAXIMUM lighting efficiency is naturally a factor of first importance when painting interiors. White paint has a reflection factor of 82 to 89 per cent when new and 75 to 85 per cent when old, according to a chart prepared by one of the largest electric companies. Lustrous metallic paints, because of their sheen, are often erroneously supposed to have even higher reflection factors. Actually the reflection factor is only about 60 to 65 per cent for this type of paint. Obviously white paints and certain light colored paints with high reflection factors should be preferred because of their lighting effect. For instance, ivory white has an approximate reflection factor of 79 per cent, cream 74 per cent and light buff 67 per cent.

In addition metallic paints have a harsh glare, the light being reflected in the form of a unidirectional beam, whereas flat white paint diffuses the reflected light in all directions. This naturally gives more uniform distribution of light.

Lustrous metallic paints have been found to have a distinctly depressing effect on workmen when used for industrial interiors. It is reported that a large mill in the South found this effect so marked after it had painted its interiors with metallic paint that in a short time they found it necessary to repaint with white paint. One of the largest industrial concerns in the country considered painting its factory interiors with metallic paint but finally rejected the idea because of the opposition of its factory foreman.

By using flat white paint, either untinted or tinted slightly, with its ability to reflect the maximum of light properly diffused, better lighting is obtained. This does not only mean that light bills will be reduced. It also signifies that workmen's fatigue will

be reduced and efficiency increased. Production will be increased and workmen better satisfied.

The following formulae are suggested for obtaining proper illumination in interiors and providing desirable paints that can be washed repeatedly:

100 lb. pure white lead (heavy paste)
2 gal. flatting oil
or
100 lb. pure white lead (heavy paste)
2 gal. pure turpentine
1 pt. floor varnish
½ pt. pure drier

They may be tinted as follows (Quantities are per 100 lb. white lead):

Ivory White— 3 oz. French Ochre
Cream —¼ lb. French Ochre
Light Buff — 3 lb. French Ochre



A large paper specialty manufacturing plant painted with tinted pure white lead paint for lighting efficiency and a pleasant working atmosphere

Miami Floating Aquarium is Piped with Lead

THE barkentine *Prins Valdemar*, built at Elsinore, Denmark, in 1892, is now Miami's unique floating aquarium. Constructed of English iron, it is said to be the only iron boat afloat and every season its hull is painted with red lead. It is 240 ft. long, has a 38 ft. beam and 21 ft. depth of hold. This barkentine has ended a romantic career on the high seas by its present unusual service. Its interior now contains 4000 ft. of antimonial lead pipe for handling both salt and fresh water to and from the exhibition tanks.

The *Prins Valdemar* was first used as a Danish training ship and later converted to the mercantile trade. It was implicated in the Mexican Revolution, seized by the Mexican Government and sold to San Francisco lumber interests for use in the Australian service. During the World War the vessel was purchased by Germany and converted from a three-masted bark to a four-masted barkentine. The Germans were so elated by her sailing qualities and speed they sent her to Norway for iron. On her return through the Skagerrack she was chased into Copenhagen by a British destroyer and interned.

After the war she was sold to American interests, and in 1924 was purchased by the

present owners for the coconut trade along the Mosquito Coast of Nicaragua. She proved too large for this service, so at the time of the Miami boom sailed from New York to the Florida port with building supplies. Converted to a hotel ship with 100 rooms, tugs pulled her aground twice and she filled with water. In 1927 the *Prins Valdemar* ended her varied career by becoming a floating aquarium.

There are 100 glass front exhibition tanks on board for both fresh and salt water tropical fish. A number of open tanks are also included for crocodiles, alligators, sharks and sea cows. This aquarium has the only sea cow born in captivity. Original

piping was not lead and gave only 18 months' service. Corrosion in the pipes clouded the water so that specimens could not be distinguished. Antimonial lead pipe, cocks and valves therefore replaced the original piping on both supply and return lines. A lead pressure-filter has also been installed. It is well known that lead is extremely resistant to corrosion when in contact with salt water and many other solutions.

Design and installation of all the lead work was done by O. G. Kelley & Co., of Everett, Mass., and New York.

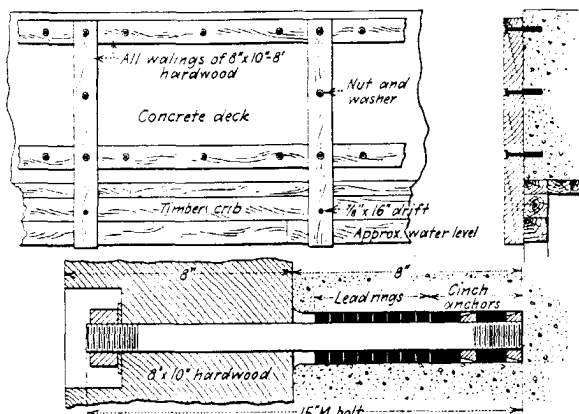


The unusual Miami Floating Aquarium, Miami, Fla.

Lead Makes Possible Strong Expansion-Anchors

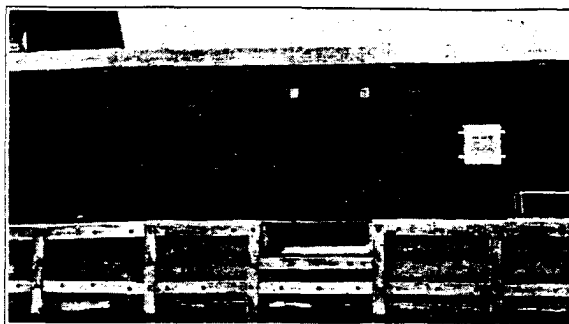
THE softness of lead has been ingeniously utilized for many years in the manufacture and use of cinch expansion-bolt-anchors. These anchors are used for a great many purposes, for example, fastening down machinery of all kinds, motors, shafting, pipes to ceilings, conveyors, elevator construction, and for every imaginable purpose where it is required to secure bolts into concrete or masonry.

Hundreds of applications for this useful device have been found and it may be obtained in both small and large sizes, $\frac{1}{8}$ in. to 3 in. In fact the size of cinch expansion-anchors has steadily grown and it is being used today in many cost saving installations in all major construction work. For example, the



Front elevation and section, together with detail, showing how walings are secured to concrete by lead cinch expansion-anchors

drawing shows a fifteen-inch stud bolt used in fastening waling timbers to the side of concrete dock walls in Canada. The walings are made of 8 in. by 10 in. hardwood and receive the full impact of any steamer when docking. Prior to the adoption of the cinch expansion-anchor type of construction, the bolts were built integrally in the concrete and as the walings



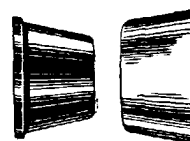
A Canadian concrete pier with walings firmly secured by lead cinch expansion-anchors

were under continuous impact and wear the work of repairs in replacing walings and bolts caused much trouble and costly labor. By using heavy cinch expansion-anchors this trouble was overcome since the bolts can easily be removed and timbers renewed whenever desired.

The accompanying cut shows the simplicity of the anchor construction. It consists of two parts, a cast iron cone and a lead alloy cone. This is known as a plain unit and is placed on the bolt head in the hole with the iron cone resting on the bolt head. The iron cone is also made with a tapped standard machine thread of any size and, in this case, the iron cone is placed in the hole first and calked on a dummy bolt, which is afterwards withdrawn, leaving the anchor installed ready to receive the bolt end, while the head of the bolt is outside of the hole securing the work. The calking of the lead alloy ring forces it down over the iron cone and it is thereby expanded and grips the walls of the hole. A compounded cinch anchor is guaranteed to remain fast under all stresses and vibration will not loosen its hold. Actual tests of the strength of the compounded anchorage have shown that they withstand a load beyond the breaking point of any bolt.



A four-unit cinch expansion-anchor tested until 2 in. bolt snapped at above 140,000 lbs. (At right). Cast iron and lead alloy cones which make up units of cinch expansion-anchors.



The Lead Industries Association invites inquiries on any subject relating to lead and will be glad to cooperate without obligation in the solution of your lead problems.