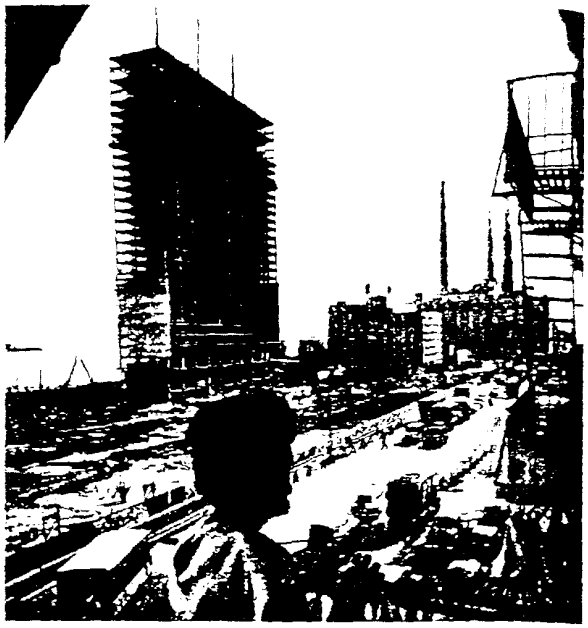
Steelwork on United Nations Secretariat Primed with Red Lead

THE first of a group of buildings to serve as United Nations world headquarters is nearing completion beside the East River in New York City. This is the thirty-nine story Secretariat Building.

Hidden under its glittering glass and marble exterior is a supporting structure containing almost fourteen thousand tons of structural steel protected by a shop coat of pure red lead paint. This partially completed framework is shown in the accompanying photographs taken at various stages during erection.

The steelwork was fabricated and erected by the American Bridge Company with Dr. C. Earl Webb, chief engineer, in charge of the project for that company. Edwards and Hjorth were the consulting engineers.



The red lead protected steel work under construction for the United Nations Secretariat Building as seen from one of the apartment windows flanking First Avenue, New York.

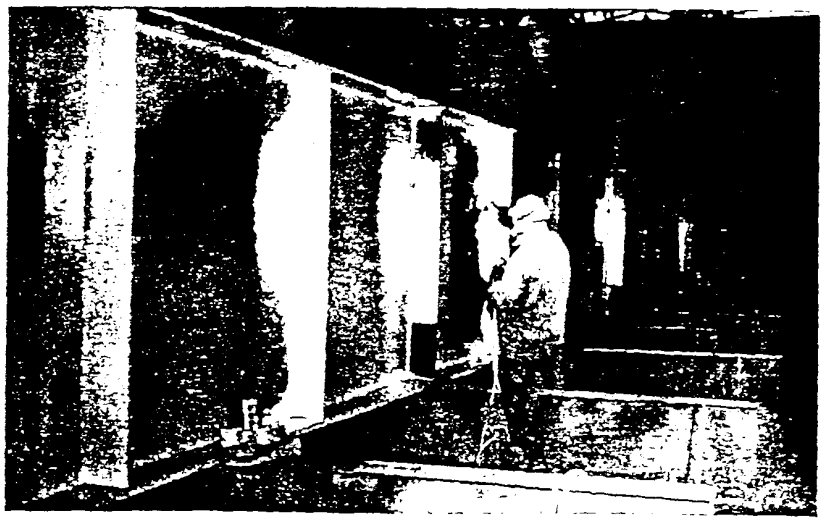
U. S. STEEL

The rust inhibitive red lead coat was shop applied and required four thousand three hundred gallons of paint conforming to Federal Specification TT-P-86. This specification calls for a ready-mixed red lead-linseed oil paint weighing at least 25 lb. per gallon with a minimum pigment content of 77.5 percent by weight. The pigment is composed entirely of red lead, containing not less than 97 percent Pb_3O_4. This paint is particularly well suited for structural steel priming since it combines the essential protective features of corrosion inhibition and good adhesion. Among the outstanding characteristics of red lead as a corrosion inhibitive pigment is its ability to prevent rust creep and undercutting around areas denuded by scratching and abrading in transit from mill to erection site.

The shop coat was applied by spraying as illustrated below. Before application of the paint, the steel was thoroughly cleaned of rust, dirt and loose scale by means of wire brushing and scraping—all oil and grease were also removed. The producers of structural steel have long realized that adequate surface preparation ranks equal in importance with the selection of the best quality paint.

At the plant of the American Bridge Co., suppliers of the steel for the U.N. building, a workman is shown applying a shop coat of red lead to a steel girder.

AMER. BRIDGE CO.



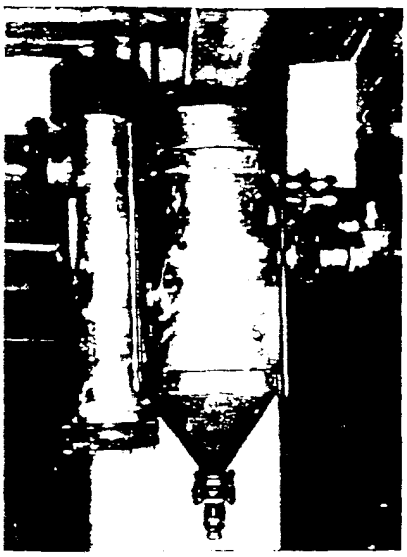
The planning of the United Nations headquarters is being carried out on an international scale befitting the world-wide scope of the organization. Wallace K. Harrison, United Nations director of planning, was assisted in the various architectural and engineering aspects of the project by eminent experts from ten of the twenty-nine Member nations. Also prominent in the planning and building are Max Abramovitz, deputy director of planning, and Mr. James A. Dawson, chief construction engineer.

The U. N. Secretariat is one among many world renowned sky-scrapers and monumental works containing red lead protected structural steel. Durable red lead paints of this type or specifically formulated to meet particular exposure demands are also widely used for initial painting and maintenance of bridges, ships, water tanks, gas holders, pipelines and industrial equipment.

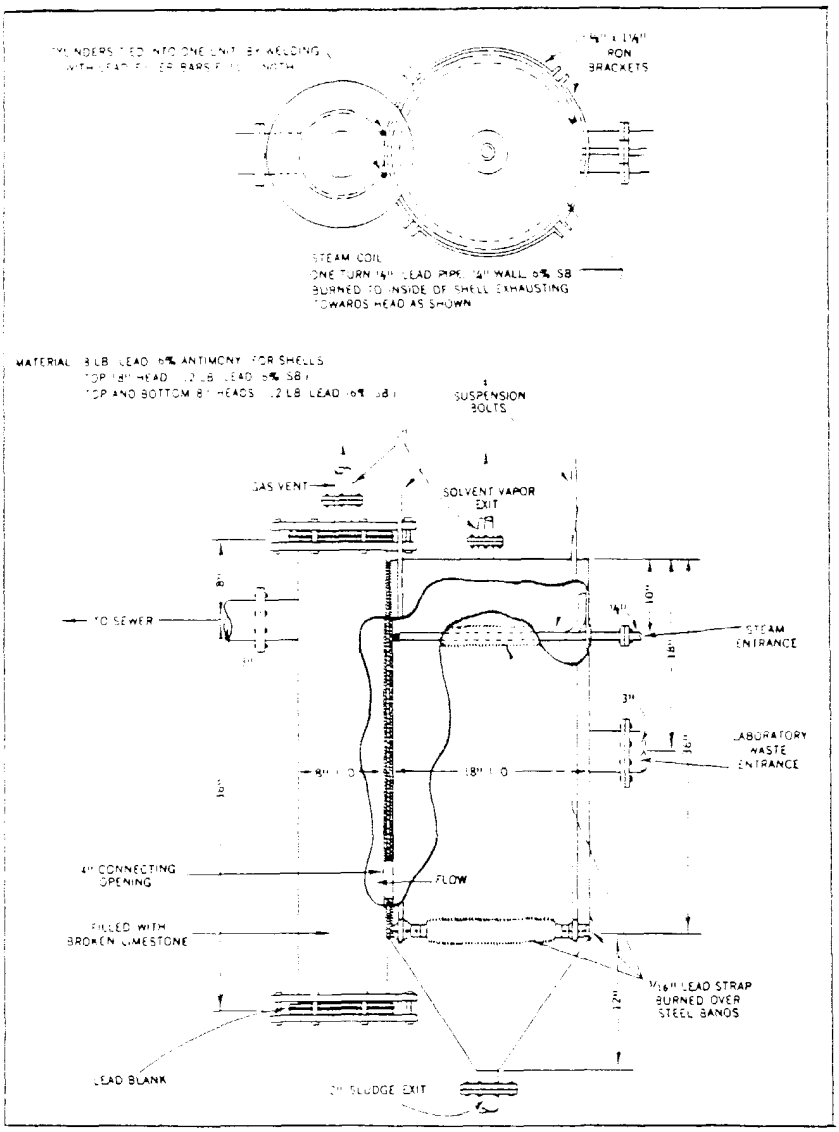
Lead Equipment Helps Solve Industrial Water Pollution Problem

CONTAMINATION and water pollution are terms that many industrial plant operators are beginning to regard with growing alarm. The Federal Water Pollution Control Act of 1948 gives concrete evidence of nation-wide concern for this problem by offering both financial and technical assistance to the states in carrying out their own stream pollution control programs. Important industrial states in turn have taken up the precedent and strengthened enforcement of their own stream pollution and other industrial waste disposal statutes. The effect of much legislation is that industrial plants normally producing acid or corrosive wastes can no longer dispose of their waste products by dumping them into the nearest river or pouring them down the drain.

Located in the heart of a heavily industrialized and populated area, S. B. Penick & Company, producers and manufacturers of botanical drugs and fine chemicals, eliminated what could have been a harmful source of sewage contamination by installing a drum type sewage solvent trap and neutralizer constructed entirely of antimonial lead. This is a unique installation, conceived and designed by engineers of S. B. Penick and Company.



Above, the all lead sewerage and solvent trap and neutralizer installed in a plant of the S. B. Penick & Co. Left, a drawing of the equipment.



have been a harmful source of sewage contamination by installing a drum type sewage solvent trap and neutralizer constructed entirely of antimonial lead. This is a unique installation, conceived and designed by engineers of S. B. Penick and Company.

Waste materials from one of the company's laboratories consists largely of water which is often acid in reaction or may be carrying small amounts of immiscible solvents. Since this waste product is corrosive and must enter the city sewage system, preventive action had to be taken at the source to neutralize the acid and also remove the immiscible materials. Most sewage systems cannot tolerate corrosives because of possible damage to sewer construction as well as the detrimental effect of these chemicals on normal sewage disposal operations. Certain immiscibles such as oils and solvents tend to hinder disposal operations besides contributing much to the malodor of the sewage. In any event, this company like many others throughout the country has successfully managed to eliminate, at the outset, many hazards which might otherwise have arisen as a result of indiscriminate disposal of contaminated liquid waste products.

All of the chemical wastes from the

laboratory enter from the right of the large diameter trap shown in the illustration. Here the light immiscible solvents rise to the surface and are distilled out continuously by means of a lead steam coil located at this level; the steam exhausting into the chamber. The solvent distillate goes to the floor above where it is collected for separate disposal. Heavy immiscible solvents fall to the bottom of the chamber and are removed at intervals by opening the valve at the base. The balance of the waste now substantially free of sludges, solvents and oils, passes into the smaller diameter trap near the bottom and rises through a bed of broken limestone which neutralize any acids. Thus purged of its harmful contaminants, the purified waste enters the sewer line near the top of the neutralizing chamber. The height of this exit line is so designed as to maintain a constant liquid level in the large trap just above the steam coil. This facilitates effective removal of the immiscible solvents.

The construction details of this entire unit are shown in the accompanying drawing. Antimonial lead (6 per cent) is used throughout as the material of construction because of its greater strength characteristics over that of soft lead. The shells of both traps consist of 8-lb. antimonial lead while the top of the large trap and the top and bottom of the small one consist of 12-lb. antimonial lead. The steam coil is $1\frac{1}{2}$ in. antimonial lead pipe with a $\frac{1}{4}$-in. wall thickness.

This unique trap was installed a little over a year ago primarily to protect the city sewage lines. It has performed this function successfully, having been cleaned and recharged only once during this period. No evidence of corrosion of the lead has been observable.

Bathroom 16 x 27 ft. Waterproofed with Sheet Lead and a Suggested Specification

AN interesting installation of sheet lead for waterproofing a large bathroom was recently made in the Lamda Chi Alpha Fraternity House at the Louisiana State University. The entire bathroom floor, measuring 16 by 27 ft. was completely covered with 3-lb. sheet lead.

The large area covered required several sections of sheet lead which were joined together with welded (burned) joints. Where lead fittings, of necessity, protruded through the pan, a welded joint was made at the juncture. Lead boots or sleeves also welded to the pan were installed around risers and approximately a one foot upstand was used around the entire room, excluding the entrance way. To confine the area of greatest possible seepage, an extra 6-in. upstand welded to the pan, was installed around the shower stalls themselves.

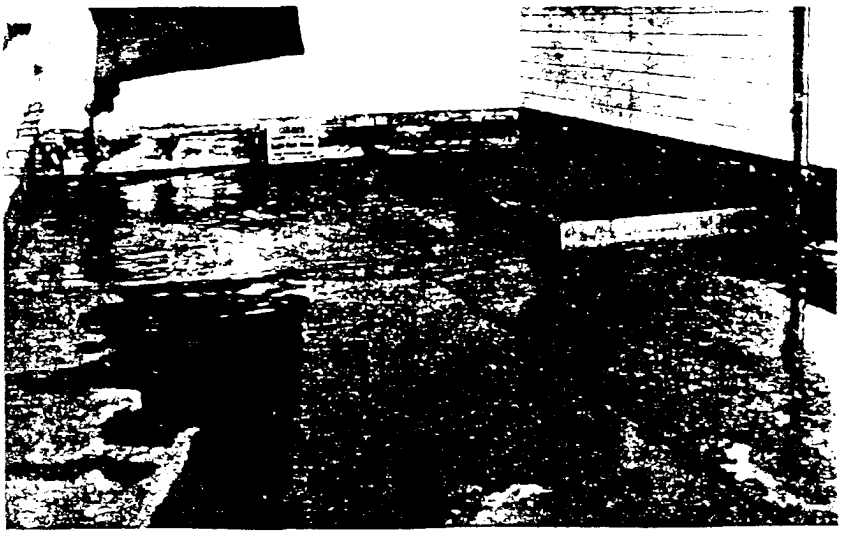
Upon completion of the lead work and before the cement was laid, the entire pan and upstands were coated with a high grade asphaltum paint.

This last is of particular importance as such sheet lead pan failures as have come to our attention have been attributable to the absence of this protection during the concrete curing stage.

The Cerdes Plumbing and Heating Co. of Baton Rouge, La., were the contractors.

Inasmuch as the use of single and multiple shower stalls is increasing, the following suggested specification for lead shower pans, along with the detailed drawings accompanying this article, will probably be of interest:

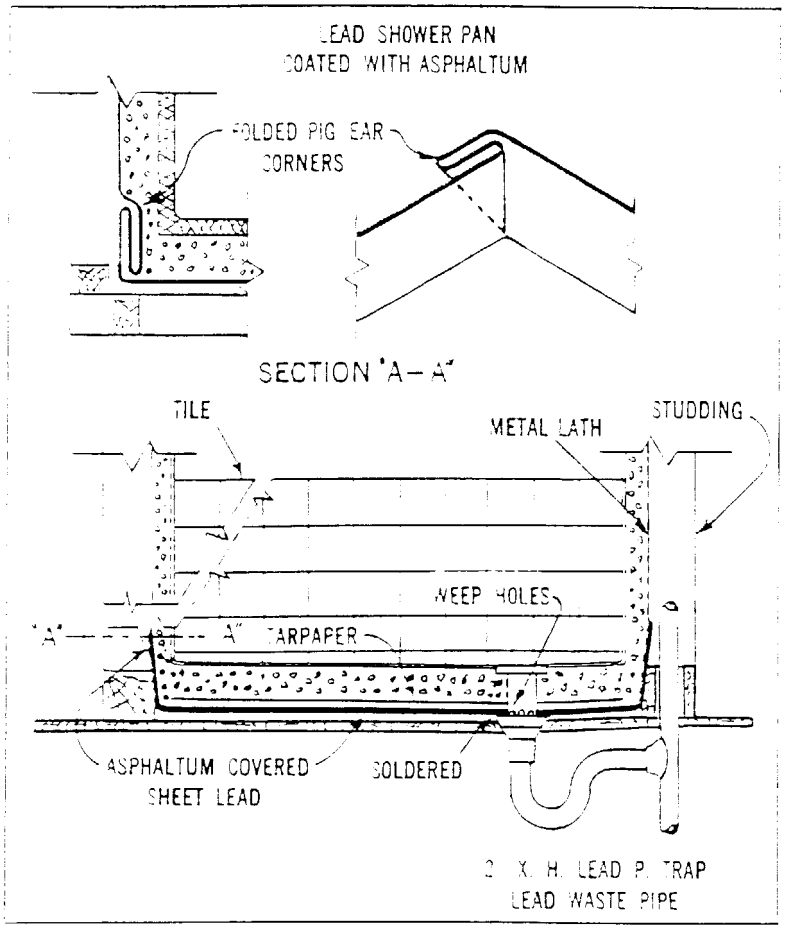
Sheet lead pan installed in the Lamda Chi Alpha fraternity house at Louisiana State University. All joints are welded and after testing a coating of asphaltum was applied.



SUGGESTED SPECIFICATION FOR LEAD SHOWER PANS

Shower stall (room) floors shall be completely lined with 4 lb. (5 lb., 6 lb., 8 lb.) sheet lead pans turned at least 6 in. up the side walls all around. Corners of pans shall be folded tightly against the upstand and soldered (welded) along the top. Corners of pans shall be a lap joint prepared by lapping one side of the upstand over the other at least $1\frac{1}{2}$ in. and soldering (welding) the vertical seam.)

Top of upstands shall be set back $\frac{1}{4}$ in. into notches in studs. Tops of upstands shall be dressed tightly against



masonry walls. In rooms too large to be covered by a single sheet of lead, seams joining sheets shall be lapped at least 3 in. in direction of flow and welded, soldered or tin solder sweated between the sheets to the width of the overlap. Concrete under pans shall be brought to a smooth finish with a mixture of cement and sand, and the lead well coated on both sides with a good grade of asphaltum. Wood floors under pans shall be firm and even with nail heads set, and made of well-seasoned 2 in. boards covered with asphalt-impregnated building paper weighing at least 15 lb. per square. Inside of pans on wood floors shall be well coated with a good grade of asphaltum. A cement and sand mixture shall be used inside pans as foundation for tile. Pans shall be graded to the floor drain to which they shall be securely soldered, welded or clamped. The trap flange shall be countersunk and weep holes provided in the drain just above the lead. The trap shall be plugged and pan filled with water as a test before installing the cement and tile. If pans are left open without immediately installing tile, they shall be protected by heavy building paper until tiled over.

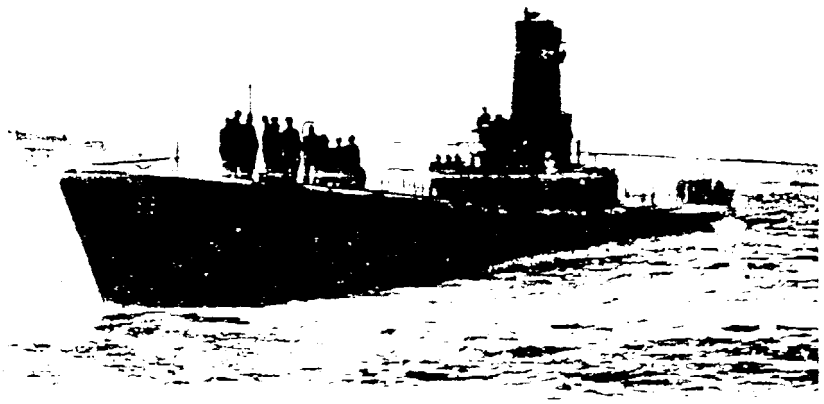
The Use of Lead in Lubricants

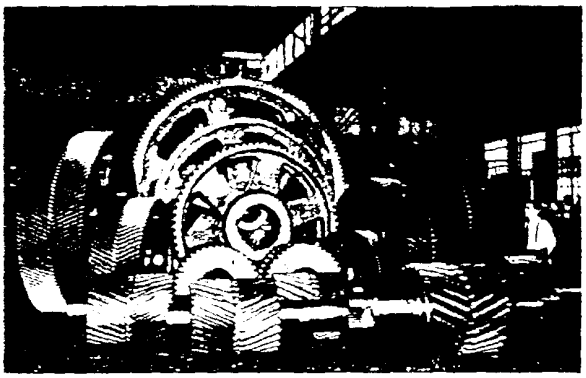
PART I

DURING the last war the British and U. S. Navy Submarine Service had to cope with a serious problem: The fact that oil slick floating on the surface of the sea could be a fatal giveaway to a submarine hiding beneath the surface. It became especially dangerous in the latter years of the war when allied submarines carried the attack to our enemies' shores and harbors.

Propeller shafts, periscopes, thrust-bearing collar mounts all had to be lubricated to assure proper functioning. But the problem was to find a lubricant that would sink to the bottom if any became detached instead of floating to the surface and forming an oil slick. Lubrication experts from several prominent American companies approached the problem by trying to increase the specific gravity of the lubricant so that it would still function as a water- and corrosion-resistant lubricant but would no longer float. After considerable research and experimentation a formula was developed in which a calcium base grease

Ships on which leaded greases were used on all exposed bearing surfaces.





Typical of the heavy service gears for which leaded greases are beneficial in protecting tooth surfaces.

THE FALK CORP

was loaded with finely dispersed powdered metallic lead. The lead added in this form gave the results desired: Specific gravity of the lubricant was greater than that of sea water and could no longer form a tell tale oil slick on the surface. Furthermore the lubricating characteristics and water- and corrosion-resistance were enhanced by the presence of the lead.

While the development of a non-slick, top-side lubricant served a unique function in submarine warfare, powdered lead as an additive in lubricants has served for many years in peacetime applications. Lead in the form of fine powder intimately mixed with grease markedly improves its lubricating properties. High quality leaded lubricants contain an average of 20 per cent by weight of metallic lead which is introduced to the grease during agitation.

In use, the grease acts as a vehicle to carry particles of lead powder to the gear or wearing surfaces where, under pressure, the lead powder coalesces and forms a uniform layer or film of lead. An important and valuable property of such a lubricant is the fact that the extremely tenacious lead lining or covering fills score marks, pitted or worn surfaces and thus, in effect, renews them. Once this has taken place, the lead coating itself becomes the bearing surface and since lead has excellent anti-friction properties, the result is smooth, friction-free, quiet operation.

Lubricants containing metallic lead are exceptionally valuable in applications where gears and bearings are open or exposed to dirt, grit and abrasive materials. The comparatively soft film of lead is capable of absorbing such materials without injuring the bearing surface. Some large herring-bone gears typical of those with which leaded lubricants are used are shown in the accompanying illustration. By guarding against the combined action of corrosive mine waters and abrasion from slimes and grit, leaded greases have found wide application in the mining industry, in mill table gears and bearings, wire rope and cable, ball mills, hoists and pumps.

The use of powdered lead greases on wire rope which consists of strands of wire surrounding a central core of hemp rope is noteworthy. This special grease is applied to the hemp to prevent excessive squeezing of the individual fibers as well as to provide continuous lubrication to the internal wire strands. In this manner knicking of the wire strands and deformation of the core sections are largely eliminated.

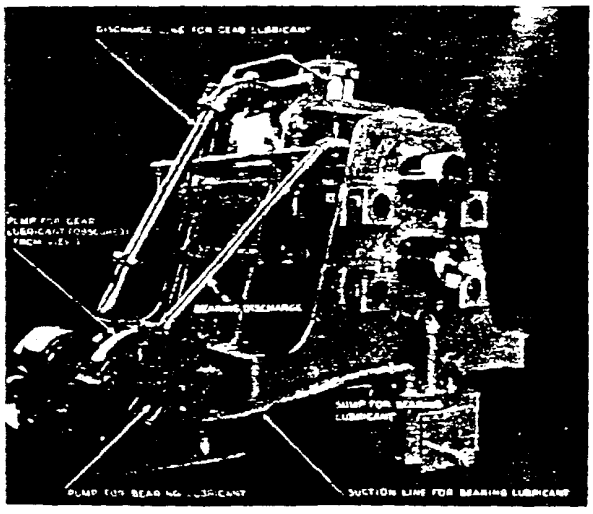
There are several lead greases on the market today which contain the triple combination of metallic lead powder, litharge and lead soaps. Such combinations result in lubricants which materially reduce friction and consequently lower the operating temperature. They have an increased load carrying ability in addition to preventing wear and corrosion. Lead soaps in a lubricant enhance the load carrying capacity of extreme pressure agents and in addition are highly beneficial in improving resistance to corrosion when water is present.

Red lead and sometimes litharge are added to ordinary grease for use as a drill stem lubricant in oil well drilling operations. The lead compounds act as anti-galling agents on threaded joints. Red lead plus grease has also found extensive use as a thread jointing compound for nuts and bolts exposed to high temperature service such as on locomotives and boiler installations.

Not many years ago the use of additives in grease was almost unknown. Today additives to give extreme pressure properties, high melting points, acid resistance, increased tenacity and tackiness, water resistance, foam resistance as well as other properties are available in many different modifications and are widely used.

Part II which will appear in the next issue of LEAD will describe how greases compounded with lead soaps are made, where they are used and how they function.

A pinion drive gear unit showing the control system of a splash lubricator. The important lubricating sections are indicated and are typical of service in which leaded lubricants are used.



THE FALK CORP.

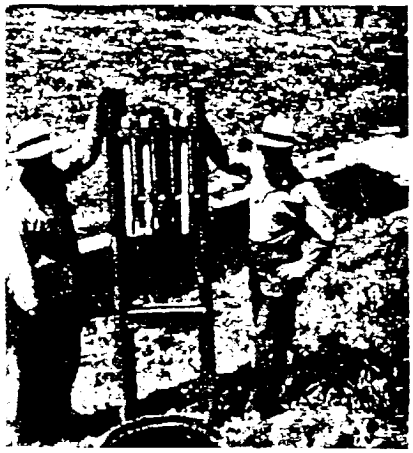
Lead Outstanding in Accelerated Corrosion Study of Plumbing Waste and Vent Pipe Materials

IN a recent test of various materials used in soil waste and vent lines conducted under accelerated conditions in Fort Worth, Texas, lead pipe proved to be outstanding, having a relative life expectancy of more than six times any of the other materials tested.

The results of the test, outlined in a paper presented at the 1949 annual convention of the American Society of Sanitary Engineering, was prepared from data developed by John D. Kane, chief plumbing inspector, Department of Public Works, Fort Worth, Texas.

The test samples, of materials customarily used for soil, waste and vent lines and those recently suggested for this use, were approximately 2 ft. in length and conformed to established plumbing size specifications. The samples were placed in a wooden rack which was then placed in a manhole carrying the return sludge from the Fort Worth sewage disposal plant's aeration basin. The samples were not submerged in the sewage but were kept 18 in. above the water line. Tests of the conditions surrounding the test samples showed the sewage to be alkaline, the condensed moisture on the samples acid and the atmosphere surrounding the test pieces to contain hydrogen sulphide. Of course, being an accelerated test, the conditions of the test were more stringent than ordinarily found in the plumbing system but all of these conditions are present in the ordinary waste system to a lesser degree.

Left. The pipe samples after undergoing the test. The lead sample, extreme right, is still in perfect condition in contrast to the others, all severely corroded and pitted. Below, the wooden test rack and exposure site. The test rack was placed in the manhole shown in the foreground.



The duration of the test was one year and after this time, the weight loss of the lead, a simple method of figuring corrosion, was less than any of the other materials tested. In addition, the lead was the only material not affected by pitting, whereas all of the others were pitted in varying degrees and in one case, had pitted completely through the wall of the pipe. This particular sample had completely failed in six months.

Complete copies of the paper entitled "Comparative Corrosion Study of Soil, Waste and Vent Pipe Materials" are available by writing to the Lead Industries Association, 420 Lexington Avenue, New York 17, N. Y.

Photograph Made with Radioactive Ore

LEAD dust, sprinkled over the word MONITOR which, still wet with ink and placed between an unexposed film and native radioactive ore from Montana, produced the accompanying photograph after 30 hours in the dark room. The original print was made by John Eieslein, son of the publisher of the Boulder (Mont.) MONITOR. The radioactive uranium ore was found on the dump of the Free Enterprise mine.

The Free Enterprise group is operated by the Sunshine Mining Co. under an agreement with the lessee, Elkhorn Mining Co.

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The following articles and reprints contain information, drawings and specifications on the use of lead products helpful to architects, engineers and others in the construction industry. They are available, free of charge, upon request to the Lead Industries Association, 420 Lexington Avenue, New York 17, N. Y.

PROPERTY PROTECTION WITH WHITE LEAD PAINT

A 24 page booklet on the protective value, durability and beauty of pure white lead paint with quantity estimating tables, formulas and mixing and tinting instructions for exterior and interior use.

A STUDY OF PAINTS FOR ENCLOSED STRUCTURAL MEMBERS IN STEEL HOUSING CONSTRUCTION

By H. A. Pray and R. S. Peoples, Battelle Memorial Institute

A reprint of a paper which was read before the General Meeting of the American Iron and Steel Institute, May 25-26, 1949, which sponsored the work. The study included some 35 kinds of paint systems.

AN INVESTIGATION OF PRIMERS FOR MARINE ATMOSPHERIC ENVIRONMENTS

By C. J. Vander Valk, Technical Director, Red Lead Division, Lead Industries Association

Results of an investigation of synthetic vehicles and red lead mixed pigment primers over an exposure period of three and one-half years on a rigorous marine atmosphere. Reprinted from "Official Digest" published by The Federation of Paint and Varnish Production Clubs.

RED LEAD TECHNICAL LETTERS

A series of technical letters issued by the Red Lead Division, Lead Industries Association. The numbers and titles follow. (Available separately.)

Technical Letter No. 3—Red Lead Primers for Atmospheric Exposure.
Technical Letter No. 1—Red Lead Paints for Marine Exposures.

NEW MARINE PRIMERS

By K. H. Roll and C. J. Vander Valk, Lead Industries Association

An article on newly developed paint primers for metals exposed to marine atmospheres written expressly for the person who is not a paint technologist. Reprinted from "Marine Engineering and Shipping Review," March 1949.

CORROSION FORUM

A series of one page articles on the use of lead as a material of chemical construction in contact with the following chemicals (available separately): Chlorine, Hydrochloric Acid, Hydrofluoric Acid, Industrial Alcohol, Sulphuric Acid, Sodium Chloride, Sulphur Dioxide, Phosphoric Acid.

Reprinted from "Chemical Engineering."

COMMERCIAL STANDARDS: Calking Lead, CS94-41

Official publications of the Government Printing Office promulgated by the U. S. Department of Commerce through the National Bureau of Standards, effective June 23, 1941.

FEDERAL SPECIFICATION WW-P-325 For Pipe, Bends and Traps, LEAD

Part 5 of Section IV of the General Standards Stock Catalog, official publication of the Government Printing Office.

FEDERAL SPECIFICATION TT-P-86a Paint: Red-Lead-Base, Ready-Mixed

Covers four types of red lead base paints including two fast drying formulations. Many intended applications listed.

LEAD WELDING

An informative as well as practical guide to lead welding. Reprinted from the "Welding Handbook," Third Edition, published by the American Welding Society.

MATERIALS AND METHODS OF X-RAY PROTECTION

By George Singer, Acting Chief Radiation Section, National Bureau of Standards, Washington, D. C., and George C. Lawrence, Ph.D., National Research Council of Canada

A discussion of the materials suitable for use in shielding X-ray installations. Reprinted from "Industrial Radiography," Vol. IV, No. 2, Fall, 1945.

CORRECTION

In the article entitled "Lead Water Services Under Grueling Conditions in New York," appearing in the last issue of "Lead," Volume Seventeen, 1949, Number Four, it is inferred that siamesing of taps to a single service line is permitted by New York City.

In a communication received from Mr. Joseph J. Halliday, Chief Inspector, Bureau of Water Supply, Manhattan, he states that while "Most certainly the sub-surface conditions in the Borough of Manhattan are the most severe tests for service pipes that may be found anywhere and, through years of experience, it has been found that lead, due to its flexibility and its resistance to corrosion, is one of the best materials for service pipes ..." and less in diameter," nevertheless "This type of connection (siamesing to a single service) is specifically prohibited in Rule #129, page 48, of the rules and regulations of this Department."

The editors of "Lead" are indeed sorry for this inference.

PHYSICAL AND CORROSION CHARACTERISTICS OF LEAD IN THE CHEMICAL INDUSTRY

By K. H. Roll, Lead Industries Association

A detailed discussion of the use of lead in the chemical industry presented before the National Association of Corrosion Engineers Conference, April 12-14, 1949.

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