Prefabricated Lead Plumbing Avoids Construction Delays

THE ease with which lead plumbing can be prefabricated has never been more aptly shown than in two very large housing projects now underway in the midwest and southwestern sections of the country.

In both of these projects, practically the same operational methods of prefabricating the lead work were used. In both, the lead roughing-in was prepared long in advance of actual construction needs in the plumbing shops of the various contractors under ideal working conditions, a situation that permits of assembly line techniques that result in better workmanship at lower cost. This pre-assembly, of course, also allows for steady, all-weather work and a smooth flow of units for quick installation when the buildings are sufficiently advanced, thereby further helping to lower costs by avoiding construction delays, delays that can very often mean the difference between a profitable or losing venture.

The two jobs are public housing projects totaling 4,200 units, 3,500 in West Dallas, Texas, and 700 in and near East St. Louis, Ill.

In the West Dallas project, lead drum traps for all baths with lead waste and vent connections and lead bends for water closet connections were prefabricated for use throughout the 3,500 dwelling units. Individual apartments will have one to four bedrooms in groups of four, six, seven and eight apartments to the building. The total 3,500 units were divided into seven project contracts each having approximately 500 units.

Lead work in process in the plumbing shop on the site of the 3,500 unit low cost housing project in West Dallas, Texas.

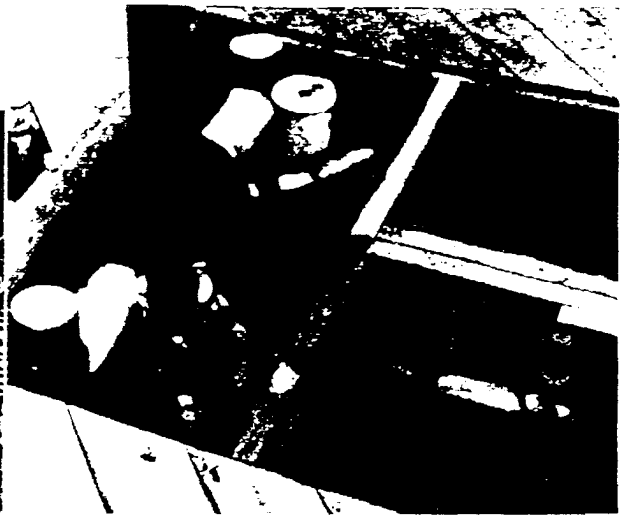
The Farwell Co. Inc., mechanical contractors of Dallas, Texas, secured the plumbing contracts for three of these projects or approximately 1,500 units. The accompanying photographs illustrate the assembly line technique used by the company in prefabricating the plumbing installations. The same pre-assembly methods for the plumbing in the remaining 2,000 units are being used by the Wm. Keseling Plumbing Co. of Houston, Texas, and the Russell Plumbing Company of Oklahoma City, Oklahoma, each of whom have the plumbing contracts for approximately 1,000 units. Plans for the project were drawn up by the Associated West Dallas Housing Architects.

In and adjacent to East St. Louis, Illinois, 700 apartment units are now under construction in three separate projects. Two of these, Roosevelt Homes and Villa Griffin will have 300 units apiece and the other, De Schields Homes, will have 100 units.

E. J. Maag, plumbing and heating contractor of East St. Louis, is installing the plumbing for all three projects and the assembly line technique

Assembly line technique has stockpiled these lead plumbing units for East St. Louis low cost housing projects.

Lead bends, lead drum traps, lead wastes and vents prepared and ready for installation on the West Dallas job.



Typical pre-assembled lead roughing-in installed for back-to-back bathrooms on the West Dallas public housing project.

of preparing the lead roughing-in was used. The work was prepared in advance of construction needs and as a matter of fact, when the accompanying photographs were taken, construction had not progressed sufficiently to secure photographs of the work in place.

The plumbing was identical in each project and high quality, Lead Industries Association "Seal of Approval" lead pipe and fittings were used for all fixture connections, wastes and vents. Drum traps were fabricated in the plumber's shop from 4 in. lead pipe as were roof flanges made from 4-lb. sheet lead. Stacks were cast-iron soil pipe with lead calked joints.

Approximately 96 tons of lead, including 61 tons of lead pipe will be required for completion and the plumbers estimate that 20,000 wiped joints will be required. Even lead scrap accumulated from shop fabrication was utilized by the plumbing contractor in making cast wall flange washers and for calking purposes, a form of economy that can only be practiced when lead is used.

Among the unusual assemblies that were prefabricated for these housing units were 67 harp-shaped waste and vent units, each with four $1\frac{1}{2}$-in. vents and four $1\frac{1}{2}$-in. stubs to provide for back-to-back combination sinks and laundry trays.

Lead Resists Corrosion In Newest Liquid Sulphur Dioxide Plant

SULPHUR dioxide is an important industrial chemical, a large tonnage of which is obtained as by-product from non-ferrous metallurgical operations. Purifying and concentrating sulphur dioxide for use in oil refining, paper pulp production, fruit curing, beet sugar refining, chemical, wine and beer production, has become an industrial process whose growth in importance has paralleled the national concern with air pollution by waste sulphurous gases and, more recently, the decrease in availability of native sulphur, long a cheap source of sulphur dioxide.

The Tennessee Copper Company at Copperhill, Tennessee, recently constructed a new plant for the manufacture of liquid sulphur dioxide based on a process perfected by the American Smelting and Refining Company at Selby, California ("Lead", Vol. 18, No. 3). The process serves as a prime example of how modern chemical engineering can take advantage of lead to combat the corrosive action of wet sulphur dioxide gas alone as well in combination with a highly corrosive organic liquid, dimethylaniline saturated with sulphur dioxide.

Briefly, the process involves absorbing $7\frac{1}{2}$ to 8 percent sulphur dioxide gas in dimethylaniline (DMA), an organic solvent. The sulphur dioxide is then stripped from the absorbent by means of indirect steam. Next it is cooled, dried with 98 percent sulphuric acid, compressed and stored as a liquid under 30 to 40 lb. per sq. in. pressure until ready for shipment.

Absorption of dilute sulphur takes place in a bubble cap tower. The shell of the tower is made of 12-lb. chemical lead erected in sections and supported by steel columns and ring angles. Inside the tower are 19 trays made of $8\frac{1}{2}$ percent antimonial lead $\frac{3}{4}$ in. thick and supported on bonded lead steel spiders. Antimonial lead bubble caps 4 in. in diameter are positioned on each tray.

Stripping of the sulphur dioxide-laden DMA and recovery of the absorbent are also accomplished in a bubble cap tower of smaller size. The shell in this case consists of bonded lead lined steel sections, the steel and lead each $\frac{1}{4}$ in. thick. Supported on bonded lead lined steel bars welded

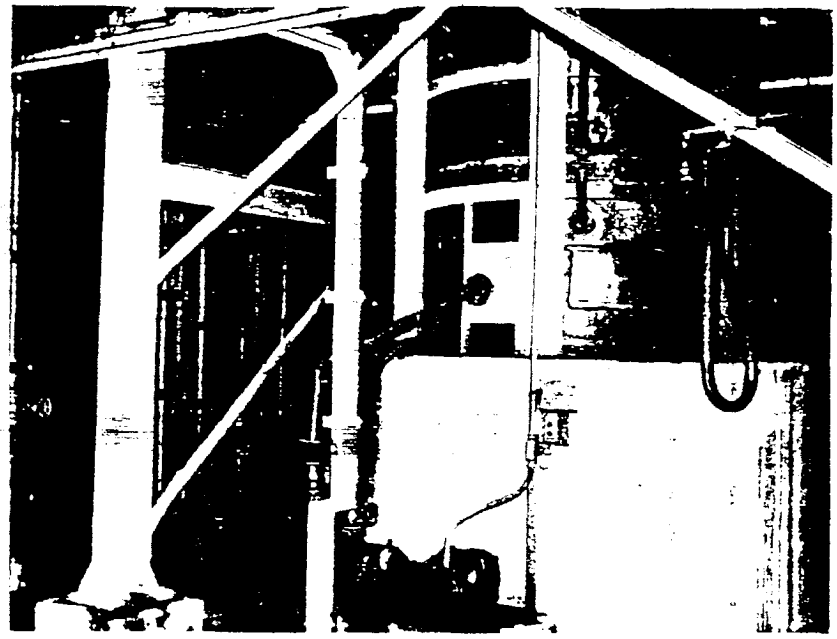
to the tower shell are 29 antimonial lead bubble cap trays.

Drying of the purified sulphur-dioxide gas is accomplished in a steel bubble cap tower, the lower portion of which is lined with 16-lb. lead to serve as a sulphuric acid storage vessel. The first tray, subject to weaker acid and wet gas, is constructed of lead as in the other towers while the upper 6 trays and caps exposed to 98 percent acid are of steel.

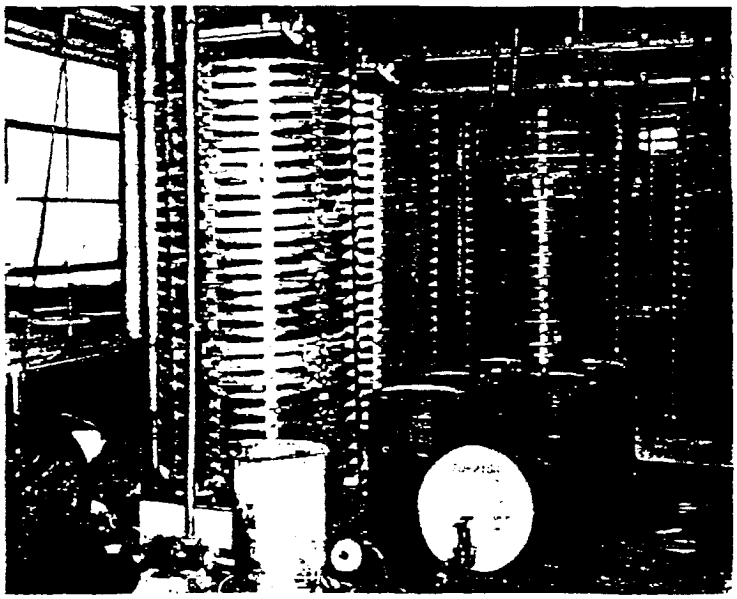
Also playing a prominent role in the DMA system of liquid sulphur dioxide manufacture are a number of lead lined steel tanks and sheet lead tanks of cage type construction used for storing and separating various chemicals. DMA solutions to and from the circulating pumps are handled in lead pipe. Cooling of the DMA solution takes place in six lead pipe coolers each consisting of 6 percent antimonial lead pipe 1 in. in diameter formed into two helical coils, one nested within the other. Cooling water is sprayed over the outer surface through a circular lead distributor.

At one stage in the process it is necessary to effect a heat exchange between hot, stripped DMA and relatively cool, sulphur dioxide-laden DMA. The heat exchangers are illustrated herein and described in greater detail in a previous issue of "Lead" (Vol. 18, No. 3). They consist of concentric lead pipes, the outer having a 2-in. I.D., and being of 6 percent antimonial lead; the inner a 1-in. I.D. of finned cross section chemical lead. The coil is designed so that the area of the space between the two is approximately equal to the cross-sectional area of the inner pipe.

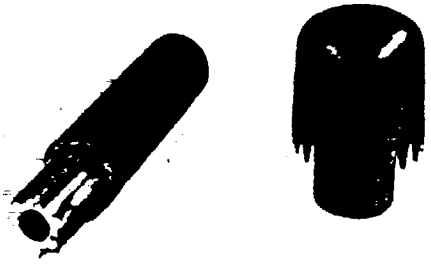
This liquid sulphur dioxide plant is the second of its kind to be constructed in this country. It represents the very latest design in modern waste gas recovery and utilization systems with a capacity of 30 tons per day of pure water-white liquid sulphur dioxide. To achieve this production with a minimum of shut-down time due to corrosion-caused failures approximately 95 tons of lead were used in fabricating the plant equipment.



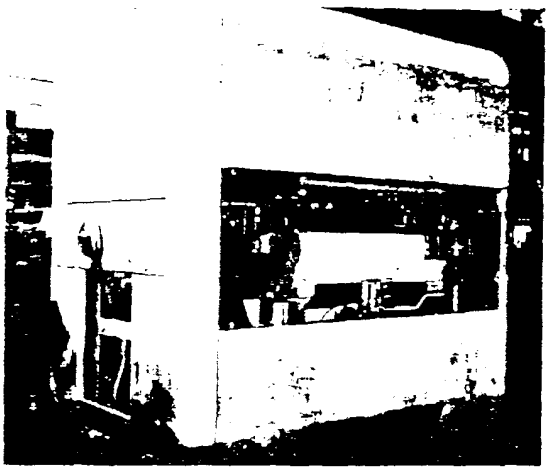
Base of bubble cap tower where sulphur dioxide is absorbed in dimethylaniline. Shell of tower is lead, as are trays and bubble caps inside. Lead piping can also be seen.



Left, DMA heat exchanger consisting of lead coils. Below, section of concentric lead pipe used in DMA heat exchanger is shown at left; at right, a 4-in. diameter lead bubble cap.



Synchrotron Employs Lead For Radiation Protection



The new 70 million electron volt synchrotron developed and built by the General Electric Co. for the California School of Medicine.

PHOTOS BY GENERAL ELECTRIC CO.

TWO and one-half tons of lead varying from 2-in. to 10-in. in thickness eliminate stray radiation in a new source of high energy X-rays known as the synchrotron. Recently installed at the California School of Medicine, the synchrotron is an X-ray deep therapy machine for combatting cancer. It consists essentially of a magnet and electron source capable of generating high energy X-rays able to penetrate much greater depths than conventional vacuum tubes.

Developed and built by the General Electric Company at Pittsfield, Mass., the synchrotron is suspended by means of a hydraulic-mechanical mechanism which permits elevating it fifteen feet over the floor above a patient or lowering it directly over the patient. It is also able to rotate about fixed shafts thus enabling the X-ray to be directed at any angle.

The main components of the mechanism are a doughnut shaped vacuum tube surrounded by a large laminated core which becomes magnetized by high voltage coils. The electrons are injected into the vacuum tube located in the magnetic field and then accelerated to about 186,000 mi. per sec. At this speed they strike a fixed target which causes them to pass through the walls of the doughnut and out into the air as highly penetrating X-rays.

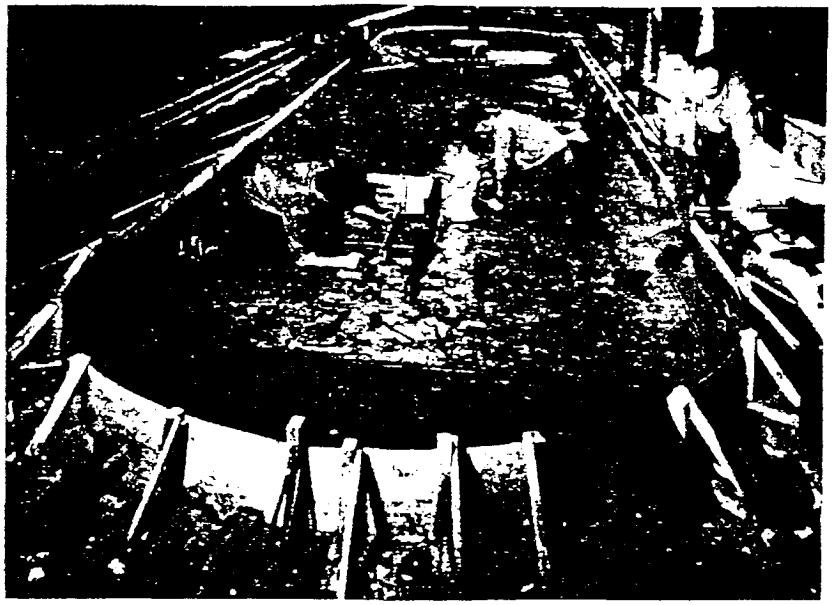
Protection of operating personnel as well as the patient from dangerous stray radiation is gained by confining the entire unit in large lead chambers, the lead being bonded directly to the steel casing of the sheathing. The complete machine is operated by remote control from a portable unit in the X-ray room which is lead lined to eliminate radiation in the adjoining rooms. After aligning the beam to the position of the patient, the technician leaves the room and operates the synchrotron from a master control desk to avoid the possibility of exposing himself to excessive radiation.

As distinguished from the betatron previously described in "Lead" (Vol. 18, No. 5) which is capable of producing 22 million electron volts for medical treatments, the synchrotron can generate higher energies and can be almost universally positioned. Both operate on the same principle, however, and require the density of lead to absorb dangerous rays emitted in directions other than desired.

Below, component parts of lead shielding chambers. Lead is bonded to a ⅜-in. steel shell. Right, synchrotron before enclosure in outer casing, showing lead shielding in place.

Grand Central Station Avoids Water Seepage With Lead Pans

RESTAURANT kitchens, soda fountains, washrooms, rooms for certain industrial processes, bathrooms, shower rooms, wherever floor surfaces are subject to frequent or constant wetting or flooding, pose the problem of controlling seepage to protect the building structure and spaces below. The problem is solved by the use of a sheet lead pan, called a safe pan, under the floor of the leakage source. The Grand Central Terminal in New York City is somewhat unique in that it has several different installations requiring this type of protection. Experience has demonstrated to engineers of the New York Central Railroad, which owns the Terminal, that a lead pan best serves the purpose and prevents the expensive damage that might otherwise occur. Accordingly, all such installations in the Terminal are so equipped.

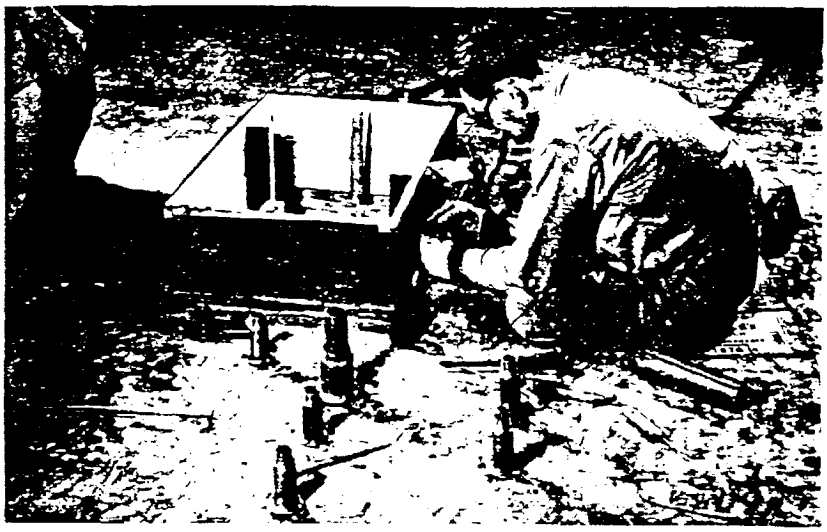


An 8-lb. sheet lead pan, 46 ft. x 12 ft., installed under a luncheonette fountain on the upper level of Grand Central Terminal.

A recent instance of this is the lead safe pan under the new fountain in the Terminal Luncheonette, operated by the Union News Company on the concourse level of the station. The water problem here is caused by the constant floor washing and the presence of such water-using equipment as soda dispensers, coffee urns and sinks, but beyond this is an extra corrosion problem caused by spillage of acid-containing fruit syrups. The corrosion resistance of lead admirably suits it to negating this hazard.

The safe pan covers an area of approximately 46 ft. x 12 ft. and is made entirely of eight pound per square foot sheet lead. The individual lead sheets are welded together. All penetrating pipes are collared with a lead sleeve which is welded to the pan to prevent leakage at these breaks in the lead pan. Inverted V bleeders leading to weep holes in the floor drain are tack welded to the pan. An eight inch upstand surrounds the entire pan and a box-like opening in the floor for refrigerating lines.

Workman welding lead upstand around opening for refrigeration lines. Note lead sleeves in place around penetrating pipes, ready to be welded to pan.



Of prime importance in the installation of a lead safe pan is the proper preparation of the lead surface before pouring concrete for the new floor. The surface is coated with asphalt paint. This is done because water which has seeped through cement, concrete or mortar containing free lime may be corrosive to lead as it is to many other common metals. The asphaltum protects the lead during the curing period of the cement. After the cement has completely carbonated the danger no longer exists. In addition, for the Terminal Luncheonette a layer of roofers felt was put down before pouring to protect against abrasion from the gravel. This, of course, is desirable.

The proven dependability of lead for this purpose is the reason for its long-time use in all sorts of applications where constant wetting is a problem.

Lead Helps Preserve Basic Documents Of The United States

Method used for hand soldering protecting sheets of tempered glass to the lead separation strip to form a completely air-tight enclosure.

LIBBEY-OWENS-FORD GLASS CO.

THE Declaration of Independence, the Constitution and the Bill of Rights are precious and irreplaceable documents whose preservation for an indefinite number of centuries is vital. Even harmful effects that appear only slowly or to a slight extent become important in this instance. Hence the Library of Congress requested the National Bureau of Standards to determine the best means of preserving the sheepskin parchments on which these historic statements are inscribed.

The Bureau decided to enclose the documents within sealed glass enclosures filled with helium. This protects them against chemically active gases such as oxygen and sulphur dioxide, insects and microorganisms and contamination with dirt or corrosive substances while, at the same time, they can continue to be on display to the American people in a shrine at the Library of Congress.

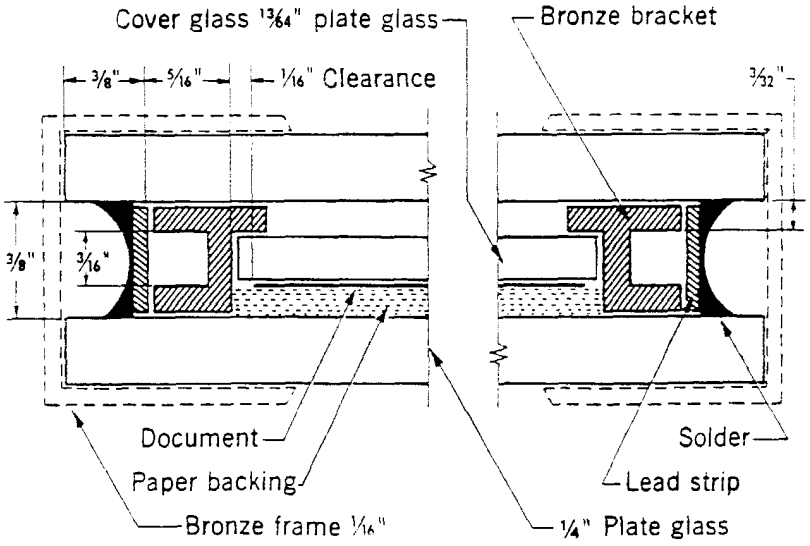
The Bureau of Standards determined, after tests, that the helium should contain between 25 and 35 percent moisture at room temperature. Too little moisture leads to brittleness and cracking of the parchment and too much to the growth of bacteria and hydrolytic reactions.

Double glass panels made commercially as "insulating" windows under the trade name "Thermopane" by Libbey-Owens-Ford Glass Company were selected for the enclosures after exhaustive tests by the Bureau of Standards. The special panels for the preservation of these documents consist of two panes of tempered plate glass. There is also enclosed in the panels a cover glass which lies directly on the documents, but has nothing to do with the sealing function. The two panes of glass are separated and held together in the unit by $\frac{3}{8}$-inch lead separator strip soldered to the edges of the panes so as to seal the unit hermetically. A special metallic coating is first applied to the glass surfaces at its edges so that a complete metal-to-glass bond is effected. Thus glass, lead separator strip, helium gas, and special leak detectors, have been combined to provide the desired protection to these priceless parchments. At the same time the unit serves to give the public a better view of the documents.

In commercial Thermopane the lead separator strip is either $\frac{1}{4}$-inch or $\frac{1}{2}$-inch in width. Large "picture windows" are normally fashioned of two pieces of $\frac{1}{4}$-inch polished plate glass separated by a $\frac{1}{2}$-inch dry air space. In many smaller windows Thermopane is composed of two pieces of $\frac{1}{8}$-inch glass with a $\frac{1}{4}$-inch dehydrated captive air space.

The lead separator strip, in addition to being a road-block to the invasion of moisture, provides flexibility so as to accommodate the differences in expansion or contraction when the outer glass is exposed to extreme cold and the inner glass to room temperature.

Constructional details of type of enclosure in which are encased the Constitution, Declaration of Independence, and the Bill of Rights.



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METAL PROTECTIVE RED LEAD PAINTS

The versatility of red lead in protective primers to meet a wide range of surface conditions, drying schedules and economic demands is described. Reprinted from "Paint and Varnish Production," January, 1951.

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)

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

CONTROLLING CORROSIVE AIR POLLUTANTS

A discussion of the various methods in use today to control corrosive air pollutants. Reprinted from "Air Repair," May, 1952.

LEAD IN MODERN CHEMICAL CONSTRUCTION

What you should know about the various types of lead construction in the chemical field. Reprinted from "Chemical Engineering," Jan. 1952.

NEW DEVELOPMENTS EXPAND USE OF LEAD CONSTRUCTION

Improvements in lead fabrication and installation methods are described and illustrated in a reprint from "Materials & Methods" May, 1951. The article shows how lead construction developments have continued to keep pace with developments in the chemical and process industries.

THE USE OF LEAD IN THE PULP AND PAPER INDUSTRY

Detailed description of various applications of lead in the modern pulp and paper mill. Covers all phases of paper pulp manufacture and treatment including sulphite acid manufacture, acid pulping, bleaching and stock handling. Reprinted from "Paper Trade Journal," Oct. 26, 1950.

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.

LEAD IN MODERN PLUMBING— WHY, WHERE, HOW IT IS USED

A 24 page booklet containing descriptive information as well as four pages of detailed drawings for plumbing installations in various type houses.

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