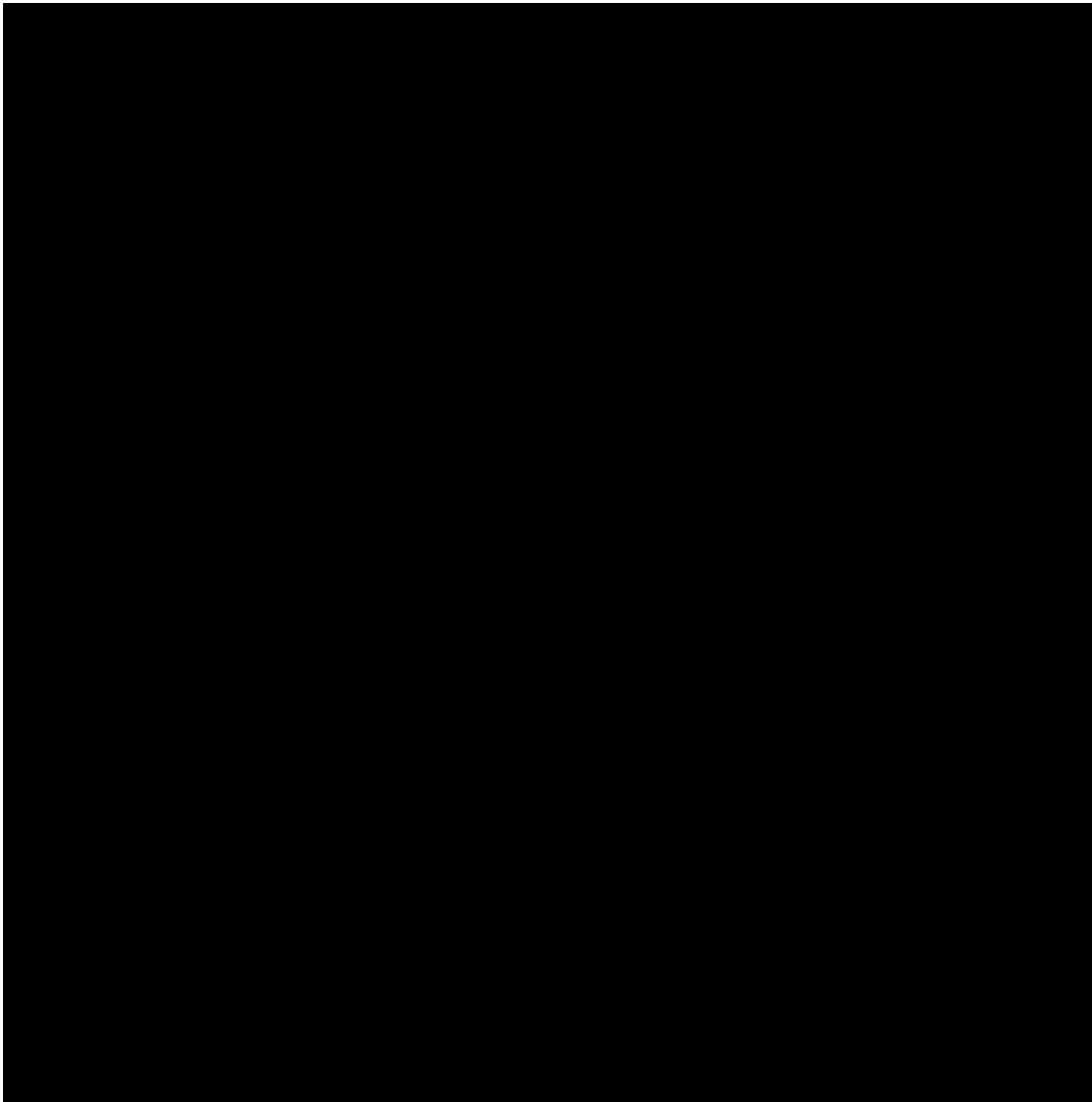


Where Weight Must Be Added Lead Concentrates It in Smallest Space

THE design of industrial lift trucks for use in intra-plant transportation, warehousing and carloading involves careful consideration of maneuverability as well as the mechanical details of power application. A number of manufacturers of these rugged little vehicles are now making use of the relatively great weight of lead to keep their dimensions small so that they can operate in the smallest possible spaces.

Most of the lift trucks carry their loads ahead of the wheelbase on racks or "forks" which slip under the load to lift it. When the fork rises the front wheels become a fulcrum around which the weight of the truck must overbalance the load. Many of the trucks are extremely powerful and can raise loads heavy enough to overbalance the mechanical structure of the truck. To avoid the embarrassing situation of having the load remain on the floor while the back wheels rear up and spin it is necessary to weight the rear end of the truck. Of course the greatest advantage of such a weight is gained when the weight is farthest from the front axle but every increase in the length of the vehicle reduces its ability to turn in limited spaces. Therefore it is desirable that the counterweighting material occupy the least possible space.

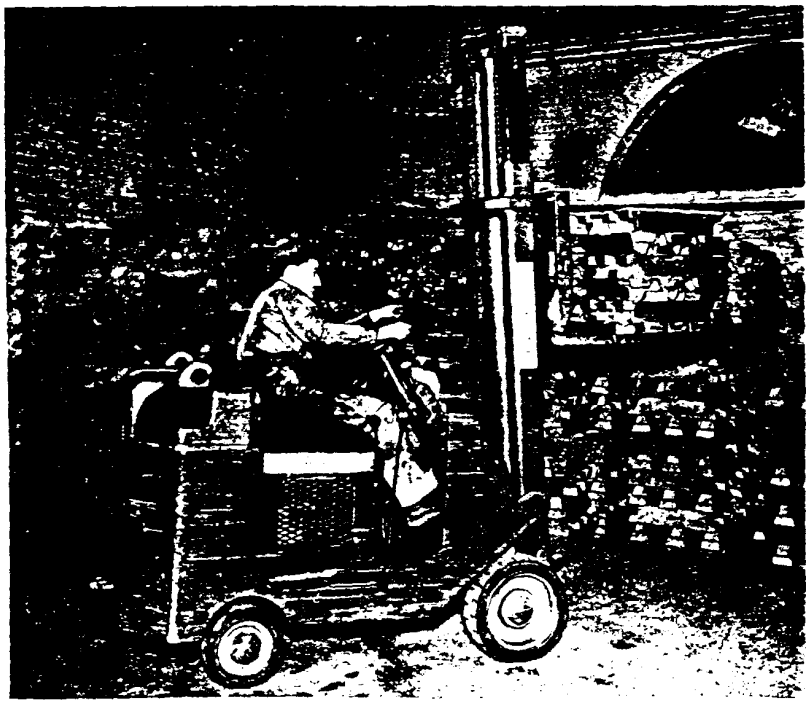
Lead is without doubt the heaviest material in relation to its bulk that is commonly available. In addition it is easily shaped by casting or it can be melted and poured directly into prepared spaces in the body of the truck. It is durable and does not have a tendency to work loose and rattle. For these reasons lead counterweights are now being extensively used by truck manufacturers.

Examples of trucks showing both types of application are shown in the accompanying illustrations.

Precast weights are used by the Elwell-Parker Company of Cleveland, Ohio in their crane trucks as well as their lift trucks. The cover picture shows weights being placed in position in a crane truck of this make. The Baker-Raulang Company of Cleveland, manufacturers of the Baker lift truck shown above use a poured lead weight in a box at the rear. Both of these electrically powered trucks also take full advantage of the lead and storage battery for balancing purposes.

Electrically powered lift truck piling merchandise. Lead poured in place in rounded truck body counterbalances the load.

Gasoline powered lift truck handling pig lead in a large lead manufacturing plant. Precast counterweights set in rear of body help to balance the load.



The Towmotor Company, also of Cleveland, use precast-weights set into the triangular spaces on either side of the power plant. Each weight is cast with a steel loop for lowering it into place in the truck.

Because of the great weight of lead in relation to its bulk the center of gravity of the counterweight is located at the greatest possible distance from the front wheels. This reduces the total weight necessary and introduces the paradoxical condition where the total weight of the vehicle can actually be reduced by using the heaviest material available.

Althought the reason for using lead counterweights on industrial trucks is to reduce the length of the truck, the principle of reducing the total weight of counterbalanced assemblies by increasing the moment arm as the volume of the counterweight is reduced can be helpful in many cases where the total weight is a critical item.

South or North
Pure White Lead Does a Good Job

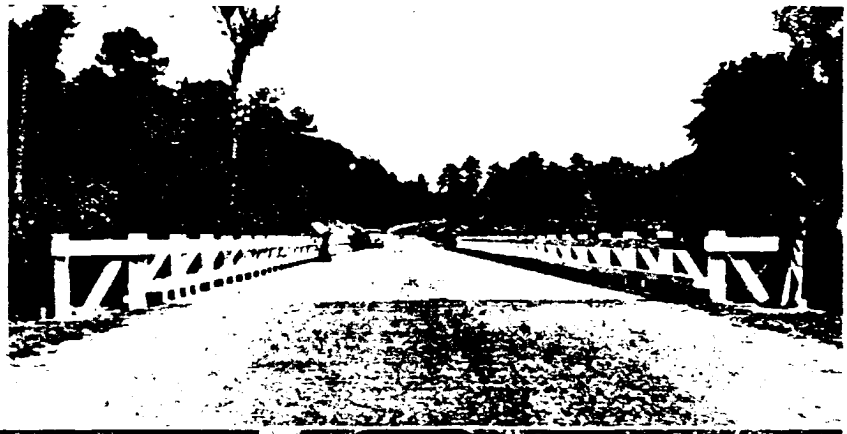
PAINT maintenance has long been considered a difficult problem in the deep south where temperatures run high and the climate is humid. As a result many structures, especially the smaller ones, have commonly gone unpainted. However, in the words of the song "It ain't necessarily so" and records of the fine performance of pure white lead paint are regularly coming to light to prove it.

The photographs herewith show how pure white lead paint has increased the attractiveness of a wide variety of structures. The comments of the users are typical of the remarks of users of pure white lead the country over. "It prolongs the life of the wood" say the owners. "I use it because my customers have found it most satisfactory" says the merchant. "It doesn't crack and peel. I can paint over it without scraping or burning" says the painter.

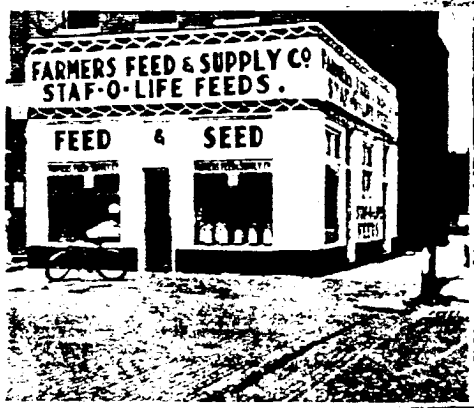
These comments by users of pure white lead paint in Lowndes County, Georgia, the heart of the turpentine producing district of the south where the climate is hot and relatively humid show that the pure white lead paint provides a satisfactory solution to the supposedly difficult paint problems of the southern areas.

It is a common assumption that different climatic conditions require special paint formulations to withstand their respective destructive effects on paint. The facts are that the weather attacks paint in about the same manner whatever the climate. The attack varies in degree or severity but not in kind. The most durable paint in one climate is likely to give the best performance in another. That is why "you're money ahead when you paint with white lead" in any climate.

Visibility of guard rails of this wooden bridge structure in Lowndes Co., Georgia is increased by the use of pure white lead paint.

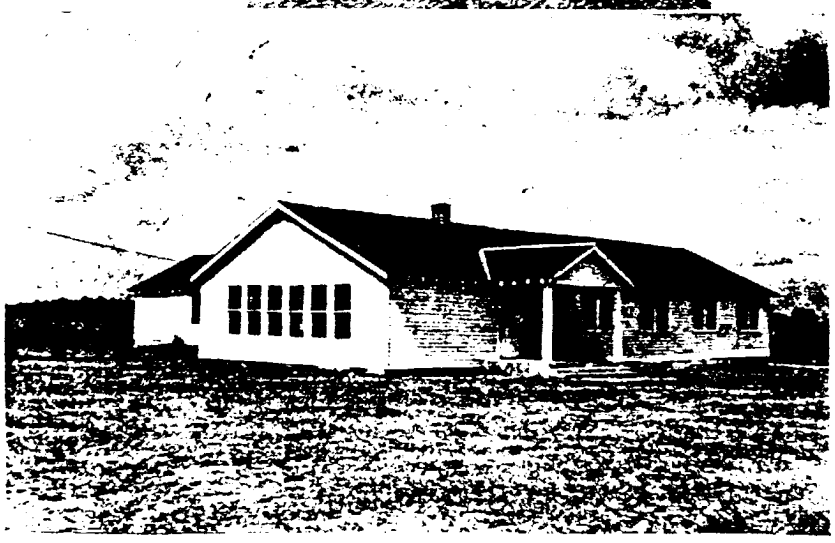


Paint materials may be sold by the feed store in the small town. This merchant uses as well as sells white lead paint.



Pine Grove Vocational School in Lowndes Co., Georgia, demonstrates to its students the durability of pure white lead paint.

Election day should be a pleasant holiday where voters gather in this attractive white lead painted voting precinct.



Weather Balloon Radio Powered By Lead-Acid Storage Batteries

FLYING on regular schedules often far higher than human endurance will tolerate, automatic radio transmitters send out data on temperature, pressure and humidity to the meteorologists who furnish weather forecasts to the army. These transmitters, carried by free balloons are completely automatic and carry a power pack of lead acid storage batteries.

These batteries are the smallest high voltage storage batteries ever built commercially and they weigh only about six ounces each. Three batteries of 18 cells each are required to furnish the high voltage plate current required by the transmitter. A three cell battery of about the same size supplies the filament current. The cases are of plastic and the separators are of a special absorptive material which provides positive spill proof protection for the electrolite.

The lead acid battery is particularly well adapted to this use because. once the plates are formed, the battery can be stored dry until required for use, then filled with electrolyte and put into service thus eliminating the usual storage battery hazard of self discharge or the deterioration which is unavoidable in so called dry batteries. Since weather observations are usually made daily a considerable stock of batteries must be kept on hand which makes necessary the careful consideration of the keeping characteristics of the battery. The freshly filled lead-acid battery can be depended upon for full current strength.

A tiny lead-acid storage battery and the lead coated steel vacuum pack shipping container which automatically fills 4 batteries with electrolyte before being unpacked. Pencil points to one of the holes through which each of the eighteen cells must be filled.

The manufacturers of these tiny batteries, the Willard Storage Battery Co., have also developed an ingenious method of filling them with electrolyte which makes use of lead's resistance to acid attack. When first developed each cell had to be filled by means of a hypodermic syringe. This was a very tedious operation and when done in the field was extremely difficult. It is now done automatically by admitting the electrolyte to a metal container in which a complete set of batteries for one observation flight are packed under high vacuum which draws the required amount of liquid into each cell.

Here lead performs another service in protecting the steel container from the corrosive action of the electrolyte. The entire can inside and out is coated with lead which is highly resistant to the sulphuric acid. Thus lead is performing the double function of furnishing power and safeguarding the power supply for the weather observation services.

Economical Utilization of Lead Necessary To Maintain Supplies for Essential Use

WAR and essential civilian demands for lead have continued to increase and the military forces have found that they need more lead for small arms ammunition and other purposes than they originally anticipated. At the same time manpower shortages both here and abroad have reduced production and imports of lead, and for the last couple of years there have been only minor Government restrictions on its use. Consequently there is no longer enough lead for all military and civilian uses and the situation has reached a point where the War Production Board has found it necessary to issue a new order more rigidly controlling the use of lead.

This order, M-38, places restrictions on the amount of lead that may be used for a number of less essential purposes, prohibits its use for some purposes, and places no limit on its use for military and highly essential civilian applications. The order itself should be consulted for specific restrictions and exemptions because of the variety of uses to which the lead is put in modern industry.

Many users of lead products will not get as much of these products as they need. However, some will. For instance, there is no restriction on lead for chemical equipment where its use is necessary for resistance to corrosion. Lead for calking is not restricted. Lead pipe, sheet and fittings are made available by the order where municipal and state regulations require their use. A number of other uses are not restricted. On the other hand white lead for civilian painting will be hard to get.

The situation calls for economical usage of lead and avoidance of wastage. There are many ways in which such economies can be made. In a nation accustomed for so long to use its resources lavishly much material can be saved by giving more careful consideration to the quantities used in each individual job.

To accomplish savings by this means is the responsibility of the designer and fabricator of lead products be he engineer or plumber. In addition all scrap lead should be collected and returned to the market as quickly as possible. By means of conservation and salvage, adequate supplies for essential uses can no doubt be maintained.

Wiscasset Public Library, built in 1805, was originally used as a bank. In 1870 it was converted to a residence and later it became the library and women's club building. The interesting texture of the white lead painted brick walls adds much to its charm.

The Smith house, built in 1797, was the home of eccentric Mary Woody Emerson, who went about dressed in her shroud. More cheerful now, it is painted with pure white lead paint.

The Cook Hubbard house, built in 1828, by Francis Cook, Collector of Customs of the Port of Wiscasset. Pure white lead paint is equally well adapted to the brick of the original house and to the wood construction of later additions.

PHOTOS BY DAYTON SNYDER

A Portfolio of American Landmarks

No. 29

Painted Brickwork In Wiscasset, Maine

IT is traditional that the early American house be built of wood painted white, usually with pure white lead paint. However wood construction was not universal and fine examples of brick construction are commonly found in New England. Many of these are also painted.

The problem of the selection of the proper paint to use on brickwork was commonly solved by the early American builder by using the same dependable pure white lead paint which served so well on his contemporary wood houses. That it performs equally well on brickwork is shown by the three houses in Wiscasset, Maine, illustrated on this page.

The Wiscasset Library is modern enough in appearance to be the work of a contemporary architect. The Smith house, the first brick house in Wiscasset, is as neat as any present day suburban residence and the Cook-Hubbard house might be a recently built farm house, yet each of these houses is well over a hundred years old.

Pure white lead was the standard paint material of the early American builders and they used it successfully on all of the common building finishes. The present day owners of these houses continue the same excellent practice and the appearance of the houses demonstrates the soundness of their judgment in buying paint materials.

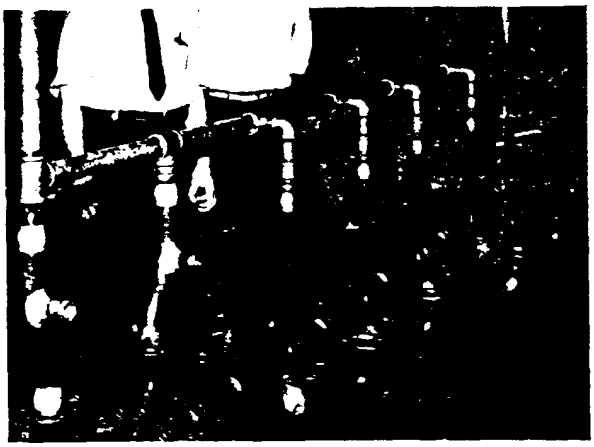
THIS IS NO. 29 OF A SERIES REPRESENTATIVE OF THE MANY AMERICAN LANDMARKS IN VARIOUS SECTIONS OF THE COUNTRY THAT ARE PRESERVED FOR THE FUTURE WITH PURE WHITE LEAD AND OIL PAINT. MANY OF THEM HAVE ALWAYS BEEN PROTECTED WITH THIS RELIABLE MATERIAL ACCORDING TO AVAILABLE RECORDS.

Over Two Years of Service Prove Design of Hard Lead Closet Flange

HARD lead floor flanges for water closet connections have now been on the market for two years. They have been found to be satisfactory by the plumbers who have put them to actual use as well as by the sanitary engineers and plumbing inspectors who have run tests on them for strength and adaptability. They have proved to be amply strong for use in public toilets as well as in residences where ruggedness is not of such prime importance.

An example of such an installation is found in the "Music Box" recreational building in Omaha, Nebraska. Here a remodeling project included the relocation of a battery of water closets. The installation which was made in accordance with the Omaha plumbing code includes lead bends properly vented with lead and lead lavatory wastes and vents.

In this case the installation is made with wiped joints and the flanges are soldered to the bends. Had the connections been made by lead welding the flanges could also have been welded to the bends without tinning or other special preparation.



Hard lead closet flanges in place on lead bends in new toilet room in Omaha, Neb., recreation establishment.

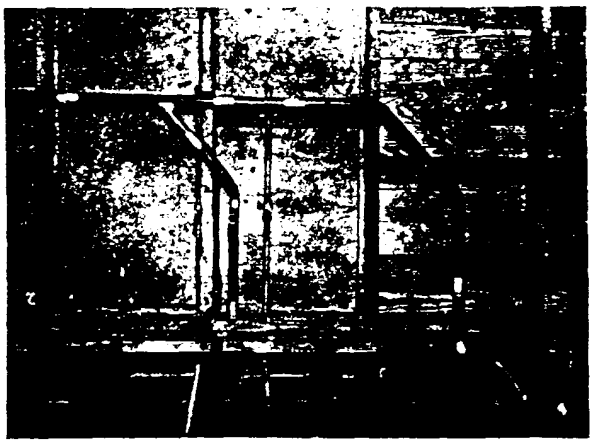
In specifying the hard lead closet flange it should be kept in mind that the Lead Industries Association's Seal of Approval on each flange identifies it as being in compliance in design and composition with the specifications of the Association. These specifications were established by means of extensive study and testing and they can be relied upon for strength and durability. The requirement of the Lead Industries Seal of Approval on all lead plumbing supplies is a convenient and sure way of insuring the use of high quality material while leaving the specification completely open since any manufacturer who meets the standards of the Association in his products may be licensed to mark them with the seal. The sole purpose of the Seal of Approval is to indicate that those standards have been met.

It is known and recognized throughout the plumbing trade.

Lead Pipe Soil Lines Get Through Where Space Is Limited

ONE of the principle advantages in the use of lead plumbing is its simplicity and directness of installation. This is important in new work where it shows up in savings of material and time as well as in remodeling where it often helps solve problems in locating and grading waste lines and vents.

These points are well illustrated in the accompanying photographs. The first one, taken in residence in Corpus Christi, Texas, shows the clean lines of an all lead waste and vent frame with vent lines run diagonal to make all connections in the direction of flow and to save pipe. No fittings and therefore no joints are required at the bends so the pipe is just as smooth inside as it is outside.



Waste and vent frame of lead in a residence in Corpus Christi, Texas. Note economical use of pipe and absence of fittings.

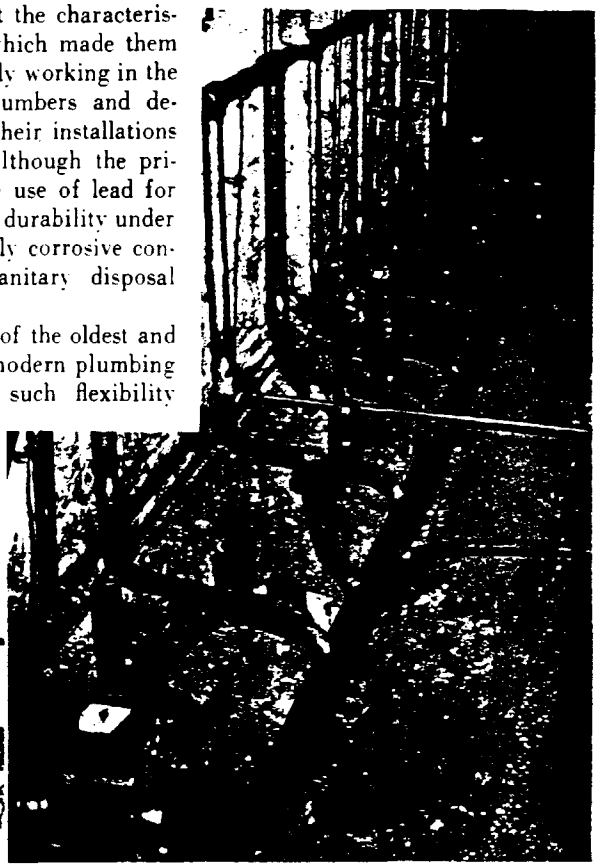
The second picture shows the roughing in for a new toilet room in the Tulsa World Building in Tulsa, Oklahoma. Here a long branch line of 4 in. lead pipe serves three water closets, three urinals, a slop sink, two lavatories, and two floor drains allowing proper fall to be obtained with a

minimum raise in floor level. The ease with which lead pipe can be bent to fit a location and joined at the nearest or most convenient point did much to simplify this installation.

Another installation in the Mayo Building, also in Tulsa, consists of the installation of an additional water closet and lavatory, a floor drain, and the relocation of the original lavatory. Here, again by using a 4 in. lead branch, the roughing in was accomplished in a minimum space, this time without changing the original floor level. Here again the advantage of unrestricted joint locations is also of great advantage as is shown where the closet vents are wiped in just above the heel of the closet bend.

Of course these remodeling jobs are special cases but the characteristics of lead work which made them possible are constantly working in the hands of careful plumbers and designers to simplify their installations and save material although the primary reason for the use of lead for plumbing is its great durability under exposure to the highly corrosive conditions found in sanitary disposal systems.

Only in lead, one of the oldest and yet one of the most modern plumbing materials is found such flexibility plus durability.



Below—Space saving lead soil line and lead fixture connections in Mayo Building, also in Tulsa.

Above—Four in. lead soil line serving seven fixtures in new toilet room in Tulsa World Building in Tulsa, Okla. All fixture connections and vent branches also of lead.

Water Service Installation Costs Vary But Costs of Lead Pipe Remains Small

THE comparison of the relationships between the cost of pipe used in water services and the cost of the complete services installed as they occur in various cities has proved to be an interesting study. Previously published have been itemized accounts of such costs in two large cities, one in the east and one in the middle-west. In both cases the total cost of the service is comparatively high due to the unavoidable administrative costs, permits, safety precautions and working conditions in a large city. Under such conditions the cost of the superior protection from troubles due to corrosion damaged afforded by lead pipe is so low as to be almost negligible.

Even in localities where installation costs of services run lower the price of such protections is also very small. The accompanying itemized costs of two typical actual service pipe installations are from the files of the Water Department of an important southwestern city. They show, as did the previous examples, that the proportionate costs of the pipe increases as the length of the service increases. They also show, however, as did the previous figures that the cost of the pipe used does not approach the position of being a major part of the total expense.

In addition, any savings that would be made by using a cheaper, less durable material would be only a

Length of service	*10'*	*21'*
Corporation cock	$1.04	$1.04
Curb stop	1.24	1.24
Curb box	3.50	3.50
Meter coupling	.50	.50
Compressor	2.50	6.25
Labor	6.77	6.10
Paving Repair	9.44	18.25
¾" Lead Pipe	3.00	6.30
	27.99	43.18
	2.80	4.32
Total	30.79	47.50
Cost of pipe percentage of total	9.7%	10.3%

Joining lead pipe for service lines in Detroit housing project.

fraction of the cost of the lead pipe. It is also true that in many cases the ease of installation of lead service pipe will actually offset the slightly higher cost of the pipe itself. Lead service pipe can be installed in long single lengths. Branches can be joined without severing the main pipe. The accompanying photographs illustrate these features with great clarity. They were taken on the site of a housing project in Detroit where 399 units each had a ¾ in. service similar to the one illustrated. It is a quick and simple operation to unroll a coil of pipe in the ditch, and make the necessary connections at the ends. There is a minimum amount of handling of the pipe required and many joints are eliminated. On this project alone

Unusually long water service installed in lead with minimum number of joints.

over 50 tons of lead service pipe was used. Rapid installation not only reduced costs but also helped to speed the completion.

There are other ways in which the use of lead pipe simplifies the work of water service installation. It forms its own gooseneck at the corporation cock and thus does not require the introduction of another material. Lead services can be made up complete in the shop ready to be laid in place and connected to mains and meter in the shortest possible time thus helping to reduce the hazards of open ditches and the expense of over night barriers and lights.

But back of all other characteristics of lead service pipe, over-shadowing the reasonable cost, ease of installation and time saving possibilities stands the superior durability of lead which is demonstrated by service lines which have been in place for many years and which are still in perfect condition.

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 28 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.

RED LEAD FOR STRUCTURAL WORK
By Dr. L. L. Carrick, Director, Red Lead Research, Lead Industries Association
A discussion of the rust inhibitive qualities of red lead paint and the best means of making use of those qualities for the protection of structural metal. Reprinted from *Engineering News Record*, April 6, 1943.

LEAD CARRIES ITS WEIGHT
By Fred P. Peters
An interesting resume of many of the long established uses of lead plus information on a number of recently developed adaptations of the properties of lead to special purposes. Reprinted from *Scientific American*, June, 1944.

SOME PAINTING PROBLEMS AND THE ANSWERS
By Dr. F. L. Browne, Senior Chemist, Forests Products Laboratory, Madison, Wis.
Reprinted from the *National Real Estate Journal*, Sept., 1939.

STAMFORD'S DOUBLE LIFETIME HOME
A complete analysis of hard lead flashing, white *lead paint, lead plumbing*, plywood and red cedar Certigrade shingle details and installation methods. Reprinted from the *American Builder*, July, 1939.

STOP DEMON RUST
Leaflet giving concise, simple instructions in the use of the rust preventing qualities of Red Lead Paint in protecting farm machinery.

FEDERAL SPECIFICATION WW-P-325
For Pipe, Bends and Traps, LEAD.
Part 5 of Section IV of the Federal Standards Stock Catalog, official publication by the Government Printing Office.

LEAD EQUIPMENT USED IN INDUSTRY
By F. L. Wormser, Secretary of Lead Industries Association
A summary of the uses of lead in the production and handling of corrosive chemicals. Reprinted from "Metal Progress" to be included in the next edition of *American Society of Metals Handbook*.

SUMMARY OF NOTES ON LEAD ROOFING
A brief description of the uses of lead for roofing and flashing purposes and the proper practices of its application. Reprinted from *Sheet Metal Workers*.

NEW LEAD COATING PROCESS ELIMINATES USE OF ZINC ALLOYS
By W. Yonkman, Engineer, Western Electric Co.
A description of a successful hot dip lead coating process with complete instructions for changing over from hot dip galvanizing using the same equipment. Reprinted from *Product Engineering*, May, 1934.

COMMERCIAL STANDARDS:
Calking Lead, CS94-41
Lead Pipe, CS95-41
Lead Traps and Bends, CS96-41
Official publications by the Government Printing Office of the above Commercial Standards as promulgated by the U. S. Department of Commerce through the National Bureau of Standards, effective June 25, 1941.

LEAD COATINGS ON STEEL
By Harold A. Knight, News Editor, Metals and Alloys
A thorough discussion of hot dip and electroplated coatings on steel sheet, wire and fabricated products including the technique of application, thickness of coatings, uses and advantages. Reprinted from the November, 1944 issue of *Metals and Alloys*.

LEAD X-RAY SHIELDING
Graphic chart based on recommendations of the International Commission on X-Ray and Radium Protection giving thicknesses of lead for respective voltages in millimetres, inches and pounds per square foot.

UPON REQUEST, THE LEAD INDUSTRIES ASSOCIATION WILL BE GLAD TO MAIL "LEAD" REGULARLY, FREE OF CHARGE, TO THOSE INTERESTED, AND WILL COOPERATE WITHOUT OBLIGATION IN THE SOLUTION OF YOUR LEAD PROBLEMS

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