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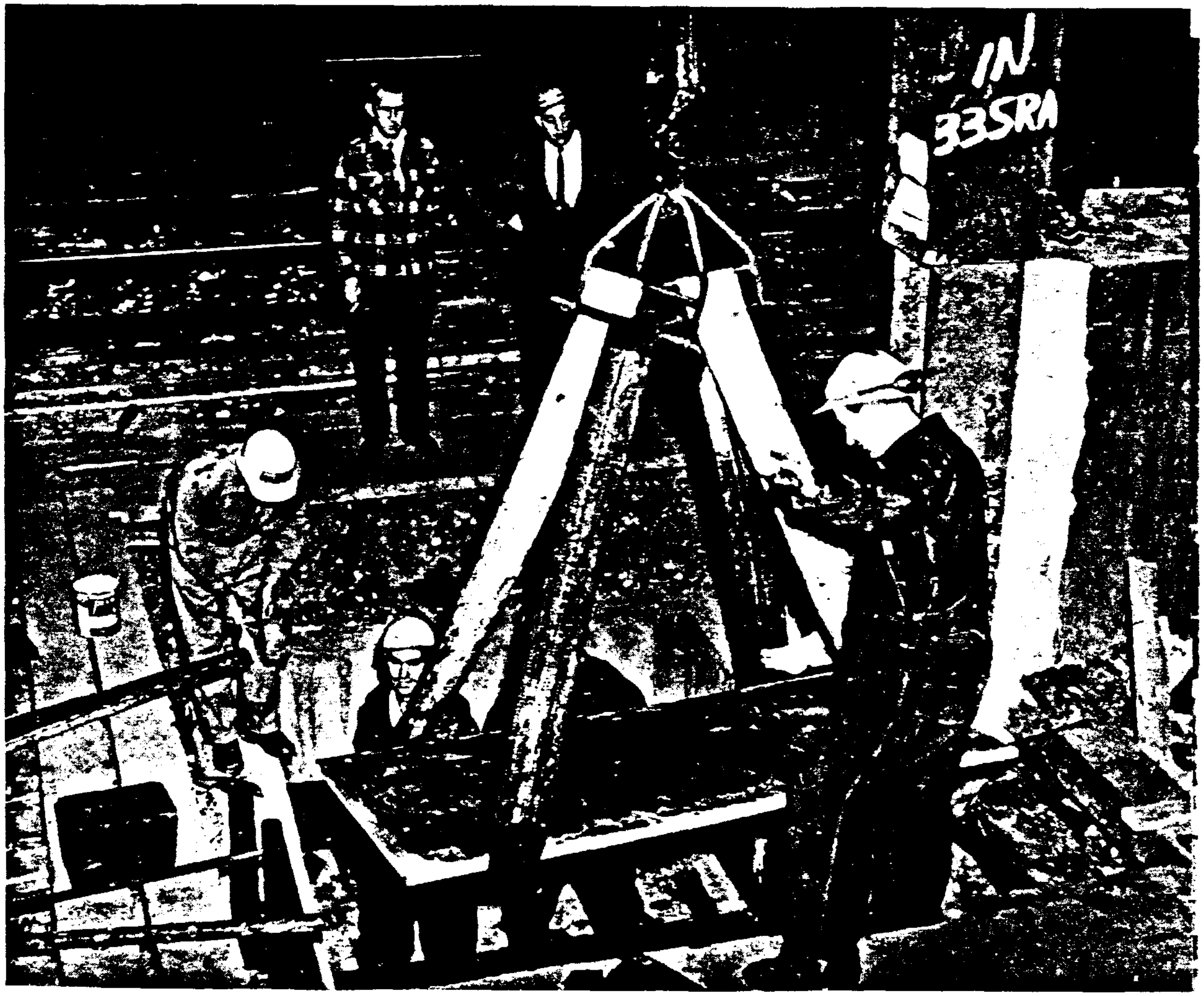

One of the hundreds of lead anti-vibration pads being installed under the footings of the new 52-story Union Carbide Building in New York. See story page 2.

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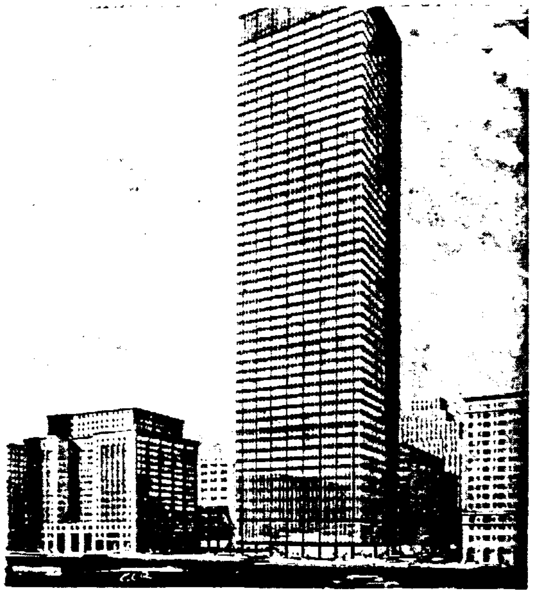


The architect's drawing of the new 52-story Union Carbide Building on Park Avenue, New York.

New Union Carbide Building "Floating On Lead"

"FLOATING on lead" would be an apt description for the 52-story Union Carbide Building, two-thirds of which straddles the New York Central Railroad's trackage into Grand Central Station in New York. The statement is not too farfetched as each of the 115 steel columns supporting the new skyscraper rest on lead anti-vibration pads.

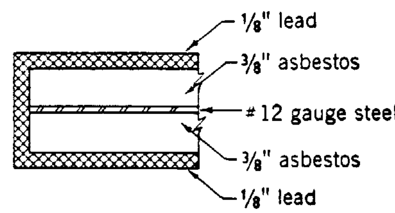
The function of these lead pads will be to cushion the building against vibrations created by the hundreds of railroad trains running in and out of Grand Central Station every day.

The effectiveness of these lead anti-vibration pads is due to the resistance to transmission of vibration through dissimilar materials in contact. The accompanying drawing illustrates the construction of the pads which are the manufacture of John F. Abernethy & Co. Inc., of Brooklyn, N. Y.

Lead, because of its excellent vibration damping properties and resistance to corrosion, is ideally suited for the shell. Also because it is an easily fabricated metal, the edges are simply and economically joined while the assembly is under manual pressure of 200 psi., forming a watertight envelope that will protect the asbestos and steel from deterioration.

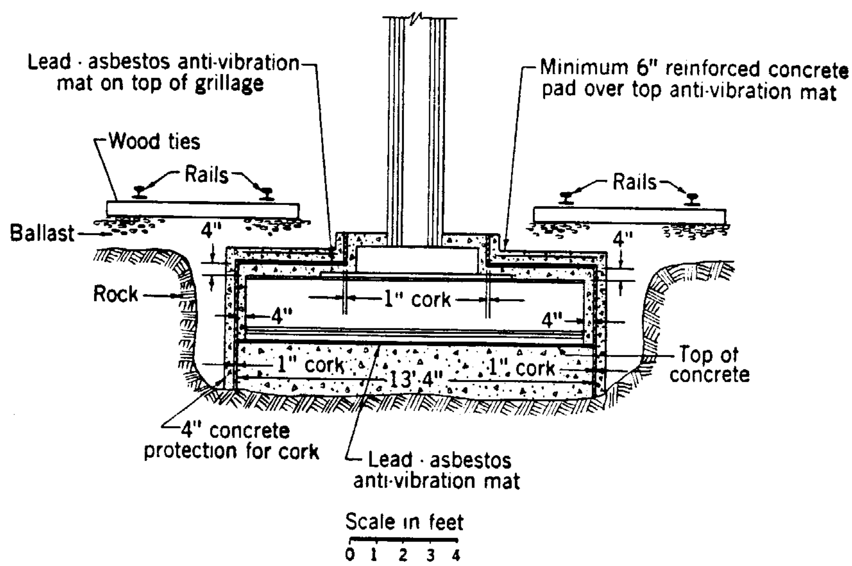
The method used to isolate the vibration from the building itself is shown in the accompanying drawing of one of the support columns. As illustrated, the foot of each column and associated substructures are set in a concrete protective pier. The column itself rests on a grillage of "I" beams laid over the lead pads. Shoulders of the grillage on many of the main support columns are covered with additional lead pads which, in turn, are covered with 6-in. of reinforced concrete. This concrete supports ballast and railroad tracks which pass directly over both sides of the piers. Interior sides of the concrete piers are lined with cork.

Above, the lead anti-vibration pads being set in place in the concrete pier and below, the pads in place, ready to receive the building's support columns.



LEAD · ASBESTOS ANTI-VIBRATION MAT

Cross-section of foundation structure for the supporting columns of the new Union Carbide Building and at right, a detail of the lead pads.



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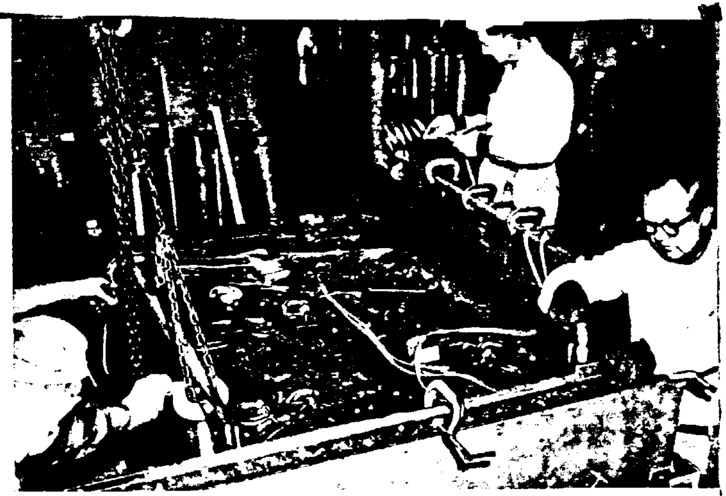
Where support columns do not extend beneath tracks, these smaller lead pads are being used as shown at left.

In the plant of John F. Abernethy & Co., as shown at the right, the edges of the lead anti-vibration pads for the Union Carbide Building are sealed by lead burning.



The architects for the Union Carbide Building are Skidmore, Owings and Merrill, New York, and the general contractor is the George A. Fuller Co., also of New York City.

The use of lead anti-vibration pads under major structures such as this one is not new. They were used to isolate the Waldorf-Astoria Hotel and other buildings along New York's Park Avenue from the same rail traffic. The Bell Telephone Company Laboratories Building on the west side of New York City is also isolated from vibration created by freight trains running through the building between the second and fifth floors.

Other buildings shielded against vibration from train traffic by lead pads include the Queen Elizabeth Hotel and Canadian National Railways Building and Station, both in Montreal, and the 30th St. Station Building of the Pennsylvania Railroad in Philadelphia.

There are also numerous applications in buildings housing heavy machinery such as printing plants, commercial laundries and rubber mills. As illustrated, these lead anti-vibration pads are adaptable to all types of construction. Where vibration from train or truck traffic and vibrating machinery may be detrimental to the life of the building or equipment or have an effect on the well-being of the building's occupants, the use of lead anti-vibration pads should be considered.

New Steel Deck Of Stadium Primed With Red Lead

SPARTAN Stadium, formerly Macklin Field with 50 per cent more seating capacity, is the new name for the home of the Michigan State University football team.

The increased seating capacity, from 51,000 to 76,000 was accomplished by the construction during 1957 of a second deck of steel placed above the present concrete stadium. As shown in the accompanying photograph, the second steel deck is along the side lines only, thus permitting far more "choice" 50-yard-line seats for all future engagements.

The steel work of the second deck is exposed to the weather and red lead paint was selected as the primer. The paint selected is similar to the Steel Structures Painting Council Paint Specification SSPC-Paint 1-55T, the formulation of which accompanies the text. As pointed out in the "Scope" section of this specification "It (SSPC-Paint 1-55T) has excellent rust inhibitive characteristics, excellent wetting ability, good durability when weathered for normal periods before finish coating, but requires about 72 hours for drying." For some applications this long drying time may rule out this paint with excellent wetting ability and in that event a number of other fine red lead paints with much faster drying times are of course available.

STEEL STRUCTURES PAINTING COUNCIL PAINT SPECIFICATIONS*

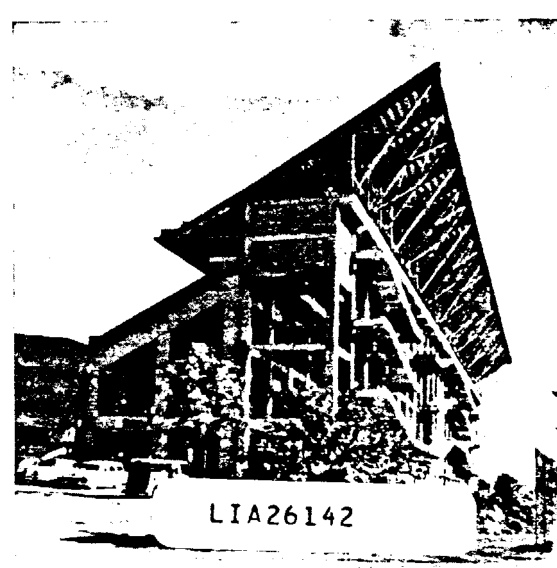
No. 1. Red Lead and Linseed Oil Primer SSPC-Paint 1-55T

	Per Cent by Weight
Pigment:	
Red Lead (97% Pb_3O_4)	99.6
Aluminum Stearate	0.4
	100.0
Vehicle:	
Raw Linseed Oil	94.0
Driers and Thinners	6.0
	100.0

Pigment (per cent by weight)	77.5
Vehicle (per cent by weight)	22.5
Weight per gallon (pounds)	25.0
Drying time (hours)	72

* Volume 2 — Steel Structures Painting Manual, 4400 Fifth Avenue, Pittsburgh 13, Pa.

This new steel deck of Michigan State University's stadium has increased seating capacity by 50 per cent.



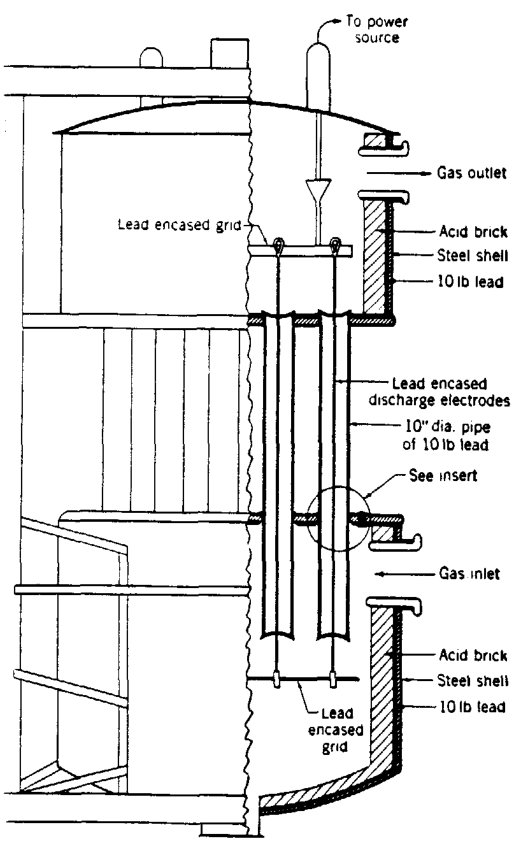
Newly-Designed Electrostatic Precipitators In Acid Regeneration Plant Use Lead

A UNIQUE variation of chemical construction practice involving the use of acid-brick linings has been utilized by Western Precipitation Corporation on two recently completed Cottrell electrostatic precipitators. New construction methods were necessary in this case to withstand the increased pressures resulting from an operating vacuum of twice that normally encountered in precipitators of this type. These precipitators are a part of a spent acid regeneration plant, designed and erected by the Chemical Construction Corporation for the Stauffer Chemical Company. This new plant, which is nearing completion in Hammond, Indiana, has been designed to produce fresh, clean, strong sulphuric acid from refinery sludges and spent acids.

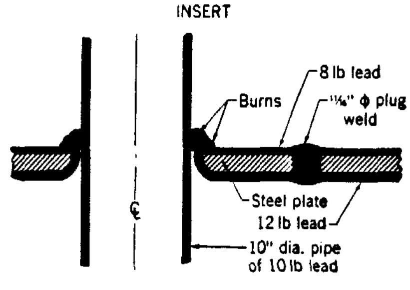
The basic operation of this plant is to remove the hydrocarbon impurities and to recover sulphuric acid values from the refinery sludges and spent acids. This is accomplished in a combustion chamber where the impurities are burned off and the sulphuric acid is broken down to SO_2. The SO_2 gas is first passed through a lead, acid-brick lined scrubber where the dust particles are removed. The gas then passes to the electrostatic precipitators where an objectionable mist consisting of tiny droplets of acid is removed from the gas stream. The removal of the acid mist is accomplished by passing the droplet laden gas from the lower chamber through the 10-in. diameter precipitator tubes into the upper chamber. Discharge electrodes in the tubes in the form of centrally-located wires carry about a 50,000 volt potential. A high voltage corona discharge ionizes the droplets and drives them to the walls of the tubes. The collected mist is then accumulated at the bottom of the tank. At Stauffer's Hammond plant, two precipitators are used in series to remove over 98 per cent of the corrosive acid mist from the gas. This "mist-free" SO_2 gas can then be transported in steel flues and equipment requiring no special corrosion protection where it will subsequently be reconverted to sulphuric acid.

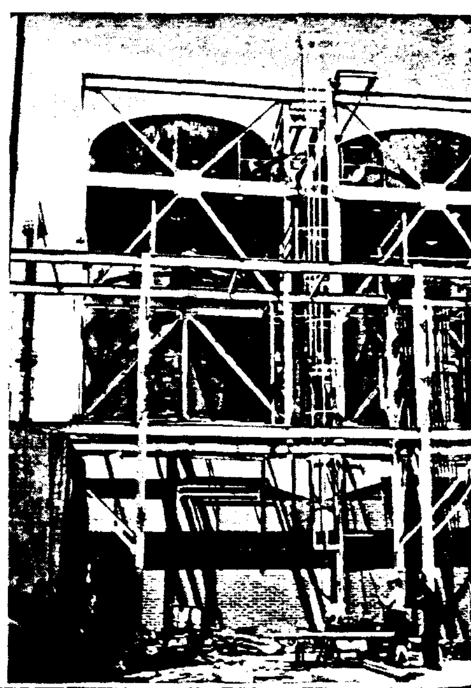
As does most equipment of this type, these precipitators rely on the excellent resistance lead has to sulphuric acid attack to protect their structural components. Normally, cage construction methods would give adequate strength. However, this equipment has been designed to operate at a substantially greater vacuum involving pressures which cage construction would be unable to withstand. A variety of construction materials and methods were studied by Western Precipitation Corp. before deciding on the construction design illustrated in the accompanying drawing and pictures. This method was chosen on the basis of least expense while still providing a safe margin of strength. The resulting structure is able to withstand even greater pressures than the design requirements of minus 40-in. water gauge suction.

The upper and lower chambers of the precipitator are supported by external steel framing. Both chambers are steel shells with lead lining. The side walls are lined with 10-lb. sheet lead with one course of acid-brick for support. The top plate of the lower chamber and the bottom plate of the upper chamber are steel, each plate containing a number of holes 10 in. in diameter. These holes are for the lead precipitator tubes which connect the upper and lower chambers. These plates have been lined with 12-lb. sheet lead lapped around the holes to the outside surface where it is burned



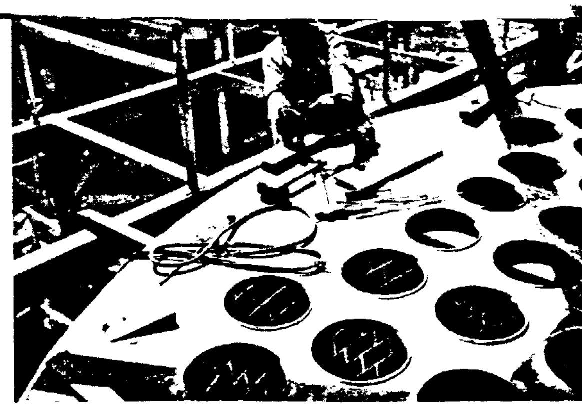
Cottrell electrostatic precipitators under construction for Stauffer Chemical Company's new sulphuric acid regeneration plant at Hammond, Ind., and cross-sectional details of the lead construction.





At left, 10-in. diameter holes for the precipitator tubes are being cut through the lead-lined floor of the upper chamber.

At right, the tube holes in the bottom chamber have been completed. One course of acid-brick, as shown, has been placed over the lead-lined side walls.



to 8-lb. sheet lead present on the external surface. Due to the short span between the 10-in. holes and the support provided by strategically located 11/16-in. diameter plug welds, the structure is sufficiently rigid to withstand the pressure without any additional support.

The precipitator tubes, containing the discharge electrodes, are 10-in. diameter tubes constructed of 10-lb. sheet lead. A pipe structure, because of its symmetry and its curved surface, is able to withstand the vacuum pressure without support.

Care has been taken in the fabrication of the precipitator tubes to assure concentricity to a high degree of accuracy. This concentricity is also required to assure a uniform corona discharge throughout the volume of the tubes. The discharge electrodes themselves are encased in star-shaped extruded lead pipe. The points of the stars increase the discharge efficiency of the electrodes.

The result is an interior completely protected by lead with the exception of the roof of the upper chamber which is rubber lined.

-Level Slop Sinks Use Lead Pans

THE ultra-modern 38-story Seagram Building on Park Avenue, New York, is depending on the metal, lead, in an important area of interior waterproofing. Sheet lead is being used under floor-level slop sinks as an impervious membrane to prevent seepage to the floor below.

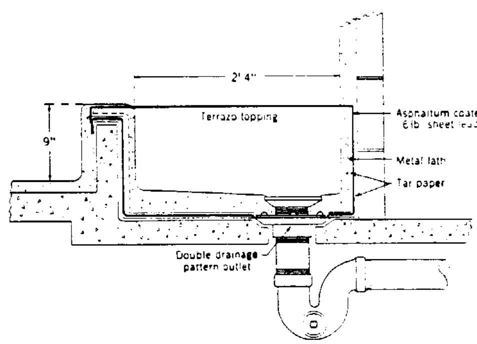
These built-in floor-level slop sinks are located in tiled service closets on each of the 38 floors and are designed to eliminate lifting of buckets and other sanitation equipment for filling and rinsing and to permit easy cleaning of the sinks themselves. The interior dimensions of the slop sinks are 2 ft. 10 in. by 2 ft. 4 in.

The sinks are finished in black terrazzo and to prevent damage by carts, a stainless steel kick plate has been placed in front of the sink.

The sheet lead pan itself is coated with asphaltum, a necessary precaution to protect it against corrosion during the curing stage of the mortar used within the pan. The asphaltum provides the interim protection until the free lime, corrosive to lead and other common metals, is cured or carbonated.

Architects for the Seagram Building are Mies van der Rohe and Philip C. Johnson, and the George A. Fuller Co. was the general contractor.

Installing these floor-level slop sinks is similar to the widely used lead shower pan except that the upstands are much higher, in this case 14 in., and the weight of lead used is heavier, 6-lb. sheet lead versus 4-lb. sheet lead. The making of the corners is similar in that they can be pig-eared or cut out and soldered or burned.



Detail of slop sink construction.

A detailed drawing of the method of installation used at the Seagram Building by the plumbing contractor, Eugene Duklauer, Inc., accompanies the text. For further details and specifications for lead shower and safe pans, write to the Lead Industries Association for Lead Building Construction Bulletin No. 2.

These built-in floor-level slop sinks installed in New York's Seagram Building are convenient and sanitary. At right, the roughed-in lead slop sink pan coated with asphaltum.

Lead In Isotope Utilization

CITIES Service technicians at the newly-constructed Cities Service Research and Development Co. Laboratory at Cranbury, N. J., are conducting experiments while peering through 42 in. of leaded glass, weighing 7,500 lb., only a few feet from a lead door 12 in. thick, weighing 30,000 lb., enclosing 3 lb. of Cobalt 60 transported to the site in a 6,000-lb. lead pig. This weighty emphasis on lead is, significantly, telling the story of similar isotope shipment, receipt, handling and utilization episodes throughout the country.

Technicians at the Cities Service Product Development Laboratory, Cranbury, N. J. are protected by 42-in. of leaded glass while moving by remote control a supply of radioactive cobalt-60 from its protective lead container.

Cities Service is using this big-little source of radiation energy as a new and powerful tool in a long-range research program now under way. The investigation into the unknown of petroleum science will add to the store of knowledge being accumulated on the effect of radiation induced ionization reactions on petrochemical processes and products.

The door guarding the entrance to the cave with walls of high-density concrete, 42 in. thick, presents with equal success only 12 in. of lead as a barrier to 5,000 curies of radiation, which is roughly 2½ times the potency of the world's supply of radium. This difference reflects the volume savings afforded also by lead isotope shipping containers used by the AEC to transport this and many similar isotopic sources. The shipment to Cranbury worth $30,000 was the largest of sixty similar shipments from Brookhaven National Laboratories to industrial and University laboratories over the past seven years—handled all the way by lead.

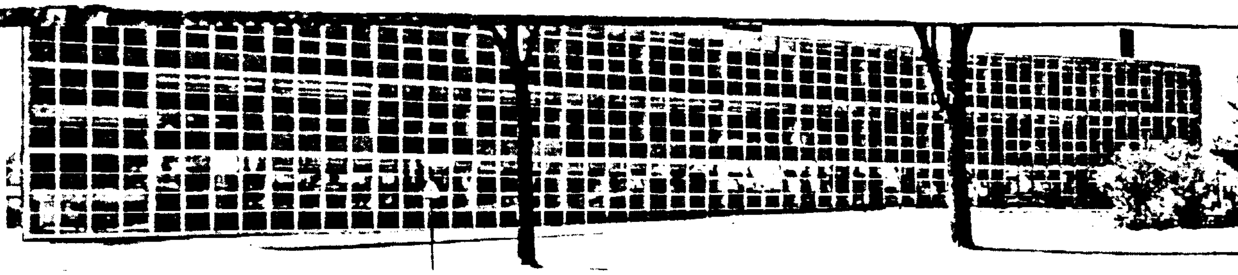
The omnipresence of lead can be keyed to a combination of properties. Lead for shielding gamma radiation is the practical choice where you must see through the shielding, as in the case of leaded glass, move it or make it compact. It would not be an exaggeration to say that in isotope and in propulsion reactor shielding lead continues its job on land, on sea, and in the air, wherever protection from gamma radiation is required.

At left, view of the 15-ton monolithic lead access door to the concrete lined cave containing 3 lb. of cobalt-60 used by Cities Service Laboratory at Cranbury, N. J. to investigate radiation effects on refinery processes and products. The door rides on six 8-in. grooved wheels and is operated hydraulically from a control panel.

At right, technicians ready a lead shipping container carrying 6 cobalt-60 radioactive sources at AEC's Brookhaven National Laboratory, Uptown, N. Y. for shipment to Cities Service Laboratory.

Photos by
Cities Service Co.

LIA26145



Spandrel areas in the Northeast Junior High School, Minneapolis, shown above, are in alternating "Spandrelite" panels of four sections, each in vivid red, green and blue. Architects are Thorshov and Cerny, Inc., Minneapolis, Minn.

Lead-Bearing Color Enamels On Spandrelite

The National Carbon Company's Research Laboratory, Parma, Ohio, is faced with green "Spandrelite." Architects are Skidmore, Owings & Merrell.

THE multi-colored glass buildings in jewel-like tones that are being constructed these days owe their brilliant color palette to lead-bearing glass color enamels. These enamels are being used by the Pittsburgh Plate Glass Company on their structural plate glass product. Spandrelite, to provide a wide variety of colors ranging from pastels to chartones. Enamels of this type are resistant to acids and alkalis and, in fact, are used extensively as Applied Color Labels on glass containers used for many familiar products such as Pepsi-Cola, where they withstand repeated cleaning and sterilizing.

The resulting spandrels for curtain wall construction are tough and durable. Although a true glass composition throughout, they are remarkably resistant to shock and will withstand a wide range of temperature fluctuations. Due to the control of color enamel formulation, excellent color uniformity is obtained from piece to piece. In addition, these colors are permanently fused into the glass and will not fade with time. This material is exceptionally resistant to man-made corrosive atmospheres. It is non-absorbent and stainproof and is easily cleaned.

The fundamental requirement of a glass enamel is a fusing temperature below the softening temperature of the glass to which it is applied. Generally, glass enamels are based on the excellent fluxing properties of lead compounds. The basic ingredient of these enamels is a lead boro-silicate glass or frit with a melting point around 900 deg.-1,000 deg. F. to which is added the necessary coloring compounds.

In addition to forming the basic low melting glass, lead compositions make possible livelier colors over a wider color palette than can be obtained with any other kind of flux. Furthermore, the lead contributes low surface tension and low interfacial tension properties to the enamels on glass. Low surface tension is that

TABLE 1

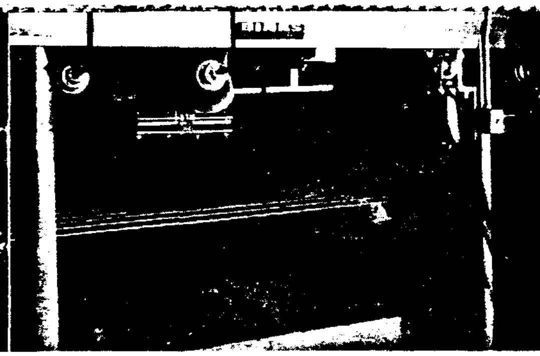
Typical Compositions of Glass Fluxes

(% Oxide Compositions)

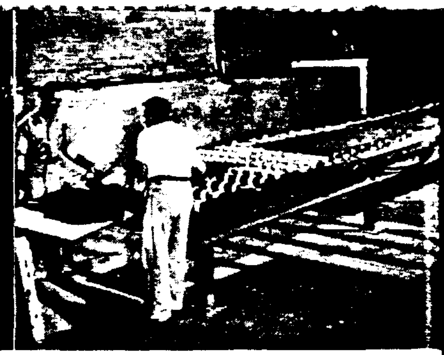
	1	2	3	4	5	6	7	8	9	10
PbO	81.8	78.8	66.6	60.4	59.5	55.5	45.5	53.1	49.4	48.6
B_2O_3	10.6	9.6	18.6	8.2	3.0	3.0	2.2	2.0	5.2	6.9
SiO_2	7.6	11.6	14.8	21.4	32.0	29.6	36.3	31.7	26.4	25.0
Al_2O_3	-	-	-	3.0	-	-	-	-	-	-
CdO	-	-	-	7.0	4.0	2.5	4.3	3.8	3.2	3.6
Na_2O	-	-	-	-	1.5	4.4	4.8	3.3	4.0	3.2
TiO_2	-	-	-	-	-	4.0	4.9	4.3	3.6	2.4
Li_2O	-	-	-	-	-	-	2.0	1.8	1.5	-
ZrO_2	-	-	-	-	-	-	-	-	6.7	6.7
Na_2SiF_6	-	-	-	-	-	-	-	-	-	3.6
Firing Temperature (°F.)	850	950	1050	1100	1120	1120	1100	1050	1100	1120
Firing Temperature (°C.)	454	510	567	593	604	604	593	567	593	604
Coefficient of Expansion ($\times 10^{-7}$)	104	85	76	73	78	89	97	98	95	85
Lead Solubility (parts per million)	cs	cs	cs	cs	500	40	2	60	100	100
Alkali Resistance	-	-	-	Fair	Good	Good	Good	Good	Exc.	Exc.

Note: cs indicates complete solubility.

In the production of "Spandrelite" sheets of glass are first fed through wash and dry cycles before they enter the spray booth.



In the spray booth, vitreous color coatings containing lead-bearing fluxes are automatically applied to the glass surface under exhaust ventilation.



The glass then moves through an anne lehr where it is semi-tempered and leaded ceramic color coating is fused

important property that is chiefly responsible for the smooth flow and generally high gloss of these leaded enamels. Low interfacial tension contributes greatly to good wetting of the glass plate surface thus promoting good adherence. The lead in the frit also plays an important role in obtaining the proper co-efficient of thermal expansion for the enamel. By adjusting the composition of the frit, the color enamel can be tailored to fit the glass panel.

As shown in the accompanying photographs, the manufacturing procedure for applying the color enamel is basically simple and lends itself to a horizontal production line. The lead-bearing frit and required pigments are thoroughly mixed and ground together, and mixed with water and alcohol as a carrier. This suspension is sprayed on the glass plates after they have passed through a thorough washing and drying cycle. The glass panels then pass into the lehr where they are gradually heated until, as they enter the firing zone at about 1,150 deg. F., the color melts and fuses to the glass. When the plates emerge, the semi-tempering treatment they have received has heat-strengthened them giving the entire structure far greater shock resistance than ordinary plate glass.

There are a variety of lead-bearing glass color compositions to meet specific requirements of the user as shown in the accompanying table.

THE *Lead* LIBRARY
of Technical Information

The following articles and reprints contain information, drawings and specifications on the use of lead products helpful to architects, engineers and others interested. They are available free of charge except where otherwise indicated, upon request to the LEAD INDUSTRIES ASSOCIATION, 60 EAST 42nd STREET, NEW YORK 17, N. Y.

MATERIALS OF CONSTRUCTION ANNUAL REVIEWS—LEAD AND LEAD ALLOYS
Lead and lead alloys in design and construction including research progress, engineering applications, and technological advancements. With bibliography, 1957 and 1956 reviews (editions are not cumulative) available. Reprinted from "Industrial and Engineering Chemistry," September, 1957 and September, 1956.

BEST DESIGNS FOR LEAD INSTALLATIONS
A special report on the applications of lead and lead alloys in the chemical and metallurgical industries. Recommended practice for joining lead sheets, and the construction of wood stave tanks, launders, towers and flues where lead is involved are included. Reprinted from "Chemical Engineering," March, April and May, 1956.

RADIATION PROTECTION
The place of lead in shielding against radiation in X-ray and atomic energy applications. Principles of lead shielding construction. Reprinted from "Lead In Modern Industry."

PORTABLE RADIATION-SHIELDING MATERIALS
A special report on commercially available shielding forms that can be used to build readily assembled, hand stacked shielding walls. Prepared by the editors of "Nucleonics," May, 1955.

LEAD WORK FOR MODERN PLUMBING
$1.50 Postpaid, $1.00 per copy in quantities of 10 or more
Profusely illustrated with over 140 photographs and drawings, the textbook presents clearly to the plumbing student the necessary tools, procedures and the methods required for lead work.

LEAD IN MODERN INDUSTRY
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A fully illustrated, 230 page, cloth bound book describing all phases of the production and use of lead, lead alloys and lead compounds.

LEAD BUILDING CONSTRUCTION BULLETINS
A series of specifications for the use of lead in building construction. (Available separately.)

BULLETIN NO. 1
Specification for Lead Waste Connections for Plumbing Fixtures with Integral Traps (Water Closets—Pedestal Urinals—Service Sinks).

BULLETIN NO. 2
Specification for Lead Shower and Safe Pans.

BULLETIN NO. 3
Specification for Lead Chemical Laboratory Drainage Systems.

FEDERAL SPECIFICATION WW-P-325
For Pipe, Bends and Traps: Lead
Dimensions and weights of lead products used in the plumbing and water works fields are given. Published by the Government Printing Office.

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 FLASHINGS IN MODERN CONSTRUCTION
Lead flashings as used in an ultramodern house in Randolph, Vt. Reprinted from "National Roofer," October, 1954.

THE STORY OF LEAD — MATERIALS THE RAILROADS BUY (Parts 1 and 2)
Lead from mine to finished product with special reference to its uses by the railroads. Reprinted from "Railway Purchases and Stores," December, 1954 and February, 1955.

RED LEAD TECHNICAL LETTERS
A series of technical letters containing red lead paint formulations. (Available separately.)

Technical Letter No. 11 — Recommended Surface Preparation of Steel for Red Lead Paints.

Technical Letter No. 12—Painting Highway Structural Steel.

FEDERAL SPECIFICATION FOR PAINT: RED-LEAD-BASE, READY-MIXED TT-P-86a
Covers four types of red-lead-base paints including two fast drying formulations. Many intended applications listed.

PAINT GALVANIZED SURFACES?
Why galvanized surfaces should be painted, the kind of pretreatment that should be given, and the correct painting systems are discussed. Reprinted from "Factory Management and Maintenance," April, 1956.

NEW LITERATURE

USE LEAD TO CONTROL REFINERY CORROSION
Latest practices in lead construction for the petroleum refining industry are described. How to avoid the difficulties sometimes experienced with lead-lined equipment is also outlined in detail. Reprinted from "Petroleum Refiner," April, 1958.

SHEET LEAD FOR ROOFING AND FLASHING
Preferred installation methods for the new 2½ and 3-lb. hard lead are given along with detailed drawings. Reprinted from "Sweet's Catalog," 1958.

LEAD FOR MODERN PLUMBING
Preferred installation methods for lead pipe and fittings in the plumbing systems of today's industrial and residential structures. Detailed drawings are included. Reprinted from "Sweet's Catalog," 1958.

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