Lead Industries Association, Inc.
292 Madison Avenue • New York, N. Y. 10017 • Telephone: (212) 679-6080

April 23, 1973

TO: ALL MEMBERS OF LEAD INDUSTRIES ASSOCIATION

Gentlemen:

As you will see in the attached publicity report for the period January - March, 1973, major feature treatment was given to the use of Lead in the World Trade Center; as Lead-Clad Steel; and on Foam for Damping Industrial Noise.

A story on Battery Powered Lift Trucks also received much editorial attention.

Finally, the use of Chrome-Yellow Paint in the National Highway Program and the ILZRO Lead Zinc House, also received significant editorial space.

We are please with the report and, hope you will be also.

Sincerely,

Lewis E. Gage
Assistant Secretary and
Director of Communications

LEG:mkl
Attachment

April 1973

LEAD INDUSTRIES ASSOCIATION
TRADE PUBLICITY PROGRAM
FIRST-QUARTER REPORT
January - March,1973

Highlights of current publicity projects discussing lead applications.....in ARCHITECTURE:

* Features of sheet lead used in construction at....

  . The World Trade Center in New York City, where four record uses of sheet lead are resulting from construction of this massive project. A five-page feature article discussing lead's role in constructing the World Trade Center has been published in the February issue of ROOFING/SIDING/INSULATION (RSI). The article, which received cover-of-book mention and required 12 photographs to illustrate, has also appeared in AMERICAN METAL MARKET and the WALLACE MINER, Wallace, Idaho, newspapers.

  . The National Mutual Life Association of Australasia Ltd., London, England, which was the first building to utilize lead clad steel, a new application for lead. The story has appeared in seven magazines.... including DESIGN NEWS, MACHINE DESIGN, CHEMICAL AND ENGINEERING NEWS and AUTOMOTIVE INDUSTRIES.

* Features on the use of sheet lead sound barriers for....

  . A New Foam/Lead Machinery Enclosure Panel Developed to Meet OSHA Standards for Industrial Noise Control -- published as a one-page feature in METAL STAMPING and in five other magazines such as PIPELINE NEWS, METAL PROGRESS, CHEMICAL ENGINEERING and FOOD PLANT IDEAS. Article has appeared in more than 10 magazines to date.

  . A newly developed acoustical building construction panel which was used to muffle the sound of two gas pipeline compressor stations in Canada. An article on these applications has been published in DODGE CONSTRUCTION NEWS and MODERN POWER & ENGINEERING.

The following applications discussed the use of lead acid

BATTERIES:

* Lead Acid Battery Fork Lift Truck Replaces Propane-Fueled Vehicle To Solve Corrosion, Environmental Problems in Knitting Mill -- this release has received exceptional attention in various media: a two-page feature in ELECTRICAL WORLD and OCCUPATIONAL HAZARDS and one-page features in FACTORY, ELECTRIC VEHICLE NEWS and THE BATTERY MAN. The article has been previously featured in AMERICAN METAL MARKET and TEXTILE WORLD.

* Nation's First Aerial Lift Bucket Powered By Lead Acid Batteries -- this recently released feature article has appeared in AMERICAN METAL MARKET, ROADS and STREETS and ELECTRIC VEHICLE NEWS.

The following feature article discussed the use of lead in

PAINT:

* Chrome Yellow Paints To Play Major Role in Highway Safety Program -- this feature article, which highlights the use of chrome yellow paint to increase safety on the nation's highways, has been printed as a two-page feature in PAINT & VARNISH PRODUCTION and as a three-page feature in AMERICAN PAINTING CONTRACTOR.

The following recently released articles have been published in the daily newspapers, AMERICAN METAL MARKET, and are slated to be published in a variety of monthly trade magazines in the near future:

* Sheet Lead Shields New Anti-Skyjack X-Ray Device Used To Detect Weapons Carried Aboard Passenger Airliners In Hand Luggage

* Expanding Field of Nuclear Medicine Expected To Expand Use of Lead

NOTE: The above two articles and the one on the use of chrome yellow paint are part of a continuing program to point up the safety aspects of lead.

* Sheet Lead To Be Used To Quiet Roar of New Jet-Propelled Cross-San Francisco Bay Ferries

The METAL BULLETIN MONTHLY has published a one-page feature article based on facts published in the 1971 U.S. Lead Review.

The recently released news article announcing the possible construction of a prototype lead/zinc metal house has been published in AMERICAN METAL MARKET, ENGINEERING NEWS-RECORD and CHEMICAL MARKETING REPORTER.

The following literature availability announcements were published:

* Publication of LEAD Magazine, Vol. 35, No. 3-4 - published in 17 magazines.

* "Lead...As A Modern Design Material" - published in 12 magazines.

Watch for publication of the following recently distributed feature articles:

* Battery-Powered Boat Puts Pleasure Back in Pleasure Boating

* Battery-Powered Trucks Replace Diesel-Powered Vehicles In Nation's Deepest Salt Mine

* Sheet Lead Used To Provide "Quiet in the Courtroom" For New Palais de Justice Building in Montreal

....and for publication of the following articles which are being readied for distribution:

* Section of Historic Lead Statue Destroyed By American Revolutionists Is Unearthed In Connecticut

* World's Largest Electric Utility Relies On Lead-Sheathed Cable, Conducts Major Training School

* Computer Demand for Mass-Produced Soldered Joints Results In Increased Use of Lead Alloy Preforms

* Leaded Vinyl Used To Quiet Business Jet, And Experimental Tracked Air Cushion Vehicle

First Quarter
Summary of Publicity Activities

Feature Articles Published.....12

News Articles Published (including literature availability announcements).....40

Feature Articles Completed.....10

News Releases Completed (including personnel announcements and literature availability announcements)..... 6

Feature Articles in Preparation..... 8

Editorial Request Responses.....6

LIA14914

A HARCOURT BRACE JOVANOVICH PUBLICATION

RSI

ROOFING | SIDING | INSULATION

FEBRUARY 1973 • ONE DOLLAR

Feature Article:

World Trade Center Construction Sets Record Use of Sheet Lead For Waterproofing

Published as Job Of The Month in the February, 1973, issue of Roofing/Siding/Insulation (RSI) Five-page article, with 12 photographs, received cover-of-book mention.

NRCA Show-'73 Product Review

JOM: Waterproofing with lead

A super waterproofing job

The gigantic twin towers of the World Trade Center in New York City proved to be a massive—indeed, record setting—sheet lead, waterproofing and metal flashing application.

JOB OF THE MONTH

A super waterproofing job

The gigantic twin towers of the World Trade Center in New York City proved to be a massive—indeed, record setting—sheet lead, waterproofing and metal flashing application.

A massive waterproofing and flashing job, involving record uses of lead, is nearing completion on the World Trade Center in lower Manhattan.

When the Center is completed in 1974, nearly a million pounds of lead will have been installed. While this is believed to be a record use of lead for this type of construction project, with this record are believed to be three other "firsts": the most lead used to line landscaping planters, to waterproof a water fountain, and for flashing around the base of buildings.

It proved to be a formidable challenge for the sub-contractors, John F. Abernathy and Co., Brooklyn, N.Y.; and Allied Lead, Inc., Chicago, Ill. The job was a joint-venture project.

Most of the lead is being installed in the World Trade Center Plaza, an enormous, five-acre elevated plaza that will surround the six buildings in the Center: the famous twin 110-story towers, the United States Customs Building, the Northeast and Southeast Plaza Buildings, and a proposed hotel.

For example, 20 huge lead-lined landscaping planters are being installed around, adjacent to, and between buildings facing the elevated plaza. Also being installed is the lead flashing around the base of buildings facing the plaza and lead waterproofing for the water fountain, an enormous installation located in the plaza's gigantic 369' x 375' center court.

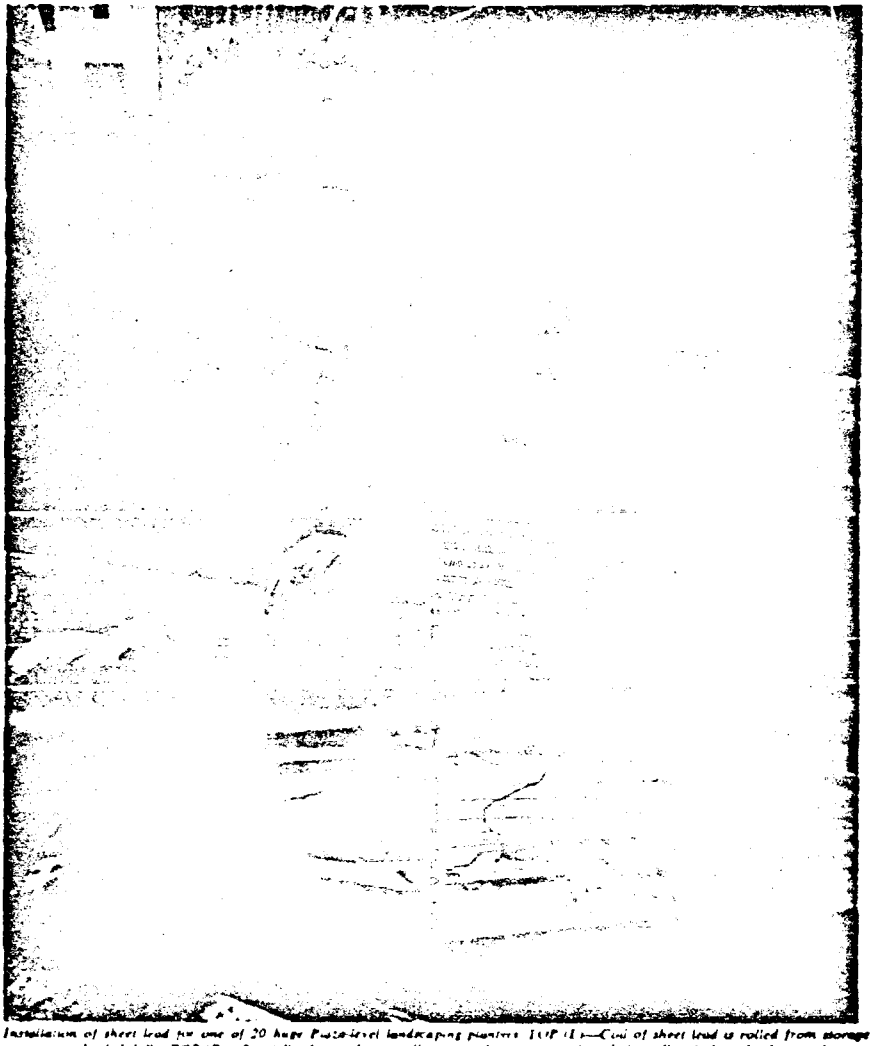
The plaza and street level lead applications are playing a critical role in constructing the World Trade Center and in order to understand why this is so, it is necessary to have a basic knowledge of some of the highly complex architectural and engineering problems that were solved in designing the Center.

Overall view of the area in the Plaza's Center Court where a 24' high, 17-ton water fountain sculpture is to be installed. Mounted atop a 13' diameter rotating turntable, the sculpture will be installed in the round opening seen in the center of the photo. A raised platform that is more than 84' in diameter will surround the sculpture. Water pouring from the sculpture will cascade over the rotating turntable, across the surface of the surrounding platform, and be collected in a gutter running along the base of the platform. Piping in the gutter will carry the water to a charge chamber, located beneath the platform, where powerful pumps will recirculate it back through the sculpture. About 76,000 sq. ft. of sheet lead was required to waterproof the charge chamber and the fountain's rotating turntable and adjoining platform, both of which will be covered in black granite.

For example, the enormous five-acre elevated plaza is actually the roof for the center's six vast below-grade levels and, despite the fact that the landscaping planters, the fountain, the six buildings at the Center and the stairways project through it, the plaza had to be made thoroughly waterproof to insure against water seepage. Such seepage could result in leaks that would seriously damage the ceiling, walls and other architectural finishes on the Concourse Level located immediately below the plaza. The Concourse Level will contain scores of international shops and restaurants, between-building passageways, the main entrance to the PATH Terminal (PATH is the abbreviation for Port Authority Trans-Hudson, a commuter rail line that runs under the Hudson River to connect Manhattan and New Jersey), subway entrances, etc.

To insure that the plaza is thoroughly waterproofed, two moisture protection systems were used. The first, a specially developed multi-material membrane that is similar to a standard built-up roofing system, was installed over flat areas

The three moisture protection projects now underway at the World Trade Center in Manhattan are expected to result in the three record uses of lead—a total of one million pounds of it will be used.



Installation of sheet lead for one of 20 huge Portalevel landscaping planters. TOP (L)—Coil of sheet lead is rolled from storage area onto wheeled dolly. TOP (R)—Specially designed, manually-operated rig was used to hoist rolls of sheet lead into planters. BOTTOM (L)—Sheets as wide as practicable were used to line planters. Sheet lead shown here is being cut to size while excess lead is rolled into coil for future use. (R)—Overall view of typical rectangular planter, seen with bottom lined with sheet lead and waiting installation of lead to cover interior and exterior sides. Planter measures 60' x 35' and is located between U.S. Customs Building and Northeast Plaza Building, one corner of which is seen under construction at upper right.

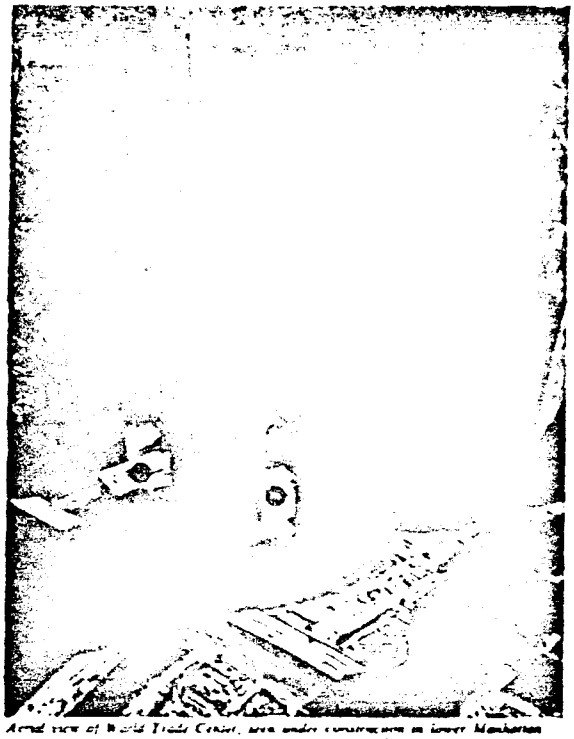
around and between buildings facing on the plaza and over all areas of the plaza center court except the water fountain. The second moisture protection system consisted primarily of sheet lead and it was used to waterproof all other plaza areas where it was not possible to use the multi-material membrane . . . the plaza landscaping planters, the water fountain, the stairways and the perimeter of buildings facing on the plaza.

While all contracts have yet to be let for lead installation at the World Trade Center, the three moisture protection projects now underway are expected to result in the three record uses of lead. Of the nearly one million pounds of lead which will be required for the three projects now underway, 780,000 lbs. will be used to line the plaza and street-level landscaping planters. 60,000 lbs. will be required to waterproof the center court fountain, and 54,000 lbs. (about 3,000 linear feet) will be used as flashing for the base of buildings facing on the plaza.

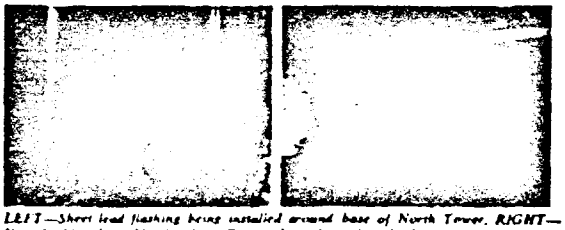
Lead for the three jobs is being supplied in increments depending on construction schedules of other subcontractors working on the World Trade Center construction project. Both 6 lb. psf (3/32" thick) and 8 lb. psf (⅛" thick) lead is being used for various moisture protection applications. The lead contains not less than 3¼% nor more than 4¼% antimony and an arsenic content of 0.10% to provide for increased corrosion resistance and to decrease thermal expansion. Sheet sizes as large as practicable are being utilized in order to keep joints to a minimum and thereby help insure the watertight integrity of the lead.

Lead's corrosion resistance, freedom from maintenance, and the fact that it provides for a trouble-free waterproofing membrane are the primary reasons it was selected for the various moisture protection applications at the World Trade Center. Lead's traditional durability . . . was another important selection factor.

All sheet lead to be in contact with concrete, fill, mortar or grout is protected first with a cold-applied



Aerial view of World Trade Center, seen under construction on lower Manhattan on a site overlooking the Hudson River, shows location of major buildings nearing completion. (1) the North and (2) South twin towers and (3) the U.S. Customs and (4) Northeast Plaza Buildings. Sites are being cleared for the (5) Southeast Plaza Building and (6) a proposed hotel. Record uses of sheet lead resulting from construction of the Center include such applications as lining for huge landscaping planters, some of which are visible at end of (7) U.S. Customs Bldg.; waterproofing for the (8) gigantic circular water fountain in the Plaza's Center Court; and flashing for the base of buildings facing on the Center's five-acre elevated Plaza, part of which can be seen under construction between the two towers.



LEFT—Sheet lead flashing being installed around base of North Tower. RIGHT—View looking down North side of Tower shows how sheet lead flashing looked after installation was nearly complete—lead seen folded under column cover has yet to be flattened and joined to flashing. As seen at far right, sheet lead flashing extends under multi-material membrane used to cover concrete deck of plaza. When final covering is installed over both areas, it will extend above base of column covers.

A total of twenty landscaping planters, some as big as Olympic-sized swimming pools and others as long as an average city block, are to be among the highlights of the World Trade Center's plaza.

bituminous brush coating of 12 to 14 mil thickness, a normal precaution against potential corrosive attack from free lime found in all materials containing cement. To insure that the lead membrane is protected from possible damage by sharp-edged stones and other inclusions that project from the surface of the concrete, a 30 lb. asphalt-impregnated felt covering was applied over the bituminous coating before the sheet lead was installed.

Landscaping planters to highlight plaza area

A total of 20 landscaping planters, some as big as Olympic-sized swimming pools and others as long as an average city block, are to be among the highlights of the Center's plaza. In addition to their landscaping function, the planters will help break up the distance between buildings in the plaza area, separate building sides from street areas, and serve as dividers between buildings and the center court. In some cases, the planters will provide a high dramatic landscaped plaza-level view of the twin towers and other buildings in the Center.

Installing plaza-level landscaping planter lining

The first step in installing the sheet lead waterproofing membrane for the plaza-level landscaping planters is to transport rolls of lead from where they are stored at various locations adjoining the 20 planters. This is being accomplished by hand-rolling the rolls onto a dolly which is then pulled to a planter. The rolls are then hoisted from the dolly by a manually operated four-leg rig device that was designed and built to install the lead lining for the planters. Wheels on the rig permit it to be rolled inside or outside the planters while transporting rolls of lead to the point where they are unrolled for installation.

The bottom of the planters are lined first, using various lengths and widths of 8 lb. lead sheet. The next step is to line the 1½' to 3' deep interior walls with long lengths of sheet lead installed horizontally. Then the lead is installed over the 8" wide top of the planter wall. In the final step, the lead is installed over the exterior wall of the planters where it joins the waterproofing membrane covering the plaza area. All seams are being lapped about an inch and then burned to insure the integrity of the lead membrane.

After each planter lining is installed, it is filled with water to test its watertightness. In order to protect the lead from expansion and contraction during daily temperature changes, the planters are kept filled with water until they are ready to be filled for planting. Lead's use of the planter linings is critical since the lining is actually an extension of the waterproofing membrane that is being installed over the entire plaza area.

Plaza landscaping

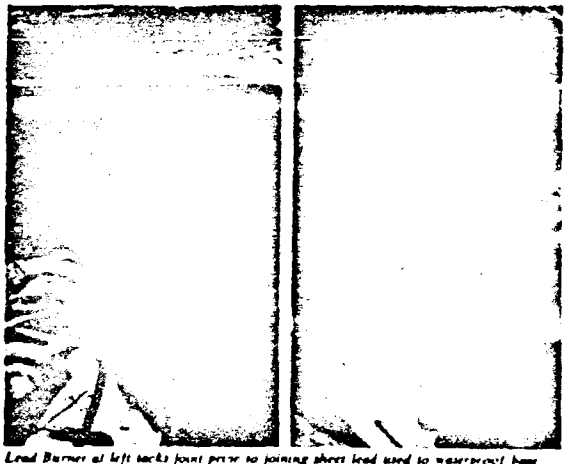
Sasaki, Dawson, DeMay Association, Inc., Watertown, Mass., are the landscape architects for the plaza and street-level areas of the World Trade Center. Plaza area planters will have ¼" thick asphalt impregnated protection board on top of the lead lining followed by insulation and a 6" thick concrete mat with integrally cast rings to receive guy wires for trees. Above this point the planter will be filled with lightweight soil mix.

The depth of the soil mix in the plaza area planters will vary from of the London plane trees while others will be planted on the slopes of the small hills.

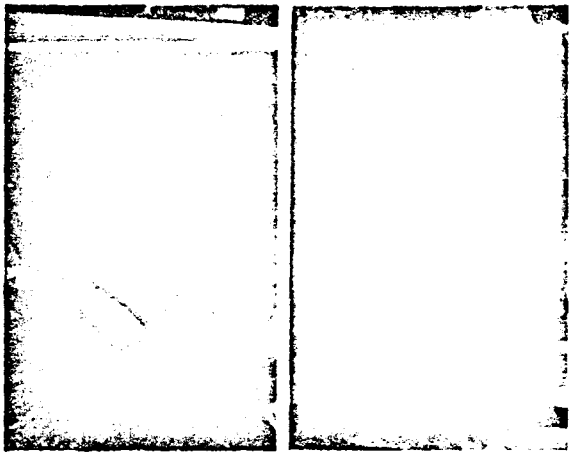
The shrub level of the planters will consist of eight different types of evergreens chosen for the color and texture of their leaves.

17-ton fountain

Among the many dramatic sights at the World Trade Center will be the water fountain in the plaza's center court. Like everything else at the Trade Center, the fountain will be gigantic in proportion and, in fact, is believed to be the biggest of its kind ever built.



Lead Burner at left tacks joint prior to joining sheet lead used to waterproof base of large raised platforms that will surround water fountain sculpture to be located in the Plaza Center Court. Part of gutter which will collect water cascading over platform edge is seen at far left. In right view, workman shaves the lead at the joint with a shave hook to show bright metal free of oxides before burning the joint.



LEFT—Sheet lead waterproofing for the base of the platform surrounding the Plaza's Center Court water fountain sculpture is shown peeled back to permit installation of some of the piping that will carry water to be circulated back through the fountain. RIGHT—After piping was installed, sheet lead was folded flat the joint was burned.

A 24' high, 17-ton cast bronze sculpture to be set on a 13' diameter rotating turntable will be installed in the center of the fountain. An enormous circular platform with an outside diameter of 82'-4" will surround the large rotating turntable on which the sculpture will be set. Rising from a 4' base, the platform, which has been completed, gradually slopes upward to the point where it adjoins the circular turntable. Water flowing from the rotating sculpture at a flow rate of 7,600 gpm, will cascade over the surface of the enormous circular platform that surrounds it, be collected in a gutter at the platform base, and then be recirculated through the sculpture by a large charge chamber located in a well below the fountain.

Approximately 76,000 square feet of sheet lead was used to waterproof the fountain and the 30 sq. ft. charge chamber well below the fountain. Six lb. psf sheet lead was used to waterproof the top of the rotating turntable and the platform surrounding it while 8 lb. psf sheet lead was used to waterproof the charge chamber well. A total of nearly 30 tons of sheet lead was required to waterproof the fountain which, like other plaza-level installations, is located above the Concourse level.

The 13' diameter rotating turntable and the 82'-4" diameter platform surrounding it will be covered in black granite. The huge size of the fountain is architecturally scaled to compensate for the gigantic proportions of the 369' x 375' center court.

Perimeter waterproofing

In designing the moisture protection system for the World Trade Center's five-acre plaza area, particular attention was paid to insuring that a watertight seal was installed around the plaza-level exterior perimeter of the Center's five commercial buildings and the proposed hotel. The reason: all the buildings will extend through and above the plaza in much the same manner as gigantic thru-roof penetrations and a failure anywhere along the seal will likely result in water leaking into the scores of international shops, restaurants, between-building passageways and other facilities in the Concourse level.

Sheet lead used to flash plaza

Waterproofing around the perimeter of the buildings is being accomplished with sheet lead, and like the sheet lead membrane used to waterproof the plaza-level landscaping planters, it is being joined to the plaza's moisture protection system in order to insure that the entire five-acre area is waterproof.

Just about everything at the World Trade Center is on a gigantic scale and installation of the waterproofing around the plaza-level perimeter of the buildings is no exception. For example, more than half a mile of 3' wide sheet lead has already been installed around the perimeter of three buildings at the Center. Included in the total are 840 linear feet of sheet lead for the perimeter of each of the twin towers and approximately 1,109 linear feet of sheet lead for the perimeter of the Northeast Plaza Building.

Techniques similar to those used to install standard base flashing are being used to install the waterproofing for the plaza-level base of the buildings. In the first installation step, the sheet lead is joined to previously installed flashing that extends from under the plaza-level lobbies of the buildings. Long lengths of sheet lead are then laid over the 3' wide base of the buildings. The lead is then folded over the edge of the outside perimeter of the building base in such a manner that overlaps and is integrated with the plaza's multi-materials primary moisture protection system.

In the final installation step, the sheet lead is cut and pieced to fit around and under the exterior column covers.

All seams were lapped 1½" and burned to insure watertight integrity of the sheet lead. Once it is installed, it becomes an integral part of the plaza's primary moisture protection system. □

Job-Facts

Manufacturers
Members of the Lead Industries Assn.,
292 Madison Ave.,
New York, N.Y.

Contractors
John F. Abernathy and Co.,
Brooklyn, N.Y.
Allied Lead, Inc.,
Chicago, Ill.

LIA14920

AMERICAN METAL MARKET January 22, 1973

Lead Use Setting Record at World Trade Center

NEW YORK — The use of lead in flashings, fountains and landscape planters is setting a record in the construction of the World Trade Center here.

The greatest quantity of lead, about 750,000 pounds, will be installed in the World Trade Center Plaza, a five-acre, elevated plaza that will surround the six-building complex. The plaza, which forms the roof of below-grade levels, will be waterproofed to pre-

vent seepage from 600 fountains and the 20 lead-lined planters which will decorate the center court.

A double membrane protection system is being used for this purpose. One is similar to a standard built-up roofing system and uses a multi-material membrane which is installed over all that areas circling the fountain. The other system uses sheet lead to waterproof planters, the fountain, the stairways and pe buildings facing the p

This project lead contracted to John F. Co., Inc., of Brooklyn Lead, Inc., Chicago

Lead for the other setting units is being supplied in quantities depending on considerations of thickness of other materials working on the World Trade Center and the water pressure, both 4 pounds per square foot (psf) (1.36" thick) and 5 pounds psf (1.7" thick) are being used.

The lead sheet contains not less than 99 percent nor more than 99.9 percent antimony and an arsenic content of 0.06 percent to provide for increased corrosion resistance and to decrease thermal expansion.

Sheet sizes being used vary in order to keep joints to a minimum and insure the watertight integrity of the lead.

Sheet lead will be used to line the 30 landscaping planters, some as large as Olympic-sized swimming pools or as long as an average city block.

The fountain in the plaza's center court will be waterproofed using about 70,000 square feet of sheet lead.

Nearly 30 tons of sheet lead are needed to waterproof the fountain itself, and the rest will be used for the fountain base the 30 square foot charge chamber wall beneath the fountain.

SHEET LEAD waterproofing for the base of the platform surrounding the Plaza's Center Court water fountain sculpture is shown pooled back to permit installation of some of the piping that will carry water to be circulated back through the fountain. After piping was installed, sheet lead was folded flat and the joint was burned.

THE WALLACE DISPATCH, WALLACE, IDAHO 83873, FEBRUARY 1, 1973

New Lead Use Record At World Trade Center

New York reports say the use of lead in flashings, fountains and landscape planters is setting records in the construction of the World Trade Center here.

The greatest quantity of lead, about 750,000 pounds, will be installed in the World Trade Center Plaza, a five-acre, elevated plaza that will surround the six-building complex. The plaza, which forms the roof of below-grade levels, will be waterproofed to prevent seepage from the fountains and the 20 lead-lined planters which will decorate the center court.

A double membrane protection system is being used for this purpose. One is similar to a standard built-up roofing system and uses a multi-material membrane which is installed over all that areas circling the fountain. The other system uses sheet lead to waterproof planters, the fountain, the stairways and penthouses facing the plaza.

This project lead been subcontracted to John F. Abercrombie & Co., Inc., of Brooklyn and Asarco Lead, Inc., Chicago.

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Examples of local and national newspaper coverage of the feature article describing the record use of sheet lead to construct the World Trade Center

LIA14921

AMERICAN METAL MARKET
NEW YORK, N. Y.
A 15,000

JAN 15 1973

lead and zinc market

Lead-Clad Steel Making Inroads in Building Market

LONDON — Lead producers here are looking on making greater inroads in the construction market this year with a new lead-clad steel material.

The composite material, developed by the British Non-Ferrous Metals Research Association, is produced by pressure bonding of lead to steel sheets that have been precoated with lead alloy.

The material can be fabricated using traditional sheet fabricating techniques, the association said, and has already been successfully used in several industrial and commercial buildings in England.

Industry observers reported that American lead producers have expressed interest in manufacturing the new lead-clad steel, and the material may be produced in the United States by the end of this year.

The Lead Industries Association in the U.S. claims that the material's price is "competitive" with other metal products used in the construction market.

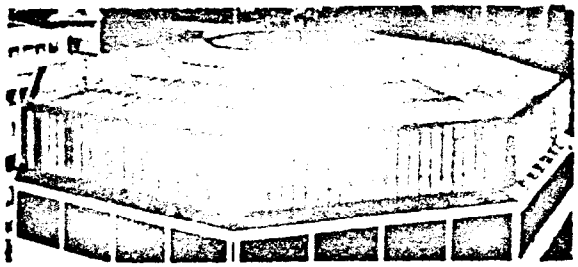
Applications of the new material include roofing, gutters, equipment. Moreover, it often was not practical to use lead for such applications, industry observers said.

Pollution Control, Too

An even bigger market for the material is seen in panels and small, deep-drawn containers from sheet, as well as flanged duct sections and spirally wrapped tubing formed from strips.

Pollution control vessels are also seen as a potential market for the lead-clad steel.

The material is currently being produced in sheet form. Single-sided cladding is immediately available, while double-sided cladding is now produced only for special orders.



LEAD CLAD STEEL – Lead producers hope to make greater inroads in the construction market with a new lead-clad steel material developed by the British Non-Ferrous Metals Research Association. The Equitable Mutual Life Association of Australasia Ltd. building, above, in London, was the first structure to use the material.

Single-side cladding is being produced with lead coatings that range from 0.020 to 0.040 inch, applied to steel that ranges in thickness from 14 to 20 gauge. The standard roofing for building applications ranges in thickness from 0.020 to 0.030 inch of lead bonded to 20-gauge steel. Thicker lead coatings on steel are being explored for chemical plant applications.

Testing May Be Needed

Standard roll-forming, brake-pressing, lock-forming and deep-drawing manufacturing techniques can be used to fabricate lead clad steel, LIA claims. Moreover, some minor testing modifications need to accommodate characteristics of the material.

Standard lead and machine tools also can be used to fabricate lead clad steel and, in addition, drilling, punching and cutting operations can be easily performed, the LIA said.

Lead-clad steel can be bent through 180 degrees without loss of adhesion and, although some thinning of the lead occurs where it forms the outer surface of the bend, the local reduction in thickness is normally acceptable, the Association added.

Most types of fasteners can be used to mechanically join lead-coated steel.

An Example

The British Association provided the following example of how the new lead-clad steel is being used:

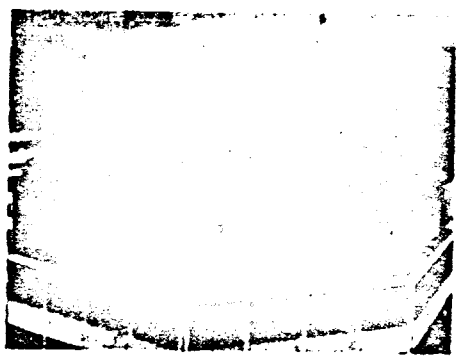
The fascia of the roof of a 10-story office building in London is in the form of an open screen comprised of 200 panels. Each 6 inches high and 1¼ inches wide, the panels are disturbed vertically around the fascia of the roof which, like the building itself, is octagonal in shape. A small gap separates each of the panels, which are hung with stainless steel bolts.

Because the backs of the panels are partially exposed to the weather, lead cladding was applied to both sides of the panels. They were fabricated from 20-gauge brass-plate steel with a cladding of about 1¾ pounds per square foot each side.

The roof was designed so that any part can be lifted and replaced without disrupting structural members.

CHEMICAL AND ENGINEERING NEWS
WASHINGTON, D. C.
W. 110,000

JAN 29 1973



New lead-clad steel gets construction tryout

Forming the vertical roof fascia panels on the National Mutual Life Association of Australasia building in London is a new material of construction, resin-bonded lead clad steel. The material developed by the British Non-Ferrous Metals Research Association, is produced by pressure bonding lead to steel sheets that have been precoated with a lead alloy. According to Lead Industries Association, New York City, the composite has undergone extensive mechanical and thermal testing without bond failure. First applications are in building construction in England, but the association feels that commercial and industrial uses — for example, lead-lined vessels in chemical service — could be even more extensive. In the U.K., sheet clad on one or both sides is available with single side lead coatings from 0.020 to 0.040 inch applied to steel ranging in thickness from 14 to 20 gage. Thicker coatings for chemical use are under study.

Feature Article:

Lead-Clad Steel Expected To Expand Use of Lead In Building and Construction

Recently released, the article has appeared in AMERICAN METAL MARKET and CHEMICAL AND ENGINEERING NEWS, MACHINE DESIGN, DESIGN NEWS, AMERICAN MACHINIST, AUTOMOTIVE INDUSTRIES and INDUSTRY WEEK

LIA14922

41-77 MACHINE DESIGN
CIRCULATION 130,000

FEB 8 1973

Strong And Quieting Lead-Clad Steel Bids For Many Jobs

A large commercial/industrial market exists for a new material developed in England, according to the Lead Industries Association Inc.

The material is a composite that combines lead's corrosion resistance and sound-barrier properties with the strength of steel. Called roll-bonded lead-clad steel, it was developed by the British Non-Ferrous Metals Research Association.

The lead-clad steel is produced by pressure bonding lead to steel sheets which have been precoated with lead alloy. It can be fabricated using traditional techniques and it has been subjected to extensive mechanical and thermal testing without bond failure.

In England, the new lead-clad steel has been successfully used for commercial and industrial building construction—it possesses excellent properties for roofing, siding, and chemical construction. However, LIA believes lead-clad steel will make its biggest contribution in other applications. These include panels, deep-drawn containers, flanged duct sections, and spirally wrapped tubing.

Development of lead-clad steel for tank panels is believed by LIA to be of particular importance since sheet lead already is being used to line a variety of chemical and pollution-control vessels. The availability of a structural material that can easily be fabricated to form an economical lead-lined vessel is expected to result in expanded lead uses for such applications.

Because roll-bonded lead-clad steel is both strong and a sound barrier, it is suited to meet the increasing demands for quieter products, LIA continues. Typical potential applications include enclosures for dishwashers, waste disposals, and laundry equipment; ductwork for air, liquid, and commodity handling systems; industrial machinery and equipment enclosures; and in a variety of automotive/transportation sound barriers.

Although it is not yet being fabricated in this country, lead-clad steel is currently produced in sheet form in the United Kingdom. Both single (one side) and double (both sides) cladding are available.

41-71 DESIGN NEWS
CIRCULATION

FEB 19 1973

Lead-clad Composite Material

Composite material combines lead's corr
sion resistance and sound barrier properti
with the strength of steel. Called roll-bonde
lead-clad steel, the composite material
produced by pressure-bonding lead to ste
sheets that have been precoated with le
alloy. The lead-clad steel is said to withsta
extensive mechanical and thermal stre
without bond failure. It can be fabricate
using traditional steel fabricating techniques
The material's sound-absorbing properti
make it especially useful for some constr
applications. Lead Industries Assn., 2
Madison Ave., New York, NY 10017.
For information, circle 30

AUTOMOTIVE INDUSTRIES, March 1, 1973

Lead Clad Material In England

A new composite material that combines le
corrosion resistance and sound barrier prope
with the strength of steel has been introduce
England.

Called roll bonded lead clad steel, the

A strong, corrosion-resistant, sound barrier composite of lead and steel has been commercialized in Britain, by Associated Lead Manufacturers Ltd. Developed by the British Non-Ferrous Metals Research Assn., it has already found markets in construction. Meanwhile, lead producers also foresee uses in making chemical-process equipment, as well as other industrial and consumer products.

The composite is made by pressure-bonding lead to steel sheets that have been hot-dip coated with an alloy consisting of 85% lead, 15% tin. The product can be fabricated via conventional steel-fabrication techniques.

[illegible] barrier materials where
clude ductwork for air, liquid
ling systems, industrial machin
l enclosures, and a variety of
tomotive transportation equipment.

CHEMICAL ENGINEERING/FEBRUARY 5, 1973

Cladding controls corrosion—and noise

A different kind of "composite" material—combines the structural strength of steel with the corrosion resistance, appearance, and sound-barrier qualities of lead—has been developed by the British Nonferrous Metals Research Assn. As its name suggests, roll-bonded lead clad steel is produced by cold-rolling molten lead sheet to terne-coated steel.

The pressure-bonded material is being offered in the United Kingdom with both single and double cladding and has already found application in exterior construction applications. Other possible uses include ventilation equipment, ductwork for commodity handling systems, enclosures for industrial machinery, even home appliance housings. Single-clad sheets are being produced with lead coatings ranging from 0.020 to 0.060 in. thick on 14- to 20-gage steel. Sheets with thicker coatings are being investigated for use in lead-lined vessels and other chemical-plant equipment.

Although some minor tooling modifications may be required, it is reported that roll-bonded lead-clad steel can be formed by deep-drawing, roll-forming, brake-pressing, and lock-forming without delamination, even in tight-radius bends. Fabrication by soldering or brazing is almost as easy as using sheet lead, and where steel-to-steel joints are required, stud and projection welding are satisfactory.

American lead producers have expressed interest in producing lead-clad steel for the domestic market, according to the Lead Industries Assn., and as recently last month the price of lead was restored to 15¢/lb, its August '72 level before Asarco started cutting prices in an effort to discourage domestic

13

12-3944 INDUSTRY WEEK
CIRCULATION

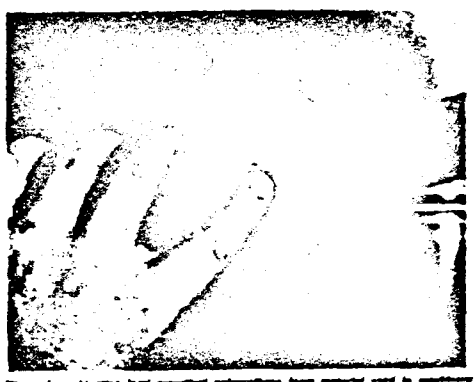
JAN 22 1973

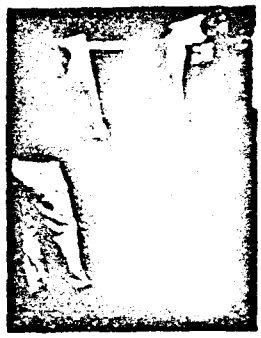
A NEW LEAD-CLAD STEEL, made by roll bonding, is being produced in England. It combines the strength of steel with the ability of lead to resist corrosion and noise. It can be formed and fabricated easily, say the developers, the British Nonferrous Metals Research Assn. (Details are available from the Lead Industries Assn., New York.)

LIA14923

DEC 1972

955





New Foam/Lead Machinery Enclosure Panel Developed To Meet OSHA Standards For Industrial Noise Control

Sound insulated machinery enclosures are one method to control noise from industrial equipment that originally was considered either too large to equip with adequate sound control, or else is already installed without built-in noise control.

According to the Lead Industries

ing, Des Plaines, Ill. The system consists of 1¼" thick lead-foam material; an extruded aluminum framing system; and flat aluminum sheets in gages ranging from .040" to .062", for the exterior face of the panel.

The lead acoustical foam material, produced by the Soundcoat Co.,

pal (.0075" thick), lead in acoustical account it meets UL-

fire retardancy, the will not "drool and" in the sheet lead like prick. In addition, al foam tends to be d workmen have to panel, e.g., for sheet material operation ish to seal personnel which sound could

ment Occupational . Act (OSHA) stand-

ards, the Maker-designed machinery enclosures can achieve reductions of between 35 to 50 decibels (db), depending on how carefully the enclosure is installed and the original noise levels encountered. According to Maker Engineering, the enclosures can be custom-built to enclose any type of machinery regardless of size and configuration. Ports can be designed into the panel enclosures to permit stock input and output and, if needed, a specially designed door can be installed to permit operators to enter the enclosure.

Maker Engineering also provides standard-size panels to facilitate do-it-yourself noise control machinery enclosures. The panels, available in standard 3'x6', 3'x8' and 4'x8' sizes, are supplied with the aluminum extrusion framing to permit construction of the sides and roofs of machinery enclosures. •

Feature Article:

New Foam/Lead Machinery Enclosure Panel Developed to Meet OSHA Standards For Industrial Noise Control

Published as one-page feature in METAL STAMPING and in five other magazines. Four placements reported in previous report, bringing total to 10.

LIA14924

PIPE LINE NEWS
LAFOURCHE, LA.
MONTHLY

NOV 1972

• SOUND INSULATION

66-1 MODERN PLASTICS

DEC 1972

Sprayed-finished goods

Formable lead-plastic laminates

Feature Article:

New Foam/Lead Machinery Enclosure Panel Developed To Meet OSHA Standards For Industrial Noise Control

..... page two of placements

METAL PROGRESS
BOVELTY, OHIO
MONTHLY

FEB 1973

MATERIALS TODAY®

SI JOE PRODUCTION MAGAZINE

JAN 1973

FOOD PLANT IDEAS
MINNEAPOLIS, MINN.
MONTHLY

DEC 1972

NOISE CONTROL PANELS

Standard size panels for do-it-yourself construction of noise control machinery enclosures feature a pair of sheet lead septa sandwiched in polyurethane acoustical foam. Each of the septa is .0078-in. thick, weighing ¼-lb psf, and the acoustical foam used in the 1¼-in. thick sandwich meets UL-94 regulations for fire retardancy, will not "dust out" or deteriorate from the sheet lead. Panels are available with mylar coating to prevent moisture absorption and/or with flat aluminum sheet facing in standard 2 by 4 ft and 4 by 4 ft sizes. Aluminum extrusion framing for sides and roofs are also available from Maher Engineering.

Lead Industries Association, Inc.

For details, circle No. 405 on card

15

Machine Enclosures, made of lead sizes, are the subject of data sheets strips. They describe the benefits of a noise and providing a good sound ry and food processing plants.

ture facts from:

Industries Assn.
York, N.Y.

LIA14925

41-42 MATERIALS ENGINEERING

JAN 1973

Metals

Lead composite panels to deaden sound

Use of lead, in conjunction with other materials, as a sound barrier for machinery enclosures is increasing to comply with OSHA noise control requirements. One company has developed a lead/acoustical foam aluminum panel that uses two sheets of lead 0.0078 in. thick. If the panel is to be used in a corrosive environment, stainless steel can be substituted for the aluminum. Noise levels are down 35 to 50 db, depending on installation. A noise reduction enclosure that also offers thermal protection consists of a perforated sheet metal sheet, layers of acoustical foam, lead, more foam and aluminum foil. According to the Lead Industries Assoc., the lead part of these panels rarely has to be thicker than 0.0312 in. Circle 171

41-29 INDUSTRY

DEC 1972

DES PLAINES, ILLINOIS

According to the Lead Industries Association, an increasing number of manufacturers of sound insulated machinery enclosures are taking advantage of the sound barrier properties of lead to insure their sound attenuation effectiveness. Many of these enclosures are made up of panels consisting of sheet lead and acoustical poly urethane foam combinations, some of which contain more than one sheet of lead separated by layers of foam to enhance sound attenuation properties over that of an equal mass of lead in a single sheet. Typical of such machinery enclosures is a new modular sound control system developed by Maher Engineering, Des Plaines. The system consists of one and a half inch thick lead foam material, an extruded aluminum framing system, and flat aluminum sheets, in gauges ranging from .045" to .063", for the exterior face of the panel.

41-7 CALIFORNIA INDUSTRY

FEB 1973

Sound deadening enclosures

Sound reductions of 30 to 50 Db can be achieved with enclosures made from aluminum panels and framing in connection with Soundcoat LF acoustical foams with lead septum creating a sound barrier. Both custom enclosures and individual panels are available. Completed panels are about 1½ in. thick and the standard panels for do-it-yourself installations are 2 x 4, 4 x 4 and 4 x 8 ft. Aluminum Handipanels, Inc.

Write 999 on Inquiry Card

41-57 PLANT ENGINEERING E.S.R. 91,000

NOV 30 1972

ENCLOSURE PANELS
Loop machinery noise in check

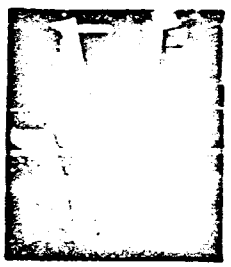
Sound-insulated enclosures offer a means of controlling noise from equipment installed without built-in noise control, or originally considered too large for adequate control measures. Enclosures utilize panels, light enough for one-man handling, consisting of sheet lead and acoustical polyurethane foam combinations. The foam material, produced by Soundcoat Co., is fire-retardant and will not dust out.

The custom-enclosure shown will house a paper grinding machine. Its panels have two layers of 0.0078-in.-thick lead sandwiched into acoustical foam covered with prefabricated aluminum sheets. Maher Engineering.

Circle 58 on Free Card

41-51 NEW EQUIPMENT DIGEST

JAN 1973



FOAM/LEAD ENCLOSES MACHINERY NOISE

Modular sound control system for machinery consists of panels of lead sheets sandwiched to acoustical foam. The self-locking combination locks to seal openings, such as holes around for electrical conduit. Sound reductions from 35 to 50 db can be achieved. Panels come in 2 x 4, 2 x 8, and 4 x 4-ft sizes with aluminum extrusion framing. Maher Engineering Co., 13 Broadway, Des Plaines, Ill. 60016

16

Feature Article:

Sheet Lead Featured in Newly Developed Machinery Noise Enclosure Panel System

Published in five magazines, bringing total articles published to date to 10 -- five placements reported in previous report

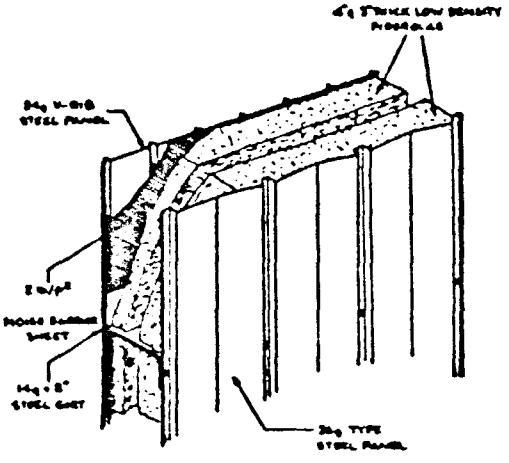
..... Third page of placements

LIA14926

36-22C DODGE CONSTRUCTION NEWS
JAN 22 1973

Near airports, pumping stations . . .

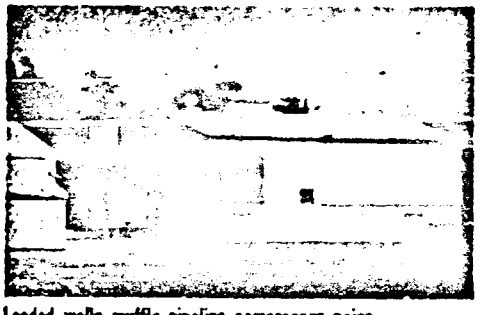
Use of lead vital in new noise-barrier panel for roof, siding



ACOUSTICAL BULLDOG PANEL (See drawing) developed for use as a barrier near airports, compressor pumps, utility plants, etc. Primary materials [illegible] lead (1/32 in.) bonded to the inside face of 24-ga. galvanized sheet (.0239 in.) that forms backside of panel.

JAN 1973

NEW IDEAS IN POWER SYSTEMS



Leaded walls muffle pipeline compressor noise

Lead linings for the building housing a gas pipeline compressor station at Lobo, near London, Ont., have reduced the compressor noise outside the building from 115 dB to only 40 dB.

Operated by the Union Gas Co. of Canada, the compressor houses a 12,500-hp turbine and is located close to a residential area, making the high noise of the machinery unacceptable. Acting as consultants, prior to construction of the station, International Pipeline Engineering drew up rigid specifications calling for reduction of the noise level of the turbine itself and for noise controls to be built into the housing.

To meet the specifications, Pre-Fab Buildings Ltd., which was awarded the contract for the building, developed an economical panel comprising

- an inside face of 2 lb-per-sq-ft sheet lead (0.0112 in. thick) bonded to 24-gauge V-rib galvanized sheet steel;
- a center zone of two layers of low-density fiberglass, one 4-in. thick and the other 3-in. thick, each with a vinyl backing;
- an exterior face of 26-gauge galvanized steel sheet with a baked enamel finish.

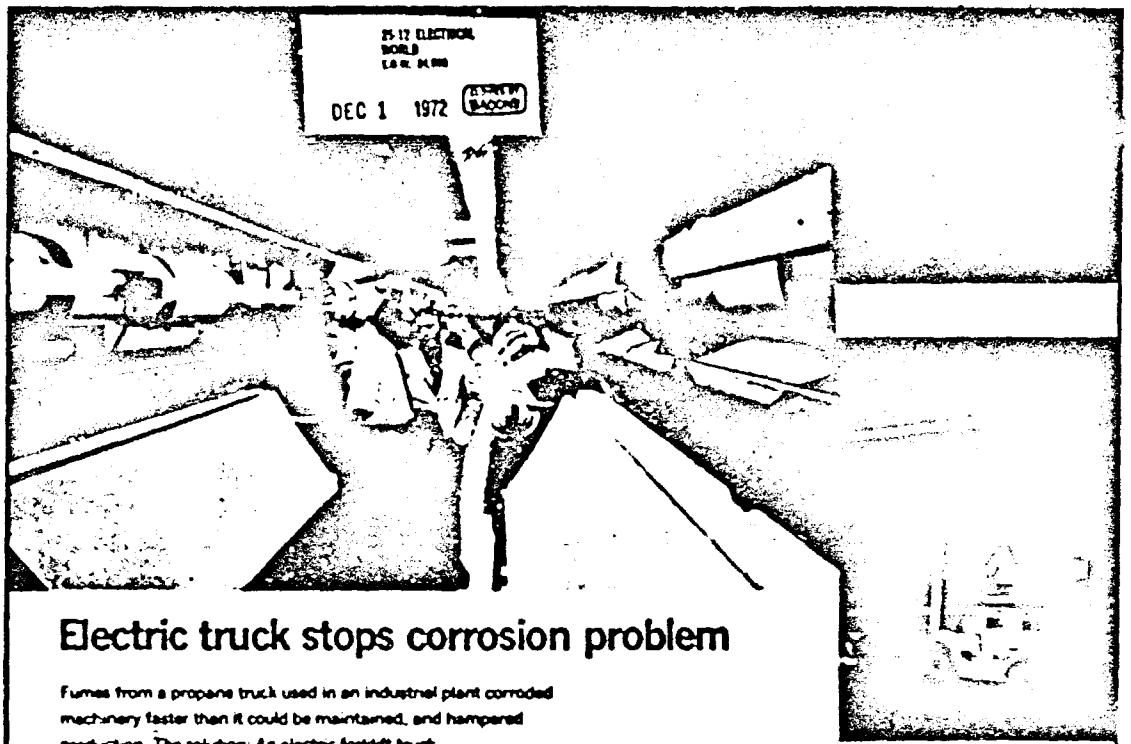
The building panel girts (stiffeners) were cold rolled from steel Z-sections. The panels are used for the roof and walls of the 43x57x22-ft building.

Feature article:

Lead Noise Barrier in New Building Panel System Silences High Pitch Whine of Compressors

First two publicity placements -- published in DODGE CONSTRUCTION NEWS and MODERN POWER & ENGINEERING

LIA14927



Electric truck stops corrosion problem

Fumes from a propane truck used in an industrial plant corroded machinery faster than it could be maintained, and hampered production. The solution: An electric forklift truck

The substitution of a lift truck powered by a lead acid battery for one powered by a propane-fueled internal-combustion engine has solved severe manufacturing corrosion and environmental problems at Aberdeen Textile Inc., a small knitting mill in Aberdeen, N.C.

Company President Glenn Fulgrham reports that the following facts became evident soon after the plant began operating:

- Knitting needles, machinery parts, and other plant equipment were rusting.
- Expensive maintenance and parts replacements were required to keep the plant operating.
- A few employees were suffering from minor nausea and mucous eye irritations.
- Production and sales were decreasing due to equipment deterioration and a loss in productive man-hours.

The solution to the problems, all related to the use of a propane-fueled lift truck, resulting in the needles becoming corroded within three hours—before the knitting operations could begin again. Corroded needles prevent yarn from traveling through the knitting head.

An estimated $1,000 was spent to replace rusting needles during a two-month period. In addition, production time was also lost due to machinery downtimes required to change the needles on the knitting machines.

With this simultaneous of factors becoming more and more detrimental to plant productivity and sales volume, as well as to employees health and morale, Fulgrham searched for other solutions to the problem.

For example, he thought the plant's electric duct heaters, used during winter months to heat incoming air to keep the plant interior at a constant temperature, might be the cause of the problem. He switched into conditioners after a number of related investigations were completed.

The knitting machines in the plant are kept at a constant temperature. To do this, a constant oil is circulated at the base of each machine. A small amount of this oil is vaporized, and the resulting

[illegible] air in the knitting room.

Meanwhile, the corrosion rate of the knitting needles was being observed. In this phase of the test, needles attached to tapes were placed on knitting machines throughout the plant. Needles near where the forklift truck operated rusted in three hours, while those at the rear of the building, some distance from where the truck operated, took 18 hours. While this also resulted in shorter but propane-fuel truck as the culprit, it was felt that the test was inconclusive because of the differences in conditions at the front and rear of the plant.

The problem was also discussed with a staff member of the North Carolina State Industrial Extension Service, and it was learned that propane and combustion sulfur, which can be oxidized in the truck engine and vented as sulfuric acid fumes being returned into the air of the knitting room. The company was assured that processes of sulfuric acid fumes plus water acid fumes would promote the high rate of machinery rusting. The overall size of the building, 6,000 sq ft, was also a major factor.

Based on this combined evaluation, Fulgrham ordered a forklift powered by a lead-acid battery as a replacement for the propane-fueled vehicle. During the 18 months this battery-powered truck has been in operation, there has been no noticeable corrosion, nor any incidents of nausea or eye irritation.

The electric truck used at Aberdeen Textile has a 4,000-lb capacity. It is fitted with a long pole when used to move wrapped cylinder rolls of cloth onto trucks at the loading dock or to unload bundles of hollow cores, around which the rolls of cloth are wrapped.

Based on the successful use of the electric truck at the Aberdeen plant, another one was ordered for a new 30,000-sq ft plant that Fulgrham manages just across the street. ■

Feature article:

Electric Truck Replaces Propane-Fueled Vehicle To Solve Corrosion, Environmental Problem in Knitting Mill

Six major placements...two pages in ELECTRICAL WORLD, one page in ELECTRIC VEHICLE NEWS, one page in FACTORY, one page in THE BATTERY MAN, two pages in OCCUPATIONAL HAZARDS

Safety idea center

DEC 1972

Clear air detective story

Soon after Aberdeen Tricot, Inc. opened its knitting mill in Aberdeen, N.C., employees began complaining of mild nausea and annoying eye irritations. Then metal machinery parts began to rust.

Hundreds of knitting needles on half the knitting machines in the plant were affected. The rust attacks were particularly severe on machines that were stopped for pattern changes. Needles rusted so badly that machines wouldn't work.

The company spent about $5,000 to replace rusted needles in a 2-month period, in addition to taking a beating on machinery downtime. Worst of all were the effects on employee health and morale.

Knitting plants closely control temperature and humidity. Aberdeen Tricot keeps the temperature at 78 to 80 degrees, humidity at 58 percent. Investigators wondered if the combination of temperature/humidity, and propane exhaust from a fork lift truck could have caused the trouble. But, changing the truck's carburetor and fuel tanks and tuning the engine did no good. Indeed, troubles grew worse.

The next line of thought led to the coolant oil in the knitting machines. To maintain a constant temperature, oil is circulated at the base of each machine. A small amount of this oil is vaporized and the resulting vapor condenses on the cooler overhead structures including the air conditioning and heating ducts. The heating elements were investigated and, since visible traces of the condensed oil were found, it was presumed that some of the particles were being burned when they came in contact with the energized heating elements.

Employees and machinery at Aberdeen Tricot, Inc. took a beating when nitrogen in the lift truck exhaust fumes combined with water in the air to form nitric acid.

Case study: N.C. knitter solves pollutant problems

The substitution of a lead acid battery-powered lift truck for one powered by a propane fueled internal combustion engine has solved a number of corrosion and environmental problems at Aberdeen Tricot, Inc., said a recent report authored by the Lead Industries Assoc., New York, N.Y.

In a company president, Glenn Faglerman, said that the following items became evident soon after his plant began operating:

- Knitting needles, machinery parts and other plant equipment were rusting.
- Expensive maintenance and parts replacement were required to keep the plant operating.
- A few employees were suffering from minor nausea and minor eye irritations.
- Production and sales were decreasing due to equipment downtime and a loss in productive man-hours.

The solutions to the problems, all of which were found to be related to the use of propane fueled lift trucks, terminated a search for the source and effects of pollutants that can develop under certain conditions in the controlled atmosphere of an industrial plant.

It was thought that the plant's electric duct heaters, used during winter months to heat incoming air to keep the plant interior at a constant temperature, might be the cause of the problem. This conclusion was arrived at after a number of related circumstances were considered.

The knitting machines in the plant also were necessarily kept at a constant temperature. To accomplish this, a coolant oil is circulated at the base of each knitting machine. A small amount of this oil is vaporized and the resulting vapor condenses on the cooler overhead structures including the air conditioning and heating ducts. The heating elements were investigated and, since visible traces of the condensed oil were found, it was presumed that some of the particles were being burned when they came in contact with the energized heating elements.

As the result of this theory, Faglerman requested assistance from Carolina Power & Light Co. to solve what was thought to be a problem with the plant's electrical heating system. These representatives made a careful study of the plant's air handling equipment and determined it was not causing the corrosion and environmental health problems.

Since the problem only existed in the production area and not in the adjoining plant office, Carolina Power & Light representatives turned their attentions to what was first believed to be the source of the problems: a propane-fueled lift truck. They speculated that fumes emitted from the truck operating in the closed environment of the plant produced an abnormally high concentrations of nitrogen in the atmosphere. When the nitrogen was mixed with the water vapor continuously circulated by the humidifiers and then combined with the heated air during winter months, the nitrogen caused a chemical reaction that resulted in the formation of nitric acid mist which is highly corrosive to most metals.

The safety company representatives also concluded that the nitric acid mist also was the pollutant that ultimately caused the nausea and eye irritations.

The situation at Aberdeen was unique because the nitrogen dioxide was reacting with the presence of moisture in the atmosphere to form more nitric acid, thus generating a continuous cycle of highly corrosive and toxic conditions as long as the heating season lasted. Carolina Power & Light representatives strenuously recommended that an electric fork lift truck replace the propane fueled vehicle.

Wishing to prove their theories valid, the Power & Light representatives assisted the knitting company in studying corrosion and environmental problems.

Samples of the oily mist and rust from the plant equipment were taken to be chemically analyzed by an outside chemical laboratory. The tests showed that about 9.5 ppm nitric acid was present in the air at the knitting room.

Also, the corrosion rate of the knitting needles was being observed. In this phase of the test, needles attached to tapes were placed on knitting machines throughout the plant. Needles placed near where the fork lift truck operated rusted in three hours while those at the rear of the building, and some distance from where the truck operated, rusted in 18 hours. While this also tended to prove the propane fuel fork lift truck theory, it was felt that the test was inconclusive because of the difference in conditions at the front and rear of the plant.

The problem was discussed with a staff member of the N.C. State Industrial Extension Service and it was learned that propane can contain sulfur which can be oxidized in the truck engine and result in sulfuric acid fumes being emitted into the air of the knitting room. They were assured that presence of sulfuric acid fumes, plus nitric acid fumes, could promote the high rate of machinery rusting.

Based on this combined evidence, Faglerman ordered a lead acid battery-powered fork lift truck as a replacement for the propane fueled vehicle. During the 18 months the lead acid battery-powered fork lift truck has been in op-

BATTERY-POWERED LIFT TRUCK TO THE RESCUE

a knitting company's problems are solved...

The substitution of a lead acid battery-powered lift truck for one powered by a propane fueled internal combustion engine has solved a number of perplexing corrosion and environmental problems at Aberdeen Tricot, Inc., a knitting company in Aberdeen, N.C.

Company president, Glenn Fogelman, reports that the following facts became evident soon after the plant began operating:

Knitting needles, machinery parts and other plant equipment were rusting.

Expensive maintenance and parts replacement were required to keep the plant operating.

A few employees were suffering from minor nausea and minor eye irritations.

Production and sales were decreasing due to equipment downtime and a loss in productive manhours.

The solutions to the problems, all of which were found to be related to the use of propane fueled lift truck, is an interesting case history of a search for the source and effects of pollutants that can develop under certain conditions in the controlled atmosphere of an industrial plant.

Closely controlled temperature and humidity conditions are critical requirements for the production of quality tricot fabric. At Aberdeen Tricot, the temperature is kept at 78 to 80 degrees Fahrenheit. Humidifiers automatically maintain a relative humidity of 56 per cent.

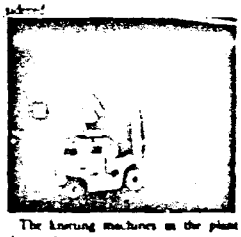
The temperature and humidity, combined with exhaust fumes from a propane-fueled fork lift truck, were first thought to be causing the corrosion, eye irritation and nausea problems since they were most evident in the production area of the plant where the truck operated. Steps were therefore taken to replace the truck's carburetor, tune the engine, and change the fuel tanks, thinking that some foreign elements may have been placed in the tanks.

These preventive measures produced no effect and the problems continued to worsen. The corrosive conditions, evident in formations on door latches and other plant equipment, became critical when they developed on the hundreds of delicate knitting needles attached to the 14-foot long needle bars of about half of the 14 knitting machines in the plant. The corrosive attacks were particularly aggressive when the machines were stopped to change a knitting pattern. The needles became corroded before the knitting operation could begin again. Corroded needles prevent yarn from traveling through the knitting zone.

An estimated $5,000 was spent to replace rusting needles during a two month period. In addition, production time was also lost due to machinery downtime required to change the needles.

With these combined factors becoming more and more detrimental to plant production and sales volume as well as employee health and morale, the company president searched for other solutions to the problems.

For example, he thought the plant's electric duct heaters, used during winter months to heat incoming air to keep the plant interior at a constant temperature, might be the cause of the problem. His conclusion was arrived at after a number of related circumstances were considered.



The knitting machines in the plant also are kept at a constant temperature. To accomplish this, a coolant oil is circulated at the base of each knitting machine. A small amount of this oil is vaporized and the resulting vapor condenses on the cooler overhead structures including the air conditioning and heating ducts. The heating elements were investigated and, since visible traces of the condensed oil were found, it was presumed that some of the particles were being burned when they came in contact with the energized heating elements. This was thought to result in fumes that were causing the corrosion and environmental health problems and thus theory was strengthened by the fact that the company president detected what he thought was smoke coming from the air vents in his office during those times when the heating elements were energized.

As the result of this theory, Aberdeen Tricot president Fogelman requested assistance from Carolina Power & Light Co. to solve what was thought to be a problem with the plant's electrical heating system. Their representatives made a careful study of the plant's air handling equipment, determined it was working efficiently, and believed it was not causing the corrosion and environmental health problems.

Since the problem only existed in the production area and not in the adjoining plant office, Carolina Power & Light representatives turned their attention to what was first believed to be the source of the problems: the propane-fueled lift truck. They speculated that fumes emitted from the truck operating in the closed environment of the plant produced an abnormally high concentration of nitrogen in the atmosphere. When the nitrogen was mixed with the water vapor continuously circulated by the humidifiers and then combined with the heated air during winter months, the nitrogen caused a chemical reaction that resulted in the formation of nitric acid mist which is highly corrosive to most metals.

The utility company representatives also concluded that the nitric acid mist also was the pollutant that ultimately caused the nausea and eye irritation. They felt that these two environmental problems were attributed to two nitric acid-based poisonous gases: nitric oxide, which is formed when nitric acid combines with metal; and nitrogen dioxide, which is formed when nitric oxide combines with oxygen. The situation at Aberdeen Tricot was unique because the nitrogen dioxide was reacting with the presence of moisture in the atmosphere to form more nitric acid, thus generating a continuous cycle of highly corrosive and toxic conditions as long as the heating season lasted. Carolina Power & Light representatives

(continued on page 18)

BATTERY-POWERED TRUCK
(continued from page 4)

therefore recommended that an electric fork lift truck replace the propane fueled vehicle.

Wishing to prove their theories and to insure Aberdeen Tricot that their opinions were unbiased (the electric company promotes the use of battery-powered electrics in industrial plants because they are normally recharged during off-peak hours), the Carolina Power and Light representatives assisted Aberdeen Tricot in studying the corrosion and environmental problems.

Samples of the oily mist and rust from the plant equipment were taken so be chemically analyzed by an outside chemical laboratory. The tests showed that about 9.5 ppm nitric acid was present in the air in the knitting room.

Meanwhile, the corrosion rate of the knitting needles was being observed. In this phase of the test, needles attached to tapes were placed on knitting machines throughout the plant. Needles placed near where the fork lift truck operated ranged in three hours while those at the rear of the building, and some distance from where the truck operated, ranged in 18 hours. While this also tended to prove the propane fuel fork lift truck theory, it was felt that the test was inconclusive because of the difference in conditions at the front and rear of the plant.

The problem was also discussed with a staff member of the North Carolina State Industrial Extension Service and it was learned that propane can contain sulfur which can be oxidized in the truck engine and result in sulfuric acid fumes being entrained into the air of the knitting room. They were therefore assured that presence of sulfuric acid fumes, plus nitric acid fumes, could promote the high rate of machinery rusting.

Based on this combined evidence, President Fogelman ordered a lead acid battery-powered fork lift truck as a replacement for the propane fueled vehicle. During the 18 months the lead acid battery-powered fork lift truck has been in operation, the plant has experienced no noticeable corrosion action and there have been no further incidents of nausea or eye irritation.

The electric truck used at Aberdeen Tricot has a 4000 lb. capacity. It is fitted with a long pole when used to move wrapped circular rolls of cloth from trucks at the loading dock or to unload bundles of hollow cores which are used to wrap the rolls of cloth. To move the circular rolls of cloth or bundles of cores, the pole is inserted in a core and is used to lift the material to be transported. When large spools of yarn, called beams, are to be moved into the plant or to and from the knitting machines, the long pole is replaced with two forks.

Based on the successful use of the electric truck at the Aberdeen plant, another one was ordered for a new 36,000 sq. ft. plant just across the street.

THE BATTERY MAN, December, 1972

41-14C FACTORY
DEC 1972

Propane-powered lift truck and knitting needles

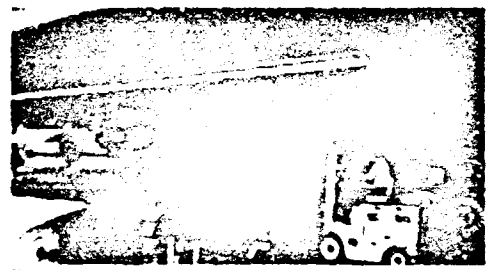
Many gasoline-powered industrial lift trucks have been converted to propane fuel in order to do away with harmful exhaust fumes. Here's a case that backfired

The substitution of a lead-acid battery-powered lift truck for one powered by a propane-fueled internal combustion engine has solved a number of perplexing corrosion and environmental problems at Aberdeen Tricot, Inc.

Soon after this Aberdeen, N.C. plant had begun operating, knitting needles and machinery were rusting, equipment downtime was increasing, and some employees were suffering from minor eye irritations. At first, it was thought that the exhaust from a propane-powered lift truck that handled beams of yarn in the closed production area might be at fault. So steps were taken to replace the truck's carburetor, tune its engine, and change its fuel supply. But the problems continued to worsen. An estimated $5000 was spent to replace rusting needles during a two month period.

The plant's electric duct heaters then became suspect. They heat incoming air during the winter months to keep the plant interior at a constant temperature. They relate to the knitting machines in this manner. A coolant oil is circulated at the base of each knitting machine, and a small amount of this oil ends up vaporized. The resulting vapor condenses on the cooler overhead structures, including the air conditioning and heating ducts. It was presumed that some of these vapor particles were being burned when they came in contact with the energized heating elements. These fumes were fingered as the source of the corrosion and environmental health problems.

So the company called Carolina Power & Light Co. But the latter's representatives, after careful study, ruled out the plant's air handling equipment. And they noted that the problem existed only in the production area and not in the adjoining plant office.



New electric lift truck eliminated the nitric acid-sulfuric acid generation problem that stemmed from previous propane propulsion

This led them to conclude that fumes emitted from the lift truck operating in the closed production area produced an abnormally high concentration of nitrogen in the atmosphere. When the nitrogen was mixed with the water vapor continuously circulated by the production area humidifiers and then combined with the heated air during winter months, the nitrogen caused a chemical reaction that resulted in the formation of corrosive and eye-irritating nitric acid mist. By-product gases were also being generated: nitric oxide, which is formed when nitric acid combines with metal, and nitrogen dioxide, which is formed when nitric oxide combines with oxygen.

The situation at Aberdeen Tricot was unique because the nitrogen dioxide was reacting with the presence of moisture in the atmosphere to form more nitric acid, thus generating a continuous cycle of highly corrosive and toxic conditions as long as the heating season lasted. Carolina Power & Light representatives, therefore, recommended that an electric fork lift truck replace the propane-fueled vehicle.

To corroborate this new theory, samples of the oily mist and rust from the plant equipment were taken to be chemically analyzed by an outside laboratory. The tests showed that about 9.5 ppm nitric acid was in the air in the knitting room.

State service consulted

The problem was also discussed with a staff member of the North Carolina State Industrial Extension Service. It was learned that propane can contain sulfur. Sulfur can be oxidized in the truck engine, and this phenomenon could result in sulfuric acid fumes being emitted into the warm air of the knitting room. The presence of sulfuric acid fumes along with the nitric acid fumes surely would promote the high rate of machinery rusting.

Based on this combined evidence, Aberdeen Tricot ordered a lead-acid battery-powered fork truck as a replacement for the propane fueled vehicle. The 4000-lb (1816 kg) rider electric has now been in operation some 18 months, and the plant has experienced no noticeable corrosion action. Also, there have been no further incidents of employee nausea or eye irritation. □

EV SOLVES PERPLEXING CORROSION PROBLEM

The substitution of a lead acid battery-powered lift truck for one powered by a propane fueled internal combustion engine has solved a number of perplexing corrosion and environmental problems at Aberdeen Tricot, Inc., a knitting company in Aberdeen, N.C.

Company president, Glenn Fogleman, reports that the following facts became evident soon after his plant began operating:

- Knitting needles, machinery parts and other plant equipment were rusting.
- Expensive maintenance and parts replacement, were required to keep the plant operating.
- A few employees were suffering from minor nausea and minor eye irritations.
- Production and sales were decreasing due to equipment downtime and a loss in productive manhours.

The solution to the problems all of which were found to be related to the use of propane fueled lift truck, is an interesting case history of a search for the source and effects of pollutants that can develop under certain conditions in the controlled atmosphere of an industrial plant.

Closely controlled temperature and humidity conditions are critical requirements for the production of quality tricot fabric. At Aberdeen Tricot, the temperature is kept at 78 to 80 degrees Fahrenheit. Humidifiers automatically maintain a relative humidity of 58 per cent.

The temperature and humidity, combined with exhaust fumes from a propane-fueled fork lift truck, were first thought to be causing the corrosion, eye irritation and nausea problems since they were most evident in the production area of the plant where the truck operated. Steps were therefore taken to replace the truck's carburetor, tune the engine, and change the fuel tanks, thinking that some foreign elements may have been placed in the tanks.

These preventive measures produced no effect and the problems continued to worsen. The corrosive conditions, evident in formations on door latches and other plant equipment, became critical when they developed on the hundreds of delicate knitting needles attached to the 14-foot long needle bars of about half of the 14 knitting machines in the plant. The corrosive attacks were particularly aggressive when the machines were stopped to change a knitting pattern. The needles became corroded before the knitting operation could begin again. Corroded needles prevent yarn from traveling through the knitting zone.

An estimated $5,000 was spent to replace rusting needles during a two month period. In addition, production time was also lost due to machinery downtime required to change the needles.

With these combined factors becoming more and more detrimental to plant production and sales volume as well as employee health and morale, the company president searched for solutions to the problem.

Since the problem only existed in the production area and not in the adjoining plant office, attention turned to what was first believed to be the source of the problems: the propane-fueled lift truck. Fumes emitted from the truck operating in the closed environment of the plant produced an abnormally high concentration of nitrogen in the atmosphere. When the nitrogen was mixed with water vapor continuously circulated by the humidifiers and then combined with the heated air during winter months, the nitrogen caused a chemical reaction that resulted in the formation of nitric acid mist which is highly corrosive to most metals.

It was also concluded that the nitric acid mist also was the pollutant that ultimately caused the nausea and eye irritation. These two environmental problems were attributed to two nitric acid-based poisonous gases: nitric oxide, which is formed when nitric acid combines with metal; and nitrogen dioxide, which is formed when nitric acid combines with oxygen. The situation at Aberdeen Tricot was unique because the nitrogen dioxide was reacting with the presence of moisture in the atmosphere to form more nitric acid, thus generating a continuous cycle of highly corrosive and toxic conditions as long as the heating season lasted. Carolina Power & Light representatives recommended that an electric fork lift truck replace the propane fueled vehicle.

Samples of the oily mist and rust from the plant equipment were taken to be chemically analyzed by an outside chemical laboratory. The tests showed that about 9.5 ppm nitric acid was present in the air in the knitting room.

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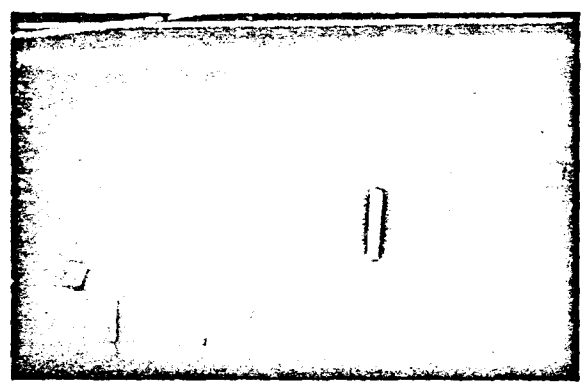
Based on this combined evidence, Aberdeen Tricot president Fogleman ordered a lead acid battery-powered fork lift truck as a replacement for the propane fueled vehicle. During the 18 months the lead acid battery-powered fork lift truck has been in operation, the plant has experienced no noticeable corrosion action and there have been no further incidents of nausea or eye irritation. ■



A 4000 lb. capacity lead acid battery-powered lift truck at the Aberdeen, N.C. knitting plant of Aberdeen Tricot, Inc. uses a pole attachment inserted in a hollow core to lift a roll of wrapped cloth. The truck was substituted for a propane fueled vehicle which was causing production, corrosion and environmental health problems in the plant.

LIA14932

First Aerial Lift Bucket Powered By Lead Batteries Claimed by Tel-E-Lect

MINNEAPOLIS — Lead acid battery sales may be in for large growth this year, due to a new application for these power cells developed by the Tel-E-Lect Corp.

The firm, based here, has produced what, officials claim, is the first truck-mounted aerial lift bucket with a hydraulic lift mechanism which is powered by lead acid batteries.

The lead acid batteries replace the truck engine which is the power source for most truck lift mechanisms. Firm officials claim that the newly developed lead acid battery power system eliminates the need to run a truck engine to supply power for a hydraulic lift system.

Trucks with aerial lift devices, commonly called bucket trucks, sometimes are known as cherry pickers or lift baskets. The basket of such vehicles, attached to a hinged boom, is used to hoist workmen as high as 50 feet while performing a variety of above-ground jobs.

Municipalities use bucket trucks to install and maintain street and traffic lights and signs and they are used in tree trims and for a wide variety of other tasks. Telephone and electric companies use fleets of bucket trucks to install, maintain and repair telephone and electrical equipment.

Tel-E-Lect Corp. announced production of the new battery-powered bucket truck following a successful six-month test of a prototype vehicle. Designed and developed in cooperation with Arkansas Power & Light Co., the prototype has been undergoing tests in Hot Springs, Ark., where the utility's personnel have been using it to perform a variety of maintenance and installation work.

W.O. Younger, Arkansas Power & Light transportation Manager, developed the concept for the battery-powered bucket truck. He also cooperated in the design and construction of the prototype unit and supervised its field testing.

Hydraulic Lift

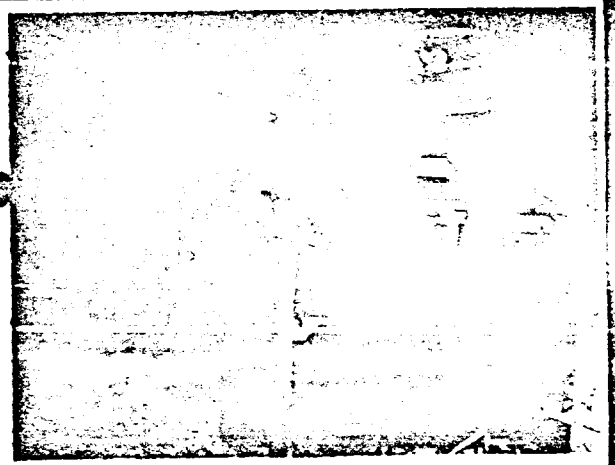
Speaking of the reasons for his interest in battery-powered aerial lift bucket trucks, Younger said, "Through 15 years of using hydraulic equipment, our company has found that the hydraulic lift system for the buckets conveniently outlasts our truck engines.

"I felt sure that if the truck engine did not have to run continuously to supply power for the hydraulic lift system, then the truck life would be extended."

Mounted on the chassis of a 1½ ton truck, a special box directly behind the cab houses four 200 A.H. 6-volt batteries used to power the prototype's hydraulic lift system.

While there were no battery malfunctions during the test, there were minor problems with the electrical wiring leading from the batteries to the control panel located in the basket.

Wiring at the elbow of the lift device's 36-foot boom kept breaking due to strain placed on it when the bucket was being lowered and raised. Special flexible electric cable was obtained to solve the problem and Tel-E-Lect reports it is using such cable for the units it now produces.

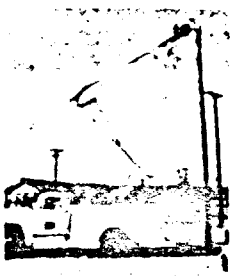


TRUCKERS DELIGHT — Lead acid battery sales could be in for some growth due to Tel-E-Lect Corp.'s lift system, above, which is powered by the batteries and not a truck's engine

35-51 ROADS AND STREETS
MIL. ELANS

JAN 1973

Truck-mounted aerial lift powered by lead acid batteries



Tel-E-Lect Corporation has announced production of a truck-mounted aerial lift bucket with a hydraulic lift mechanism that can be powered by lead acid batteries. Use of the batteries replaces the truck engine as the power source for the hydraulic lift mechanism.

Trucks with aerial lift devices, also called bucket trucks, are used to hoist workmen as high as 50 ft while doing many above ground jobs. Municipalities use them to install and maintain street and traffic lights and signs.

According to the manufacturer, elimination of an engine idle unit will result in a considerable savings on gas, oil and maintenance for fleet operators.

For more details, circle 577 on reader service card.

ROADS & STREETS, JANUARY, 1973

Feature article:

Nation's First Aerial Lift Bucket Powered By Lead Acid Batteries is Introduced

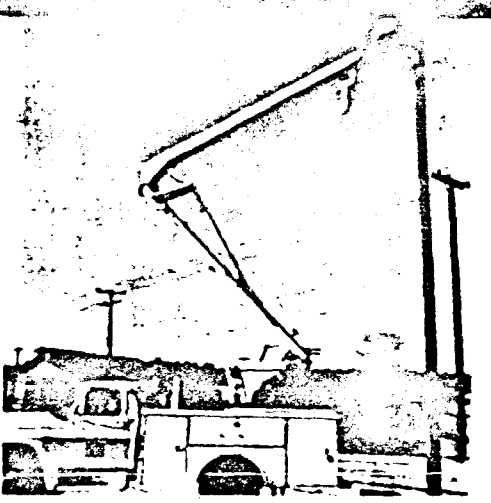
Recently released, the article has been published in two magazines thus far

23

Vol. 1 No. 4

NOVEMBER 1972
(Published Quarterly)

Electric Vehicle News



Replacing street lights was one of the many jobs performed by Arkansas Power & Light Company servicemen in Hot Springs, Ark., when the utility undertook a 35 week test of the feasibility and operating economics of using power supplied by lead acid batteries to operate the hydraulic lift mechanism of a truck-mounted aerial lift bucket. The test provided positive proof that batteries provide hydraulic lift mechanism power more efficiently and at far less cost than the conventional power source for such mechanisms, a power take-off unit attached to the truck engine motor. Batteries are not usable in phase because they are mounted on a specially built box located on the floor of the truck chassis just behind the cab Tel-E-Lect Corp., Minneapolis, Minn., built the prototype bucket truck in cooperation with the utility and has announced production of bucket trucks equipped with the newly developed lead acid battery power source

Feature Article:

Nation's First Aerial Lift Bucket Powered By Lead Acid Batteries is Introduced

.....published in ELECTRIC VEHICLE NEWS, second magazine to publish article

FEBRUARY 1973

DVID

Chrome Yellow Paints to Play Major Role In Highway Safety Program

Highway Safety Act of 1973 now before Congress to allocate $250 million to mark rural two-lane roads for first time.

Chrome yellow paint will play a major role in two highway pavement marking programs that are key elements of a proposed nationwide Federally funded highway safety project. The two programs were developed to help decrease the staggering 16.4 million vehicular traffic accidents that resulted in some 55,000 deaths, two million disabling injuries and more than $11 billion in property damage in the United States during each of the past two years.

The nationwide highway safety project would result from the Highway Safety Act of 1973 which is expected to be passed early in the 93rd Congress. The two highway pavement marking funding programs that should help meet the critical need to provide sufficient initial funds to thoroughly mark the rural two-lane roads where two-thirds of the nation's highway fatalities presently occur. A total of $200 million to be allocated during a two-year period beginning July 1, 1974 would be authorized for the program.

Research Program

The second project authorized by the Act would be a pavement marking research and demonstration program to determine the effectiveness of various types of pavement markings under inclement weather and nighttime conditions. A total of $50 million would be authorized for this phase which would run concurrently with the pavement marking project.

Traffic control devices are believed to be capable of preventing thousands of accidents and subsequent deaths, injuries and property damage annually. It is estimated that the pavement marking programs can save from 3,000 to 5,000 lives each year and help reasonably to avoid from 63,000 to 105,000 injuries in the United States. It is also estimated that pavement markings on rural roads will save $2.50 to $4.00 for each dollar it will cost highway authorities for their application.

Rural roads were the scene of some 60 per cent of the highway traffic deaths during the 1971 period. It is for this reason that the special pavement marking program authorized by the Act gives priority to the installation of markings on these roads.

Solid, broken and dotted single and double center line markings are the most frequently used to prevent highway traffic accidents. Solid line pavement markings are also used to mark the edges of streets and highways where there is inadequate space for emergency stops.

Highway Yellow

These pavement markings and such others as curb markings and transverse lines that indicate highway obstructions are painted "highway yellow," a special color standard that has been specified for all continuous highway traffic control devices, including signs. Yellow has been found to be the most visible color to the human eye from among all those in the spectrum. The yellow pigment that most readily meets the standard as far as color and cost are concerned is lead chromate, or "chrome yellow."

In addition to meeting the color standard for highway yellow, chrome yellow pigment is said to possess many other important qualities which make it the most versatile low-cost pigment available for traffic control paints. Chrome yellow paint has good resistance to degradation by light and a means chemicals used to remove snow and ice from pavement. It is for these reasons that chrome yellow paints will play a major role in any nationwide highway pavement marking program. In most cases, reflectorized chrome yellow paint will be used for pavement markings, since this helps improve nighttime visibility.

The $200 million the Highway Safety Act will allocate for the nationwide pavement marking program cannot be fully appreciated until one is aware of the critical need for such a program. Simply stated, it will provide for the first time, funding to mark in accordance with the "1971 Manual on Uniform Traffic Control Devices for Streets and Highways" (known as the UTCD) those roads which are included in the Federal primary and secondary highway sys-

Testing

Feature Article:

Chrome Yellow Paints to Play Major Role in Highway Safety Program

Two major placements.....two pages in PAINT & VARNISH PRODUCTION, three pages in AMERICAN PAINTING CONTRACTOR

tem, as well as those roads which are not.

A revised, updated and expanded version of the 1961 manual it supercedes, the 1971 edition is published by the U.S. Department of Transportation, Federal Highway Administration, and was developed with the cooperation of the National Joint Committee for Uniform Traffic Devices. The end result of efforts that began in 1927 to develop a uniform standard for traffic control devices, the 1971 manual is intended to serve as the regulatory directive for all streets and highways in the United States.

States Lack Funds

Without the new funds, states lack the money to provide the paint, men and equipment needed to comply with the new requirements. For example, the New York State Highway Department expects to use about 308,000 gallons of highway yellow paint this fiscal year when it begins implementation of the provisions of the new manual. The Department estimates it will require an additional 132,000 gallons of highway yellow paint to fully comply with the new manual during the following fiscal year.

Many municipal and county officials, responsible for maintaining nearly three million miles of paved rural and urban primary and secondary highways that were not built with Federal aid funds, find it difficult if not impossible to comply with the guidelines published in the new manual. They have far less money to allocate for such purposes than do states and, as a result, only 27 per cent of such highways have been marked in accordance with the manual.

With the $200 million being sought in the Highway Safety Act of 1973, it is expected that all states and counties in the United States will have sufficient money to provide the paint, men and equipment required to mark the principal highways under their respective jurisdictions. In addition, the funding will permit surveys to determine where pavement markings are needed in order to comply with the 1971 UTCD Manual.

In carrying out the program, it is estimated that 800,000 miles of two-lane roads will receive yellow centerline markings, and that approximately 500,000 miles of edgelines will be placed on primary and secondary county and township routes at a cost of $135 million.

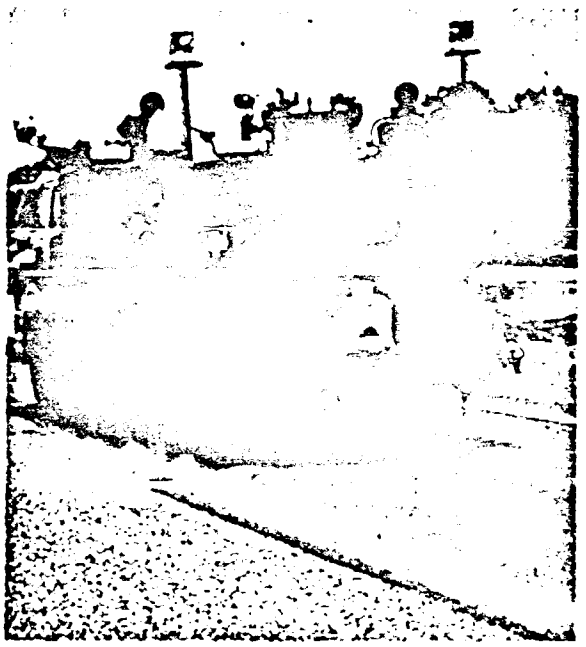
The Act also directs individual states to submit annual reports on the results of the effectiveness of the Act's two pavement marking programs to the Secretary of the Interior. He will, in turn, report the results to Congress.

If the pavement marking programs provide the expected decrease in highway accidents — and small-scale tests on rural two-lane roads in various states indicate that proper pavement markings can reduce accidents as much as 64 per cent (as in California), reduce fatalities as much as 79 per cent (as in Kansas), and reduce highway traffic injury by as much as 41 per cent (as in Michigan) — it is likely that permanent funding for pavement markings will be provided by the states. This would be particularly important, since highway pavement markings last from only one to three years, depending on the amount of traffic, the width of the road, weather conditions, etc.

Other Programs

In addition to the $50 million proposed for the pavement marking research and demonstration program in the Highway Safety Act of 1973, other major programs likely to be authorized which involve the extensive use of chrome yellow paint would include:

- Spot improvement projects for the elimination of high hazard locations — $200 million.
- A program to eliminate roadside obstacles — $150 million.
- A special highway safety research and development program — $235 million.
- Other highway safety programs — $620 million.



The two most frequent causes of roadside accidents are soft highway shoulders which cause drivers to lose vehicle control, and disabled vehicles parked where there is insufficient room alongside highways. In order to call increased attention to such hazardous areas, the 1971 Manual on Uniform Traffic Control Devices has introduced the use of solid yellow pavement edge lines to replace the white edge lines that are now in use.

LIA14936

61-3 AMERICAN PAINTING CONTRACTOR
JAN 1973

Center and edgeline plan before Congress calls for $250 million outlay

CHROME YELLOW paint will play a major role in two highway pavement marking programs that are key elements of a proposed nationwide, federally-funded highway safety project.

The markings were conceived to help decrease the staggering 14.4 million vehicular traffic accidents that resulted in 54,000 deaths, two million disabling injuries and more than $13 billion in property damage on the nation's highways during each of the past two years.

The road safety program would result from the Highway Safety Act of 1973 which Congress is expected to pass early this year. The two separate highway marking projects would cost a combined $266 million. They are considered top priority among the dozen or so highway safety programs to be authorized by the Act.

Two-thirds of the $1 billion annual cost of the programs would come from the Highway Trust Fund, which is financed by federal taxes on the sale of oil, gasoline and truck highway uses and can now only be used for new highway construction.

Of interest to painting contractors who bid on road marking work is a special pavement marking program that would be the first project authorized by the Act. For the first time it will meet the critical need for sufficient initial funds to thoroughly mark the rural two-lane roads where two-thirds of the nation's highway fatalities presently occur.

A total of $200 million, to be allocated during a two-year period beginning with the fiscal year ending June 30, 1974 would be authorized for the program.

It is estimated that 800,000 miles of two-lane roads will receive yellow centerline markings and that approximately 800,000 miles of edgelines will be placed on primary and secondary county and township roads at a cost of $126 million.

The second project authorized by the Act would be a pavement marking research and demonstration program to determine the effectiveness of various types of pavement markings under different weather and nighttime conditions.

An outlay of $50 million is anticipated for this phase. Funding for the program also would be available during the two-year period beginning with the end of the 1974 fiscal year.

Highway authorities say that such traffic control devices can prevent thousands of accidents and subsequent deaths, injuries and property damage annually. It is estimated that the pavement marking programs alone can save 5,000 to 8,000 lives each year and avoid

Pavement markings primarily are designed to separate opposing streams of traffic flow. Lack of solid yellow lines in about 200,000 miles of highway is provided in the 1973 Highway Safety Act now pending.

U.S. DECISION ON MARKING PROGRAM NEAR

Photo courtesy Lead Industries Association

CHEMICAL SPOTLIGHT
RIDGEWOOD, N.J.
DEC 15 1972

ARTHUR D LITTLE estimates that non-woven disposables will increase from $795 mil '71 to $1.6 bil by '76.....The Lead Assn figures that 800,000 miles of two lane roads will have yellow centerline marking and the cost will be $40 mil. The Assn also expects that $25 mil will be used in applying "no passing" pavement markings & 500,000 miles of edgelines will be put on primary & secondary county & township roads at a cost of $135 mil.....UPJOHN figures that last year in the thermoplastic urethane elastomer business that 16 mil lbs were used by solution & extrusion processes, 8 mil lbs injection molding & 1 mil lbs miscellaneous & that the market will continue to grow 15%/yr.

that were not built with federal aid funds find it difficult, if not impossible, to comply with the guidelines published in the new manual.

They have far less funds to allocate for such purposes than do states. As a result, only 37 per cent of these municipally-maintained roads have been marked in accordance with the manual.

Adequate Funds Expected

From the $200 million being sought in the Highway Act of 1973, it is expected that all states and counties in the U.S. will have sufficient money to provide the paint, men and equipment required to mark the principal highways under their respective jurisdictions.

In addition, the funding will permit surveys to determine where pavement markings are needed in order to comply with the 1971 UTCD Manual.

The Act also directs individual states to submit annual reports on the effectiveness of the two pavement marking programs to the Secretary of the Interior, who will report to Congress.

Small-scale tests on rural two-lane roads in various states indicate that proper pavement markings can reduce accidents as much as 64 per cent (as in California); reduce fatalities as much as 70 per cent (as in Kansas); and reduce highway traffic injury by as much as 61 per cent (as in Michigan).

If government funds provide anything like these results, it is likely that permanent funding for pavement markings will be provided by the states. This would be particularly important since highway pavement markings only last 2 yrs one to three years, depending on the amount of traffic, the width of the road, weather conditions, etc.

In addition to the $200 million proposed for the pavement marking research and demonstration program in the Highway Safety Act of 1973, other major programs likely to be authorized which involve the extensive use of chrome yellow paint would include:

1. Spot improvement projects for hazard locations, $300 million.
2. A program to eliminate roadside obstacles, $190 million.
3. A special highway safety research and development program, $250 million.
4. Other highway safety programs: $430 million.

The four remaining programs authorized by the Act include $60 million for drug use and driver behavior research; $5 million for a highway safety educational programming and study project, and $6 million for a feasibility study to determine the need for a National Center for Statistical Analysis of Highway Operations. ■

LIA14937

With Lead in Gas Threatened, Industry Eyes New Uses

NEW YORK — With the possibility of lead being removed from gasoline, industry officials are desperately looking for other applications to take up the slack.

One such new application could be lead shielding used for X-Ray airport luggage inspection systems.

Like nuclear shielders (AMM Feb 26) airport inspection systems will require lead for safety tests, the Lead Industries Association stressed. However no specific consumption predictions were given by the group.

A LIA spokesman told this newspaper that nuclear shielders and airport luggage inspection systems, "of course won't consume as much lead" as commonly used in gasoline, "but there are applications ready could help in taking up the slack."

The inspection system being tested by the LIA allows airport officials to view the contents of carry-on airline luggage or packages without opening them.

The system, called Dynalloy and manufactured by Varo X-Ray Corp., Los Angeles, has been "successfully" tested by Western Airlines and Pacific Air West Airlines at Los Angeles International Airport, and by Delta Airlines at New York's Kennedy International Airport, according to an LIA spokesman.

Pulsed Use

Also, the federal government has reportedly bought 36 of the systems which are exclusively distributed by Electronic Instruments, Mount Vernon, N.Y.

Using an X-Ray, the system produces visible images of the contents of luggage or a package. The images, which are viewed on a screen once through a specially designed porthole, are similar to those seen in a three-dimensional photograph negative.

The images consist of shadows of varying density and a specially trained operator can detect weapons and explosives by their shape.

Despite its advantages, the new system presents one potential hazard — increasing radiation.

Therefore, the manufacturers had to build an effective radiation shield using lead.

The unit's entire X-Ray generator system is completely enclosed in 5/32 of an inch thick lead, except for the X-ray tube slit which directs the beam. The lead shield weighs roughly 16 pounds per square foot.

Critical Role

Lead also plays a critical role in the unit's fluoroscopic viewing system. Indirect viewing of the screen is accomplished by use of a mirror so that primary radiation from the X-ray tube will not strike the viewing port. To insure complete shielding from any secondary radiation, the viewing port consists of ¼-inch thick leaded glass.

Delta Airlines held a recent three-week test of a Dynalloy unit at its Kennedy International Airport terminal.

In addition to determining if the system would be effective in the inspection of all luggage to be carried aboard airliners, Delta also wanted to see how quickly the equipment could function.

According to Cary Moore, Delta Airlines station manager at Kennedy International Airport, the test was highly successful from the standpoint of its capability of rapidly and efficiently providing a visual inspection of all hand luggage.

Delta estimates that widespread use of an X-ray fluoroscopic unit throughout its system would reduce from minutes to seconds the time required to process an individual's carry-on luggage.

For example, it could take as long as five minutes to manually inspect carry-on baggage of passengers preparing to board a jumbo jet.

Other Tests

Tests conducted by Western Airlines and Pacific Air West Airlines at Los Angeles International Airport have determined that with the new X-ray system, the average bag inspection takes about 10 seconds, indicating that only by light delay is encountered by boarding passengers.

In the meantime, the new fluoroscope system is being used for other purposes. The U.S. Air Force is using it to check incoming overseas mail, packages and baggage for contraband such as illegal weapons and narcotics.

A number of religious organizations and agencies that diplomatic or indirectly represent foreign governments are using the equipment to screen incoming mail and packages that might contain explosives sent by terrorist organizations.

LEAD TO THIS AIRPORT — Boosts in spending, industry is or not, may open a new area for lead consumption, the Lead Industries Association asserts. The carry-on baggage shielding system, above, which is being used by Delta Airlines at New York's Kennedy Airport, combines X-ray and fluoroscopic viewing to observe the content of packages without having to open them. However, a shield of 5/32 of an inch thick lead sheet is needed to protect people from radiation.

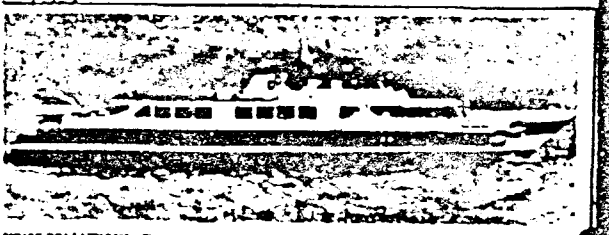
AMM February 26, 1973

312 AMERICAN METAL MARKET
NEW YORK, N.Y. 10036
JAN 9 1973
COPYRIGHT RACONE

Typical example of advance releases published in AMERICAN METAL MARKET that are slated to be published later in various monthly magazines

Top: Sheet Lead Shields New Airport Luggage Inspection X-Ray Device Designed To Deter Skyjackers

Bottom: Sheet Lead Used To Quiet New Water-Jet-Propelled, Cross-San Francisco Bay Ferries



NOISE POLLUTION?— Three new high-speed passenger ferries are scheduled to begin operations in mid 1974 providing commuter service in San Francisco Bay. However, the "ferries" turbines will create so much noise that the engine room walls will require sound barriers composed of lead weighing 1½ pounds per square foot of sheet lead laminated to a 1/2 inch thick insulating board.

LIA14938

THE AMERICAN METAL MARKET
FEB 26 1973
CLIPPED BY BACON'S

Nuclear Medicine May Be the 'Doctor' To Give Lead Industry That Robust Look

NEW YORK — While lead is taking a beating in some fields, due to environmental considerations, one bright spot for expanding consumption could be nuclear medicine.

The Lead Industries Association backed up this claim by pointing to the inherent dangers involved in using nuclear materials in places like hospitals.

Nuclear medicine has been used to diagnose internal cancer.

The process involves the injection of minute amounts of radioisotopes into the body.

The process has the advantage over X-rays by being more precise in locating the diseased area and determining the effectiveness of treatment.

But this process has one particular major disadvantage — radiation.

Various techniques have been developed to protect persons involved in nuclear isotopes from radiation.

Lead executives are optimistic over the fact that lead is currently the leading contender as the material to shield persons from nuclear radiation.

According to the Atomic Energy Commission, when other shield materials are considered, comparisons are usually expressed in terms of lead because it represents the best practical shield for most applications."

Among other things, the AEC is responsible for establishing the radiation limits permitted in nuclear medicine. Licensing doctors specializing in this process and determining the thickness of shielding material for such applications as the lead shielding devices for radiopharmaceuticals.

Protective shields are required from the time the nuclear materials are shipped from the manufacturer until they are injected into the body. For example, the material is shipped to the user in special lead shielded devices.

Lead To The Rescue

Other special shielding devices are needed to store the material, and the storage shields themselves are in turn stored in lead-lined safes.

When the radio active material is being transferred from one shield device to another, the action takes place inside a radiation leak-proof, lead lined glove box and technicians using it wear lead-impregnated gloves. Radiation protection in the form of hypodermic needle shields are used for nuclear medicine.

As the use of nuclear medicine expands, the LIA predicts a dramatic growth of lead consumption in this field. However, the LIA declined to give specific figures.

A number of companies are specializing in developing and producing nuclear medicine products. A leading firm in the field is Atomic Development Corp., Plainview, N.Y.

"Our company's success in the nuclear medicine product field is the result of its being built on a foundation of lead," Atomic president Pat Miola said. "Virtually everything we produce is either made entirely or partly of lead."

The company's product line ranges from containers used to ship and store nuclear medicine to accessory equipment for gigantic cancer detection scintillation scanners and cameras that can photographically scan the human body from head to toe.

The company's design department has developed a wide variety of lead radiation shielding products.

Saves Weight, Space

According to Miola, although lead's primary shielding property is mass, its use invariably saves weight and space. He also says the world's cost and the ease with which it can be cast, extruded, rolled, machined or otherwise formed, continues to make it one of the most efficient and economical shielding materials.

Radiopharmaceutical shields and shipping devices are typical of the products the company casts from lead. To produce the devices, pig lead is melted and poured into round, cylinder-shaped molds with a hollow core. When the lead has cooled and the desired shape of the shield or shipping device has been formed, it is removed from the molds. If required, the sides of the devices are machined and then painted.

Molds also are used to produce the various types of caps that fit over the tops of the devices. Shield devices have lift-off caps while shipping devices usually have for opening.

A typical radioactive shield or shipping device that could be used to ship a radiopharmaceutical is about 3 inches high, has lead walls about 1½ inch thick, a ¾ inch diameter hollow core, and weighs about two pounds.

In addition to its advantages of being the densest of any commonly available material and being available in a wide variety of forms, lead has another advantage with regard to its use as a radioactive shield material. Because lead does not become contaminated by neutron or gamma rays, it may be used continuously without fear of its becoming a radioactive source itself by emitting harmful rays, the LIA claimed.

NUCLEAR LEAD — Radioactive isotope shields, being sprayed by workmen, could be hot selling items, the Lead Industries Association predicts. Made from inert lead, they are used in medical facilities in conjunction with nuclear devices to detect illness.

Typical Example of advance releases published in AMERICAN METAL MARKET that are slated to be published later in various monthly magazines

.....page two

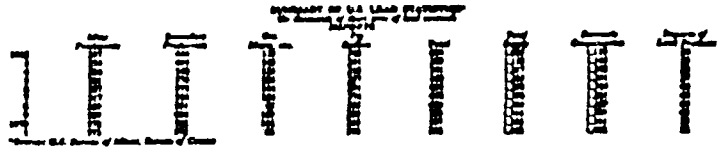
LIA14939

1971 US LEAD REVIEW

Provisional returns by the US Lead Industries Association reveal that although US lead consumption set a record in 1971, higher production costs and lower prices resulted in a somewhat unsatisfactory year for several producers. An oversupply position at the beginning of 1971 gradually eased however, and with the dock strike, continued high consumption, and the imposition of a 10 % ad valorem surtax on imports, stocks fell and prices rose by the end of 1971.

At 573,377 short tons of lead, mine production in 1971 was the highest for 43 years, although the increase on 1970 was only marginal. Of this total output Missouri retained its dominance and was responsible for 75 % (427,717 short tons) of 1971 production. On a monthly basis production was running below 1970 levels until December, when a 30-year high of 55,000 tons was reached.

Secondary lead recovery in 1971 is estimated to have



fallen by about 25,000 short tons to 373,000 tons, of which 61 % of the total scrap recovered was in the form of old battery plates. Other sources, evenly divided were: (a) drosses and residues, and (b) solder, battery-lug, cable sheathing, type metal, weights and castings of all kinds.

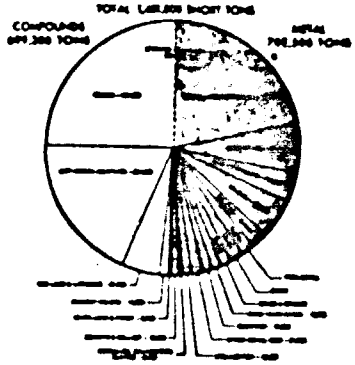
Largely because of the dock strike at the West Coast ports and the imposition of the 10 % ad valorem surtax on imports in August, total imports for 1971 fell by 29 % as US producers became less dependent on imported lead. The total of 362,000 short tons was the lowest figure for 20 years, although Canada and [illegible] as leading suppliers of imports.

[illegible] all forms rose by over [illegible],000 short tons. The sectors which dominate [illegible] moves (up by 30,000) [illegible] although this latter [illegible] indicative of greater [illegible] of Federal orders have [illegible] in too large for exports to represent the recov- [illegible] flowed the 1970 accum- [illegible] quidation, the lack of [illegible] immediate demand in [illegible]

[illegible] ich which experienced [illegible] down, were anti-knock [illegible] ype. Anti-knock addi- [illegible] 64,300 tons in 1971, [illegible] as thought to be an [illegible] environmentalist concern [illegible] [illegible] under a gasoline [illegible] in usage.

The average price for 1971 has been estimated at between 11.6-13.8 cents per lb., in a year in which the price began at 13 5c. in January, until a split developed in June and prices were quoted at 13.5-15 cents per lb. Subsequently the price narrowed to 14-14.5 cents per lb. The short term forecasts for lead are fairly good, despite increasing environmentalist concern. Stocks at the beginning of 1972 were lower than for 1971 and demand continues strong. One advantage may be gained from the growing concern with the environme[illegible]

ESTIMATED
LEAD CONSUMPTION BY PRODUCTS - 1971
TOTAL 1,081,000 SHORT TONS



as demand grows for low cost, efficient sound control materials in industry. The increase in the use of battery-powered vehicles also augurs well.

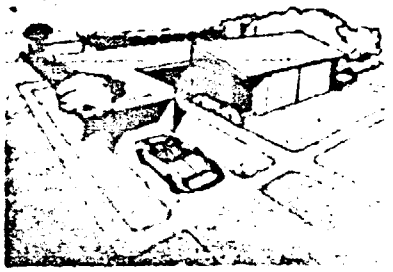
In the long term, lead use in prefabricated housing sections has been studied as has the use of organo-lead chemicals as preservatives for wood and marine materials against termites or fungi for example and as an anti-rust treatment for metallic surfaces. One encouraging aspect of recent lead research has also revealed that airborne lead does not affect the lead level in the blood and this, taken in conjunction with other promising long term applications for lead should, according to the Lead Industries Association, ensure continuing h □

30

Example of publication of Lead Industries Association data published as the result of providing editors with copies of the 1971 U.S. Lead Review

Feature article published in METAL BULLETIN MONTHLY November, 1972, issue

LIA14940



LEAD-ZINC HOUSE – Design of lead/zinc house was sponsored by the International Lead Zinc Research Organization and executed by the Rhode Island School of Design. Housing unit calls for approximately 1.5 tons of lead and of zinc. Prefabricated design provides for ease of construction, flexibility and economy.

Prototype Lead-Zinc House Planned for Construction

NEW YORK – Construction of a prototype lead-zinc metal house demonstrating a coordinated systems approach to the use of the metals and their fabricated products will begin in a few months, according to the Lead Industries Association here.

Backing a group of two from the copper and aluminum industries — whose trade associations and research organizations have already moved to demonstrate the marketability of these metals in home construction — this project will be under the sponsorship of the International Lead Zinc Research Organization, Inc. (ILZRO). Design work will be supplied by the Rhode Island School of Design.

In addition to demonstrating traditional and hybrid applications for lead and zinc in housing, the prototype will include such new developments as a variety of lead composite materials, wrought zinc roofing systems, new finishes and improvements for zinc-coated steel building panels and zinc die castings produced with recently – improved die casting techniques.

Such relatively new housing applications as sheet lead for sound attenuation also will be included.

Although the metal house will be designed for factory-built mass production anywhere in the world, LIA said, the basic prefabricated design is so flexible that it can be finished in many ways to satisfy individual tastes and requirements, using classical as well as contemporary materials, finishes and techniques.

A basic aim of the design is to reverse the incidental approach to use of lead and zinc in current construction, the association said.

Prototype House

The metal prototype house also will emphasize several specific advantages of critical importance in today's ecology. The availability of lumber, for instance, has become a major problem due to inefficiency of land reserves, particularly in Asian countries. This has resulted in erratic supply and rising prices.

The ILZRO design incorporates a novel core and service module that centralizes service facilities. Such areas as kitchens and bathrooms would be positioned in the core area to minimize costs and to increase efficiency. Rooms requiring fewer services, such as bedrooms, are attached, like saunas, to the core area.

This design approach and the materials of construction being used make up still another housing departure — the easy addition or removal of room units to meet changing family needs. Although the basic design can be employed for two-story homes, the prototype will be a one-story unit, with attached carport.

Module Location

The "plug-in" service module, the heart of the service facilities, will be located on an outside wall of the house. It will contain all mechanical units, such as heating, ventilating, and air conditioning.

The location of the service module and the fact that the prototype metal house will have insulated air leaks and controlled air intakes, means that the air supply can be purified and the usual products of heating combustion excluded, another plus for the environment.

Insulation efficiency will be high in the metal house. This will be made possible through the variety of new and improved composite materials containing lead and zinc. These materials will reduce heat and cooling demands, thereby contributing to energy conservation.

A metal house also is rot, mildew and insect resistant, factors having special significance in tropical and subtropical areas of the world, LIA said.

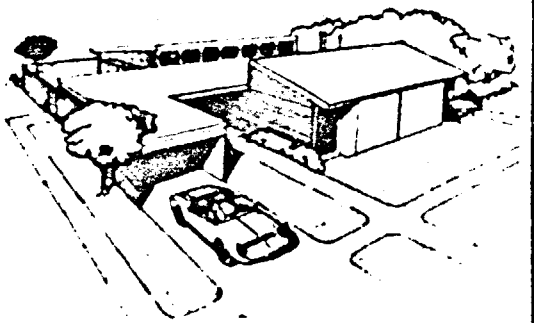
Factory-Built

House plans call for the metal house to be factory-built. It will be demountable and transportable from one building site to another. Such houses also will require minimal maintenance in contrast to the constant efforts required for wood structures.

For example, the galvanized steel wall units for the houses will be prefinished in the factory and should require novel repainting. The metal house can be constructed at the site by as few as two unskilled men using simple hand tools.

On the basis of producing 10,000 metal houses, costs are estimated at between $14 to $16 per square foot. This compares to $18 to $20 per square foot for conventional wood-constructed housing.

CHEMICAL MARKETING REPORTER
DEC 25 1972



LEAD AND ZINC FOR A HOUSE: Design of this lead-zinc house, sponsored by International Lead Zinc Research Organization and executed by Rhode Island School of Design, calls for use of approximately 1.5 tons of lead and zinc. In addition to demonstrating traditional uses for the metals, it calls for [illegible] composite materials, wrought zinc roofing systems, [illegible] coated steel building panels.

ENGINEERING NEWS-RECORD
FEB 1 1973

Metal substitute for lumber in houses studied

In the face of rising lumber costs and shortages, other materials producers are making moves to grab more of the housing market. Among them is the zinc and lead industry, which is financing the design and construction of an all-metal prototype house that they say will cost, on the basis of 10,000 houses, between $14 and $16 per sq ft, compared to $18 to $20 per sq ft for conventionally constructed wood housing.

The system of construction is a prefabricated one, designed by the Rhode Island School of Design. The International Lead Zinc Research Organization, Inc. (ILZRO), New York City, the cooperative research arm of the lead and zinc industry, has provided $50,000 so far and expects to spend $50,000 more for construction of the prototype. The single house will be a one-story ranch-type house containing 1,200 sq ft.

The system will consist of galvanized, or zinc-coated, steel wall panels, averaging 2.5 × 8 ft, and steel columns and galvanized steel decking, normally used as sheet rogers, for the floors and roof. The designers say that the long-span steel decking is more economical than a joist and bridging system for floors. Lead sheeting 1/64 in. thick will be placed inside the wall panels where erected for sound attenuation.

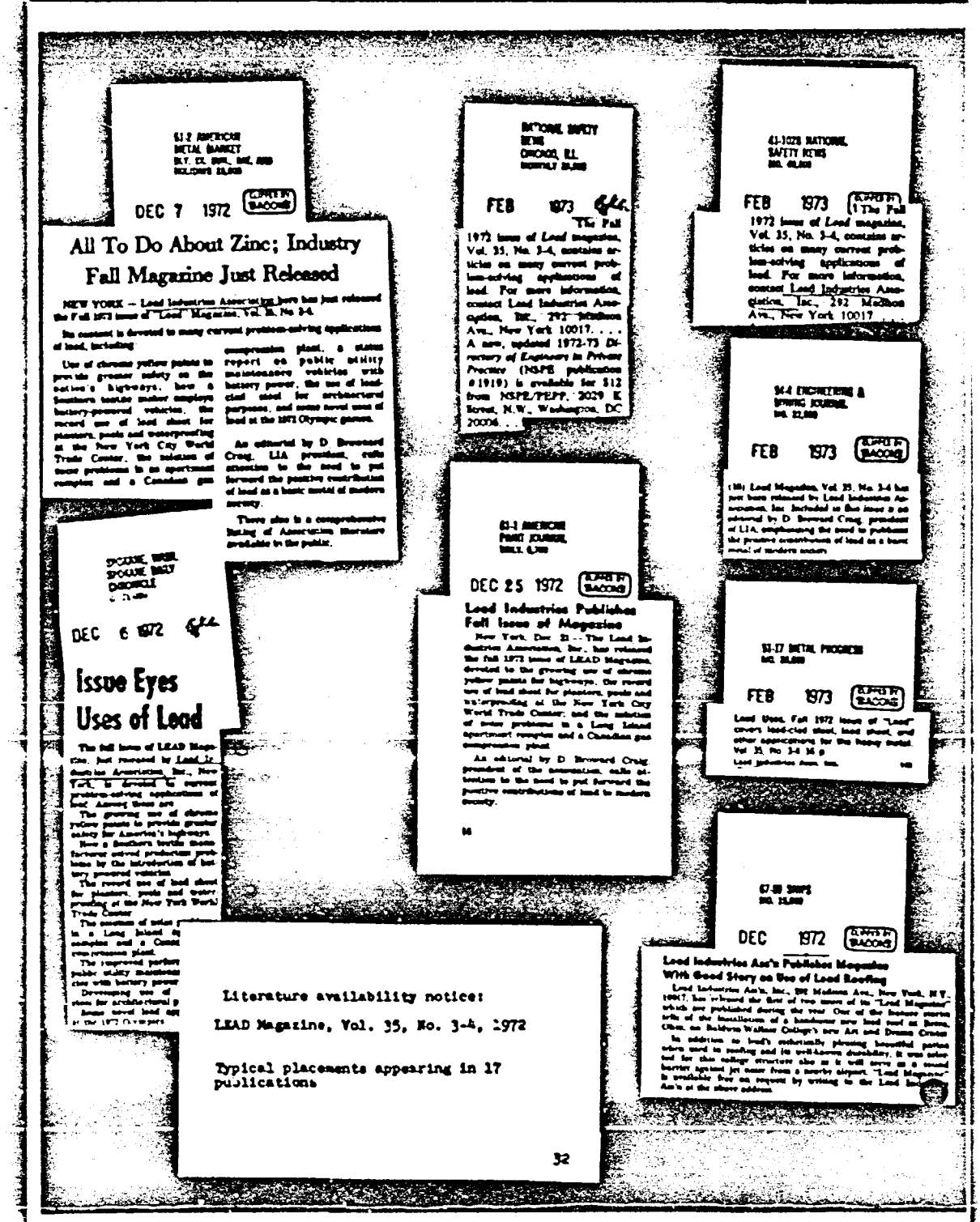
The wall panels will be 2 in. thick with a galvanized outside skin, contain a center core of urethane and have an interior galvanized finish. They will not be load bearing, but will act to stiffen the structural frame.

News Release:

Prototype Lead/Zinc douse Planned

Typical placements appearing in AMERICAN METAL MARKET, CHEMICAL MARKETING REPORTER and ENGINEERING NEWS-RECORD

LIA14941



DEC 7 1972

All To Do About Zinc; Industry Fall Magazine Just Released

NEW YORK – Lead Industries Association here has just released the Fall 1972 issue of "Lead" Magazine, Vol. 35, No. 3-4.

Its content is devoted to many current problem-solving applications of lead, including

Use of chromate yellow paints to give the greater safety on the nation's highways, how a Southern textile worker employs battery-powered vehicles, the record use of lead sheet for planters, pools and waterproofing at the New York City World Trade Center, the solution of some problems in an apartment complex and a Canadian gas compression plant, a status report on public utility maintenance vehicles with battery power, the use of lead-clad steel for architectural purposes, and some novel uses of lead at the 1972 Olympic games.

An editorial by D Brownard Craig, LIA president, calls attention to the need to put forward the positive contributions of lead as a basic metal of modern society.

There also is a comprehensive listing of Association literature available to the public.

DEC 6 1972

Issue Eyes Uses of Lead

The fall issue of LEAD Magazine, just released by Lead Industries Association, Inc., New York, is devoted to current problem-solving applications of lead. Among these are:

The growing use of chromate yellow paints to provide greater safety for America's highways.

How a Southern textile worker increased production productivity by the introduction of battery-powered vehicles.

The record use of lead sheet for planters, pools and waterproofing at the New York World Trade Center.

The solution of some problems in a Long Island apartment complex and a Canadian gas compression plant.

The improved performance of [illegible] battery maintenance vehicles with battery power.

Increasing use of lead-clad steel for architectural purposes.

Some novel lead uses at the 1972 Olympics.

FEB 1973

The Fall 1972 issue of *Lead* magazine, Vol. 35, No. 3-4, contains articles on many current problem-solving applications of lead. For more information, contact Lead Industries Association, Inc., 292 Madison Ave., New York 10017. . . . A new, updated 1972-73 *Directory of Engineers in Private Practice* (NSPE publication #1919) is available for $12 from NSPE/PEPP, 2029 K Street, N.W., Washington, DC 20006. . .

FEB 1973

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FEB 1973

(The) Lead Magazine, Vol. 35, No. 3-4 has just been released by Lead Industries Association, Inc. Included in the issue is an editorial by D. Brownard Craig, president of LIA, emphasizing the need to publicize the positive contributions of lead as a basic metal of modern society.

DEC 25 1972

Lead Industries Publishes Fall Issue of Magazine

New York, Dec 25 -- The Lead Industries Association, Inc., has released the Fall 1972 issue of LEAD Magazine, devoted to the growing use of chromate yellow paints for highways, the record use of lead sheet for planters, pools and waterproofing at the New York City World Trade Center, and the solution of some problems in a Long Island apartment complex and a Canadian gas compression plant.

An editorial by D. Brownard Craig, president of the association, calls attention to the need to put forward the positive contributions of lead to modern society.

FEB 1973

Lead Sheet, Fall 1972 issue of "Lead" covers lead-clad sheet, lead sheet, and other applications for the heavy metal. Vol. 35, No. 3-4 $1.0

DEC 1972

Lead Industries Ass'n Publishes Magazine With Good Story on Use of Lead Roofing

Lead Industries Ass'n, Inc., 292 Madison Ave., New York, N.Y. 10017, has released the first of two issues of its "Lead Magazine" which were published during the year. One of the features covers [illegible] of the installation of a handsome new lead roof on Bowne Office on Baldwin Wallace College's new Art and Drama Center.

In addition to lead's industrially pleasing, beautiful patina when used in roofing and its well-known dependability, it was noted that this college structure also as it will serve as a sound barrier against jet noise from a nearby airport. "Lead Magazine" is available free on request by writing to the Lead Industries Ass'n at the above address.

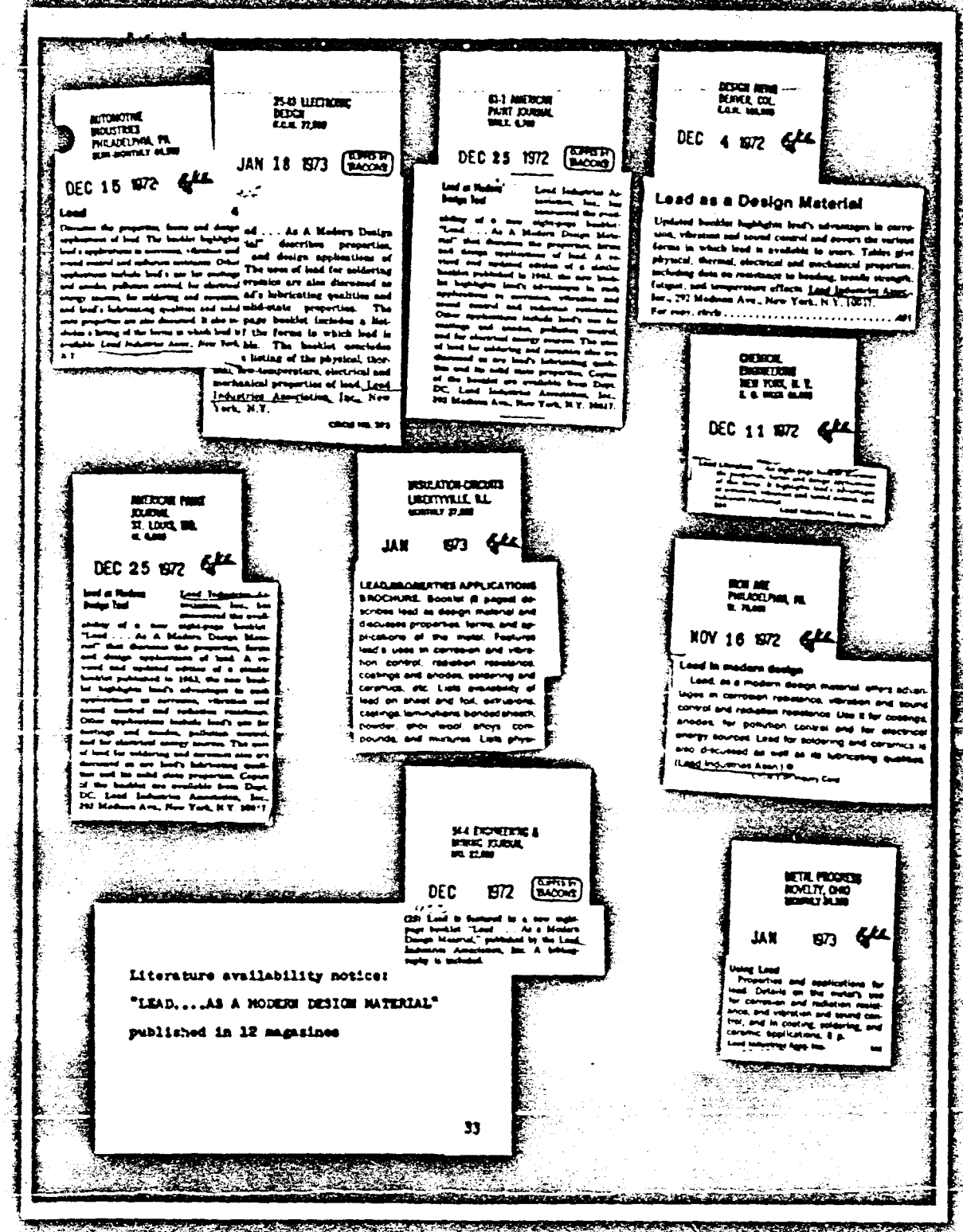
Literature availability notice:

LEAD Magazine, Vol. 35, No. 3-4, 1972

Typical placements appearing in 17 publications

32

LIA14942


AUTOMOTIVE INDUSTRIES PHILADELPHIA, PA.
DEC 15 1972
Lead
25-63 ELECTRONIC DESIGN
JAN 18 1973
SUPPLIED BY BACON'S
of . . . As A Modern Design Material" describes properties, and design applications of lead. The uses of lead for soldering ...mission are also discussed as ...d's lubricating qualities and ...and solid-state properties. The ...ure are also discussed. It also ...page booklet includes a list-...sting of the forms in which lead is ...available. Lead Industries Assn., New York, bla. The booklet concludes ...a listing of the physical, thermal, low-temperature, electrical and mechanical properties of lead. Lead Industries Association, Inc., New York, N.Y.
63-1 AMERICAN PAINT JOURNAL
DEC 25 1972
SUPPLIED BY BACON'S
Lead as Modern Design Lead
Lead Industries Association, Inc., has announced the avail-ability of a new, eight-page booklet "Lead . . . As A Modern Design Material" that discusses the properties, forms and design applications of lead. A re-vised and updated edition of a similar booklet published in 1963, the new booklet highlights lead's advantages in such applications as corrosion, vibration and sound control and radiation containment. Other applications include lead's use for coatings and anodes, pollution control, and for electrical energy sources. The uses of lead for soldering and corrosion also are discussed as are lead's lubricating qualities and its solid state properties. Copies of the booklet are available from Dept. DC, Lead Industries Association, Inc., 292 Madison Ave., New York, N.Y. 10017.
DESIGN NEWS — DENVER, COL.
DEC 4 1972
Lead as a Design Material
Updated booklet highlights lead's advantages in corro-sion, vibration and sound control and covers the various forms in which lead is available to users. Tables give physical, thermal, electrical and mechanical properties, including data on resistance to bending, tensile strength, fatigue, and temperature effects. Lead Industries Asso-ciation, 292 Madison Ave., New York, N.Y. 10017. For more, circle 491
CHEMICAL ENGINEERING NEW YORK, N.Y.
DEC 11 1972
AMERICAN PAINT JOURNAL ST. LOUIS, MO.
DEC 25 1972
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INSULATION-CIRCUITS LIBERTYVILLE, ILL.
JAN 1973
LEAD/ELASTOMERIC APPLICATIONS BROCHURE. Booklet (8 pages) de-scribes lead as design material and discusses properties, forms, and ap-plications of the metal. Features lead's uses in corrosion and vibra-tion control, radiation resistance, coatings and anodes, soldering and ceramics, etc. Lists availability of lead on sheet and foil, extrusions, castings, laminations, bonded sheets, powder, shot, wool alloys com-pounds, and mixtures. Lists physi-
IRON AGE PHILADELPHIA, PA.
NOV 16 1972
Lead in modern design
Lead, as a modern design material offers advan-tages in corrosion resistance, vibration and sound control and radiation resistance. Uses it for coatings, anodes, for pollution control and for electrical energy sources. Lead for soldering and ceramics is also discussed as well as its lubricating qualities. (Lead Industries Assn.) ●
M-4 ENGINEERING & MINING JOURNAL
DEC 1972
SUPPLIED BY BACON'S
Lead is featured in a new eight-page booklet "Lead . . . As a Modern Design Material," published by the Lead Industries Association, Inc. A bibliography is included.
METAL PROGRESS NOVELTY, OHIO
JAN 1973
Using Lead
Properties and applications for lead. Details on the metal's uses for corrosion and radiation resist-ance, and vibration and sound con-trol, and in coating, soldering, and ceramic applications. 8 p.
Literature availability notice:
"LEAD....AS A MODERN DESIGN MATERIAL"
published in 12 magazines
33