



Lead Industries Association, Inc.

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July 25, 1973

SUBJECT: PUBLICITY STATUS REPORT
SECOND QUARTER -- 1973

TO THE MEMBERS OF THE LEAD INDUSTRIES ASSOCIATION, INC.:

We are pleased to send for your review, the second quarterly report for 1973 on LIA publicity activities. Also included are photo copies of many of the articles from our scrapbook.

I would appreciate any comments you might have on this report, and would also be pleased to hear from you if you have suggestions for inclusion in our publicity program.

Very truly yours,

Jerome F. Smith

Jerome F. Smith
Secretary & General Manager

JFS:lm
Enclosure

LEAD INDUSTRIES ASSOCIATION
TRADE PUBLICITY PROGRAM
SECOND-QUARTER REPORT
April - July, 1973

Highlights of current publicity projects discussing lead applications.....in LEAD ACID BATTERIES:

- * A feature story on the use of battery-powered special-purpose personnel carriers to replace internal combustion vehicles at Morton Salt Company's Painesville, Ohio mine -- deepest salt mine in U.S., published in SKILLINGS MINING REVIEW.
- * Two articles concerning the use of battery-powered buses to help solve the nation's mass transit problems, have been published in AMERICAN METAL MARKET, MACHINE DESIGN, and THE NORTHERN MINER.
- * A new 18-ft.-long pleasure boat that is expected to provide quiet for both fishermen and motor sailors. The recently-released article has been featured in THE BATTERY MAN and DESIGN NEWS magazines thus far.

A major release discussed the unique Consolidated Edison Cable Splicing School which specializes in joining, splicing and wiping UNDERGROUND ELECTRICAL CABLES.

- * A two-page feature describing the school and highlighting how students are taught to wipe lead-sheathed cable joints was published in the May 1, 1973 issue of ELECTRICAL WORLD.

Feature articles on the use of SHEET LEAD SOUND BARRIERS for:

- * A newly developed acoustical/thermal building panel used to quiet the sound of ductwork and fans at the Long Island Lighting Company's Northport, N.Y. plant. This story was the color-cover feature story of the May 15, 1973 issue of ELECTRICAL WORLD magazine and it was also featured as a one-page placement in PUBLIC UTILITIES FORT-NIGHTLY, a two-page feature in METAL BUILDING REVIEW, a one-column feature in FACTORY, and a three-column feature in AMERICAN METAL MARKET.

- * Montreal's Justice Building, which features the use of sheet lead sound barriers in the building's walls and at the partition line along the building's heating and air-conditioning system. Published in AMERICAN METAL MARKET.

A feature article concerning the introduction of LEAD CLAD STEEL was given prominent attention in such magazines as PURCHASING, MATERIALS ENGINEERING, PROGRESSIVE ARCHITECTURE, CHEMICAL EQUIPMENT and AMERICAN MACHINIST magazines.

Four recently-released feature articles, which have been distributed to a variety of monthly metalworking, design and engineering magazines, have been published in the daily newspaper, AMERICAN METAL MARKET.

The articles include such subjects as:

- * LEAD SHIELDING used for nuclear medicine shipping containers and shields.
- * LEAD CASTING used to produce an equestrian statue of the the last King of the Americas, King George III. Toppled from its pedestal by Revolutionary War patriots on July 9, 1776 and chopped to pieces to be used for bullets, parts of the statue were unearthed near Wilton, Conn., where they were believed to have been buried while enroute to a Continental Army armory.
- * LEAD SOLDER PREFORMS used to mass-produce soldered joints for a variety of electronic and other products.

A feature article discussing the use of LEAD SHIELDING for an anti-skyjack X-ray device being tested for use at airports, has appeared in MACHINE DESIGN, SECONDARY RAW MATERIALS and ELECTRO-MECHANICAL DESIGN magazines. LEAD SHIELDING also was featured in a by-line feature by P.E. Robinson in AMERICAN METAL MARKET.

The fourth article to be published discussing the use of CHROME YELLOW PAINT to improve highway safety has been published as a three-page feature in AMERICAN PAINT JOURNAL magazine.

Publicity announcing the Annual Lead Industries Meeting appeared in such magazines as WASTE TRADE JOURNAL, IRON AGE, METALWORKING INTERNATIONAL, AMERICAN PAINT JOURNAL and in the AMERICAN METAL MARKET.

Releases announcing the re-election of D. Broward Craig to president and chairman of Lead Industries Association, Inc., appeared in more than 20 publications including MINING CONGRESS JOURNAL, AMERICAN METAL MARKET, SCRAP AGE, THE NORTHERN MINER, and ADVANCED BATTERY TECHNOLOGY.

The news release announcing the Second International Soldering Conference, which was jointly sponsored by the Lead Industries Association and the American Welding Society, appeared in more than 10 magazines including IRON AGE, WELDING JOURNAL, DESIGN NEWS, WELDING DESIGN & FABRICATION and AMERICAN METAL MARKET.

Eight papers concerning the use of lead in a variety of products and its availability were delivered during the Annual Meeting. More than 130 copies of the papers have been delivered to various editors.

Two literature availability notices were published in various magazines during the reporting period:

- * "Publications and Films" was published in more than 5 magazines.
- * "Lead -- A Modern Design Material" was published in more than 25 magazines.

Watch for publication of the following ready-for-distribution feature articles:

- * Ninety Tons of Lead Batteries Provide Uninterruptible Back-Up Power For IBM Computers
- * New Motorola "Tweeter" Loudspeakers Feature Use of Lead Zirconate-Titanate
- * The Extensive Use of Massive Extruded Lead Tubes For New Copper Mine Acid Mist Precipitator
- * The Use of Lead Acid Batteries To Power New England Flood Warning System

Second Quarter
Summary of Publicity Activities

Feature Articles Published..... 19

News Articles Published (including
literature availability announcements)..... 60

Feature Articles Completed..... 8

News Release Completed (including
personnel announcements and literature
availability announcements)..... 10

Feature Articles in Preparation..... 7

Editorial Request Responses.....146 *

- * NOTE: This figure includes the more than 130 copies of papers delivered during the Annual Meeting provided to editors at their specific request.

SOLID STATE MINING REVIEW

MAY 12, 1973

VOL. 12 NO. 5
CINCINNATI, OH

Battery-Powered Personnel Carriers at Morton Salt Mine

AT PAINESVILLE, Ohio, Morton Salt Co. operates the deepest salt mine in the U. S. to produce about 1.3 million tons of rock salt a year. The 2000-ft. deep mine, situated on the shore of Lake Erie, about 30 miles east of Cleveland, also has the distinction of tapping a vast bed of what is believed to be the world's largest deposit of rock salt. The bed covers an area of about 100,000 square miles of rock salt, and it extends under Lake Erie, into Canada as far as southern Ontario, and diagonally across the U. S. as far south as West Virginia.

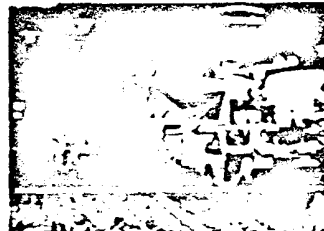
At Morton's Painesville mine, salt is mined by the room-and-pillar method. In this mining technique, about half the rock salt is removed from the working face of the mine whereas the remainder is left in the form of pillars to support the mine roof. The first step in mining salt at Painesville is blasting. A 10-ft. deep undercut is made at the base of the work face, and a series of multiple holes for explosives are drilled mechanically over the same distance into the face of the wall. The work face is blasted at the end of a work shift, providing about 500 tons of rock salt to be produced by the next work shift.

Supervisory personnel play an important role in the safe and efficient operation of the mine. One of their more important jobs is to check the work face to see that it has been properly undercut at the base, and to ensure that the holes for the explosives have been drilled properly and placed. Just as important, the supervisors also check to see that the explosives have been set properly before the work face is blasted. Because the work face being blasted can cover as much as 4000 ft., the supervisors must be transported quickly from one point to another along the work face.

Until recently, supervisory personnel were transported to and from work face areas by diesel-powered personnel carriers. A maintenance crew, operating from an underground shop on the mine's working level, also used the carriers for transportation to and from job assignments. In addition, (Continued on page 8)



Scene of a large salt processing machine underground the base of a rock salt work face is 30 ft. deep at Morton Salt Co.'s mine at Painesville, Ohio. At the end of a work shift, the face is blasted to provide about 500 tons of rock salt for initial processing underground before being hoisted to surface for additional treatment.



View of three of the five new battery-powered electric personnel carriers purchased by Morton Salt Co. to replace diesel-powered vehicles at its salt mine at Painesville, Ohio. The units are shown passing check-out at the motor pool, situated at the 2000-ft. deep working level of the mine.

Salt Mine

rock, both in quality (the most is vehicles) and in the work to also reduce losses.



Storage area for the 1.5 million tons of salt mined annually at Morton Salt Co.'s mine at Painesville, Ohio. When not in use, the stockpile, situated outdoors, is covered with a tarpaulin.

ry-powered is in the electric can be. One of the five, 1 compartment personnel carriers are in that have at times to be floor of red with a salt crystal to traction not to be a to perform any pulling duty. The electric is beneficial other of the

the five vehicles, and it is a rugged and dependable piece of equipment. Vehicles maintenance personnel check the water level in each of the lead acid battery cells at least once a week, refilling them with water when required. They also add water at the end of the charging period, rather than at the beginning, to avoid the possibility of the solution heating over because of heat expansion during the charging period. In addition to their use in transporting supervisors, the electric vehicles are used to transport personnel who supervise the first phase processing the rock salt underground after it is blasted from the work face. Performed by portable equipment temporarily installed adjacent to the work face, the first phase processing includes crushing large chunks of rock salt and screening them to uniform size.

The uniform-size rock salt is hoisted to the surface where it is screened and processed further. Some of the salt is packaged in a variety of grades and container sizes, but most of it is transferred to large storage silos or piles to await shipment. Salt from Morton's Painesville mine primarily is used to melt snow and ice from streets and highways in a wide area extending from waters bordering the Great Lakes to those in the northeast and as far into the southern region as West Virginia. Some of the salt from the Painesville mine also is used for a variety of agricultural and industrial purposes.

Feature article:

**Battery-Powered Personnel Carriers Replace
Internal Combustion Vehicles at Morton Company
Salt Mine**

Published in:

SKILLINGS MINING REVIEW

May 12, 1973

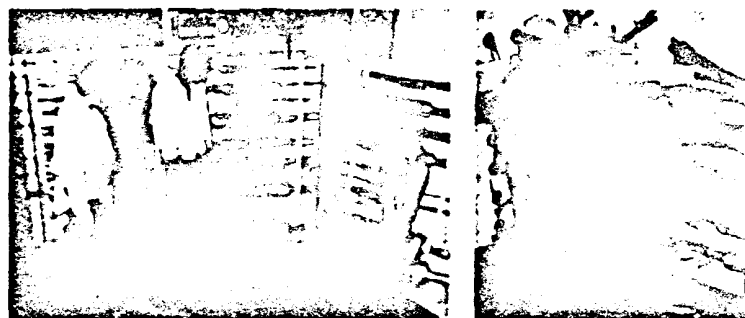
The electric vehicles in service at the Painesville mine are designed to control features of quiet operation, compact, rugged construction, and give maximum distance between battery charges. The mechanical design of the vehicles is simple and requires a minimum of maintenance. The batteries used in power the unit of the new vehicles are 6-volt. The batteries range in size from 180 to 225 and, unlike automobile batteries, they take repeated deep cycling, or charging and discharging. The largest of the five vehicles is powered by a 36-volt, d.c. traction-type motor that transmits power to a worm gear differential through a matched set of three drive belts.

An automatic battery charger has been incorporated in the design of

Electrical World

METHODS

TRANSMISSION/DISTRIBUTION



Student 200 training complete the Consolidated Edison Cable Splicing School. 8 to 12 week course each year. Advanced course each is at Consolidated Edison Cable Splicing School, using all the latest safety equipment and safety work procedures.

'Hands-on' training for lead-sheath wiped joints

As part of the extensive effort required to assure that its underground power distribution system operates in full, Consolidated Edison (C-E) of N.Y. has developed what may be the nation's first comprehensive training department. The department has set up several highly specialized training schools designed to train both its own employees and those of other utilities in the art of installing and maintaining the wide variety of equipment that make up a utility's distribution system.

One of the training schools in the Consolidated Edison Cable Splicing School is the most extensive of its type in the country, and so far as is known, the only one of its kind operated by a utility on such a large scale for training of other utilities.

The school is primarily designed to train experts in the combined art of splicing lead sheathed underground power cable, and then soldering the spliced joint in such a manner that it will form a watertight seal that is as strong and corrosion-resistant as the cable's protective lead sheathing.

The school's curriculum is divided into three courses. The first runs from eight to ten weeks, and is designed to teach the basics of splicing underground power distribution cable. The second is a six-month field training program,

where cable splicing techniques learned during the first course are practiced during supervised on-the-job assignments. The third course is a three-week advanced program.

The courses are a combination of practical application of theory lessons and "hands-on" methods used to simulate field conditions. The methods and curriculum employed have been tried and proved through the thirty years the school has been in existence. Henry Harding, training administrator for all the school's electrical construction, has 22 years of experience, and Mike Conn, assistant training representative in charge of the cable-splicing school, has 15 years of experience with Consolidated Edison back to 1929. The school has a permanent staff of six, augmented by additional training personnel as needed.

The most comprehensive and diverse schooling is taught during the first eight-to-ten-week basic course. While the trainees are primarily instructed in the various ways of connecting lead-sheathed cable, they also receive instruction on how to splice non-sheathed cable. In addition, they are taught to splice copper and aluminum conductors and assemble cable joints for direct current, and to construct cable terminations.

"Lead-sheathed cable is still the most

effective type of protected cable for use in underground distribution systems," says Conn. "Lead sheathing on cable is also to maintain the continuous contact of sheath that is encountered when the cable is being installed. Its corrosion resistance and ability to be easily and accurately joined are added benefits."

The trainees learn how to make 36 different high-voltage lead-sheathed cable joints during the basic course. The joints range from the least difficult, such as splicing a 24 x 11-in. lead sheath over a joint in a 350-kcmil, 54-v cable, to splicing a 74 x 28-in. lead sheath over a joint in a 350-kcmil, 54-v cable, to a 3-in. single 500 kcmil - better known as a "henry" joint.

Because Consolidated Edison runs the task of installing and maintaining literally millions of soldered, lead-sheathed cable joints, most of the space at the Cable Splicing School is taken up by areas where "in the bench" splicing and soldering instruction takes place. Each work area has its own separate electrical cable pegs and pins of solder, which is kept liquid and ready for use. Students working at the benches are under constant supervision of experienced instructors, who have prepared detailed drawings and specifications for each of the joints the students make during the 10-week course (see boxed copy below for representative "wiped" joint procedure).

Continued from Page 1, ENR



One of the prominent instructors in the training program, Robert Smith, instructs trainee Bernard Curry as he makes one of many lead-solder joints representative of those used on Consolidated Edison's underground-distribution cable system.

done). The students also learn how to "break down" each type of soldered joint taught at the school, since they would have to troubleshoot the place of work before repairing a joint that failed in the field.

The school's three-week advanced course in cable splicing is considered after the trainees have satisfactorily completed their six months of field training, following completion of the 10-week primary course. The advanced course includes instructions on how to make the completed 4-way, 1-way 13-4v and 27-4v splices. The trainees make each type of joint three times, and then each joint is wrapped (the lead around the joint is heated and input completely off) and broken completely down under the supervision of an instructor.

Advanced course trainees also are required to spend a secondary 120-hr "test" course, using all auxiliary safety equipment and procedures.

Other training programs at the school include a 10-day course in transmission splicing, which is designed for experienced underground distribution splicers, a five-day course for transmission splicer's helpers, and a three-day underground residential distribution (URD) course. Also available are general training programs that include a refresher course in cable splicing and a five-day trouble-shooting course that is designed to further increase experienced students' and cable splicers' skills with the various emergency situations they can expect to encounter in the field.

Approximately 200 students complete the Cable Splicing School's course each year. The school's total on-the-job training program opens an approximate five-year period. After this period, the school's cable splicers earn a minimum of slightly more than \$11,800 a year. □

Procedure for wiping a joint

Leads of lead-sheathed cable, because of the increased bulk of the spread conductors, are always of greater diameter than the cable itself, and therefore require the use of a lead sleeve to encase the joint. The school orders the lead sleeves in 24-in. to 36-in. diameters, to splice cable ranging from a minimum of 3 in. to a maximum of 27 in. For ease in handling, the sleeves are usually ordered in 32-in. lengths, which are cut to size as required.

Having selected the proper sleeve length for the electrical joint to be made, the student wraps the inside of both ends of the sleeve clean back about 1 in. before lining with talcum or mastic wax. The outside of the sleeve, back about 2 in. to 3 in. depending on the diameter, is also scraped clean and flared.

After the sleeve is laid up over the conductors, the ends of the sleeve are prepared to fit the approximate shape of each end of the spread area. This step, called dressing, is accomplished with a mastic mallet or dresser. The sleeve is then moved aside while the conductors are spliced.

Following this step, areas on the cable's lead sheathing that are to become part of each joint are scraped clean and flared. The sleeve is then placed over the areas of the joint so that each end extends over the previously scraped and flared lead sheathing around the cable.

The dresser is usually used to tap

each end of the sleeve into place to fit snugly against the dressed and flared areas of the lead sheathing around the cable. An additional thin coating of flux is applied to the area before ground paper or plaster is put in place to prevent adhesion of solder at points beyond the joint.

When the joint has been properly prepared, it is pressed by the special technique called wiping. Wiping requires special lead solder to achieve a smooth, watertight joint.

The technique of wiping a lead-solder joint requires a great deal of skill and involves an almost spent many hours practicing it. First, molten solder is poured around the joint formed by the lead sleeve and the lead sheath of the cable and sleeve. A cloth held by hand just below the molten area is used to draw the solder to flow over the bottom surfaces and it adheres to the dressed and flared areas.

After the lead from the hot pour has cooled to the point where it reaches the joint at every end, (single, additional solder is poured over the top and bottom areas. This solder also is prepared to meet to the wiping stage before an additional pour is made. The process is rapidly repeated, with one hand pouring solder from a ladle and the other continuously wiping the joint as the solder builds up, until the joint is the desired thickness. At this point, the joint is unworked and finished by a final wiping.

Exclusive feature story for:

ELECTRICAL WORLD -- May 1, 1973

Consolidated Edison's Lead Cable Splicing School

NOTE: ELECTRICAL WORLD carried color-cover feature story on the use of sheet lead to quiet Long Island Lighting Company facility in the magazine's following issue, May 15, 1973.

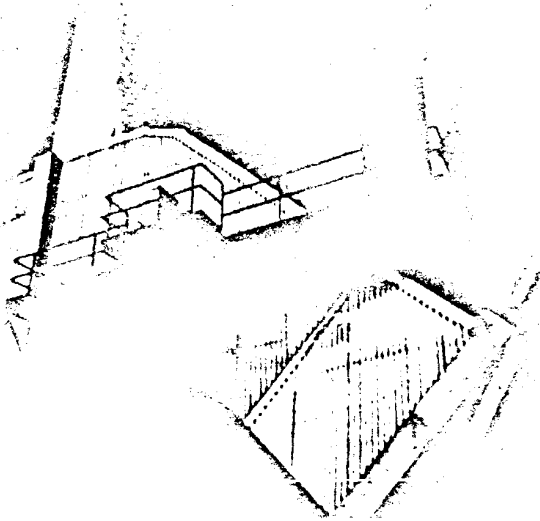
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5117 ELECTRICAL
WORLD
E.C. MANN

MAY 15 1973



573



COVER STORY FEATURE ---

Use of sheet lead to quiet sound of Long Island
Lighting Company Facility.....

One of six feature placements

ELECTRICAL WORLD - May 15, 1973

NOTE: This feature placement has been reprinted
for use in the LIA promotional pro-
gram directed to the sound control
market.

Bedroom community's quiet undisturbed

As a result of an extensive sound-reduction project now nearing completion, the Long Island Lighting Co. (LILCO) power plant at Northport, N.Y., remains one of the nation's quietest gas-turbine (fuel) power generating stations.

The problem LILCO faced was, "How to increase the capacity of a large generating station in the middle of a 'bedroom' residential community without generating huge noise problems?" LILCO's solution involved the extensive use of acoustic barriers, plus sound-dampened intake ducts—both relying on the sound-dampening characteristics of sheet lead.

There are three 425-hp generating units at the Northport plant. The sound-reduction program involved the installation of new equipment as follows:

- Induced-draft-fan equipment and associated ductwork, which are being installed to improve the operating efficiency of Unit 1, installed in 1967, and Unit 2, installed in 1972.

- Induced-draft-fan equipment and associated ductwork, and an electrostatic precipitator, which are being installed as original equipment for Unit 3, which went on line in 1972.

To understand the problems LILCO faced in reworking the new equipment, it is necessary to understand why the noise is so concerned with noise control at the Northport plant.

Located on Long Island Sound, the plant is flanked on three sides by a quiet suburban residential community. It contains more than 700 homes, some of which are as close as 1,200 ft to the power station structures. Except for the LILCO plant, Northport has no commercial or business areas, or even any nearby commercial or industrial developments. The area also is renowned for extensive recreational activities.

Because of the low ambient sound levels in the community, LILCO engineers faced a particularly difficult sound-control problem when the first two units were being designed. They knew that operations of the machinery and associated equipment for the two units would produce noise levels in the 90-to-130-db range, and that such levels would annoy homeowners in the surrounding community. Further complicating the problem was the fact that such sound would travel far in the quiet suburban atmosphere.

Studies in 1963 of community sound

levels determined that a 3-to-5 decibel increase in ambient sound level would be acceptable, and would avoid widespread complaints from homeowners. Therefore, when the plant was being designed, LILCO specified that noise from the plant could not exceed 70 db outside the general plant walls, and 90 db immediately outside the exhaust ductwork and walls of any mechanical particulate collector of each unit. To accomplish these goals, four basic steps were involved:

- Various equipment inside the plant was purchased with low sound level where practicable, or was enclosed in sound-dampening materials.

- Whenever needed, walls and ceilings inside the plant were covered with sound-absorbing panels and materials.

- The entire plant was enclosed in sound-dampening walls and exterior panels.

- Acoustic enclosures were provided for forced-draft fans and venting systems.

As a result, when Units 1 and 2 were initially completed LILCO had no need to be concerned with noise complaints from the community. When the noise

problem was made to install new induced-draft-fan equipment in Unit 1, however, additional noise-reduction work was required. Because the ID fans and their associated ductwork are too large to be installed inside the plant, the existing plant walls could not be used even partially to attenuate sound. So alternative noise-reduction methods had to be implemented.

Tests conducted inside the ductwork on the exhaust side of the induced-draft fan installed in Unit 1 revealed an average reading of 125 db, a sound level far in excess of the original 90-db level set for noise outside the plant walls. As an indication of what the 125-db sound level means, it can be compared to the sound of a lawnmower jet plane. And it is on the threshold of pain for the human ear.

While the 600-ft-high exhaust stack, ductwork, and the induced-draft fan, was usually found to be a primary noise source, conventional shielding of the noise coming from the top of the stack involved the problem. It was then determined that a better primary noise screen, which required no structural treatment, was the induced-draft-fan con-

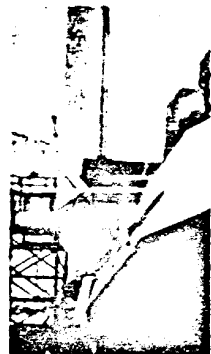
struction that noise emanating from the east and west sides of the plant would have to be carefully controlled, since it travels directly and without restriction toward the surrounding community. However, noise emanating from the north and south sides of the plant—as caused by Unit 1's induced-draft-fan housing—has not been a major problem, because it either dissipates over Long Island Sound or is blocked by high hills behind the plant.

Based on this knowledge, thermal insulation with two sheets of 1-lb/sq ft lead was specified to enclose the induced-draft-fan housing of Unit 1—covered east and west as well as the ductwork leading from the housing to the particulate-collector house in the induced-draft fan was covered in thermal insulation with only one sheet of lead.

With this problem solved, the job of controlling the noise from Unit 3 began. While different than the first two units, since an electrostatic precipitator had been included in its design, experiments passed on controlling noise from the first two units indicated that a combination of all three types of panels—thermal only, thermal/acoustic (one layer of lead), and thermal/acoustic (two layers of lead)—should be used to enclose the fan, ductwork, and precipitator.

First, the ductwork leading from the power plant to the precipitator and its support (used to remove particulate matter resulting from operation of the precipitator) were enclosed with thermal insulation panels. Next, the precipitator and ductwork leading from it to the induced-draft fan were enclosed in thermal/acoustic panels containing one layer of sheet lead. Then, the induced-draft-fan housing and the ductwork leading from it to the stack were enclosed with thermal/acoustic panels containing two layers of lead. To achieve maximum acoustical insulation, these two lead sheets are separated by a layer of mineral wool. In essence, the lead system, "free-floating," and is therefore more effective.

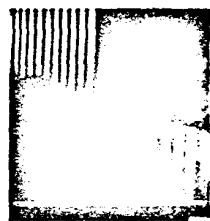
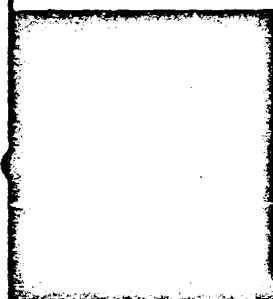
The ductwork and induced-draft-fan housing for the first two units required about 30,000 sq ft of panels. Approximately 52,000 sq ft were required to enclose the third unit; however, in addition to the unit's induced-draft-fan housing and associated ductwork, its precipitator housing and the ductwork from the plant to the precipitator also had to be enclosed. Transco delivered the panels pre-cut to size and ready for installation. The considerably reduced installation time and decreased equipment downtime while the first two units were being modified. Also, one of the pre-cut panels permitted the third unit to be readied for operational testing faster than would have been possible had the panels not been cut to size. □



Thermal/acoustic panels were installed on ductwork leading from induced draft fan compartment (left) to No. 3 unit's 625-ft high stack. Acoustic panels cover ductwork leading to induced draft fan housing and ductwork from precipitator to fan (right).



Shown from the left, the No. 3 unit.



Shown from the left, the No. 3 unit.



Shown from the left, the No. 3 unit.

25-77 PUBLIC UTILITIES
FORTNIGHTLY
L.A. 8-200

MAY 10 1973

EXPRESS
BACONE

INDUSTRIAL PROGRESS—(Continued)

A Case History in Industrial Noise Control

Problem: How to increase the capacity of a large electrical generating plant in the mode of a "bedroom" residential community without generating huge noise problems as well.

Solution: Extensive use of sound barriers along with a modified air intake—both relying primarily on lead.

As a result, the Long Island Lighting Company (LILCO) power plant in Northport, N.Y., is one of the utility industry's quietest fossil-fueled power generating stations. There are three power generation units at the utility's Northport plant and each unit is designed to produce 600 megawatts of electrical power for the LILCO system.

According to Lead Industries Association, sheet lead is being used "extensively in a primary sound barrier in a newly developed combustion thermalacoustic building plant. The panels are being used to build sound-damping enclosures around new equipment in order to bring the Northport facility into conformance with the strict noise control specifications set by the utility when the plant was built.

"Super Quiet" Location

Situated on Long Island Sound, the plant is flanked on three sides by a very quiet suburban residential community. It contains more than 700 homes, some of which are as close as 1,200 feet to the power station structures.

level compares to that heard inside a quiet living room.

Because of these low ambient decibel levels, LILCO engineers faced a particularly difficult noise control problem when the first two units were being designed. They knew that operation of the machinery and associated equipment for the two units would produce sounds in the high 90 to 110 dBC levels and that such levels would be particularly annoying to homeowners in the surrounding community. Further complicating the problem was the fact that such sound would travel far in the quiet suburban atmosphere of the surrounding community.

Studies of sound levels in 1963 of the surrounding community determined that a 5.5 decibel increase in ambient sound levels would be acceptable and sound widespread noise complaints from homeowners. Therefore, when the plant was being designed, LILCO specified that noise from the plant could not exceed 70 dBC outside the plant walls and 90 dBC outside the exhaust ductwork and walls of the mechanical particulate collectors of each unit. Their goals were accomplished through four basic steps:

- Various equipment inside the plant was purchased with the most practicable low sound level, or else was enclosed in standard sound-dampening materials.
- Whenever needed, walls and ceilings inside the plant were covered with sound absorbing panels and materials.
- The entire plant was enclosed in sound-dampening walls and curtain panels.
- Acoustic silencers were provided for forced draft fans and ventilating systems.

As a result, LILCO was not concerned with noise complaints from the surrounding community until a recent decision was made to install the new induced-draft fan equipment in Unit No. 1. Because of their large size, the

fans and their associated ductwork could not be installed inside the plant. Thus the existing plant walls could not be used even to partially enclose them.

A 600-foot high emission stack, connected to the induced-draft fan by huge ducts, was found to be the primary noise source. However, after adequately filtering noise coming from the top of the stack, it was determined that a new primary noise source requiring acoustical treatment was the induced-draft fan casings and ductwork leading to and from them.

Sound Reduction

According to Frank J. Wells of LILCO's electrical engineering staff, the most enclosure for the ductwork and fan housing provided a very large sound radiating surface much like that of a gigantic loud speaker system. Therefore, the decision was made to enclose both the fan housing and the associated ductwork with a sound barrier system.

Several problems had to be overcome before the noise barrier could be installed. It had to be able to withstand the approximately 450°F operating temperatures of the equipment, and it had to be capable of providing an adequate degree of sound attenuation since noise levels were not consistent throughout all areas to be covered.

To help solve the problem, the utility called on the services of Transco Inc., in Chicago. A leading manufacturer of prefabricated thermal insulation panels, the company has recently developed two types of insulated panels that are specifically designed to provide a sound transmission loss of up to 52 decibels. Transco has installed its standard thermal insulation panels at more than 90 electrical power plants throughout the country as well as more than a score of other types of industrial plants. LILCO's Northport plant was the first application for the company's combination thermal/acoustical panel system.

Use of Sheet Lead to quiet sound of Long Island Lighting Company facility.....

one of six feature placements

PUBLIC UTILITIES FORTNIGHTLY May 1973

PUBLIC UTILITIES FORTNIGHTLY—MAY 10, 1973

1977 METAL
BUILDING REVIEW
NO. 148
MAY 1973

Two views of semi-circular thermal insulation panel being installed to enclose equipment being installed at Unit No. 3. Left view shows ductwork leading from induced draft fan equipment to unit's 600' high stack. Right view shows construction of panels covering additional ductwork leading to stack, panels covering induced draft fan housing (bottom, center), and ductwork from precipitator to fan (right corner). Lower walls of precipitator housing (partly visible at bottom right) also were insulated with panels. Emission stack and other equipment for Unit No. 2 is visible in background.

LIGHTING COMPANY'S NORTHPORT, N.Y. PLANT IS A CASE HISTORY FOR INDUSTRIAL NOISE CONTROL

A report from the Lead Industries Association, 292 Madison Avenue, New York 10017.

Problem: How to increase the capacity of a large electrical generating plant in the state of a "hardcore" industrial community without generating high noise problems at work.

Solution: Enclosure use of sound barriers along with a modified air intake. Both solving problem on both.

At a glance, the Long Island Lighting Company (LILCO) power plant at Northport, N.Y., is one of the utility industry's quietest fossil-fuel power generating systems. These are three power generating units at the utility's Northport plant and each unit is designed to produce 480 megawatts of electrical power for the LILCO system.

According to Lead Industries Association, sheet lead is being used extensively at a primary sound barrier in a newly developed construction thermal/insulation building panel. The panels are being used to build sound-deadening enclosures around core equipment in order to bring the Northport facility into compliance with the state's noise control specifications set by the utility when the plant was built.

The new equipment includes the following components:

Induced draft fan equipment and associated ductwork that are being installed to improve the operating efficiency of power generation (Unit No. 1, installed in 1967, and Unit No. 2, installed in 1968). Induced draft fan equipment and associated ductwork and air intake ducts for power generation (Unit No. 3), which were

in service in 1972.

In order to understand the problem LILCO faced in understanding the new equipment, it is necessary to understand why the utility is so concerned with noise control at its Northport plant.

Located on Long Island Sound, the plant is flanked on three sides by a very quiet suburban residential community. It contains more than 700 houses, some of which are as close as 1,200 feet to the power station structure. Except for the LILCO plant, Northport has no commercial or business areas, so noise control is considered an industrial development. The area also is bordered from exposure reduction, as in all levels. Numerous outdoor sound levels in the community range from a day average of about 30 decibels (dBA) at night to a day time high of about 52 dBA. The 50 dBA night level compares to that found in a residential area's reference. The 52 daytime level compares to that found inside a quiet living room.

Because of these low ambient sound levels, LILCO equipment faced a particularly difficult noise control problem when the first two units were being designed. They knew that operation of the machinery and associated equipment for the two units would produce sounds in the high 90 to 150 dBC levels and that such levels would be particularly annoying to businesses in the surrounding community. For this reason, the problem was the fact that such sound would level in the quiet suburban atmosphere of the surrounding community.

The thickness of the thermal insulation is determined by the operating temperature conditions of the equipment to be insulated. The above of one or two layers of sheet lead is determined by the amount of noise reduction desired.

Traverse had engineers personally visited with LILCO to build the thermal/insulation panels. The thermal/insulation panels were built from sheet lead, which was being supplied by the company. LILCO engineer told the panel that after installing Unit No. 1, and its associated ductwork, it was found that panels surrounding the level of sheet lead were not sufficient to solve specific noise control problems associated with the equipment. This was due to the fact that some leaks in the induced draft fan housing were much higher than in the ductwork leading to and from the housing.

The location of the equipment and the broad path of the noise it generated created additional problems. For example, it was found that noise emanating from the East and West sides of the plant would have to be carefully controlled since it would travel the surrounding community. Noise emanating from the North and South ends of the plant was not a particular problem because in other locations near Long Island Sound or the area is flanked by high hills behind the plant.

Based on the knowledge, thermal insulation with two sheets of 1 lb. per sq. yd. was specified to control the induced draft fan housing of Unit No. 3 as well as the ductwork leading from the housing to the stack. Ductwork leading from the particular induction fan to the induced draft fan was covered in thermal insulation with one sheet of 1 lb. per sq. yd.

With this problem solved, the job of

Panel 1 built, LILCO Electrical Engineering Staff, displays cross-section of one of the two types of thermal insulation panels that solved major noise problems at company's Northport plant. Panel paneling 1 lb. sheet lead around burner, even extending from between two layers of mineral wool which provides panel with thermal insulating properties. Some of the equipment covered by the panels can be seen in background.

and ductwork leading from it to the stack are enclosed with thermal/insulation panels containing two 1 lb. per sq. yd. sheet lead. To achieve maximum sound insulation, the two lead sheets are separated by a layer of mineral wool. In addition, the lead contains "Tie Rods" and a flange of sheet lead.

Line drawing of power generation Unit No. 3 at Long Island Lighting Company's Northport, N.Y. plant, shows location of three types of components required for building panels used to solve noise control problems for the installation's 11 burner ductwork and necessary equipment.

had to be able to withstand the approximately 450°F operating temperatures of the equipment, and it had to be capable of providing an airtight degree of sound enclosure since some leaks were not completely eliminated as they were.

To help solve the problem, the utility called on the services of Traverse Inc., Chicago, Ill. A leading manufacturer of performance, thermal insulation panels, the company has recently developed two types of insulated panels that are specifically designed to

provide a sound transmission loss of up to 52 decibels. Traverse has installed its modified thermal insulation panels at more than 50 electrical power plants throughout the country as well as more than 100 other types of industrial plants. LILCO's Northport plant is the first application for the company's semi-circular thermal/insulation panel system.

Since transmission loss of the new panel system is achieved through the use of either a single or double layer of 1 lb. per sq. yd. (1/64") sheet lead, for maximum efficiency,

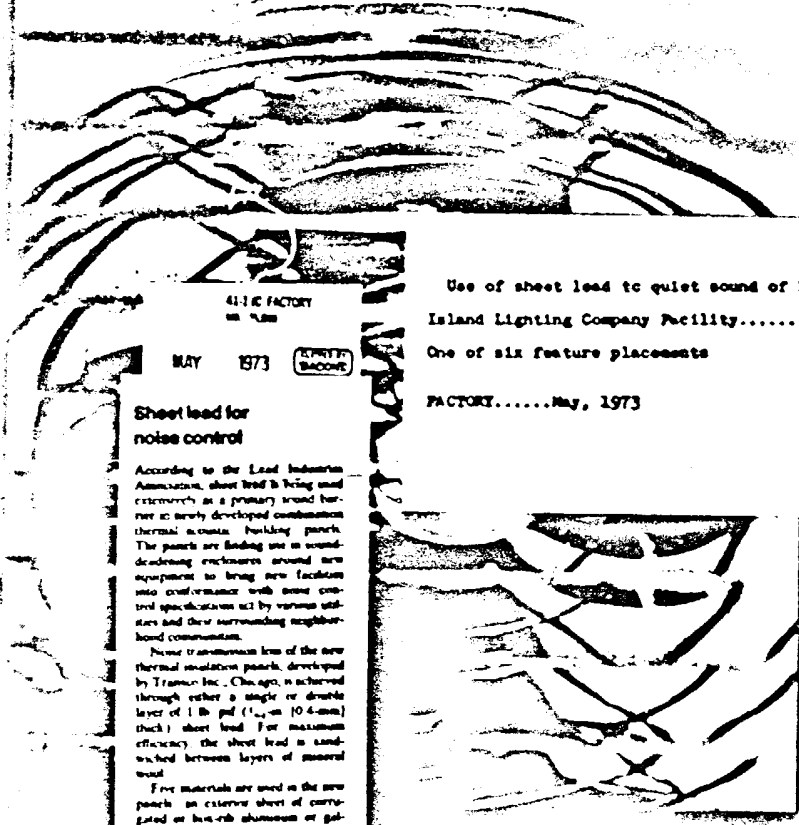
Use of sheet lead to quiet sound of Long Island Lighting Company Facility.....
One of six feature placements
METAL BUILDING REVIEW - May 1973

Page 11

11

Factory

ventilating a non-air conditioned plant



Use of sheet lead to quiet sound of Long Island Lighting Company Facility.....

One of six feature placements

FACTORY.....May, 1973

MAY 1973

ALPINE BACONE

Sheet lead for noise control

According to the Lead Industries Association, sheet lead is being used extensively as a primary sound barrier in newly developed combination thermal nuclear power plants. The plants are finding use in sound-deadening enclosures around new equipment to bring new facilities into conformance with noise control specifications set by various states and their surrounding neighborhood communities.

Noise transmission loss of the new thermal insulation panels, developed by Transon Inc., Chicago, is achieved through either a single or double layer of 1 lb. per sq. ft. (10.4 mm) thick sheet lead. For maximum efficiency, the sheet lead is sandwiched between layers of mineral wool.

Five materials are used in the new panels: an exterior sheet of corrugated or flat aluminum or galvanized steel, a layer of mineral wool insulation, single or double layers of sheet lead, a layer of aluminum foil, and a wire mesh retainer on the sound source side of the panel.

Thickness of the thermal insulation is determined by operating temperature conditions. The choice of one or two layers of sheet lead depends on the amount of noise reduction desired. □

RECEIVED
METAL MARKET
BY: D. B. B. 102 100
MARCH 20 1973

MAR 20 1973

CHRYSLER
BAG 7.5

LIA Believes Sound Barrier Application To Boost Markets

NEW YORK — The domestic lead industry appears confident that lead will become an integral part of industrial noise pollution control systems.

The Lead Industries Association said that a growing number of large electrical generating plants, located in residential communities, are having a problem increasing capacity without increasing noise levels above Occupational Safety & Health Administration and Local standards.

LIA reports that one solution to the problem is the use of sound barriers along with a modified air intake system, both of which primarily use lead.

In all three systems, the Long Island Lighting Co. (LILCO) power plant at Port Jervis, N.Y. has been used as the typical heat-treating power generating station in the industry. This lead system, LIA has been able to increase generating capacity without greatly increasing noise levels.

According to the LIA, sheet lead is being used extensively as a primary sound barrier in a newly developed transmission thermal converter building plant.

The plants are being used to heat sound-dampening surfaces around new equipment in order to bring the Port Jervis facility into compliance with the most recent sound standards. The LIA believes that the application for the sheet lead will become a growing market for lead.

Located on Long Island Sound, the plant is located on three sides by a quiet suburban residential community.

Measured ambient sound levels in the community ranged from a few quarters of about 55 decibels at night to a daytime high of about 65 decibels.

Because of these low ambient sound levels, LIA engineers found a particular difficult noise control problem when the first two units were being designed. They knew that operation of the machinery and associated equipment for the two units would produce sound in the high 80 to 100 decibel levels and that such levels would be per-

manently annoying to businesses in the surrounding community. Further complicating the problem was the fact that such sound would travel far to the quiet suburban atmosphere of the surrounding community.

Studies of sound levels in 1962 of the surrounding community determined that a 54 decibel average to ambient sound levels would be acceptable and avoid widespread noise complaints from businesses. Therefore, when the plant was being designed, LIA specified that noise from the plant could not exceed 70 decibels outside the plant walls and 50 decibels outside the adjacent downtown and made of the mechanical particulate collectors at each unit.

As a result, LIA was not concerned with noise complaints from the surrounding community until the recent downturn was made to install the new induced draft (I.D.) fan equipment. Because of their large size, the I.D. fans and their associated ductwork could not be installed inside the plant.

Two reinforced within the ductwork on the exhaust side of the induced draft fan installed resulted in average reading of 130 decibels a level far in excess of the original 50 decibel level set for noise outside the plant walls. As an indication of what the 130 decibel level means, it can be compared to the sound of a lawnmower at 90 decibels and it is on the

threshold of pain for the human ear.

A 600 foot high concrete stack converted to the induced draft fan by large ducts, was found to be the primary noise source. However, after adequately clearing noise coming from the top of the stack, it was determined that a new primary noise source requiring additional treatment was the induced draft fan casing and ductwork leading to and from them.

According to Frank J. Wells of LIA's electrical engineering staff, the steel enclosure for the ductwork and fan housing provided a very large sound reflecting surface such that the effect of a significant lead system. Therefore, the decision was made to enclose both the fan housing and the associated ductwork with a sound barrier system.

Several problems had to be overcome before the noise barrier could be installed. It had to be able to withstand the approximately 60 degree F operating temperatures of the equipment and it had to be capable of providing an adequate degree of sound attenuation where noise levels were not constant throughout all areas to be covered.

To help solve the problem, the study called on the services of Trane Inc., Chicago. In a manufacturer of pre-engineered thermal treatment panels, the company has recently developed two types of insulated panels that are specifically designed to provide a sound transmission loss of up to 10 decibels.

Trane has installed its standard thermal insulation panels at more than 10 electrical power plants throughout the country as well as most than a score of other types of industrial plants. LIA's Port Jervis plant is the first application for the company's combination thermoinsulation panel system. Operation of the two power reactors is achieved through the use of either a single or double layer of one panel per square foot (100 lbs./sq. ft.) sheet lead. The sheet lead is sandwiched between layers of the material used that is one of the standard materials used to produce the company's thermal insulation panels.

Initial Release on use of sheet lead to quiet sound of Long Island Lighting Company Facility

Published in American Metal Market
March 20, 1973

NOTE: Publication in daily newspaper followed by large number of magazine feature placements.

13 IN. DIAMETER
EQUIPMENT
DL 61 000

MAR 1973

EXPERT
BACON

CHEMICAL EQUIPMENT

MATERIALS OF CONSTRUCTION

LEAD CLAD COMPOSITE

Composite material combines lead's outstanding corrosion resistance with the strength of steel. Called roll bonded lead clad steel, material is produced by pressure bonding lead to steel sheets which have been pre-treated with lead alloy. Material possesses steel-like properties for chemical construction. Applications include panels and small deep-drawn containers from sheet as well as flanged duct sections and specially wrapped tubing. Development of lead clad steel for tank panels is important since sheet lead is already being used to line a variety of chemical and pollution control vessels. Lead Industries Association, Inc.

News Article: Availability of Lead-Clad Steel Announced

Samples of new item placements -- published in **PROGRESSIVE ARCHITECTURE**, **TECHNICAL SURVEY**, **AUTOMOTIVE INDUSTRY**, **CHEMICAL EQUIPMENT**, **AMERICAN MACHINIST**

AMERICAN
MACHINIST
NEW YORK, N.Y.
B-WEEKLY EDITION

MAR 5 1973

AM Trends

Materials

27 42 AUTOMOTIVE INDUSTRY
INTERNATIONAL
L.S. 31,000

MAR 1 1973

EXPERT
BACON

Lead Clad Material in England

A new composite material that combines lead's corrosion resistance and sound barrier properties with the strength of steel has been introduced in England.

Called roll bonded lead clad steel, the new composite material was developed by the British Non Ferrous Metals Research Assoc. It is produced by pressure bonding lead to steel sheets which have been pre-treated with lead alloy. The lead clad steel is said to have been subjected to extensive mechanical and thermal testing without failure.

Advantages are claimed for roll bonded lead clad steel as a sound barrier material. Potential applications include ductwork for air, liquid and waste handling systems, industrial machinery and equipment enclosures, and a variety of automotive transportation equipment.

3 27 PROGRESSIVE
ARCHITECTURE
DL 61,000

APR 1973

EXPERT
BACON

Like-lead, A composite material reportedly possesses lead's outstanding corrosion resistance, excellent sound and sound barrier properties with the strength of steel. Called roll bonded lead-clad steel, the material was developed in England. It is produced by pressure bonding lead to steel sheets which have been pre-treated with lead alloy. The lead-clad steel has been subjected to extensive mechanical and thermal testing without failure. It can be fabricated using traditional steel fabricating techniques and has been successfully used for commercial and industrial building construction applications. It is suitable for roofing, siding and chemical construction. Lead Industries Association, Inc. Circle 103 on reader service card.

Cladding controls corrosion—and noise

A different kind of "composite" material combining the structural strength of steel with the corrosion resistance and sound barrier properties of lead has been developed by the British Nonferrous Metals Research Assoc. As its name suggests, roll bonded lead-clad steel is produced by cold rolling rolled lead sheet to form a lead-clad steel.

The pressure-bonded material is being offered in the United Kingdom in both single and double cladding, and has already found applications in exterior corrosion-resistant applications. Other possible uses include waste handling equipment, ductwork for industrial machinery, waste handling equipment, and industrial machinery, even better applications. Lead-clad sheets are being produced in 14 to 20-gauge steel sheets with thicknesses ranging from 0.020 to 0.040 in. They are being offered for use in lead-lined vessels and other chemical plant equipment.

Although using stress relieving modifications may be required, it is reported that roll bonded lead-clad steel can be formed by deep-drawing, hot forming, brake forming, and hot forming without deformation, even in the end on heads. Fabrication by welding or brazing should be possible using sheet lead and where spot or arc welding is required, lead and preformed welding are recommended.

American lead producers have expressed interest in producing lead-clad steel for the domestic market. According to the Lead Industries Assoc., and an order book in the price of lead was reported to show that in August 72 level but no orders started coming in from the domestic market.

41 000 TECHNICAL SURVEY
DL 61,000

APR 7 1973

EXPERT
BACON

GB's Mullard Res Labs' exptl, inexpensive Doppler radar intruder alarm uses thin-film microwave circuit techniques. A Gunn oscillator, a Schottky detector and a circulator to separate the transmitted and received signals--all are integrated in a thin-film circuit on a single 1-cm square substrate (13b). A new Brit construction material, roll-bonded, lead-clad steel, is being used to form the vertical roof fascia panels on a London building. The panels were formed by pressure-bonding lead to steel sheets that had been pre-treated with lead alloy.

7126 PURCHASING MAGAZINE
L.E.N. PLANE

MAR 20 1973

EXPRESS
BACON

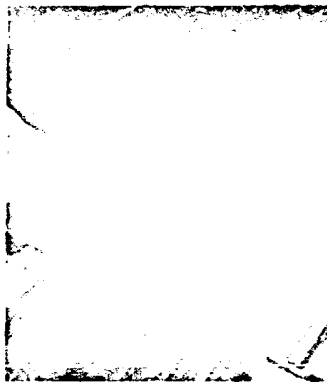
News Article: Availability of Lead-Clad Steel Announced

Two examples of feature placement --
PURCHASING MAGAZINE, March, 1973
MATERIALS ENGINEERING, March, 1973

TECHNOLOGY TRENDS

Many uses seen for lead-clad steel

material. It can be soldered, brazed and burned almost as easily as sheet lead.
For information, write to Lead Industries Assn., Inc., 845 Madison Ave., New York, N.Y. 10017.



A COMPOSITE MATERIAL, developed in England, combines the strength of steel with the corrosion resistance and low barrier properties, and extreme appeal of lead.

Roll-bonded lead-clad steel, as developed by the British Nonferrous Metals Research Assn. and produced by pressure bonding lead to steel sheets coated with a lead alloy. The material takes extensive mechanical and thermal treatment without bond failure. It can be fabricated with traditional techniques. U.S. lead companies are considering the material for industrial and construction uses.

Potential applications include small, deep-drawn containers, flanged duct sections and specially shaped tubing. Use of the material for tank parts should be significant, since sheet lead already is being used to line chemical and pollution control vessels. The material is expected to find use in sound-dampening enclosures for home appliances, air-handling equipment and industrial machinery.

The lead-clad steel is being produced in Britain. Single-side clad sheet is available immediately, while double-side clad is produced to special order. Coatings range from 0.020 to 0.040", applied to steel from 14 to 30 gage. Thicker coatings are being explored for chemical applications.

Standard fabricating techniques such as roll forming, brake pressing, hot forming and deep drawing can be used on lead-clad steel. It can be heat treated 1400° without loss of adhesion and with normally perceptible thinning of the lead on the outer surface of the bond.

Most types of fasteners can be used for joining the

6142 MATERIALS
ENGINEERING
ON FILE

MAR 1973

EXPRESS
BACON

Three steel composites keep machinery quiet

Three composite materials, all using at least one layer or sheet of steel, substantially reduce noise emanating from a wide range of machinery. Combinations of steel and fiberglass, steel and lead, and steel and an adhesive have been developed and are now commercially available.

Working on the principle of constrained layer damping, U.S. Steel's Resonance Control of a thin sheet of steel to which a sheet of fiber-

glass or viscoelastic adhesive is laminated. The resultant material is then bonded to the offending vibrating panel, housing or enclosure. Noise or vibrations are then dissipated as a small amount of heat. The new damping panel may be attached to wood, metal or glass with adhesives, mechanical fasteners or heat bonding. The resultant laminate is effective to 300 f.

Other potential applications for Resonance Control include automotive components, air compressor housings, parts hoppers, transformer housings and conveyors. Circle 188

Another approach is a combination of steel sheet perforated with thousands of minute holes placed over 6 in. layers of fiberglass. According to Diamond Perforated Metals Div. of Whitaker, noise is trapped and dampened out by the fiberglass. The perforated metal has several functions. It enables the noise to reach the fiberglass through the perforations, protects the fiberglass and adds strength to large enclosure panels.

Enclosures measuring 100 ft long, 20 ft wide and 30 ft high for turbo-machinery have been built and noise levels have been cut by 40 dB. The material is also a practical barrier for air intakes and exhausts.

Circle 189

lead-clad steel is a
known in England and

15

is produced by bonding lead to steel which has been pre-treated with lead plating. The lead-clad steel has shown no failure after extensive mechanical and thermal tests, according to the Lead Industries Assn.

Lead cladding may be applied to one or both sides of sheet steel. Single cladding is being produced with lead coatings that range from 0.020 in. to 0.040 in. applied to 14- to 20-gage steel. Cladding between 0.020 and 0.030 in. on 20-gage steel is standard for building applications.

Standard roll forming, brake pressing, hot forming and deep drawing techniques can be used to fabricate lead-clad steel. However, as with most new materials, some minor initial tooling modifications may be needed to accommodate the composite material. Most mechanical fasteners may be used.

Potential applications include appliance enclosures, ductwork for air liquid and semi-solid handling systems, industrial machinery enclosures and in a variety of automotive applications. Circle 187

METALWORKING NEWS
NEW YORK, N.Y.
U. S. DAILY

FEB 26 1973

Lead and Zinc Markets

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 normal materials to pierce the human body.

Nuclear medicine has been used to diagnose internal cancer.

The process involves the injection of minute amounts of radioactive isotopes 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 the process has one particular major disadvantage — radiation.

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

Lead operations 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 devices operating in this area, and determining the

thickness of shielding material for such operations 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 boxes.

When the radio active material is being transferred from one shield device to another, the worker takes place inside a radiation lead-proof, lead lined glove box, and technicians using a cover lead-impermeable 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., Flatbush, 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 Miele 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 diagnostic cancer detection, scintillation scanners and cameras that can photographically scan the human

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

Barry Wright, Spens

According to Miele, although lead's primary shielding property is mass, its use invariably comes in many shapes and sizes. He also says the metal's cost and the ease with which it can be cast, extruded, rolled, machined or otherwise formed, combine 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 mold. If required, the sides of the devices are machined and then polished.

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 pivot for opening.

A typical radiative shield or shipping device that would be used to ship a radiopharmaceutical to about 3 inches high, has lead walls about 1 1/2 inch thick, a 3/4 inch diameter hollow core, and weighs about two pounds.

In addition to the 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 radiative shield material. Because lead does not become contaminated by neutrons or gamma rays, it may be used continuously without fear of its becoming a radioactive source itself by emitting harmful rays, the LIA claims.



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

NUCLEAR MEDICINE REQUIREMENTS EXPAND USE OF LEAD FOR RADIATION SHIELDING

Initial publication of feature story....
published in Feb. 26, 1973 issue of
AMERICAN METAL MARKET

51-7 AMERICAN
METAL MARKET
215 E. 14th, S.W. 4th
OKLAHOMA 73101

MAY 29 1973

(EXPIRY
200000)

Lead Will Tip Quebec's Scales Of Justice in Favor of Silence

MONTREAL — Approximately 100,000 square feet of sheet lead were employed in the new Province of Quebec Justice Building to ensure that noise from one area of the building would not permeate through walls or partitions to adjacent areas.

John Hildebrand, project coordinator for the partitions contractor, Frank Proulx, Inc., reported that sheet lead played most of the critical noise control problems in the building. He remarked that lead is one of the most efficient noise barriers of all common building materials.

Among its areas of employment in the Justice Building were sheet

lead barriers used above the tops of partitions and walls, as a component of soundproofing partitions, and as noise barriers in portions of the building's heating and cooling system.

In the latter instance, Hildebrand pointed out that in high rise buildings, such as the Justice Building, heating and cooling systems are a frequently overlooked channel for noise transmission.

Part of the Justice Building's heating and cooling system, he said, is contained in an open sheet metal housing extending around the interior perimeter of the building above the window level. Normally this would be a prime channel for noise to travel the length and breadth of the building and into each room along the way.

However, the problem was solved at the Justice Building by installing a series of sheet and lead barriers inside the sheet metal housing at the point where it intersects the partition line, the project coordinator said.

According to the architect, Ernie Owen, predrummed barriers of steel or gypsum could not have been used because they would have been difficult to fit around the various pipes of piping and ductwork running up the heating and cooling system. In their stead, sheet lead was selected because it could be easily cut with a knife or shearer and was simple to install.

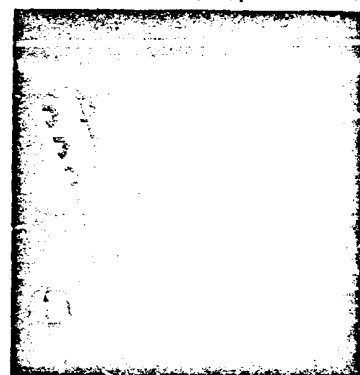
Hildebrand indicated that sheet lead also played a key role in preventing barrier vibrations for a large number of other wall types, ceiling assemblies, and partition assemblies. Depending on requirements, either one or two pounds of sheet lead was used.

The 50 courtyards in the building by and around sheet lead plumes barriers, each about 3 feet high and a total of 12 feet long.

In the main court chamber, a large room with soundproofed walls, the sheet lead plume barrier installed above the walls was nearly 3 feet high and about 175 feet long.

Initial publication of feature article:
Sheet Lead Used To Control Noise in New
Province of Quebec Justice Building in Canada

AMERICAN METAL MARKET — May 29, 1973



A CLOSE-UP of the heating system at Montreal's Justice Building shows how sheet lead is installed at office partition wall lines to keep noise from traveling between offices.

lead and zinc market

Another Fragment of Lead Statue Of George III Found in a Swamp

WILTON, Conn. — A 36-pound fragment of a pre-Revolutionary War lead statue of King George III was unearthed here by Louis Mether, a local resident, from a small swamp just about two miles from his home.

This is the first fragment of the statue to have been discovered in more than 50 years. The last notable discovery was back in 1877, when four large pieces weighing about 200 pounds were found on a farm near Wilton swamp.

The specimen statue weighed 4,000 pounds and was cast from lead and coated with gold leaf. It was placed atop a high marble pedestal in Bowling Green Park at the tip of the Borough of Manhattan in New York City in 1770.

On July 8, 1776, soon after the first public reading of the Declaration of Independence in New York City, a group of enthusiastic patriots toppled the statue.

Within a matter of days, as the American Revolution got under way, the statue was broken into pieces of approximately 30 pounds each. The valuable lead was hauled into wagons and carted off to a military depot in Litchfield, Conn., where at least half of it was melted down and sent into 6,000 bullets for the Continental Army.

It is speculated that a large part of the statue's other half was recovered by Patriots lead to the Crown while they were driving the lead.

ad wagon stopped off at a house in the Wilton area to rest and eat. The pieces were hidden in scattered areas around the town.

After believing that additional fragments are in the area.

Initial publication of feature article:

Lead Fragment of King George III Statue
Destroyed by Revolutionary War Patriots
Is Unearthed

AMERICAN METAL MARKET -- May 10, 1973

AMERICAN METAL
MARKET
NEW YORK, N. Y.
6, 1973

JUN 6 1973 644

Lead and zinc market

Call for Mass-Produced Soldered Joints Increasing Use of Lead Alloy Preforms

NEW YORK — Rising industrial demand for mass-produced soldered joints has resulted in the increased use of lead alloy preforms, a recent survey by Lead Industries Association showed.

The survey revealed a consistent effort by many industries to either partially or completely automate production lines. This, in turn, has brought about many changes in soldering procedures and techniques, including the solder preform.

Lead alloy solder preforms, the Association said, are manufactured in many configurations, containing varying quantities of certain metals alloyed with lead, with or without a flux core. Alloy combinations are available in wide variety for joining specific metals. It was pointed out.

Lead content in the alloys may range from nearly 100 percent to a low of 20 percent. In most cases the alloy is made with tin.

Among the tin-lead alloys listed

by the Association, two of the most common are 62 percent tin-36 percent lead soldering alloy used for temperature-sensitive electronic components, and 60-40 tin-lead solder used for automobile radiators, valves and cooling units.

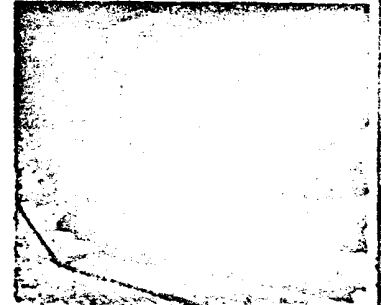
Other types of alloys contain small amounts of silver and so on. An example of this would be a 97.5 percent lead-2.5 percent silver alloy used for torch heating or repair

bars and similar metals. When the material is to be soldered is intended for use in heated environments, it proved tin is added to the above to eliminate susceptibility to corrosion.

Other alloying elements include copper, gold, antimony, bismuth, cadmium, germanium, and others. Such elements, in one way or another, proved lead to be used to join virtually any metal, the Association stated.

Solder preforms are designed to produce perfect solder fillets for specific joints in an assembly. They can be manually placed on the area to be soldered or they can be dispensed automatically by a variety of mechanical devices that are usually custom-designed for a specific solder preform application.

Once in place, solder preforms can be joined by an conventional heating method compatible with the assembly, including infra-red lamps, induction or resistance heating, manual or propane gas torch, even a hot plate. Depending



CHAS. WADSWORTH, 62 percent tin-37 percent lead alloy, are typical of the solder preforms that have been developed to solve the wide variety of joining problems in the electronic and other processing industries.

on the specific requirement, one or a combination of these heating techniques can be used to make joints with lead alloy solder preforms.

The preforms come in a variety of shapes, such a flat bar of one or more of the following four most common forms were punched parts, spheres, or solder-coated metal bars, the Association said.

Initial publication of feature article:

Use of lead for soldered preforms

AMERICAN METAL MARKET — June 6, 1973

61-77 MACHINE
DEPT
L.A. 15,488

APR 5 1973

APR 5 1973

Electronic Defense Against Air Piracy



FBI agents stand in with guns drawn on hijacker of a United 727 jet in Miami on August 18, 1972. Agents standing on left with Smith stand in looking on from the plane. Air hijacking regulations put into effect on January 8 have that for aircraft crews talk on this. Photo, AP.

curious to Cuba is often a three-day affair. Some 17,000 people have had trips interrupted in the past 10 years. A more serious problem, however, are the casualties among the passengers that result from shoot-outs with authorities. To date, 3 passengers have been killed in the U. S. in deals with skyjacks.

The skyjacker's lot is not a happy one, either. Over 75 skyjacks have fled to Cuba. Because of conditions there, 36 have returned to the U. S. to face prosecution. Two-thirds of those that remain are said to be in jail or under house arrest. Also, four have been killed in gun battles. One was the victim of an apparent suicide.

Keeping Records

As of January 6 of this year, airlines were required by federal law to screen and/or search every passenger and every piece



Detector finds new job screening passengers at airports. Originally developed in F-105 to locate broken and hot fuel in air taken from main, the single-frequency detector establishes an alternating magnetic field between seats in each side of the aircraft's fuselage. The device is used by the manufacturer to screen aircraft that are smaller than aircraft. Photo, Harrison R. Cooper Associates.

APR 5, 1973

planes. The occasional body search, the presence of Sky Marshals, and metal detectors used prior to 1973 were

a ride to Cuba."

Planes are occasional victims of skyjacks. The Airline Pilots

orts

Effective in stopping

Costs

y has been expensive
is involved, including

are the most obvious ones. Last year, estimated more than \$2.5 million of which recovered. Other expenses include lost operating expenses of hijacked plane, insurance premiums, license fees, damaged expenses for housing during unscheduled stops and Cuba. A factor for a one average out-of-pocket is about \$10,000 for a ride to Cuba."

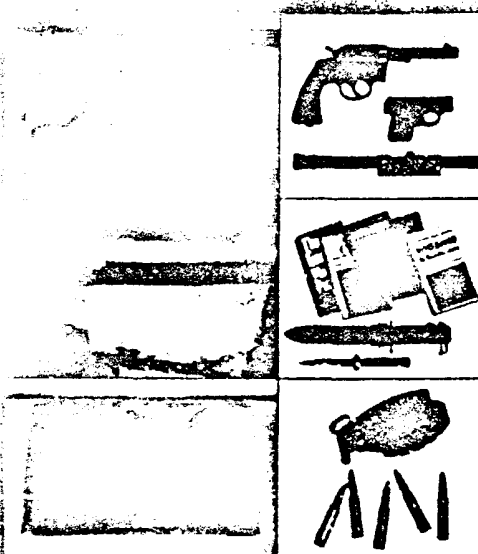
Association reports that 150 crew members (pilots, navigators, stewards)—or 1 out of 70—were involved in skyjack attempts in 1972. Over the years, six pilots have been shot or stabbed, one was blinded.

The federal government pays, too. Each time a skyjacked plane touches down at a U. S. airport, a swarm of FBI agents descends on the plane. The greater the number of stops, the more agents are involved. Recently, the FBI has begun following commandeered planes in a chase plane, obviously increasing the cost of surveillance.

Also, the FAA's celebrated corps of Sky Marshals (1,300 to 1,500 strong) has been placed on ground duty at airports around the country to help prevent pirates from boarding aircraft.

The public suffers much in the way of inconvenience. An air-

Macmillan-Dunlop



X-ray fluoroscope "looks" into carry-on luggage. Gun, knives, and grenades, concealed in packages, show up clearly on fluoroscope screen. Photo, Philips Electronic Instruments.

guides between small and large objects by generating two fields—one at a high frequency, the other at a low frequency. Disturbances within the field are analyzed by data processing circuitry to determine if the object is large enough to be a weapon.

Processing time for passengers has been improved with the newer, walk-through models. Passengers are rarely delayed for more than three minutes during inspection.

X-ray fluoroscope equipment is used to check carry-on bag-

gage-flipping device, tucked into a shaving kit in a suitcase, is unobserved by X-ray equipment. Although X-ray systems are not required by new FAA screening regulations, they're being tried by several airlines because they can speed package examination. Photo, Philips Electronic Instruments.



SKYJACKING

page in airports around the country. This system is mounted in a lead-lined enclosure to prevent radiation leakage. At the enclosure surface, radiation level is said to be about the same as that emitted from a color TV set. Typical maximum package size is 34 x 18 x 36 in.; maximum weight is 100 lb.

One system, built by Philips Electronic Instruments, Mount Vernon, N. Y., uses an X-ray-generating unit that is adjustable from 10 to 150 kV, depending on the "penetrating power" required. This system projects the X-ray image of the package to a mirror so that the primary radiation will not be reflected to the viewing port. An operator views the image at the port on a sheet of leaded glass 0.38 in. thick. Resolution on the glass is 3 line-pairs/mm. Operating speed is estimated to be as high as 4,800 packages per day, or 15 sec per package.

Price for X-ray equipment runs about \$10,000 to \$25,000. This expense must be borne by the airline because the FAA does not explicitly require that X-ray equipment be used. It simply states that carry-on baggage must be inspected, and the airlines seem to be of a consensus that X-raying the packages is the fastest way of doing the job.

Do Screening Measures Work?

Since July, 1972, when tough boarding procedures were first put into effect, skyjackings dropped from an average of four per month to less than one per month, according to FAA figures. Since the even stricter measures were put into effect on January 5 this year, two at-

AIRPORT ANTI-SKYJACK X-RAY DEVICE SHIELDED BY LEAD

Feature article released by LIA used as basis for expanded feature published in MACHINE

DESIGN April, 1973

One of three feature placements

41-57 SECONDARY
RAW MATERIALS
NO. 1389

MAR 1973

EX-107
24008

With Lead in Gas Being Threatened Industry Is Looking for New Uses

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 baggage inspection systems.

Like vaccine medicine, airport inspection systems will require lead for safety with the Lead Industries Association campaign. However, no specific recommendations were given by the group.

A LIA spokesman told this newspaper that nuclear medicine and airport baggage inspection systems "of course won't consume as much lead" as currently used in gasoline, "but these new applications really 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 baggage or packages without opening them.

The system, called Dynaflex and manufactured by Torr-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.

Also, the federal government has reportedly bought 34 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 baggage or a package. The

images, which are viewed on a screen seen 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 airline security device has one potential hazard — excessive radiation.

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

The unit's entire X-Ray generator system is completely enclosed in 5/16 of an inch thick lead, except for the X-ray tube in which directs the beam. The lead sheet weighs roughly 10 pounds per square foot.

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 1/4-inch thick leaded glass.

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

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

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

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 baggage.

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

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 relatively little delay is encountered by boarding passengers.

Other Tests

In the meantime, the new detection 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 directly or indirectly represent foreign governments are using the equipment to screen incoming mail and packages that might contain explosives mailed by terrorist organizations.

SECONDARY RAW MATERIALS Month

AIRPORT ANTI-SKIJACK X-RAY DEVICE SHIELDED

BY LEAD

Feature article published in SECONDARY

RAW MATERIALS -- March, 1973

One of three feature placements

PS-41 ELECTROMECHANICAL
DESIGN
IN LEAD

APR 1973

LEAD
BACON

X-RAY DESIGN SPOT CONTRABAND lead shielding protects bomb detectors

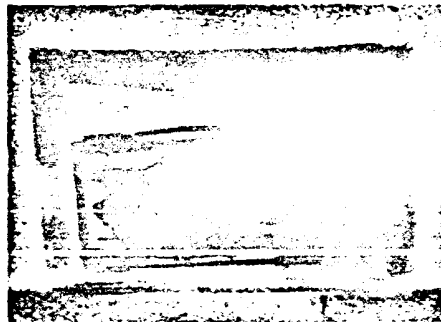
Preventing hijacking and increasing air-line passenger security has forced designers to develop a wide array of sensors that detect contraband. Pondering how to meet air travelers, magazine designers and security guards often face the conundrum of airport departure terminals. But despite their apparent improvements in security, departing passengers are subject to a great deal of delay while their carry-on baggage is searched.

Confronted with this problem, engineers at the Yon X-Ray Corp., Los Angeles, designed a fluoroscopic surveillance system called Dynafloor. In

secondary radiation, the viewing port consists of 1/4" thick leaded glass.

Delta Airlines began a three-week test of a Dynafloor unit at its Kennedy International Airport terminal in mid-December of last year. In addition to determining if the system would be effective in the inspection of all baggage to be carried aboard airplanes, Delta also wanted to see how quickly the equipment could function.

Delta announced that widespread use of X-ray fluoroscopes using tungsten as systems would reduce from minutes to seconds the time required to process an individual's carry-on baggage. For example, it could take as long as five man-hours to manually inspect carry-on baggage of passengers preparing to board a jumbo jet. Tests conducted by Western Airlines and Pacific Air West Airlines at Los Angeles have



An X-ray viewer, mounted inside a tungsten vault, shows up on the viewing screen of an X-ray viewer for checking carry-on baggage. Packages of bombs show up in upper right corner of the small screen.

addressed to providing fast baggage inspection, the X-ray beam is entirely safe from radiation hazard, says the manufacturer. Claimed to be five times safer than the new industry standard for a color television set, the unit's entire X-ray generator system is completely enclosed in 5/32" thick, 10 lb/sq ft lead, except for the X-ray tube slot which directs the beam.

Lead also plays a critical role in the unit's fluoroscopic viewing system. Designers accomplished indirect viewing of the screen with a mirror, so that primary radiation from the X-ray tube does not strike the viewing port. To insure complete shielding from any

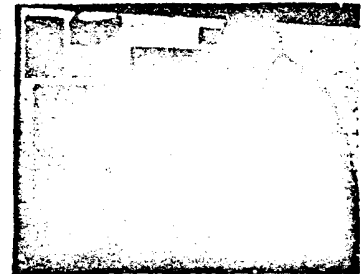
external Airport have determined that with the new X-ray system, the average bag inspection takes about 30 seconds, indicating that relatively little delay is encountered by passengers.

In the meantime, the U.S. Air Force is using the new detection system to check incoming overseas mail, packages and baggage for contraband such as illegal weapons and narcotics. A number of religious organizations and agencies that directly or indirectly represent foreign governments are also using the equipment to screen incoming mail and packages that might contain explosives mailed by terrorist organizations.

51-2 AMERICAN
METAL MARKET
R.T. EL. 800, INC. 800
SOLDIER BLVD.

MAR 12 1973

LEAD
BACON



LEAD TO THE AIRPORT - Being provided, below is or not, may cause a man's eye for lead concentration, the leaded glass viewing port. The carry-on baggage viewing system, about, which is being used by Delta Airlines at New York's Kennedy Airport, combines X-ray and fluoroscopic viewing to observe the interior 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.

AIRPORT ANTI-SEYJACK X-RAY DEVICE SHIELDED BY LEAD

Feature article published in **ELECTROMECHANICAL
DESIGN** -- April, 1973

One of three feature placement

Photo caption release -- AMERICAN METAL MARKET

APRIL 1973

41-75 DESIGN NEWS
VOL. 10, NO. 134, 1973

MAY 21 1973

ENTER
BACON

Feature article: Battery-Powered Pleasure
Boat Introduced

Published in: DESIGN NEWS
May, 1973

Design NEWS

Battery-powered Boat is Pollution-free

—Port Salerno, FL.—Lead-acid batteries are helping to put "Pleasure" back in boating. They're being used to power an 18-ft-long boat that is made by the Branson Boat Co.

Called the "Electra 18", the battery-powered boat was designed to solve two of the major problems facing the rapidly expanding pleasure boat industry: noise pollution and oil residue pollution.

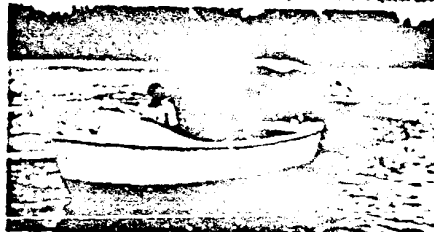
Although it was designed for fishing, the boat is also gaining acceptance for leisurely engineering, picnicking and cruising in light traffic waters, according to Branson.

The Electra is powered by two heavy-duty marine lead acid batteries,

each delivering 375 ampere at 24V and installed in a lead box. The lead box also contains the boat's electric motor and an automatic bilge pump that prevents the motor from flooding due to excessive rainwater. The total weight of the boat, including the lead box and the equipment, is 1,300 lb. Since the weight is at the craft's centerline, the boat is unusually stable.

The inboard power system for the craft, a permanent magnet electric motor that delivers 54 hp, can run the boat for about 30 miles at 5 mph cruising speed. At 3 mph, the boat can be operated for 12 hours. A solid state controller permits variable speeds down

to 1 mph. A battery-charging circuit prevents overcharge and, with good care, the batteries will last several years, says Branson. Cost is \$4,300 FOB.



Battery-powered Electra 18 with 5 1/2 ft beam and 14 ft draft is made boat for leisurely fishing.



Two heavy-duty marine batteries (375 amp at 24V) drive motor mounted in lead box to give maximum speed of 5 miles and range of 30 miles without recharging.



In addition to being designed to provide optimum stability, the hull and keel also provide protection for the boat's heavy duty propeller and rudder. The craft has a 5 1/2' beam and a draft of only one foot, making it especially suited for shallow water fishing.

Company President Branson reports that work is in progress for a model to produce a 30' fiberglass electric boat. He says the boat will be known as the "Electra 30" and it will have an 8' beam and a draft of 18". The boat will have a total displacement of between 5 to 6 thousand pounds depending on the number of people aboard.

The battery capacity of the Electra 18 will be over 30 kilowatt hours; and the boat's maximum speed will be about 6 knots. At a speed of 5 knots, the boat is expected to run for more than 12 hours for a total distance of about 60 nautical miles before recharging.

THE BATTERY MAN June, 1973

BATTERIES HELP ELIMINATE NOISE AND POLLUTION OF WATERWAYS

"Pleasure" gets put back in pleasure boating. . .

Lead acid batteries are helping to put pleasure back in pleasure boating. They are being used to power an 18 foot long boat that is being produced by the Branson Boat Company, Port Salerno, FL.

Appropriately 18' the boat designed to solve problems facing pleasure boat communities: air pollution from engines used to power boats, and the pollution created by oil.

A lot of noise resulting from conventional powerboats is being held back by engine crank. Or eliminate these;

Norman Branson, president of the boat company.

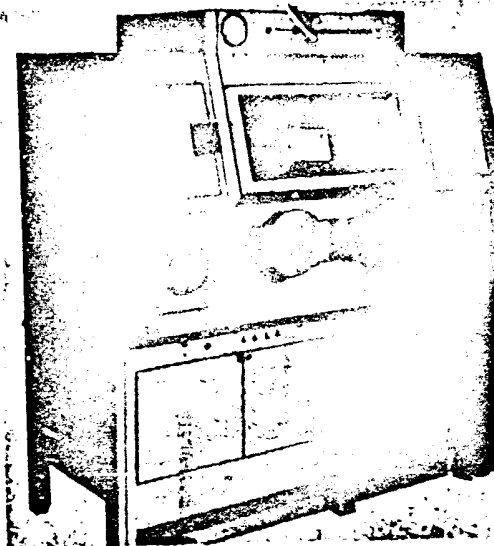
Designed for fishing, the boat is also gaining acceptance for leisurely sight seeing, picnicking and cruising in light

boat for about 30 miles at 5 miles per hour cruising speed. At 3 miles per hour, the boat can be operated for 12 hours. A solid state controller permits variable speeds down to below 1 mph. Automatic motor into any 115 volt ac to recharge the batteries. A crank prevents overcharge the batteries will according to the

Feature article: Battery-Powered Pleasure
Boat Introduced

Published in: THE BATTERY MAN
June, 1973

metals for nuclear energy section



SWALE STATION GLOVE BOX has thick-walled lead walls, weighs about 5 tons, and contains leaded glass parts in the front and sides. Technicians use glove boxes to transfer radioactive pharmaceutical materials from one doctor to another.

Growing Atomic Energy Use Spurs Lead Shielding Demand

By PHILIP E. ROBINSON

NEW YORK — With lead beds and natural gas becoming scarce, all eyes point to a burgeoning demand for atomic energy. In addition to the 10 nuclear plants now in operation in the United States, 10 plants are being built and 17 are on order. According to a recent United States Atomic Energy Commission estimate, by the year 1,960, 50 to 60 per cent of the nation's electric power will be generated by nuclear energy, as compared to only 4 per cent today.

Nuclear-powered ships, common to the U.S. Navy today, are ex-

pected to be commonplace in the U.S. merchant fleet as well. The Navy's atomic-powered fleet now includes nearly 30 cruisers, aircraft carriers, destroyers and submarines. Proposed plans call for a nuclear-powered carrier every third year, and five to seven submarines

and a guided missile destroyer each year. The energy crisis, coupled with the high lead bed cost, has caused a renewed interest on the part of both government and private industry in building nuclear-powered merchant ships.

Nuclear energy is by no means restricted to electric power plants and ship propulsion systems. For example, years of research have resulted in great advances in radiochemistry, to the point where a whole new industry is developing to serve the field of science and medicine. Radiotopes and radiopharmaceuticals are used to detect and treat cancer, control therapy to cure and prevent many lung diseases by the dentist.

All these factors give strong evidence that the use of lead in the nuclear industry will increase in the immediate future.

The harnessing of atomic energy brought with it the problem of controlling the powerful rays emitted during atomic disintegration. Basically, the problem of protection from these rays is the same as from X-rays. Lead as a shielding agent has played a honored role in this area since the discovery of X-rays in 1895.

The Favored Material
Lead is clearly the favored

AMERICAN METAL MARKET

SPECIAL SUPPLEMENT:

"METALS FOR NUCLEAR ENERGY"

Special feature article by:

Philip E. Robinson

(Page One)

metals for nuclear energy section

Growing Atomic Energy Use Spurs Lead Shielding

(Continued from page 3A)

shielding material in a variety of applications where space is at a premium, such as on a ship, where mobility is important, such as shipping cargo for nuclear materials and waste, where weight is a significant factor, such as where shipping containers, drums, etc., are concerned, or where flexibility of design is required, such as lead brick walls.

In fact, lead is so efficient in a shield material that it is almost always the first material to be considered when designing shielding against X-rays or gamma rays, the two most common types of radiation encountered. It is because of this that the Atomic Energy Commission has stated that when other shield materials are considered, "Considerations are usually expressed in terms of lead because it represents the best practical gamma shield for most applications."

Although lead's primary shielding property is density, in use other items weight and space, too. Lead's low cost and the ease with which it can be cast, extruded, rolled, machined or otherwise formed make it one of the most efficient and economical shielding materials.

It is difficult to pinpoint the specific market potential for lead in nuclear power construction because a standard nuclear power plant has yet to be developed. Atomic power plants are in various stages of construction and existing approval such have different lead requirements because of the differences in design.

For example, some reactors are designed to use a cask for transferring depleted fuel elements from the reactor to a storage area. The Yankee power plant at Rowe, Mass., planned approximately 100,000

acres due to the Indian Point reactor containment sphere required 75 tons of lead, and another 75 tons of lead was required to shield the four domes.

The Lab River reactor in Minnesota, a boiling water reactor (BWR), has a 20-ton lead gamma shield. Its purpose is to absorb much of the gamma radiation from the reactor before it reaches the concrete shielding. Other reactors of this type have been built at Braidwood, Ill., and near Pasadena, Calif.

Food transfer casks are used by many reactors so that hot elements can be shifted during burn-up and removed more they are depleted. The Mallon Nuclear Power facility in Nebraska has a transfer cask that required 120 tons of lead. A transfer cask for an experimental sodium reactor required 45 tons of lead, while a cask to contain a sodium-mercury reactor could not require as much as 25 tons of lead. This

drain of such materials will be required in more nuclear power plants are added.

Classified Data

Nuclear-powered U.S. Navy surface and subsurface ships are known to require vast amounts of lead, but the specific amount of each lead, where it is used, and how it is installed is classified information. What is known is that the use of lead in Navy ship construction will continue to expand. In recent years, the U.S. Navy has placed increased emphasis on both surface and subsurface atomic ship construction.

The Navy would like to launch a massive two-year, \$60-million shipbuilding program to modernize its fleet. The plan is reported to include a nuclear-powered carrier every third year, and five to seven submarines and a guided missile destroyer each year. The world, of course, represents a huge market for lead... and the demand to begin

the Navy's massive nuclear-powered shipbuilding may come sooner than expected due to the worldwide shortage of oil.

The oil crisis, and again the high cost of fuel oil, is also resulting in a revival of plans for atomic-powered merchant ships. Something of what the new mood can be seen in the lead requirements for the first nuclear-powered merchant ship, the *Essex*, which is under construction at the General Electric nuclear facility at Erie, Pa. About 100 tons of bulkhead shielding was required for the *Essex*. About 100 tons of bulkhead shielding was required for the *Essex*, and at least 1,000 pounds of lead was required for other applications. While it is not known just how much lead they will require, nuclear-powered merchant ships now planned will be three times more powerful than the *Essex*.

Reaction involving

Research and test reactors are increasing in size and number, and they have their own lead requirements. The plutonium recycle test reactor, required a 10-ton shielding machine, the George Tech research reactor required a 15-ton gamma and thermal shield, and a similar installation was required by the National Bureau of Standards. The Washington testing reactor required 2 tons of lead and other lead brick because of its efficiency. Cancer treatment and diagnosis is one of the most rapidly expanding fields of medicine. This expansion is, in turn, creating expanding markets for lead. For example,

there are 1,000 hospitals throughout the country that have radioisotope facilities, and each facility has a wide variety of radiation shielding applications that require lead.

Foremost in usage is the lead shielding which surrounds the equipment itself. Included are such devices as artery and bone scanners. They use as much as seven tons of lead and there are about 1,000 such installations throughout the country.

There are nearly as many small orthography businesses and they require up to 10 tons of lead shielding.

Radiotelescope storage and radiopharmaceutical shields and shipping devices are required by the Government. A typical radiotelescope shield for shipping devices is about 2 in. high, has lead walls about 1 1/2 in. thick and 4 1/4 in. between ends to store the radiopharmaceutical, and weighs about 2 pounds.

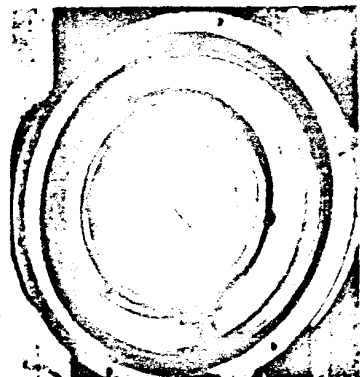
The radiopharmaceuticals may be stored in tubes that have 8 in. thick lead walls and weigh several tons. Special machine-proof glass boxes which are used to transport radiopharmaceutical materials from one device to another weigh as much as 1 ton.

Lead, being an extremely stable material, does not become radioactive under bombardment by neutrons. An additional favorable factor in using lead shielding, therefore, is its purity or scrap value. It also is important to note that reclaimed lead accounts for 1/3 of the U.S. consumption, much of which is used for shielding material.

When lead, brick or stone is used for shielding X-rays or gamma rays, its density is all that counts. The slight lowering of density by alloying or by impurities is of little consequence. Readily available commercial lead is suitable since it can be obtained in purity up to 99.99 percent, whereas a 99.5 percent purity is considered acceptable for the application.

TYPES OF LEAD USED FOR RADIATION SHIELDING

Form	Use
Lead Sheet, Sheet, and Plate	Permanent shield installations
Lead Brick	Where solid lead is impractical, due to location, shape, and accessibility
Lead Wool	Filling dead spaces in a radiation barrier
Lead Slag	In-the-field quick filling and patching
Lead Putty	Joining, caulking, temporary and or repair
Lead Bricks	Permanent, easily handled, may be stored and re-used
Lead Pipe	Shielding of radioactive liquids
Lead and Tubing	Shielding of radioactive liquids
Lead Sheet/Lead-plate	Shielding of radioactive liquids
Pipe	Shielding of radioactive liquids
Lead Slag	Shielding of gamma and beta rays carrying radioactive materials
Lead Powder	Dispersed in rubber or plastic for bulk shielding, also mixed in concrete and asbestos cement



TWO FORMS OF LEAD were used to fabricate the collimator seen mounted in the center of a radiography camera, which is used for head-to-toe spine detection scanning.

AMERICAN METAL MARKET

SPECIAL SUPPLEMENT:

"METALS FOR NUCLEAR ENERGY"

Special feature article by:

Philip E. Robinson

(Page Two)

American PAINT JOURNAL

Monday, April 6, 1973

Chrome Yellow In Spotlight

Pavement Marking Program Hinges on Legislation

CHROME YELLOW PAINT will play a major role in two highway pavement-marking programs of a proposed nationwide highway safety project. The programs were developed to help decrease the 14.4 million vehicle traffic accidents that resulted in 36 thousand deaths, two million disabling injuries and more than \$13 billion in property damage in the United States in 1971 and 1972.

The nationwide highway safety project would result from the Highway Safety Act of 1972 which is expected to be passed by the Congress. The pavement marking program, which will cost \$200 million, are considered of primary from among the more than a dozen highway safety programs to be authorized by the Act. Two-thirds of the billion-dollar annual cost of the highway safety program would come from the Highway Trust Fund, which is financed by federal taxes on the sale of gasoline and truck highway use and can now only be used for new highway construction.

The first project authorized would be a special pavement marking program. For the first time, it will meet the critical need to provide sufficient paint funds to thoroughly mark the rural two-lane roads where two-thirds of the nation's highway fatalities occur. The second project would be a pav-

ement-marking research and demonstration program to determine effectiveness of types of pavement markings under different weather and night time conditions.

Solid, broken and dotted single and double center line markings are the most frequently used to prevent traffic accidents. They indicate "passing" and "no passing" and "passing-with-caution" zones and, even though they are known to control lane markings, they are not always in the geographic center of pavements. Solid line pavement markings also are used to mark the pavement edge of streets and highways where there is inadequate clear space to the left of the line even for double vehicles or for making emergency stops.

Three types of pavement markings and others mark at each marking site: (1) two-lane roads with solid center lines; (2) two-lane roads with solid center lines and dashed edge lines; (3) two-lane roads with solid center lines and dashed edge lines. A special color standard that has been specified for all voluntary highway traffic control devices, including signs, Lane Industries Association Inc., New York, says the present paint pigment that most readily meets the standard color requirement, as well as cost requirements is lead chromate or "chrome yellow."

American Paint Journal

The association also says it has good resistance to degradation by light and weather conditions and is resistant to wear from pavement. In most cases, reflectorized chrome yellow paint will be used for the pavement markings, since this helps improve night time visibility.

The \$200 million which the Act will allocate for the nationwide highway pavement marking program would be fully appropriated until use to cover of the critical need for such a program on transportation spokesmen have 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 "MUTCD"). These roads included in the Federal and primary and secondary highway system, as well as those roads which are not.

A revised, updated and expanded version of the 1961 manual is supervised, 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 of Uniform Traffic Devices. The end result of efforts that began in 1957 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.

There is, however, a major problem in implementing the provisions of the new manual on a nationwide basis until the new law is passed.

Of the nearly 4,000,000 miles of paved streets and highways in the United States only 20,000 miles of interstates, state and county and municipal primary and secondary roads are built with Federal aid funds.

In qualifying for Federal aid funds to build new highways, states had to agree to maintain them after they were

built. They had to do so in accordance with regulations and regulations established by the UTCD Manual. Many proved for funds needed to comply even with the 1961 edition of the manual. The states found it virtually impossible to comply with the greatly expanded requirements for the increased use of traffic control devices outlined in the 1971 manual. In particular, they lacked the funds to provide the paint, signs and equipment needed to comply with the new requirements.

For example, the New York State Highway Department expects to use about 200,000 gallons of highway yellow paint this fiscal year when it begins implementing the provisions of the new manual. The Department estimates it will require an additional 122,000 gallons of highway yellow paint to fully comply with the new manual during the 1973 fiscal year. Based on the fact that it takes about 17 gallons of paint to paint one mile of 4-inch to 6-inch wide normal width pavement marking, this state expects to have to paint approximately 20,000 miles of additional yellow pavement marking to comply with the new manual.

Many municipal and county officials responsible for maintaining the nearly 2,000,000 miles of paved roads 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.

With the \$200 million being sought in the Highway Act of 1972, it is expected that all states and counties in the United States will have sufficient money to provide the paint, signs and equipment required to mark principal highways under their jurisdiction. The funding also will permit surveys to determine where pavement markings are needed in order to comply with the 1971 UTCD Manual.

It is estimated that 200,000 miles of two-lane roads will receive yellow center line markings and that approximately 200,000 miles of edge lines will be placed on primary and secondary county and township roads at a cost of \$120 million.

The Act also directs 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, it is likely that permanent funding for pavement markings will be provided by the state. This would be particularly important where highway pavement markings only last from one to three years depending on the amount of traffic, the width of the road, weather conditions, etc.

In addition to the \$20 million provided for the pavement marking research and demonstration program of the Highway Safety Act of 1972, other major programs likely to be authorized which involve the extensive use of chrome yellow paint would include: (1) improvement projects for high hazard locations \$200 million; a program to eliminate roadway obstructions \$150 million; a special highway safety research and development program \$225 million; and other highway safety programs \$420 million.

Feature Article:

CHROME YELLOW PAINT TO AID NATION IN DECREASING AUTO ACCIDENTS

NOTE: This is the fourth feature article to be published on chrome yellow highway paint.

41-77 BATTERY
DESIGN
EOM 15,000

MAY 31 1973

41-77 BATTERY

Battery Powered Bus Publicity Released during
and immediately after Annual Lead Industries
Association, Inc. Meeting in Detroit

Published in AMERICAN METAL MARKET, THE
NORTHERN MINER, MACHINE DESIGN

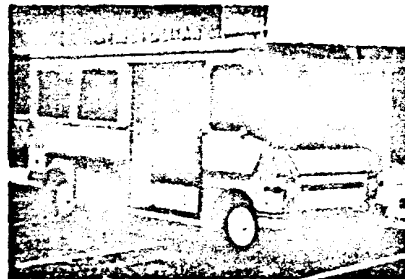
NEWS TRENDS

Electric Bus Features Quick-Change Batteries

Battery-powered shuttle bus now operating in Cleveland is heralded by the Lead Industries Association Inc. as one "answer to some of the major intra-city transportation problems that might result from promulgation of vehicular restriction laws passed by various metropolitan authorities." The laws referred to are those which would prohibit internal-combustion vehicles in some sections of a city to cut down on air pollution.

The bus carries 25 passengers and is operated by Cleveland Electric Illuminating Co. to transport employees from the company's headquarters to a service center. The bus makes eight round trips daily on runs that are approximately 2 miles long. It is one of the first electric-powered mini-buses to be in permanent use in the U.S.

Designed and manufactured by Battroac Truck Corp., Boyer-



town, Pa., the new bus has a top speed of 25 mph—well suited to city speed limits—and a maximum range of 60 miles before the batteries have to be recharged or changed. A self-contained battery system per-

mits removal and replacement of the lead-acid battery power package in less than 8 min—the vehicle does not have to be tied to a battery charger for long periods or taken out of service while batteries are changed.

41-77 THE NORTHERN
MINER
EOM 15,000

APR 12 1973

41-77 BATTERY

51-2 AMER. M.
METAL MARKET
MAY 15 1973
EOM 15,000

MAY 15 1973

51-2 AMER. M.

A Cleveland Firm's Intro-Plant Bus Is Powered by a Lead-Acid Battery

NEW YORK — A lead-acid battery-powered bus may be one answer to strict United States government requirements for efficient control of automotive pollution emissions, the Lead Industries Association claimed.

One lead-acid battery bus, designed and manufactured by Battroac Truck Corp., Boyertown, Pa., is being employed by the Cleveland Electric Illuminating Co. to transport employees between the company's headquarters and service center.

The 25-passenger bus has a top speed of 25 miles an hour, and a maximum battery range of 60 miles.

A self-contained battery system developed by Battroac permits

removal and replacement of the lead-acid battery power cell in less than 8 minutes.

This means that the vehicle does not have to be tied to a battery charger for long periods or taken out of service while the batteries are recharged.



ELECTRIC VEHICLE. Provided by lead acid battery, it is the first production vehicle to use an electric motor of the 11.4 and 21 ampere ratings in Detroit.

Test run for a new lead consumer

Above are some of the nearly 200 officials representing North America and foreign companies who attended the 5-day combined annual meetings of the Lead Industries Association and the Zinc Institute held in Detroit on Apr. 6-10, who prepare to board an electric bus for a short tour of downtown Detroit.

Supplied by the Cleveland Electric Illuminating Co., which is testing it and the Battroac Corp. manufacturers, the vehicle demonstrates the role lead acid batteries are playing in developing non-polluting passenger systems for intra-city shopping centers.

Visible from left to right are R. L. Stubble and Development American Lead, England; E. H. Gierke, General Lead, Van Nuys, Calif.; R. E. Williams, Homestead Mining Co., San Francisco; and R. E. Robinson, Executive Vice President of the Lead Industries Association, Inc., and the Zinc Institute, New York. N.Y. R. B. Barrow, President American Lead, Spokane, Wash.; Robert De la Battroac Corp. who represented the manufacturer of the electric bus; and H. J. Whitson, NL Industries, High Falls, N.J.

AMERICAN PAINT JOURNAL
April 23, 1973

Lead Industries Association Names Mardick, Ramsey New Directors

Detroit, April 18 - J. A. Mardick, vice president Metale Diverse, M. L. In-
dustries and R. H. Ramsey, vice presi-
dent, Raymond Mining Corp., both of
New York, were added as new mem-
bers of the board of directors of Lead
Industries Association, Inc. at its re-
cent meeting here.

Other directors re-elected at the 60th
Annual Meeting of the Association
were: D. B. Craig, Jr., Joe Mardick
Corp., New York; J. G. McCullough,
Ames Lead & Zinc Inc., Chertok, Mo.;
S. J. Strawn, American Smelting &
Refining Co., New York; F. H. Chubb,
Bureau Hill Associated Smelters Pro-
prietary Ltd., Melbourne, Australia;
J. C. MacLellan, Consors American Inc.,
Baltimore, Wash.; H. T. Purpy, Or-
chemo Ltd., Vancouver, L. M. Norbert,
Inventor Industries Inc., Houston, R. O.
Brennan, E. I. du Pont de Nemours &
Co., Wilmington, Del.; R. J. Koser,
KOSB Inc., Philadelphia, R. A. Knecht,
American Smelting & Refining Co.,
New York, R. A. Gaudin, Jr., Gar-
den Metal Co., Chicago, R. M. Blum-
berg, Raymond Mining Corp., New York,
W. H. Lyle, North Mining Co., Walla-
Walla, P. C. Munkittrick, International Lead
Company of Missouri, San Francisco.
J. A. Mardick, W. L. Industries, Inc.,
Highland Park, N. J.; E. C. Mardick, In-
ternational Sales Corp., Ltd., Toronto, R. A.
Krugger, Clark Lead Co., Bismarck,
Mo.; H. F. Foster, Nippon Vanner & Sons,
Baltimore, Va., and T. M. Bayly, Eljay
Corp., Baton Rouge, La.

D. B. Craig, executive vice president
of Joe Mardick Corp., New York, was
re-elected president and chairman of
the board of directors.

T. M. Bayly, Eljay Corp., Baton
Rouge, J. F. Rittenhouse, Eljay Corp.,
Plymouth Meeting, Pa., and J. G. Mc-
Cullough, Ames Lead & Zinc Inc.,

Chertok, Mo., were re-elected vice presi-
dents of the association.

L. E. Oger, director of communica-
tions, was elected to the additional post
of assistant secretary.

Other officers re-elected were: P. E.
Rubman, secretary; J. P. Smith, treasurer
and general manager; R. J. O'Hara, Ames Lead & Zinc, In-
dustries; and Mrs. D. L. Moore, comp-
troller and assistant treasurer.

BOYCE METALWORKING
STATIONS,
PINECROFT, PA.
MONTHLY \$2.25

FEB 1973

9,000 copies 15¢
delivery 10¢ per copy
mailing 10¢ per copy
shipping 10¢ per copy
The total cost of 10¢
from 10¢ per copy
10¢ per copy 10¢ per copy
shipping 10¢ per copy
10¢ per copy

BOYCE METALWORKING

Annual Meeting-Lead Industries Asso-
ciation, April 18-19, 1973, Agri-
cultural Association, 291 Madison Ave.,
New York, New York 10017

National Paint Powder Association
Spring Meeting, April 19, 1973, Same Ad-
dress, Agri-Association, 291 Madison Ave.,
New York, New York 10017

North National Open House & Book
Ordering Conference, April 19, 1973, Chertok,
Mo. The Philadelphia Society of
April, 1st Jan 1973, New York, New
York 10017

April 21, 1973

General publicity resulting from releases
announcing LIA Annual Meeting and selection
of LIA Board of Directors

41-71 WASTE TRADE JOURNAL
WEEK

MAR 24 1973

STREET-
BACON'S

Lead Industries Association, Zinc
Institute to Hold Joint Annual
Meeting April 6-8

The Lead Industries Association, Inc. (LIA) and the Zinc Institute, Inc. (ZI) will hold their Annual Joint Meeting at the Sheraton-Cadillac Hotel, Detroit on April 6-8. The meeting will mark the 45th for the LIA and the 55th for ZI.

Attendance at the two meetings will be primarily confined to mem-
bers of the two associations and
members of closely related trade so-
cieties whose members are mem-
bers of the two associations. Foreign
and domestic government officials as

well as members of the press will be
invited to the meetings.

The Annual LIA Meeting is
scheduled to begin on the afternoon
of April 6 with a business session to
announce and elect the Association's
Board of Directors and to hear the
Treasurer's report. Later in the after-
noon, there will be a report on the
status of lead in gasoline and a panel
from the auto industry will discuss
the future use of such lead contain-
ing products in batteries, solders and
paints in automobiles. A LIA Board
of Directors Meeting will be held in
the late afternoon.

The annual LIA meeting will con-

April 6, an announcement will be
made of the election of ZI officers
and the treasurer's report will be de-
livered on part of the morning ses-
sion. The use of that in automobile
design during the 1973-80 period
and use of that in applications during
next ten years will be discussed.

The Cadillacs Committee, a Zinc
Institute-related association made up
of U.S. and foreign companies who
produce polychrome steel, will join
the LIA/ZI luncheon on April 8
when the Zinc Institute will present
its annual Spencers Award. The Cadil-
lacs Committee will join the ZI for
the noon luncheon on April 6.

512 AMERICAN
METAL MARKET
BY EX. 101, 102, 103
BUILDING 14, 100

MAR 5 1973

STREET-
BACON'S

calendar of events

The listing of industry
meetings and other events is
published regularly on the last
Monday of each month.

APRIL

14 - National Meeting Institute
Equipment Association, Regency
West Hotel, Atlanta, Georgia
National Meeting Institute
Equipment Association, 1428
Fifth St., Pittsburgh, Penn.

Manufacturing Engineers, 30701
Ford Rd., Dearborn, Mich. 48120

64 - Lead Industries Association
and Zinc Institute, Annual Meeting,
Sheraton-Cadillac, Detroit, Mich.
(Contact: Lead Industries
Association, 291 Madison Ave.,
New York, N.Y. 10017)

12 - Design Engineering
Conference and Show,
Philadelphia Civic Center,
Contact: Chappell & Polak, Inc. 345
Park Ave., New York, N.Y.
10017

12 - American Metal Stamping
Association Technical Conference,
Pittsburgh Hotel, Pittsburgh
(Contact: AMSA, 27027 Chardon,
Cleveland, O.)

lead, zinc producers confident

[illegible][illegible][illegible]

SPECIAL ANNUAL MEETING PUBLICITY.....
Feature article published in:
THE NORTHERN KURIER -- April 18, 1973

41 LX SCMP AGE

APR 1973

C-111
BACON

Craig to Head Lead Association

D. B. Craig, executive vice president, St. Joe Minerals Corporation, New York, was re-elected president and chairman of the board of directors of the Lead Industries Association, Inc.

Re-elected vice presidents of the Association during the 45th annual meeting in Detroit were: T. M. Smythe, Ethyl Corporation, Baton Rouge, La.; J. F. Rutkowski, Istra Corporation, Plymouth Meeting, Pa.; and J. G. McCubough, Amco Lead & Zinc, Inc., Chryslar, Mo.

L. E. Gager, director of communications for LIA, was elected to the additional post of assistant secretary.

Other officers re-elected by LIA were: P. E. Robinson, executive vice president, J. F. Smith, secretary and general manager, R. J. O'Hara, Amco Lead & Zinc, Inc., Chryslar, Mo., treasurer, and Mrs. D. L. Moore, compiler and assistant treasurer.

lead and zinc market

Lead Industries Association
Re-elects Craig to Top Post

DETROIT — D. Bradford Craig, executive vice-president, St. Joe Minerals Corp., New York, last week was re-elected president and chairman of the Lead Industries Association, Inc.

At its 45th annual meeting, held here, T. M. Smythe Ethyl Corp., Baton Rouge, La., J. F. Rutkowski Istra Corp., Plymouth Meeting, Pa., and J. G. McCubough, Amco Lead & Zinc, Inc., Chryslar, Mo., were re-elected vice-presidents of the lead marketing association.

L. E. Gager, director of communications for LIA, was elected to the additional post of assistant secretary.

Other officers re-elected by LIA were: P. E. Robinson, executive vice-president, J. F. Smith, secretary and general manager, R. J. O'Hara, Amco Lead & Zinc, Inc., Chryslar, Mo., treasurer, and Mrs. D. L. Moore, compiler and assistant treasurer.

J. A. Marshall, vice-president, Metals Division, P. E. Robinson, R. H. Ramsey, vice-president, Newmont Mining Corp., both of New York, were elected directors of the Association.

Directors who were re-elected were D. Bradford Craig, St. Joe Minerals Corp., New York; J. G. McCubough, Amco Lead & Zinc, Inc., Chryslar, Mo.; Samuel D. Brown, American Smelting & Refining Co., New York; P. E. Robinson, American Smelting & Refining Co., New York; R. H. Ramsey, P. G. Ltd., Vancouver, B.C.; L. H. Harrison, Dresser Industries, Inc.,

Houston; R. G. Broadbent, E. I. du Pont de Nemours & Co., Wilmington, Del.; R. J. Ramsey, ESB Inc., Philadelphia; R. A. Leland, American Smelting & Refining Co., New York; R. A. Gardner, Jr., Gardner Metal Co., Chicago; R. H. Ramsey, Newmont Mining, New York; W. H. Love, Brierley Mining Co., Jackson, Mo.; P. C. Bismore, Minnesota Lead Co. of Minnesota; San Francisco; J. A. Marshall, NE Industries, Hightstown, N.J.; E. C. Heston, Nevada Sales Corp., Ltd., Toronto; H. A. Kruger, Chubb Lead Co., Birmingham, Ala.; R. Young, Brown, Walker & Sons, Richmond, Va.; and T. M. Smythe, Ethyl Corp., Baton Rouge, La.

ZINC INSTITUTE ELECTIONS

S. D. Brown, executive vice president, American Smelting & Refining Co., has been elected president and chairman of the Board of Directors of the Zinc Institute, Inc.

Elected vice presidents were J. R. Alexander, The New Jersey Zinc Co., Perth Amboy, Pa.; J. C. Dorman, St. Joe Minerals Corp., New York, N.Y.; and E. D. Matthews, Tanco Gulf, Toronto, Canada. R. J. O'Hara, Amco Lead & Zinc, Inc., Chryslar, Mo., was re-elected treasurer.

54.7 MINES CONGRESS
JOURNAL
NO. 17,280

MAY 1973

C-111
BACON

Samuel D. Brown, executive vice president of American Smelting & Refining Co., has been elected president and chairman of the board of the Zinc Institute, Inc., and D. B. Craig, executive vice president of St. Joe Minerals Corp., was re-elected president and chairman of the board of the Lead Industries Association, Inc.

56.134C BATTERY
WILL, LIND

MAY 21 1973

C-111
BACON

D. Bradford Craig, Executive Vice President, St. Joe Minerals Corporation has been appointed to the Board of Directors of The Battery Rehabilitation Center. It was announced by John S. Grant, Board President. A graduate of Harvard College and Harvard Law School, he was

54.21 THE BATTERY
WILL, LIND

APR 26 1973

C-111
BACONLead Industries Association
Personnel Announcement.....

D. B. Craig Elected to President & Chairman
of Lead Industries Association, Inc.

4.14 ADVANCED BATTERY
TECHNOLOGY
WILL, LIND

MAY 1973

C-111
BACON

APPOINTMENTS

- * Orlando Automotive Batteries, Ltd., Harry Lyness becomes managing director.
- * Orlando Industrial Division, Leonard Grooming was appointed to the new position of European Director.
- * Christie Electric Corporation, R. L. McDonald is the new manager, Marine Power Sales.
- * Bako-Union, Inc., the board of directors have approved the resignation of John Arrol to vice president and chief financial officer.
- * Lead Industries Association, Inc., at the 45th Annual Meeting D. B. Craig, executive vice president of St. Joe Minerals Corporation, was re-elected president and chairman.

LIA ASSOCIATION
MANAGEMENT
IN LIA

MAY 1973

LEADER
BACON



Jerome F. Smith

Jerome F. Smith has been named Secretary and General Manager of Lead Industries Association and Zinc Institute. Mr. Smith has been with LIA since 1961, serving as Technical Director and Advertising Director.

LIA CHAIRMAN
OF THE
L.I.A. LIA

APR 1973

LEADER
BACON

THE CASTING ENGINEER
DETROIT, MICH.
L.I.A. LIA

MAY 1973

Jerome F. Smith has been named Secretary and General Manager of Zinc Institute (ZI) and Lead Industries Association (LIA). Other ZI appointments include Mrs. Dorothy Moore, assistant treasurer and comptroller, Lewis E. Gage, director of communications, and Ray Asadi, manager of construction services. Mr. Smith has been with LIA since 1961, serving as advertising and technical director. Mrs. Moore has been with ZI since 1963, while Mr. Gage has been active in market development and communication programs for ZI since 1961. Mr. Asadi has been with LIA since 1966, working on market development and trade show assignments. A Sheldon Rudolph president and Phil Crane V.P. have formed North American Die Casting Corp., Ford, Michigan, Va. The company will specialize in die cast products used in the building products



J. F. Smith

Lead Industries Association

Jerome F. Smith has been named Secretary and General Manager of Lead Industries Association and Zinc Institute. Mr. Smith has been with LIA since 1961, serving as Technical Director and Advertising Director. He has also served as Liaison Director and Advertising Director. He has been named LIA Secretary and Manager in 1971.



J. F. Smith

Lead Industries Association Personnel

Announcements.....

Smith, Moore, Gage, Asadi

23 Magazines

LIA PART
B. BACON PRODUCTION
IN LIA

APR 1973

LEADER
BACON

LIA and ZI Name Four

Jerome F. Smith has been named Secretary and General Manager of Lead Industries Association (LIA) and Zinc Institute (ZI). Other LIA and ZI appointments include Dorothy Moore, assistant treasurer and comptroller, Lewis E. Gage, director of communications, and Ray Asadi, manager of construction services.

Mr. Smith has been with LIA since 1961, serving as technical director and advertising director. He was elected LIA Secretary and Manager in 1971. A member of several professional organizations, Mr. Smith is a graduate of the University of Miami with a B.S. in chemistry and geology. Mr. Moore has been with Zinc Institute since 1963.

As comptroller and assistant treasurer for LIA and ZI she will be responsible for the financial operations of both organizations.

A graduate of Washington University, Mr. Gage has been active in market development and communication programs for ZI since 1961. He has been instrumental in securing major advertising and public relations programs for the

two marketing groups. He had previously been associated with U.S. Rubber Co. and Borden Corp.

Mr. Asadi has been with LIA since 1966, handling a number of market development and trade show assignments. A graduate of Tulane University with a B.S. in engineering, he formerly served with Continental Aircor Parts.

WORLD BIRDS
SAN FRANCISCO, CALIF.
MARCH 1973



Smith

54th WORLD BIRDS
MAR 1973



Smith

Jerome F. Smith has been named Secretary and General Manager of Lead Industries Association and the Zinc Institute. Smith has been with the Lead Industries Association since 1961, serving as technical director and advertising director. In 1971 he was elected Secretary and Manager.

Edward A. Schick has been named president of the Borden, Columbia and Tulane Chamber of Mines, Canada. Schick, who is vice president, engineering for Fluor Development Limited, has been a vice president of the Chamber of Mines since 1961.

BATTERY ENGINEERING
STANDARD CORP.
MONTHLY \$2.00

APR 1973

Lead-acid Lead 80 current publica-
tions covering lead applications in
architecture, electronics, cable, search
for planning. Lead Industries Assn.,
Inc. 11 80 Circle 204

25-11 ELECTRIC
INDUSTRY
NO. 4879

MAR 1973

827 LEAD PUBLICATIONS, FILMS
More than 80 current publications are
listed in a 12-page booklet titled "Publica-
tions and Films". They cover specific applica-
tions of lead and lead-containing products
including those for architecture, electronics,
cable, search, and corrosion protection. Other uses include radiation shield-
ing, welding and soldering, and batteries.
The 26-minute, 16 mm color film "Lead
Materials" is also listed. Lead
Association, Inc.

BUILDING DESIGN &
CONSTRUCTION
DISCOUNT
MONTHLY FILMS

MAR 1973

LEAD
Lead uses
in construction
and design
are covered in
this booklet.
Lead Industries Assn.,
Inc. 11 80 Circle 204

PLANT ENGINEERING
BARRINGTON, ILL.
E. & W. H. HARRIS

FEB 22 1973

Look to lead as a design material. Lead's many ap-
plication possibilities, as well as its properties and
available forms, are covered in a revised booklet pub-
lished by Lead Industries Assn., Inc. It highlights
advantages of the metal in vibration and sound con-
trol, pollution control, radiation resistance, coatings
and anodes, soldering and ceramics, etc. (Circle 3
on Post Card)

41-10 KATELON MAGAZINE
ENGINEERING
NO. 4879

MAR 1973

PUBLICATIONS BOOKLET—Lead Industries Assn.
Inc. A 12-page booklet titled "Publications and
Films" lists more than 80 current publications from the
booklets are listed by code numbers under spe-
cific categories of lead and lead-containing products
and films, including batteries.

Circle 302 on Reader Service Card

LEAD INDUSTRIES
INTERNATIONAL
PHILADELPHIA, PA.
MONTHLY \$2.00

MAR 1973

Lead... As A Modern Design Mate-
rial highlights lead's advantages in such
applications as corrosion, vibration
and sound control and radiation resis-
tance. It discusses the properties,
forms and design applications of lead.
Lead Industries Association, New
York.

For free copy circle No. 270

4-258 ELECTRIC FORCE
NEWS MAGAZINE
NO. 4879

EB 1973

tidbits...

Literature Availability Announcement:

"LEAD...AS A MODERN DESIGN MATERIAL"

Published in more than 25 magazines

41-75 DESIGN NEWS
NO. 4879

MAR 19 1973

Uses of Lead

Booklet, 12 pages, is entitled "Publica-
tions and Films". It lists more than 80
current publications in the field of lead
application. Each publication is listed
by code numbers under specific
categories of lead and lead-containing
products. A thin insert in a color film on
disasters.

NEW DESIGN NEWS
NO. 4879

MAY 1973

Industrial electric trucks. "Le-
ad Industries," a 16-page book-
let from the Lead Industries Assn.,
contains current performance reports
from coast-to-coast users of both in-
ternal combustion powered and elec-
tric trucks. It discusses operational and
maintenance costs, environmental ef-
fects, safety and efficiency.

Circle 302 on Reader Service Card

LEAD INDUSTRIES
INTERNATIONAL
PHILADELPHIA, PA.
MONTHLY \$2.00

MAR 1973

The 80 publications, including
more on welding, batteries, anti-corrosion
and cable, published by the Lead Indus-
tries Association, 222 Madison Ave.,
New York, N.Y. 10017, are described in
a booklet.

Selections should be for the list of
current publications available. One
should be a brochure from Corrosion Co.
of America, 3000 Spring Ave., Buffalo
Park, N.Y. 14203. The booklet, No. 170,
has an annex part, is comprehensive,
for general use, high electrical resistance
and low cost.

15-8 CHEMICAL AND
ENGINEERING NEWS
NO. 4879

MAR 19 1973

Literature

132 Publications List of more
Service

363

3

3

3

3

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3

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3

1-73 ADV. ADVERTISING
NEWS OF NEW YORK
NO. 4879

MAR 23 1973

for your information

27-256 IRON AGE METALWORKING
INTERNATIONAL
NO. 4879

MAR 1973

Lead... As A Modern Design Mate-
rial highlights lead's advantages in such
applications as corrosion, vibration
and sound control and radiation resis-
tance. It discusses the properties,
forms and design applications of lead.
Lead Industries Association, New
York.

For free copy circle No. 270

Lead... As A Modern Design Mate-
rial highlights lead's advantages in such
applications as corrosion, vibration
and sound control and radiation resis-
tance. It discusses the properties,
forms and design applications of lead.
Lead Industries Association, New
York.

Lead... As A Modern Design Mate-
rial highlights lead's advantages in such
applications as corrosion, vibration
and sound control and radiation resis-
tance. It discusses the properties,
forms and design applications of lead.
Lead Industries Association, New
York.

ADV. ADVERTISING
NEWS OF NEW YORK
NO. 4879

54-6 THE IRON
MAGAZINE
NO. 4879

MAR 1973

Book Reviews

Lead Assn. Booklet

The Lead Industries Association, Inc.,
has announced the availability of a 12-
page booklet "Publications and Films",
which lists more than 80 current publica-
tions distributed free of charge by the
Association.

For quick reference and ease in order-
ing, the publications have been listed by
code numbers under specific categories
of lead and lead-containing products and
applications.

For free copies of the 12-page booklet
"Publications and Films", write to:
Director Service Dept., Lead Industries
Association, Inc., 222 Madison Ave.,
New York, N.Y. 10017.

Circle may be obtained by writing: Manager,
Engineering, 125 West 17th St., New York, N.Y. 10011.

Publications and Films—published by the Lead
Industries Association, Inc. The 12-page booklet
lists more than 80 current publications and is distrib-
uted by the Association. Circle may be obtained by
writing: Manager, Engineering, 125 West 17th St., New
York, N.Y. 10011.

148 LEAD List of free edu-
cational and informational
materials available. Lead
Industries Association

LEAD BOOKING

Circle 302
A 16-page booklet lists lead
books, pamphlets, brochures, and
describes various examples in various
forms and applications. Lead
Industries Association, Inc. 222
Madison Ave., New York, N.Y. 10017.

Circle may be obtained by writing: Manager,
Engineering, 125 West 17th St., New York, N.Y. 10011.

Publications and Films—published by the Lead
Industries Association, Inc. The 12-page booklet
lists more than 80 current publications and is distrib-
uted by the Association. Circle may be obtained by
writing: Manager, Engineering, 125 West 17th St., New
York, N.Y. 10011.

Circle may be obtained by writing: Manager,
Engineering, 125 West 17th St., New York, N.Y. 10011.

Circle may be obtained by writing: Manager,
Engineering, 125 West 17th St., New York, N.Y. 10011.

Circle may be obtained by writing: Manager,
Engineering, 125 West 17th St., New York, N.Y. 10011.

117 P. AL. V. AL. J.
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