LIA15475

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SUBJECT: LEAD CLAD STEEL

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

The attached copies of publicity are part of a campaign we have initiated to promote the use of lead clad steel in the U.S. Response to these first appearances has been somewhat beyond our expectations -- most of the inquiries being questions as to immediate availability.

Given the response so far, and assuming the material would be competitive, we feel it would have wide usage as roofing or flashing. Additionally, we are just beginning to explore its potential for chemical applications or for container uses.

LIA has further technical information on how to manufacture lead clad steel with minor modification to existing lead rolling equipment. We would be happy to send it to you if your firm has an interest in undertaking production of this material.

Very truly yours,

E. D. Martin

EDWIN D. MARTIN, AIA
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lead and zinc market

Lead-Clad Steel Making Inroads in Building Market

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

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

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

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

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

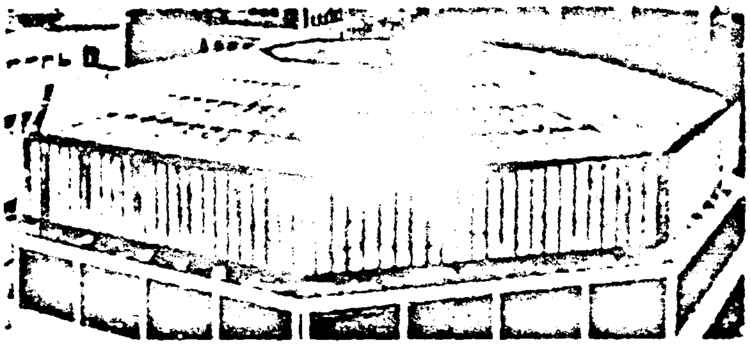
Applications of the new material include roofing, gutters, downspouts and ventilation equipment. Heretofore it often was not practical to use lead for such applications, industry observers said.

Pollution Control, Too

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

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

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



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

Single-side cladding is being produced with lead coatings that range from 0.020 to 0.040 inch, applied to steel that ranges in thickness from 14 to 30 gauge. The standard coating for building applications ranges in thickness from 0.020 to 0.030 inch of lead bonded to 30-gauge steel. Thicker lead coatings on steel are being explored for chemical plant applications.

Tooling May Be Needed

Standard roll-forming, brake-pressing, lock-forming and deep-drawing metalworking techniques can be used to fabricate lead clad steel, LIA claims. However, some minor initial tooling modification may be required to accommodate the forming characteristics of the composite material.

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

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

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

An Example

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

The fascia of the roof of a six-story office building in London is in the form of an open screen composed of 200 panels. Each 8 inches high and 1½ inches wide, the panels are installed vertically around the fascia of the roof which, like the building itself, is octagonal in shape. A small gap separates each of the panels, which are hung with stainless steel bolts.

Because the backs of the panels are partially exposed to the weather, lead cladding was applied to both sides of the panels. They were fabricated from 30-gauge terne-plate steel with a coating of about 1½ pounds per square foot each side.

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

Ceramics as catalyst support in auto emission control

Although catalysts for auto emission control have been much in the news lately, comparatively little has been written or said about materials used to support the catalysts. However, finding substrates that will stand up under the severe operating conditions encountered in catalytic reactors is also proving to be a formidable task. Some of the problems—and some possible solutions—were the subject of an all-day session on ceramic materials for reactors in Detroit at the Society of Automotive Engineers International Congress and Exposition.

Robert M. Campau, executive engineer of emission and safety programs at Ford Motor Co., points out that pollution control reactors must withstand normal operating temperatures as high as 2000° F. In addition, they must operate efficiently with gas temperatures, pressures, compositions, and velocities that fluctuate rapidly over wide ranges, and they must withstand the mechanical shocks and vibrations of vehicle operation.

Automotive engineers are looking to ceramic materials to meet these requirements, Mr. Campau says, because they appear to be the only suitable materials available in large enough supply at a reasonable cost. To produce ceramic parts for 10 million new cars a year plus the after market, ceramics manufacturers must build new production facilities. First, however, auto makers must decide which types of ceramics they're going to use and also solve some fundamental design problems.

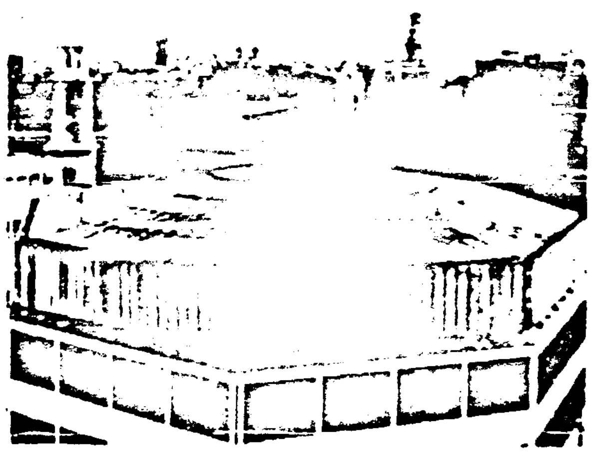
Mr. Campau explains that two types of ceramic substrates are under consideration: packed beds of pellets of alumina (or other inorganic oxides) and porous ceramic monoliths coated with high surface alumina. Both pellets and monoliths have shortcomings for long-term use in automotive applications, the Ford engineer notes. Pellets tend to abrade each other, grinding off the active catalyst. Once started, shrinkage of the catalyst bed leaves more space in the container for movement, and attrition proceeds more rapidly, sometimes to the point of clogging the gas passages. Also, pellet catalysts can't be placed directly at the exhaust manifold, where temperatures are most favorable to the reaction, because the pressure pulses there cause rapid attrition. Even several feet downstream where the exhaust flow is steadier, backfiring can cause rapid failure of the catalyst bed.

Monoliths, such as the glass-ceramic substrates under development by Corning Glass Works and by W. R. Grace's Davison Chemical division, among others, avoid these problems but have additional ones of their own. For example, differences in thermal expansion can cause the metal housing to pull away from the ceramic structure and cause mechanical failure. Also, an engine misfire can dump droplets of unburned [illegible] into the converter, where [illegible] local reactions can develop [illegible] spots [illegible]. The hot spots can cause the alumina coating to change [illegible], thereby reducing some of the surface area and thereby reducing catalyst effectiveness. Worse, the hot spots can cause the ceramic to melt, plugging some of the passages and eventually [illegible] converter failure.

Although it is [illegible] early to [illegible] pelletized catalysts, the [illegible] to be [illegible]. For example, Chrysler Corp. has disclosed its intent to buy Corning's [illegible] cellular glass-ceramic support material. Final contract details [illegible] to be ironed out, but Corning is already engineering facilities, and deliveries to Chrysler are scheduled to begin in March [illegible].

For the time being, auto makers seem to be accepting catalytic converters reluctantly as the only way to meet federal emission standards for [illegible] 76. Still, there is [illegible] that thermal reactors have the potential to [illegible] hydrocarbons and carbon monoxide [illegible] at lower costs. As with catalytic converters, the problem is one of materials. Those metal alloys that can stand the hot oxidizing atmosphere in the reactor are expensive, difficult to fabricate, and susceptible to stress corrosion when subjected to frequent heating and cooling.

Development continues, however, and again ceramics may provide the "breakthrough" needed for a practical thermal reactor system. The National Aeronautics and Space Administration's Lewis Research Center in Cleveland has been evaluating materials under a contract with the Environmental Protection Agency. Several ceramic materials appear to be good candidates for use in thermal reactors, Lewis scientists Philip L. Stone and Charles P. Blankenship told the SAE session. Silicon carbide has exhibited the best performance from the standpoint of mechanical strength and overall temperature capability. However, glass ceramics, fused silica, and high-temperature mullites have also shown promise and warrant further consideration because of their potential for lower cost and easier fabrication.



New lead-clad steel gets construction tryout

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