

LEAD INDUSTRIES ASSOCIATION, INC.

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TELEPHONE - AREA CODE 212

OR 4-6222

September 15, 1964

SUBJECT: MARKETS FOR LEAD AND
LEAD PRODUCTS - CERAMICS

To the Industry Development Committee
of the Lead Industries Association, Inc.:

Attached is the first in a series of memoranda on the use of lead in various markets and the activities of the Association pertinent thereto, corresponding with a similar series submitted to you last year.

We hope that these will provide you with information which will be a basis for intelligent discussion of these markets at the October 19, 1964 meeting of the committee and a sound approach to the establishment of budgets and future plans. We will welcome comments prior to the October 19th meeting as well as at the meeting.

Very truly yours,



Executive Vice President

RLZ:mk
Enc.

*Look Ahead with Lead*

September 15, 1964

MARKETS FOR LEAD AND LEAD PRODUCTSMEMORANDUM NO. 1-64LEAD IN CERAMICS

Our memorandum No. 7, Sept. 6, 1963, with this same heading gave a rather detailed report of this market and our promotional efforts on its behalf up to that time. These efforts have now been continuous for almost eight years. They have shown definite results in substantially higher consumption of lead even on a per capita basis. Final 1963 and early 1964 figures result in even a better picture than our last year's report reveals. A revised lead consumption chart for this market is attached. It reveals that instead of a slight decline in use of domestic lead by this industry in 1963 there was a rather substantial increase of about 1,500 tons. It also reveals that estimated consumption for 1964 will increase by another 2,000 to 3,000 tons based on figures for the first five months of this year. To this, of course, must be added the sizeable tonnages imported by the ceramic industry in the form of lead oxides. On that basis 1964 should represent all-time peak consumption even exceeding the abnormally high years of 1941, 1950 and 1955.

The ceramic industry is really made up of a group of lesser industries most of which use lead in varying ways and for somewhat different reasons. The increasing use of lead is distributed over those in varying degree and in smaller amounts, but in the aggregate add up to impressive figures. These should be examined in a little detail to plot our own course intelligently. The sub-groups in which we are mainly interested are glass, porcelain enamels, glasses for dinner ware, tile, brick and other so-called white wares, and electronic applications.

Glass. Lead is used in optical glass, radiation shielding glass, television tubes, neon tubing, light bulbs, fine crystal, solder glass and some miscellaneous applications. The glass industry probably uses more lead than any other branch of the ceramic industry, although no separate statistics are available. All of its lead applications appear to be growing, particularly in solder glass and miscellaneous applications wherein the higher cost of the lead glass is more than compensated for by the greater flexibility in manufacturing which reduces manufacturing costs.

Porcelain Enamels. The big existing market for porcelain enamels is on steel and except for some use in ground coats lead is not extensively used. Considerable work, however, is being done by the ceramic industry to develop lower temperature enamels for steel and particularly one coat enamels. Lead is finding some use in the lower temperature enamels but so far this use is very small. This is an area in which more technical research might prove to be of great value. Porcelain enamels for aluminum were introduced some ten years ago. These extra low firing enamels were at first both leaded and lead free and technical problems have delayed the full development of this market. At present, however, we believe that the porcelain enameling industry is convinced that they cannot make good enamels for aluminum without lead and few if any enamellers are using lead-free enamels on aluminum. Also the Porcelain Enamel Institute has

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reconstituted its Aluminum Division and the aluminum industry has come up with better alloys for porcelain enameling. All these developments point towards more rapid increase in the use of porcelain enameled aluminum in the future. Last year something over 10,000,000 sq. ft. of this product was produced using an estimated 200 to 300 tons of lead.

Glazes. The dinner ware industry was convinced by lead shortages during the war that they could not economically get along without lead in their glazes nor produce a good product. This use seems well established and the quantity of lead will be determined by the well being of the dinner ware industry itself, which has been hampered by Japanese and European imports of the finished ware. The main threat has been from toxicity resulting from improperly applied lead glazes and threatened legislation to outlaw the use of lead in such glazes. This problem is being handled through our health and safety activities and ILRO and appears to be under control for the moment.

There do not seem to be any particular problems involved with tile glazes which seem to be using lead in substantial quantities. The use of glazed brick with lead glazes seems to be becoming more popular.

Electronics. This classification covers a multitude of applications. Among those of direct interest to the lead industry are piezoelectrics, thermoelectrics and permanent magnets. Of these lead zirconate-titanate piezoelectrics used in sonar, ultrasonic cleaning devices and the like are already of some commercial importance using between 500 and 1,000 tons of lead a year now whereas this use was nominal a few years ago. Lead telluride thermoelectrics are of lesser importance but are being used to a very limited extent commercially and in such things as missiles. Lead ferrites for permanent magnets are insignificant now but, depending on certain technical break-throughs, could be of substantial importance at some future date.

Thus the outlook for lead is excellent. Most established ceramic products using lead have growth markets and there are several new products, one or more of which should show substantial future growth. Our promotional program started in 1956 with an expenditure of some \$10,000 to produce the loose-leaf manual, LEAD IN THE CERAMIC INDUSTRIES. This expense has not and does not now need to be repeated since the manual has been kept up-to-date by issuance of one or more supplements at an annual cost of about \$2,000. These are mailed as issued to all who have the book for insertion in it. Also the complete book is available from stock to new ceramic students and others requesting it.

Early in the program several graduate research fellowships on lead in various phases of ceramics were supported with several purposes in mind. First, of course, was to add to the technical knowledge of lead in ceramics which might lead to its greater use. Second, they were expected to interest both the fellows and their instructors in lead and create more ceramists with a good knowledge of lead. Third, the fellowships themselves and papers subsequently published on the results of the fellowship work were both excellent sources of publicity and created a lot of good will toward lead. The cost of this fellowship program at the outset was

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some \$7,500 per year. However, after the formation of ILLCO this part of the program was turned over to that group, under which it has been expanded, but has cost LIA nothing since about 1959.

A third facet of our program from the beginning has been to have one of our technical staff knowledgeable on the subject of lead in ceramics. He spends perhaps 25 percent of his time contacting the industry and ceramic schools, attending ceramic meetings, gathering information for publicity and advertising, preparing articles for publication and answering inquiries or, when necessary or advisable, following them up in person. The present staff member doing this work has established many valuable contacts and is widely respected in the ceramic industries.

The last phase of our ceramic program since its inception has been a continuing trade paper advertising campaign to tell the ceramic industries about the advantages and possibilities of using lead in their products. In the first full year of this campaign the cost was about \$12,000 and was designed as a crash program with a rather full schedule in all important ceramic magazines to make a strong initial impression and get the program off to an impressive launching. In subsequent years as the program gathered steam and recognition in the ceramic industries it has been carefully modified to minimize expense without reducing effectiveness. As a result in 1964 the advertising cost of this program will approximate \$10,000 despite space rates and production costs which are substantially higher than in 1958.

Suggested Future Work

We believe it is no exaggeration to say that this program of LIA has contributed materially, over the last six years, to an increase in the use of lead by the ceramic industry of some 7,000 tons annually valued at about \$2,000,000 at today's prices on pig lead alone. We believe it is equally true that, with new uses having considerable potential development and most of the older uses growing, the future is particularly bright. When the program was started our Ceramic Committee estimated that the use of lead in ceramics could be at least doubled. Part of this increase has been realized. There appears to be little reason to doubt the feasibility of the original objective in time.

Therefore, we recommend continuation of this program with some changes, the changes being designed to bring those ceramic products using lead which have the greatest market growth potential to the attention of the ultimate user or specifier, such as the architect or design engineer as the case may be, while still keeping before the ceramist the advantages of lead in all ceramic products. The products with immediate growth potential which we believe should now be given special attention are porcelain enameled aluminum, certain glasses like solder and specialty glasses, and some electronic applications, notably lead zirconate-titanate. We believe that other future growth possibilities, like porcelain enameled steel and permanent magnets, will have to await further technical development but we do hope that if possible they will be given priority in research preferably in more intensive programs than fellowships or both.

With this in mind we recommend continued issuance of supplements to

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LEAD IN THE CERAMIC INDUSTRIES at a cost of about \$2,000 next year, the same as this year. At this low cost we can realize the most value from our original investment in the manual and keep ceramists informed of new data and developments in the areas of our particular interest.

We should also continue and intensify, if possible, our technical service work. It should have special emphasis on the growth products without neglecting established products. The aluminum industry itself, beyond participation in the Aluminum Division of the Porcelain Enamel Institute, has not made much effort to promote porcelain enameled aluminum since they also have cheaper but less durable finishes like baked enamels and paints, and anodizing, which is just as costly as porcelain enamel but less satisfactory in several respects. If we place more emphasis on the promotion of porcelain enameled aluminum, we would propose to enlist more support from them as we have done successfully in our promotion of battery powered trucks with battery and truck manufacturers and electric utilities. This technical service work is charged to our general technical service and administrative budget and not directly to ceramics.

In 1964 we ran six one-page ads in each of the three ceramic publications - BULLETIN OF THE AMERICAN CERAMIC SOCIETY, CERAMIC INDUSTRY and CERAMIC AGE. We believe that, along with previously mentioned supplements to LEAD IN THE CERAMIC INDUSTRIES, we can get adequate coverage of ceramists and keep the advantages of lead before them if we reduced this schedule to a four-time basis in 1965 at a space and production saving of about \$2,000.

We also advertised porcelain enamels in METAL PRODUCT MANUFACTURING in two one-page ads in 1964 at a cost of about \$1,200 which we believe should be repeated in 1965.

One thing we believe should now be added to this program is advertising to the user of porcelain enameled aluminum, specifically the architect. Acceptance of this material recently for stores and buildings of such firms as Sears, Roebuck, I.B.M., and A. C. Sparkplug, which has also involved reorders after several years indicating satisfaction, suggest a strong possibility that this product, now using only 200 or 300 tons of lead a year is ready to blossom out with a potential many times that figure. Also Aluminium, Ltd. has just come out with a new and better enameling alloy of aluminum which should eliminate some of the production problems previously experienced by aluminum enamellers. We suggest that four one-page ads in PROGRESSIVE ARCHITECTURE be added to our schedule. In black and white this would add about \$5,000 to our cost, partly balanced by the \$2,000 saved on the ceramic magazine advertising. However, since color is a main feature of porcelain enamel, these ads should probably be in at least two colors, preferably full four-color process. Two colors would add about another \$1,000. Four colors, the most desirable, would cost nearly \$7,000 additional. Thus four pages in PROGRESSIVE ARCHITECTURE would add about \$3,000 in black and white to the total cost of the ceramic program, about \$4,000 in two colors, and \$10,000 in four colors.

It is also proposed that the expensive 4-color plates used for the advertising be used to make inexpensive electros for the production of

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a 4-page 4-color promotional brochure to be used in answering inquiries and in a bulk mailing to our list of architects. The estimated cost would be about \$2,500 and would enable us to get far more value out of the expensive color plates. These brochures would also be offered to the aluminum industry at our cost for their own distribution as has been done so successfully in our motive power battery program with public utilities and industrial truck and battery manufacturers. This again multiplies the value of LIA dollars spent.

In addition promotion of porcelain enameled aluminum would be included in our displays at architectural and design shows and given more emphasis in our publicity program. This would not involve any increase in cost but some shifting of emphasis. These are not charged directly to ceramics but rather to conventions and exhibits and to publicity accounts.

We further believe that, particularly with respect to electronic and miscellaneous applications, instead of referring to these haphazardly, as in the past, in the three design magazines in which we are advertising - MATERIALS IN DESIGN ENGINEERING, PRODUCT ENGINEERING and MACHINE DESIGN - two additional pages in each of the last two be set aside for ceramic advertising. This would entail an additional annual cost of about \$6,500.

The following summarizes the 1965 recommendations, as compared with 1964, chargeable directly to ceramics:

	<u>1964</u>	<u>1965</u>
Supplements	\$ 2,000	\$ 2,000
Advertising to ceramists	8,500	6,500
Advertising to metal mfrs.	1,500	1,500
Advertising to architects	-	8,000*
Advertising to designers	-	4,500
Brochure	-	2,500
Four-color plates for ads & brochure	-	4,000
Total	12,000	29,000

*Four colors. Black and white would be \$5,000 and two colors \$6,000.

All of the foregoing figures are approximate.

