

AZI-LIA EXPANDED RESEARCH PROGRAM

AMERICAN ZINC
INSTITUTE, INC.

LEAD INDUSTRIES
ASSOCIATION

375 MADISON AVENUE
NEW YORK 17, N. Y.
ON 54880

SCHWABE F. HASTKE
Director of Research

IN REPLY REFER TO
PROJECT NO.

May 10, 1961

To All Members of the Following NRP-AZI-LIA Committees:
Electrochemical, Chemical, and Metallurgical Subcommittees; Corrosion
of Galvanized Hot Water Storage Tanks Committee; Paint Technical Committee;
Galvanizing Committee; Zinc Die Casting Manufacture Committee, Lead Pig-
ments Committee, Lead Cable Sheathing Task Group, Lead Solder Task
Group, Lead Ceramics Technical Committee

Gentlemen:

Attached is a copy of the paper which I presented at our most
recent annual meeting.

Rather than discuss the research which was covered by S. E. Bok
and A. E. Cook, I took the opportunity of expressing my appreciation
to the industry for their wonderful cooperation in supplying materials,
consultation, analyses, etc. on our various projects.

I thought you should see this as I have gone on record to indicate
that our program is achieving success because of the cooperation of our
own industry people and the associated industries.

Sincerely,

Schwabe F. Hastke

SFH:gn
attachment

FOR RELEASE NOT EARLIER THAN
4:00 P.M., Tuesday, May 2, 1961

EXPANDED RESEARCH PROGRAM REPORT

By Dr. Schrade F. Padtke
Director of Research
Expanded Research Program - Lead Industries Association

Our program has now moved into its third year. I think we should take stock of our position, review the progress of our research and take a look at what we have accomplished. The industry has achieved surprising success in this brief span of time and the program has grown larger with each year. It is befitting, therefore, that in spite of its glamor, we do not overlook the most important factors in our research, and that we remember the solid foundation on which our program has been built, and the combined support the industry has put behind this effort.

It would be easy to take pride in the ever growing dollars in our budget - but dollars alone don't produce anything. Money is inanimate and accomplishes nothing in itself. Machines merely repeat what man tells them to produce. Only people have the ability to make significant advances. Dollars provide people with the time to devote to this program and machines and equipment provide the tools needed for investigating new uses for our metals.

Behind the research report, to be presented today are long hours of engineering, planning and programming which is done by our industries' technical people in our working technical committees. These steps are followed by screening of research proposals, selection of contractors,

(Presented at 33rd Annual Meeting
Lead Industries Association
Chicago, Illinois, May 2, 1961)

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award of research contracts and the follow-up to make certain that our research needs are met. All this requires highly competent technical manpower, dollars for expenses to travel to meetings and to confer with contractors and finally, it demands time away from assigned company responsibilities to see that this industry-wide program of research meets with success.

The technical data are then passed on to the sales and marketing people of the many companies in our industry, who in turn make studies as to how this information can most effectively be used to further their business and to increase the sale of lead and zinc. In like manner, the information is put in the hands of the Lead Industries Association and the American Zinc Institute to permit promotion of the perfected developments.

Returning again to the technical committee and to the technical personnel of the member companies, here is where the vital cooperative effort is made; the pooling of industry information, the assistance to the Expanded Research Program, to our research contractors, and to each other. These are the people who make the industry stand together to insure the technological progress of lead and zinc. Without this industry backing, without the solid support of its people, we in the Expanded Research Program could not accomplish our goals effectively.

While I have talked about the committee function in this program, it is only one facet of the total effort put in by the industry people. At the risk of becoming tiresome I will briefly outline several case histories showing what the companies have done to advance our program. These cases do not appear in any of our budgets and have not been reported previously.

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In our program for development of improved techniques for sheathing cable we had outstanding cooperation from the John F. Robertson Company who designed the equipment, installed it and participated in paying for the operating costs to improve the machine. The American Smelting and Refining Company and the Anaconda Company provided the materials used in improving the machine. We had representatives of the cable sheathing companies who offered their technical advice and suggestions. Of very great significance was the outstanding work done by representatives of the Anaconda Company in carrying out the physical testing and metallographic examination of the products produced on the equipment. The Lead Industries Association contributed by working with us in the final write-up of the technical paper covering this development.

In our study of lead-base alloys at Armour Research Foundation, the American Smelting and Refining Company and St. Joseph Lead made available to our contractors background information on lead alloy development to assist them in their work. Consolidated Mining and Smelting Company as well as American Smelting and Refining Company provided extremely high purity materials which were used as the base stock for the alloy study. To reduce the high cost of analyzing lead alloys and the difficulties in carrying out such analyses, we had outstanding cooperation from American Smelting and Refining Company, St. Joseph Lead, Eagle-Picher, COMINCO and Cerro de Pasco who provided the analytical data for the wide series of alloys which was prepared. Other member companies furnished information on metallographic techniques and offered help to facilitate progress of the program.

In our investigation of the behavior of lead asbestos pads we had outstanding cooperation from New York Central who provided background information on the use of these pads as well as from the Abernathy Company

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which made all the test samples employed in our investigation.

In our examination of new techniques for producing high strength lead alloys the American Smelting and Refining Company conducted the first evaluation of test materials which proved the feasibility of this approach for producing new high strength creep resistant alloys. Subsequently special lots of materials and alloys were presented to the contractor by American Metal Climax and Consolidated Mining and Smelting Company. In addition, Anaconda and American Smelting and Refining Company lent assistance in proper metallographic techniques, as we were now working in new areas where existing techniques were no longer effective.

In lead for sound attenuation we have had excellent help from Cordo Chemical, Bar Ray, various naval research laboratories, Dave Chapman, Inc., Mobasco Industries, Curlator Corporation, American Viscose, United States Plywood, United States Gypsum, Broken Hill Associated Smelters, St. Joseph Lead, American Smelting and Refining and COMINCO. Each of these organizations contributed sample lots of materials or provided us with information for our study and evaluation. The U. S. Navy, which is conducting a related program, provided us with the results of work they have done in this area.

One of the major objectives of this program is that we are able to produce cheap lead sheet at minimum cost in large tonnage quantities. Initially Consolidated Mining & Smelting Company developed a continuous casting process for producing starting sheets. Broken Hill Associated Smelters took up this idea and expanded it into a commercially feasible piece of equipment which has been designed, built and operated in their South Melbourne laboratories. Because of the inherent simplicity of this technique and its adaptability to many of the needs in our program,

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Broken Hill Associated Smelters prepared an outstanding movie on this device which will be shown to you on Wednesday morning May 3 at 9:00 o'clock at the opening session. This device will be ultimately of tremendous importance to us in our sound attenuation program. In addition, these two companies have developed manufacturing cost data and have experimented with various alloys which can be cast and have made this information freely available to the industry. In addition, Broken Hill Associated Smelters have studied methods for adhesive bonding of lead sheet which have also been made available for future incorporation in this program. Interestingly enough two of our member companies are constructing new office facilities and are using lead at this early date in the construction of their building to permit practical application of the developments in this research effort.

In our study of new methods for producing lead coated steel stock we have had the wonderful cooperation of the American Can Company which has worked closely with us in establishing specifications and in testing the final product from the standpoint of bonding, corrosion, formability and adherence. The steel samples for this program are also supplied to us by the American Can Company so that we will have material of uniform quality for evaluation. We are studying the effects of surface conditions on the chemical and mechanical behavior of lead. Broken Hill Associated Smelters are assisting markedly in this program and are providing the high purity materials from COMINCO as the base stock for our testing. In addition, they are spending considerable time with the contractor for this research to assist us, because of the long distance involved between our headquarters and the source for the research.

On our very important program for the development of new lead organic compounds and new applications we have had vital help from our associated

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companies: The Ethyl Corporation, National Lead, Associated Ethyl in England as well as the Quartermaster Research and Engineering Command of the Quartermaster Corps located in Natick, Massachusetts. These companies and organizations have provided analytical help and information on the safe handling of these materials. Eagle-Picher Company, National Lead, The Ethyl Corporation, Hammond Lead have all made significant contributions to the research which is being conducted at Eagle-Picher on lead primer pigments compatible with water reducible systems. This help has been in the form of technical consultation, sample materials and the provision of background data developed at each of these companies' own expense. We will soon award a contract to the Eagle-Picher Company for investigation of lead pigments for exterior paints. At a very reasonable cost we are obtaining tremendously valuable background and experience from the Eagle-Picher Company which ultimately will be made available to the benefit of our industry as a whole.

We have many ceramic fellowships located in the universities here and abroad. Our member companies have provided background information as well as many important sample materials for our students. We have just recently initiated a program to develop improved methods for high speed plating of lead. U. S. Smelting, Mining & Refining Company have turned over to us data which they have developed in this field for the assistance of our contractor. We are looking at problems which are encountered in lead plating tanks where electrochemical corrosion is involved. The Enthone Division of American Smelting & Refining Company, National Lead and the British Non-Ferrous Metals Research Association all have provided background data to assist us in this area.

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I am sure that I have omitted other important contributions made by our member companies and by our associated companies but I have used these few examples to illustrate the really vital contributions, that are being made. When someone asks about the dollars being spent by our industry I always hesitate, because the exact dollars which appear in our Expanded Research Program do not truly reflect this tremendous industry cooperation and contribution to the over-all program. It is impossible to convert into dollars the broad experience of our industry, their background, and the preparation of sample materials, yet I hope that I have shown you just how important the industry backing is to us in our Expanded Research Program and how we could not make the progress we have made were it not for this tremendous help. Also, I have not pointed out this remarkable industry contribution simply as a pat on the back for the industry, rather do I want to show how much our industry is behind this program and how vital their solid contributions are to our progress.

One of the very important programs we have had in the past and which has continued to achieve success for the industry is the program for the development of improved techniques for sheathing electrical cables with lead. This program has been initiated originally by the Lead Industries Association in cooperation with the cable manufacturers. There have been several machines developed in the past for the continuous extrusion of lead; but, their range of capabilities was limited to chemical lead and to copper bearing lead. The machines were not able to produce the high strength lead alloys which have found such wide application for cable sheathing of electrical conductors. As I have mentioned before, the John F. Robertson Company offered to look into this program and to modify the existing design of the Hansen Robertson Machine to permit continuous

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extrusion of the cable sheathing alloys. These alloys, of course, are antimonial lead, arsenical lead, tellurium bearing lead and related alloys. In 1958 progress was still slow and tedious but by the early part of 1959 success was achieved and all the alloys were produced on a pilot plant basis. Certainly not all the production problems were solved but the feasibility of extruding these alloys on the Hanson Robertson Press was conclusively established. Sample cables were sheathed and the physical properties were found to be at least equal or better than material produced on the conventional intermittent hydraulic press. Throughout this program, our member companies supplied the materials, the cable manufacturers furnished us with free consulting services and special mention must be made of the contribution of Mr. Claremont Snyder of the Anaconda Company who did all the evaluation of the physical properties of materials. When the results obtained from the new machine design promised a significant commercial potential, the information was brought together and a paper was written for presentation at the American Institute of Electrical Engineers. LIA staff contributed significantly to the preparation of the paper and without their help we would not have been able to meet the deadline for presentation of the paper. The information was disseminated in countries around the world. To describe the apparatus we prepared a short film which had been presented at our first industry meeting. This film, together with the data, has also had very wide circulation. At the beginning, the response to the equipment was lukewarm and there was some question as to the value of the development which had been accomplished. However, after the presentation of the paper and the discussions held in the various countries trade interest increased and we have recently learned that during 1960 there were 16 of these machines sold in Europe, 6 in Japan, 4 in the

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United States and one in Australia. The delivery schedule of one of the suppliers of this equipment requires completion of one new continuous-extrusion press every three weeks for the entire year of 1961. Other manufacturers of this type of equipment are doing extensive research to modify their own apparatus for producing the alloys I have mentioned or similar alloys. These improvements certainly mean continued use of lead in cable sheathing, retention of our present markets and the arrest of the decline in the use of lead in cable sheathing.

This case history highlights two very important factors which deserve special emphasis. First, that once a technical advancement has been developed, it must be followed up by wide dissemination of the information to stimulate other people into considering the knowledge and making use of it. Unless this is done the benefits of research are entirely wasted. Secondly, that the published research data did not produce an immediate response, and that there was a lag in time before full use was made of the information and before procurement of the equipment was stepped up.

Thus we learn that people must be patient and time must be allowed for research results to become fully effective. We see that approximately five years have elapsed from the inception of the idea to its successful realization in terms of new sales and increased consumption of lead for cable sheathing.

In conclusion, I want to emphasize the progress which has been made possible only through full support on the part of the industry. This is not the work of one man or of a few men; it is the work of the entire industry in which technical people as well as sales people are playing an important part to insure the success of our efforts. The results cannot be achieved over night. As a matter of fact, in this particular case

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which I have described, five years have transpired before the effects of an idea were realized.

I have talked about the results of only one program, and now I want to turn the program over to Mr. Eck and to Mr. Cook who will discuss our over-all program and the progress we are making. Thank you.