

LEAD INDUSTRIES ASSOCIATION

60 EAST 42ND STREET

NEW YORK 17, N. Y.

February 21, 1958

MEMORANDUM

TO: Industry Development Committee, L.I.A.
 FROM: Technical Steering Committee, L.I.A.

SUBJECT: Battelle Report on "Evaluation of Research Needs and Formulation of a Research Program"

By mid 1956 a need was felt by the Technical Steering Committee for the establishment of a well defined, long-range research program for usage as a reference structure in the evaluation and programming of recommended L.I.A. research expenditures. More specifically, it was felt that the existing practice of considering individual projects, per se, without relation to established long-range objectives, might readily lead to imbalance, not only with regard to function, but also with respect to type; applied vs. basic and aggressive vs. defensive.

After considered discussion the early formulation of a long-range research plan was deemed advisable. It was further felt expedient to expose our problem to a "New Look" by seeking the assistance of a competent external consultant group of wide experience and contacts. A subcommittee was appointed to screen the field and obtain cost estimates for such assistance. Three proposals were obtained and evaluated (Stanford Research Inst., Battelle and A. D. Little). These were submitted to your group (at the 1957 Annual L.I.A. Meeting), along with our recommendation that Battelle be awarded the study. This recommendation was approved by both your group and the Board of Directors.

The accompanying report "Evaluation of Research Needs and Formulation of a Research Program," represents the culmination of joint Interim Battelle-T.S.C. efforts. The study was set in motion with the May 27, 1957 meeting in Columbus, Ohio, between the T.S.C. and pertinent members of the Battelle staff. Here the scope, character and limits of the study were defined, i.e., it was agreed:

1. While defensive measures for the maintenance of existing markets could not be depreciated, that L.I.A. research objectives should be weighted toward market expansion in areas where the properties of lead and its products might answer industries' needs.
2. That recommendations for the actual timing and placement of suggested areas of research were outside the scope of the study. Such action was held to be the function of the T.S.C. to be formulated on the merits of individual cases as the occasion arose.



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3. That Battelle should proceed as independent of the L.I.A. membership as possible so that the study would reflect an entirely fresh approach, not influenced by the opinions of those in close continuous touch with the lead industry.

A subsequent joint "Guidance" meeting was also held at Columbus on October 24, 1957 for the purpose of general review and advice prior to the assembly of the final report.

After the receipt of the final Battelle report, and the allowance of adequate time for individual consideration by its membership, the T.S.C. met on January 9, 1958 for discussion and evaluation.

THE TECHNICAL STEERING COMMITTEE'S EVALUATION OF BATTLE'S REPORT

The consensus of individual expression regarding the Battelle report as a "whole" (presentation, scope, diligence exhibited, etc.) was quite favorable. While deemed somewhat lacking in certain areas and of debatable evaluation and interpretation in others, it was held to cover the field quite well; not only providing an influx of new suggestions and potential but also complementing the overall Association research program now under way. As an aid to the formulation of long-range research policy and planning it will serve its intended purpose. With certain adjustments and deletions (outlined below) the Battelle Report represents a consolidated record closely coinciding with and complementary to the Technical Steering Committee's views regarding approach, scope and potential.

As already inferred, it is felt that specific recommendations regarding the selection, timing and placement of specific research projects should be a continuing, flexible function of the T.S.C. Research Director, capable of readily responding to changing conditions; such action to be formulated on the merits of individual cases as the occasion arose.

T.S.C.'S EVALUATION OF BATTLE'S SPECIFIC PROPOSALS

The T.S.C.'s ratings of Battelle's suggested program is as follows:

A. OF SUFFICIENT STATUS FOR IMMEDIATE INVESTIGATIONS

1. Area for Potential Applied Research

- (a) Reinforced Lead and Lead Alloys
Owens-Corning Fiberglass Corp., via Mr. H. B. Allen already reported to T.S.C. product of considerable interest to potentialities. L.I.A. secretary has already written to Dr. A. C. Siefert, Director of Research for Owens-Corning Fiberglass inquiring as to possible areas for cooperative research.

Battelle Report References: Page 6, Table 1, Item 1.
Appendix A, Page A-1.

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4-2. Area for Potential Basic Research

(a) Lead Alloys - General Research

This item is much too general. Should be broken into several items, perhaps functional-wise, i.e., cable alloys, bearing alloys, solders, etc.

Battelle Report References: Page 8, Table 2, Item 1.
Appendix A, Page A-19.

(b) Powder Metallurgy of Lead and Lead Alloys

This also is broad in scope. Lead and alloy powder or granules or flakes for cable extrusion in continuous machines is just one item in this field.

Formulations with high melting point metals, reinforcement materials, etc., is another area.

Battelle Report References: Page 8, Table 2, Item 2.
Appendix A, Page A-21.

(c) Improvement of Mechanical Properties of Lead with Insoluble Metals by Suspension in the Mushy State
Of considerable interest but should check to avoid duplication of current Bunker Hill efforts in this field.

Battelle Report References: Page 8, Table 2, Item 3.
Appendix A, Page A-25.

(d) Lead Chelates and Their Applications

Many potential developments might result from the knowledge of properties developed in this field.

Battelle Report References: Page 8, Table 2, Item 5.
Appendix A, Page A-26.

(e) Perfluorinated Organolead Compounds
See note 2 (d) above.

Battelle Report References: Page 8, Table 2, Item 6.
Appendix A, Page A-28.

(f) Lead Oxide Condensation Products with Organic Materials
See note 2 (d) above. National Lead has done sufficient work on this so that it would not want to reveal data already developed.

Battelle Report References: Page 8, Table 2, Item 7.
Appendix A, Page A-30.

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- (g) Lead Hydride - Properties and Applications
See note 2 (d) above.

Battelle Report References: Page 8, Table 2, Item 9.
Appendix A, Page A-32

- (h) Lead Leachability - Ceramics (Primarily Porcelain Enamels)
Work already under way by the Ceramics Technical
Committee.

Battelle Report References: Page 9, Table 2, Item 12.
Appendix A, Page A-36.

- (i) Literature Compilation - Ceramics
See note 2 (h) above.

Battelle Report References: Page 9, Table 2, Item 13.
Appendix A, Page A-36.

A-3. Battelle Deferred Research Ideas Transferred by T.S.C. to Active

- (a) Ceramic - Lead Bearing Ferroelectric and Dielectric Materials
Work already under way or planned by Ceramics Tech-
nical Committee at Rutgers and Univ. of California.

Battelle Report References: Appendix B, Page B-1, Item I.

- (b) Ceramic - Complex Lead-Bearing Glasses
Work already under way by Ceramics Tech. Com. at
Ohio State University.

Battelle Report References: Appendix B, Page B-1, Item III.

- (c) Ceramics - Effect of Lead on Titanium Dioxide Recrystallization
Can be included in work already under way by Ceramics
Tech. Com. at Univ. of Illinois

Battelle Report References: Appendix B, Page B-1, Item V.

- (d) Ceramics - Low Temperature Enamel on Steel
Work already under way by Ceramics Tech. Com.
at Univ. of Illinois.

Battelle Report References: Appendix B, Page B-1, Item VI.

- (e) Assembly of Basic Information re Lead Containing Ceramic Products
Information concurrently gathered during fellowship
studies.

Battelle Report References: Appendix B, Page B-2, Item X.

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- (f) Basic Research on PbO Effects on Ceramic Properties
See note (e) above.

Battelle Report References: Appendix B, Page B-2, Item XI.

- (g) Powdered-Lead Cable Sheathing
This was considered as covered in item 2 (b) above.

Battelle Report References: Appendix B, Page B-3, Item XII.

- (h) Lead Used in Sound Attenuation
After discussion of mixing with light aggregates, foaming, and combination with asbestos, A.S.&R. volunteered to pursue this aspect in their own laboratories.

Battelle Report References: Appendix B, Page B-4, Item XIII.

B. Of Increasing Interest But Requiring Additional Information

1. Areas for Potential Applied Research

- (a) Loaded Steels
Inland Steel and others already active in research.
Should try to find new applications and increased markets.

Battelle Report References: Page 6, Table 1, Item 2.
Appendix A, Page A-4.

- (b) Lead Foil, Sheet Laminations
Should contact Crown-Zellerbach, Johns-Manville, Minnesota Mining, etc.

Battelle Report References: Page 6, Table 1, Item 4.
Appendix A, Page A-7.

- (c) Nylon-Coated Lead Glass Fiber
Contact Owens-Corning Fiberglass, duPont

Battelle Report References: Page 6, Table 1, Item 6.
Appendix A, Page A-12.

- (d) Lead Silicate Cullet for High Reflectance Road Markings
Contact Asphalt Institute, Federal and State Highway agencies.

Battelle Report References: Page 7, Table 1, Item 8.
Appendix A, Page A-14.

- (e) Lead Interlayer in Metallization by Vapor Deposition
Contact Ethyl Corp. and duPont

Battelle Report References: Page 7, Table 1, Item 9.
Appendix A, Page A-16.

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B-2. Area for Potential Basic Research

- (a) Tetraethyl Lead and Alkyl to Initiate Oxidation
or Halogen Reactions
Contact Ethyl Corp. and DuPont

Battelle Report References: Page 8, Table 2, Item 8.
Appendix A, Page A-31.

- (b) Lead - A Cancer Palliative
Refer to L.I.A. Health and Safety Division.

Battelle Report References: Page 9, Table 2, Item 11.

- (c) Toxicity of Lead
Refer to L.I.A. Health and Safety Division.

Battelle Report References: Page 9, Table 2, Item 14.

B-3. Battelle Preferred Research Ideas on which I.S.C. Thinks More Information
Is Required

- (a) Study of Yellowing in Lead Glass and Glazes
Needs further evidence of necessity by contact
with the ceramic industries.

Battelle Report References: Appendix B, Page B-2, Item IX.

- (b) Lead-Plastic Mixes
Contact companies now making such products to find
uses and increase markets.

Battelle Report References: Appendix B, Page B-3, Item XVI.

- (c) Inert Anodes in Sea Water
See note 3 (b) above.

Battelle Report References: Appendix B, Page B-3, Item XI.

- (d) Making Duplex Alloys by Displacement
Requires further explanation and clarification by
Battelle.

Battelle Report References: Appendix B, Page B-3, Item XII.

- (e) Lithographing Solder Strip on Cans
Contact can companies for more data.

Battelle Report References: Appendix B, Page B-4, Item XIII.

- (f) Lead Flake-Plastic Coatings
Contact manufacturer to aid in determining usefulness
and promote.

Battelle Report References: Appendix B, Page B-4, Item XIV.

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C. Deferred Because of Low Current Anticipated Feasibility

1. Areas for Potential Applied Research

(a) Lead Covered Electrical Conduit

Samples are currently under test at Hammermill Paper Co. but anticipated thickness required for adequate performance is tentatively regarded uneconomical. Other developments might change this.

Battelle Report References: Page 6, Table 1, Item 3
Appendix A, Page A-6

(b) Lead Foil Laminated Paper, Cloth, etc. with Adhesive on One Side
Considered the subject of prior external negative investigation. Any possibilities should be brought to light in inquiries regarding item B-1-(b) above.

Battelle Report References: Page 6, Table 1, Item 5
Appendix A, Page A-8

(c) Galena Concentrates in Gamma Shielding
Considered of poor feasibility because of anticipated ready alteration of galena in concrete mass.

Battelle Report References: Page 6, Table 1, Item 6
Appendix A, Page A-10

C-2. Areas for Potential Basic Research
None

C-3. Battelle Deferred Research Ideas on which T.J.C. concurs

(a) Increased Abrasion Resistance in Lead Ceramics Due to Zirconium.
This was reported in Supplement to our ceramic manual issued in December, 1957.

Battelle Report References: Appendix B, Page B-1, Item IV.

2. Eliminated Because of Low Tonnage Potential. Exploitation by Members.
Exploitation by Members

1. Areas for Potential Applied Research

(a) Lead Montmorillonite Clays

Probably low tonnage potential

Battelle Report References: Page 7, Table 1, Item 10.
Appendix A, Page A-17.

(b) Lead Hetero- or Isopoly Anions
Very small tonnage

Battelle Report References: Page 7, Table 1, Item II.
Appendix A, Page A-18.

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D-2. Areas for Potential Basic Research

- (a) Study of Recrystallization of Lead and Lead Alloys
Considered a part of item A-2-(a)

Battelle Report References: Page 8, Table 2, Item 4.
Appendix A, Page A-23.

- (b) Semi-Conductor Uses of Lead Compounds
Cost considered high in relation to indeterminate
nature of objective.

Battelle Report References: Page 9, Table 2, Item 10.
Appendix A, Page A-33

D-3. Areas of Deferred Research Ideas

The following Deferred Research Ideas appearing in Appendix
B, Pages B-1 to B-4, of the Battelle Report were eliminated:
Items II, VII, VIII, XII, XIII, XIV, XV, XVII, XVIII, XXII,
XXIII, XXIV, XXV, XXVII and XXVIII.

In addition to the foregoing projects suggested in the Battelle report,
the T.S.C. has several other projects under consideration which have been developed
from other sources. It is the intention of the T.S.C. to submit to the Industry
Development Committee specific recommendations and budgets for research before
April 1, 1958 so that the latter committee may be in a position to make recommen-
dations to the Board of Directors for consideration at the time of the Annual
Meeting.

FOR THE TECHNICAL STEERING COMMITTEE

Harold E. Lee

Chairman

By


Robert L. Ziegfeld, Secretary.