

LEAD INDUSTRIES ASSOCIATION

480 LEXINGTON AVENUE

NEW YORK 17, N. Y.

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Subject to Revision

RED LEAD TECHNICAL COMMITTEE

New York, N. Y.

June 23, 1944

A meeting of the members of the Red Lead Technical Committee of the Lead Industries Association was held in the Association's office on Friday, June 23, 1944. The following were present:

Committee

A. C. Goets
E. W. McMullen
Owen Shobe
J. O. Johnstone
George Dickman
Alex Stewart

Representing

Eagle-Picher Lead Co.
Eagle-Picher Lead Co.
The Glidden Co.
Hammond Lead Products Inc.
National Lead Co.
National Lead Co.

Others Present

M. M. Zeller
F. E. Sprague
Ralph Baker
A. J. Kieckheff
E. L. Hallett
Harold Zahn

Representing

Eagle-Picher Lead Co.
The Glidden Co.
National Lead Co.
National Lead Co.
National Lead Co.
National Lead Co.

Guest

Borman Ellis, U. S. Maritime Commission

F. E. Wornoor, Secretary
L. L. Carriek, Director of Red Lead Research
J. L. Benson

The meeting was called to order at 10:15 A.M. with Dr. Carriek presiding.

FORMULATION OF PAINTS TO MEET THE TOP COAT REQUIRE- MENTS OF THE NAVY

Dr. Carriek brought up the question of the request of the Navy for recommendations for a paint to be used over camouflage paint as a preservative of ships which might be laid up after the war. (Red Lead Report No. 2). He pointed out that this could be handled either as a recommendation from the Lead Industries Association or as separate recommendations from the various manufacturers.



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Mr. Stewart stated that he believed it would be best to submit an Association recommendation.

Mr. Sprague stated that this recommendation would be for a complete paint not just a pigment. The plan of the Association group is to recommend the scope and extent to which red lead should be used.

Mr. Zeller stated it might be advisable to recommend a paint as a part of the industry's effort because it is desired that red lead shall be a part of the system.

Mr. Stewart said this is not strictly a red lead job; it is more in the field of white lead.

Mr. Sprague stated it is not proper to tie all members of the Association to a single recommendation because individual companies might wish to recommend their own formulas.

Mr. Stewart inquired what formulations individual companies might have to offer that the Association could support and stated National Lead Co. has several paints which have been tested by eight years of exposure on steel panels.

Mr. Sprague inquired if we should go outside of the red lead field.

Dr. Carriek stated if we do this we will.

Mr. Stewart said this is a special problem and it will be helpful to the red lead program if the Lead Industries Association cooperates.

Mr. Shobe stated that his company has a remarkable paint intended for tank and structural steel uses which has shown up well through six years field exposures and that they have test samples with three years exposures.

Mr. Zeller stated that apparently the Association has nothing to offer and it will be better to submit the National Lead Company's paint than to offer no suggestions whatever.

Mr. Stewart said it would probably be easier to handle if individual companies were to submit their recommendations.

Dr. Carriek stated that individual companies would probably be requested for their recommendations in any case.

The suggestion of Mr. Sprague that the Association support the National Lead Company's proposed formulations until the Association has something better to offer and that individual companies be free to submit their own suggestions, was agreed to by all those present.

FORMULATION OF RED LEAD UNDERWATER PRIMERS TO MEET THE COST OF EITHER NAVY ES-T-18 or U.S. MARINE COAST GUARD ES-MC-25.

Dr. Carriek then suggested that referring to Item No. 1 on the Agenda the principal problem at the present time is cost which is largely influenced by the cost of the vehicle. The best paint tested so far is more expensive than the paint with which we are trying to compete. The main difference is in the cost of the vehicle.

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Mr. Diehlman asked Mr. Ellis what the relative importance was between cost and durability.

Mr. Ellis replied that cost and durability are given about equal rating in determining what paint shall be bought by the Maritime Commission. He continued by stating that red lead is not showing up very well in current tests but that zinc chromate, with which it has been compared, is in an alkyl vehicle whereas the red lead is in linseed oil. L.I.A. Paint No. 1 is showing up well now although it did not look so good at first. S2-MC-23 has failed in several exposure tests. L.I.A. Paint No. 1 and No. 6 have been best in underwater exposure. L.I.A. Paint No. 11 has been rated best in tide-range exposure. L.I.A. Paints Nos. 4, 5, 7, 12 and 13 have been better than Navy specifications.

In reply to the question as to the type of failure experienced with the S2-MC-23, Zinc Chromate primer, Mr. Ellis stated it was failing by blistering.

Mr. Stewart said that zinc chromate primers show more blistering in both underwater and tide-range exposures than do red lead primers and zinc chromate-red lead primer pigment mixtures. In two formulations red lead seems to reduce blistering. L.I.A. Paint No. 4 at half-ratio is better than S2-MC-23. Mr. Stewart then said he would like to have Mr. Zahn of the National Lead Company explain some work which has been going on in their laboratory in the investigation of the mechanism of corrosion of painted steel surfaces.

Mr. Zahn then described testing equipment which he has set up to determine polarity of electrical couples established by the contact of paint films with steel surfaces. He also showed graphs of time-polarity relationship of a number of different paints applied to steel surfaces demonstrating that zinc pigments show a drop to negative polarity when the test is started with a slight tendency to rise in the positive direction, not sufficient to create a positive potential. Other curves showed that a zinc and lead mixture and straight lead pigments have a positive reaction with a tendency to increase slightly but generally remain uniformly positive.

Mr. Stewart said representatives of the Naval Research Laboratory were very much interested in the time-potential curve studies that Mr. Zahn was making and that the studies of Mr. Zahn checked work they were doing in their own laboratory.

Mr. Stewart said that while this work is entirely preliminary, results indicate that information will be obtained which will help to put lead pigments back where they belong. It indicates that we can get costs down and still provide better performance than zinc chromate can give.

Mr. McMullen offered some formulations on low-cost red lead paint which he thought would be valuable. These were the following formulations:

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60-2-1, 25 crd.

Percent

Formulation	by wt. of Total Paint	Bulking Value	Gallons of Material	Cost per Pound	Total Cost
Pigment-55.5%					
Red Lead	50%	27.81	.0134	.3727	\$2.8734
Zinc Chromate	10%	8.56	.0213	.1727	.3340
Zinc Oxide	10%	8.56	.0213	.1727	.3340
Magnesium Silicate	10%	11.13	.0421	.4688	.1113
Diatomaceous Silica	10%	8.56	.0213	.1727	.1113
Vehicle-44.5%					
77-98	100%	44.50	1.342	8.7860	4.9178
	100.00		7.8078		8.8910

Weight per Gallon-13.875 MC per Gallon-\$1.23

60-2-1

Formulation	Percent by wt. of Total Paint	Bulking Value	Gallons of Material	Cost per Pound	Total Cost
Pigment-57.0%					
Red Lead	50%	27.81	.0134	.3727	\$2.9017
Zinc Oxide	10%	8.56	.0213	.1727	.3340
Magnesium Silicate	10%	11.13	.0421	.4688	.1113
Diatomaceous Silica	10%	8.56	.0213	.1727	.1113
Vehicle-43.0%					
77-98	100%	43.00	1.342	8.7860	4.7811
	100.00		7.1428		8.5636

Weight per Gallon-13.009 MC per Gallon-\$1.18

60-2-1

Formulation	Percent by wt. of Total Paint	Bulking Value	Gallons of Material	Cost per Pound	Total Cost
Pigment-54.0%					
Red Lead	50%	27.81	.0134	.3727	\$2.8919
Zinc Oxide	10%	8.56	.0213	.1727	.3340
Iron Oxide	10%	8.56	.0213	.1727	.3340
Magnesium Silicate	10%	11.13	.0421	.4688	.1113
Diatomaceous Silica	10%	8.56	.0213	.1727	.1113
Vehicle-46.0%					
77-98	100%	46.00	1.342	8.7860	4.8666
	100.00		7.8078		8.8910

Weight per Gallon-13.009 MC per Gallon-\$1.18

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Mr. Sprague said that he believed that zinc chromate is a variable material and that the Association is endeavoring to find weaknesses in zinc chromate paints. He asked if there is not enough information available to let it be known that zinc chromate is not a superior material.

Mr. Stewart stated definite x-ray tests show that zinc chromate has no definite chemical composition and two batches of this material are never identical. This is a condition which is not true for lead pigments. He also stated that he liked Mr. McMillen's proposed formulas.

Dr. Carriek stated they looked as if they should be worth trying.

Mr. Stewart said that the more information of this type there is disseminated and the more promptly it is done the better off the red lead program will be.

Mr. Sprague said that Mr. Shobe had also made several formulations which will meet the cost requirements.

Mr. Carriek then suggested that to formulate a red lead program based on cost that he would have panels prepared of the nine formulas submitted by the laboratories of the members of the Technical Committee and that he would have the panels sent to Daytona Beach, Florida, for immediate exposure. He suggested that for the primer coat they discard the vehicle used in SS-MC-23 and use a vehicle without phthalic anhydride as Eagle-Fisher JV-26 or its equivalent.

Mr. Goets suggested the elimination of dipentene from JV-26 and the substitution of mineral spirits. He also suggested the use of the same top coat SS-MC-6 on all samples.

Mr. Dickman then suggested the use of two top coats; one for emergency and the other for after war use. The emergency top coat vehicle is not to contain phthalic anhydride.

Mr. Dickman said Mr. Ellis stated that pigmentation J in Maritime Commission vehicle seems to stand up better than zinc chromate. It might be possible to take some liberties with pigmentation J.

METHOD OF CARRYING OUT RED LEAD RESEARCH PROGRAM

Dr. Carriek stated then that the work of the research group had not progressed as well as it might have because panels which were to have been put out for exposure had not been prepared.

Mr. Stewart said that they were ready now to provide any necessary manpower to get the proposed panels on exposure.

Mr. Joller then read a letter suggesting that the members who are going to cooperate in these tests should be willing to give this L.I.A.A. work a prior claim. This was approved by all members present.

Dr. Carriek said that the setting up of panels which have been exposed and are to be exposed is only a part of the work. It is fundamental research upon which to base the development of new types of red lead paints. Work of different kinds should be allotted to various companies and the results brought in to the meeting and discussed.

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Mr. Sprague said that considerable had been done and much information had been gathered and that the pertinent question now is how can this information be used by members to increase the sales of red lead? It was suggested that it might be time to reveal some of the information the L.L.C. had compiled pertaining to lead poisoning.

Mr. Stube asked why not get a booklet about red lead similar to the one put out by the zinc industry on the use of zinc sheet on galvanized iron, to inform specifying agencies that red lead paint does not need to be 100% red lead pigment.

Dr. Curriak said that for such a book pictures and specific data on the performance of proposed formulations would be necessary.

Mr. Baker then said that a technical type of book would be more likely to remain in engineers files than would a pictorial presentation which would tend to be regarded as a current publication and through accident destroyed.

Dr. Curriak suggested that Mr. Hornsner, who had been temporarily called out of the meeting, tell what he has learned about the attitude of consumers towards toxicity.

Mr. Hornsner said that he was not worried about the toxicity problem and regretted that a heavy committee effort was not made when the problem first occurred. The Association was continuing to correct erroneous statements about lead. He said that on a recent visit to Johns-Hopkins University the doctors were willing to admit a serious error in the determination of the "lead line" in swabs of suspected lead poisoning victims. He also said he was astonished that doctors apparently never make analysis of the paint suspected of having poisoned children who chew it from cribs or toys. No crib or toy manufacturer is using or has used lead paints for a long time.

Mr. Sprague stated that red lead paints have been largely sold through specifications. The Association should establish the fact, that red lead in formulated paints is the best metal primer even when extended, so that manufacturers and formulators of paints will be encouraged to use red lead in their products and promote its use.

Mr. Baker stated that the color of red lead and its long standing reputation as the best metal priming paint is an important selling point and that the fact that zinc chromate is included in some recommended formulations will tend to reduce the opposition of zinc chromate manufacturers.

Mr. Zeller suggested a review of the first meeting to refresh memories as to the object of the red lead research group.

Mr. Hornsner then read extracts from the reports of the first and second meetings.

It was agreed that the problem is largely a technical one and that the first step should be the appointment of a Technical Committee to investigate the problem, inasmuch as all or many of the red lead producers have already studied the problem in their own laboratories. It was felt that

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the industry should examine first the relative merits of the pigments in the same paints particularly for three purposes -

1. Atmospheric exposure
2. Fresh water exposure
3. Salt Water exposure

It was agreed that the study should consider all phases of the problem and not be confined to 100% red lead pigmentation, and that the facts derived would be at the disposal of the technical staffs of all participating companies; that the best red lead paints that could be made with various types of slow and fast drying vehicles should be compared with the best zinc chromate paints in any types of vehicles. Then costs and competitive formulations could be considered on the basis of a definite scientific background.

Mr. Koller stated that we have arrived at the first objective of determining whether or not zinc chromate is a better paint than red lead. We have learned definitely that red lead is better; now what are we going to do with the information?

Mr. Sprague asked is it practical to determine the best formulations and set them up as recommended practice until new information is available. Why not take the best formulas we can select at the present time, parcel them out to members to be made up and get them out under test.

Mr. Baker said that red lead is generally considered the last word in metal protective primer and price is usually not too important. Mr. McMillen stated that zinc chromate is not standing up well and that many serious failures of this material can be expected soon.

Mr. Coats asked are we still limiting ourselves to marine paints as one of the biggest outlets for red lead paints is for atmospheric exposure.

Mr. Baker said it should be kept in mind that there is a large number of specifiers of 100% red lead who should not be sold on the idea that paints of smaller red lead percentages are just as good. Bethlehem Steel is recommending a formulation of 75% red lead; 25% iron oxide in a reinforced linseed oil vehicle and that engineers are being solicited for their opinions of this paint. He also stated that L.I.A. should keep in touch with state highway engineers group.

LEAD INDUSTRIES RESEARCH PROJECT NO. 8

Dr. Carriak asked shall we go ahead with the discussion of Research Project No. 8.

Mr. Dickinson stated original work was based on pigmentation "T" which is 50% or more red lead.

It was decided to change the pigmentation "T" in those paints which had not been prepared to pigmentation 72 given below. This is the pigmentation suggested by Eagle-Picher in their formula 80-B-1. It is 50% red lead; 10% zinc oxide; 10% zinc chromate, 30% magnesium silicate and 10% diatomaceous silica.

In other respects, Research Project No. 8 is to be carried out as originally planned.

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DISCUSSION OF FORMULATIONS OF RED LEAD PRIMER FOR RAILWAY STEEL CARB

Dr. Carriak then brought up subject No. 6 of the Agenda asking if we should become more interested in atmospheric exposures. He also stated that panels of red lead primers of all L.I.A. primer paints with and without top coats are on exposure to the atmosphere. One particular paint has stood up very well. Mr. Diehlman said that this paint was not included in the plans but had been put as an extra.

It is composed of

Red Lead	88.5%
Iron Oxide	85.5%
Bicalite	9.5%

in a 55-gallon length vehicle (RZ154 in 60% tung oil-40% linseed oil, 60% solids). Pigment by weight 60%.

Mr. Baker then said that many railroad car builders have ceased to buy primers. They are buying painting systems on a test-run basis from approved manufacturers whose painting systems have been tested. Buying is based on cost of painting system rather than on cost of primer and top coats. They usually desire to spend \$3.00 for the system. Some zinc chromate is being used in these paints. Since this is going to be a matter of suggesting a paint system we will have to recommend a top coat also. Prospects of lowering the cost of the primer coat indicates that it might be possible to include red lead in the top coats for both Pennsylvania Red and Black.

Mr. Wormser asked if we have enough information to make recommendations without further research.

Mr. Shobe suggested that an article prepared for a railroad magazine on the work done to date would form a basis for establishing future objectives.

Mr. Baker then said that at Wilmington, railroad shops have been disappointed with proprietary paints and have gone back to pure red lead paint. If we had some intermediate cost paint to recommend it would be helpful in retaining the red lead business.

Mr. Shobe said that the two-coat systems offered by various companies are not designed to take the place of red lead but to be a better paint than the cheap paints.

Dr. Carriak suggested that atmospheric exposure tests be set up in Florida along with the underwater tests.

Mr. Baker said that the manager of the Inside Gas and Light Co. of St. Louis was willing to expose panels adjacent to gas holders or to arrange to paint sections of the gas holders with sample formulations if this group wishes to make such a test.

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Dr. Carrick asked the members to think this matter over and make recommendations of paint systems for this use.

Mr. Baker said that oil storage tanks in certain areas in Texas also use red lead.

Dr. Carrick asked if there would be a change of getting test paints applied to oil storage tanks.

Mr. Baker said it could certainly be arranged.

This closed the general discussion of the prepared agenda.

Dr. Carrick said that he has twelve vehicles submitted to him by the Bakelite Co. for use in experimental red lead formulations. Eight of these have never been used before and were obtained through the interest of the Bakelite Co. in determining what resins are suitable for use with red lead. The Bakelite Co. were an important factor in promoting zinc chromate.

The meeting then adjourned after planning to hold the next meeting in this office on July 21.

L. L. Carrick

L. L. Carrick
Director of Red Lead Research