

LEAD INDUSTRIES ASSOCIATION

480 LEXINGTON AVENUE

NEW YORK 17, N. Y.

RED LEAD DIVISION

FINAL DRAFT

CONFIDENTIAL

RED LEAD TECHNICAL COMMITTEE

New York, New York

December 8, 9, 1949

A meeting of the Red Lead Technical Committee was held on December 8 and 9, 1949 in the offices of the Lead Industries Association. The following persons were present:

Present

Mr. George Diehlman
Mr. A. C. Goets
Dr. J. O. Johnston
Mr. G. F. Shobe

Representing

National Lead Company
Eagle-Picher Company
Hammond Lead Products
The Glidden Company

Dr. L. L. Carrick, Director of Red Lead Research, Meeting Chairman
Mr. Robert L. Siegfeld, Secretary, Lead Industries Association
Mr. C. J. Vander Valk, Technical Director, Red Lead Division

REVIEW OF FLORIDA DATA ON NAVY PROJECTS

Inspection data was submitted to the members of the committee by Mr. Diehlman on Lead Industries Association primer paints exposed in Florida as part of Projects 16 and 17.

Both of these projects were initiated by the Bureau of Ships of the U. S. Navy to develop improved anticorrosive paint systems for all exterior surfaces of naval vessels.

Project No. 16 is composed of thirty-seven bottom paint systems exposed on 10 in. by 12 in. panels at complete immersion at five sites on the Atlantic coast. These exposure sites are Miami, Florida, Wrightville Beach, North Carolina, Yorktown, Virginia, Solomons, Maryland and Sayville, New York. Fifteen of the systems were submitted by the Red Lead Technical Committee. The composition of the Lead Industries Association systems and the Navy control systems are included with the performance data in the report attached to these minutes.

Project No. 17 is composed of twenty-two primer paints applied to 6 in. by 12 in. steel panels to a dry film thickness of approximately three mils. These paints are exposed vertically at tide level and at a forty-five degree angle to the atmosphere at Miami, Florida and Sayville, New York. Nine of these primers were submitted by the Red Lead Technical Committee. The composition and performance data on the Lead Industries Association paints and the Navy control paints are included in the report attached to these minutes.



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A review of the performance data for approximately nine months exposure in Florida revealed the following:

Total Immersion

Among the outstanding bottom paint systems are two submitted by the Lead Industries Association. These systems have performed better than all the Navy control systems applied at comparable film thicknesses (10 mils) and have performed at least as well as the hot plastic systems applied at three times the film thickness (30 mils).

One outstanding system is composed of a basic zinc chromate metal conditioner applied over sandblasted steel followed by L.I.A. Primer 328 and Navy Cold Plastic Antifouling Paint 105. L.I.A. Primer 328 has the following composition:

PIGMENT:	Red Lead (97%)	47.0%
	Zinc Yellow	8.8%
	Zinc Oxide	8.3%
	Magnesium Silicate	27.2%
	Mica (325 Mesh)	8.3%
	Aluminum Stearate	0.4%
		100.0%

VEHICLE:	Omar V-24	25.4%
	Omar P-10	8.7%
	Liquid Coal Tar	8.9%
	Zinc Resinate	1.2%
	Chlorinated Rubber	6.3%
	Petroleum Naphtha	46.7%
	Pine Oil	0.8%
		100.0%

Pigment (by wt.)	51.9%
Vehicle (by wt.)	48.1%
Wt./Gal.	13.6 lbs.
PV	34.5%
Volatile and Drier in Vehicle	47.5%

The other outstanding system is composed of a basic zinc chromate metal conditioner applied over sandblasted steel followed by L.I.A. Primer 336 and L.I.A. Antifouling 337. L.I.A. Primer 336 has the following composition:

PIGMENT:	Red Lead (97%)	100%
VEHICLE:	Polyvinyl Chloride-	
	Acetate (VACN)	19.4%
	Methyl Isobutyl	
	Ketone	51.9%
	Toluene	20.1%
		100.0%

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Pigment (by wt.).....22.1%
Vehicle (by wt.).....77.9%
Wt./Gal.....9.2%
PV.....18.8%
Volatile Drier in Vehicle.....80.6%

L.I.A. Antifouling 337 has the following composition:

PIGMENT: Cuprous Oxide 100.0%
VEHICLE: Polyvinyl Chloride -
Acetate (VINYL) 15.2%
Rosin 15.2%
Methyl Isobutyl Ketone 35.0%
Toluene 34.6%
100.0%

Pigment (by wt.).....59.8%
Vehicle (by wt.).....40.2%
Wt./Gal.....15.5 lbs.
PV.....49.3%
Volatile and Drier in Vehicle.....69.6%

Tide Level

The outstanding Lead Industries Association primers after nine months' Florida tide level exposure were L.I.A. 321 and L.I.A. 324. These primers were superior in performance to the Navy control paints when applied over identically prepared surfaces.

Included among the control paints were Navy Formula 84/h7 (now Joint Army-Navy Spec. Jan-P-735), Navy Spec. 52-P-15, and Maritime Commission Specification 52-MC-201. The formulations of the two best L.I.A. primer paints to date are given below:

L.I.A. 321

PIGMENT: Red Lead (97%) 53.6%
Zinc Yellow 10.0%
Zinc Oxide (Lead Free) 8.0%
Graphitic Mica 24.7%
Raw Sienna 4.0%
Magnesium Silicate 9.4%
Aluminum Stearate 0.3%
100.0%

VEHICLE: Polyvinyl Chloride-
Acetate (VACN) 4.7%
Vehicle No. 27
(Castor Oil Alkyd) 42.5%
Petroleum Naphtha 17.1%
Ethyl Butyl Ketone 35.0%
Driers 0.6%
Antiskinning Agent 0.1%
100.0%

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Pigment (by weight).....37.0%
 Vehicle (by weight).....63.0%
 Wt./Gal.....10.9 lbs.
 PV.....3%
 Volatile and Drier in Vehicle.....73.5%

L.I.A. 325

PIGMENT:	Red lead (97%)	53.0%
	Zinc Yellow	10.0%
	Zinc Oxide (Lead Free)	8.0%
	Graphitic Mica	15.0%
	Raw Sienna	4.0%
	Magnesium Silicate	9.7%
	Aluminum Stearate	0.3%
		100.0%

VEHICLE:	Alkyd Resin Solutions	42.3%
	Vehicle No. 27 (Castor Oil Alkyd)	29.6%
	Raw Linseed Oil	7.1%
	Mineral Spirits	18.9%
	Driers	1.9%
	Antiskinning Agent	0.2%
		100.0%

Pigment (by weight).....48.8%
 Vehicle (by weight).....51.2%
 Wt./Gal.....13.0 lbs.
 PV.....3%
 Volatile and Drier in Vehicle...52.9%

Atmospheric

After nine months' exposure to a Florida atmosphere, all of the L.I.A. paints, with only one exception, were found in perfect condition. The lone exception was L.I.A. No. 325 consisting of a red lead base mixed pigmentation in an alkyd vehicle conforming to Navy Specification S2-N-13a, Grade I. All of the L.I.A. formulations are given in detail in the report accompanying these minutes.

After reviewing the Florida data and noting the generally favorable results the Committee decided that the results of these projects should be followed very closely and every effort be made to have the Bureau of Ships conduct service tests to evaluate the outstanding red lead base paints under practical conditions. Also to encourage the Bureau to publicize the data in reports before technical societies.

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REVIEW OF CONDITION OF PAINTED SPECIMENS IN COMPREHENSIVE ATMOSPHERIC EXPOSURE PROGRAM (PROJECT NO. 14)

A written report was submitted to the Committee by the technical director summarizing the inspection results after one year at all five sites. This was supplemented by the projection of Kodachrome slides of all specimens showing significant deterioration at South San Francisco and by five diameter photographic enlargements of checked panel areas at Joplin.

The high incidence of corrosion at the South San Francisco site and the failure of certain paints at Joplin by checking were cause for reconsideration of the previously adopted plans for publicizing this project.

The originally adopted plans called for publication of a report before the end of the year (1949) describing the details of the project including paint compositions, exposure specimens and paint application. This report was to be circulated to several thousand individuals interested in formulation, specification and purchase of metal protective paints. This initial descriptive report was to be followed at intervals of approximately six months with progress reports containing the inspection data and pertinent comments on performance of the paints at all five test sites.

A review of the first year data revealed that the high incidence of corrosion at the San Francisco site was accompanied by many discrepancies in dry film thicknesses. Most of the seriously affected areas contained less paint than the 1.5 mils specified in the original project instructions. Also, all of the severely checked systems at Joplin were found to contain paint thicknesses far in excess of the prescribed amount.

Because the unexpected and unprecedented failure after one year of atmospheric exposure of paints based both on red lead and other pigments was traceable in large part to impractical film thicknesses, it was decided to eliminate the Joplin and San Francisco sites from the wide scale publicity releases. Thus the initial descriptive report and subsequent progress reports would cover the specimens exposed at Cleveland, New Orleans and Sayville.

It was then proposed and agreed that all publicity releases on the remaining three sites should be held in abeyance until another complete inspection has been made in the early spring, probably in March, 1950.

Since the primer paint conforming to Federal Specification TT-P-86, contained on panel 260, is wrinkled and checked at New Orleans and because this specification has been superseded by Federal Specification TT-P-86a, it was decided to eliminate this paint from the project at all sites.

Because the elimination of the Joplin site leaves Sayville as the only site of exposure with the four types of paint conforming to the new Federal Specification TT-P-86a, it was decided to expose specimens containing these paints at Cleveland and New Orleans at the earliest possible date and to include the performance data on these paints at all three sites in publicity releases.

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It was further agreed to limit the published performance data on the complete vinyl system (wash primer, red lead-vinyl anticorrosive and aluminum-vinyl finish coat) to the three multiple coat areas only. This decision was based on the knowledge that the red lead-vinyl anticorrosive is not designed to give adequate protection in thicknesses only approximately single shop coats.

NEWLY REVISED RESOLUTIONS FOR LABELING PAINTS CONTAINING RED LEAD

At the Red Lead Technical Committee meeting held on July 1, 1949 a set of resolutions was adopted for the labeling of paints containing various proportions of red lead. These resolutions constituted a revision of those adopted by the Red Lead Division in 1945 at the request of the National Paint, Varnish and Lacquer Association. The new resolutions differ from those previously filed with the N.P.V.L.A. in that they allow the use of the term "Red Lead Paint" for labeling paints containing 75 percent or more red lead by weight in the pigmentation. The 1945 resolutions specified that labels for paints containing less than 90% red lead in the pigmentation contain the qualification "modified". The new broadened resolutions were formulated to keep in step with the development of high quality mixed pigment red lead paints developed in recent years to supplement pure red lead paints for various specific needs such as fast drying, increased resistance to water immersion and increased abrasion resistance. An example of such a quality paint known to give excellent performance on surfaces immersed in fresh water and in corrosive industrial atmospheres is Type IV of Federal Specification TT-P-86a. This formula contains 85% red lead by weight of the pigmentation.

After adoption by the committee the proposed resolutions were circulated to the sales management personnel of the Red Lead Division for comment or approval.

At the meeting of the Technical Committee held on September 9, 1949, it was reported that the new resolutions had been approved by a majority of the companies circularized. The committee then advised Mr. Zigfeld and the technical director to bring the new resolutions to the attention of the N.P.V.L.A. and investigate the feasibility of:

- (1) Having the new resolutions placed on file with the N.P.V.L.A. for possible future reference by the Federal Trade Commission.
- (2) Having these resolutions called to the attention of the members of the N.P.V.L.A. in one of their circulars, preferably through the Scientific Section.

Mr. Zigfeld reported to the committee members that he and the technical director had discussed these points with Mr. M. Q. Macdonald, Legal Counsel of the N.P.V.L.A., on November 30. At that meeting Mr. Macdonald suggested that a letter be written to General J. F. Battley, President of the N.P.V.L.A., requesting the concurrence of his association on these labeling policies. Mr. Macdonald also said he thought it advisable to inform Mr. E. F. Nickson, Chairman of the Federal Specifications Board, of these new labeling policies and seek his cooperation in supporting the resolutions.

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The members of the Red Lead Technical Committee were also told that Mr. Macdonald advised very strongly that we refrain from sounding out the Federal Trade Commission on the subject of labeling red lead base paints. He said that we could not gain any advantage by doing this and that certain members of the Commission might resent such a course of action.

After hearing Mr. Ziegfeld's report the Technical Committee agreed that the technical director should discuss these labeling policies with Mr. Erickson and that Mr. Ziegfeld should request the concurrence of the Paint Association in a letter to General Battley.

REVIEW OF TECHNICAL PAPER ON THE PAINTING OF GALVANIZED IRON

A draft of a proposed technical paper or article on red lead base primer paint for galvanized iron was reviewed by the Committee. This paper was based on the exposure data on several red lead base and zinc dust base paint systems exposed at Sayville, Long Island for approximately three years.

It was decided that this paper should be redrafted for presentation before local Paint Production Clubs placing emphasis on the following points:

- (1) Quick drying type red lead base paints are particularly effective for painting weathered galvanized surfaces particularly where initial rusting of the steel base metal has occurred, since they are known to be unsurpassed as rust inhibitive paints on ferrous surfaces and can be depended upon to adhere to the zinc coating.
- (2) Although zinc dust paints are used extensively as protective coatings for zinc surfaces, field tests show that they rate poorly for corrosion inhibition of ferrous surfaces. This limits their usefulness on metallic zinc coatings which have weathered to the point where rusting of the base steel has occurred and also for the painting of structures made up of both galvanized metal and structural steel.
- (3) Zinc dust and red lead can be combined successfully in primer formulations with the resultant advantages of primers based on either of these pigment materials used separately.

REPORT ON INTERVIEW WITH BRIDGE ENGINEER OF THE SAN FRANCISCO - OAKLAND BAY BRIDGE

The technical director reported on an interview with Mr. Carl E. Hamilton, Senior Bridge Engineer of the San Francisco - Oakland Bay Bridge. During this interview Mr. Hamilton outlined the maintenance painting procedures on the Bay Bridge.

This bridge was completed in 1937 and consists of a combination of a cantilever-truss span and two complete suspension bridges placed end to end. The total length of the Oakland Bay Bridge, without approaches, measures 4.3 miles and contains 17,000,000 square feet of structural steel surface. The steel was sandblasted before receiving the shop coat of red-lead-in-oil. After erection the structure was painted with

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another coat of the red lead primer throughout and with two coats, making a total of three, on members considered to have the most rigorous exposure. Two coats of aluminum paint (2.5 lb. flake aluminum paste per gallon of phenolic vehicle) were applied as finish coats.

The same red lead primer (20 lb. per gallon) is used for maintenance. In addition to the red lead this paint also contains metallic leafed lead to the extent of three percent by weight of the pigmentation. This is added as a flattening agent to give better "teeth" for subsequent paint coats.

Surfaces that are rusted are sandblasted and given two or three coats of red lead and two coats of aluminum. Surfaces that are due for painting according to the normal schedule but are not rusted are washed down to remove salt deposits and are then painted with a coat of red lead followed by a coat of aluminum finish paint.

Mr. Hamilton stated that he was well pleased with the performance of the present system and considers red lead paints the most fool proof for the protection of such a massive structure exposed to a rigorous marine atmosphere. However, since the use of a comparatively slow drying oil vehicle paint requires considerable costly moving and relocation of scaffolding, he is considering the use of a red lead primer with a faster drying vehicle. His aim is the application of two primer coats in an eight hour working day. Because of adverse experimental experiences with alkyl base mixed pigment paints, Mr. Hamilton is wary of alkyl vehicles and prefers quick drying paints based on phenolic varnishes.

After hearing this report the Red Lead Technical Committee agreed that it would be advantageous to ask Mr. Hamilton's cooperation in applying a few carefully selected Lead Industries Association fast drying synthetic vehicle paints over test areas on the bridge to ascertain the best system for an accelerated painting schedule.

The technical director said that he would write Mr. Hamilton offering our cooperation in developing an acceptable fast drying red lead primer formula and report the results to the Committee at the next meeting.

INSPECTION OF LEAD PAINTS ON ALUMINUM SIDING

Mr. Goets and the technical director reported on a trip on December 1 to inspect paint exposure tests on aluminum siding at the Reynolds Metal Company Research Laboratory at Glen Cove, Long Island.

This test is comprised of ten 8 ft. x 8 ft. painted aluminum panels exposed vertically facing south on the former Charles Pratt Estate at Glen Cove. The panels were fabricated from eight inch 35 aluminum alloy interlocking siding. For comparison purposes the same paint systems were exposed on panels of the same dimension constructed of both 8 in. spruce novelty siding and galvanized iron sheet.

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The exposed systems include several well known brand name house paints, a corrosion inhibitive type metal protective system, and white lead in oil. The pigmentations ranged in lead pigment content from one hundred percent to zero.

The panels had been exposed for approximately two years at the time of inspection.

The results of the test were summarized as follows:

All of the paint systems showed good performance after two years exposure on both the aluminum and wood surfaces. The presence of lead pigments, reported as deleterious in some quarters, had no adverse effect on the performance of the paints on the aluminum panels at Glen Cove.

The pure white lead system had weathered in its characteristic manner by surface checking and uneven chalk formation on both the metal and wood surfaces.

In a few cases localized peeling was noted on the galvanized panels.

The technical director said that a detailed report on this inspection would be prepared and circulated to the Committee members in the near future.

NEXT MEETING

It was decided to set February 9 and 10, 1950 as the next tentative meeting dates.

The meeting was adjourned at 4:00 P.M. on December 9.

C. J. Vander Valk
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Technical Director