

LEAD INDUSTRIES ASSOCIATION

66 EAST 42ND STREET

NEW YORK 17, N. Y.

February 5, 1960

SUBJECT: SUMMARY OF L.I.A.
PROJECT 23

To Members of the Lead Pigments Technical Committee:

At the meeting of the Committee on September 30, 1959, the secretary was instructed to prepare a report on the calcium phosphate test results and submit it to the Committee for approval.

I have now prepared a draft of the Termination Report of L.I.A. Project 23, as attached. To facilitate making any revisions, I am sending this report to you in duplicate so that one copy may be returned to us with your comments.

Your suggestions and comments will be appreciated. If we do not hear from you by February 23, we will assume that you approve the draft as submitted.

Sincerely yours,

David M. Borcina

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Secretary, Lead Pigments Technical Committee

LEAD INDUSTRIES ASSOCIATION

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NEW YORK 17, N. Y.

FIRST DRAFTFebruary 5, 1960L.I.A. PROJECT 85TERMINATION REPORTCALCIUM PLUMBATE-RUSTOLEUM-RED LEAD
PAINT INVESTIGATION

This project was exposed to compare the performance of calcium plumbate and Rustoleum #769 with several red lead primers and TT-P-641b, Type I, Zinc Dust, Zinc Oxide. Exposures were one and two coats of primer, top-coated and untap-coated, on solvent washed new galvanized, and on 100 per cent rusted steel, wire brushed.

PAINTS AND TEST CONDITIONSPAINT NO. FORMULATION

2501	Composition	Paint Per Cent	Pigment Vehicle Per Cent
	Calcium plumbate	(53.40	76.00
	Rustion C.R.	{ 3.90	5.50
	No. 1 Barytes	70.30 { 6.60	9.40
	Asbestos substitutes	{ 6.40	9.10
			<u>100.00</u>
	20/30 Pale linseed stand oil	4.80	16.20
	Pale boiled linseed oil	9.60	32.20
	Acid refined linseed oil	7.10	23.90
	White spirit	6.60	22.30
	Aluminum stearate	0.30	1.00
	Lead naphthenate solution (10% Pb)	1.00	3.40
	Cobalt naphthenate solution (3% Co)	0.30	1.00
		<u>100.00</u>	<u>100.00</u>
2502	Same formulation as 2501 with red lead substituted for calcium plumbate on a volume basis.		
2503	A red lead mixed pigment formulation, competitive in cost with the calcium plumbate paint containing approximately 60-70 per cent red lead, about 15 per cent iron oxide and about 15 per cent asbestos.		
2504	Rustoleum No. 769.		

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PAINT NO.
2505FORMULATION
L.I.A. 9-1

<u>Composition</u>	<u>Pounds</u>	<u>Pigment Vehicle</u> <u>Per Cent</u>
Red lead, 97% grade	991.00	30.00
Siliceous iron oxide,		
85% Fe ₂ O ₃	295.00	15.00
Aluminum stearate	9.80	0.50
*Zinc dust (Federal Specification TT-2-291)	1,070.00	54.50
		<u>100.00</u>
Raw linseed oil	241.00	49.00
Alkyd resin solution (Federal Specification TT-2-266, Type I, Class A)	168.00	34.20
Mineral spirits	76.10	15.50
Lead naphthenate (24%)	4.40	0.90
Cobalt octoate (6%)	2.00	0.40
	<u>2,457.30</u>	<u>100.00</u>

Pigment - 80%
 Vehicle - 20%
 Wt./gal. - 16.90 lb. (without zinc dust)
 PV - 43.30

*Zinc dust is to be packaged separately and mixed with paint at time of use.

2506

L.I.A. 9-4

<u>Composition</u>	<u>Pounds</u>	<u>Pigment Vehicle</u> <u>Per Cent</u>
Red lead, 97% grade	1,007.00	50.00
Aluminum stearate	9.90	0.50
*Zinc dust (Federal Specification TT-2-291)	997.00	49.50
		<u>100.00</u>
Raw linseed oil	238.00	46.50
Alkyd resin solution (Federal Specification TT-2-266, Type I, Class A)	168.00	32.75
Mineral spirits	101.00	19.50
Lead naphthenate (24%)	4.90	0.87
Cobalt octoate	2.00	0.38
	<u>2,527.80</u>	<u>100.00</u>

Pigment - 79.70%
 Vehicle - 20.30%
 Wt./gal. - 18.40 lb. (without zinc dust)
 PV - 41.40

*Zinc dust to be packaged separately and mixed with paint at time of use.

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PAINT NO. FORMULATION
 2906 17-7-5415, zinc dust, zinc oxide.

TEST SITES: Joplin, Mo., Chalmette (New Orleans), La. and Perth Amboy, N.J.

PANELS: New untreated galvanized sheet.
 Rusted steel plate, sand blasted and rusted, wire brushed.

EXPOSURE: 45 degrees, south.

TOP COAT: Massachusetts green.

APPLICATION OF PAINTS:PANEL AREAS

2	1
1	4

Area 1 - One coat of primer.

Area 2 - Two coats of primer.

Area 3 - Two coats of primer,
one top-coat.Area 4 - One coat of primer,
one top-coat.LENGTH OF EXPOSURE:

The panels were exposed at Joplin in October, 1957, and those at Chalmette and Perth Amboy, in November, 1957.

Final inspection at all sites was made in June, 1959.

SUMMARY

A summation of the test results and the actual final inspection ratings at each location follows. The summary will refer only to the rust ratings of the paints on the wire brushed panels and to the flake ratings of the paints on the galvanized panels. The actual inspection reports, however, include data on chalking of the paint on the wire brushed panels and rusting of the galvanized panels. A rating of 10 is perfect and 5 or less indicates failure.

JOPLIN, MO.

On the 100 per cent rusted, wire brushed panels, paint 2901 (calcium plumbate) provided rather poor corrosion protection with a rating of 6 in area 1 (one primer coat), followed closely by paint 2904, (Rustoleum), a rating of 7. All other primers were rated better. In area 2 (two primer coats), area 3 (two primer coats, one top-coat), and area 4, (1 primer coat, one top-coat), the cor-

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rosion ratings of paints 2501 and 2504 were also significantly poorer than all other primers on test.

On the new galvanized, solvent washed panels, paint 2504 (Barstolcum) was flaking badly in area 1, with a rating of 7, while all other primers were rated at 10. However, paint 2501 (calcium plumbate), had developed cracks in areas 1 and 2, signifying early breakdown.

The final inspection ratings at Joplin follow:

L.I.A. PROJECT 23

JOPLIN, MISSOURI

Exposure: 15° South
Exposed: October, 1977
Final Inspection: June, 1979

100% Rust - Wire Brushed

Paints	AREAS							
	1		2		3		4	
	Chalk	Rust	Chalk	Rust	Chalk	Rust	Chalk	Rust
2501*	6	6	6	7	6	9	6	9
2502	6	9	6	10	6	10	6	10
2503	6	9	6	10	6	10	6	10
2504	6	7	6	9	6	9	6	8
2505	10	9	10	10	6	10	6	10
2506	10	8	10	10	6	10	6	10
2508	10	9	10	10	6	10	6	10

* Paint 2501 - Area 2 - 8 Crack

New Galvanized - Solvent Washed

Paints	AREAS							
	1		2		3		4	
	Rust	Flake	Rust	Flake	Rust	Flake	Rust	Flake
2501*	10	10	10	10	10	10	10	10
2502	9	10	10	10	10	10	10	10
2503	10	10	10	10	10	10	10	10
2504	10	7	10	3	10	8	10	10
2506	10	10	10	10	10	10	10	10
2508	10	10	10	10	10	10	10	10

* Paint 2501 - Area 1 - 7 Crack; Area 2 - 3 Crack

FIRST DRAFTFebruary 9, 1969CHALMETTE, LA.

At this exposure site, highly humid, warm climate, paints 2501 and 2504 performed very poorly on both rusted and galvanized panels.

On the rusted, wire brushed panels, area 1, paint 2504 showed total and complete failure, rated 0, with paint 2501 rated 3, providing very little if any protection. The corrosion ratings for both these paints in areas 2, 3 and 4, were also significantly poorer than the other primers.

On the new galvanized panels, area 1, paint 2501 was flaking very badly, rated 4, and paint 2504, with a 7 rating, was not much better. On area 2, flaking was even more advanced with these two paints, 2501 being rated at 2, and 2504, with complete loss of adhesion, rating 0. In addition, cracks had developed in paint 2501 in areas 3 and 4. All other primers had performed excellently with ratings of 10 on all panel areas.

The final inspection ratings at Chalmette, La. follow:

L.I.A. PROJECT 22CHALMETTE, LA.

Exposure: 45° South
Exposed: November, 1977
Final Inspection: June, 1979

100% Rust - Wire Brushed
AREAS

<u>Paints</u>	<u>1</u>		<u>2</u>		<u>3</u>		<u>4</u>	
	<u>Chalk</u>	<u>Rust</u>	<u>Chalk</u>	<u>Rust</u>	<u>Chalk</u>	<u>Rust</u>	<u>Chalk</u>	<u>Rust</u>
2501*	6	3	6	3	7	7	7	6
2502	9	8	9	8	7	10	7	9
2503	7	9	7	9	7	10	7	10
2504	-	0	6	6	7	7	7	3
2505	9	8	9	9	7	9	7	9
2506	9	8	9	9	7	9	7	8
2508	10	8	10	9	7	9	7	9

* Paint 2501 - Area 2 - 5 Flake

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CHADWICK, LA. (CONTINUED)Pre Galvanized - Solvent Washed

Paints	AREAS							
	1		2		3		4	
	Rust	Flake	Rust	Flake	Rust	Flake	Rust	Flake
2501*	10	4	10	2	10	10	10	10
2502	9	10	10	10	10	10	10	10
2503	10	10	10	10	10	10	10	10
2504**	10	7	10	0	10	8	10	10
2505	10	10	10	10	10	10	10	10
2506	10	10	10	10	10	10	10	10
2508	10	10	10	10	10	10	10	10

* Paint 2501 - Area 3 - 7 Crack; Area 4 - 9 Crack
 ** Paint 2504 - Complete loss of adhesion on Area 2.

PERTH AMBOY, N.J.

At this exposure site, industrial atmosphere, paint 2501 performed comparatively better than it did at the other test locations on the rusted steel panels and perfectly on the galvanized panels. Paint 2504, on the other hand, performed about as poorly here as it did at the other locations.

On the rusted, wire brushed panels, area 1, paint 2508 (TT-P-641b, Type I) zinc dust-zinc oxide exhibited almost complete failure with paints 2504, 2505 (L.I.A.9-1, and 2506 (L.I.A.9-4) not much better. Paint 2501 was rated at 7 with only two other primers performing better. These paints, with a rating of 9, were 2502 (red lead replacing calcium plumbate) and 2503 (red lead, iron oxide replacing calcium plumbate on a cost basis). On areas 2, 3, and 4, all primers were rated at 10 with one exception, paint 2508 rated at 7 in area 2.

On the new galvanized panels, paint 2504 was flaking badly in areas 1, rating 3, area 2, rating 1 and breaking down in area 4 where it was rated at 8. All other primers had performed excellently with ratings of 10.

The final inspection ratings at Perth Amboy follow:

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L.I.A. PROJECT 83

FENTH AMBOL, N. J.

Exposure: 450 South
Exposed: November, 1957
Final Inspection: June, 1959

100% Rust - Wire Brushed

Paints	AREAS							
	1		2		3		4	
	Chalk	Rust	Chalk	Rust	Chalk	Rust	Chalk	Rust
2501	5	7	5	10	10	10	10	10
2502	10	9	10	10	10	10	10	10
2503	9	9	10	10	10	10	10	10
2504	9	3	7	10	10	10	10	10
2505	10	8	10	10	10	10	10	10
2506	6	3	6	10	10	10	10	10
2508	10	1	7	7	10	10	10	10

New Galvanized - Solvent Washed

Paints	AREAS							
	1		2		3		4	
	Chalk	Rust	Chalk	Rust	Chalk	Rust	Chalk	Rust
2501	10	10	10	10	10	10	10	10
2502	10	10	10	10	10	10	10	10
2503	10	10	10	10	10	10	10	10
2504	10	3	10	1	10	10	10	8
2505	10	10	10	10	10	10	10	10
2506	10	10	10	10	10	10	10	10
2508	10	10	9	10	10	10	10	10