

LEAD INDUSTRIES ASSOCIATION

400 LEONINGTON AVENUE

NEW YORK 17, N. Y.

RED LEAD DIVISION

November 22, 1949

SUBJECT: REPORT ON FIRST
ON-SITE INSPECTION
OF PROJECT NO. 14

To The Members Of The Red Lead Technical Committee

A report on the first year's performance of the primed paints in Lead Industries Association Project No. 14 is attached. This report was prepared following the completion of a personal inspection tour of all five exposure sites.

The report shows considerable variation in performance of identical paint compositions at the different exposure locations. A few of these inconsistencies are undoubtedly due to differences in climate and environment. San Francisco in particular seems to offer an unusually rigorous exposure.

However film thickness measurements made at San Francisco and in a few cases at Joplin indicate that many of the failures occurred on paints applied at thicknesses considerably under or over the prescribed 1.5 mils $\pm$ 10%. Several of the seriously corroded single primer coat areas at San Francisco contained less than 1 mil of paint. This applies to red lead base paints as well as paints based on zinc chromate and other pigments. Also, three paints showing checking on the exposed primer areas at Joplin were applied at dry film thicknesses considerably in excess of 1.5 mils.

In view of these unanticipated adverse results, we think it advisable that the members of the Red Lead Technical Committee reconsider previously adopted plans for publicizing this project. This has been placed on the agenda for the next Committee meeting on December 8.

Very truly yours,

C. J. Anderson

N2811

CONFIDENTIAL REPORT
TO NEW LEAD TECHNICAL COMMITTEE

L. I. A. PROJECT NO. 14

First General Inspection

Inspection Dates: August 26, 1949 - Cleveland (with G. F. Shobe
and E. Atwood)

September 7, 1949 - Sayville (with R. L. T. Co.)

October 10, 1949 - New Orleans (with J. Pedarros)

October 12, 1949 - Joplin (with L. L. Carrick)

November 8, 1949 - San Francisco (with W. Halfrich)

Reported by: C. J. Vander Valk
Date: Nov. 15, 1949

N2811.01

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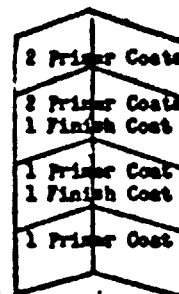
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INTRODUCTION

Project No. 14 is comprised of ninety-four primer paints atmospherically exposed at five sites. Flat panels are exposed at all sites. Angle iron specimens were placed on exposure at two locations, Joplin and Sayville.

The specimens were layed out in the following manner in order to obtain exposure of the primer in one and two coat thicknesses and under aluminum and white finish coats.

1 Primer Coat	2 Primer Coats
1 Finish Coat	1 Finish Coat
1 Primer Coat	2 Primer Coats



The specified film thickness was 1.5 mils $\pm$ 10% per coat for both the primer paints and finish paints. Each primer appears at each location on two flat panels, one with the aluminum finish coat and one with the white finish coat. Each primer appears at Joplin and Sayville on four angle specimens; two with the aluminum finish coat and two with the white finish coat.

All specimens were exposed at 45 degrees facing south between September 1 and October 1, 1948.

TABULATION OF DATA

With few exceptions, significant deterioration or failure was found only on the single coat primer areas and was confined to general corrosion. Therefore tabulation in this report is limited to corrosion ratings on exposed single coat areas. Paints showing significant deterioration in multiple coat systems are listed on page 12 following the summary table for the single coat areas.

Where impairment in performance indicated excessive or deficient film thicknesses, measurements were made with a Magna Gauge at the time of inspection. These measurements are tabulated in the "Summary Table of Inspection Data" for the Joplin and San Francisco sites.

The photographic reference standards for "Evaluating Degree of Resistance To Rusting Obtained With Paint On Iron Or Steel Surfaces" (A.S.T.M. Designations: D610-417) were used as the basis for rating the specimens at all exposure sites.

The seventy paints under study based on five vehicles are listed on the first three pages of the table. The twenty-four comparison paints, including several conforming to government specifications, are listed on the last page of the table.

Summary of ResultsSan Francisco

The following paints received corrosion ratings of 8 or less on the single coat primer area of at least one specimen at San Francisco.

Those marked with an asterisk are sufficiently rusted to rate five or less on at least one specimen. The numbers preceded by (-) indicate that at least one of the panels contains less than the prescribed film thickness of 1.5 mils - 10% or 1.35 mils.

Paints Under Study

- (-) 203 - 100% red lead in oil
- (-) 205 - 100% red lead in a mixed alkyd-phenolic vehicle.
- (-) 206 - 100% red lead in an alkyd vehicle.
- (-) 207 - 100% red lead in a modified phenolic vehicle extended with linseed oil.
- (-) 210 - 75% red lead in a mixed pigmentation containing a mixed alkyd-phenolic vehicle.
- (-) 211 - 75% red lead in a mixed pigmentation containing an alkyd vehicle.
- (-) 215 - 25% zinc chromate in a mixed pigmentation containing a mixed alkyd - phenolic vehicle.
- (-) 217 - 25% zinc chromate in a mixed pigmentation in a modified phenolic vehicle extended with linseed oil.
- (-) 227 - 49.5% zinc chromate in a mixed pigmentation in a modified phenolic vehicle extended with linseed oil.
- *228 - 24.5% zinc chromate in a mixed pigmentation containing an oil vehicle.
- 229 - 24.5% zinc chromate containing an oil extended alkyd vehicle.
- (-) 232 - 24.5% zinc chromate in a mixed pigmentation contained in a modified phenolic vehicle extended with linseed oil.
- (-) 235 - 24.5% red lead in a mixed pigmentation contained in a mixed alkyd - phenolic vehicle.
- 238 - 54.5% red lead in a mixed pigmentation contained in an oil vehicle.
- (-) 252 - 39.5% red lead in a mixed pigmentation contained in a modified phenolic vehicle extended with linseed oil.
- 254 - 14.5% zinc chromate in a mixed pigmentation contained in a mixed alkyd-phenolic vehicle.
- (-) 257 - 14.5% zinc chromate in a mixed pigmentation contained in a modified phenolic vehicle extended with linseed oil.
- 266 - 52.5% red lead in a mixed pigmentation contained in an oil vehicle.
- (-) 290 - 51.5% red lead in a mixed pigmentation contained in a modified phenolic vehicle extended with linseed oil.
- (-) 293 - 37.5% red lead in a mixed pigmentation contained in a mixed alkyd-phenolic vehicle.
- (-) 314 - 34.5% lead chromate in a mixed pigmentation contained in an alkyd vehicle.
- (-) 315 - 34.5% lead chromate in a mixed pigmentation contained in a modified phenolic vehicle extended with linseed oil.

Comparison Paints

- 858 - United States Maritime Commission Specification 52-MC-29.
- (-)e259 - 55.0% zinc chromate in a mixed pigmentation with an alkyl vehicle.
- (-)e260 - 65.0% zinc chromate in a mixed pigmentation with a phenolic vehicle.
- 261 - 25% zinc chromate in a mixed pigmentation with a phenolic vehicle.
- e262 - Federal Specification TT-P-641 (80% Zn dust, 20% ZnO-Oil)
- (-)e264 - 25% lead chromate in a mixed pigmentation with an alkyl vehicle.
- (-) 266 - 60% blue lead in a mixed pigmentation with linseed oil.
- (-) 267 - 57.4% blue lead in a mixed pigmentation with an alkyl vehicle.
- (-) 268 - Federal Specification TT-P-86.
- 297 - 72% leaded zinc in a mixed pigmentation with an alkyl vehicle.
- 299 - 72% B.C.W.L. in a mixed pigmentation with an alkyl vehicle.
- 301 - 72% B.S.W.L. in a mixed pigmentation with an alkyl vehicle.
- (-)e302 - Navy Dept. Specification 52-P-18.
- e307 - 100% red lead in vinyl. (wash primer was not applied)
- (-)e310 - Federal Specification TT-P-20 (100% blue lead in linseed oil)
- (-) 311 - Federal Specification TT-P-86a, Type IV.
- (-) 342 - 30% Ba-K chromate in an alkyl extended with oil.

Joplin

All of the paints under study received corrosion ratings of ten on the single primer coat areas on the flat panels at Joplin. However paint 203 showed considerable checking over the two coat primer area and was rated seven in this category. The single coat areas on both the aluminum and white finished panels contained less than the prescribed amount of paint, 1 and 0.9 mil respectively, while the two coat areas contained paint thicknesses in excess of the prescribed amount (3.6 and 3.4 mils respectively).

Among the comparison paints exposed at Joplin only two showed significant rusting on the single coat areas on the flat panels. These were 297 consisting of a leaded zinc pigmentation and 299 consisting of a basic carbonate white lead pigmentation, both in the same alkyl vehicle. Paints 268 (TT-P-86) and 310 (TT-P-20) were severely checked over the exposed primer areas. Both of these paints were applied at twice the originally specified thickness of 1.5 mils per coat.

Although corrosion on the flat specimens was virtually non-existent at Joplin, several of the angle iron specimens were rated eight or worse for general corrosion. Much of this corrosion apparently resulted from the presence of loosely adherent mill scale on the base specimens. This was indicated by the concentration of rust in small areas and by the wide difference in performance in many cases between two specimens carrying the same primer.

Paint 203 showed no checking on the angle specimens at Joplin. However paints 268 and 310 were seriously checked on both the flat specimens and angle specimens.

Paints at Joplin rated eight or worse for corrosion on single coated angle specimen areas were:

Paints Under Study

- 205 - 100% red lead in a mixed alkyd-phenolic vehicle.
- 207 - 100% red lead in an oil extended modified phenolic vehicle.
- 210 - 75% red lead in a mixed pigmentation contained in a mixed alkyd-phenolic vehicle.
- 218 - 34.5% zinc chromate in a mixed pigmentation with an oil vehicle.
- 221 - 34.5% zinc chromate in a mixed pigmentation contained in an alkyd vehicle.
- 225 - 49.5% zinc chromate in a mixed pigmentation with a mixed alkyd-phenolic vehicle.
- 234 - 24.5% red lead in a mixed pigmentation with an oil extended alkyd vehicle.
- 240 - 54.5% red lead in mixed pigmentation with a mixed alkyd-phenolic vehicle.
- 242 - 54.5% red lead in mixed pigmentation with an oil extended modified phenolic vehicle.
- 293 - 37.5% red lead in mixed pigmentation with a mixed alkyd-phenolic vehicle.
- 313 - 34.5% lead chromate in mixed pigmentation with a mixed alkyd-phenolic vehicle.

Comparison Paints

- 258 - United States Maritime Commission Spec. 52-MC-29.
- 267 - 57.4% blue lead in mixed pigmentation with an alkyd vehicle.
- 297 - 72.0% leaded zinc in mixed pigmentation with an alkyd vehicle.
- 299 - 72.0% B.C.W.L. in mixed pigmentation with an alkyd vehicle.
- 307 - 100% red lead in vinyl vehicle.
- 331 - Federal Specification TT-P-86a, Type IV.
- 340 - Joint Army-Navy Specification Jan-P-735 (Navy 84/b7).
- 351 - Federal Specification TT-P-86a, Type I.
- 353 - Federal Specification TT-P-86a, Type III.

New Orleans

No corrosion was observed on the single primer coat areas of the paints under study at New Orleans. Checking was also absent.

Checking was observed on the exposed primer areas with two comparison paints at the New Orleans site. These were 268 (F.S.TT-P-86) and 310 (F.S.TT-P-20).

Comparison paints showing serious corrosion at New Orleans on single primer coat areas were:

- 261 - 25% zinc chromate in mixed pigmentation with a phenolic vehicle.
- 263 - 80% zinc dust, 20% ZnO in an alkyd vehicle.
- 297 - 72% leaded zinc in mixed pigmentation with an alkyd vehicle.
- 299 - 72% B.C.W.L. in mixed pigmentation with an alkyd vehicle.

- 301 - 72% B.S.W.L. in mixed pigmentation with an alkyl vehicle.
- 307 - 100% red lead in vinyl vehicle.
- 310 - Federal Specification TT-P-30.

Cleveland

None of the panels exposed at Cleveland showed any general corrosion after one year exposure. However these panels contained a heavy collection of dirt.

The panels containing paints 297, 299 and 301, by far the poorest performing paints at the other locations, showed some edge corrosion at Cleveland but no general corrosion.

Sayville

All of the flat panels containing the primers under study at Sayville rated ten in general corrosion. No checking was observed on these panels.

Only a few of the comparison paints contained on the flat panels were seriously corroded. Those receiving ratings of eight or less were:

- 266 - 60% blue lead in mixed pigmentation with an oil vehicle.
- 297 - 72% leaded zinc in mixed pigmentation with an alkyl vehicle.
- 299 - 72% B.C.W.L. in mixed pigmentation with an alkyl vehicle.
- 301 - 72% B.S.W.L. in mixed pigmentation with an alkyl vehicle.
- 310 - Federal Specification TT-P-30.

As at Joplin, several of the angle specimens showed serious corrosion even though the identical system was unaffected on the cold rolled flat panels. This was probably due in large part to imperfections in the steel surfaces. Among the paints under study receiving general corrosion ratings of eight or less were:

- 205 - 100% red lead in a mixed alkyl-phenolic vehicle.
- 215 - 24.5% zinc chromate in a mixed pigmentation with a mixed alkyl-phenolic vehicle.
- 216 - 24.5% zinc chromate in a mixed pigmentation with an alkyl vehicle.
- 217 - 24.5% zinc chromate in a mixed pigmentation with an oil extended modified phenolic vehicle.
- 246 - 65% red lead in a mixed pigmentation with an alkyl vehicle.
- 254 - 50% iron oxide in a mixed pigmentation in an oil extended alkyl vehicle.

Among the comparison paints rated eight or less on angles at Sayville were:

- 263 - 80% zinc dust, 20% ZnO in an alkyl vehicle.
- 266 - 60% blue lead in mixed pigmentation with an oil vehicle.
- 297 - 72% leaded zinc in mixed pigmentation with an alkyl vehicle.
- 299 - 72% B.C.W.L. in mixed pigmentation with an alkyl vehicle.
- 301 - 72% B.S.W.L. in mixed pigmentation with an alkyl vehicle.
- 302 - Navy Dept. Spec. 53-P-18.
- 310 - Federal Specification TT-P-30.

SUMMARY TABLE OF INSPECTION DATA

SINGLE PRIORITY GAY AREAS

PAGE NO.	DAYVILLE		CLINTON PLAN	NEW CASTLE PLAN	JOPPIN				SAS FRANKFURT		TYPE FIGHTER STATION	TYPE VEHICLE	NOTES
	PLAN	ADLER			PLAN	PLAN		PLAN	PLAN				
						PLAN	PLAN						
2011 2012	10 20	10 20	20 20	20 20	10 20	10 20	10 20	10 20	0 20	1.0 0.0	2000	OIL	Two most primary areas showing 80 Joplin - Rating 2 Plan Union. 2-1.0 2-0.0
2013 2014	10 20	10 20	20 20	20 20	10 20	-	20 20	20 20	20 20	1.00 2.00			
2015 2016	20 20	20 0	20 20	20 20	10 20	-	20 0	0 0	0 0	1.0 0.0	2000	OIL AND MIL. FUEL	
2017 2018	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2019 2020	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2021 2022	10 20	10 20	20 20	20 20	10 20	-	0 20	0 20	0 20	1.0 1.0			
2023 2024	10 20	10 20	20 20	20 20	10 20	-	0 20	0 20	0 20	0.0 1.0	2000	OIL AND MIL. FUEL	
2025 2026	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 1.0			
2027 2028	10 20	10 20	20 20	20 20	10 20	-	0 20	0 20	0 20	0.0 1.0	2000	OIL AND MIL. FUEL	
2029 2030	10 20	10 20	20 20	20 20	10 20	-	0 20	0 20	0 20	0.0 1.0			
2031 2032	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	1.0 0.0	2000	OIL AND MIL. FUEL	3 miles. 80 Joplin - considerable well enough.
2033 2034	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2035 2036	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2037 2038	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2039 2040	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2041 2042	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2043 2044	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2045 2046	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2047 2048	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2049 2050	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2051 2052	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2053 2054	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2055 2056	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2057 2058	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2059 2060	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2061 2062	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2063 2064	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2065 2066	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2067 2068	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2069 2070	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2071 2072	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2073 2074	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2075 2076	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2077 2078	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2079 2080	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2081 2082	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2083 2084	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2085 2086	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2087 2088	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2089 2090	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2091 2092	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2093 2094	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2095 2096	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2097 2098	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2099 2100	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2101 2102	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2103 2104	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2105 2106	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2107 2108	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2109 2110	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2111 2112	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2113 2114	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2115 2116	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2117 2118	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2119 2120	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2121 2122	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2123 2124	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2125 2126	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2127 2128	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2129 2130	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2131 2132	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2133 2134	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2135 2136	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2137 2138	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2139 2140	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2141 2142	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2143 2144	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2145 2146	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2147 2148	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2149 2150	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2151 2152	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2153 2154	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2155 2156	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2157 2158	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2159 2160	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2161 2162	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2163 2164	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2165 2166	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2167 2168	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2169 2170	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2171 2172	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2173 2174	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2175 2176	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2177 2178	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2179 2180	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2181 2182	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2183 2184	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
2185 2186	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0			
2187 2188	10 20	10 20	20 20	20 20	10 20	-	0 0	0 0	0 0	0.0 0.0	2000	OIL AND MIL. FUEL	
218													

PANEL No.	KATYVILLE			CITY- LAND FLY	REV CITY- LAND FLY	JOPLIN				LAW FLY- FLY		TYPE FLYING STATION	TYPE VEHICLE	NOTES	
	FLY	ANGLE				FLY	CON.	FLY	FLY	FLY	FLY				FLY
		No. 1	No. 2												
2381 2382	30 30	30 30	30 0	10 10	30 30	30 30	- -	0 0	0 0	0 0	1.5 1.5	24.00	OIL		
2383 2384	30 30	30 30	30 10	30 30	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5				
2385 2386	30 30	30 30	30 10	30 30	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5	24.00	OIL AND ALYS		
2387 2388	30 30	30 30	30 10	30 30	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5				
2389 2390	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5	24.00	OIL AND ALYS		
2391 2392	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5				
2393 2394	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5	24.00	OIL AND ALYS		
2395 2396	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5				
2397 2398	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5	24.00	OIL AND ALYS		
2399 2400	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5				
2401 2402	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5	24.00	OIL AND ALYS		
2403 2404	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5				
2405 2406	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5	24.00	OIL AND ALYS		
2407 2408	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5				
2409 2410	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5	24.00	OIL AND ALYS		
2411 2412	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5				
2413 2414	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5	24.00	OIL AND ALYS		
2415 2416	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5				
2417 2418	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5	24.00	OIL AND ALYS		
2419 2420	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5				
2421 2422	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5	24.00	OIL AND ALYS		
2423 2424	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5				
2425 2426	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5	24.00	OIL AND ALYS		
2427 2428	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5				
2429 2430	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5	24.00	OIL AND ALYS		
2431 2432	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5				
2433 2434	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5	24.00	OIL AND ALYS		
2435 2436	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5				
2437 2438	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5	24.00	OIL AND ALYS		
2439 2440	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5				
2441 2442	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5	24.00	OIL AND ALYS		
2443 2444	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5				
2445 2446	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5	24.00	OIL AND ALYS		
2447 2448	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5				
2449 2450	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5	24.00	OIL AND ALYS		
2451 2452	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5				
2453 2454	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5	24.00	OIL AND ALYS		
2455 2456	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5				
2457 2458	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5	24.00	OIL AND ALYS		
2459 2460	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5				
2461 2462	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5	24.00	OIL AND ALYS		
2463 2464	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5				
2465 2466	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5	24.00	OIL AND ALYS		
2467 2468	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5				
2469 2470	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5	24.00	OIL AND ALYS		
2471 2472	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5				
2473 2474	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5	24.00	OIL AND ALYS		
2475 2476	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5				
2477 2478	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5	24.00	OIL AND ALYS		
2479 2480	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5				
2481 2482	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5	24.00	OIL AND ALYS		
2483 2484	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5				
2485 2486	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5	24.00	OIL AND ALYS		
2487 2488	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5				
2489 2490	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5	24.00	OIL AND ALYS		
2491 2492	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5				
2493 2494	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5	24.00	OIL AND ALYS		
2495 2496	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5				
2497 2498	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5	24.00	OIL AND ALYS		
2499 2500	30 30	30 0	30 10	30 10	30 30	30 30	- -	10 30	10 30	30 0	1.5 1.5				

PAPER NO.	BAYTILLS			CLEVE- LAND FLY	REV FLY	JOPLIN				SAS FLY		TYPE F. SHED- EATLON	TYPE VEHICLE	NOTES
	FLY	EDGE				FLY	FLY	FLY	FLY	FLY	FLY			
		No. 1	No. 2											
2041 2042	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 10	10 10	10 10	1.0 1.0	20.00	OIL	
2043 2044	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 10	10 10	10 10	1.0 1.0		20.00	OIL AND ALTS
2045 2046	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 10	10 10	10 10	1.0 1.0	20.00	ALTS AND FIREOLIC	
2047 2048	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 10	10 10	10 10	1.0 1.0	20.00	ALTS	
2049 2050	10 10	0 10	10 10	10 10	10 10	10 10	- -	10 10	10 10	10 10	0.0 1.0	20.00	OIL AND HOL FIREOLIC	
2051 2052	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 10	10 10	10 10	1.0 1.0	20.00	OIL	
2053 2054	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 10	10 10	10 10	1.0 1.0	20.00	OIL AND ALTS	
2055 2056	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 10	10 10	10 10	1.0 1.0	20.00	ALTS AND FIREOLIC	
2057 2058	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 10	10 10	10 10	1.0 1.0	20.00	ALTS	
2059 2060	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 10	10 10	10 10	1.0 1.0	20.00	OIL AND HOL FIREOLIC	
2061 2062	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 10	10 10	10 10	1.0 1.0	20.00	OIL	
2063 2064	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 10	10 10	10 10	1.0 1.0	20.00	OIL AND ALTS	
2065 2066	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 10	10 10	10 10	1.0 1.0	20.00	ALTS AND FIREOLIC	
2067 2068	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 10	10 10	10 10	1.0 1.0	20.00	ALTS	
2069 2070	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 10	10 10	10 10	1.0 1.0	20.00	OIL AND HOL FIREOLIC	
2071 2072	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 10	10 10	10 10	1.0 1.0	20.00	OIL	
2073 2074	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 10	10 10	10 10	1.0 1.0	20.00	OIL AND ALTS	
2075 2076	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 10	10 10	10 10	1.0 1.0	20.00	ALTS AND FIREOLIC	
2077 2078	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 10	10 10	10 10	1.0 1.0	20.00	ALTS	
2079 2080	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 10	10 10	10 10	1.0 1.0	20.00	OIL AND HOL FIREOLIC	
2081 2082	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 10	10 10	10 10	1.0 1.0	20.00	OIL	
2083 2084	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 10	10 10	10 10	1.0 1.0	20.00	OIL AND ALTS	
2085 2086	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 10	10 10	10 10	1.0 1.0	20.00	ALTS AND FIREOLIC	
2087 2088	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 10	10 10	10 10	1.0 1.0	20.00	ALTS	
2089 2090	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 10	10 10	10 10	1.0 1.0	20.00	OIL AND HOL FIREOLIC	
2091 2092	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 10	10 10	10 10	1.0 1.0	20.00	OIL	
2093 2094	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 10	10 10	10 10	1.0 1.0	20.00	OIL AND ALTS	
2095 2096	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 10	10 10	10 10	1.0 1.0	20.00	ALTS AND FIREOLIC	
2097 2098	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 10	10 10	10 10	1.0 1.0	20.00	ALTS	
2099 2100	10 10	10 10	10 10	10 10	10 10	10 10	- -	10 10	10 10	10 10	1.0 1.0	20.00	OIL AND HOL FIREOLIC	

(COMPARISON PAINTS)

[illegible]

(2) Vertical exposure.

CONDITION OF MULTIPLE COAT AREASSan Francisco

Except for the few paints listed below, breakdown was limited to the single coat primer areas.

- 235 - 24.5% red lead mixed pigmentation in a mixed alkyd-phenolic vehicle. Slight corrosion was in evidence on the exposed two primer coat area (rated 9) on the panel containing the aluminum finish coat. The corresponding area on the panel containing the white finish coat was O.K.
- 238 - 54.5% red lead mixed pigmentation in oil vehicle. Slight corrosion was in evidence on the exposed two primer coat area (rated 9) on the panel containing the white finish coat.
- 247 - 65% red lead mixed pigmentation in oil extended modified phenolic vehicle. A panel (aluminum finish coat) showed corrosion on exposed two primer coat area (rated 9). - B panel O.K.
- 315 - 34.5% lead chromate mixed pigmentation in an oil extended modified phenolic vehicle. Considerable corrosion present on two coat primer area (rated 8) on A panel. - Same area on B panel O.K.
- 258 - 52-WC-29. A panel shows considerable rusting on two coat primer area (rated 8). Same area on B panel O.K.
- 301 - 72% B.S.W.L. mixed pigmentation in alkyd vehicle. Areas containing two primer coats rusted on both A and B panels (rated 8 on A panel, 9 on B panel).
- 302 - Navy 52-P-18. Two coat primer area slightly rusted on B panel (rated 9). Same area on A panel O.K.
- 307 - 100% red lead in vinyl vehicle. Severely rusted on both primer areas and on finish coated single primer coat area. The wash primer treatment was omitted from the system.
- 310 - Federal Specification TT-P-20. Both A and B panels severely corroded on areas containing two primer coats (rated 2 and 4). These areas also showed severe chalking (both rated 5).
- 342 - Ba-K chromate mixed pigmentation in alkyd vehicle. Double coated primer areas show rust on A and B panels. (A panel rated 9, B panel rated 8).

Joplin

Only two paints showed any rust on the multiple coat areas of the flat panels. These were 297, rated 9+ on the two primer coat area of panel B and 310, rated 9+ on the two primer coat area of panel B.

Three paints exposed at Joplin on flat panels showed serious chalking on the two primer coat areas. These were 203 (rated 7 on both panels), 266 (rated 6 on both panels) and 310 (rated 3 on both panels). The first two are composed of red lead in oil while the third is composed of blue lead in oil (F.S. TT-P-20). In all three cases it was found that these paints were applied to dry film thicknesses in excess of the prescribed 1.5 mils ± 10%.

Several of the paints showed some corrosion on the angle specimens at Joplin on the areas containing two coats of primer exposed to the atmosphere. However this corrosion was generally evident on only one of the duplicate sets of angles. In most cases the corrosion on multiple coat areas was apparently associated with the surface condition of the base specimen. Most of the rusting was localized and in many cases the lifting of semi-adherent mill scale was clearly evident.

New Orleans

The multiple coat areas at New Orleans were entirely free of rust. Two paints showed serious checking at New Orleans on the two primer coat areas. These were 268 (P.S.TT-P-86) and 110 (P.S.TT-P-20).

Cleveland

None of the multiple paint coat areas were rusted, checked or otherwise deteriorated at the Cleveland sites.

Sayville

None of the flat specimen areas containing multiple paint coats showed any corrosion at Sayville.

Only a few isolated cases of rusting were observed on the multiple coat areas at Sayville. These were limited to only one specimen of the duplicate sets. As at Joplin, most of this corrosion was localized and can probably be accounted for by the presence of loose and semi-adherent mill scale.