Painting for Aircraft †

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Abstract: Objective This research is aimed to reduce time for the aircraft painting processes and
decrease the budget for the painting activities which will not affect to the life limit of the painting
and will not affect to the aerodynamic of the aircraft. method The research will be conducted by
setting up the experiments to study the aircraft surface painting preparation methods, in order to
find the better method of aircraft painting study the technical specification of the aircraft coating in
associate with the viscosity of painting, air temperature for painting, relative humidity, drying time,
lifetime period, hardness and difference, interval of time between painting and mixing solvent
quality study the tools that use for painting such as air spray, airless spray, roller and brush study
for error checking methods for understanding the painting defects result Reduce the errors that
might occur during the aircraft painting processes which will lead to the budget decreasing and
time reducing for aircraft painting conclusion To obtain the good quality of painting, it is very
important to realize the specification of applied coating, working processes and painting equipment
that associate with the maintenance manual of each aircraft, the effect factors that take into account
of the painting and the technique of painting that is used.

Keywords: corrosion; dry film thickness; wet film thickness; specification of painting; surface
preparation

1. Introduction

Painting is to protect material surface forming dry film from moisture, dielectric, anti-chemical,
sound wave, air flow, etc., against corrosion also is good to see appearance. The principal of basic
anticorrosion is to cut humidity, air and chemical from the surface. In addition, the process of
corrosion occurrence is that the metal is exposed by surrounding, it is reacted to chemical and
electrical, finally property can be changed.

Corrosion factors and progress according to environment are as follows (Table 1).

<table>
<thead>
<tr>
<th>Environment</th>
<th>Corrosion Factors and Progress According to Environment</th>
<th>Corrosion Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offshore</td>
<td>Sun energy (UV, temperature), salt particle, salt</td>
<td>100</td>
</tr>
<tr>
<td>Industry</td>
<td>Corrosion gas (acid gas), density of medicine, temperature, moisture</td>
<td>20–30</td>
</tr>
<tr>
<td>Mountain</td>
<td>Between Dryness and wetness, rain, snow, type of inhabit organism</td>
<td>10–20</td>
</tr>
</tbody>
</table>
2. Surface Preparation

Surface preparation is the most important to determine a factor of paint life, damaged materials and contaminated things on surfaces should be totally removed and to forming “Profile” (roughness on the surface) to improve adherence for paint workability. The method are chemical (solvent, thinner, etc.) and Mechanical (sandpaper, power tool, etc.) (Figure 1).

![Factor Affecting The Life Time Of Painting](image)

**Figure 1.** Factor affecting the life time of painting or coating.

3. Wording Explanation of Paint and Coating

There are a lot of painting wording. For example, pot life, SVR (solid volume ratio between wet film and dry film), recoating interval, viscosity, relative humidity, dry film thickness, paint specification, profile, holiday (miss spot on surface) etc. (Figure 2).

![comparison between surface with profile and without profile](image)

**Figure 2.** comparison between surface with profile and without profile.

4. Method:

4.1. Equipment and Painting Are Used in Royal Thai Navy’s Aircraft

The type of painting method in RTN’s aircraft are brush painting, roller painting, air spray, airless spray. Environment for painting must be considered, defects can occur according temperature, humidity, dew point, wind, vent condition. The specification of painting is guidance for coating (Table 2).

Specification of painting (Do–228) (Figure 3 and 4).
### Table 2. Example of coating specification

<table>
<thead>
<tr>
<th></th>
<th>Dope (per DON 788)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic components</td>
<td>1 Volume part</td>
</tr>
<tr>
<td>(LCM No.476)</td>
<td></td>
</tr>
<tr>
<td>Thinner (LCM No.477)</td>
<td>1 Volume part</td>
</tr>
<tr>
<td>Processing time</td>
<td>5 approx. 5 h at 23 C</td>
</tr>
<tr>
<td>Spray application</td>
<td>½ cross-coat</td>
</tr>
<tr>
<td>Intermediate drying time</td>
<td>Min. 1 h (after 1st. and 2nd. Layer)</td>
</tr>
<tr>
<td></td>
<td>Min 1½ h (after 3rd. Layer)</td>
</tr>
<tr>
<td>Layers</td>
<td>4</td>
</tr>
<tr>
<td>Viscosity 4 mm ISO cup (with thinner)</td>
<td>4 s at 20+ or −2 C</td>
</tr>
<tr>
<td>Viscosity 4 mm DIN cup (without thinner)</td>
<td>195+ or −5 s at 20+ or −2 C</td>
</tr>
<tr>
<td>Apply 1st. dope layer</td>
<td>Basic component with thinner (mixing ratio 1:1 by volume) use a sponge or foam block apply ½ cross-coat, the dope must fully penetrate the polyester fabric</td>
</tr>
<tr>
<td>Apply 2nd. Thru 4th. Dope layer</td>
<td>Only basic component without thinner use a sponge or foam block apply 3 ½ cross-coat</td>
</tr>
<tr>
<td>Intermediate drying time</td>
<td>min. 1 h after the 2nd layer min. ½ h the last min 8 h</td>
</tr>
</tbody>
</table>

**Wet film thickness gauge**

The wet film thickness gauge is a device to check his spray pattern and a sprayer that lacks experience. (affect to DFT)
dry film thickness equipment

dry film thickness equipment, after application of the paint the measurement of the dry film thickness must be carried out follow specification of painting. (affect to coating’s property)

Figure 4. Dry film thickness measure.

5. Result

Understanding, how to clean up the surface and use suitability tool, decrease time for coating and painting, decrease error occur, save budget, the aircraft look beautiful (Figure 5 and 6).

Figure 5. RTN painting’s work.

Figure 6. RTN painting’s work.
6. Conclusions

The painting or coating is very important to protect aircraft from corrosion and make she looks beautiful. Depend on right action and suitable specific coating. That can reduce time for the aircraft painting processes and decrease the budget.

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