Challenges and recent developments for paint removal technologies

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Presentation to

AVT-302 Paint Removal Technologies for Military Vehicles

Context

Military Aircraft

→ **Life time ~ 40 years or more in severe environnement (marine conditions , mechanical stresses …)**

→ **Paint removal needed for :**

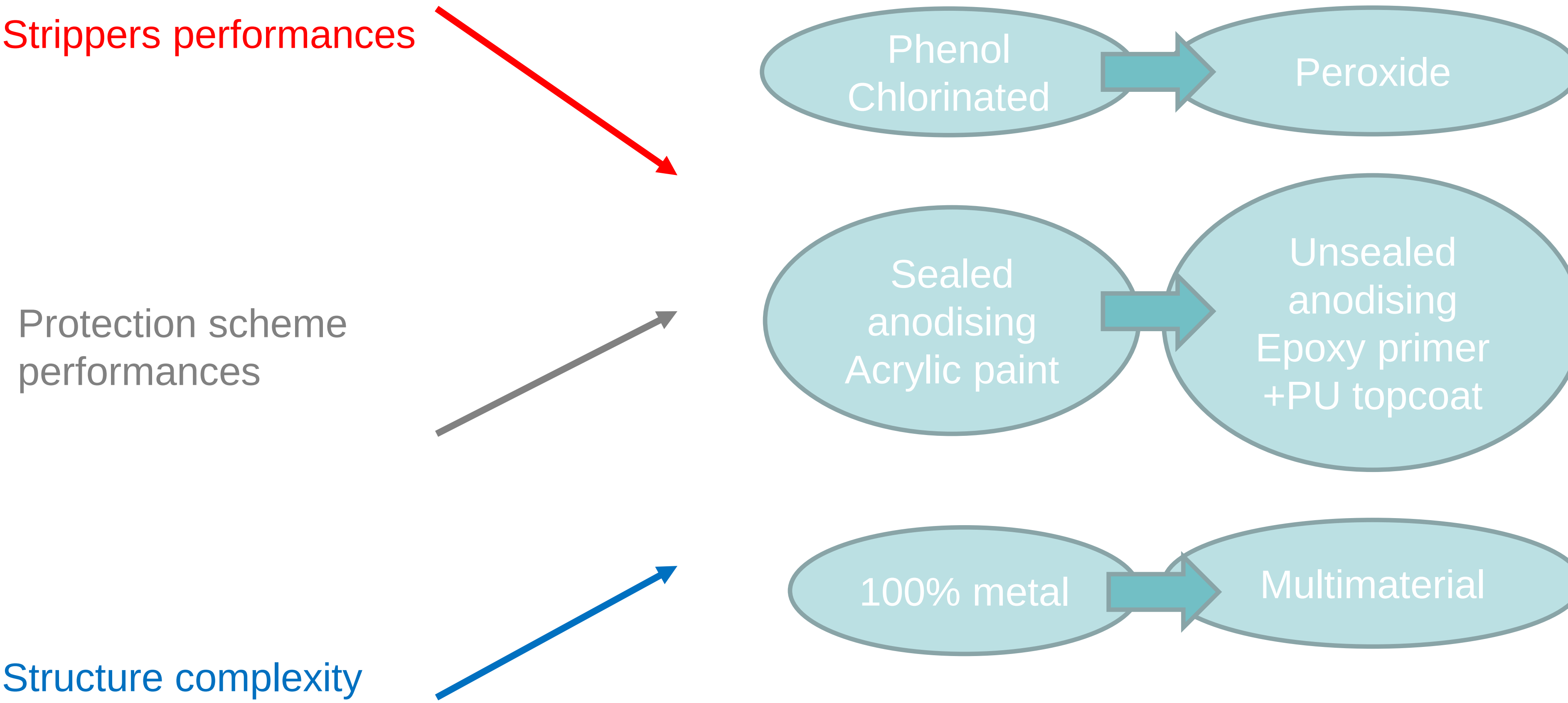
  →maintenance (corrosion inspection and repair on metallic parts)

  →paint scheme modification (color changes)

→ **Paint removal constitutes the 1st step to reapply a new performant paint**

→ **Need to ensure efficiency and reliability**

Evolutions


Strippers performances
Protection scheme performances
Structure complexity
Phenol Chlorinated
Peroxide
Sealed anodising Acrylic paint
Unsealed anodising Epoxy primer +PU topcoat
100% metal
Multimaterial

Current technologies

<u>Metal parts :</u>

Need = corrosion inspection and repair

→ chemical stripping : peroxide strippers

<u>Composite parts :</u>

Need = paint thickness reduction

→ masking during chemical stripping (to protect composite and wire mesh)

→ sanding

Current technologies

Time consuming operations :

- Stripping efficiency very dependant of temperature, not homogeneous (an additional mechanical sanding step could be necessary)
- Sanding on composite (difficulties related to heating)
- Masking and demasking composite parts
- Restoration of degraded polysulphide sealants

→ Improvements needed

For individual parts, easier :

- On aluminium parts : acid strippers applicable

Requirements for new technologies

- No degradation of composite parts
- No degradation of sealants
- Reduction of the whole sequence time (masking, stripping, cleaning)
- ROI ?
- Compatibility with EHS regulation

Other drivers :

- waste reduction (vs chemical strippers)
- Use of recycled materials
- Local treatments without masking

« New » technologies

Proven technologies vs availability

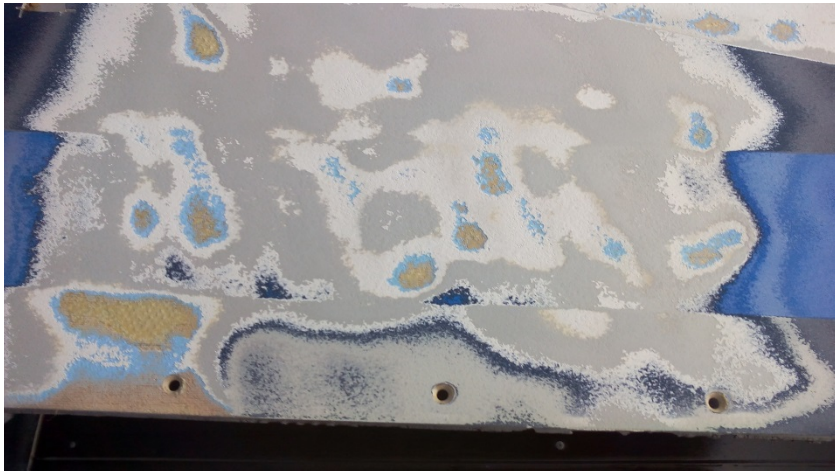
- Plastic Media blasting :
  - Type V Acrylic : already qualified on metallic parts
  - Type VII Starch
  - Type VIII « nano composite »,
- Spongejet
- CO_2
- Cryojet
- Laser
- Flashjet
- Water

→ Industrial availability

Media Type V- on composite parts

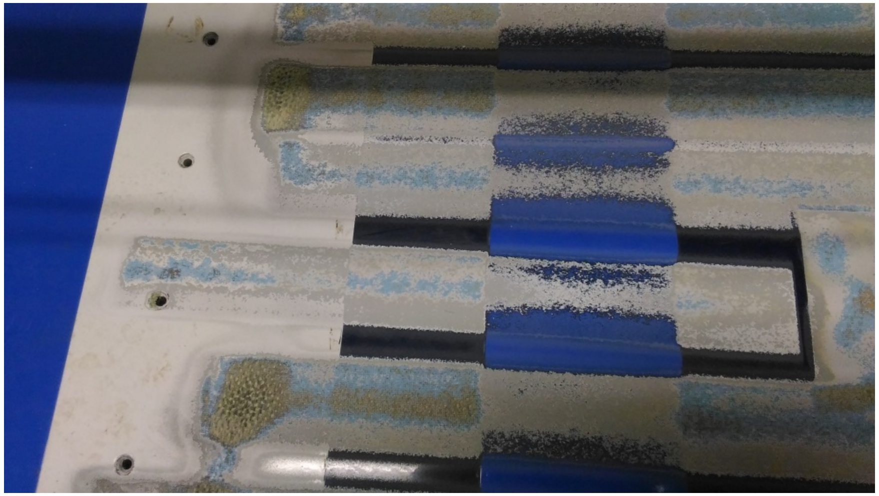
- Kevlar / Epoxy / Mesh + surfacer 5014 + PU66
- Media : acrylic
- Conclusions of 1st trials :

- Risk of degradation because of impact energy / Automation only if real time loop
- Operation time to consolidate
- No degradation of sealants



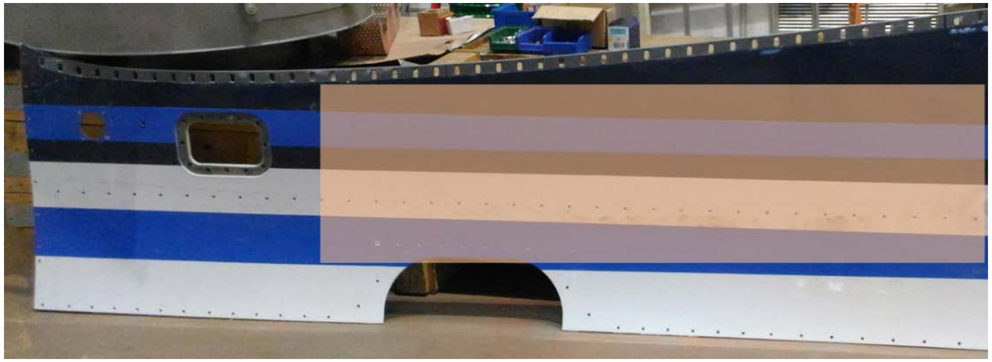
Media Type VII

- Kevlar / Epoxy / Mesh + surfacer 5014 + PU66
- Media : EnviroStrip XL
- Conclusions of 1st trials :
  - Same as Type V : risk of degradation because of impact energy
  - Risk on sealants (sharp edges of media)



Media Type VIII nano

- Kevlar / Epoxy / Mesh + surfacer 5014 + PU66
- Media : **Magic® II Composite Blast Media :** nano-structured abrasive media made from blended amino thermoset resins reinforcing fiber and acrylate polymer
- Conclusions of 1st trials :
  - no damage on composite and mesh
  - To evaluate on sealant



Magic® II .mov

Conclusions

- As composite parts proportion increases, chemical stripping will be more and more inadapted
- Intermediate coating (F565-4010 (PPG)) will be considered to limit risk of chemical stripper on composite parts
- Whatever the media is, ROI of the industrial facilities is a crucial point considering their using.
- For automation, only a system with closed loop control could ensure no risk on the parts. On a whole aircraft, such a system could become very complex.