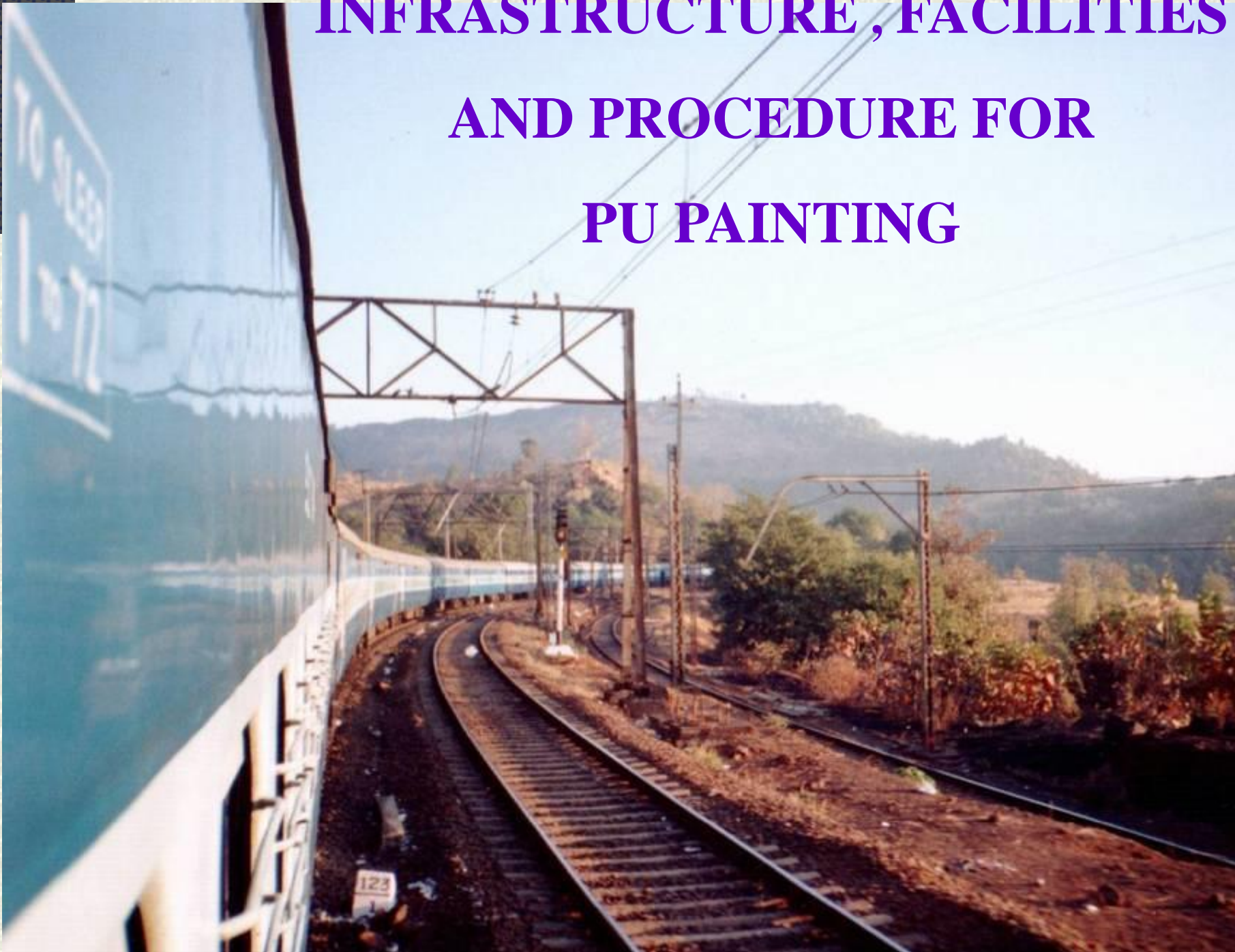


INFRASTRUCTURE , FACILITIES AND PROCEDURE FOR PU PAINTING



WHAT IS A PAINT?

- # Physically, paint is a mixture of four important elements:
 - # **Pigments**, **Additives**, **Binders** and **Solvents**
 - # **Pigments** render color and opacity to the paint.
 - # **Additives** endow the paint with special properties such as resistance to fungus, rust etc.
-

PAINT COMPONENTS

- # **Binders** hold the paint together and also bind it to the surface being painted, thus promoting durability.
 - # **Solvents** give a paint its flowing property, enabling brushing/rolling on a surface.
-

PURPOSE OF PAINTING

- ❖ Different paints have specific properties that prevent, or at least delay the rusting and corrosion by forming a protective layer around the substrate.
- ❖ Different colour schemes provide aesthetic look to materials.

TYPE OF PAINTING SYSTEM FOLLOWED IN INDIAN RAILWAYS

- ❖ **Alkyd- Alkyd- Alkyd system
(Followed in ICF)**
 - ❖ **Epoxy-Epoxy- Alkyd system
(Earlier in RCF for ICF type coaches)**
 - ❖ **Epoxy- Epoxy- Polyurethane system
(RCF for ICF type coaches)**
 - ❖ **Epoxy-Polyester- Polyurethane system
(RCF for LHB type coaches)**
-

WHY SWITCHING OVER TO PU PAINTING

- ❖ Alkyd painting system is less durable.
 - ❖ Gloss & Colour retention is very poor
 - ❖ It has less resistance to salty atmosphere
 - ❖ It has less resistance to ultraviolet rays
 - ❖ Require frequent repainting
 - ❖ Hence increased effective cost of painting
-

SYSTEM OF POLYURETHANE PAINTING ON CONVENTIONAL COACHES

1. Surface Preparation
 2. Primer Application
 3. Ist coat Putty Application
 4. IInd coat putty application
 5. Putty Rubdown
 6. Surfacer application
 7. Satin Blue Paint application
 8. Masking
 9. Craft Blue Paint Application
-

SURFACE PREPRATION

- # ENSURE NO OIL OR GREASE ON THE SURFACE,CLEAN WITH PETROLEUM HYDROCARBON SOLVENT
 - # SHOT BLASTING WITH STEEL SHOTS
 - # S170:S230:S280 IN 40:40:20 RATIO
 - # SURFACE CONFORMING TO SA-2.5
 - # CLEANING WITH COMPRESSED AIR
 - # PRIMER TO BE APPLIED WITHIN 4 HRS.
-



**CONVENTIONAL SHELL MASKING FOR
BLASTING**



BLASTING WHEEL

BLASTING CHAMBER

A worker wearing a full-body protective suit and a white hood is using a high-pressure air hose to clean a large, curved metal shell. The worker is positioned in a long, narrow industrial corridor with a high ceiling and several skylights. The shell being cleaned is a large, cylindrical component, possibly a boiler or a large tank, with a textured surface. The floor is dark and appears to be wet or covered in debris. In the background, there are structural beams, pipes, and a ladder leaning against a wall. The overall scene depicts a maintenance or cleaning operation in a heavy industrial environment.

SHELL CLEANING WITH COMPRESSED AIR

PRIMER APPLICATION

- # ROZC/ EPOXY PRIMER
 - # DFT- 35-40 MICRONS IN ROZCP AND 60 MICRONS IN EPOXY PRIMER
 - # FLASH OF TIME – 15 MINUTES
 - # DRY IN OVEN FOR 30 MINUTES AT 70 DEGREE CENTIGRADE
-

PUTTY APPLICATION

- # APPLICATION WITH KNIFE
 - # Ist COAT COMMULATIVE DFT- 160-185
 - # II_nD COAT COMMULATIVE DFT-258 -
335
 - # POT LIFE -2 HRS. AT 27 DEGREE
CENTIGRADE
-

PUTTY...CONTD

- # Application of first full coat filler on side wall and end wall with wider putty knife
- # Scraping excess filler from window edges and other edges
- # Allow this coat to hard dry



PUTTY...CONTD

- # Apply second full coat filler on side wall and end wall with wider putty knife
- # Scraping excess filler from window edges and other edges
- # Allow this coat to hard dry



INFRA...CONTD

- # Manual or pneumatic platform for putty application
- # Oven for drying
- # Straight edge for checking flatness
- # DFT gauge



PUTTY RUB DOWN

- # RUB DOWN WITH SANDER / EMERY PAPER
 - # SANDING DISC-80, EMERY PAPER150
 - # CLEANING WITH AIR
-

PUTTY RUB DOWN

- # After hard dry of putty, rubdown to smoothen the surface with 80-120 grade emery paper with pneumatic sander at 10,000rpm.
- # Blow the dust with compressed air



SURFACER APPLICATION, SATIN BLUE PAINT AND MASKING

- # SURFACER APPLICATION
 - # DRYING
 - # RUB DOWN WITH 220 GRADE SILICON CARBIDE EMERY PAPER
 - # SATIN BLUE PAINT APPLICATION
 - # DRYING
 - # MASKING
-

MASKING

- # After hard drying of first top coat mark the to be masked.
- # Make base edge by using 25 mm paper tape.
- # Then mask the area with wax coated light weight masking paper



TOP COAT APPLICATION

- # RUB DOWN
 - # TOP COAT APPLICATION WITH APPLICATOR/MANUAL SPRAY GUN
 - # 15 MINUTES FLASH OF TIME
 - # 1 HOUR DRYING AT 70 DEGREE CENTIGRADE
-

ROOF PAINTING

- # CENTRAL PORTION WITH APPLICATOR
 - # SIDES WITH BRUSH
 - # DRYING
 - # IInd COAT WITH BRUSH
-

SYSTEM OF POLYURETHANE PAINTING (LHB COACH PAINTING)

1. Surface Preparation
 2. Primer Application
 3. Putty Application on joints
 4. First Coat Putty application
 5. Second Coat Putty application
 6. Putty Rubdown
 7. Fine Putty Application
 8. Fine Putty Rubdown
 9. PU Primer Application
-

CONT...

9. Spot Filling
 10. PU Under Coat Application
 11. First PU Top Coat Application
 12. Masking
 13. Second PU top Coat application
 14. De masking
-

SURFACE PREPARATION

- Masking of machined parts, threaded holes, stud etc.
 - Remove oil spot with solvents.
 - Garnet blasting of complete shell (exterior & interior)
 - Thorough cleaning with compressed air and vacuum.
 - Inspection of surface for Sa 2 ½, ISO-8501-I
-



UN BLASTED SHELL

INFRASTRUCTURE AND FACILITIES REQUIRED FOR SURFACE PREPARATION (ROBOTIC)

- # Robot Blasting M/C
- # Blasting material
- # Masking facilities
- # Safety Equipments
- # Compressed air
- # Cleaning Arrangement
- # Inspection comparator
- # Inspection gauges









INFRASTRUCTURE AND FACILITIES REQUIRED FOR SURFACE PREPARATION

- # Shed and blasting equipments
- # Blasting material
- # Masking facilities
- # Safety Equipments
- # Compressed air, brushes, vacuum cleaner etc



PRIMER APPLICATION

- # Mask the areas which are not to be primered
 - # Mask the area where primer dft should be 20-30 micron.
 - # Mix base and hardener in specified ratio with the help of pneumatic mixer and maintain required viscosity by adding solvent with the help of ford cup.
-



BASE & HARDENER



PNEUMATIC MIXER



PAINT MIXING

CONT...

- # Apply Epoxy Metal primer(RAL-3012) on shadow portions by means of Air Spray Gun with flexible extension arrangement.
 - # Apply Primer with airless Spry Gun(DFT-60 micron) on exterior , interior and under frame.
 - # Allow to hard dry (min 16 hrs in air or 45 min in oven at 70-80 deg.cent.)
 - # Check paint film thickness
-



PRIMER APPLICATION WITH AIRLESS SPRAY GUN



PRIMERED LHB

INFRASTRUCTURE AND FACILITIES REQUIRED FOR PRIMER APPLICATION

- # Paint Mixing facilities(Pneumatic mixer)
- # Viscosity Measuring arrangements(Ford Cup) →
- # Paint Filters



INFRA...CONTD.

- # Airless Spray Gun
- # Automatic Primer Application Booth
- # Drying Oven





**AUTOMATIC PAINT APPLICATOR
AND DRYING OVEN**

INFRA...CONTD

- # Paint Dry Film Thickness measuring gauge
- # Micro scope for observing painting defects



PUTTY APPLICATION

- # Slight grinding of primer with 150 grade emery paper
- # Application of polyester filler on joints with small flexible knife
- # Allow to hard dry



INFRASTRUCTURE AND FACILITIES REQUIRED FOR PUTTY APPLICATION

- # Emery paper 150 grade.
- # Different type of putty application knife
- # Wood handle putty scrapper



9FP-40F



7P-50F



7HP-50F



7BP-60F



INFRASTRUCTURE AND FACILITIES REQUIRED FOR PUTTY RUBDOWN

- # Compressed air
- # Working platform
- # Palm grip
Pneumatic
sanders(10,000
rpm)
- # Self adhesive /well-
crow sanding disc
of 80



FINE PUTTY APPLICATION

- # After putty rub down many defects become visible
 - # Apply thin coat of putty with wider putty knife on side wall & end wall
 - # Scraping excess filler from window edges and other edges
 - # Allow this coat to hard dry
-

FINE PUTTY RUBDOWN

- # After hard dry of fine putty, rubdown it to smoothen the surface with 180-220 grade emery paper with pneumatic sander at 10,000 rpm.
 - # Blow the dust with compressed air
-

PU PRIMER APPLICATION

- # Mix base and hardener OF PU primer in specified ratio with the help of pneumatic mixer and maintain required viscosity by adding solvent.
 - # Apply Primer with airless Spry Gun(DFT-60 micron) on exterior side wall & end wall.
 - # Allow to hard dry (min 16 hrs in air or 45 min in oven at 70-80 deg.cent.)or 16 hrs in open.
 - # Check paint film thickness.
-

INFRASTRUCTURE AND FACILITIES REQUIRED FOR PU PRIMER APPLICATION

- # Paint Mixing facilities(Pneumatic mixer)**
 - # Viscosity Measuring arrangements(Ford Cup)**
 - # Paint Filters**
 - # Airless Spray Gun**
 - # Automatic Primer Application Booth**
 - # Drying Oven**
 - # Paint Dry Film Thickness measuring gauge**
-

SPOT FILLING

- # Mark scratches and local defects carefully
- # Mix spot filler, base & hardener in small quantity
- # Apply filler on identified spot with small putty knife
- # Allow it to dry



APPLICATION OF PU UNDERCOAT

- # Rub down the PU primered and spot filled complete side wall & end wall with 400 g emery paper.
- # Blow the loose dust with compressed air
- # Remove left over dust with dust bonding cloth



PU UNERCOAT CONTD...

- # Mix base and hardener of PU under coat in specified ratio with the help of pneumatic mixer and maintain required viscosity by adding solvent.
 - # Apply paint with airless Spry Gun(DFT 40-60 micron) on exterior side wall & end wall and roof.
 - # Allow it to hard dry (min 16 hrs in air or 45 min in oven at 70-80 deg.cent.)
 - # Check paint film thickness.
-

INFRASTRUCTURE AND FACILITIES REQUIRED FOR UNDER COAT APPLICATION

- # Dust bonding cloth
- # 400 g emery paper
- # All facilities required in PU primer painting



PU TOP COAT APPLICATION

- # Grind smoothly under coat surface with 400g or above grade emery paper.
 - # Remove all dust with dust bonding cloth.
 - # Mix base and hardener of top coat in specified ratio with the help of pneumatic mixer and maintain required viscosity by adding solvent.
 - # Apply paint with airless Spry Gun (DFT 40 micron) on exterior side wall ..
 - # Allow it to hard dry (min 16 hrs in air)
 - # Check paint film thickness
-

INFRASTRUCTURE AND FACILITIES REQUIRED FOR MASKING

- # Marking equipments & consumable
 - # 25 mm edge marking paper tape
 - # 36 mm masking tape
 - # Masking paper
 - # Movable ladder or working platform.
-

2nd PU TOP COAT APPLICATION

- # After masking lightly grind the left areas with 400 g or above grades of emery paper.
 - # Remove all dust with dust bonding cloth.
 - # Mix base and hardener of 2nd top coat in specified ratio with the help of pneumatic mixer and maintain required viscosity by adding solvent.
 - # Apply paint with airless Spry Gun (DFT 40 micron) on exterior side wall ,end wall and roof.
 - # Allow it to hard dry (min 16 hrs in air)
 - # Check paint film thickness.
-

DEMASKING

- # After drying of 2nd coat masking to be removed gently.
 - # Carefully examine the masking mark, pant seepage if any.
 - # Examine any other defects
 - # Rectify all defects and get quality clearance.
 - # Dispatch to furnishing shop.
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LHB RAJDHANI PAINTED SHELL



LHB SELF GENERATING SHELL

SAFETY PRECAUTIONS FOR PU PAINTING

- # Inhalation of solvent vapours or paint mist should be avoided by using proper respiratory mask.
- # Contact of liquid paint with skin should be avoided by using proper gloves.



SAFETY PRECAUTIONS CONTD...

- # Contact of liquid paint with eye should be avoided.
- # Forced ventilation should be provided when applying paint in confined spaces or stagnant air.
- # Refer material data sheet for safety provided by paint supplier.



A photograph of a high-speed train with red and silver passenger cars on a railway track. The train is moving from left to right. In the background, there are several multi-story buildings and trees under a grey, overcast sky. The foreground shows gravel tracks and some green weeds.

Thank You