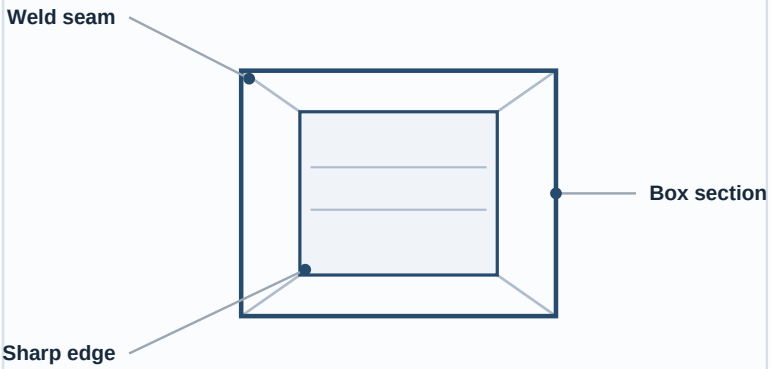
UNDERSTAND THE SURFACE BEFORE DESIGNING THE COATING.

Tractor & Construction Machinery Chassis (Main Frame) — Open-field corrosion, mud/manure contact, stone impact, UV and continuous mechanical load. Before designing the right coating, we evaluate the material chemistry, the geometry and the service conditions together.

PART DIAGRAM — TRACTOR & CONSTRUCTION MACHINERY CHASSIS (MAIN FRAME)



COATING CROSS-SECTION



Five questions define a coating system

1. **MATERIAL**
   Hot-rolled structural steel (S235/S355), 4–12 mm; welded box sections and a heavy-section load-bearing frame.

2. **SURFACE**
   Mill scale, weld slag and oil residue must be removed; weld seams and sharp edges need dedicated treatment.

3. **GEOMETRY**
   Faraday areas inside box sections and along weld seams; risk of film thinning on sharp edges and delayed heat-up in thick sections.

4. **SERVICE CONDITIONS**
   Open-field corrosion, mud/manure contact, stone impact, UV and continuous mechanical load

5. **PRODUCTION TARGET**
   Medium volume, high part variety; target: full cure in thick sections and consistent corrosion resistance.

CONCLUSION: For the Tractor & Construction Machinery Chassis, the goal is not just a good-looking finish; it is a consistent powder-coated surface that withstands open-field corrosion, stone impact and UV, fully cured through thick sections.

FROM SURFACE TO PROCESS ENGINEERING FLOW

The Tractor & Construction Machinery Chassis cannot be coated like just any part. A sound process needs measurement, pretreatment, the right coating selection, application and verification to work together.

01 **ANALYSIS** Substrate + surface
02 **PRETREATMENT** Cleaning + conversion
03 **COATING** Chemistry + film
04 **APPLICATION** Electrostatics + flow
05 **CURING** Time + temperature
06 **VERIFICATION** Test + record

A. Surface Characterisation

The condition of the substrate surface (cleanliness, roughness, oxide/scale and any weld zones) is determined. The right process starts with the right definition of the surface.

MEASURABLE INPUTS
Surface cleanliness • roughness • weld marks

B. Pretreatment Design

Grit blasting (Sa 2½) or alkaline degreasing + iron/zinc phosphate conversion coating; slag and pores in the weld zone are removed for a uniform, active surface.

CORE TARGET
Clean, active, uniform, repeatable surface

C. Coating System Selection

For harsh field corrosion, a zinc-rich epoxy primer + polyester (TGIC) topcoat system is selected; UV, scratch and chemical resistance are targeted.

DECISION CRITERIA
Durability • appearance • service life • cost

D. Application Engineering

Electrostatic powder coating, 80–120 µm; penetration into box sections and weld seams with tribo/corona charging, an extended oven profile for thick sections and part-temperature monitoring.

GEOMETRY EFFECT
Weld seam • Box section • Sharp edge

Managing the process with data, not by eye

µm
FILM THICKNESS
Coating uniformity

°C
PART TEMPERATURE
Actual cure condition

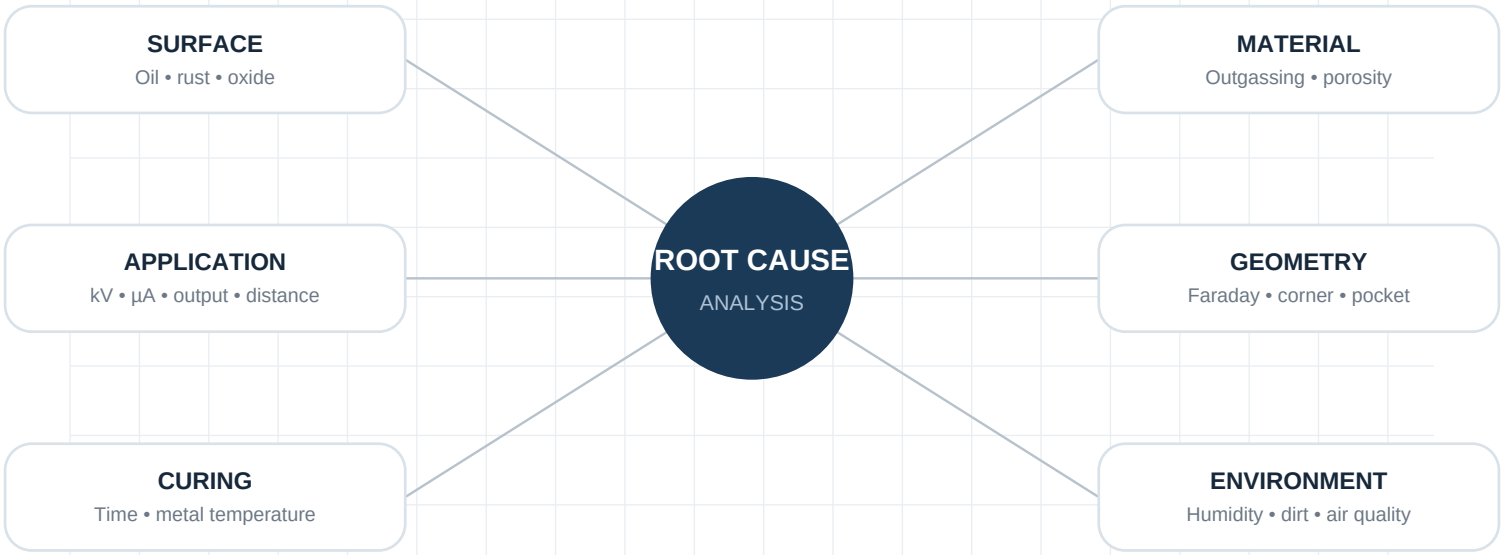
kV / µA
ELECTROSTATIC CHARGE
Transfer and penetration

Ω
GROUNDING
Charge dissipation and stability

ENGINEERING PRINCIPLE In the Tractor & Construction Machinery Chassis process, we define a process window rather than a single parameter. The aim is to reproduce the same surface quality across different shifts and part conditions.

A SURFACE DEFECT IS A SYMPTOM, NOT THE ROOT CAUSE

Coating defects rarely come from a single setting. The same symptom may stem from surface preparation, material, electrostatic behaviour, film thickness or curing.



Common defects and diagnostic approach

POOR ADHESION

The coating detaches from the surface or fails in testing.

CHECK: cleaning / pretreatment / cure

ORANGE PEEL

Uneven flow; the surface looks wavy or rough.

CHECK: film / flow / temperature

PINHOLE / CRATER

Pinholes or local craters form on the surface.

CHECK: dirt / gas / humidity / oven

FARADAY ZONE

Insufficient penetration in deep corners and pockets.

CHECK: geometry / kV-µA / air

BACK-IONIZATION

Star/blister defects from overcharging.

CHECK: current / distance / thickness

UNEVEN THICKNESS

Thin and thick areas on the same part.

CHECK: position / motion / output

DIAGNOSTIC PROTOCOL

1 Define the symptom → **2** Measure the data → **3** Isolate the cause → **4** Test one variable → **5** Standardise

A GOOD SURFACE PROCESS must be measurable • repeatable • traceable • optimisable. This approach is the basis of part-specific application guides for parts such as the Tractor & Construction Machinery Chassis.

THE RIGHT EQUIPMENT, AT THE RIGHT SCALE.

For the Tractor & Construction Machinery Chassis, production volume drives the equipment choice. At low and medium volume, manual systems give flexibility; in series production, automatic systems apply the same recipe to every part.

LOW / MEDIUM VOLUME

Manual application



Elite / Elite Plus

Manual powder coating units; kV, µA and air settings.



Smart AI

Suggests settings for the part; guides the operator in manual work.



Manual Powder Coating Gun

Light, ergonomic hand gun.



Manual Powder Booth

Manual application and powder recovery.



Box Oven

Curing in batch production.

SERIES PRODUCTION

Automatic line



Automatic Powder Coating Gun

Series application in fixed or moving arrays.



OWL + Smart AI

Recipe-based, zone-by-zone application in difficult areas.



Single / Two-Axis Reciprocator

Automates the gun motion.



PVC Monocyclone Booth

Fast cleaning and powder recovery.



Powder Center

Fast colour change on automatic lines.



Conveyor Oven & Pretreatment

Surface preparation and curing on a continuous line.

OWL INTEGRATION In difficult areas such as weld seam, box section, sharp edge, OWL applies targeted, zone-by-zone coating with a Smart AI recipe. For details, see the “OWL — Cavity” application sheet.

PROJECT SUPPORT Share your line, your part and your production target, and we will define the equipment selection and the booth, oven and conveyor layout together. strong3000.com · info@strong3000.com · WhatsApp +90 537 353 54 19