

S.I.DE.P.

SMART ENGINEERING

Design at High Speed



THE COMPANY

S.I.D.E.P.
SMART ENGINEERING

S.I.D.E.P. is a **multidisciplinary engineering** company, certified **ISO 9001** and **ISO 15085-2**, with headquarters in **Livorno**, founded in **2010** to support clients in the development of complex projects, providing **integrated skills** in mechanical, electrical, structural design and numerical simulation.

Over the years we have developed a working method focused on the management of the entire design process, including re-fitting activities: **from existing asset survey to production support.**

33 PEOPLE
12 Engineers | 19 Technicians | 2 Others

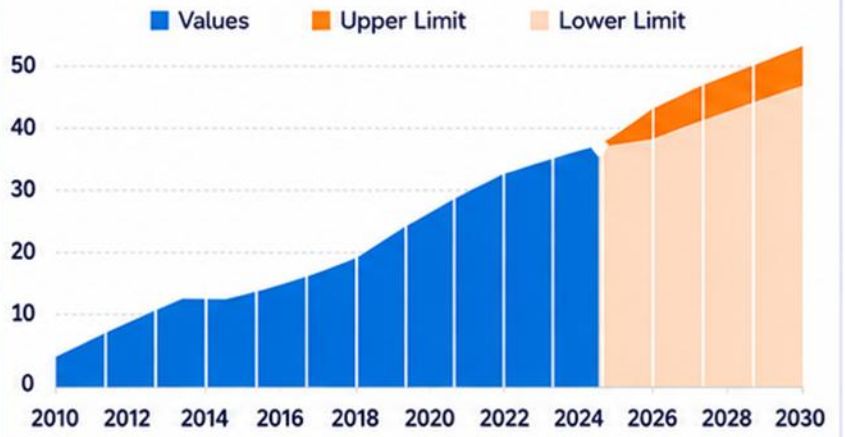
SINCE 2010
At the service of engineering

HEADQUARTERS
Livorno

BRANCH OFFICE
Pistoia
Electrical Design Department



STEADY GROWTH SINCE 2010



OUR TEAM



OUR VALUES



RELIABILITY, EXPERTISE, INNOVATION AT THE SERVICE OF OUR CLIENTS

WHO WE ARE

- S.I.D E.P. headquarters are located in the city of **Livorno.**
- Since 2021, the branch office (Electrical Design Department) has been opened in the strategic city of **Pistoia.**

IN A NUTSHELL:

- Deep knowledge in railway sector
- Cross experience in several industry segments
- Virtual design & testing for time to market reduction and cost savings
- Optimized design for competitive solutions
- Dedicated HW/SW computational resources
- Strategic position close to main market players



PROFESSIONAL SKILLS



Feasibility studies / Concept design and rendering / Reverse engineering
(using sophisticated equipment, such as 3D scanners)

Executive Design
(mechanical, pneumatic, electrical, composite etc.)

CAE Simulations
(structural, vibrations, acoustics, thermal, thermodynamic)

Workshop direct support / Revamping

Maintenance Manuals and spare parts catalogues, technical documentation for homologation

Trackwork's mechanical interfaces analysis
(Gauging, PTI, Track Negotiation, Coupling etc.)

Electronic system development

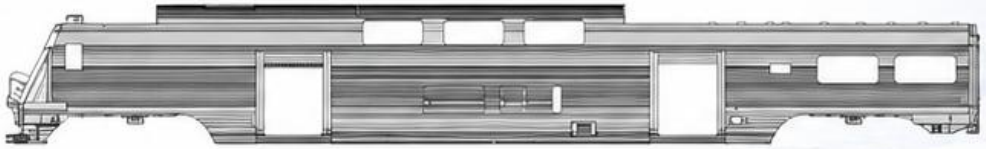
S.I.DE.P.
SMART ENGINEERING

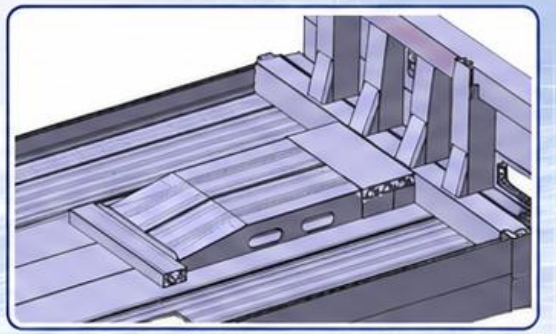


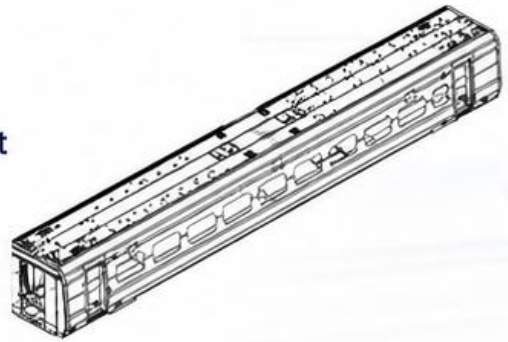
MECHANICAL DESIGN

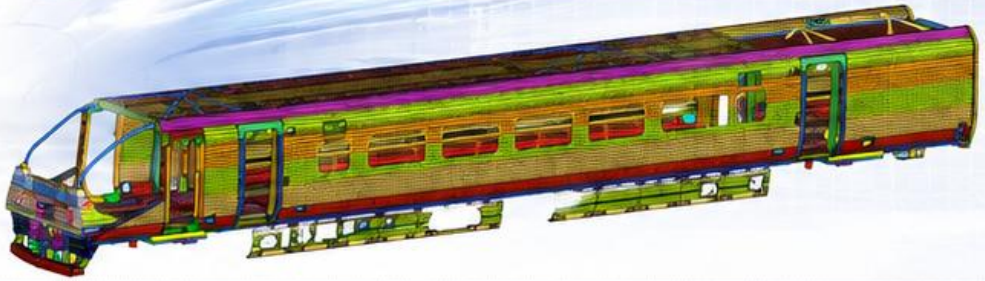
CARBODY DESIGN

- Carbody frame design:
  - Full structure design
  - Design Optimization
  - Additional welded parts design
  - Bolted parts design
  - Alternative glued/riveted fixing development
- Workshop follow up and production assistance



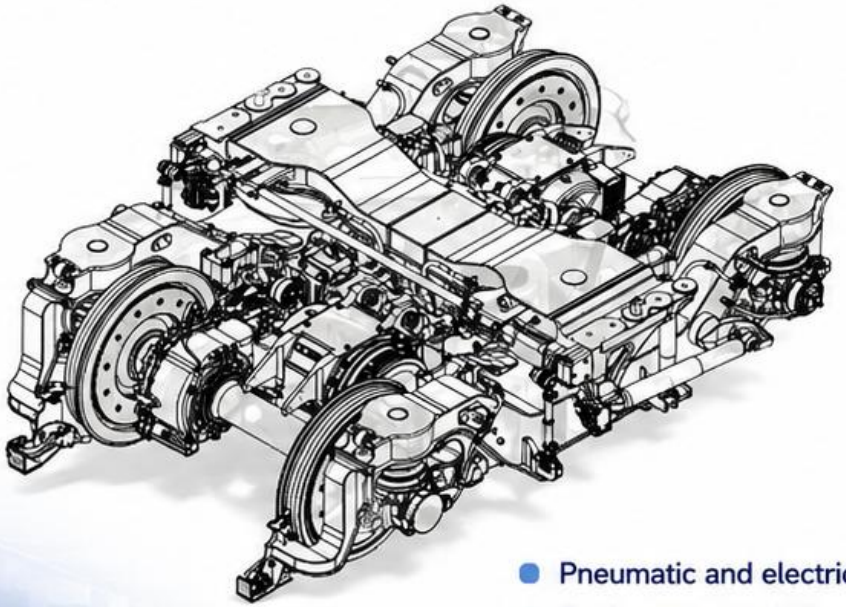


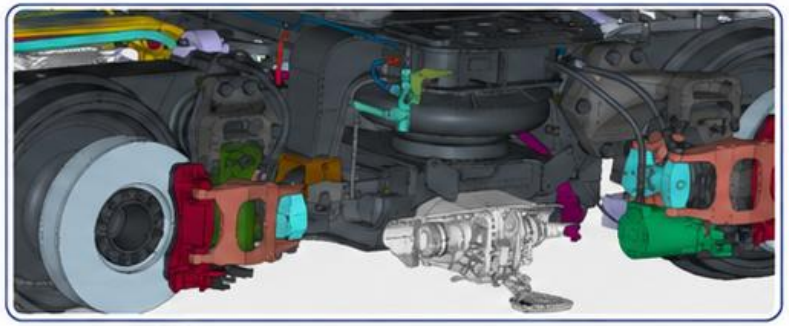


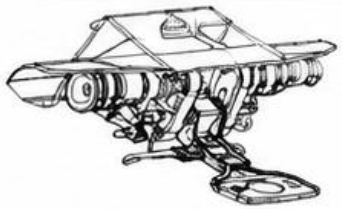


BOGIE DESIGN

- Bogie's frame, bolster beam and welded parts development
- Mechanical mounting, wheel-set, brake system, antennas
- Primary and secondary suspensions integration



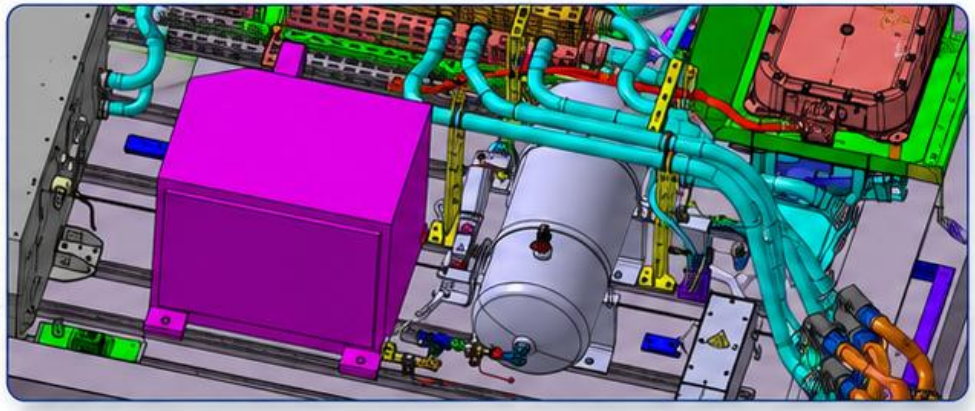




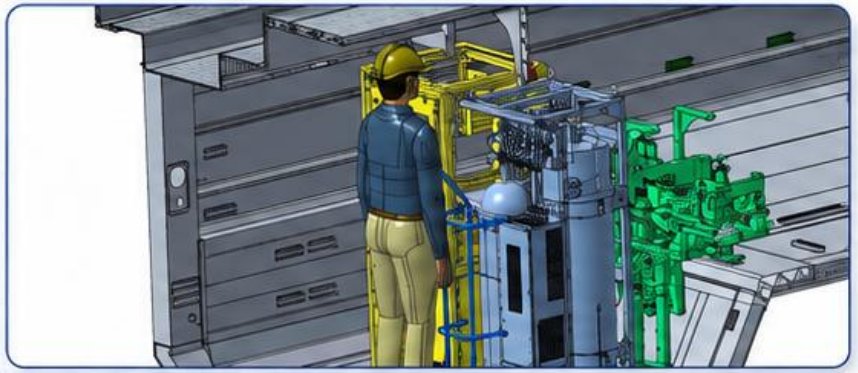


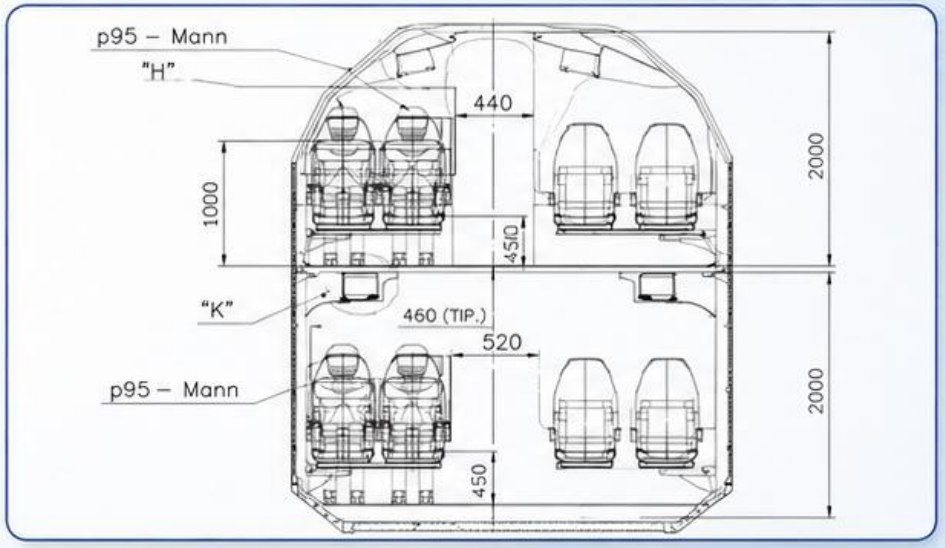
- Pneumatic and electrical systems integration
- Equipment and devices integration (collector shoes, pick-p and axle bush sensors, etc.)

LAYOUT DEFINITION AND SYSTEMS INTEGRATION

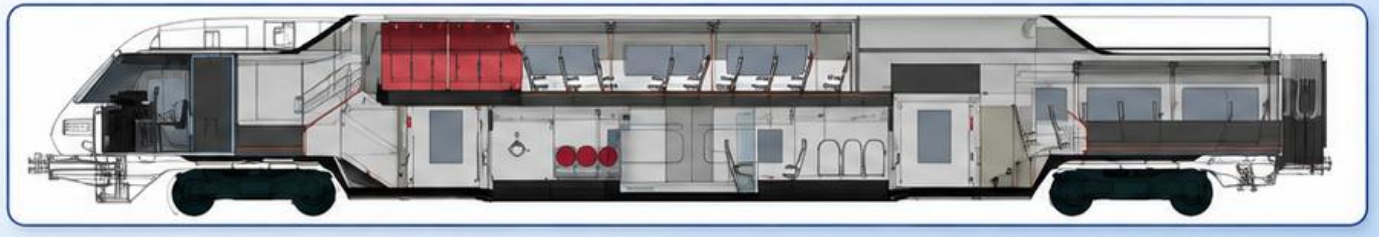


- Underframe, roof and in-car electrical system integration mechanical solutions
- Underframe, roof and in-car pneumatic system integration mechanical solutions
- Underframe and roof layout of electrical and pneumatic equipment





- In-car fire extinguishing system integration mechanical solutions
- Car-to-car connections definition
- Vehicle Layout definition
- Ergonomics studies
- Weight management



CAB DESIGN & ENGINEERING SOLUTIONS

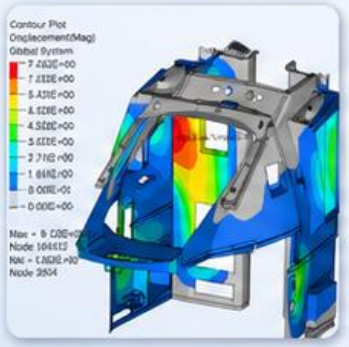
CAB INTERIORS

Cab interiors and driver desk design
(composite materials)











- Underframe, roof and in-car electrical system integration mechanical solutions
- Underframe, roof and in-car pneumatic system integration mechanical solutions
- Underframe and roof layout of electrical and pneumatic equipment
- In-car fire extinguishing system integration mechanical solutions
- Car-to-car connections definition
- Vehicle layout definition
- Ergonomics studies
- Weight management

FRONT CAB SHELL

Cab shell development shell
for Trams, Metro and Trains.





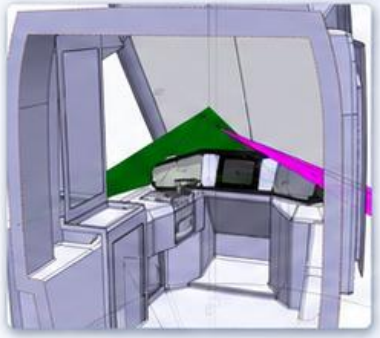
PROJECT

- 3D MODEL
- FEM ANALYSIS
- 2D DRAWING
- MOULD DESIGN
- PRODUCTION SUPPORT

DELIVERY

CAB STUDIES

VISIBILITY STUDIES

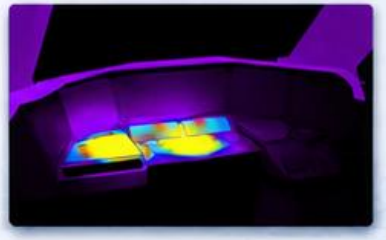


ERGONOMIC STUDIES





LIGHTING CALCULATIONS



- Cab operator visibility studies
- Cab operator ergonomic studies
- Cab's Lighting calculations

CAE SIMULATIONS & ENGINEERING SUPPORT

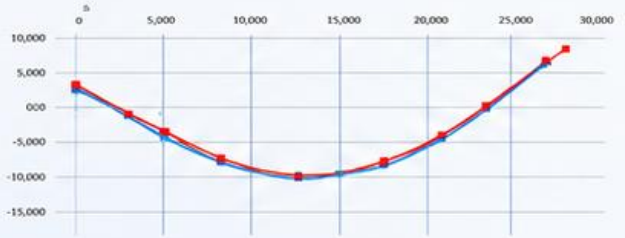
Advanced CAE simulations and analysis to optimize design, ensure reliability and support the entire product development cycle.

1. CAE PROCESS & SERVICES

FEASIBILITY ANALYSIS → PRELIMINARY DESIGN → FINAL DESIGN → VALIDATION & TEST → PRODUCTION

OFFICIAL and TECHNICAL DOCUMENTATION

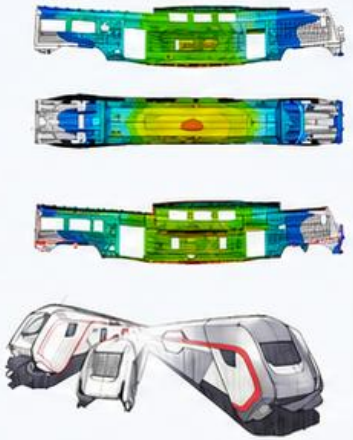
REQUIREMENT ANALYSIS	PRELIMINARY SIZING	FINAL DESIGN	TEST REQUIR. & PLAN DEFINITION	CERTIFICATION (Supporting)
CONCEPTUAL DESIGN	MESHLESS MODEL & ANALYSIS	FE MODEL & ANALYSIS	TEST EXECUTION (Supporting)	ON-COURSE VARIATIONS
MATERIALS ANALYSIS	FE MODEL & ANALYSIS	DETAILED STRUCTURAL ANALYSIS	FE MODEL & ANALYSIS (Test cases)	REVAMPING
	WEIGHT DISTRIBUTION		NUMERICAL CORRELATION	NON-COMPLIANCES

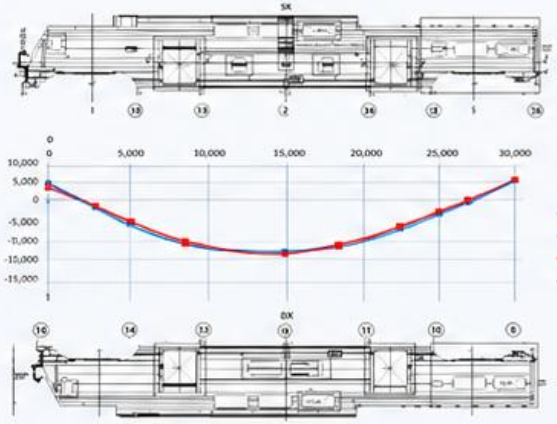




2. CAE ANALYSIS CAPABILITIES

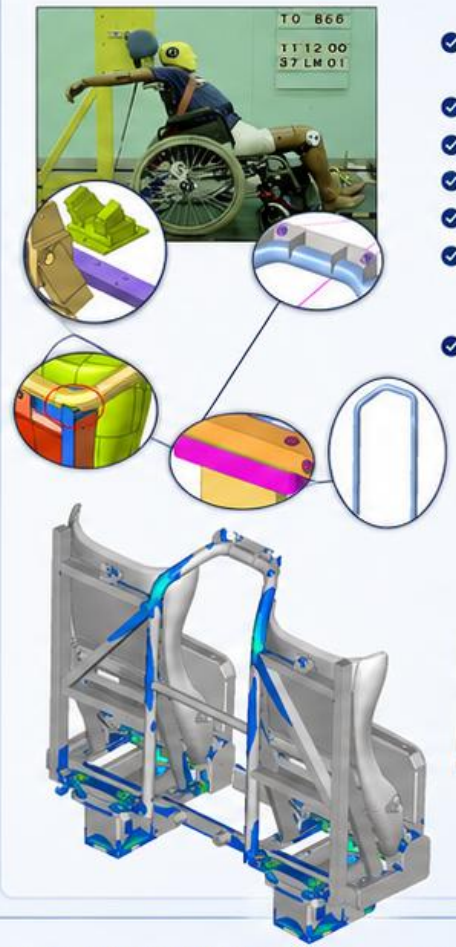
- Detailed FEM analysis of structures and of its main components
- Detailed modelling of welded parts and joint features
- Static and Fatigue load case implementations
- Stress results extraction and utilization factor determination
- Vibrations, acoustics, thermal, thermodynamic calculations







3. OPTIMIZATION & ADVANCED ANALYSIS



- Iterative approach to reduce efforts in late design phases
- Weight optimization
- Crash analysis and optimization
- Non-linear analysis and optimization
- Composite analysis and optimization
- Testing activities support (by performing the numerical correlation)
- Non-compliances resolution and verification



IMPROVED RELIABILITY AND SAFETY

Advanced simulations ensure robust and reliable designs.

WEIGHT AND COST OPTIMIZATION

Efficient designs with optimized materials and performance.

REDUCED DEVELOPMENT TIME

Iterative and virtual validation to speed up product development.

SUPPORT THROUGHOUT THE LIFECYCLE

From concept to production, including certification support.

COMPETITIVE ADVANTAGE

Innovative solutions tailored to meet the highest industry standards.

S.I.DE.P.
SMART ENGINEERING

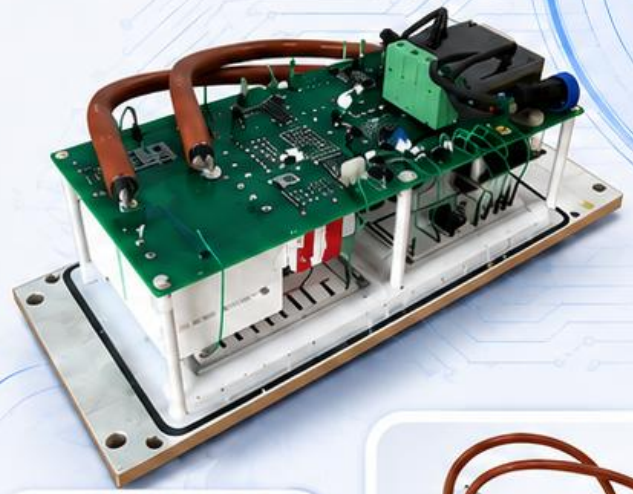


ELECTRONIC SYSTEMS DEVELOPMENT

ELECTRONIC SYSTEMS DEVELOPMENT

- Design of microcontroller boards
- Design of custom sensors on ceramic support
- Design of boards based on ceramic support
- Design of systems with heat dissipation and/or high electrical insulation issues
- Design of electronic boards and systems for signal conditioning
- Design of low-consumption electronic boards and systems
- Design of AC/DC and DC/DC converters
- Study of heat flows for power section optimization
- Design of systems for local and remote control and remote management
- Design of Event Recorder system









- Development of transducers using integrated circuits
- Development and tuning of solutions for sensor calibration
- Development of applications and apps for interfacing with transducers
- Use of communication channels
- Creation of WEB interfaces to easily access the systems to be controlled

RELIABILITY & SAFETY | THERMAL OPTIMIZATION | LOW POWER DESIGN | ADVANCED COMMUNICATION | SOFTWARE & WEB INTEGRATION

TRAIN LOG–S
EVENT RECORDER

MORE THAN RECORDING.
A SMARTER WAY FORWARD.



A complete onboard data-logging platform

Engineered for railway service vehicles: modular, scalable and designed for fast retrofit installation.

370 × 282.5 × 138 mm	20 + 20	9–160 Vdc
COMPACT	**SCALABLE**	**WIDE INPUT**
Flexible mounting	Base + expansion channels	Natural convection cooling

1 COMPLIANT

EN 14033 · EN 62625-1 Cat. A

Railway-ready architecture

2 CRASH MEMORY

Certified protected storage

Black box + data logger

3 RETROFIT-READY

Quick fastening · bolted connection

Designed for easy installation

4 CONNECTED

PC tool · Mobile app

CAN · RS-485 communications

KEY STANDARDS

EN 14033 • EN 62625-1 Cat. A • EN 45545-2 • EN 50121-3-2 / EN 55022 / EN 61000-4-x • EN 61373

Railway service vehicles Crash memory Fire & smoke EMC Vibration / shock

MODULAR ARCHITECTURE

Data Logger + Black Box

S.I.DE.P.
SMART ENGINEERING



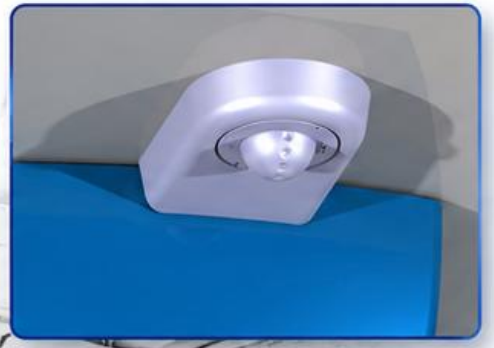
REVAMPING

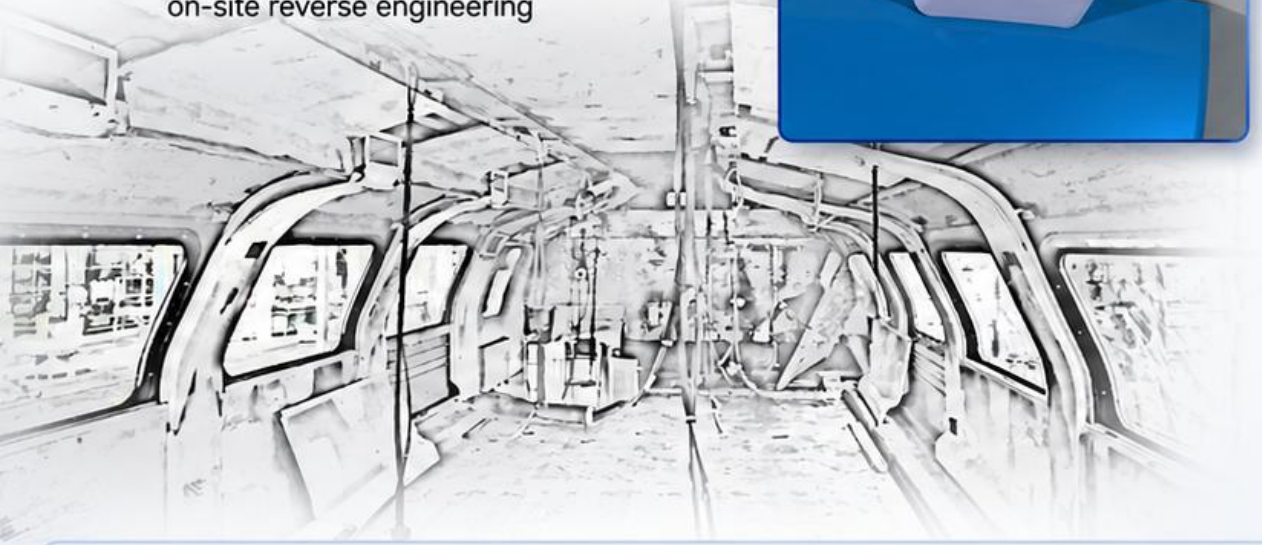
DESIGN UPDATING & IMPROVEMENT

KEEPING YOUR ROLLING STOCK SOLUTIONS SAFE, MODERN AND CUSTOMER-FOCUSED

DESIGN UPDATING

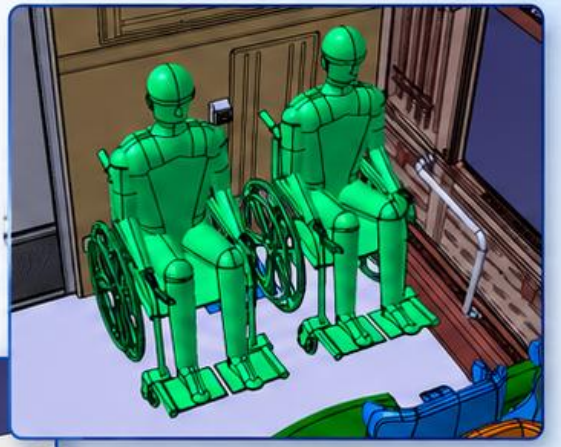
- Fire-fighting equipment installation studies for safety regulations update (EN45545)
- System updating and integration due to customer requests
- Mechanical integration and on-site reverse engineering

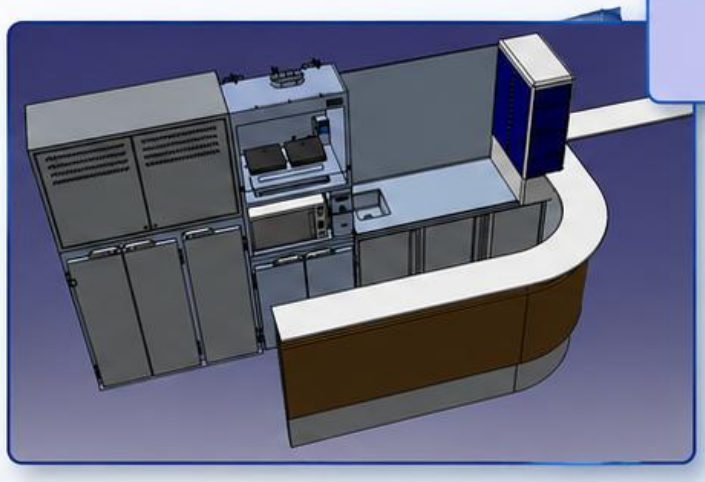




DESIGN IMPROVEMENT

- Revamping of existing carriage fulfilling TSI-PRM requirements
- Ergonomics evaluation and proposals
- Bistrot area development and implementation





SAFETY COMPLIANCE & RELIABILITY

Updates ensure compliance with the latest standards and regulations, improving safety and reliability.

CUSTOMER-FOCUSED SOLUTIONS

We integrate customer requests and improve existing designs to meet specific needs.

OPTIMIZED PERFORMANCE & ERGONOMICS

Ergonomic evaluations and smart redesign improve comfort, usability and overall performance.

COST & TIME EFFICIENCY

Iterative approach and reverse engineering reduce efforts and lead times.

EXTENDED LIFECYCLE VALUE

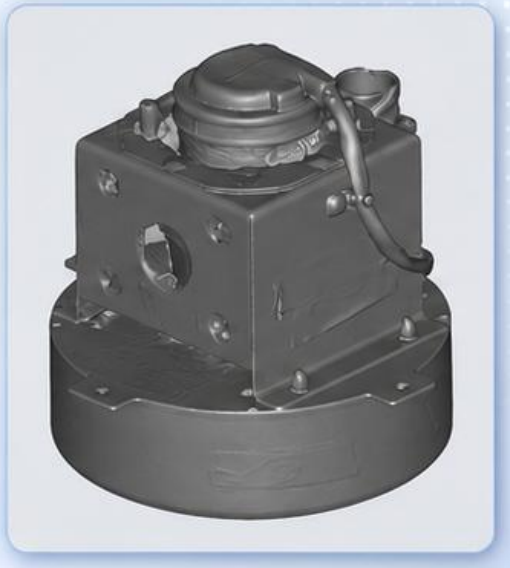
Revamping and system updates extend asset life and maximize return on investment.

3D SCANNING

ACCURATE DATA. SMARTER DESIGN. REAL-WORLD SOLUTIONS.







ON-SITE & IN-OFFICE SCANNING

3D scanning of objects and environments both **on site** and **in our offices**.

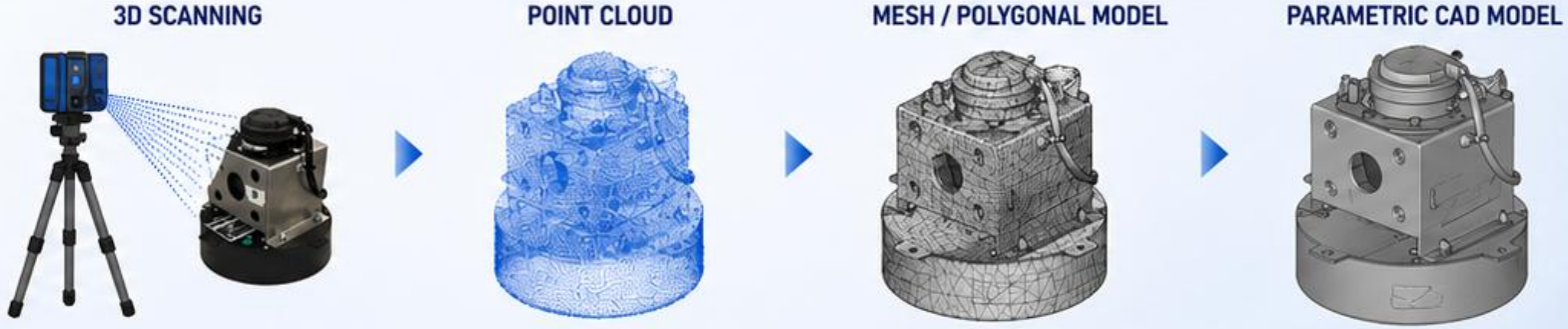
DATA PROCESSING

Scanned material **processing** and **polygonal model** generation.

3D RECONSTRUCTION

Reconstruction of scanned objects/areas using **parametric 3D CAD software**, for **reverse engineering / CAE**.

FROM REALITY TO DIGITAL MODEL



HIGH ACCURACY

Precise data capture for reliable results.

TIME SAVING

Fast data acquisition and efficient workflows.

FLEXIBILITY

Suitable for complex shapes and hard-to-reach areas.

BETTER DECISIONS

Accurate data for design, analysis and manufacturing.

COST EFFECTIVE

Reduced rework, improved process efficiency.

S.I.DE.P.
SMART ENGINEERING



TECHNICAL DOCUMENTATION

MANUALS & SPARE PARTS CATALOGUES

CLEAR INSTRUCTIONS. COMPLETE DOCUMENTATION. EFFICIENT MAINTENANCE.

MAINTENANCE INSTRUCTIONS

Detailed installation instructions which highlight:

- General installation instructions
- Cleaning and preparation requirements
- Maintenance plans
- Detailed periodic maintenance activities description
- Detailed preventive maintenance activities description
- Detailed corrective maintenance activities description



SPARE PARTS CATALOGUES

Starting from the complete assembly model, all the system are split up to sub assembly down to individual parts.



INSTALLATION MANUALS

Detailed installation instructions which highlight:

- Project information
- Storage requirements
- Installation preparations (i.e. drilling of mounting holes, flatness constraints, dimensions check, surface preparations, etc.)
- Installations phases





IMPROVED MAINTENANCE EFFICIENCY

Clear instructions reduce errors and save time.

COMPLETE & ACCURATE DOCUMENTATION

All information available in one reliable source.

EASY PARTS IDENTIFICATION

Exploded views simplify parts search and ordering.

COMPLIANCE & TRACEABILITY

Structured manuals support regulatory compliance and audits.

COST SAVINGS

Better planning and maintenance reduce downtime and costs.

S.I.DE.P.
SMART ENGINEERING



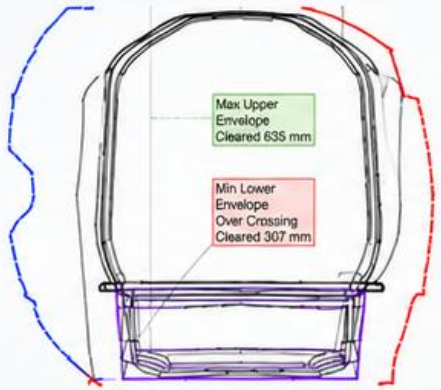
COMPATIBILITY ANALYSIS

GAUGING ASSESSMENTS & TRACK NEGOTIATION STUDIES

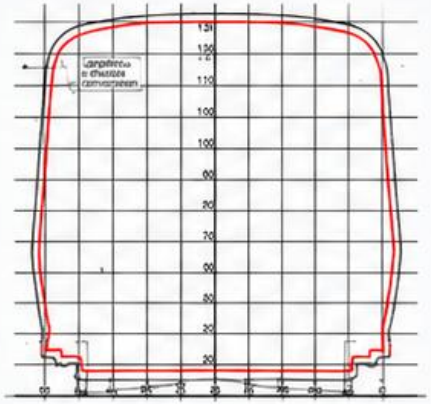
Ensuring safe clearance, interoperability and operational performance across all rail systems.



- Gauging assessments and Swept area calculation for Tramway's vehicles
- Static, Kinematic and Dynamic gauging calculations for Mass Transit vehicles
- Conventional Railway's vehicles gauging calculations according with EN15273 standard
- UK Railway's vehicle gauging assessments according with RGS standards

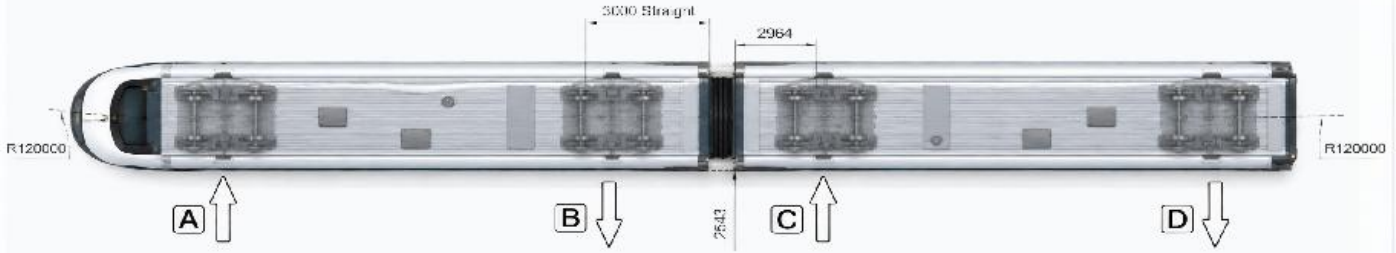






TRACK NEGOTIATION STUDIES

- Dimensioning of the mechanical interface systems (couplers, drawbars, gangways, etc.)
- Dimensioning of the connections (pneumatical, electrical, etc.)
- Clearance assessments
- Coupler Gathering Range assessments (automatic coupling limits)
- Track Negotiation analyses
- Limit scenarios definition for coupling analysis
- Centering system device design



SAFETY COMPLIANCE
Ensuring compliance with international standards.

INTEROPERABILITY
Guaranteeing compatibility across different rail systems.

OPTIMIZED DESIGN
Accurate calculations for reliable and efficient solutions.

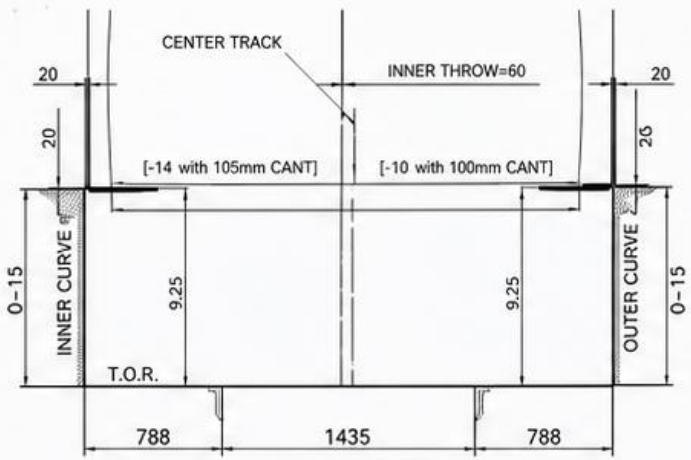
OPERATIONAL RELIABILITY
Improved performance and reduced risks.

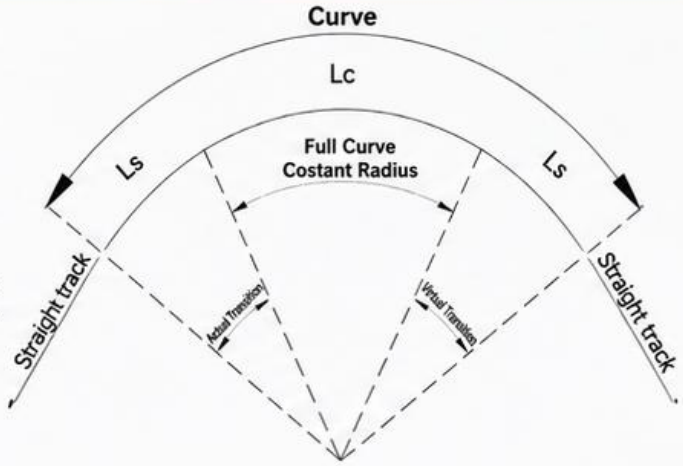
COST & TIME EFFICIENCY
Optimized processes to save time and resources.

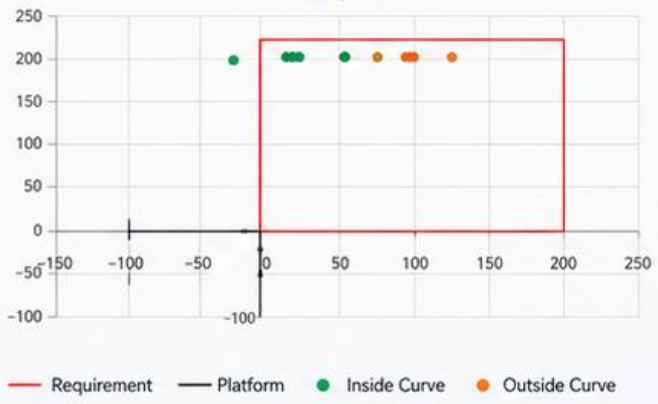
TRACKWORK'S REQUIREMENTS ANALYSIS & PTI ANALYSIS

Comprehensive analysis and verification of trackwork parameters to ensure rolling stock compatibility, safety and compliance.

- Trackwork's parameter assessment (for rolling stock compatibility)
- Rolling Stock Mechanical interfaces definition
- Track drawings analysis
- Vehicle behavior assessment







- Platform-Train Interface analysis according with UNI7360, TSI PRM or ADA requirements
- Customized PTI assessments and design support for special technical requirements
- Stepping distance assessments according with NTSN PRM and GMRT2173 requirements
- Clearance analysis in station

S.I.DE.P.
SMART ENGINEERING

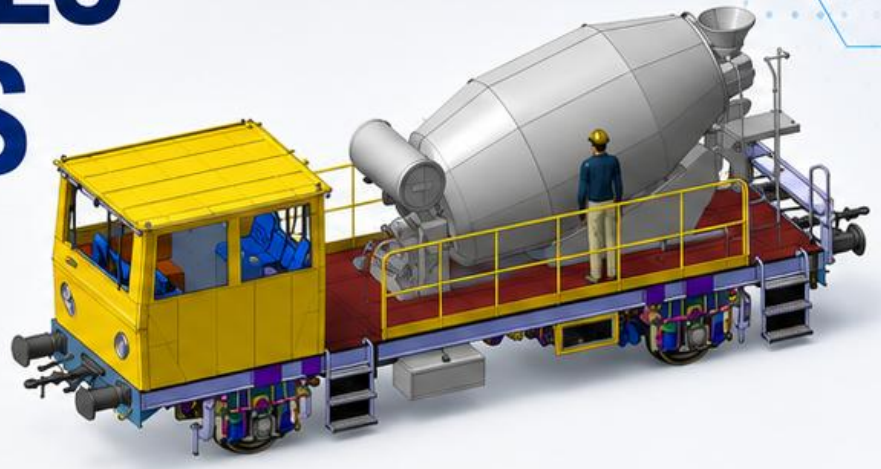


MAINTENANCE VEHICLES AND FREIGHT WAGONS DESIGN

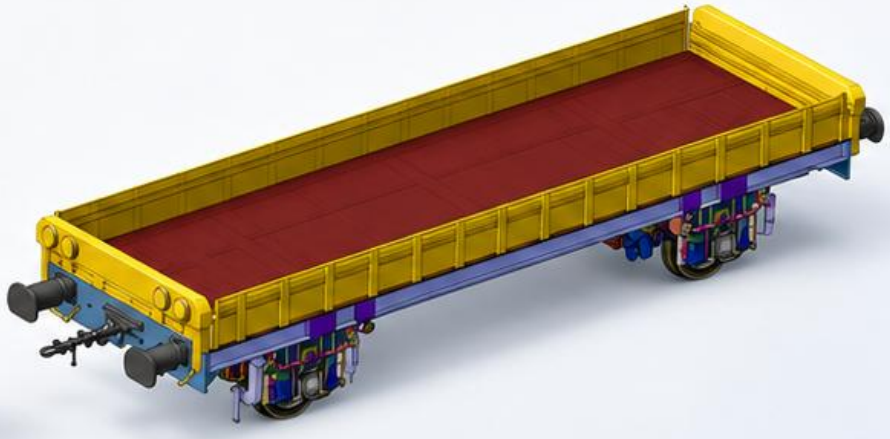
MAINTENANCE VEHICLES AND FREIGHT WAGONS

Turnkey design of railway maintenance vehicles and freight wagons, including the definition of:

- STRUCTURES
- CABIN
- WHEELSETS
- ELECTRICAL SYSTEM
- HYDRAULIC SYSTEM
- PNEUMATIC SYSTEM
- CRITICAL PURCHASING COMPONENTS







According to latest **RFI Road Map** and **EN14033** requirements.

HEADQUARTER
Via Giovanni March 14/b,
57121 Livorno (Italy)

BRANCH OFFICE
(ELECTRICAL DESIGN DEPARTMENT)
Via Umberto Mariotti 190,
51100 Pistoia (Italy)



S.I.DE.P.

SMART ENGINEERING

+39 0586 077627

info@sidep.it

www.sidep.it