FIRST CLASS ENGINEERING

E-Techology – Development of electrical engineering solutions

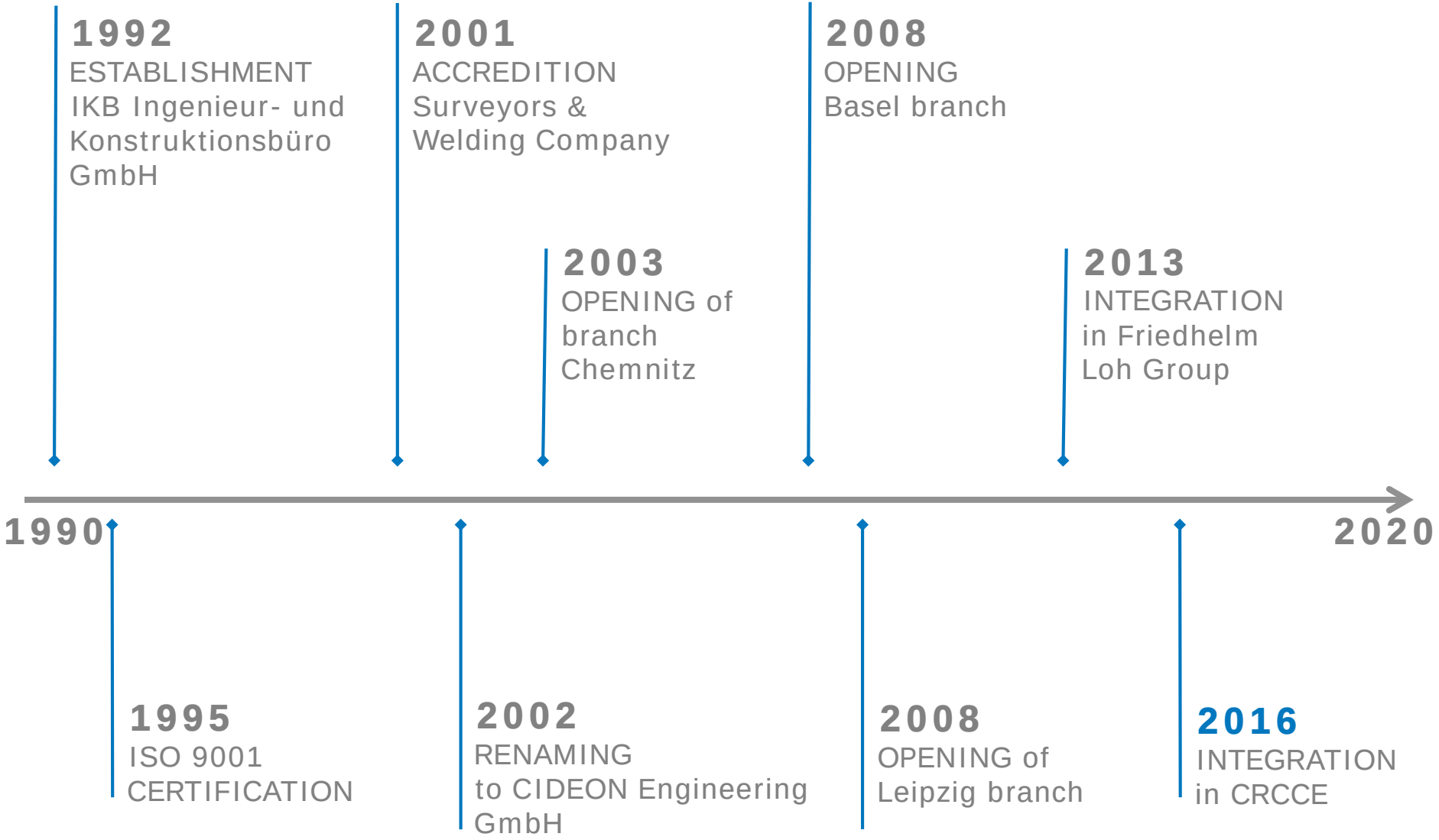
Company

About us

- Team with more than 110 employees at the locations **Basel**, **Bautzen**, **Chemnitz, Essen** and **Leipzig**
- More than **25 years** of market presence and specialisation in the rail vehicle sector
- Ensuring highest expertise in the redevelopment, modernisation or conversion of rail vehicles

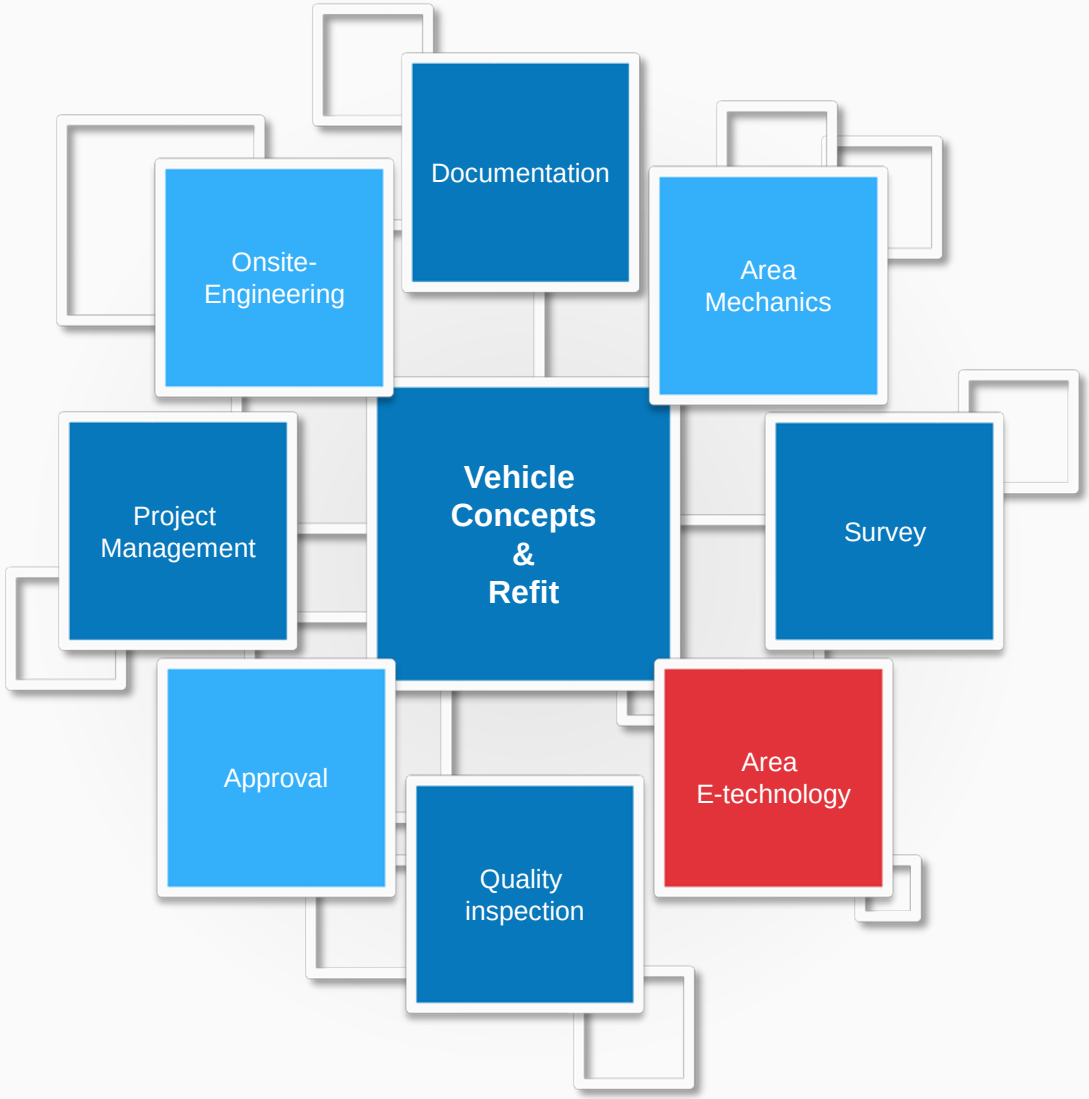
Company

Brief summary



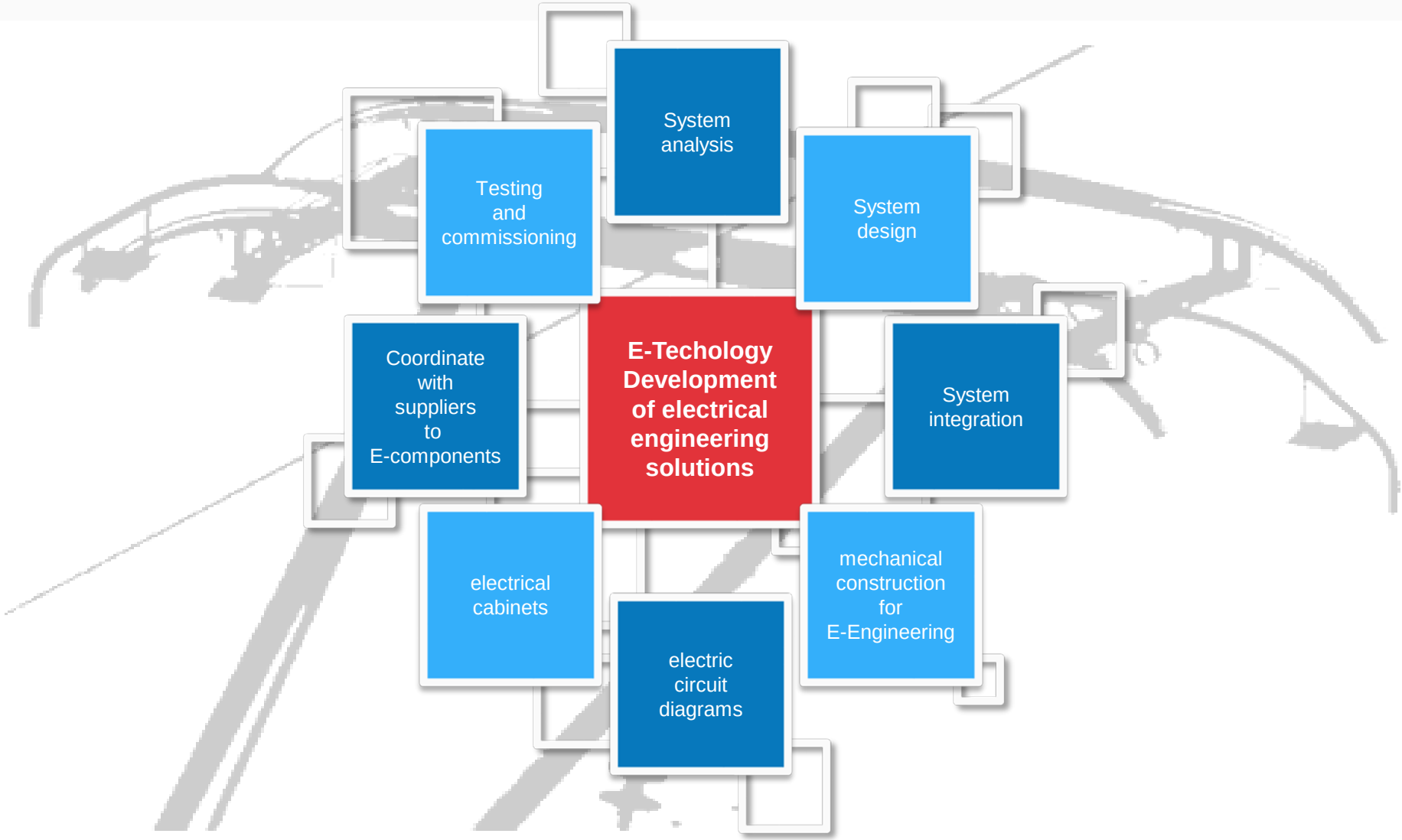
Services

Overview of all services



Area E-Technology

Overview Portfolio



E-Technology

Development of electrical engineering solutions

- **Design planning**
  - Generation of first concepts (depending on the task)
  - Comparison of known and new approaches
  - Assessment according to technical and economic feasibility
  - Consideration in terms of Benefit, failure and effects analyses as well as reliability

- **Results:**
  - Circuit designs
  - Analysis of the energy footprint of the actual situation
  - Software specifications
  - Specification of the cost and time-intensive components

E-Technology

Development of electrical engineering solutions

- **Implementation planning**
  - Schematic diagrams and circuit diagrams
  - Parts list, connection lists and Bundlisten
  - Energy footprint of the target situation
  - Supply specifications
  - Testing, conversion, work instructions, operating and maintenance manuals
  - Training documents

- **Manufacturing / Conversion support**
  - On-site customer support with the realisation of prototypes and the start of series production.

E-Technology

Development of electrical engineering solutions

- **Results of changes from production:**
  - Adjusted circuitry documents for the start of serial production
  - Final documentation to submit to the regulatory authorities
  - Supporting the customer with the data transfer into his data management system

- **CAD-Systems**
  - To create new (or revise old) documents, we use the following systems:
    - AutoCAD and ecscad at our own locations
    - E3, Ruplan, Engineering Base, EPLAN and ELCAD based on longstanding cooperation with external service providers

E-Technology

Entwicklung elektrotechnischer Lösungen

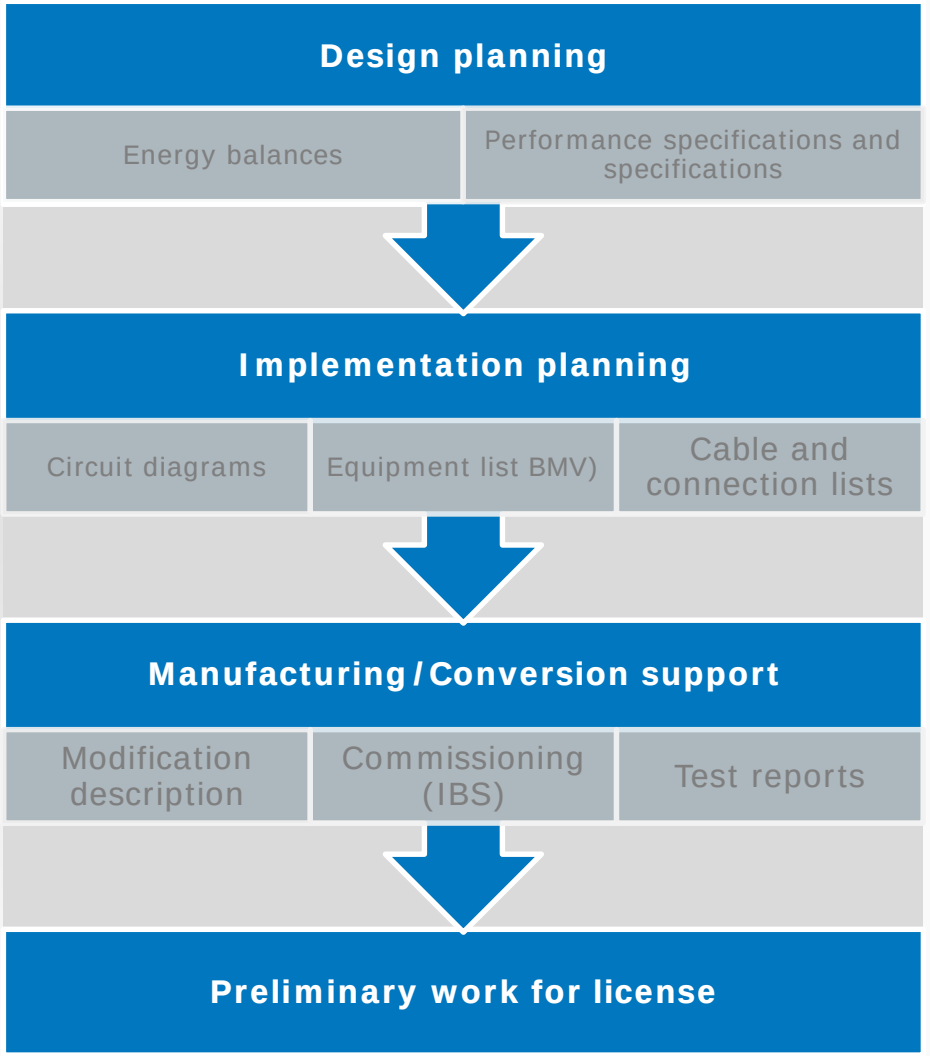
- **The following are not part of our portfolio:**
  - Software- / Hardware development
  - Developments in control and regulation technology

- In these areas, **external experts or firms** are used as required

References to electrical engineering

Overview of some processed product groups

Projects	Design planning	Implementation planning	Production- / modification support	Preliminary work for license
EC-Refit	✓	✓	✓	✓
EMS	✓	✓	✓	
LED Re482	✓	✓	✓	✓
Teloc 1500	✓	✓	✓	



References to electrical engineering

EC Refit

Requirements

- Refit for the next 20 years of service life
- Creating a production and logistics concept for the conversion of 225 vehicles

Customer benefits

- Adapted to the new usage in modernised domestic traffic
- International use still possible by RIC capability

Implementation

- The following assemblies have been upgraded and integrated:
  - Power supply system
  - Lighting concept
  - WC system (bioreactors)
  - Yaw damper
  - Interior

References to electrical engineering

EMS

Requirements

- Subproject management: CIDEON Schweiz AG
- Start date: 2013
- Activities
  - Assessment of the current condition of the vehicle
  - Installation of test systems
  - Preparation for procurement of assemblies

Customer benefits

- Cost optimisation in the project
- Consumption-based charges of the purchased traction current

Implementation

- Recording and evaluation of all user group requirements
- Development, review and approval of solution concept for the measuring system
- Installation inspection and installation of the energy meters for pilot vehicles
- Creation of performance specification and tender documents

References to electrical engineering

LED Re482

Requirements

- Replacement of the old halogen headlights with new LED headlights
- Proof of the suitability for railways use of the new front lights (compliance with EN 60077-1 and EN 50155)
- Approval of the new components in Germany, Italy and Switzerland

Customer benefits

- Reduction in the retrofitting effort by fitting the new headlights into the existing lamp body
- Longer service life of the new LED lights reduces maintenance costs

Implementation

- Definition of requirements for new headlights
- Implementation of the tender
- Type selection
- Installation Engineering
- Accompanying prototype retrofitting, creation of retrofitting instructions for serial retrofitting

References to electrical engineering

New construction Do of BT for DB AG for transport contract Main-Weser-Niddertal-Kinzigtal "MWNK"

Requirements

- Further development on basis of Do 2003
- Adaptation to FIS
- Implementation
  - Laptop sockets
  - Video surveillance
  - External speaker
  - Displays (external and internal)
  - Additional Function Monitors (text to speech)
  - Preliminary setup for e-ticketing
  - Passengers communication station

Customer benefits

- The vehicles are used for the train composition of loco-hauled multi-part units from newly constructed and adapted existing vehicles
- These are new vehicles for operation with reconstructed vehicles on the basis of Do 2003 under the condition that existing vehicles are equipped with adapted FIS (based on the IBIS bus)

Implementation

- Vehicle wiring
- Integration of new lines
- Updating trunk and cable tables
- Selection of electrical components, such as conductive material, including cross sections, terminals, relays, switches in coordination with the customer

References to electrical engineering

Vamos

Requirements

- Customer support in-house for development of a light rail vehicle

Customer benefits

- Vehicle specifically for the operating conditions in Bielefeld
- Environmentally friendly due to low energy consumption
- Special know-how, for example, development of bogie

Implementation

- Implementation of components, wiring diagrams, routing of cables for
  - lights (external and internal)
  - Driver's cabin equipment
  - Brake based on the brake control supplied by the brake supplier

References to electrical engineering

Add-on air-conditioning of a railcar of RVT model (BR 654)

Requirements

- Add-on air-conditioning of a railcar of RVT model (BR 654)

Customer benefits

- The redesign provides the customer a vehicle that specifically suits the operating conditions of the customer
- Implementation of the components preferred by the client

Implementation

- Implementation of the components preferred by the client
- Expansion of energy unit
- Creation of circuit diagrams
- Cabling
- Fire protection analysis for add-on air conditioning

References to electrical engineering

Lorry trailer cars LB 7

Implementation

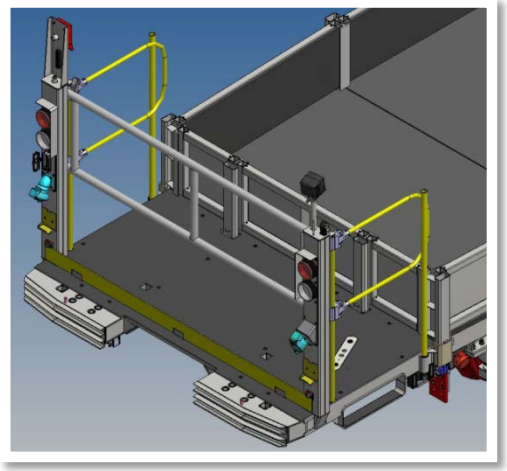
- Implementation E-share for lorry trailer cars LB7
- Machining with CAD system EPLAN

Customer benefits

- Lorry trailer cars LB7 for the transport of building materials and equipment on the subway rail network of the Hamburger Hochbahn
- It should be possible to load the new lorries from the front side and thereby enable the transport of, for example, midi excavators in single-track tubbing tunnels

Customer benefits

- Schematics creation and earthing concept
- Component list
- Wiring diagrams (cable lists, wiring dia-grams and schematic routing of cables)
- Electromechanical integration of the switch cabinets and transformer box
- Integration of brake control, safety loop and ATS system into the complete circuit



Thank you for your attention!

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