**IMS MANUAL**

**INTEGRATED MANAGEMENT SYSTEM**

in accordance with

ČSN EN ISO 9001
IRIS
ČSN EN ISO 14001
ČSN OHSAS 18001
ČSN EN 50126

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0. GENERAL PROVISIONS

0.1 INTEGRATED MANAGEMENT SYSTEM MANUAL CONTROL

The Head of the Quality Control (HQC) is responsible for issuing, updating and distributing of the IMS Manual. HQC may entrust a relevant specialised department of the company with the preparation of individual parts of the Quality Manual or HQC may appoint a work team to this purpose. The company General Manager approves the IMS Manual. The IMS Manual is maintained and stored electronically, the copy of the document printed from the IS is uncontrolled and topical as to its printing date only. For the needs of customers and other parties interested, the IMS Manual is available on the company website; this version is controlled by the Quality and Environment Management Department. The Quality and Environment Management Department also manages the uncontrolled prints of the IMS Manual for customer needs both in the Czech and English versions. The Organization Chart of the company, valid as to its printing date, is the attachment to this version of the IMS Manual.

0.2 PURPOSE OF THE INTEGRATED MANAGEMENT SYSTEM MANUAL

The IMS Manual of ŠKODA ELECTRIC a.s. describes the integrated management system established in accordance with the requirements of ČSN EN ISO 9001, IRIS, ČSN EN ISO 14001, ČSN OHSAS 18001, ČSN EN 50126 standards and certain parts of ISO/TS 16949 standard. The IMS Manual is intended for the company’s employees, for the needs of audits performed by the customer or a third party and for the presentation of company’s IMS. The structure and numbering of chapters (from Chapter 3 on) of the IMS Manual is identical to the structure of IRIS standard and adapted, where necessary, to describe the specific requirements and activities of the subsystems, such as environment, occupational health and safety (OHS) and RAMS.

0.3 AREA OF APPLICATION AND VALIDITY

The IMS Manual is valid in ŠKODA ELECTRIC a.s. and it is binding for all employees of the company. The IMS Manual describes briefly the operation method of IMS and it refers in particular to the follow-up and associated IMS documents. Some chapters also cover the basic description of the implementation of the requirements of ČSN EN ISO 9001, IRIS, ČSN EN ISO 14001 and ČSN OHSAS 18001 standards to which no separate organizational guideline is available. These are chapters:

5.5.3. Internal Communication
6.3. Infrastructure
6.4. Working Environment
7.2.3. Communication with Customer
1. INTRODUCTION

ŠKODA ELECTRIC a.s. was established on Jan 1, 2003, as an affiliated company of ŠKODA HOLDING a.s., involving the Drives Business Unit formed from the former Controls Division of ŠKODA ENERGO s.r.o. On July 1, 2003, ŠKODA TRAKČNÍ MOTORY s.r.o. merged with ŠKODA ELECTRIC s.r.o. into Traction Motors Business Unit, and what was also incorporated is a part of the technological section of ŠKODA DOPRAVNÍ TECHNIKA, engaged in system projects of vehicles drives. The company development continued with its extension by the third Unit - Trolleybus Business Unit - as of Jan 1, 2004, which followed up the well-established production of trolleybuses of the former ŠKODA OSTROV s.r.o. An alteration of the company organization took place on July 1, 2006, when the Drives BU and the Trolleybus BU merged to form two divisions - the Traction Motor BU and the Drives and Trolleybus BU. On 1 May 2007, the legal for of the company has been changed to ŠKODA ELECTRIC a.s. (joint-stock company). As of October 1, 2011, the Division Drives & Trolleybuses was divided into two separate divisions. The company has three divisions - Division Traction Motors, Division Drives, and Division Trolleybuses. As of the date the IMS Manual was issued, the company of ŠKODA ELECTRIC a.s. is a part of the ŠKODA TRANSPORTATION Group.

ŠKODA ELECTRIC a.s. builds on the achievements of its organizational parts and the long tradition of electro-technical production in the SKODA WORKS in Plzeň, which was launched in the former electro-technical plant in 1921. High technological level, output parameters and reliability of the products is based on the results of company’s own technical development and the results of the collaboration with other specialized worksites.

The supplied motors and control units are used to drive the electric locomotives, subway rail cars, trolleybuses, and trams as well as for driving of special vehicles and industrial equipment. The company is able to supply both the complete vehicle drives, used by customers at home and abroad, and the subcomponents such as traction and auxiliary electric motors, control and regulating power electronics, including the appropriate software. We also coped up with the demanding manufacturing technology of linear motor stators and electromagnet coils for the linear stepper drives intended for the nuclear power engineering.

As to the trolleybuses, SKODA ELECTRIC a.s. continues in the long and successful tradition of the trolleybus production that is in existence since 1936. The company has taken over this branch from ŠKODA OSTROV Company and, in cooperation with the bus body manufacturers, it developed modern trolleybuses driven with asynchronous traction motors of its own production and the company ranks among the world’s top companies in this field.

2. INTEGRATED MANAGEMENT SYSTEM CHARACTERISTIC

The Integrated Management System of ŠKODA ELECTRIC a.s. is based consistently on the principles of quality management stated in ČSN EN ISO 9001. IMS is aimed at the continuous improvement of company effectiveness and the satisfaction of customers and other interested parties. The organization control includes quality management together with other management disciplines:

a) Focus on Customer and Other Interested Parties

ŠKODA ELECTRIC a.s. is fully aware of its dependence on its customers. Therefore, it endeavors to understand their current and future needs, to foresee their expectations and to concentrate its efforts on meeting customer’s requirements;

b) Employees Leading and Management (Leadership)

The persons in authority promote the compliance between the purpose and aim of the organization. They create and maintain an internal environment, which helps employees to fully involve in achieving the objectives of the organization.
c) Involvement of Employees
Employees at all levels are the basis of the organization and their full involvement enables to take
advantage of their abilities in favor of the organization.

d) Process Approach
A desired result is achieved much more efficiently, if the activities and related resources are managed as a
process.

e) System Approach to Management
Identifying, understanding and managing of interrelated processes as a system contribute to the
effectiveness and efficiency of the organization in achieving its objectives.

f) Continuous Improvement
Continuous improvement of the overall performance of the organization is the permanent objective of the
organization.

g) Factual Approach to Decision Making
Effective decisions are based on analysis of data and information.

h) Mutually Beneficial Supplier Relationships
Organization and its suppliers depend on each other and a their mutually advantageous relationship
improves their ability to create a value.

3. TERMS, DEFINITIONS AND ABBREVIATIONS USED

3.1 EXPLANATION OF TERMS
The interpretation and definitions of terms is stated in the informative Attachment no. 3 that includes
interpretation and definitions of the terms used within the company and in this IMS Manual (use was made
of ČSN EN ISO 9000).

3.2 ABBREVIATIONS USED
Š-ELC  -  ŠKODA ELECTRIC a.s.
IMS    -  Integrated Management System
SM     -  Guideline
IS     -  Information system
PSR    -  Project Status Report
BRM    -  Business Review Meeting: company development assessment (sales and economics)
FAI    -  First Article Inspection
EA_DMS -  Easy Archive_ Document Management System - the system to manage and control the
documents in the ŠKODA TRANSPORTATION Group
ASPI   -  Automated Legal Information System
RAMS/LCC -  Reliability, Availability, Maintainability and Safety, a Life Cycle Costs
SMBOZP -  Occupational Safety and Health Management System
IRIS   -  International Railway Industry Standard
PPAP   -  Production Part Approval Process
APQP   -  Advanced Product Quality Planning, modern quality planning
FMEA   -  Failure Mode and Effects Analysis, analysis of possible modes and consequences of
defects
MSA    -  Measurement System Analysis
4. MANAGEMENT SYSTEM

4.1 GENERAL REQUIREMENTS

The company has established, introduced, documented, implemented and maintains IMS in accordance with the requirements stated in Article 0.2, and the effectiveness of IMS is continuously improved.

a) Processes needed for the IMS and its application, their sequence and interaction are identified and stated in the Process Map and the Process Chart of the SM-ŘJ-04 Process Control Guideline.

b) Procedures for the control of individual processes and the division of process tasks and powers are stated in the relevant guidelines and working directions.

c) Criteria necessary to assure and improve the process control effectiveness are described in the SM-ŘJ-04 Process Control Guideline and in individual process guidelines.

4.1.1 Definition of Areas Subject to Certification (Scope of Certification):

- Design, development, production, testing, sale, servicing, repairs and refurbishment of electric equipment and machines.
- Design, development, manufacture, testing, sale, servicing and refurbishment of drives and their components for traction vehicles, including the control software.
- Design and development management, assembly, testing, commissioning and servicing of trolleybuses.

Processes related to the defined areas are performed in the following locations:

- Production plant Plzeň, Průmyslová 4
- Sale and Technical Support Office Ostrov
- Development Office and Laboratory Prague

No item has been excluded from the ISO 9001, 14001, OHSAS 18001 and ČSN EN 50126 standards.

The Art. 4.4 Management of multi-sites Project is excluded from the requirements of IRIS standard. All the projects are prepared and controlled exclusively in the company headquarters.

4.2 DOCUMENTATION REQUIREMENTS

4.2.1 General

The IMS document handling is controlled by the rules stipulated for the creation, control, and archiving of documents in accordance with SM-ŘJ-01 Document Management and SM-P-02 Rules on Document Archiving and Destruction. The documents are kept by the system on the paper and electronic carriers, and the documents describe:

- IMS basic elements
- Their assignation to individual workplaces;
- References to other associated documents and records.

The scope of documentation results from the requirements of standards mentioned in 0.2 and the actual needs of company with regard to the effective management.
4.2.2 Integrated Management System Manual

The IMS Manual is structured as required by the standards mentioned in Article 0.2 and it describes (or refers to its further description of) IMS.

a) The IMS Manual includes the area of IMS application – see the Manual’s Chapter 4.1

b) The IMS Manual refers to the mandatory documented procedures as per IRIS:
   - Transfer of processes and their parts – see Chap. 4.1
   - Document Management – see Chap. 4.2.3.
   - Record Management – see Chap. 4.2.4.
   - Provision of Resources – see Chap. 6.1
   - Training – see Chap. 6.2.2.3
   - Validation of Design and Development – see Chap. 7.3.6
   - Development Project Approval (Safety Integrity) – see Chap. 7.3.8
   - Purchase – see Chap. 7.4.1
   - Device and Tool Management – see Chap. 7.5.1.4
   - First Article Inspection (FAI) – see Chap. 7.9
   - RAMS/LCC – see Chap. 7.11
   - Change Control – see Chap. 7.13
   - Internal Audit – see Chap. 8.2.2.
   - Nonconforming Product Control – see Chap. 8.3.
   - Corrective Actions – see Chap. 8.5.2.
   - Preventive Actions – see Chap. 8.5.3.

The IMS Manual describes interaction between processes – see Chapter 4.1).
4.2.3 Document Management

The main objective in the field of document handling is to ensure that the documents needed, in the latest version, and that are necessary for quality execution of their work are available to employees. The rules for approval, revision, identification, distribution, and downloading of documents are described in the SM-ŘJ-01 Document Management Guideline. The Foreign Document Management Rules are stipulated by the Work Instruction, PP-TÚ-01 Foreign Document Management, and, for the area of standards and regulations, by the SM-TÚ-02 Standardization Guideline. The Engineering Documents Archiving Procedures are defined by the Work Instruction, PP-TÚ-02T Archiving T/TÚ Documents.

4.2.4 Record Management

Records are kept so that they provide the proof of the conformity with the specified requirements and on the effective functioning of IMS. Storage of records meets the requirements of both the regulations and customer. The Guideline, SM-ŘJ-02 Record Management, specifies the rules for the record management process. The records are protected and stored in such a manner as to minimize the risk of their destruction or damage.

4.3 Knowledge Management

The best knowledge and experience is asserted in the Design Control Process when individual design stages are reviewed and verified and technological procedures determined and optimized (see Guideline SM-TÚ-01 Design Control) and within the Kaizen movement. Within the framework of this, a use is also made of the experience from the previous similar projects, namely on performing the Product FMEA and Process FMEA, and during the RAMS analyses at Stages 3-6 of the Product Life Cycle as per SM-ŘJ-19 Standard RAMS Program.

4.4 Management of Multi-Sites Projects

Excluded, it does not refer to ELC

5. Management Responsibility

5.1 Personal Commitment

The top management is committed to implementing and continuous improving of IMS by:

- Communicating within the company the importance of meeting the customer requirements in accordance with the valid legislation (in a form of generally accessible Management commitment that constitutes a part of the applicable Policy),
- Determining the Policy and objectives,
- Stipulating the IMS management review rules,
- Providing resource availability,
- Reviewing the Product Implementation Processes to prove their effectiveness and efficiency.

5.2 Focus on Interested Parties

5.2.1 Customer Focus

Top Management have determined the procedures to render their services and products in such a way that the customer requirements are met and expectations satisfied (see Chapter 7.2.1 hereof).

Top Management has also developed procedures to ensure customer satisfaction (see Chapter 8.2.1 hereof).
5.2.2 Requirements of Legislation and Other Interested Parties

The organization has stipulated the documented procedures for identification and management of relevant legal and other requirements in the Guideline of SM-ŘJ-16 Maintenance of Legal Regulations Register and, by using ASPI, the follow-up Register of Legal Regulations.

5.3 INTEGRATED MANAGEMENT SYSTEM POLICY

The company’s board of directors approves the company policy which is made public and communicated to all employees of the company. The Policy is a part of the controlled documents in EA-DMS. The company policy is published on the websites of Š-ELC and elsewhere in the company as required. The company managerial personnel is responsible for the implementation of Policy.

The company policy:

- Is in compliance with the strategic objectives of the organization,
- Includes personal involvement and activities when the requirements of customers and other interested parties are being met,
- Includes the obligation to meet the valid legislation,
- Includes the commitment to continuously improve IMS,
- Provides framework for IMS revisions,
- Is documented, maintained and communicated within the company and its understanding by company employees is ensured.
- Is available to interested parties and it is regularly revised.

5.3.1 Business Plan

The company determines the Business Plan for each year (by the methodology of ŠKODA Business Plan) and this Plan is based on the long-term strategy of the company and ŠKODA TRANSPORTATION Group. The Business Plan includes both the business objectives and the commercial and product strategy resulting from the risks and opportunities on the railway application market. The Business Plan also includes the estimations of the expected company performance as, for example, costs, revenues, etc.

5.4 PLANNING

5.4.1 Objectives

The policy implementation is ensured by objectives that include the target values wherever possible. The objectives are determined, approved and reviewed by the Top Management or Division Management.

What is usually defined for each objective is as follows:

- Initial status and target status,
- Sequence of actions leading to meet the target,
- Deadline and responsibility for the compliance inspection and overall rating of the target.

Depending on their scope and as required, the objectives are broken down to smaller targets and tasks of individual workplaces and employees. In this way, the objectives are understood and fulfilled by individual employees which results in understanding the IMS Policy as well.

5.4.2 Integrated Management System Planning

The management system is based on the process approach and uses the PDCA methodology.

- P (Plan) - identification, description and analysis, determination of targets, methods and procedures, planning and description, determination of risks and critical points;
- D (Do) – actual implementation, management, monitoring and control;
- C (Control) – verification, review, inspection, measurement, action-taking;
• A (Act) – analysis and evaluation, confirmation and stabilization, feed-back provision.

This is the method to ensure the process of continuous improvement arising from the Company Policy and IMS Planning, processes and products, monitoring, inspection and verification. The planning in the area of Environmental Management pertains mainly to the identification, assessment, and management of the environmental aspects. These activities are performed in accordance with the Guideline SM-ŘJ-12 Environmental Aspects, individual identified and assessed aspects are stated and evaluated in the Register of Environmental Aspects.

What is analogically employed for the area of Occupational Safety and Health, and Fire Protection (OSH & FP) are the procedures for detection, identification and management of the OSH & FP related risks under the Guideline SM-P-06 Risk Management in OSH, and the follow-up Register of OSH Risks.

The planning in the area of operational reliability and product safety is carried out upon the analyses of reliability, maintainability, safety and costs of the product life cycle (RAMS/LCC) as per SM-ŘJ-17 RAMS Management, and SM-ŘJ-19 Standard RAMS Program.

5.5 RESPONSIBILITY, POWERS AND COMMUNICATION

5.5.1 Responsibility and Powers

The division of responsibilities and powers in the company is defined by:

- The guidelines: SM-GŘ-02 Organization Rules, SM-GŘ-01 Rules for Signing and Approval, SM-P-01 Work Rules,
- Description of activities for specific position (SM-P-05 Description of Activities),
- Company organization chart and organization structure,
- Responsibility Matrix in specific project,
- Decisions of the General Manager in the form of an employee appointment for office or putting an employee in charge of delegated activities and responsibilities.

To make the orientation in the organizational structure and spheres of activities of individual departments easier, the “Organizational structure” database, administered and regularly updated by the Human Resources Department, is made available for the company employees. This database is integral part of the EA_DMS Document Management System.

The company is managed by the corporate bodies of which the highest is the General Assembly. The company is inter-organizationally structured into individual departments managed by Departmental Directors who are directly subordinated to the General Manager of the company and into divisions managed by the Division Managers or Technical Managers.
5.5.1.1 Responsibility for Quality
Quality Management Department Managers in the Divisions are immediately informed on the products or processes that do not comply with the requirements. Engineering Inspection (EI) workers have the authority to stop production as soon as they suspect any quality problems. The EI workers or the delegated production workers who are responsible for the assurance of conformity with the requirements for product are present in all shifts.

5.5.2 Management Representatives
General Manager of the company appoints the Management representatives for:
- Integrated Management System (IMS)
- Occupational Safety and Health and Fire Protection Management;
- Customer relations.

The Management representatives are delegated with the powers and responsibilities, particularly those to:
- assure that the processes necessary for IMS are being established, implemented and maintained;
- provide the Executive Board and the Board of Directors with the reports on achieved IMS performances and on any needs for improvement;
- promote the awareness of the importance of customer’s requirements throughout the company;
- assignment of tasks and demanding the improvement actions from all the company's managerial personnel

5.5.3 Internal Communication
Company Management provides the establishment of appropriate communication channels pertaining to the management and process systems. The persons responsible for the internal communication within the company are General Manager, managers of individual divisions, and technical managers. The communication is structured as follows:

- **Sessions** – the system defines individual types of sessions (meetings of corporate bodies, executive board sessions, division management sessions, departmental sessions, etc.), their contents, agenda, and participants. Minutes of the meetings, consequential tasks and their solutions are distributed through electronic mail.
- **Teams** – teams are established for certain activities. The rules for individual team activities are defined in applicable guidelines. For solving specific problems, finding optimum solutions, improvements, etc., the following teams are established:
  - Project teams - to manage and assess the project progress and result.
  - Business teams - to clarify and review the business cases and identify the customer’s requirements for product.
  - Revision teams – to assess the impacts of the changes in design and development.
  - Complaint teams – to control the customer complaint handling process.
- **Visual Management** – Policy, objectives, tasks, and results in the field of quality, environment, OSH, and the continuous improvement system (Kaizen).
- **Commercial information** – to file and exploit the information on business partners and market requirements.
- **Information on implementation processes** – within the BaaN ERP information system.
- **Information on economy** (finances, bookkeeping, costs and profits) – within the BaaN ERP and BRM information system.

In relation to its environmental aspects and EMS, the company ensures bilateral communication with the interested parties and the central government bodies through the management representative for IMS while, in the area of risks and OSH & FP system, through the representative for OSH & FP area.
5.5.4 Customer Relations Management

The company considers the monitoring and improvement of customer relations one of the decisive conditions to assert its products on the market. What is established to this purpose is the procedure to monitor and assess the customer satisfaction (see 8.2.1) and the Company Management representatives are appointed for this area. These representatives regularly submit the assessment results of customer satisfaction to the Company Management, the improvement actions are proposed and implemented for the relevant problems.

5.6 MANAGEMENT SYSTEM REVIEW

5.6.1 General

Company Management reviews individual parts of the management systems at regular sessions in accordance with the Executive Board Session Agenda held in the course of the year. Comprehensive reviews of the IMS are performed at one year’s intervals to ensure IMS continuing suitability, adequacy and effectiveness. This review considers the opportunities for improvement, the need for changes in the IMS, including the evaluation of the topicality of Policy and objectives and it evaluates possible effect on IMS integrity.

5.6.2 Review Input

The review-related inputs, outputs, decisions and actions are described in the Guideline SM-ŘJ-03 Management System Review.

5.6.3 Review Output

The Management System Review Outputs are the source for introduction of improvement actions in the areas that have an adverse influence on the company prosperity, process performance and effectiveness or product quality, reliability and safety.

6. RESOURCE MANAGEMENT

To ensure a proper function of the Integrated Management System and its processes, improvement of customer’s and other interested parties’ satisfaction, requirements are imposed for the required resources and suitability and adequacy is assessed of the existing sources to meet the company objectives. In case such resources are insufficient, their optimization and completion is planned for all the procedural fields and the processes of Quality Management, Occupational Safety and Health, Environmental Protection, product reliability and safety, for the sphere of logistics, law, etc. Depending on their scope and priority, the sources are provided by the corporate bodies and Company Management within the powers and responsibilities delimited by SM-GŘ-02 Organization Rules, and SM-GŘ-01 Rules for Signing and Approval.

6.1 PROVISION OF RESOURCES

Any need for resources is identified on the basis of IMS review by the management, upon the Company Business Plan (see 5.3.1), alternatively, upon the requirements of the company department and division managers or the process owners within their process improvement. These needs and requirements are reviewed from the point of reasonability, usability, contributions to the functionality and improvement of the management systems and/or products in terms of their availability. Company Management provides the appropriate resources for:

- Fulfilment of the Business Plan;
- Enforcement, maintenance and continuous improvement of IMS;
- Improvement of customer’s satisfaction by meeting its requirements.
- Improvement of the effectiveness of activities and profitability of the company results.
6.2 HUMAN RESOURCES

6.2.1 General
The competence of the company personnel performing work that may have an effect on product quality, reliability and safety, environment, occupational safety and health, and fire protection, is based on their corresponding education, training, skills and experience. The procedure to provide competent human resources is documented in the Guideline SM-P-03 Employee Qualification.

6.2.2 Qualification, Importance Awareness, and Training
The necessary qualification of the employees is given by the Guideline SM-P-03 Employee Qualification and SM-P-15 Employee Development; the form and scope of training provided are documented in the Training Plan. The senior officers define the requirements for further professional development and qualification improvement of employees and they plan, in collaboration with the Human Resources Department, to implement these requirements in the form of Training and Education Plans. The requirements for the qualifications of personnel to perform specific professions are stipulated in relevant job descriptions. New employees pass the adaptation process as per SM-P-14 Adaptation Process to obtain the necessary knowledge of the company organization and the performance of technical activities.

6.2.2.1 Product Designing Skills
The professional competence, qualification, and mastering the methods and tools necessary for the product designing process are monitored and developed, competent employees are assigned into the development programs as per SM-P-03 Employee Qualification, and SM-P-15 Employee Development.

6.2.2.2 Employee Motivation and Their Responsibilities
The company considers the motivation of employees a significant tool to attain a high company performance. For this, the company determines suitable motivation tools. These tools comprise the assessments stipulated by KPIs and Kaizen, the continuous improvement area.

6.2.2.3 Training
The company has the defined procedures for the personal development of employees described in Guideline SM-P-15 Employee Development. Critical activities, special processes, which require special employee qualifications and competences are identified and they are completed with defined requirements for the qualification of personnel executing such activities and processes.

6.2.2.4 Management Performance
Individual objectives are based on both the objectives defined in the Business Plan and the specific objectives determined for each calendar year.

6.3 INFRASTRUCTURE
Company Management administers the infrastructure needed for the product implementation. Management covers maintenance, repairs, refurbishments, and reconstructions according to the company requirements and needs that result from the Business Plan.

− Technological equipment for implementation and supporting processes is compared with the requirements of project implementation and the requirements for productivity assurance. Equipment modernization, reconstruction or repairs are planned in accordance with the Guideline SM-SM-01-Investment Management.

− Ordinary maintenance of machinery and equipment to maintain their serviceability is planned and implemented in accordance with SM-SM-02 Machinery and Equipment Maintenance.

− Activities necessary to assure and maintain the compliance with product requirements during the implementation are determined and ensured in accordance with the Guideline SM-VU-02 Product Handling and Protection.
6.4 WORKING ENVIRONMENT

The company management controls the working environment so that it meets the parameters necessary for the achievement of product conformity with the requirements, namely

- in the technological processes that require controlled work environment at the workplaces below:
  - coil production and assembly of control systems (cleanliness, dust-free environment, lighting);
  - Calibration Centre (cleanliness, air temperature and relative humidity);
  - insulation material store (air temperature and relative humidity);
- Health protection and safety at work require:
  - Elimination and limitation of risks in OSH & FP;
  - Work environment ergonomics and culture in terms of hygiene, cleanliness, temperature, illumination, noise, and other factors which may have positive influence on the satisfaction and performance of employees.
  - Provision of personal protective means and working clothes.

Standardization of working environment and order on workplace are solved using 5S method which represents tools and techniques used to introduce improvement and maintenance of order and organization on workplace.

6.5 CONTINGENCY PLAN

The organization has introduced and maintains procedures for identification of the possibility of occurrence of undesirable emergency situations and hazards. These procedures are aimed at minimizing the damages brought about by such emergency situation with minimum impact on the product supplies to customers, their quality, operational reliability and safety, on the environment, personal safety and health or damage to the company property.

6.5.1 Emergency Preparedness and Response

Procedures to control the important environmental aspects and OSH related risks are specified for the OSH and environmental protection area to handle such situations with minimum impact on personnel safety, environment, and the company property. These procedures are based on the requirements of applicable legislation, they are reviewed and adapted, if necessary.

Appropriate resources are segregated to assure the procedures to conform to the emergency plans, and employees are regularly trained and examined in the knowledge of these procedures. The emergency preparedness and response in company is ensured in accordance with the "Emergency Action Plan in Company Buildings" (Emergency Plan), local emergency instructions, General Manager's decision ensuring fire protection in the company, and Guideline SM-P-12 Traumatological Plan.

6.5.2 Special Situation Plan

Actions to mitigate the damages for special situations that endanger the products supplied to customers or make the products fail in operation are determined in the cases below:

- Outages of the supplies of energy and media for technological processes (actions to prevent accidents and damages to the technological equipment caused by the interruptions in supplies of energy and media, etc.)
- Supplier failures to deliver the products (by the assurance and preparation of alternative suppliers for the selected goods, etc.)
- Significant losses of capacity due to the losses of human resources (engagement of agency employees, etc.)
- Failure of the key technological and testing devices (by the provision of contractual maintenance with the servicing organizations to minimize the times until recovery, etc.)
Mass failure of the products in operation (procedures to rectify the mass product defects in operation, etc.)

The details on these actions are stated in applicable Guidelines. If the product supplies to customers are endangered or compromised despite the actions taken, the competent Project Manager shall inform the customer of this situation and its foreseen development or of the actions taken to eliminate such failures.

6.6 Operations Control

The organization operations are standardized by activities that are performed by qualified resources under the defined conditions. These process conditions are specified in standards, instructions, manuals, procedures and contractual relations with suppliers and customers. Adherence to the defined conditions ensures that no diversion will take place from the Quality Policy and Objectives, reliability, OSH, FP, and environmental protection. Analyses of individual IMS processes and suitable actions are taken to remove such diversions and improve the processes according to these procedures.

In the important environmental aspects, moderate and undesirable OSH & FP risks, and the processes, the actions and procedures are determined, introduced and maintained for their control so that OSH and environment related risks are eliminated or minimized to the acceptable extent, at best directly at their sources (origin), without influencing the achievement of the target values.

- Activities and responsibilities concerning the operations control in the area of environmental protection are stated in the guidelines below
  - SM-ŘJ-13 Handling of Chemicals and Agents (associated Dangerous Chemicals and Agents Register),
  - SM-ŘJ-14 Handling of Wastes (associated Dangerous Waste Register),
  - SM-ŘJ-15 Air protection and pollution sources (associated Register of Medium Air Pollution Sources),
  - SM-ŘJ-12 Environmental aspects (associated Environmental Aspects Register).
- Activities related to the operations control in the area of occupational safety and health and fire protection are specified in the documented procedures
  - SM-P-10 Assurance of OSH,
  - SM-SM-06 Revisions and Checks of Electric Appliances,
  - SM-VÚ-05 Revisions and Checks of Electric Tools,
  - SM-SM-03 Operation, Examinations, and Revisions of Dedicated Electrical Equipment,
  - SM-SM-04 Operation, Examinations, and Revisions of Dedicated Gas Equipment,
  - SM-SM-05 Operation, Examinations, and Revisions of Dedicated Stationary Pressure Vessels,
  - SM-P-11 Preventive Medical Examinations,
  - SM-P-07 Industrial Accidents,
  - SM-P-09 Provision of Personal Protection Means,
  - SM-P-13 SAFETY RULES, behavioral rules for the external companies, visitors, and educational visits.

7. Product Implementation

7.1 Product Implementation Planning

The Company plans and develops processes needed for the product implementation. To plan the product implementation effectively, the company manages its activities in accordance with the Guidelines SM-TÚ-
01 Design Control, SM-ŘP-01 Project Management, SM-VÚ-01 Production Planning and Control and SM-ŘJ-26 Quality Planning. During the product implementation planning, the company determines:

- Requirements for product,
- Processes and documents, including the provision of product-specific resources;
- Product-specific activities required for verification, validation, monitoring, inspection and testing, and product acceptance criteria;
- Records necessary to prove that the implementation processes and the resultant product meet the requirements.

7.2 CUSTOMER RELATED PROCESSES

7.2.1 Determination of Product-Related Requirements

Company determines the requirements in accordance with the procedure set out in the Guideline SM-OÚ-01 Contract Review:

- Requirements specified by the customer, including the requirements for activities at the time of product delivery and after product delivery, stated in trade agreements, technical specifications and/or other agreements with the customer
- Requirements for product in terms of legislation and other regulations that are defined by the company on the basis of customer requirements stipulated in the trade agreements. If the customer does not define special requirements for the observance of legal rules, the company shall observe in its products and processes the applicable laws of the Czech Republic and relevant harmonized technical standards related to the products manufactured. The company keeps and maintains the set of relevant legal regulations that is available in the updated version to all employees of the company – see Guideline SM-ŘJ-16 Maintenance of Legal Regulations Register. Availability of relevant technical standards is ensured for the assigned employees by assigning them the rights to access the ÚNMZ Database,
- Further requirements determined by the company or other interested parties.

7.2.2 Review of Product-Related Requirements

Every product inquiry or order or contract draft or tender conditions are reviewed with respect to company capability to meet the customer’s requirements. The procedures to review the requirements and to coordinate the associated activities are stated in the Guidelines SM-OÚ-01 Contract Review, SM-ŘP-01 Project Management, SM-TÚ-01 Design Control, and in the set of guidelines and working directions from the area of Reliability Management (RAMS), Stages 1 and 2 of Product Life Cycle as per SM-ŘJ-19 Standard RAMS Program.

7.2.3 Customer Communication

In Š-ELC, the system of communication with a customer is determined by:

- Contractual covenants with a customer for a specific business case (communication channels)
- Special long-term covenants with a customer (communication channels, communication matrix, etc.)

The competent Business Sector, Quality Management, Project Manager or After-Sales Service Sector is responsible for the arrangement of a communication system with the customer. Information obtained by other departments within the communication competences delegated to them are forwarded to the employee in charge of the management of relevant business case, to the employee responsible for the management of after-sale services or the employee responsible for data collection in the RAMS system.

The communication with a customer concerns mostly:

- Information on the requirements for the product and its implementation;
- Handling of inquiries, orders or contracts including amendments thereof;
Duties and powers or, alternatively, joint efficiency during design and development;
Information on meeting the contractual obligations;
Customer feedback, including customer complaints,
Information about product operation at the customer or user, including information on failures and product maintenance.

7.2.4 Tender Management
The Tender Management Process is based on the activities specified in SM-OÚ-01 Contract Review, it includes the procedures and responsibilities in assessing the customer requirements and the Tender conditions, including the assessment of risks and company's competence to meet the Tender conditions. The Key Performance Indicator (KPI) is set in the system.

7.3 DESIGN AND DEVELOPMENT

7.3.1 Design and Development Planning
The company plans and controls the design and development of a product in compliance with the Guideline SM-TÚ-01 Design Control. The competent Head of Technical Department or an employee of the Technical Department authorized by the Head performs the planning of activities during the design and development process. The Design and Development Plan is documented. During the design and development planning the Company determines:
- The design and development stages;
- The review, verification and validation that are appropriate to each design and development stage;
- The responsibilities and powers during design and development.

The company controls the interface between different groups involved in the design and development to ensure effective communication and clear assignment of duties. The planning output is updated, if necessary, according to the actual progress of the design and development process.

7.3.2 Design and Development Inputs
Technical Department determines the inputs as regards the product requirements. Records of inputs are kept. The inputs include:
- Customer requirements for the product
- Customer feedback,
- Requirements of legal and other regulations;
- Technical standards;
- Information about existing technologies and products, including the assessment of the materials and substances used in technological processes and in the products in terms of environmental and personal health protection (RoHS, REACH),
- Requirements for the product operation, storage, handling and delivery,
- Requirements for the parameters of product quality, reliability, and safety,
- Requirements for products with regard to their impact on safety and environment during their use, maintenance, and disposal.

The inputs are reviewed for adequacy, entirety, unambiguousness and mutual compliance. The reviewing procedures can be found in the Guidelines SM-TÚ-01 Design Control and in the set of documents from the area of RAMS, Stage 1 and 2 of Product Life Cycle as per SM-ŘJ-19 Standard RAMS Program.
7.3.3 **Design and Development Outputs**

The outputs of individual design and development stages are verified in relation to the design and development inputs. The outputs are approved prior to release. The design and development outputs involve:

- Data proving the comparison of inputs and outputs;
- Product specifications;
- Technical drawings and further technical documents to the product;
- Design and Production Process FMEA;
- Special product features, if appropriate;
- Production Process Flow Chart;
- Technological process specification, including the special processes;
- Specification of the requirements for delivery inspection;
- Specification of the requirements for personnel qualification, if required;
- Specification of the gauges and measuring devices;
- MSA Measuring System Analyses, if appropriate;
- Records of the tests performed;
- Operational Instruction Cards;
- Calculations (predictions) of reliability indicators for the selected products.

The documents of design and development outputs are approved prior to their release.

7.3.4 **Design and Development Review**

The design and development revisions are performed at individual stages in accordance with the planned activities for the purposes below:

- Assessment of the design and development result capabilities to meet the requirements set out;
- Identification of all the problems and proposal of necessary actions.

The representatives of organization units, which are involved in the individual design and development stages to be reviewed, shall take part in this review. Records of the review results and of all other necessary actions are kept in the Technical Department. The documents from the previous stages shall be updated as required based on the stage review results.

7.3.5 **Design and Development Verification**

The verification is performed in accordance with the planned activities to ensure the compliance of design and development outputs with the design and development input requirements. The records of review results and of any other necessary actions are kept.

7.3.6 **Design and Development Validation**

The design validation is performed at predetermined production stages by means of in-process tests while the end product is subjected to the type tests or, as the case may be, the life and reliability tests, all performed in accordance with the applicable standards or regulations. The part of product validation is also the company's first finished article inspection as per SM-ŘJ-23 First Article Inspection (FAI). The fragment of the company products' validation is carried out as a part of vehicle validation within the commissioning process or the trial run.

The company products subject to the type approval or homologation (trolleybuses) are validated within the scope and at the frequency required by individual regulations and guidelines of ECE and EEC, as amended. The procedures and division of responsibilities associated with the achievement of homologation and maintenance of compliance with the homologized type are stated in the Guidelines SM-TÚ-01 Design Control and SM-ŘJ-09 Change Control.
Product validation results are the part of the source materials used to prove the product conformity and issue the Declaration of Conformity, if such declaration is required by the law or the contractual covenants with customer.

If it is a product design in the project where customer requires approval of new or changed product/process, the production process and product are subject to approval (PPAP).

7.3.7  **Design and Development Change Control**

All the changes are documented. A person authorized to approve the changes is responsible for updating all documents affected by the changes concerned. The procedures for change control are given in the Guideline SM-ŘJ-09 Change Control. The changes which have impact on the final product's parameters specified by customer are validated before their series application (see also Article 7.13).

7.3.8  **Design and Development Approval**

The documented procedure to assess the safety integrity level as per ČSN EN 50128 is the part of Guideline SM-TÚ-01P Design Control, and the follow-up control documents applicable for the products of the Divisions.

7.4  **PURCHASING**

7.4.1  **Purchasing Process**

To ensure the compliance of purchased product with the specified requirements, a procedure is developed and specified in Guideline SM-N-01 Purchase and Stores, and in the associated documents. The purchased objects are materials, products and services necessary for the production of the company's final product.

7.4.2  **Purchasing Information**

Information and documents for purchasing and their particularities are described in Guideline SM-N-01 Purchase and Stores. The basic documents are as follows:

- Ordering/pre-ordering proposal generated by the Baan ERP system that contains exact specification of the product or service to be purchased, the requirements for quality and reliability and for the proof thereof and, if necessary, the data to verify the products purchased;
- Ordering request in the Easy Archive system for the purchase of products that are not kept as purchased items in BaaN ERP IS,
- Purchase Agreement draft/Purchase Order issued by the Purchase and Stores Department which comprises all the transferred data from the corresponding order proposal together with completed data on prices, deadlines, or any other data. If necessary, technical documentation forms a part of the order,
- Contract issued on the basis of the order.

The compliance of the draft contract with the purchase order shall be verified by the appointed employee of Purchasing Department. The contract can be substituted with the Purchase Order confirmed by Contractor.

7.4.3  **Verification of a Purchased Product**

The company has the determined inspection activities necessary to ensure that the product purchased meets the specified requirements, including FAI. The company also has the established verification procedures and the product release method when such product is verified by customer. This is specified in the Purchasing Information stipulated by Guideline SM-N-01 Purchase and Stores. The supplier control rules and procedures are stated in Guideline SM-N-02 Supplier Selection, Assessment, and Development.

7.4.4  **Supplier Chain Management**

The Strategic Purchase Department ensures the long-term development of collaboration with the selected suppliers and the prospects of joint implementation of the future projects. Common meetings of the Company Management and the selected suppliers are arranged for regularly within this development.
Regular evaluations are made for the performance of the key suppliers. The activities associated with the assessment of suppliers are ensured by the Supplier Development Department.

7.5 PRODUCTION AND SERVICE PROVISION

7.5.1 Production Control and Service Provision

The company plans and implements the production under controlled conditions. The process of production planning and control is described in Guidelines SM-VÚ-01 Production Planning and Control. The controlled conditions include:

- Information describing the product features;
- Availability of production documentation;
- Use of suitable production equipment;
- Availability and use of the monitoring and measuring devices;
- Personnel qualification and competence;
- Assertion of monitoring and measuring;
- Assertion of the activities in handling and protecting the product;
- Assertion of the activities when product is being released/suspended, and delivered.

7.5.1.1 Production Planning

Production planning is performed in Baan ERP system and it is based on the delivery dates as required by customers in the contract. These requirements are used as a base to assess the capacities and for the sale orders followed by the mapping of production orders for the product implementation.

7.5.1.2 Production Documents

Production documents are developed in the Design Control process to be released for the product implementation as per SM-TÚ-01. The parts of these documents are the Manufacturing Worksheets (technological procedures with the inspection operations, fixtures, and special tooling, and NC programs), Manufacturing Checklists for a single piece production, Instruction Cards with those for special processes, identification records for the product configuration details, control plans, and measurement data sheets. The production documents handling system is specified in Guideline SM-VÚ-01 Production Planning and Control. The Tests and Inspection Plans Development and Control Procedures are described in "SM-ŘJ-26 Quality Planning" Guideline. Flow charts of production processes are developed for the selected projects.

7.5.1.3 Production Process Change Control

The Production Process Change Control process is a part of the Change Control process as described in Guideline SM-ŘJ-09 Change Control, see also Article 7.13.

7.5.1.4 Device and Tool Management

All the tools, special devices, production and control fixtures are controlled. The procedures for their management are stated in Guideline SM-VÚ-06T Tools and Fixtures.

Machinery and equipment maintenance to preserve their fitness is planned and implemented pursuant to SM-SM-02 "Machine and Equipment Maintenance" Guideline.

7.5.2 Production Process and Service Provision Validation

The company performs validation of such production processes for which it is difficult to perform easily (e.g., by monitoring, measuring, visual inspection, etc.) or economically the verification of the resultant product's compliance with the specified requirements. The processes in ELC are listed in Guideline SM-ŘJ-24 Special Processes. Validation proves the capability of processes to achieve the results planned.
The company determined for these processes the controlling tools which include the preventive actions to ensure the required process quality and stability:

- production equipment,
- employee qualification,
- methods and procedures,
- measuring equipment and processing of measurement results,
- used materials,
- environment.

All the factors influencing the special process results are described in the Process Instruction Cards.

Special ELC processes:

- Welding
- Soldering
- Bonding
- Screw joints
- Insulation system impregnation
- Pressing the electrical connections
- Thermal processes
- Surface treatments

7.5.3 Identification and Traceability

Individual materials, parts and products, purchased and delivered, are clearly identified by drawings, specifications, orders or other documents. The identification is ensured from the reception of goods and the receiving inspection throughout the production, assembly, and final inspection up to the delivery and commissioning. FIFO Procedure is observed in the material flow and stock inventory process. During production, the material which is not intended to be built into a product, is identified by being placed in the specified reserved places and marked to avoid confusion with material to be used for production. The principles to ensure necessary traceability of materials, parts, products and staff are stipulated in Guidelines SM-TU-05 Identification and Traceability, SM-TU-03P Project SW Management, SM-TU-01 Design Control, and SM-TK-01 Inspection and Testing.

The range of monitored items and their parameters critical to quality, safety and reliability of the final product is defined by the Inspection and Test Plan that is developed for a type of product or for a specific business case. The monitored item identification records necessary for the configuration management are kept, stored and updated for every change of product configuration.

7.5.4 Customer’s Property

The company takes care of customer’s property that was delivered in connection with the product implementation. The appropriate sector that uses this property is responsible for the identification, verification, protection and security of such property. Loss, damage or detection of its inadequacy for the future use is communicated to the customer. Records are kept of the above facts. The procedure used in the company is described in Guideline SM-OÜ-03 Customer’s Property.

7.5.5 Product Protection

Handling, storage, packaging, protection and delivery of products or parts are ensured so as to avoid incorrect handling, damage, confusion of parts or products or any undesirable changes to their properties. Rules and procedures for these activities are stipulated in Guidelines SM-VÛ-02 Product Handling and Protection, SM-N-01 Purchase and Stores, and SM-OÜ-02 Storage of Finished Products.

Principles to handle products during the production process associated with the final inspection, quality protection, preservation, packaging and product storage and product delivery are specified by Guidelines.
SM-VÚ-03 Packaging, Protection and Delivery. The principles of finished product protection during their storage in the company are the part of Guideline SM-OÚ-02 Storage of Finished Products.

7.6 MONITORING AND MEASURING DEVICE CONTROL

Monitoring and measuring as well as the monitoring and measuring devices needed to furnish evidence of the product conformity with the imposed requirements are all detailed in the technical documentation (technological procedures and instruction cards, inspection and test plans, etc.). The company has set up procedures to assure the correct and purposeful monitoring and measuring that are performed in conformity with the requirements of ČSN EN ISO 9001, applicable laws, and customer requirements. The procedures, record keeping and identification methods are set forth in Guideline SM-ŘJ-0 Rules of Metrology. All the monitoring and measuring devices used in the company are linked to the relevant national measurement standard in accordance with the applicable legal requirements and they are subject to the periodical calibration process.

7.7 PROJECT MANAGEMENT

The company employs PM to implement significant business cases of the Project Management. This process includes the activities starting from enquiry and offer to end with the termination of the warranty operation of products. The powers and responsibilities for the control of individual parts of this process are distributed among the company's technical departments:

A. Business sectors in the phase from the acceptance of enquiry, order or tender application up to entering into an agreement with customer, see SM-OÚ-01 Contract Review,

B. Project management and planning sectors in the phase from signing the contract with customer up to the product delivery to customer, see SM-ŘP-01 Project Management,

C. After-sales service sectors in the phase from the product delivery to customer up to the termination of warranty operation of such product, see SM-PS-01 After-Sales Services.

The principal purpose of the Project Management is ensure that the project is implemented

› in the required time,
› complete and at the top quality,
› in conformity with the budget (initial calculation).

7.7.1 Integration Management

To implement the project, project teams are established embracing the representatives of the company's technical departments. Project Manager is appointed to the office of Project Team Manager who manages and coordinates all the crucial activities, including the communication within the company and with the customer (see 7.7.7).

7.7.2 Scope Management

The Project Plan is processed to ensure that:

› it embraces all the necessary tasks and rules for the project's entire life cycle;
› it contains the whole scope of works divided into individual sets of works, this scope is checked and verified;

7.7.3 Time Management

Project Time Schedule (Project Schedule) is elaborated for all the projects of PaT Division and for the selected projects of TRM Division. Milestone Plan is elaborated for the remaining projects of TRM Division. The Project Schedule contains:

› specific activities to create/produce the project supplies,
inter-relations between individual sets of works, including those that pertain to suppliers,
sequence of the activities, source requirements, duration times,
critical path.

Project Time Schedule is periodically reviewed:

on the Company Management negotiations, by discussing a so called Project Status Report, if necessary, suitable actions are taken to implement the project as required by customer.

Operationally by project managers at the presence of the leading technical departments of the company

7.7.4 Cost Management

Project package is developed for each project (Project Package in Phase A, Project Status Report in Phase B, including the Warranty Cost Budget for Phase C). Performance of this budget is periodically evaluated, including the prospect of costs and profits and the comparison to the initial calculation (package) of the project. For detailed description of the Project Cost Management see SM-ŘP-01, Article 11.

7.7.5 Quality Management

The area of assurance of quality, reliability and safety of a product is the part of complete Project Management and it is based on customer requirements. Quality assurance includes:

identification of customer requirements for quality, reliability and safety of a product (SM-OÚ-01 Contract Review, SM-ŘJ-19 Standard RAMS Program, Stage 1 to 3),
elaboration of product design and Inspection and Test Plan, risk analyses, RAMS analyses, and requirements for the purchased products (SM-TÚ-01, SM-ŘJ-19 Standard RAMS Program, Stage 4 to 6),
performance of all the inspection and test operations specified by the Inspection and Test Plan, including FAI (SM-TK-01 Inspection and Testing, SM-ŘJ-23 First Article Inspection (FAI),
assessment of all the records documenting quality, reliability and safety of a product (SM-TK-01 Inspection and Testing),
documentation of all the deviations from the required quality and taking the actions to their elimination (SM-ŘJ-10 Nonconforming Product Control, SM-PS-01 After-Sales Services).

7.7.6 Human Resource Management

Project Management is delegated to the employees with adequate qualification to manage the project. Project Team members are qualified in their professions and they possess relevant knowledge, experience and skills to perform their offices in the Project Team. The details on Human Resource Management in the project are in SM-ŘP-01 Project Management, Article 8.

7.7.7 Communication Management

Project Manager and Project Team members ensure communication on the course of project implementation process with all the interested parties:

inside the company on the performance of Time Schedule, on costs, on quality and risks,
with customer on the performance of the contract covenants as regards the timeliness of deliveries,
with suppliers on timeliness and quality of the deliveries,
with the company's end product user on condition such option is granted to the company by its contractual partner (customer).

The details on the provision of communication in the project are specified in SM-ŘP-01 Project Management, Article 9.
7.7.8 Risk and Opportunity Management

The project risk analysis is performed in Project's Phase A, i.e. in the Contract Review process as per SM-OÚ-01, the results are documented in the Project Package. To cut down the importance of risks, suitable actions are taken during the project implementation; the residual risks are covered in the Project Package (in calculation). The details on the Risk Management are specified in SM-ŘP-01 Project Management, Article 13.

7.8 Configuration Management

The Configuration Management processes are introduced in both Divisions and they include:

- Identification of product items (components) significant for resultant quality, reliability and safety of the final product, including the purchased parts;
- Determination of the critical features of these products and their identification system (designation),
- Regulation to monitor and record the identification features of the monitored items into the final product configuration outline
- Projection of the Change Control results onto the configuration of final product, including the product changes in the project's Phase C, i.e. in the warranty operation at the user.

These activities are aimed at acquiring and maintaining the outline on a final product configuration during such product's implementation, commissioning, and warranty operation, including the software

These activities are closely linked to the product identification system and traceability (see 7.5.3) and they are detailed in SM-TÚ-01 Design Control, SM-TÚ-05 Identification and Traceability, SM-TÚ-03P Project SW Management, and SM-TÚ-08P Configuration Management.

7.9 First Article Inspection

The company established and enforces the First Article Inspection process (FAI) covering:

- FAI of the purchased parts or purchased processes, and the goal of FAI is to verify that the company requirements for the purchased product are met and confirm the implementation processes and further factors of the supplier to ensure the stable quality of the products supplied to Š-ELC,
- FAI of the parts of the product in progress (in-process FAI) the goal of which is to verify the compliance with the requirements specified in the production documents
- FAI of the final product that is a part of final product's validation, it is used for the verification of the compliance of final product with the customer requirements specified in technical specifications and/or in the contract.

The procedures, activities, and responsibilities in this process are listed in SM-ŘJ-23 First Article Inspection (FAI) and SM-N-02 Supplier Selection, Assessment, and Development.

7.10 Commissioning, Service with Customer

The company products are set into operation at the customer after the completion of all inspections and tests as well as the trial run, if required. The commissioning process is set forth in SM-PS-01P After-Sales Services, and SM-TK-03T After-Sales Services. The company is responsible for the commissioning of trolleybuses, while the rest of products (electrical equipment, traction engines) are set into operation by the final manufacturer of the vehicle, at contingent presence of the company specialists if required so by the vehicle manufacturer. The services associated with the product's commissioning and with its warranty operation are furnished by the workers of After-Sales Service sectors in Divisions in the scope specified in the contract with customer. These services may include:

- training and education of the product operators (user),
training, education, and technical support of the workers who render the preventive maintenance of the product and the maintenance after product failure, applicable to both the user's workers and the workers of contractual companies,

service interventions to rectify operational failures in product and recovery of the product to the operation ready status.

The part of the after-sales services is also the collection and evaluation of operational data on the product, i.e. data on failure, on after-failure maintenance, on idle times, on the consumption of spare parts, etc. These data are gathered in the unified data base to be evaluated in order to improve the parameters of operational reliability and safety of the company products (see also 8.4). The work with data base is described in SM-ŘJ-18 RAMS/LCC Data Base.

7.11 RAMS/LCC

The railway equipment reliability management system under ČSN EN 50126 is established and enforced in the company as per SM-ŘJ-17 RAMS Management, and SM-ŘJ-19 Standard RAMS Program, and it covers all the product life cycle stages, being a part of IMS. Detailed working directions are developed and issued to individual stages. RAMS Program of specific project is developed:

- for all the projects where required by customer,
- for all the railway applications under ČSN EN 50126,
- for further projects, upon the Division Management decision only.

The RAMS system in the company also pertains to the SW management area under ČSN EN 50128 and partly under ČSN EN 50129. The part of activities in this area is also the assurance of necessary safety integrity (SIL).

The part of RAMS Management is the Product Life Cycle Cost (LCC) Management process that is aimed at defining, for the needs of customer an company, the estimated part of the Product Life Cycle Costs (except for the costs for the operation and the costs for product disposal), i.e. the acquisition costs (they are parts of Sales Agreement), the costs for preventive maintenance, and the costs for the after-failure maintenance. The estimated costs for maintenance are derived from risk analyses, reliability analyses, and maintainability of the product and its components. The process is described in Guideline SM-ŘJ-19 Standard RAMS Program.

7.12 OUTDATED ITEMS MANAGEMENT

The Outdated Items Management is the part of the Design Control process (SM-TÚ-01) and the Change Control process (SM-ŘJ-09).

7.13 CHANGE CONTROL

The company established the Product and Process Change Control process described in SM-ŘJ-09 Change Control. The process includes:

- change requirement identification,
- assessment of the change proposal in terms of the impact on the final product (including the changes induced by supplier) on the associated activities (purchasing, etc.) and on the costs for change implementation,
- approval of the change proposal and definition of the scope of documents that are to be changed,
- specification of the product the change is to be performed, verified and validated on, or determination of the date such change is to be implemented in the process,
- the actual introduction of changes into the technical documents and distribution of these documents, including their distribution to the suppliers or customers,
- implementation of the change to the product or in the process,
verification and validation of the change.

If it is a change to product or process in the project where customer requires the approval process according to PPAP Procedure, the production process or product is subject this approval process.

8. MEASUREMENT, ANALYSIS AND IMPROVEMENT

8.1 GENERAL

The company plans and implements monitoring, measurement, and analyses of the products, activities, and processes that are needed for:

- Proving the conformity of the integrated management system with the relevant standards according to Article 0.2 Manuals (IMS review), see Guideline SM-ŘJ-03,
- Continuous improvement of the system and its processes (process control, criteria and process control objectives, continuous improvement system) and products, see SM-ŘJ-25,
- Assurance of conformity of its products with the requirements of customers and other interested parties (inspections and testing), see SM-TK-01,
- Monitoring the product reliability parameters (RAMS/LCC) and their comparison with the parameters predicted within the design and development, see SM-ŘJ-19,
- Continuous improvement of company performance, fulfillment of Business Plan, Policy and Objectives (BRM, PSR Meeting, IMS review),
- Monitoring and measuring the key operation features that have or might have substantial impact on environment (Environmental Aspects), see SM-ŘJ-12
- Procedures for taking the pro-active (attainment of the objectives in the area of OSH and EMS, operation parameters, and legal requirements) and the reactive (accident and near-accident monitoring and management, undesirable events, breakdowns, injuries and diseases) actions, see SM-P-06

8.2 MONITORING AND MEASUREMENT

8.2.1 Customer Satisfaction

The company collects information on customer perception to see whether or not the customer's expectations were met by assessing the customer satisfaction as per the methodology defined by Guideline SM-OÚ-04 Customer Satisfaction Monitoring.

8.2.2 Internal Audit

The company compiles the Internal Audit Plan to provably verify the IMS function and effectiveness, detect the risks, and find the possibilities for improvement. The documented procedure that pertains the internal audits is specified in Guideline SM-ŘJ-07 Internal Audits. The examined goal of the internal audit is also performance and efficiency of the corrective and preventive actions. External auditors are also used to perform internal audits in the company.

Internal system audits are used to identify the IMS status, particularly to see if IMS:

- Conforms with the planned activities and requirements of ČSN EN ISO 9001, IRIS, ČSN EN ISO 14001, ČSN OHSAS 18001 and ČSN EN 50126,
- Is enforced and maintained effectively.

The internal process audits are performed to find whether or not the product implementation process meets all the requirements of the documents relevant to the specific implementation stage or imposed by any part of the implementation processes.
8.2.3 Process Monitoring and Measuring

For each implementation process stipulated by IRIS or determined by the Company Management, a Process Plan and monitoring and assessment criteria for such process. These processes are monitored by the Process Owner who monitors the process results on a long-term basis to compare them both with criteria and preset objectives to seek the opportunity to improve this process.

If appropriate, we perform the process fitness and efficiency inspections for the key processes. Inspection procedures are described in SM-ŘJ-27 "Statistical Process Control" Guideline.

Production processes are monitored to verify such process parameters that have influence on quality and reliability of the product, on the environment or personal safety and health.

8.2.4 Product Monitoring and Measuring

Monitoring and measuring the product features verifies if the product requirements are met. Monitoring and measuring are performed at appropriate stages of the product implementation process and life cycle and in cooperation with the product user and even at the stage when product is in service. The product monitoring and measuring procedures are stated in relevant technological procedures, Inspection and Test Plans or working directions.

As the evidence of product's conformity with the specified requirements, the records with clear identification of a person responsible for product release are kept and maintained. The product is supplied to the customer only on condition that all activities planned have been finished at a satisfactory level, unless stated otherwise by the responsible person in co-operation and upon the agreement with the customer. The product monitoring and measuring procedures are stipulated by Guidelines SM-TK-01 Inspection and Testing.

Within the RAMS/LCC system, the product's critical features are monitored in individual stages of the product life cycle, the data are analyzed in order to eliminate the influences that may affect the operational reliability and safety of the products. Data collection system of the data on the product operation, failures, and maintenance is introduced in the life cycle's Stage 11 and 12 under ČSN EN 50126. Data are analysed and the results are used to modify and improve the products. The data collection system is given in Guideline SM-ŘJ-18 RAMS/LCC Data Base.

8.2.5 Conformity Evaluation

Evaluation of conformity is performed in order to ensure compliance of activities and products with the requirements of legal regulations and in accordance with the Company Policy commitment. The company established, introduced and maintains the procedure to assure compliance of activities and internal documents with the legal requirements in the area of quality, environment and occupational safety and health as well as in other areas of company management. This procedure is stipulated by Guideline SM-ŘJ-16 Maintenance of Legal Regulation Register.

The overall evaluation of the compliance of activities and documents with the requirements of legal regulations is a part of periodic annual verification of IMS by Company Management.

8.3 Nonconforming Product Control

To control the nonconforming product, the procedure is established and maintained in accordance with Guideline SM-ŘJ-10 Nonconforming Product Control. This Guideline identifies an unambiguous method of identification, separation and further control of a nonconforming product that prevents an unintended use of this product. The company keeps records of the nature and causes of defects and failures and of the adopted and taken actions, including the exceptions.

If the nonconforming product is repaired and restored to the condition that conforms to the requirements, it is checked and tested in accordance with Guidelines SM-TK-01 Inspection and Testing to prove its conformity with the requirements. If the nonconforming product is discovered only after its delivery or when it was already put into operation, the company takes immediate actions corresponding to the
consequences that have occurred or may possibly take place in conformity with Guidelines SM-PS-01 After-Sale Services and SM-TK-03 After-Sale Services.

The organization determined, introduced and maintains the procedures to solve the existing and potential non-conformity stated in Guideline SM-ŘJ-06 Corrective and Preventive Actions, and in further IMS documents.

These procedures are used to deal with all the cases of product defects and failures, breakdowns and undesirable events, etc.

The procedures include:

- Identification of the event, its description and if necessary, prevention the further continuation of the activities (process stopping, putting out of operation, separation and storage of defective part, verification of accident scope...),

- Immediate action leading to the mitigation of the impact of the event on quality, environment, safety and health of persons, and the property:
  - Elimination of the non-conformity by correction (recovery of the required condition by repair, rework, etc.),
  - Reclassification and change of the original requirements and the method of use conditional upon the express consent of a competent person (approval of an exception),
  - Permanent exclusion from the original application, disposal,
  - Cause investigation and detection, proposal and implementation of system actions to eliminate the cause

- Search for the existing and potential non-conformities and risks and their possible causes
  - Taking actions to eliminate the corresponding probability of their occurrence and seriousness of their impact (risk),
  - Review of actions prior to the introduction of environmental aspects assessment process and risk analysis,
  - Recording of results of the effectiveness of the actions taken.

8.3.1 Nonconforming Process Control

The nonconformities and deviations of the processes or their factors from the prescribed requirements for the process are solved within the nonconformity control process as per SM-ŘJ-10 Nonconforming Product Control, Article 15. Possible impacts of the process nonconformities on the product quality are assessed in the solution process.

8.3.2 Exceptions Approved by Customer

If customer reserved the right in the contract to permit or reject the company's request to allow exception for a nonconforming product or process, the production activities cannot be continued without the reception of customer's statement. If customer permits such exception, this permit is kept with the competent Project Manager. If the exception is approved, Technical Department shall determine the identification method for the products with exception; if the approval is limited for a limited period of time or for a determined number of products, validity of such exception must be monitored to ensure that, after the exception validity has expired, the products are produced and supplied as conforming to the original documents.

8.4 DATA ANALYSIS

To demonstrate the suitability and effectiveness of the IMS, quality, reliability, and safety of products, and to find opportunities for the improvement, the company collects and analyses appropriate data.
Data analysis represents a process of the transformation of inputs (data and information) into outputs (analysis result, proposed actions) in terms of detecting the rate of conformance, development trends, objective implementation, action effectiveness, etc. Analyses are particularly performed for:

- Data obtained from monitoring and measuring certain processes in terms of proving the compliance with the process requirements,
- Product measurement data in terms of proving the compliance with the product requirements,
- Purchasing process data (quality, delivery dates, prices), including supplier evaluation, purchase-related risk identification and evaluation,
- Production control data
- Product inspection, measurement and test data, product quality and reliability results, non-conforming product control results, corrective and preventive actions, improvement, emergency preparedness and response,
- ELC-product sales data (project results, PSR, reliability of deliveries, etc.), incl. customer satisfaction,
- Data on operation, failures and product maintenance at the customer/user,
- Compliance of the registers of legal and other requirements and internal documents with actual legal regulations,
- Correctness and completeness of the register of environmental aspects, evaluation of their seriousness, effectiveness of objectives and actions, and periodic assessment of the company's environmental profile,
- Correctness and results of the performed analysis of hazards, identification and assessment of OSH&FP related risks, effectiveness and expeditiousness of the objectives and actions for improvement, the results in the area of OSH&FP,
- Resource management, determination of the requirements for the qualification and assurance of the resources,
- Results of internal and external audits, inspections and checks,
- Company economic result, overall growth, company effectiveness and productivity,
- Meeting the objectives.

Data analysis is performed continuously during the operative control of processes and activities (evaluation of individual projects, operation reliability calculations, etc), or periodically for a certain period of time (partial or comprehensive review of IMS by Management, Business Plan and its overall fulfillment, annual financial statement, meeting the objectives, etc.). Results of the analyses are submitted to the organization units of appropriate competences to take necessary actions:

- Company bodies,
- Executive board,
- Division Management.

**8.5 IMPROVEMENT**

**8.5.1 Continuous Improvement**

Continuous improvement of the IMS effectiveness in the company is performed in accordance with Guidelines SM-ŘJ-06 Corrective and Preventive Actions, SM-OU-04 Customer Satisfaction Monitoring, SM-ŘJ-03 Management System Review, and SM-ŘJ-25 Improvement.

**8.5.2 Corrective Actions**

To prevent the recurrence of nonconformities, the company has specified and implemented actions to eliminate their causes. The corrective actions are adequate to the impacts of nonconformities discovered. The established documented procedures for the execution of corrective actions are described in Guideline
SM-ŘJ-06 Corrective and Preventive Actions, and SM-ŘJ-10 Non-Conforming Product Control, and they impose requirements for:
- Description of nonconformity
- Determination of causes for non-conformity
- Determination of corrective action to eliminate the non-conformity
- Determination of the suitability of an action to eliminate the cause of non-conformity
- Records of actions taken,
- Verification of action implementation,
- Verification of action effectiveness.

Use 8D Report to deal with nonconformities as per SM-ŘJ-06.

8.5.3 Preventive Actions

In case of need, preventive actions are determined at all company levels to eliminate the causes of potential nonconformities. The actions are adequate to the effects of potential problems. The company has established the documented procedures in Guidelines SM-ŘJ-06 Corrective and Preventive Actions to impose the requirements for:
- Determination of suitability of the actions to eliminate the causes of potential nonconformities and to eliminate/cut down the risks,
- Determination and implementation of actions, where applicable,
- Implementation control and evaluation of action effectiveness,
- Records of the actions taken.

9. ASSOCIATED DOCUMENTS

9.1 EXTERNAL DOCUMENTS

ČSN EN ISO 9000 Quality Management Systems – Fundamentals, principles and glossary
ČSN EN ISO 9001 Quality Management Systems – Requirements
ČSN EN ISO 9004 Managing for the sustained success of an organization - A quality management approach
ČSN EN ISO 14001 Environment Management System – Requirements with directions for use
ČSN EN ISO 14004 Environment Management System – General guideline about principles, systems and supporting methods
ČSN EN ISO 14050 Environment Management System – Glossary
ČSN OHSAS 18001 Occupational safety and health management systems – Requirements
IRIS International Railway Industry Standard
ČSN EN 50126-1 Railway equipment – Determination and proof of reliability, availability, maintainability and safety (RAMS)
ČSN EN 50128 Railway equipment – Communication and security systems and data processing systems. Software for railway control and protection systems
ČSN EN 50129 Railway equipment – Communication and security systems and data processing systems. Safety related electronic systems.
ČSN P ISO/TS 16949 Quality management systems – Particular requirements for the application of ISO 9001:2008 for automotive production and relevant service part organizations
9.2 **INTERNAL DOCUMENTS**

The list of currently applicable internal IMS documents is kept in the database of Company’s Controlled Documents in EA_DMS system.

10. **ATTACHMENTS**

Annex no. 1  -  Organization Chart

[Organization chart](2011-10.doc)

Annex no. 2  -  Process Map

[Process map.pdf]

Annex no. 3 (informative)  -  Terms and Definitions

[Pojmy a definice.doc]