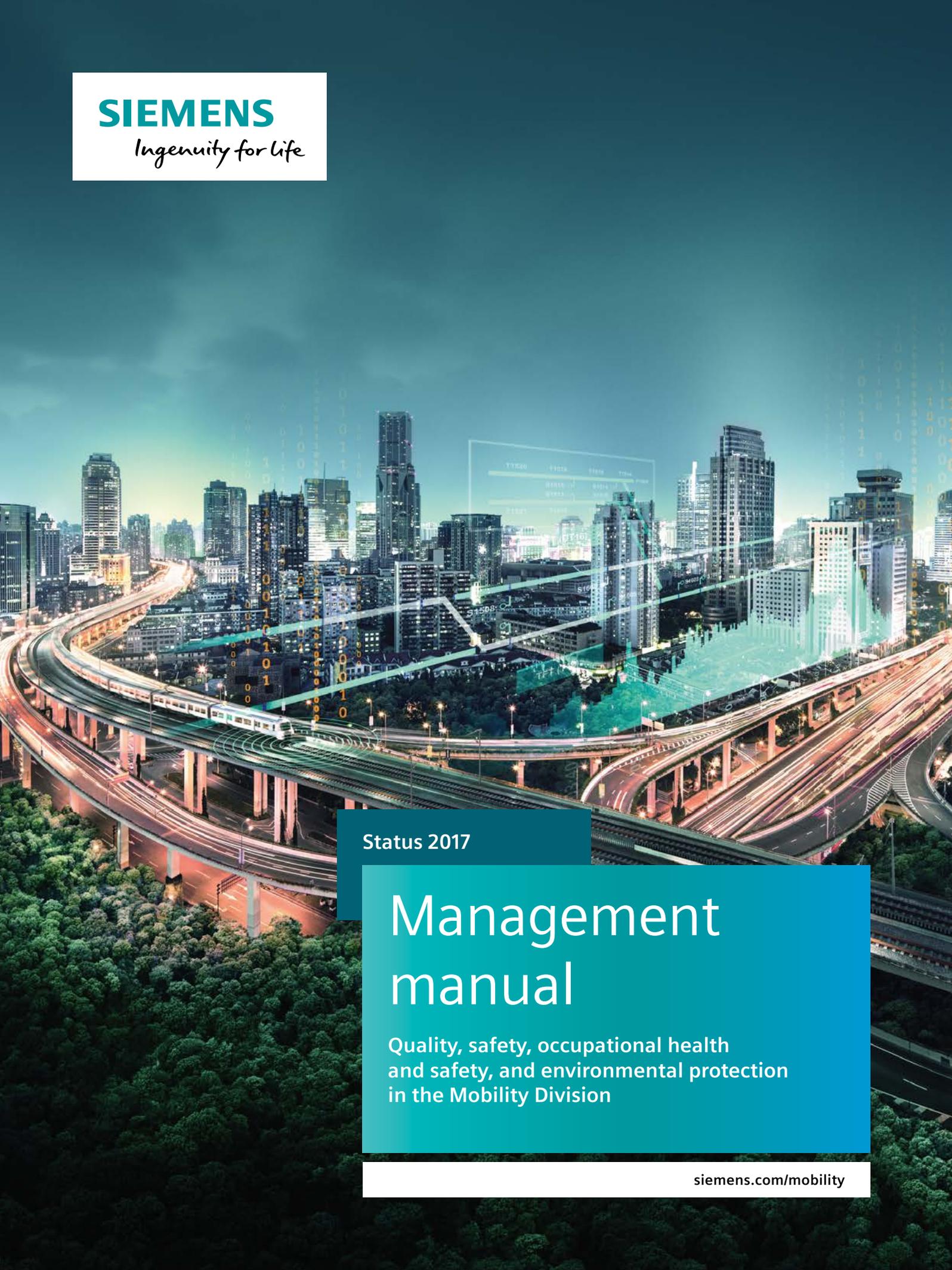




**SIEMENS**

*Ingenuity for life*



Status 2017

# Management manual

Quality, safety, occupational health  
and safety, and environmental protection  
in the Mobility Division

[siemens.com/mobility](http://siemens.com/mobility)



# Smart, efficient mobility solutions – for today and tomorrow

## Contents

**Management system**

**Processes**

**Business policy**

**Product quality**

**Controlling the management system**

**Methods for improving the management system**

**Documentation**

**Division Mobility**

Page

5

6

8

10

12

12

14

15

Change is the only constant in our world as we face new challenges from globalization, urbanization, worldwide climate change, and Earth's growing population. The emergence of new megacities and urban conglomerates mean constant change for our mobility as well. We need safe, fast, affordable, flexible, and environmentally sound options for moving both goods and people. And now more than ever, we must learn to optimize how we utilize our existing infrastructure, which cannot be expanded indefinitely. In Germany alone, we expect the volume of local rail traffic to rise from 6 million to 10 million passengers per day. In the United States, the volume of freight transport is expected to grow to 4 billion metric tons annually by 2050. Meanwhile, traffic on the roads is in danger of total gridlock. The density of automobile traffic will triple in India, quadruple in Indonesia, and grow tenfold in China. The increased density of cars in traditional private transport is no longer compatible with livable cities. Many areas have already had to issue driving bans. This explains the growing importance of both intermodal solutions and public transportation.

Improving operational safety, availability, throughput and the passenger experience – the Mobility Division's smart transportation solutions use innovative IT to get goods and people quickly and safely to their destination at an affordable price and with a low environmental impact. We are a preferred partner to cities, municipalities, railroad operators, and local transportation companies, who turn to us for efficient and reliable rail vehicles, management solutions for road and rail, and a comprehensive portfolio of maintenance and other services.

We pursue uncompromising standards of quality, safety, occupational health and safety, and environmental protection coupled with continuous innovation and performance you can count on.



# Introduction

Our thinking revolves around mobility, and we are already shaping the mobility of tomorrow. We bring the latest technology trends to road and rail and deliver greater sustainability, efficiency, and reliability – with smart solutions for efficiently moving people and goods. We rigorously focus on solutions that are forward-looking, reliable, and will help our customers offer their passengers more than just transportation from A to B. Our solutions ensure maximum availability, increased throughput, and – last but not least – the best possible travel experience.

Our global customer base appreciates the innovative power of our products and solutions, together with their reliability, safety, durability, sustainability, and cost-effectiveness.

We see it as our responsibility to our customers, partners, and employees to meet this standard of quality every day.

We fulfill this responsibility in our commitment to ensure and continuously improve our high standards of product quality, environmental protection, health management, and safety through a comprehensive management system.

For us, this also means that our customers around the world can count on uniform principles of quality, safety, occupational health and safety, and environmental protection:

**Quality, safety, occupational health and safety and environmental protection are personal**

Everyone has a contribution to make. That is how we will meet the expectations of our customers, our employees, and society as a whole.

**Quality, safety, occupational health and safety and environmental protection are obligatory**

Everyone is involved in maintaining and constantly improving the processes.

**Quality, safety, occupational health and safety and environmental protection are all-inclusive**

Everyone contributes to the success of our company with their creativity and commitment.

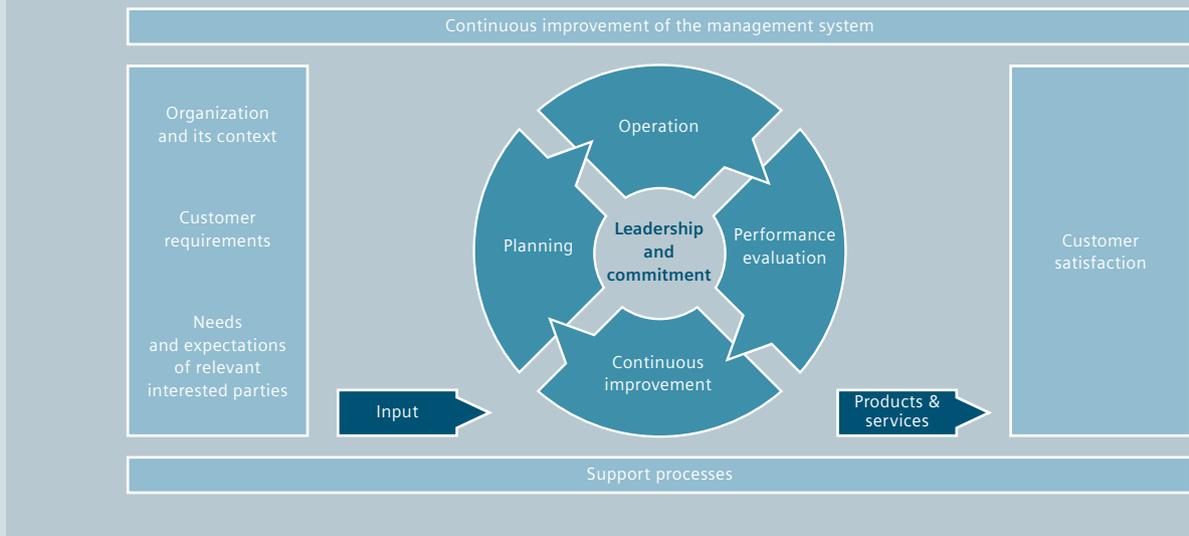
**The management system outlined in this manual is obligatory for all managers and employees of the Siemens Mobility Division.**



Dr. Jochen Eickholt  
CEO Division Mobility

A high-angle, perspective view of a railway track. The tracks run parallel to each other, receding into the distance. Overhead power lines and support structures are visible, crossing the tracks. To the right, a large, modern building with a glass facade is partially visible. The ground is covered in gravel and wooden sleepers. The overall scene is industrial and structured.

Why we need  
uniform processes  
and clear cut  
rules ...



# Management system

This manual outlines the key points of the Mobility Division’s management system and defines the general requirements for all organizational units in consideration of internal and external influencing factors. The Division CEO drives the development and implementation of the management system through planning and targets and ensures a system of controls.

The management system is obligatory for all employees. The documentation structure is outlined in the section entitled Documentation. The organizational units are responsible for citing, substantiating, and documenting any exceptions to the requirements of ISO 9001 or other standards that may be necessary. Holding companies listed in the Mobility Division’s organizational chart may have their own independent management systems. The same applies to organizational units whose unique business mandate requires a separate management system.

The management system documentation – including all methods and procedures – is available to all employees in the organizational units in structured form. It may also be accessed by external personnel for auditing purposes, but is otherwise intended for internal use only.

## Implementation and assessment

The management system is focused on satisfying customer requirements and the expectations of all interested parties of relevance, and ensuring compliance with the law and company policies. It meets the Siemens quality management standards and the requirements for a quality management system set forth in ISO 9001, for a maintenance system in accordance with national railway legislation, and for an occupational health and safety and environmental management system (EHS) as set forth in ISO 14001 and OHSAS 18001.

Management monitors and assesses its implementation, effectiveness, and efficiency.

Depending on the requirements of the markets or customers, the following standards or guidelines have also been met:

- International Railway Industry Standard (IRIS)
- Capability Maturity Model Integration (CMMI)
- Entity in Charge of Maintenance (ECM)

# Processes

## Our claim: reliable process quality ...

Effective and efficient processes make up a key element of our management system. They ensure that our products and services meet the specified requirements to the complete satisfaction of our customers and everyone concerned.

These processes are divided into three, closely intermeshed process categories:

- The general specifications for the core processes are formulated and controlled in the **management processes**.
- The **business and operational processes** encapsulate all business activities in precisely coordinated sub-processes: from product origin and acquisition to project management, hand-over to the customer, and after-sales service.
- All supporting activities are included in the **support processes**.

Process coordinators look after the various subordinate activities in all three categories. They plan, supervise, and document each individual process according to customer-specific and product-specific criteria. This involves considering risks and opportunities affecting both the organization and all interested parties of relevance. Appropriate methods, e.g. process performance indicators, are used for monitoring and control. Elements of quality management, occupational health and safety, and environmental protection are integral components of these processes. The same applies, wherever legally required, to elements of safety and maintenance management.

The function and efficacy of the core processes are ensured by the consistent application of project management throughout, and by the use of quality gates.

Our aim is to make all processes staff-oriented, robust, transparent, and reproducible at all times with optimum integration of our partners.

... with integrated activities for occupational health and safety and environmental protection.



# Processes

## Management Processes

Strategic Planning & Controlling

Financial Planning & Controlling

## Business and Operational Processes

### Customer Relationship Management (CRM)

Plan

Understand

### Supply Chain Management (SCM)

Plan

Source

### Product Lifecycle Management (PLM)\*

Plan

Product Portfolio Management

\* Tailored for specific business requirements

## Support Processes

Quality Management

Safety and maintenance management

Environment, Health & Safety

Intellectual Capital Management



This pictured process house is the basis for the specified process houses within the Business Units.

Enterprise Governance

customer relationships

Sell

Care

Make

Deliver

Return

Define

Realize

Commercialize/Operate

Phase out

Human Resources

Financial Management

Procurement

Process and Information Management

Communication

ECC

Administration & Infrastructure

Operating Rules

# Business policy

The principles of our business policy in our effort to achieve business excellence are as follows:

- We consider it our primary responsibility to achieve utmost satisfaction with all our customers and cultivate a lasting trust in our products and services.
- We aspire to constructive, long-term, trusting relationships with our partners around the world in compliance with the law and the highest ethical standards.
- We foster competence, creativity, and achievement potential in our employees.
- We are very aware of our social, environmental, and economic responsibility for sustained development.
- Our efforts to protect the life and health of our employees and other people as well as to conserve natural resources influence our thinking and actions and help to safeguard our competitive position.

These principles are implemented by means of the following **strategic objectives**:

- To develop, manufacture, and sell high-quality products, which are reliable, environmentally compatible, and safe.
- To do business everywhere and at all times in compliance with the applicable rules and to deliver top results with our business partners in keeping with the highest ethical standards.
- To meet the requirements of our customers – those negotiated as well as those that can be reasonably expected – to their complete satisfaction.
- To constantly monitor and optimize the processes based on application-specific experience and recognized standards in order to achieve the highest customer benefits with simultaneous commercial viability.
- To ensure efficient implementation of statutory provisions, directives and standards, as well as the requirements for environment, health & safety (EHS).
- To ensure exemplary conduct on the part of management personnel, ensuring that their employees receive the information, support and training needed to achieve the objectives.

## Strategy

The Mobility Division's management system ensures that the aforementioned strategic objectives are implemented through concrete measures in order to position the Division at the top of the global market for the long term. We pay special attention to supporting the good health of our employees and preventing accidents.

The values and vision of Siemens AG mold the thoughts and actions of the entire Group. They are binding for everyone. They are described more precisely in the corporate guidelines "Siemens Quality Management: Mandatory Elements," "Principles of Environmental Protection, Health Management and Safety," and "Corporate Information Security Guide (V3)." The Mobility Division has developed the principles and objectives for the Mobility management system on this basis.

# Organization

Responsibility for quality and safety, as well as occupational health and safety, and environmental protection at Siemens AG is stipulated throughout the company.

The CEO of the Mobility Division assumes responsibility for the stipulation and pursuance of the divisional objectives relating to quality and safety, as well as occupational health and safety, and environmental protection. The CEO ensures that the management system is developed and achieved, and that constant improvements are made to its efficiency. This includes:

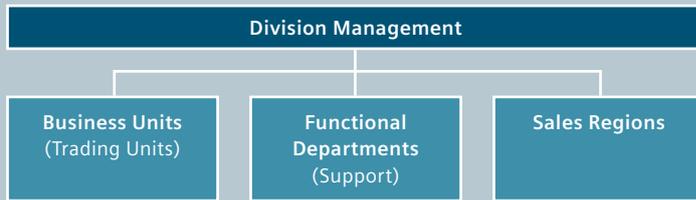
- Giving managers and staff a clear direction and motivating them to work consistently in a customer-oriented manner. Compliance with customer requirements and the statutory and regulatory requirements are in the foreground.
- Defining the management policy with the objective of improving economic value added and increasing customer benefits.
- Performing regular management reviews to assess the effectiveness of the management system and initiate measures to boost efficiency, thereby also improving the quality of the product.
- Securing the availability of suitable resources.

The management teams of the operational organizational units define the objectives for quality, safety, occupational health & safety and the environment more specifically and in greater detail, and they define the respective areas of responsibility, tasks and authorities.

The heads of the organizational units assume responsibility for the quality of their processes and products as well as for compliance with the requirements for occupational health and safety and environmental protection. They decide on the measures that are capable of improving the quality of the product and the environment and those that are capable of ensuring the health and safety of employees in the workplace.

Apart from this, they determine the assignment of responsibility for sub-processes. Managers are required to encourage their own employees to work in a health-conscious manner with an awareness of quality, occupational safety, and environmental protection. Furthermore, managers also ensure that the knowledge and skills required for this are communicated to the employees and that the necessary tools and resources are made available to them.

The heads of the organizational units are responsible for all activities associated with quality management, safety and maintenance management, as well as occupational health and safety and environmental protection.



### Organizational structure

The organizational chart depicts the structure of the Mobility Division. Details are outlined in the various organizational charts and task flowcharts. The Division's Quality Management department and the EHS Division Office report directly to the CEO.

Responsibility	Technical authority	
<p><b>Managing Board</b></p>	<p><b>Corporate offices:</b></p> <ul style="list-style-type: none"> <li>■ Quality Management (CT BE QM)</li> <li>■ Technical Safety</li> <li>■ Environmental Protection, Health and Safety Management (HR EHS)</li> </ul>	
<p><b>Division CEO</b></p>	<p><b>Divisional offices:</b></p> <ul style="list-style-type: none"> <li>■ Quality Management and EHS Division Office</li> </ul>	<p>The divisional offices for Quality Management and EHS Division Office define the regulatory framework. They have the necessary regulatory authority in this context. They perform informative, coordinating, advisory and supervisory functions in this respect and the same applies to all other quality offices, management representatives, environmental protection officers, occupational safety specialists, and other EHS experts and medical officers.</p> <p>All of the offices mentioned above support the process and product managers, but do not release them from their respective responsibility.</p>
<p><b>Heads of the Business Units, process owners, managers, EHS officers of the Business Unit and sites</b></p>	<p><b>Heads of Quality Management, environmental protection officers, management officers, ECM coordinator, ECM managers, medical officers, occupational safety specialists</b></p>	<p>The heads of Quality Management within the Business Units and Business Segments are generally appointed by the heads of the respective organizational units. Their functions and duties are laid down in detail in job profiles and other regulatory documents. Each head of Quality Management is subordinated directly to the head of their organizational unit and is independent of the other organizational structures.</p> <p>The appointment of the quality manager in the project (QMIP) as well as the EHSMiP (EHS Manager in the Project) follows a defined process.</p> <p>EHS experts and officers in environment, health and safety are appointed by the responsible EHS manager in the Business Unit/location according to the laws and specific internal regulations. Their functions and duties are laid down in their letters of appointment.</p> <p>The ECM coordinator and the ECM managers are appointed by the heads of the Business Unit. Their tasks are set forth in greater detail in job profiles and other regulations. They normally answer directly to the heads of their organizational unit and are independent of the other organizational structures.</p>

# Product quality

## This is how we ensure product quality ...

Product requirements are determined, evaluated, and contractually stipulated in close contact with the customer. Development, project planning and project processing activities are all planned on this basis. Functional and technical solutions are derived from project specifications, e.g. planning documents or requirement specifications, and are laid down in specifications (e.g. performance specifications) for realization. The results are evaluated, verified, and validated. When products are purchased, released specifications and/or other technical documents are sent to qualified suppliers. The delivered products' compliance with the purchasing requirements is ensured by means of predetermined inspections and testing or other appropriate measures.

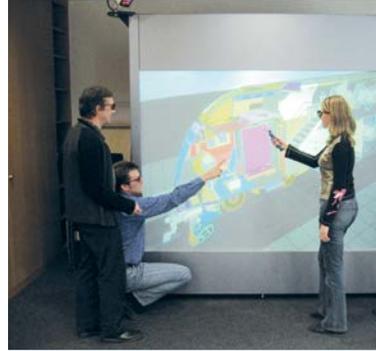
At Siemens, manufacturing, assembly, installation, commissioning, and service activities are planned and performed under defined, reproducible conditions and include selective monitoring and measuring procedures. These are validated by means of state-of-the-art inspection and testing facilities, which are operated by specialists. The use of all necessary monitoring and measuring equipment is ensured – as is the use of appropriate calibration and tracking systems.

The procedure described above serves to systematically ensure product quality. Preventive measures, including monitoring and testing activities, are factored in throughout the entire value-added process, and are implemented and documented accordingly. Professionals with special qualifications in quality – called Quality Managers in Projects (QMIPs) – are employed in complex projects. The experience and expertise of the QMIPs is assured by means of special training schedules. Another example of the high priority attached to product quality by the Mobility Division.

## Occupational health and safety, environmental protection

Siemens begins assessing and considering the possible impact of our products and services on people and the environment right in the planning phase, applying international standards and taking into account local laws governing environmentally sound product design for the entire product lifecycle, including end of life.

**... while adhering to all occupational safety and health and environmental protection standards.**



# Product quality

## Product creation

Product planning and development are customer-oriented and in line with market requirements. Selective preventive quality measures and other techniques are planned and implemented in order to meet these requirements and eliminate errors at an early stage. These include review techniques, failure mode and effects analyses (FMEAs), safety and reliability studies, trials/tests (in the laboratory and on the test track), type testing, environmental impact assessments, etc. Qualified, experienced personnel ensure systematic error prevention. This approach is also applied throughout the engineering and project planning phase.

## Project-management-process for projects



### Inspection and test centers

## Project-management-process for large service projects



### Inspection and test centers

## Commissioning

Infrastructure products, systems, as well as complete systems including the integrated or related modules and components, are inspected and tested based on an inspection and test plan. The scope of inspection and testing for the commissioning meets the customer specifications stipulated in the contract, including the requirements stipulated by the authorities and recognized standards. Verification of a complete system's performance capability and safety is included in the documents that are relevant to the acceptance procedure.

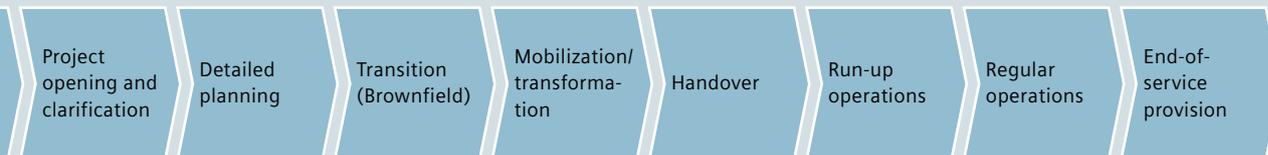


**Supplier management**

We cultivate long-term relationships with trusted suppliers, who we think of as partners. They are assessed, evaluated, and promoted within the framework of a thorough selection and qualification procedure. The suppliers are generally involved in the development process from an early stage in order to produce innovative, high-quality products that incorporate the principles of EHS. Joint quality and safety standards are coordinated and specified in technical documents. The release and acceptance processes are defined on a product-specific basis.

**Production and assembly**

Production and assembly activities are planned meticulously, thoroughly documented in work and test plans, and specified for the various processes and operations. Validating inspections and tests, such as screening and system tests, are integrated into the reproducible process steps. Selective quality assurance measures accompany the entire production and assembly process. Particular care is exercised with respect to all components that affect safety and reliability. Agreed upon customer acceptance procedures are planned and carried out. EHS measures are actively promoted in the course of production and assembly.



**Customer Services**

Investments in new concepts should deliver a long-term and sustainable return. This calls for effective service strategies, which are essential if safety, system reliability, and availability are to be maximized over the system's life cycle.

Our service portfolio guarantees the safe operational status of vehicles and components, and includes both proven maintenance strategies and efficient spare part solutions, through to digital services, testing and validation, training, and refurbishment. All our services can be structured to suit customer requirements, to ensure that our service meets their individual needs.

**Test and Validation Center**

Our various vehicle types – ranging from a standard to a meter gauge design and from an electric to a diesel powered trains – are tested extensively on our own track system. Our test center is expertly equipped to deal with all customer specific and country specific requirements. The track layout in our test center allows to test the train performance under “real-world” conditions. Comprehensive testing and preparation for technical approvals and validations guarantee that Siemens rail vehicles will operate safely. Our test and validation center is fully equipped with the most modern testing systems – from a measuring curve to a turn-tilt-table, acoustic measuring station and high-voltage testing station.

# Controlling the management system

During the controlling process, partial objectives and measures are permanently oriented towards achieving the company's overall targets. These targets are clearly defined and measurable, and they are agreed upon and updated periodically within the organizational units. Management personnel track, assess, improve and report on the degree to which these targets have been achieved.

## Target discussions

Target discussions are conducted with the Mobility Division within Siemens. These target discussions include such fundamental issues as quality and safety, as well as occupational health and safety and environmental protection. The agreements are implemented within the organizational units.

## Self-assessments

Process owners measure and evaluate the performance of their processes for compliance with the agreed process objectives, then use benchmarking, lessons learned and best practices to implement a continuous process of improvement.

## Management review

Management conducts regular reviews of the quality, safety and EHS management system in the organizational units. Management also reviews implementation based on a variety of factors, including audits, assessments, benchmarks, key figures, on-site inspections, self-assessments and reviews. Any improvement measures which may be necessary are subsequently derived from the results, implemented, and the effectiveness of these measures is reviewed.

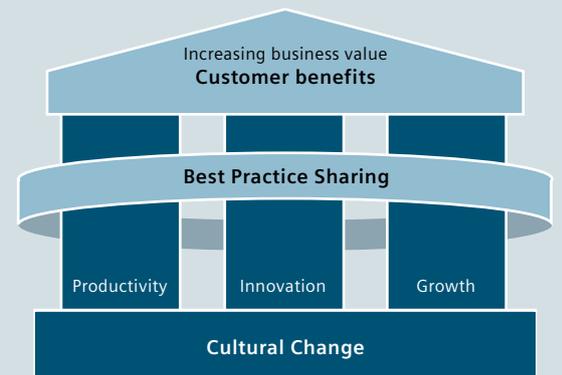
## Customer satisfaction

We gather customer-related information both actively and passively. This information is then evaluated and used to determine methods for boosting customer satisfaction.

**Thanks to the interaction of all management instruments and targeted controlling, we have now established a continuous improvement process encompassing all levels of our company and wholly aimed at achieving BUSINESS EXCELLENCE.**



## Methods for improving





# the management system

## Improvement

*top+* is the Siemens corporate program for becoming best in class.

*top+* represents clear goals, concrete measures and definite consequences.

This instrument effectively activates an improvement system that demands a correspondingly high level of commitment on the part of every management employee. A core element of this method is a six-step approach, a process that we use to improve our quality and safety, and our standard of EHS for the benefit of our customers and employees, and to strengthen our cost position.

We rely on the dedication of our managers and employees. We therefore encourage and make active use of their ideas, suggestions, and initiatives. We have established an idea management system for this purpose. All ideas and suggestions are evaluated within the framework of this system, and bonuses are paid for every idea that we put into practice.

## Mandatory elements of

### Siemens Quality Management

This corporate guideline has been developed based on the knowledge and experience of experts throughout the company as well as on the results of a global benchmark. It serves as the basis for the continuous improvement of the management system.

The maturity level is reviewed at regular intervals by means of assessments.

The content focuses on nine elements:

- Customer integration
- Quality standards in processes and projects
- Consistent supplier management
- Business-driven quality planning
- Focused quality reporting
- Comprehensive qualification for quality
- Continuous improvement
- Quality culture through influence of management
- Control and support role of the quality manager



## Best practice

Our aim is to be world class, and this is why we perform benchmarking and have adopted Best Practice Sharing as an element of our continuous improvement system.

Once the results are evaluated, appropriate improvement measures are decided upon and implemented. We assess our success by means of a selective implementation controlling system.

## Siemens Leadership Framework

The Siemens Leadership Framework demonstrates our mutual understanding of excellent leadership and is binding for all executive personnel. It provides a clear-cut basis for the measurement and evaluation of management performance and provides a standardized

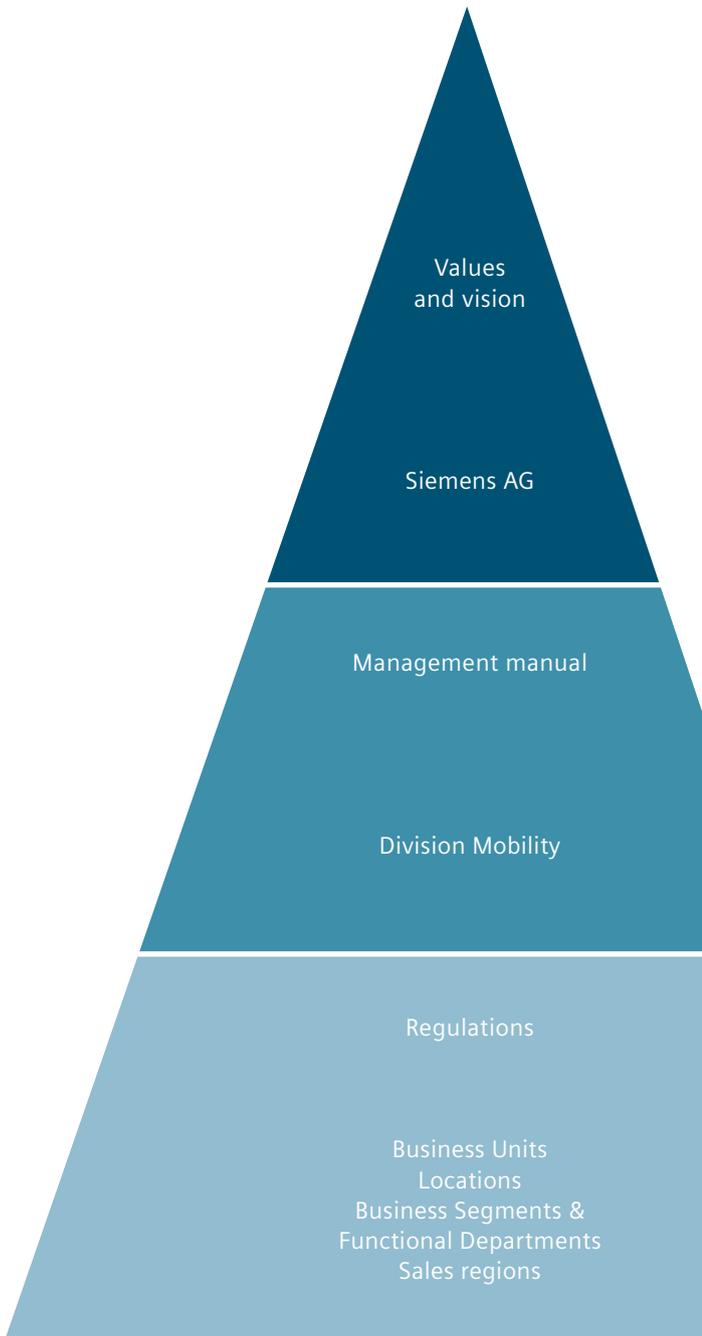
approach for the evaluation of potential. It also offers a means of deriving binding measures for promotion and personnel development.

Outstanding employees and management personnel achieve outstanding results with the help of their excellent skills.



# Documentation

Document management ensures that documents and data are checked, released, and/or put into force according to specific procedures. The same applies to the distribution, filing, archiving, amendment, and deletion of such documents and data, as well as their listing in directories according to their respective status. The specifications are generally structured on three levels:



## Dokumentation

### Siemens AG

The vision and values of Siemens AG define our corporate culture.

The Siemens Guidelines and Standards define the fundamental objectives, structure, and responsibilities of our company. They are the foundation for further developing and continuously improving the management systems.

### Division Mobility

This manual contains general statements about the division's management system. It is supplemented by regulations that apply throughout the Division, which contain higher-level management system specifications and procedures.

### Business Units, Locations, Business Segments & Functional Departments, Sales Regions

The management system is defined in even greater detail in these units in order to ensure operational effectiveness. These regulations describe the individual processes and procedures, if necessary down to employee level.

# Division Mobility

Integrated solutions for the efficient transport of people and goods

## Mobility Management Business Unit

- Products, solutions, and entire systems for automating and optimizing road and rail transport



## Mainline Transport Business Unit

- Rail vehicles for regional and long-distance transportation
- Product and system solutions for passenger and freight transport



## Urban Transport Business Unit

- Rail vehicles for municipal passenger transportation
- Passenger railcars



## Turnkey Projects & Electrification Business Unit

- End-to-end solutions for rail transport
- Electrification solutions
- Charging infrastructure for e-buses



## Customer Services Business Unit

- Services and tools for servicing and also safety and maintenance management of rail vehicles and infrastructure systems



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