

Integration of Management Systems in Railway Transport

Katarzyna Chruzik

The University of Dąbrowa Górnicza, Poland

Leszek Mindur

The International University of Logistics and Transport in Wrocław, Poland

The mandatory management systems implemented since 2008 in rail transport resulting from legal requirements [1-8], very often (especially in the first years of implementing the requirements) functioned independently of the optional procedural approach - ISO standard [9-10]. Currently, the integration of requirements in both the mandatory and voluntary areas has become common practice. Legal requirements and recommendations do not define or suggest any specific form of extending the existing management systems. Regulation EC 402/2013 in Article 3 point 7 [8] defines only the obligation of interaction between systems (interfaces mean all interaction points during the system or subsystem life cycle). The publication describes the relationship between the requirements in the field of management systems currently used in the railway system resulting from legal requirements (Safety Management System - SMS) and voluntary implementations (Quality Management and Environmental Management System).

Keywords: electromobility, urban logistics, e-car-sharing, maintenance of car-sharing.

1. THE CRITERIA OF INTEGRATION

One of the fundamental criteria for integration is obviously the similarity in the way of building, implementing and certifying systems. The basic difference between optional and obligatory systems is the nature of the system supervisor. In the case of voluntary systems based on standards and recommendations, these are accredited units operating on the market that do not have a strictly industrial character. In the case of the Safety or Maintenance Management System (SMS, MMS), based on legal requirements and recommendations in Poland, it is the Office of Rail Transport. This state entails the threat of a different approach to the assessed documentation and practices.

However, regardless of the main criterion defining the scope of system operation (safety, quality, environment), one can notice a lot of common processes (Figure 1) and requirements.

The basic requirement of the process approach - omitted in the industry requirements and legal recommendations - is the independence of supervision over the system in terms of its substance, organization and finances. In the case of Plenipotentiaries of the system (employees

responsible for the proper functioning of the system):

- ISO - should be dependent directly on the Management Board and independent in the scope of the main process,
- SMS - should be independent of the transport department,
- MMS - should be independent of the maintenance department,
- SMS / MMS - should be independent of the transport and maintenance department.

Despite the lack of legal requirements in terms of substantive, organizational and financial independence, this should be one of the basic criteria for the construction and implementation of systems in the railway industry.

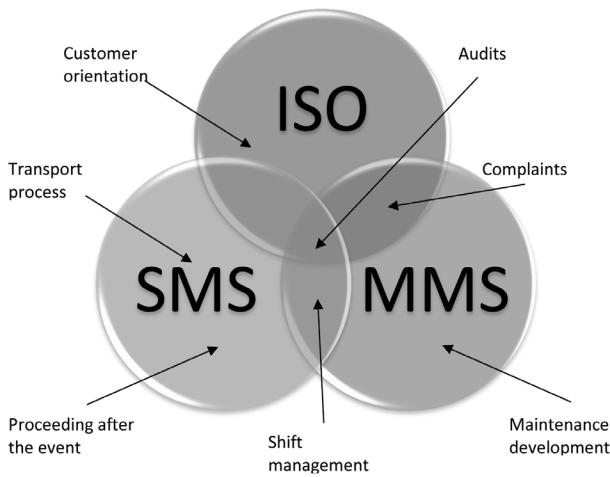


Fig. 1. Management systems functioning at railway operators – interactions.

2. SYSTEM INTEGRATION

System integration is based on the combination of systems so that they can use each other's resources. They are then subject to joint certification. Unfortunately, in the case of the railway industry and the separation of auditing

entities, this is impossible. Systems are verified under two independent audits and have to meet the requirements without duplicating the description of convergent processes. Therefore, apart from integration, there are also descriptions of processes specific to a given group of requirements. The systems also have integrated descriptions of processes and refer to them in terms of legal requirements or those resulting from the standards of the International Organization for Standardization. They are then subject to independent certification.

Analysing the processes required in the Safety Management System and Quality and Environmental Management Systems, it is hard not to get the impression that the lack of integration may hinder the functioning of railway operators. Experience in the field of system management now allows for efficient integration or extension of system requirements. Table 1 presents the suggestions for description of processes in the Integrated Management System (SMS, 9001, 14001) in relation to the criteria of individual

Table 1. Relations of areas of the integrated system.

Description	SMS criterion §4 Ordinance of the Finance Minister 2007, Journal of Laws, 60 Text 407, as amended	ISO 9001	ISO 14001
Book of IMS	all	4.4	4.4
Process map	all	4.3, 4.4	4.3, 6.1.1
Security policy	1a	5.1, 5.2	5.1, 5.2
Security culture	1, 1a	7.3	7.3
Management overview	1, 1a	5.1, 6, 9.1, 9.3, 10	5.1, 6, 9.3, 10
Development, supervision and management of the safety improvement program	1, 1a, 2	6.2, 9.1	6.2
Operational risk management	2, 4, 5, 402/2013	4.1, 6.1, 6.3, 9.1	4.1, 6.1, 9.1
Shift management	2, 4, 5, 402/2013	4.1, 6.1, 6.3, 9.1	4.1, 6.1, 9.1
Railway transport / Railway traffic management	3	7.1, 8.1, 8.2, 8.3, 8.5	7.1,
Providing railway infrastructure	3	8.1, 8.2, 8.5, 8.6	6.1.4, 8.1
Designing railway infrastructure	3	7.1, 8.3, 8.5	7.1
Maintaining efficiency	3	6.3, 7.1	7.1
Hazard identification and occupational risk assessment	2, 4, 5	6.1	6.1
Access, exchange and management of information	7	6.3, 7.4	7.4
Competence management	6	5.3, 7.1, 7.2, 7.3	5.3, 7.2, 7.3
Suppliers evaluation	4, 5, 6	8.4	9.1.2
Supervision of documents and records	3	7.5	6.1.3, 7.5
Inspections	9	8.6, 8.7, 9.1,	9.1
Implementation of audits	9	8.6, 8.7, 9.1, 9.2	9.1, 9.2
Corrective and preventive actions and supervision of nonconformities	9, 10	10.2	10.2
Monitoring	2, 5, 6, 7, 9, 1078/2012	4.1, 6, 9.1, 10, Deming's wheel	4.1, 6, 9.1, 10, Deming's wheel
Proceedings after the occurrence of a threat or an event	8	-	6.1.2, 8.2
Preparation of emergency plans in case of crisis	10	-	6.1.2, 8.2
Review of inquiries, offers, contracts and orders	-	4.2, 5.1.2, 8.2	4.2
Customer orientation	-	4.2, 5.1.2, 8.2	4.2
Settlement of a service	-	4.2, 5.1.2, 8.2	4.2
Environmental monitoring and measurements	-	4.1, 6.1, 6.3, 9.1	4.1, 6.1, 9.1

groups of requirements also illustrated on the process map - Figure 2. In the case of Safety Management Systems, they have to be extended in the scope of other legal requirements [1-3,8].

Taking into account the convergence of the

construction of requirements resulting from ISO standards, it is very easy to extend this analysis with further requirements, e.g. resulting from information security management [11].

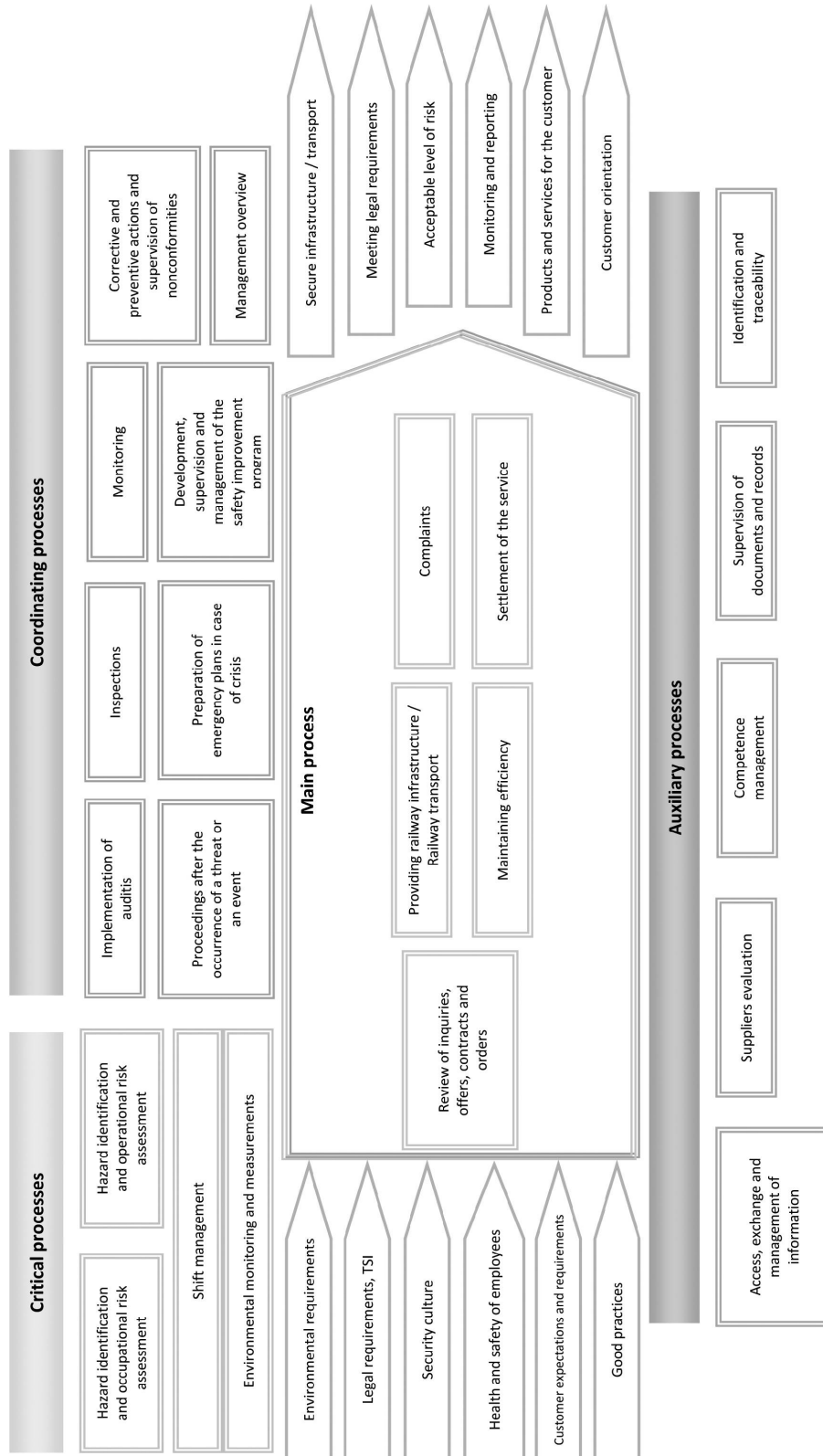


Fig. 2. Model of processes of the Integrated Management System.

Referring to the areas of the integrated management system (ISO, SMS) one should talk about elements of one system, not individual systems, connected in some places. This is due to the fact that the elements of the integrated system interact with each other. When building processes and documentation of the integrated management system, an analysis should be performed from the perspective of the quality of services and products, adjusting processes not only to the expectations of customers but, above all, to safety requirements or the impact of the process on the environment.

For the needs of the Integrated Management System, "safety" is thus a synonym of quality, professionalism, high security in the operational and environmental area and continuous improvement of services in the main process. It means ensuring that the services provided are carried out to the highest quality standards, meeting legal requirements and preventing operational and environmental risks. The implemented Integrated Management System should guarantee not only the high quality of services and highly qualified staff, but especially an acceptable level of safety of the rail operator's services as illustrated in the Declaration on the development of safety culture in rail transport, Security Policy and up-to-date Safety Improvement Plans containing the criteria included in ISO 9001, 14001 and legal requirements SMS (Safety Management System).

The analysis of mandatory criteria and voluntary management systems in rail transport highlights the convergence of many requirements. The implementation of voluntary systems is primarily related to the given criterion (e.g. quality) in input data analyses and streams any minor modifications to the description of processes. The already existing, legally-derived management systems (SMS, MMS) can be easily expanded by increasing the quality of their services and, hence, the competitiveness of railway operators on the market.

The implemented integrated management system contributes to:

- increasing prestige,
- increasing the competitiveness and customer confidence in the services provided.

In addition, it leads to:

- clearly defined division of responsibilities and competences of individual employees, and thus facilitating the management of the organization,

- facilitating communication between individual departments and employees inside the enterprise,
- continuous and comprehensive improvement of the processes carried out,
- simplifying the documentation describing the system and, consequently, its suitability in managing the organization,
- reduction of costs related to lack of quality of services,
- reduction of costs related to the use of the environment and possible penalties.

3. SUMMARY

At present, there are different models of management system integration in rail transport. From full independence of systems resulting from legal requirements (SMS, MMS) - even among themselves - up to full integration with voluntary systems (e.g. ISO 9001, 14001, 18001 or 27001). The risk related to the accreditation process in two independent entities with divergent areas of activity was virtually eliminated as the auditors' experience increased. In addition to the costs associated with integration, this process brings many benefits resulting from the lack of duplication of convergent activities, documentation or the duplication / limitation of employee involvement. The weakest and most sensitive element of integration is the Plenipotentiary of the Safety Management System, who now has to have full industry knowledge in the field of the main process in addition to the process requirements.

REFERENCES

- [1] The Act of 28 March 2003 on railway transport
- [2] Commission Regulation (EU) No 1158/2010 of 9 December 2010 on a common safety method for assessing conformity with the requirements for obtaining railway safety certificates
- [3] Commission Regulation (EU) No 1169/2010 of 10 December 2010 on a common safety method for assessing conformity with the requirements for obtaining a railway safety authorisation
- [4] Commission Regulation (EU) No 1078/2012 of 16 November 2012 on a common safety method for monitoring to be applied by railway undertakings, infrastructure managers after receiving a safety certificate or safety authorisation and by entities in charge of maintenance
- [5] Commission Regulation (EU) No 445/2011 of 10 May 2011 on a system of certification of entities in charge of maintenance for freight

- wagons and amending Regulation (EC) No 653/2007
- [6] Regulation of the Minister of Transport of March 19, 2007 on the safety management system in rail transport No. 59 Item 744
 - [7] Regulation of the Minister of Infrastructure of May 22, 2009 amending the regulation on the safety management system, No. 59, item. 744
 - [8] Commission Implementing Regulation (EU) No 402/2013 of 30 April 2013 on the common safety method for risk evaluation and assessment and repealing Regulation (EC) No 352/2009
 - [9] EN ISO 9001:2015 Quality Management Systems - Requirements (ISO 9001:2015)
 - [10] EN ISO 14001:2015 Environmental management systems – Requirements with guidance for use (ISO 14001:2015)
 - [11] PN-EN ISO/IEC 27001:2017-06 - Information technology - Security techniques - Information security management systems - Requirements (ISO/IEC 27001:2013 including Cor 1:2014 and Cor 2:2015)

Date submitted: 2018-10-31

Date accepted for publishing: 2018-11-28

Katarzyna Chruzik
The University of Dąbrowa Górnicza, Poland
katarzyna.chruzik@gmail.com

Leszek Mindur
The International University of Logistics and
Transport in Wrocław, Poland
lmindur@vp.pl

