THE EUROPEAN ARCHITECTURE OF SAFETY REGULATIONS FOR RAILWAY – A CRITICAL REVIEW

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SUMMARY

The European safety regulations have started in 2004 with the regulation 2004/49/EC. Following this a lot of safety regulations were created, structured in common safety targets (CSI), common safety methods (CSM) and common safety indicators (CSI).

The development between 2004 an 2014 is a story of success. But it is also covering some mistakes and some detours on the way to a save and efficient railway traffic. The further development of the system of safety regulations should take into account for example, that the opportunity for using synergies between different roles in the railway system is an important issue for efficiency. This brings us more and more to a modular system of requirements, some of them valid for all players in the railway business, some of them specialised for specific roles.

Today we are fare away from this. The presentation will give some recommendations for the optimisation of the system of safety regulations in Europe and also for using the European system as template for regions and railway systems of the world.

INTRODUCTION

Ten years ago the European Union started to create safety regulations for railway undertakings. The first directive was the 2004/49/EC directive, which is addressed to railway undertakings and railway infrastructure companies. As EC directive it was necessary to transform it to the national laws of the member states (MS). This was done much later, for example in Germany in a first step partially in 2007 and completely with the change of the German railway law in September 2012.

Based on this safety directive, named as mother of all following safety regulations, a lot of specifying regulations were published. These documents follow the PDCA-philosophy of management systems (plan-do-check-act). They were structured as Common Safety Targets (act), Common Safety Methods (plan and do) and Common Safety Indicators (check). The most important regulations are the regulation (EC) 352/2009 regarding risk evaluation and assessment, changed in 2013 by regulation (EU) 402/2013, the regulation (EU) 1158/2010 for assessing conformity with the safety requirements for railway operators, the regulation (EU) 1169/2010 for infrastructure companies and the regulation (EU) 445/2011 for Entities in Charge of Maintenance, both with the same purpose. In 2012 the regulation (EU) 1077/2012 covering requirements for the supervision of the national Safety Authorities (NSA) and the regulation (EU) 1078/2012 covering the requirements for the monitoring of RU´s and ECM´s were published. These regulations must not be transformed in national law, because EU-regulations are directly valid in all member states. Most of them are also covered in the COTIF contract and on this way they are valid in all states, which have signed the COTIF contract.

All these safety rules are addressed to three players in the railway market, the operators of railway vehicles, the operators of railway infrastructure and the entities in charge of maintenance. As fourth actor the NSA´s are also addressed regarding supervision of the whole system.

If a company has more than one of these roles, they have to fulfil requirements for the same objective in different ways depending on the different regulations. A reasonable synchronisation is missing in a lot of items, which makes it difficult to use synergies.

The regulations are valid for the RU´s and ECM. These players are responsible to set it valid for second row of service providers by their contracts. This is sometimes a problem for the real life in railway business. Service provider for major overhaul of components, rental or leasing companies for staff and vehicles are not obligated by law, they are obligated by the contracts with RU´s and ECM. But the influence of competition and the position in the market is very often a limitation for the real chance of a RU or ECM, to give the safety requirements to the suppliers and to watch if they fulfil this.

The interface between manufacturer and ECM is also a difficult point. In a lot of real cases they have no contract between. When the rolling stock company as owner of the vehicles (ROSCO), who has the contract with the manufacturer, is not the ECM than exists no direct contract between manufacturer and ECM. Based on the Technical Specifications for Interoperability (TSI) the final manufacturer of the railway vehicle (Original Equipment Manufacturer –OEM) has to give information about the maintenance program including all components and covering the derivation of the maintenance activities, intervals and technologies. The ECM needs this information urgently for the development of the maintenance program and for his risk management. But there is no requirement for the owner to check if the manufacturer fulfil his responsibility and give this information to the ECM. Unfortunately the Notified Bodies check in the evaluation of conformity only if the maintenance documentation exists, but not if the content is in compliance with the requirements of TSI regarding maintenance.

Following I will show what can be done to avoid these problems.

NOTATION

COTIF	Contract about international railway traffic
CSI	Common Safety Indicators
CSM	Common Safety Methods
CST	Common Safety Targets
EU	European Union
EC	European Commission
ECM	Entity in Charge of Maintenance
MMS	Maintenance Management System
MS	Member States of the European Union
NoBo	Notified Body for conformity assessments
NSA	National Safety Authority
OEM	Original Equipment Manufacturer
PDCA	Plan-Do-Check-Act
ROSCO	Rolling stock operating company owns railway vehicles
RU	Railway Undertaking (operator of vehicles and/or infrastructure)
TSI	Technical Specifications for Interoperability

PROPOSALS FOR THE FURTHER DEVELOPMENT

The existing system can be specified by the following figure:

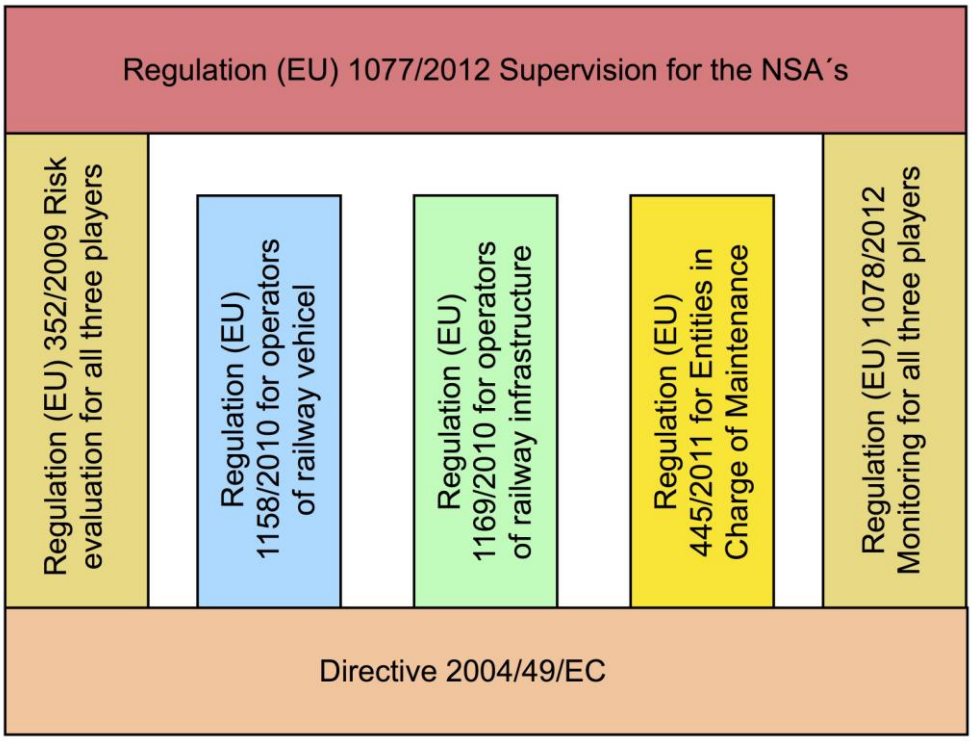

Figure 1: Rules for Railway Safety in the European Union

A modular system with common basic modules for RU´s, Infrastructure companies and Entities in Charge of Maintenance, further named “players of the first row”, and special modules for each role allows synergies in the case that one company has more than one role.

The system should also cover specific requirements for all service providers, which deliver safety related services, following named “players of the second row”. In this way it would be not only depending on the market power of the RU, if the have an opportunity to enforce the safety requirements by their contracts.

In the field of railway operations there are no requirements for example for rental companies (ROSCO) for locomotive drivers or wagon inspectors or other safety related staff. Also for a leasing company for railway vehicles there are no requirements regarding a process-oriented management system if their management processes are relevant for the railway safety. Of course, the RU has to give the requirements to the provider and has to control and to watch them, but the practice in daily life depends on a lot of subjective factors. It would be a better solution when the service providers must have an individual Safety Management System (SMS), adapted to kind, volume and safety relevance of their services and required by law.

We have the same situation in the field of maintenance. A system of voluntary certifications for the service providers is included in the existing safety regulations, but, for example, the market power of a small ECM is not strong enough to require a voluntary certification from a big vehicle manufacturer who offers major overhaul of components. But these services and the required Maintenance Management System (MMS) behind are highly relevant for safety. A requirement by law for a MMS, also adapted to kind, volume and safety relevance of their services would be a better way.

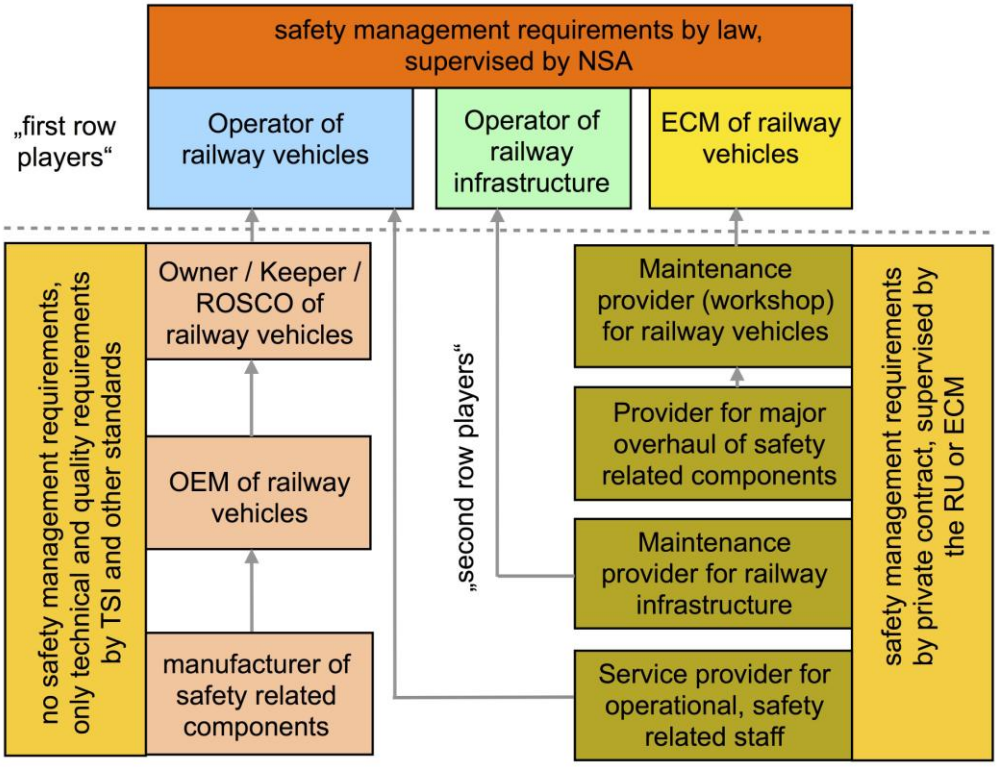

Figure 2: Supply Chain of Safety related Services

The participation of the “second row players” into the regulations of the safety management should be required by law, not by contract. The content should be adapted in relationship to kind, volume and safety relevance of their services. This brings us to the following structure.

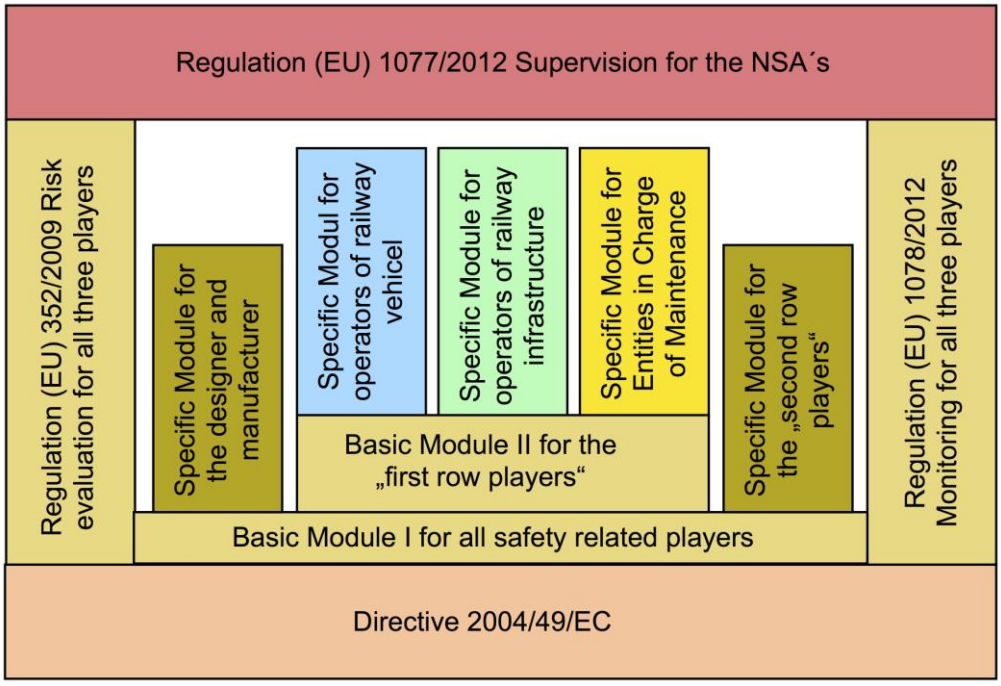

Figure 3: Proposal for the Structure of Rules for Railway Safety

This system would be independent from private contracts and market power of the different companies.

Another problem is the different interpretation in the current management systems, for example between SMS of the RU and MMS of the ECM. An example therefor is the interpretation of risk acceptance criteria in the risk evaluation by the NSA. We discuss in Germany about risk acceptance for the SMS of RU only in the way to fulfil operational regulations, standards and TSI (Codes of Practice). A quantified evaluation based on probability of hazard, which is provided as “Explicit Risk Estimation” in the Regulation (EU) 352/2009, shall not be used. In the MMS we discuss, that we can use all three methods shown in the regulation (EU) 352/2009, also the explicit risk estimation as risk acceptance criteria, based on standards like EN 50126 RAMS or EN 60812 FMEA. If a company is RU and ECM and wants to create only one uniform risk management process for both management systems, they will have some problems in the daily practice. A uniform interpretation would be helpful. The proposed modular system will avoid this problem because of the same basic requirements for all players.

That´s why such definitions and interpretations shall be contained in the Basic Module I in figure 3 in the same way for all safety related players. Many items of the regulations (EU) 1158/2010, 1169/2010 and 445/2011 with the same purpose, but different wording can be taken in the basic modules. The remaining parts shall be covered in the specific modules.

Risk and monitoring management processes, communication processes, information processes and documentation processes shall be part of the basic modules. Many items, which today must be negotiated in the contracts in a lot of various clauses, could be valid for all players in an uniform way without different interpretations and misunderstandings.

In the Basic Module II can be regulated all special requirements for the “first row players”. The content of the Specific Modules” will be minimised to the specific requirements for the specific role of the player. A lot of synergies could be used in such a system.

CONCLUSION

We are on a very good way in Europe to save and to increase the safety level of railway traffic. A lot of work was done in the last years to create and to publish the regulations, to install the process-oriented management systems and and to integrate it in the practice. But we have to estimate also, that we have some problems with the handling in the daily life. The remarks shall show, based on the existing system, what can be done for the further development. These proposals are also usable for other regions to build up or to develop a railway safety system. All players with safety relevance, “first and second row” of the supply chain, should be participants of such a system. This should be based on regulations, which are valid for all, not only by private contracts in the second row. A modular system allows synergies and avoids different interpretations and misunderstandings in the same management processes.