

# THE MARKET CONCEPT OF RAILWAY VEHICLES MAINTENANCE ON THE RAILWAYS OF REPUBLIC OF SRPSKA

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**Abstract** – The maintenance of railway vehicles is a combination of all management, administrative and technical activities during the service life of these vehicles with the aim of remaining in service or returning to service in a condition capable of performing the required functions. Apart from the technical, the railway system has been the subject of strong institutional development for the last two decades. The emergence of private railway companies, the application of new technologies and the development of new ways of organizing traffic further complicate the complexity of the railways. The complexity of the railway system requires the definition of clear responsibilities and obligations of all participants. All participants in the railway system must contribute to a higher level of safety and the development of the interoperability of the European railway network. The owner of the railway vehicle is responsible for maintaining the vehicle in the orderly condition. For freight cars, OTIF regulates (ATMF - Annex A) establishment of a competent maintenance body - ECM, where car maintenance is carried out through four functions. On the example of the Railways of Republic of Srpska, the maintenance system for all towing and towed vehicles was considered, and its compliance with the principles of the modern transport market was assessed.

**Keywords** – railway vehicles, maintenance, transport market, interoperability.

## 1. INTRODUCTION

The policy and strategic goals of the European Union (EU) are based on a single and open transport market throughout the EU and Europe, and should be the path to a new concept of railways in Bosnia and Herzegovina, including the Railways of Republika Srpska (ZRS). In the new environmental conditions, a solution needs to be found that will satisfy the numerous specifics of the built railway systems of all countries and at the same time lead to the creation of preconditions for the single market. The aim of this paper is to present a model of the process of maintenance of railway vehicles based on the organizational structure of the ZRS, which satisfies the conditions of a market-oriented railway.

## 2. REGULATORY FRAMEWORK AND ESTABLISHMENT OF RAILWAY VEHICLE MAINTENANCE SYSTEMS

### 2.1. Certification of personnel for maintenance and technical inspection

For all towing and towed vehicles, certain

maintenance workshops must be certified by the Notified Body - NOBO-s and entered in the national vehicle register. The certificate of fulfillment of conditions must meet the conditions necessary for the safe and orderly conduct of railway traffic. The overall goal of certification is to provide confidence to all road users that the maintenance system through maintenance management meets specific requirements and to guarantee railway undertakings that vehicle maintenance is performed by professionals [4].

The national railway safety authority issues a certificate to the person in charge of the maintenance of railway vehicles and keeps records of all issued certificates in the national register of railway vehicles.

The technical inspection of the vehicle in the process of issuing a license for the use of the vehicle serves to check whether the vehicle has the prescribed and correct devices and equipment installed and whether it is capable for safe traffic. The conditions and manner of performing technical inspections of towing and towed vehicles are mostly defined by railway undertakings within their safety management systems, although in some countries they are prescribed by the national railway safety authority.

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## 2.2. The rolling stock register

The rolling stock of railway companies in BiH, including ZRS, is stored in the central base managed by the European Railway Agency - ERA, so therefore, there are no obstacles for railway wagons from BiH to operate on the EU railway network as well as in the neighboring countries. Only authorized persons of the Regulatory Board and railway companies ZRS and Railways of the Federation of BiH have access to the database.

The National Railway Safety Authority, on the basis of instructions prescribed by the Intergovernmental Organization for International Railway Transport - OTIF, maintains a national register of railway vehicles and railway infrastructure. All national vehicle registers of EU member states are connected to the European vehicle register maintained by the European Railway Agency - ERA. The National Railway Safety Authority submits to the Secretary-General of OTIF all approved vehicle types on a given railway network. OTIF maintains a register of vehicle types of all Member States [4]. A good example of establishing a maintenance system is the maintenance of freight cars. Each body in charge of maintenance of freight cars must be certified by the ECM - Entities in Charge of Maintenance certification body, and the vehicle registered in the national vehicle register.

## 3. FUNCTIONS OF ZRS MAINTENANCE SYSTEM

The maintenance body performs the functions of managing the maintenance system and is responsible for the outcome of the maintenance activities it manages. Currently, the Railways of Republic of Srpska is a single company with inseparable infrastructure from railway operations and the company is sector-organized. Since ZRS currently exists as a single legal entity, the maintenance system is integrated into the joint venture.

In order to prove that the maintenance system in the current state of ZRS has been established, four functions of the maintenance system were analyzed and checked: maintenance management function, maintenance development function, rolling stock management function and maintenance performing function [1].

### a) I Maintenance management function

The maintenance management function ensures the safe condition of towing and towed vehicles in the railway system. This function coordinates maintenance functions. Maintenance processes are defined in the Business Plan of ZRS (external contractors for the implementation of the maintenance function, distribution of work by workshops, distribution of responsibilities, distribution of staff,

established strategies for achieving maintenance goals). Also, this function monitors maintenance and checks maintenance results. Practically, the maintenance decision-making process is controlled by the maintenance management.

### b) II Maintenance development function

The maintenance development function includes the identification and management of all maintenance activities of railway vehicles that affect safety. This function manages the rolling stock maintenance file. Types of maintenance, regular maintenance cycles, as well as allowed deviations from the planned maintenance deadlines are defined for towing and towed vehicles.

### c) III Rolling stock maintenance function

The management of the maintenance of the rolling stock of ZRS includes the exclusion of towing and towed vehicles from the traffic and their return to the traffic after the performed maintenance. This function ensures the timely maintenance of towing and towed vehicles.

### d) IV Maintenance performing function

The function of performing maintenance is the technical performance of maintenance tasks of railway vehicles. At ZRS, the function of maintaining railway vehicles is performed in workshops in Doboje, Prijedor and Banja Luka. The document management system for the repair of freight cars is defined in the document Manual of the freight car maintenance system (No. 399-4 / 13 of 05.03.2013), based on which the Railways of Republika Srpska received a certificate for freight car maintenance according to ECM - Entity in Charge of Maintenance.

## 4. THE RAILWAYS OF REPUBLIC OF SRPSKA MAINTENANCE SYSTEM CONCEPT

According to the existing organization and technical-technological division of labor for the field of maintenance of railway rolling stock on the railway network of the Railways of Republic of Srpska, there are three locations:

1. Workshop Doboje - workshop for repairing locomotives and cars;
2. Workshop Banja Luka - workshop for repairing passenger cars;
3. Workshop Prijedor - workshop for repairing freight cars.

ZRS has adopted regulations on the maintenance of railway vehicles in a uniform manner (Rule book 241) which regulates the order and level of maintenance of all railway vehicles that enter the public railway lines. In addition, maintenance is performed according to applicable international regulations: COTIF, GCU, AVV, RID, UTP, UIC publications.

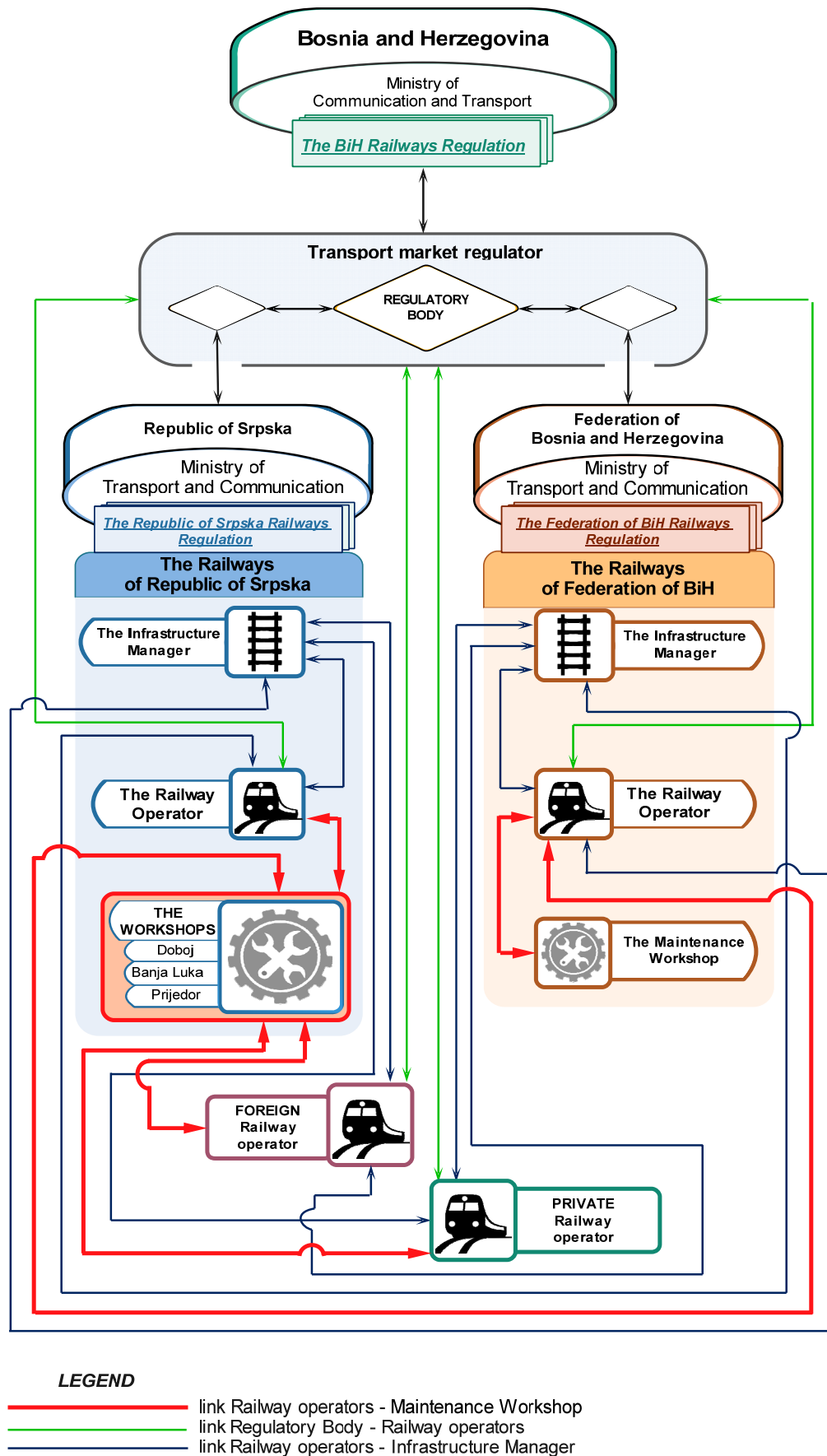


Fig.1. System of maintenance of ZRS in the conditions of open transport market

When handing over the railway vehicles for repair to the workshop, the technical condition of the vehicle is determined, as well as the missing and installed atypical parts, sets and equipment of the vehicle, which must be installed or replaced with appropriate standardized parts. The scope of work is prescribed for each type of repair, and the procedure for repairing the towing vehicle, sets and equipment is regulated by the appropriate technical instruction [6].

The level of competence of the ZRS railway vehicles maintenance system is considered through the following areas:

- Registration for performing activities and valid certificates of sections;
- Organization of work in the Sections for maintenance of railway vehicles;
- Document management system;
- System for monitoring the impact of maintenance on safety and reliability;
- Procurement system for spare parts, materials and maintenance services;
- Technological procedures;
- Professional qualification of employees;
- Infrastructural and technical equipment;
- Technical documentation;
- Measuring, testing and control equipment.

ZRS rolling stock maintenance workshops already have certificates for the performance of railway vehicle maintenance services issued by the Regulatory Board. Retaining the certificates of ZRS workshops, as well as all those from BiH, is a very important segment in opening the market of railway services. The current model of work organization in ZRS has classified the workshops for the maintenance of the rolling stock as a group of jobs of the railway operator, which must change by the time BiH joins the European Union [1].

Studying of the literature and experiences regarding the issue of maintenance of railway vehicles leads to the realization that there is no universal model or strategy for the maintenance of railway vehicles. Railway operators and vehicle owners determine the maintenance model based on the structure of their own rolling stock, the experience gained while using the vehicle and the applicable regulations. Taking into account the general concept of maintenance, basic principles, types, cycles and other maintenance procedures, as well as the principles of the open transport market, Fig. 1 presents the maintenance system of ZRS and the interactions of its participants.

## 5. CONCLUSION

The Railways of Republic of Srpska currently exists as a single legal entity and the maintenance system is integrated into the joint venture. Examination of the ZRS maintenance system indicates

that it has been established for more than 200 years in accordance with its tradition and that it satisfies the basic principles of its functions. The entire railway system of ZRS in the coming period should be reformed and reoriented to the market way of doing business. The new organizational structure of the railways should make a turn in the domain: opening the transport market, user orientation, financial consolidation of the existing railways, increasing operational efficiency and reducing the number of employees while increasing their competence. The reform will also affect the maintenance system, and accordingly a set of recommendations has been made as a guideline for its improvement:

1. Harmonize the systematization of jobs with maintenance technology;
2. Fill vacancies with skilled labor (uncontrolled labor outflow);
3. Develop maintenance functions in accordance with the procedures of the International Organization for International Railway Transport (OTIF);
4. Develop a management function and a maintenance development function at the level of the maintenance section (free transport market);
5. Technically and technologically modernize the maintenance function.

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