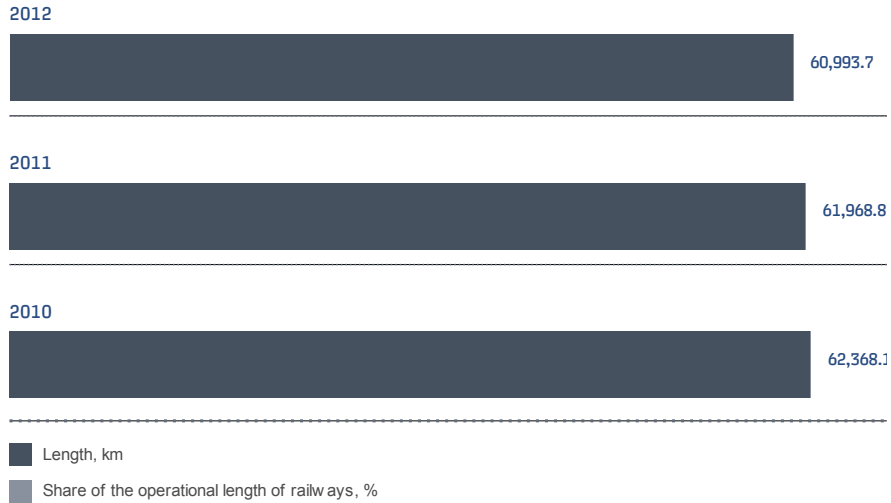


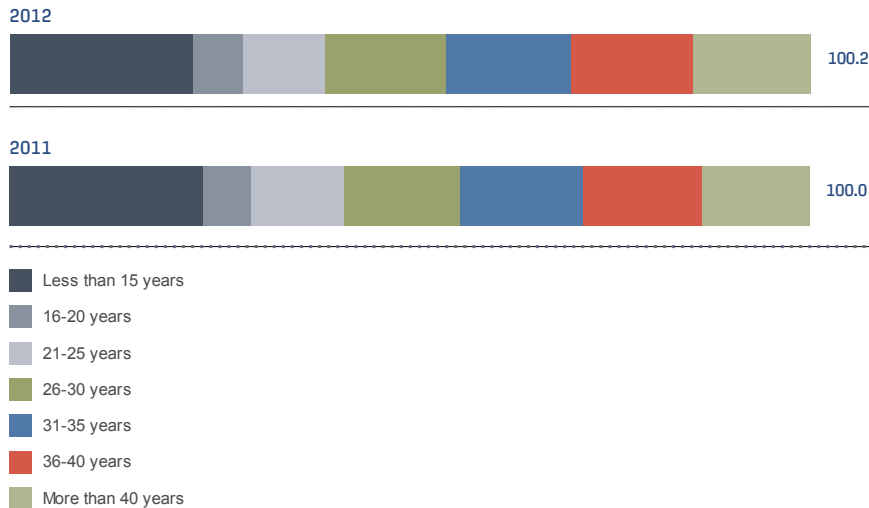
### Infrastructure Reliability

Innovative railway automation and remote control equipment will improve the safety of railway traffic, and help achieve targets for the carrying and processing capacity of the railways.

#### LENGTH OF LINES EQUIPPED WITH AUTOMATIC BLOCK SIGNAL SYSTEMS AND CENTRALIZED TRAFFIC C



#### ANALYSIS OF ELECTRIC INTERLOCKING SYSTEMS BY THEIR SERVICEABLE LIFE IN THE RAIL NETWORK,



In 2012, the number of failures of infrastructure components declined by 10% compared with 2011. The overhaul life was increased on 2,600 km of track. Railway sections with speed restrictions of 40 km/h and less reduced by 3,566.0 km for passenger traffic and by 5,123.7 km for freight traffic.

Railway automation and remote control equipment in the Russian railway network are used in 203 signaling, centralized and blocking devices and two Automation and Remote Control Maintenance Centers employ a total of 36.4 th. people.

At present, the JSC "Russian Railways" Automation and Remote Control Division is validating a new methodology of resource, risk and reliability management at different stages of the life cycle of equipment (URRAN), which will form the underlying basis of operational work management throughout the Holding Company.

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## NUMBER OF RAILWAY TRAFFIC SAFETY INCIDENTS AND EMERGENCIES

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2012



2011



2010



During the project implementation:

- ▶ equipment reliability indicators and failure rate recalculation coefficients have been defined depending on the technical equipment, climatic conditions and categories (loading) of lines;
- ▶ values of the indicators and coefficients of operational reliability of automation and remote control equipment have been calculated and the calculation methods have been developed;
- ▶ the procedure for setting permissible values of failure rate for hauls and stations has been defined on the basis of prescribed values of the average recovery period and limitations of the line availability factor.

In addition, technical audit and commission investigations of railway automation and remote control equipment were organized with the involvement of manufacturer representatives. Annual organizational and technical measures help reduce the number of signaling and interlocking equipment failures, improve the culture to use technical equipment and increase the number of services provided to JSC "Russian Railways" customers.

In future a unified multilevel system is planned for the automated monitoring of the state of technical equipment and the automated accounting system for technological operations. The Infrastructure Directorate will set up diagnostic and monitoring centers to control the technical state of automation equipment.

### Scientific and development program of JSC "Russian Railways" for the period up to 2015

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**The program provides for the implementation of innovative railway automation and remote control systems and equipment:**

- ▶ a phased transition to microprocessor-based automatic arrow and traffic light blocking and electric interlocking devices;
- ▶ application of microprocessor-based train traffic and safety control systems with the use of a radio interlocking center;
- ▶ use of integrated train traffic control systems, data transfer to locomotive safety devices through a digital radio channel;
- ▶ introduction of a multilevel automated system for the diagnosis and monitoring of the state of signaling, centralization and blocking devices;
- ▶ introduction of low-maintenance floor-mounted signaling, centralization and interlocking equipment, new generation mechanical equipment with redundancy and diagnosis elements.

#### 2012 Results

Innovative track alignment technologies have been introduced using the current integrated system of spatial data of railway infrastructure

Dynamic laboratories for testing infrastructure with an axle load of 27 ton-force and at a speed of 200 km/h have been developed.

Advanced design of infrastructure facilities has been introduced.