



ОТРАСЛЕВОЙ
ЦЕНТР
ВНЕДРЕНИЯ
НОВОЙ ТЕХНИКИ И ТЕХНОЛОГИИ



Train Identification System

Russian Railroads experience

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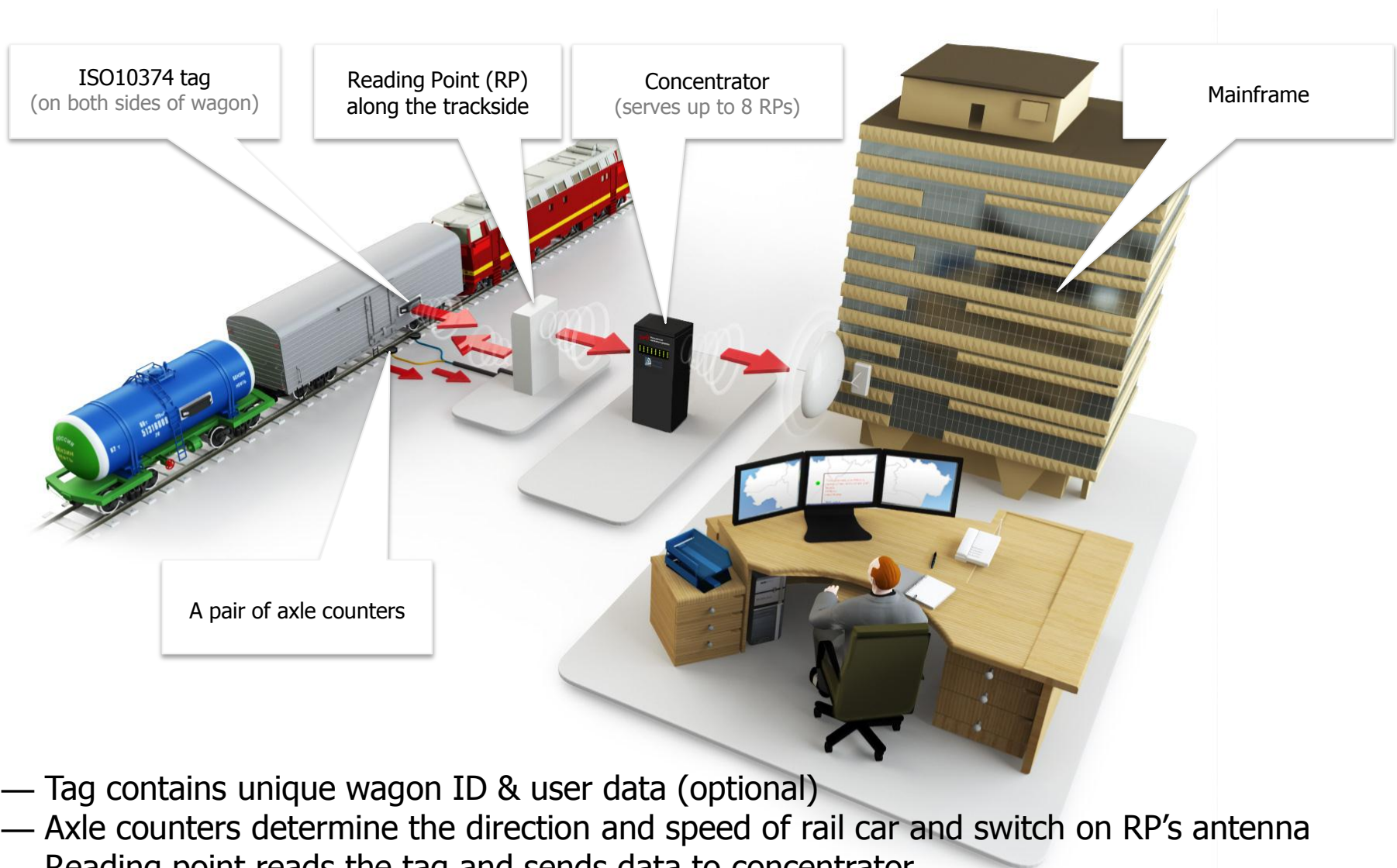
OSV

- is a subsidiary of Russian Railroads with headquarters in Moscow
- employs 1500 people in 17 branches over Russia
- was established in 1999
- works mainly for rail sector
- its mission in design, development and implementation of new techniques, technologies and equipment with means of its own potential and strong partnership with science and educational institutes in order to make the transportation process reliable and safe.

Most important activities

- **Train Identification System** (RFID-based)
- Implementing energy-efficient and resource-saving technologies on rail transport
- United center for seals accounting (cargo transportation security and theft prevention)
- On-board control systems for locomotives
- Automated systems and information technologies for logistics, process management and infrastructure
- ... and numerous innovative and perspective projects

Architecture of the system



- Tag contains unique wagon ID & user data (optional)
- Axle counters determine the direction and speed of rail car and switch on RP's antenna
- Reading point reads the tag and sends data to concentrator
- Concentrator aggregates data from several RPs and sends it to the mainframe

How it works

The reading point reads the tag, composes a special format message and sends it through the concentrator to the top level of system to be processed by mainframe. With a tiny delay it is possible to find out all the details of the specific train – speed, direction, type of rail cars or locomotives, their quantity and sequence.

Basing on these messages we get information about entrance or exit the shed, arrival or departure the station, passing the state border etc – basing on reading point's place and its exact coordinates...

and finally we are able to graphically 'build' the train...

сутки 23.07.2009

посл датчики кл станции посл-статистика ПАСС ГРУЗ

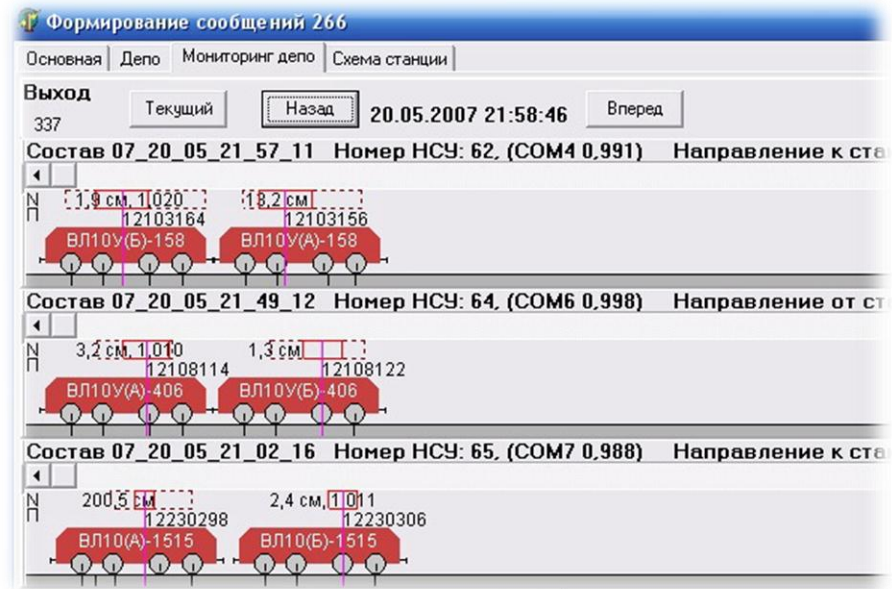
ТЧ ТЧЗ Бекасово

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06	ВЫХОД Д	23.07.02:47	ВЛ10у	ТЧЗ Бекасово	50а	12100996	53	ВЛ10у	50А	23.07.02:47	12100996	00:00
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08	ЗАХОД Д	23.07.02:59	2ВЛ10к	ТЧЗ Рыбное-Сортировочное	727а	12214532	54	ВЛ10к	727А	23.07.02:59	12214532	00:00
					727б	12214540		ВЛ10к	727Б		12214540	
					835а	12216693		ВЛ10к	835А		12216693	
					835б	12216701		ВЛ10к	835Б		12216701	
09	ЗАХОД Д	23.07.03:00	ВЛ10у	ТЧЗ Бекасово	1001а	12120010	51	ВЛ10у	1001А	23.07.03:00	12120010	00:00
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История операций с инвентарным номером 12120010

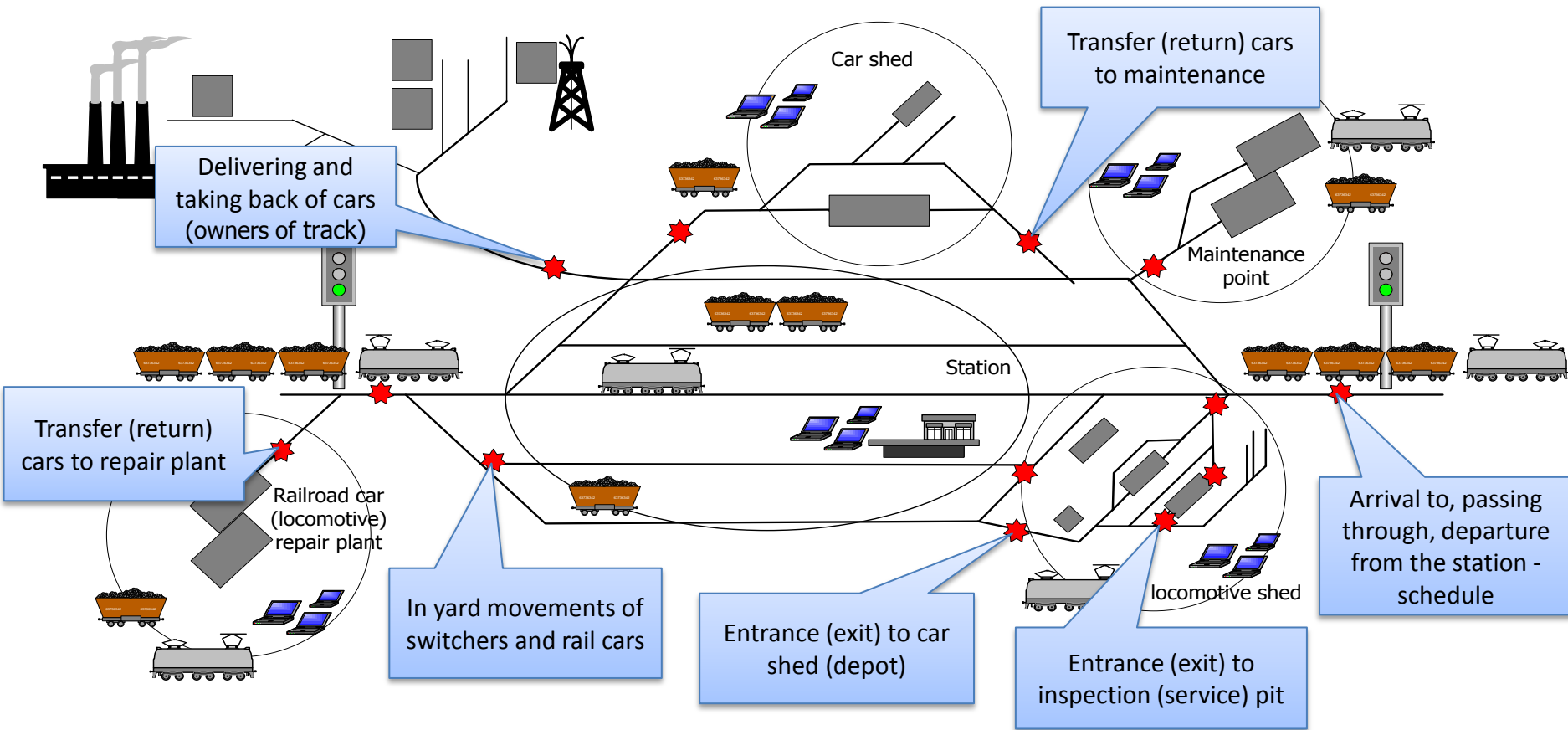
за сутки за 2 суток за 3 суток за неделю за декаду за месяц

№	САИ				ПРЕДПРИЯТИЕ	ОКДЛ			
	НСУ	О	ДАТА	ОПЕРАЦИЯ		ОПЕРАЦИЯ	№ ПОЕЗДА	СОСТОЯНИЕ	ДАТА
					Манькино I	О.Ж. РАБОТЫ		О.Ж. РАБОТЫ	23.07.11.45
					Лукино	ПРИБ	2452	ГОЛ. ПОЕЗДА	23.07.09.35
30139828	01	0	23.07.08.53	ОТПР	Кубинка II				
30139776	02	1	23.07.08.51	ПРИБ	Кубинка II				
30139906	02	1	23.07.08.19	ПРИБ	Пожитково				
30139963	02	0	23.07.08.14	ОТПР	Бекасово-Сорт		2452	ГОЛ. ПОЕЗДА	23.07.08.58
30135130	53	0	23.07.05.35	ВЫХОД Д	Бекасово-Сорт				
					ТЧЗ Бекасово	О.Ж. РАБОТЫ		О.Ж. РАБОТЫ	23.07.05.03



Typical reading points layout

Placing RPs at different parts of the process we can achieve the needed degree of control and automation depending on the requirements.




 Reading point at certain places of technological process

1. There are about 2400 RPs on infrastructure of Russian Railroads: at locomotive sheds, major stations, passenger stations, on state borders and inter-road junctions.
2. 99% of locomotives and 20% of freight cars are equipped with tags.
3. Train Identification System is currently in commercial operation, its data is being used for automatic fixation of train operations, schedule control for passenger trains, operations with locomotives.
4. Since 2000 year, the base numbering system is in force where every tag contains 8 digit rail car number. Starting 2011 year there will be a new numbering system with throughout unique numbers that excludes the necessity to put the rail car number into the tag and therefore eliminates the coding equipment and makes mistakes the thing of the past.
5. Train Identification System is based on ISO 10374 standard (RFID) that is being used on 43 railroad companies in 17 countries. And **we move towards** to our European colleagues making the system compatible with ISO 18000-6C (Gen2) standard by developing 2-standards tag & reader.

Train Identification System-based technologies on Russian Railroads

In use

Entrance/exit control to/from locomotive shed

Process control at locomotive shed

Schedule control for passenger trains

Train transfer control through inter-road junctions and state borders

Trial

Downtime control for freight cars on cargo stations and marshalling yards

Entrance (exit) control to shed and turn-around time control for multiple units

Freight car's transfer control between inter-road junctions

Locomotive stay control on fueling position (entrance/exit to the fuel yard)

Soon

Freight car operation control at maintenance point and locomotive shed

Schedule control for commuter trains

Rail car passing control of weighting equipment

Corporate web-service for rail car fleet owners

TIS has ever greater importance

TIS has ever greater importance

The System has proven its practicality
and in 2010 has got a further expansion by edict #195 of Ministry of Transportation

1. The Order regulates all rail cars to be equipped with the tags independently of form of property.
2. The Order regulates infrastructure to be equipped with the Reading Points.
3. The Order defines the possibility to have an online access to information from the TIS by fleet owners.
4. Brand-new rail cars can only be registered if they have a tags.

The technical effect of TIS results in providing the other information-management systems with the most objective and relevant information about the transportation process. The fact of matter, TIS itself is an accounting system, and the cumulative results can only be achieved in tough connection with the effective technologies of operational management.

We split technical effects into 3 categories:

- The reduction of rail car downtime
- Improving the management quality leading to the lowering the planned reserves (for example, the size of operational fleet)
- Exclusion of accounting distortion and staff mistakes.

2011 tag internal numbering system

1. Tag now contains throughout unique number, not a rail car number as it was earlier. There is a database of all issued numbers in the main server facility of Russian Railroads.
2. As the tag passes the reading point it is being checked for 'twins' and it binds to the real rail car number. The real rail car number is being taken from the wheel report (wagon list). When there are 5 coincidences the tag is automatically registered after this rail car.
3. No need to have a coding equipment. The consumers buy a ready-to-use tags.
4. The new numbering system is fully compatible with the 8 digit one – no need to replace the previous generation tags.
5. 100% guarantee of coding and staff mistakes (there were up to 2% of mistakes due to human factor).

TIS equipment product line

- Different reading points depending on the place of infrastructure to install:
 - RP with the remote antenna
 - RP for 2-way tracks (1 RP for 2 tracks)
 - RP with 2 antennas for 1 track (reads the tag on both sides of rail car)
 - RP to install in a limited clearance size
- 2 standards RP (10374+18000)
- 2 standards tag (10374+18000)
- ISO 10374 tag with user rewritable memory



Harmonizing the standards

We consider this very important moving towards to our European colleagues who use ISO 18000 standard. Accordingly, we have already made some initial steps in this direction:

- We began the development of two-standards equipment (tag & reader).
- We passed through a number of meetings with our Finnish colleagues and found common points of interests in respect of train identification from both sides of the borders.

Therefore the harmonizing standards of identification systems between Russia and other European countries is one of our vital matters that we are willingly ready to discuss.



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Thank you for your attention!

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