factsheet #24

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HOW ERTMS HAS BECOME THE "DE FACTO" WORLDWIDE STANDARD FOR RAILWAY TRAFFIC MANAGEMENT AND SAFETY

In the early 1990s, the European Rail Industry, with the backing of the EU Institutions, embarked on an initiative to design and create a common, single railway signaling system that would make rail transportation in Europe the most competitive, efficient safest and, as a world premiere, interoperable mode of transport. Factors which prompted this idea of a single, harmonized and interoperable system were the existence of more than 20 national train control systems that made cross-border train movements extremely technically complex, administratively very time consuming and consequently non-competitive against other modes of transport, particularly road transport.

Some national legacy rail control systems were only supported by a single and incumbent supplier whilst others were very expensive to maintain and support due to obsolescence issues. The situation was even further exaggerated by differences in track gauges, national electrification and traction power schemes.

Environmentally, however, rail transportation emerged not only as "the" alternative to road and air transport but also as the lowest CO_2-emmission mode of transport contributor.

BACKGROUND BEHIND ERTMS

As a unique signaling system developed from a vision, ERTMS has been designed to be fully interoperable. The intention is to facilitate any train equipped with ERTMS to be able to operate on any line fitted with ERTMS, irrespective of the supplier, and be safe – the interoperability being geographical – across country borders and interoperable between different suppliers, either through the on-board fitment or the infrastructure fitment. This would produce an open supply market, increase competition across the rail market and benefit the Infrastructure Managers and the Railway Undertakings and ultimately the services for passengers and freight operators.

SYSTEM ARCHITECTURE OF ERTMS - BASIC TECHNICAL DESCRIPTION

A top-level point of view of ERTMS shows three different sub-systems:

1st an interoperable safety and control system (ETCS);

2nd a radio system supporting cab signalling for driving without line side signals;

3rd an international traffic management system (ETML);

ERTMS offers various functional configuration options in line with the different ETCS levels as described.

ERTMS Level 1: the information required on board trains is provided via the on-board balise antenna from track mounted balises linked through an LEU linked to the lineside signals. In Level 1, movement authorities can also be issued over several sections, safely enabling operational speeds of up to 350 km/h.

ERTMS Level 2: The key feature of ERTMS Level 2 is that information is transmitted by radio to the train from an RBC (Radio Block Centre). Fixed balises are needed to determine the train's position and to forward non-variable track data. Signals can continue to be used for mixed operation although they are no longer required for pure Level 2 operations. Track vacancy detection information and information about point positions are transmitted from the associated interlocking to the RBC which generates the train's movement authority and sends it to the ETCS on-board computer unit. Line throughput is considerably increased and driving "on electronic sight" through section blocks enables short headways at maximum speed.

ERTMS Level 3: The main infrastructure elements of Level 2 are retained - however, track vacancy detection components are no longer needed. Moving-block operations are possible. In Level 3, trains actively participate in route protection and have to reliably indicate their integrity to the RBC. The RBC is thus capable of optimizing train traffic. Level 3 is currently not standardized but work is actively progressing for this solution.

CROSS-BORDER OPERATIONS

European Commission is directly supporting and promoting cross-border connections coordinated with the ERTMS corridors vision. Cross-border examples already in service include the pioneering Vienna-Budapest line in 2003. 2009 saw the opening of the first High Speed cross border line linking Belgium to Germany, followed by the Amsterdam - Antwerp HS line. France and Spain are also now connected through a tunnel under the Pyrenees equipped with an ERTMS system. The recently approved (Dec 2016) European ERTMS Deployment Plan will add several new cross-border connections in the next few years.

THE EUROPEAN STANDARD EXPANDS INTERNATIONALLY

The substantial benefits achievable by the application of ERTMS have not passed unobserved by countries outside Europe, as the standard has already been implemented on every single continent. Infrastructure Managers have adopted the European model to revamp their old railway networks as they strive to increase traffic efficiency and raise safety standards to cope with rising populations and passenger numbers. One of the most important and substantial benefits enjoyed by IMs and RUs is achieving the economies of scale as procurement for compliant solutions from several suppliers in open competition is possible.

ERTMS ON TRACK

Currently, 50% of the global signalling market share is based on ERTMS technology with more than 50 countries deciding to deploy or already committed to ERTMS. Investments outside Europe represent over 50% of the global share spanning all continents.

Among other key benefits of ERTMS, it is the only rail control system able to raise a complete railway network to another level as a continuous communication based solution. Advantages include:

- Increased capacity on existing railway lines
- Greater ability to respond to and satisfy the growing passenger and freight transport demands:
- ERTMS reduces headway between trains enabling up to 40% more capacity on currently existing infrastructure
- Higher speeds: ERTMS allows for a maximum speed of up to 500 km/h and is now considered in several countries as the system of choice for the construction of new High Speed lines;
- Higher reliability rates: ERTMS helps to significantly improve reliability and punctuality, which are crucial for both passenger and freight transport;
- Reduced maintenance costs where trackside signaling equipment is no longer required and therefore with reduced Capital expenditure.
- An open supply market: trackside and onboard equipment may be supplied by any of the ERTMS suppliers as all equipment is fully interoperable, making the supply market more flexible, independent and competitive;
- Having a worldwide accepted and maintained series of technical standards brings significant economies of scale and competitive whole life-cycle costs;
- Improved safety for passengers, employees and freight transport, which may be an issue in certain parts of the world
- Full network interoperability nationally and internationally

All of the above mentioned benefits indicate that ERTMS is becoming the standard of choice for railway companies worldwide.

SUPPLIERS

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