William W. Hay Railroad Engineering Seminar

“ERTMS/ETCS L2 - Issues and Challenges in the Certification Process”

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Date: Friday, April 1, 2016
Time: Seminar Begins 12:20 pm
Location: Newmark Lab, Yeh Center, Room 2311
University of Illinois at Urbana-Champaign

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HAY SEMINAR, April the 1st 2016

ERTMS/ETCS L2

Issues and challenges in the certification process

University of Illinois at Urbana-Champaign
205 North Mathews Ave., Urbana, IL 61801-2352
Italian railway infrastructure

Network: 16,703 km
- Double track: 7,513 km
- Single track: 9,190 km
- Power supplied lines: 11,902 km (71%)
- Tunnels and bridges: 1,980 km
- Stations: 2,300

Signalling technologies
- SSC – SCMT: 15,839 km
- ERTMS: 641 km
- GSM-R: 9,000 km

- ~1,000 km: High Speed
- ~950 km: City network
- ~2,900 km: Basic performance
- ~3,900 km: Medium performance
- ~7,950 km: Low traffic line
ERTMS in Italy – State of the art

Benefit for integration of two Italian ETCS Project:
- HS/HC
- Corridors
ERTMS Lev 1

As long as the signal is red, I have to wait and not pass the balises.
My authority and track description come completely over the radio, therefore my cab display is always up to date and I need no lineside signals.
Roma-Napoli: the first ERTMS HS line L2 in the world

- YEAR 2005
- HS LINE
- THE FIRST LINE WITH ERTMS/ETCS L2
Rome-Naples: the main challenge

UNISIG

CENELEC

CCS-ON BOARD

CCS-TRACKSIDE

Anybody there?
The Bologna-Firenze: the main challenge

- YEAR 2009
- 80 kM UNDERGROUND HS LINE
- ERTMS/ETCS L2
The Bologna-Firenze: the main challenge

- Ensure that the stop limits of the trains were in correspondence with the exodus points in gallery

- Cooperative shortened MA
The Bologna-Firenze: the solution

Evaluation of the implementation of the requirements expected for the project with traceability matrixes

Lab tests, with exact replicas of on-field products (INTERLOCKING, RBC, ON-BOARD SUBSYSTEM)

On-field tests with two trains, in order to replicate realistic operational scenarios
Deep assessment of safety related application conditions exchanged between the various subsystems (INTERLOCKING, RBC, ON-BOARD SUBSYSTEM)

Overall global safety assessment following CENELEC standards, in order to evaluate the achievement of the global tolerable hazard rate
The Milano-Treviglio: the main challenge

- YEAR 2015
- ERTMS Level 2 Baseline 3 (latest issue of the ERTMS with the new braking curves)
- Use of the ERTMS and Italian National System
The Milano-Treviglio: the main challenge

- Overlapping ERTMS system to traditional systems
- Have a line managed with a mixed traffic
The Milano-Treviglio: the solution

- Managed with operational procedures
- The analysis of non-intrusiveness of the ERTMS on the traditional system (trackside and IXL side)
Driverless trains with ATO
Satellite tracking of train
Satellite Localisation of the vehicles, in order to avoid the necessity of eurobalises along the track, achieved with the use of an augmentation network implemented trackside.

Management of the ERTMS and the interlocking in an integrated solution.

Management of different type of vehicles (fuel trains, track maintenance trains, Hi Rails).
Thank you for your attention