



EDUARDO CALIXTO
— CONSULTANT —

Training Program	: RISK MANAGEMENT FOR RAILWAY INDUSTRY (BASED ON EN50128 AND EN50129)
Discipline	: SAFETY ENGINEERING
System	: RAILWAYS ASSETS (ROLLING STOCK, SIGNALLING, INFRASTRUCTURE, LOCOMOTIVE)
Subsystem	: Railways assets (Pantograph, Bogie, Breaks, Train Control Management System (TCMS), Balise, Computer Based Interlock (CBI), Lineside Electronic Unit (LEU), Radio Block Centre (RBC), Locomotive Diesel Engine, others.)
Training Focus	: Safety Concept, Modeling and analysis of risk
Lesson Code	: 0111
Lesson Title	: Safety Program implementation
Training Elements	: EN 50128 and EN 50129 concepts Safety program implementation throughout life cycle Preliminary Hazard Analysis concepts. Functional Hazard Analysis; HazLog Analysis; SIL concepts; Hardware Hazard Analysis; Software Hazard Analysis; FMEA analysis FTA model; Safety Case. Isk Management

Training Objectives:

- To understand and apply the concept of EN50128 and EN 50129.
- To understand and apply the Preliminary Hazard analysis application.
- To understand and apply the HazLog concepts.
- To understand and apply the Functional Hazard analysis.
- To understand and implement the Hardware Hazard Analysis.
- To understand and implement the Software Hazard Analysis.
- To understand the SIL concepts.
- To understand and apply the hardware hazard analysis.
- To understand and apply the software hazard analysis.
- To understand the FMECA concepts.
- To understand the FTA concepts and model.
- To understand the BTA concepts and model.
- To understand the safety case concepts and application.



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Day 1:

Subject	Activity	Time	Resources
Module 1 - Welcome and Introduction of participants and trainer, scope of training.	Theoretical	30 min	PPT
Module 2 - EN 50128 and EN 50129 concepts	Theoretical	60 min	PPT
Module 3 - Safety program Implementation	Theoretical	60 min	PPT
Module 4 - Preliminary Hazard Analysis	Theoretical	60 min	PPT
Module 5 - Preliminary Hazard Analysis cases	Theoretical	60 min	PPT
Lunch Break: 12:30 – 14:00 hrs.			
Module 6 - System Hazard Analysis and HAZlog concepts	Theoretical	60 min	PPT
Module 7 - System Hazard Analysis and HAZlog cases	Practical	60 min	Templates
Module 8 - Functional Hazard Analysis and SIL	Theoretical	60 min	PPT
Module 9 - Functional Hazard Analysis and SIL case	Practical	60 min	Templates

Day 2:

Subject	Activity	Time	Resources
Module 10 - FMECA analysis concept	Theoretical	60 min	PPT
Module 11 - FMECA analysis case	Theoretical	60 min	PPT
Module 12 - FTA concepts	Theoretical	60 min	PPT
Module 13 - FTA application case	Theoretical	60 min	PPT
Lunch Break: 12:30 – 14:00 hrs.			
	Theoretical	60 min	PPT
Module 14 - Bow tie Analysis concept	Practical	60 min	BQR Software
Module 15 - Bow tie Analysis application case	Theoretical	60 min	PPT
Module 16 - Safety case concept	Practical	60 min	PPT