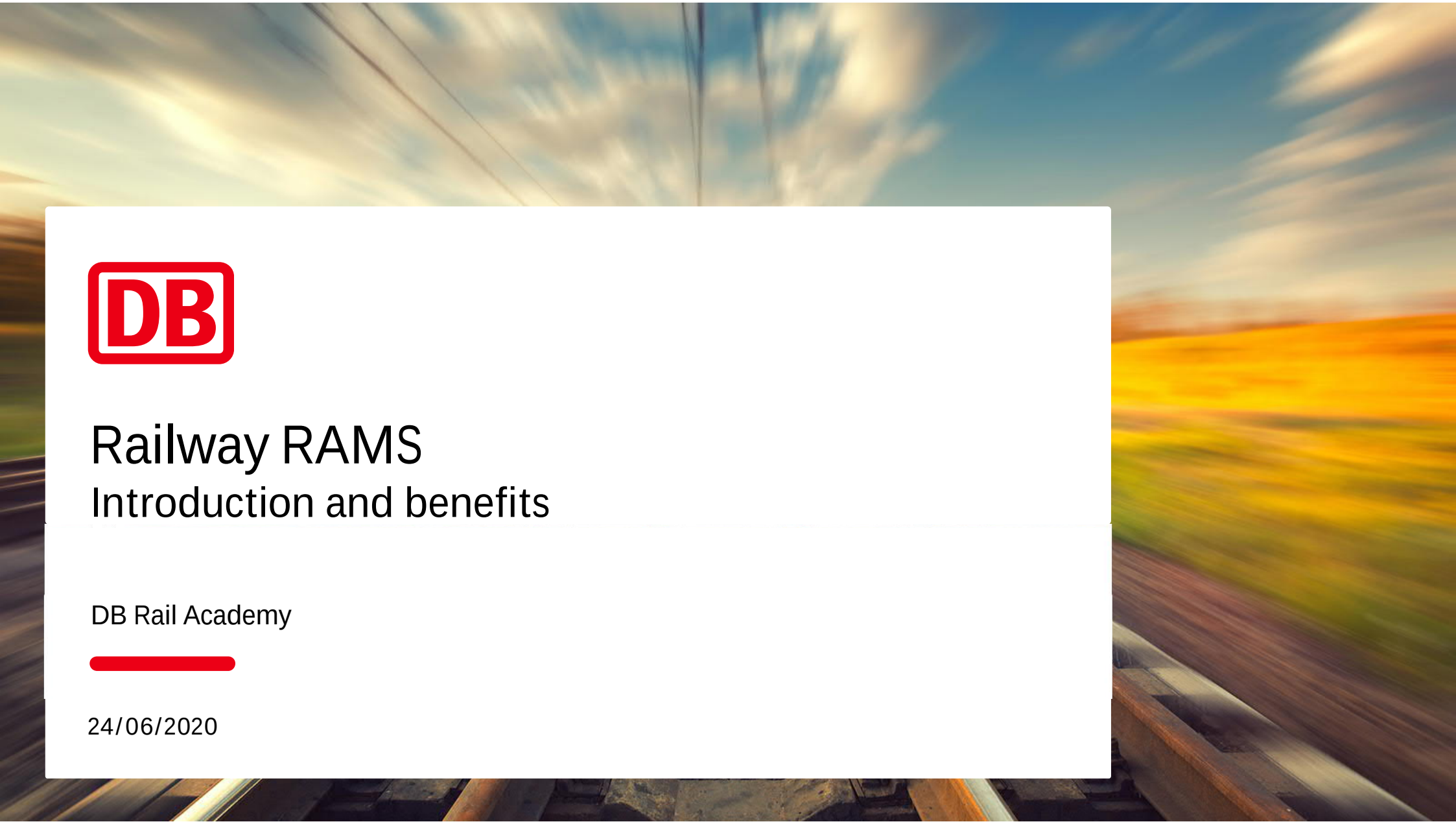


Railway RAMS

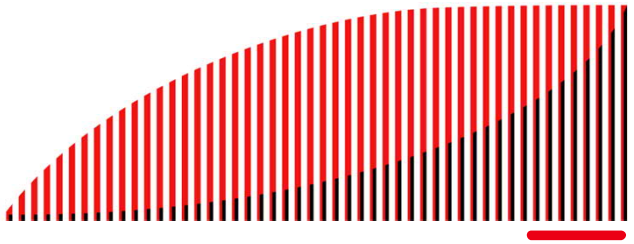
Introduction and benefits

DB Rail Academy

24/06/2020

Agenda

1. Why RAMS?
2. Implication of RAMS
3. Exercise

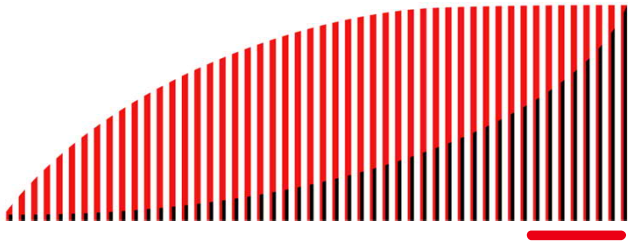


Why RAMS?

The participants will know the RAMS acronym, they will know that RAMS is about safety, performance and quality.

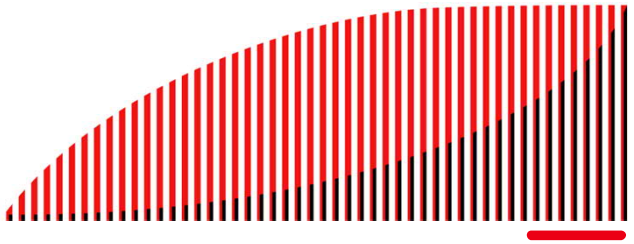
The participants will understand why RAMS is important for railway safety

The participants will know that railway RAMS is a systems engineering approach according the V-cycle

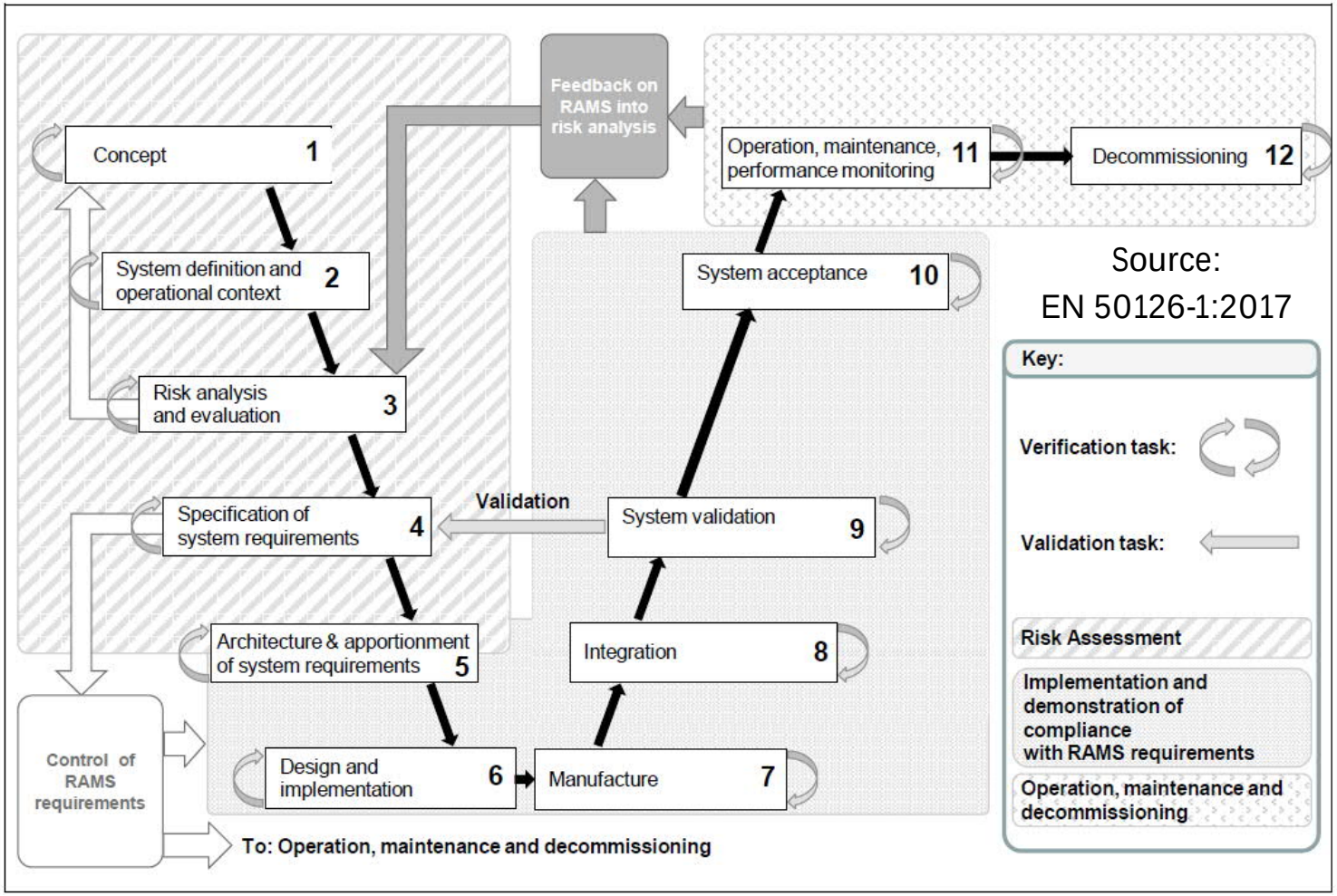


Definition

1. Reliability is the ability to perform a specific function.
2. Availability is the ability to keep a functioning state in the given environment.
3. Maintainability is the ability to be timely and easily maintained.
4. Safety is the ability not to harm people, the environment, or any assets during a whole life cycle.

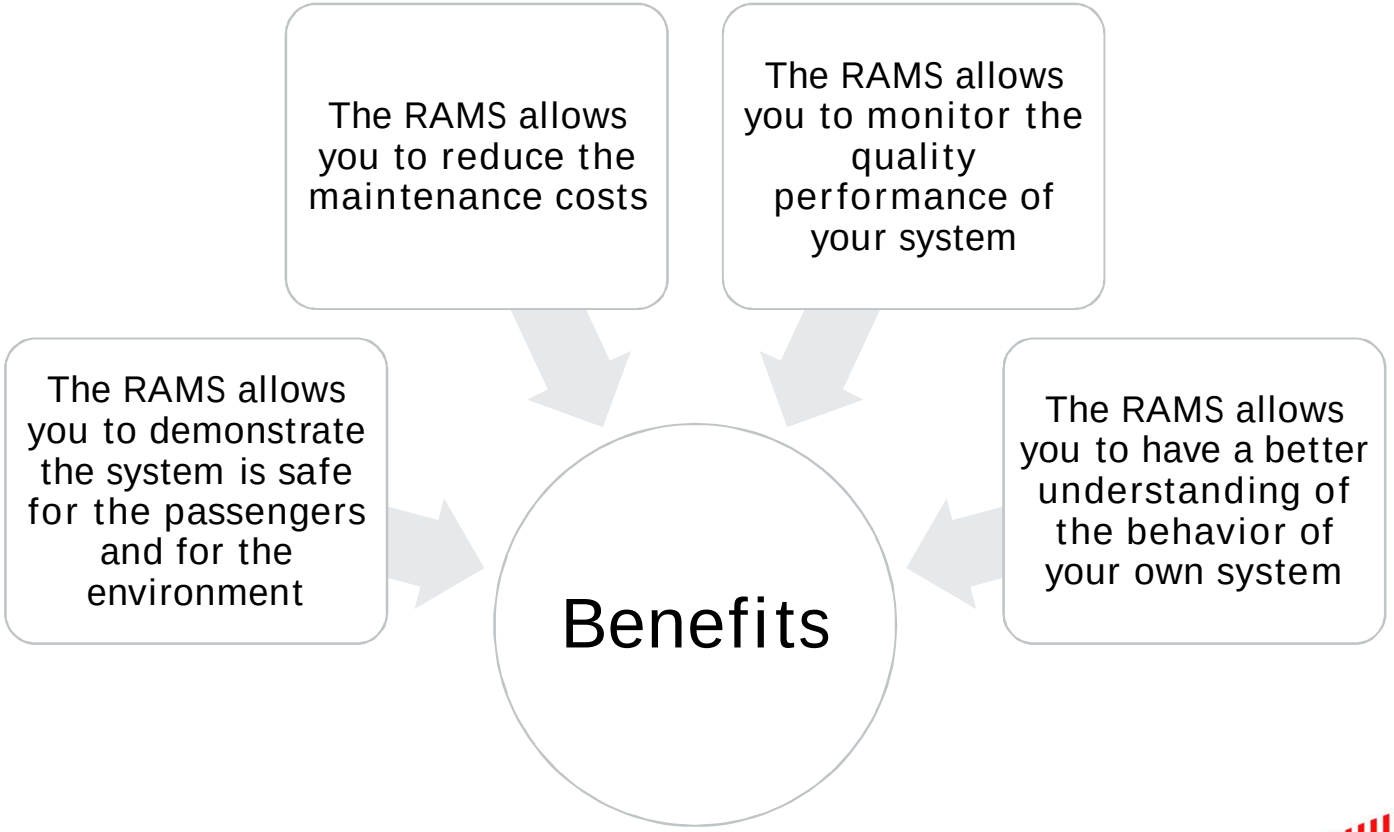


The systems engineering approach for railway RAMS
The V-cycle representation for validation & verification (V&V) tasks



"Verification ensures you built the system right. Validation ensures you built the right system."

Benefits of RAMS



For what do we need RAMS?

Assure that our system is RELIABLE

- Analyze if our system achieve the Reliability targets (Failure Rate < X)

Assure that our system is AVAILABLE

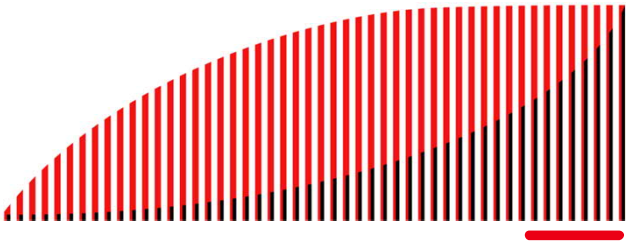
- Analyze if our system achieve the Availabilty target (e.g. 99,5% of availability)

Assure that our system is MAINTAINABLE

- Analyze if our system achieve the Maintenbility targets (Mean Time To Repair < X)

Assure that our system is SAFE

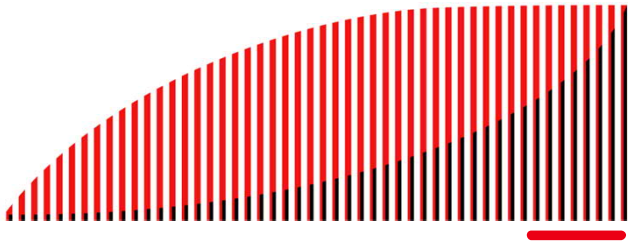
- Analyze if our system achieve the Safety targets (The safety targets are not all Quantitative, they can be also Qualitative)



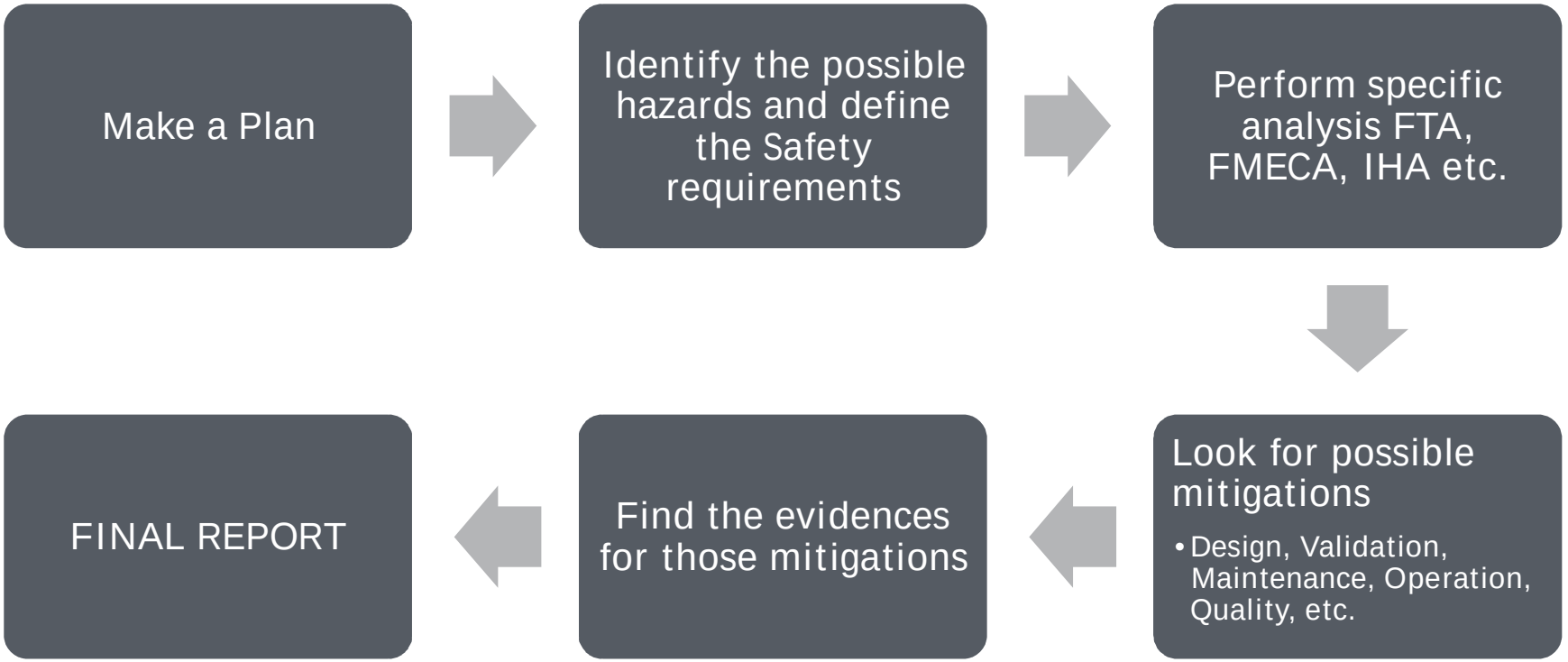
Implication of RAMS

The participants will understand what is the process to detect Hazards.

The participants will have the knowledge to understand why is useful a Hazard Log.



The Safety Process



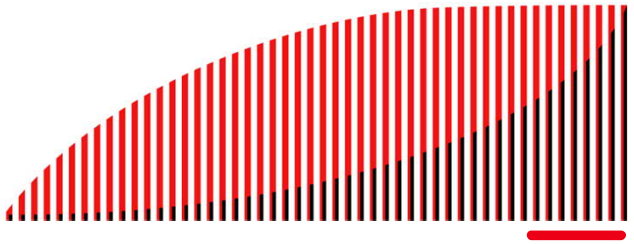
The process is given by the CENELEC norms which are mandatory to apply in

- EN 50126
- EN 50128
- EN 50129

Exercise

The participants will get involve in the training preparing their own Hazard Log.

The participants will understand the basis of the Hazard Log document.

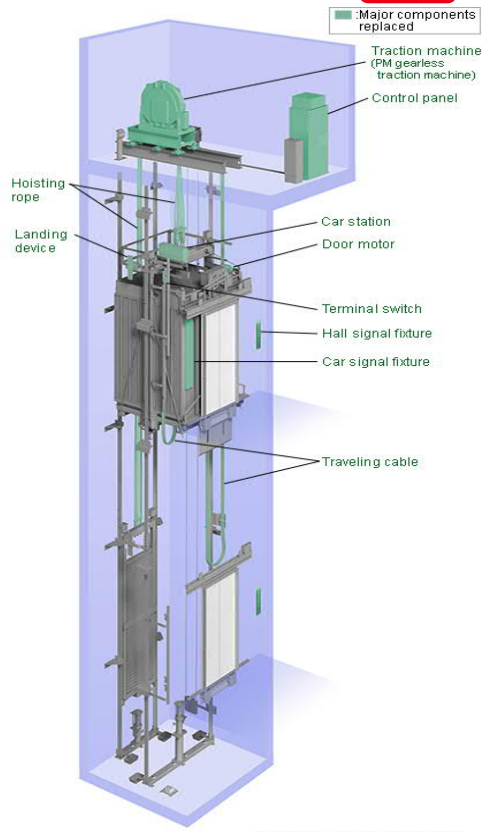


Elevator Hazard Log

ID	Hazard	Cause	Accident	*Criticality Pre	Mitigation	*Criticality Post	Evidence

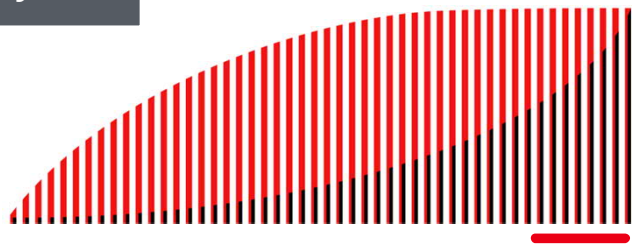
Severity	Frequency	Class

Frequency of occurrence of an accident (caused by a hazard)	Risk Acceptance Categories			
Frequent	Undesirable	Intolerable	Intolerable	Intolerable
Probable	Tolerable	Undesirable	Intolerable	Intolerable
Occasional	Tolerable	Undesirable	Undesirable	Intolerable
Rare	Negligible	Tolerable	Undesirable	Undesirable
Improbable	Negligible	Negligible	Tolerable	Undesirable
Highly improbable	Negligible	Negligible	Negligible	Tolerable
	Insignificant	Marginal	Critical	Catastrophic
	Severity of an accident (caused by a hazard)			



Conclusions

- All the different fields from railway need a RAM and Safety Analysis
- RAMS applies to all life cycle phases of the project
- Is possible to make a predictive maintenance if we understand the behavior of our system
- A proper Safety Assessment it will not only safe lives, but also will save us money




Thank you so much for
your attention!


DB