

A 'safe system' process model for level crossings

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UNECE GE.1

UNECE Expert Group tasks

- Enhance safety at level crossings
- Evaluate laws and safety performance
- Evaluate factors leading to unsafe conditions
- Strategic action plan for road/rail interface
 - Develop framework to implement
 - Use ‘safe system’ approach
 - Monitor and report
- Workshops to support core objectives
- Identify future strategic and research needs

'Safe system' process model?

areas:

- Infrastructure design & management
- User behaviour management
- National policy and law
- Safety enhancement

elements and *process*:

- **economics, engineering,** environment, ergonomics
- enable + **educate** + encourage (=> empower)
- **enforcement,** emergency preparedness, expectations
- ***engage, evaluate, enhance***

Level crossing

Operation
Lifesaver
'3 key elements'

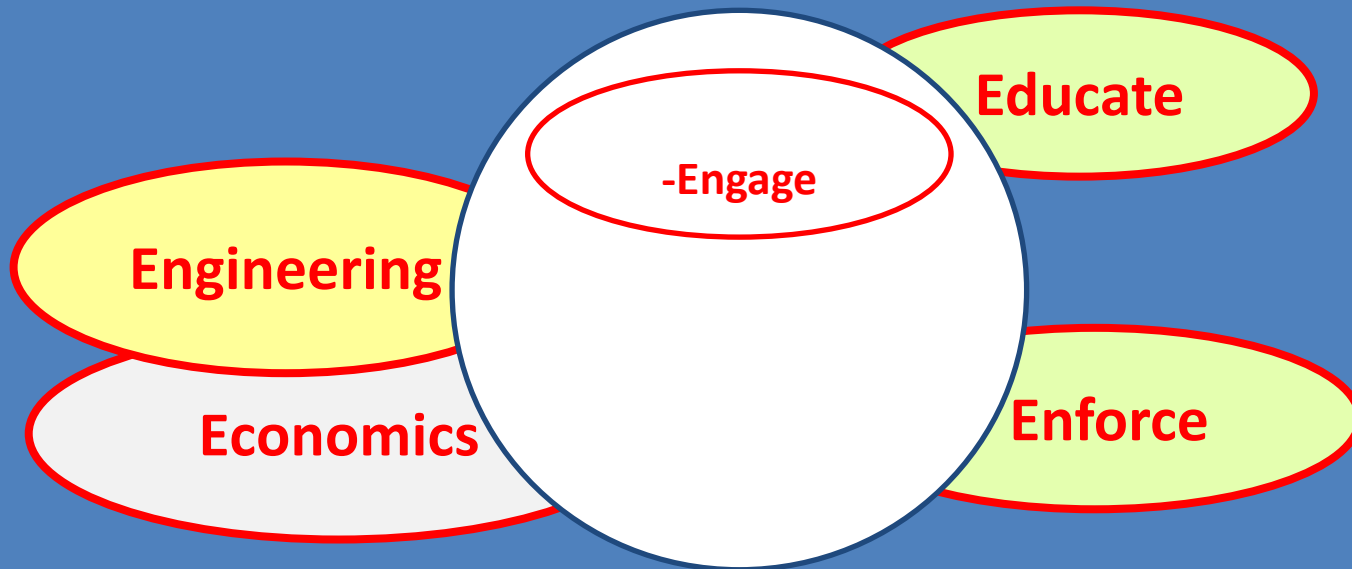
Engineering

Educate

Enforce

Level crossing safe system

UNECE
'approach' &
'5 key elements'



Level crossing safe system

UNECE
'areas' to
evaluate

Infrastructure
management

User
Behaviour
management

Educate

-Engage

Engineering

Economics

Enforce

National policy & law

Level crossing safe system

UNECE
'develop
strategy'

Infrastructure
management

User
Behaviour
management



National policy & law

Level crossing safe system

UNECE
other 'elements'

Infrastructure
management

User
behaviour
management

Environment

Educate

Engineering

-Engage
-Evaluate
key risk factors
-Evolve plan
-Enhance safety

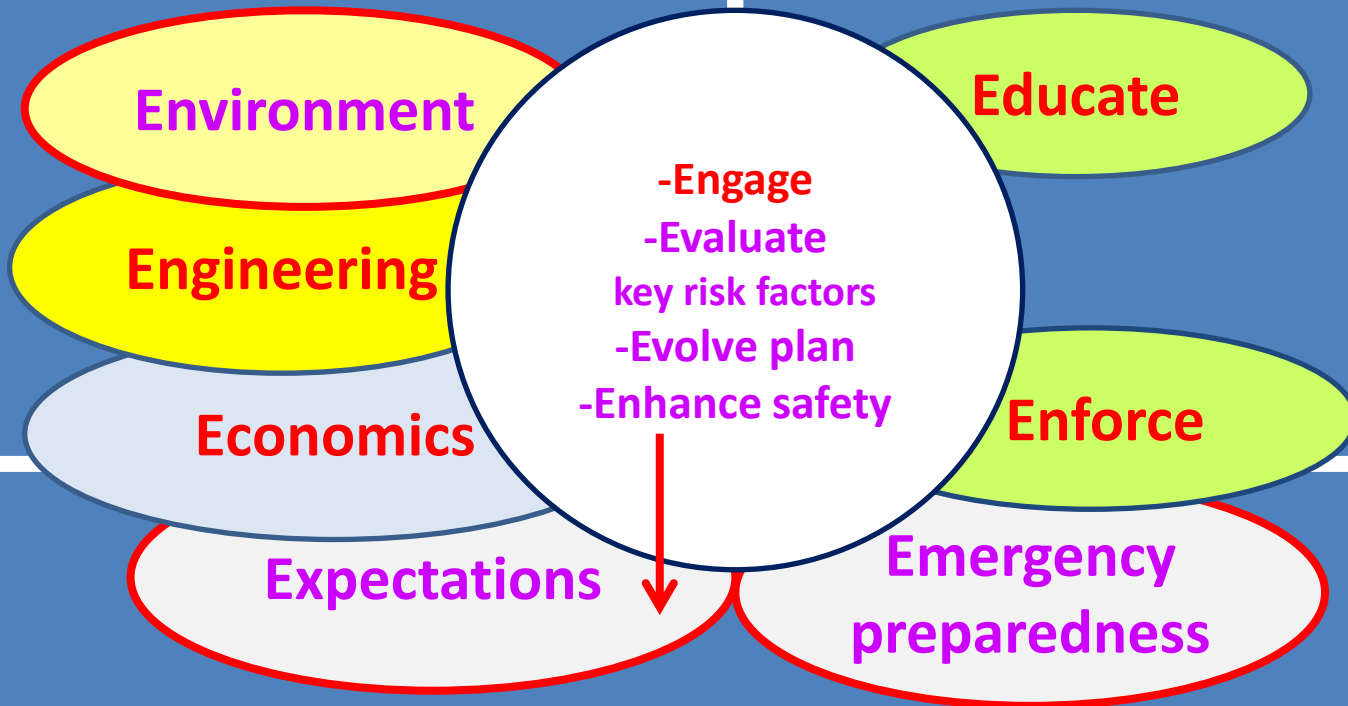
Economics

Enforce

Expectations

Emergency
preparedness

National policy & law



Level crossing safe system

Ergonomics
'fit for purpose'

Infrastructure management

design &

User behaviour management

Ergonomics

Environment

Educate

Engineering

- Engage
- Evaluate key risk factors
- Evolve plan
- Enhance safety

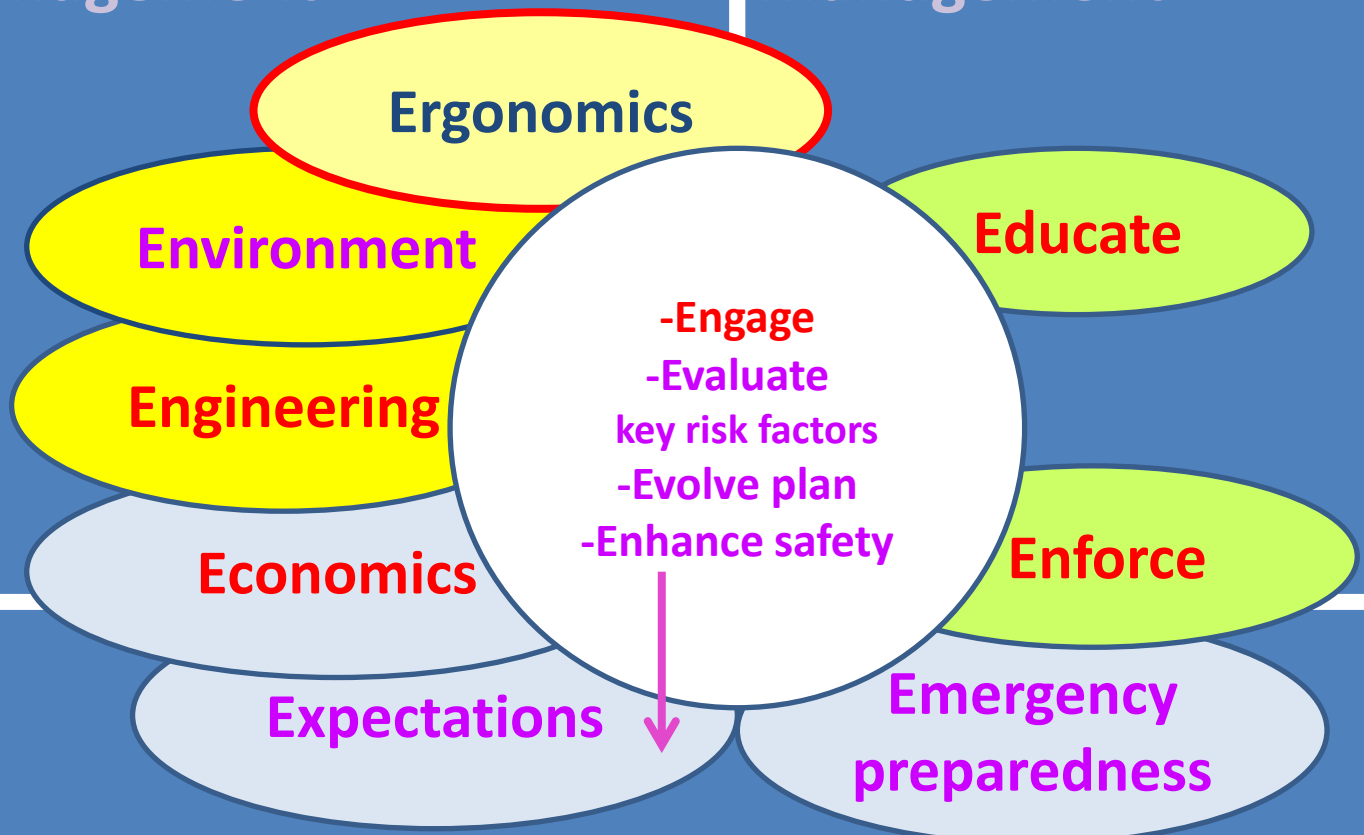
Economics

Enforce

Expectations

Emergency preparedness

National policy & law



Level crossing safe system

'empower user'

Infrastructure design & management

User behaviour management



National policy & law

Theory of planned behaviour

Beliefs ->

-> perception:

(attitude, acceptability & ability)

-> intention

-> behaviour

Source: Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, p. 179-211.

Level crossing safe system

ISO 'continual improvement'

Infrastructure design & management

User behaviour management



National policy & law

Level crossing 'safe system'

- system approach
- multi-disciplinary
- safe by design & fit for purpose
- empower the users
- manage the risks
- enhance safety

Level crossing safe system

Infrastructure design & management

User behaviour management



National policy & law