A ‘safe system’ process model for level crossings

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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

Engineering

Educate

Enforce

Operation Lifesaver
‘3 key elements’
Level crossing safe system

UNECE ‘approach’ & ‘5 key elements’

- Engage
- Evaluate
- Evolve plan
- Enhance safety

Engineering
Economics
Educate
Enforce
Level crossing safe system

- Engage
  - User
    - Behaviour management
  - Educate
  - Enforce
  - Engineering
  - Economics
  - National policy & law

UNECE ‘areas’ to evaluate
Level crossing safe system

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

Infrastructure management
User Behaviour management
Economics
Engineering

National policy & law

UNECE ‘develop strategy’
Level crossing safe system

Infrastructure management

User behaviour management

Environment

Educate

Engineering

Enforce

Economics

Emergency preparedness

Expectations

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

National policy & law

UNECE

other ‘elements’
Level crossing safe system

Infrastructure design & management

User behaviour management

National policy & law

Design &

Ergonomics

Environment

Engineering

Economics

Expectations

Emergency preparedness

Educate

Enforce

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

Ergonomics ‘fit for purpose’
Level crossing safe system

Infrastructure design & management

User behaviour management

National policy & law

Ergonomics

Enable

Educate

Encourage

Enforce

Emergency preparedness

Expectations

Economics

Engineering

Environment

‘empower user’

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

RSC
Theory of planned behaviour

Beliefs ->
  -> attitude, acceptability & ability
  -> intention
  -> behaviour

Level crossing safe system

Infrastructure design & management
- Ergonomics
- Environment
- Engineering
- Economics
- Expectations
- National policy & law

User behaviour management
- Enable
- Educate
- Encourage
- Enforce
- Emergency preparedness

ISO ‘continual improvement’

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

act

check

do

review & plan

act

do

check
Level crossing ‘safe system’

- system approach
- multi-disciplinary
- Safe by design, fit for purpose
- empower users
- manage risks
- enhance safety
Level crossing safe system

Infrastructure design & management

- Economy
- Environment
- Engineering
- Ergonomics

User behaviour management

- Expectations
- Emergency preparedness

National policy & law

Enable

- Educate
- Encourage
- Enforce

Review & plan

- Engage
- Evaluate
- Evolve & plan
- Enhance safety

Act

Do

Check

- Evolve & plan
- Enhance safety