PEDESTRIAN SAFETY AT LEVEL CROSSINGS - HOW THE ISSUE SHOULD BE ADDRESSED?

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CRASHES AT LEVEL CROSSINGS: PEDESTRIANS AT HIGHER RISK

Collisions between trains and road users imply:
• the highest probability of fatal consequences for victims compared to other road traffic collisions
• serious economic costs – estimated to approximately $180 000 per crash in urban areas

Since 1990, a considerable effort has been concentrated on the reduction of such crashes:
• the number of fatalities involving motorists has decreased
• the number of pedestrian victims has remained unchanged and even increasing in the past few years.

WHY PEDESTRIAN RISKY CROSSING LACKS IN UNDERSTANDING?

There are various limitations in past research:
• Attempts to explain pedestrian crossing were based on the study of motorists’ behaviour, while pedestrians are exposed to the influence of more and different risk factors.
  e.g., related to the presence of train stations, rail staff and traffic, other pedestrians etc.
• Crash reports data served to identify risk factors informing on the frequencies and not on the origins of behaviour.
• Crash reports data is often based on different classification criteria between authorities and might include suicide and trespass cases (i.e., having different psycho-social origins than risk-taking at level crossings).
• Studies predominantly investigated the effect of single factors on crossing decision without taking into consideration their potential interaction with other factors.

SYSTEMS APPROACH – WHAT BENEFITS?

Level crossings are complex systems:
• multiple system components on different hierarchically organised levels play a role to increase pedestrians’ safety
• the system performance is dynamic (changing over time) based on feedback loops between components

Looking at the problem from a systems perspective will allow to:
• examine crossing decisions according to the particular crossing context and the global system performance
  e.g., long and short term influence of multiple factors
• inform on the origins of risky behaviour and how it might be mitigated
• target performance failures of concrete components of the system to develop more adequate safety measures, or to improve the global system performance

WHAT ARE THE RISK FACTORS AT PLAY?

• The systems approach provides a broad and holistic perspective to the investigation of the origins of risky crossing
• Pedestrians’ crossing decision is shaped by the complex interaction between social, political, technological and environmental factors.
• Arguably, organisational factors are rather associated with long term effects, while physical factors - with short term effects on risk-taking tendencies.

FOCUS GROUP STUDY: RESULTS AND FUTURE IMPLICATIONS

Results from a focus group study conducted with pedestrians were analysed based on the above framework. The benefits of applying a systems approach to the investigation of risky behaviour and its origins were confirmed:
• Multiple factors typically involved in crossing decisions were identified:
  e.g., position of gates, presence of parked train, crossing motivation, knowledge about road rules and risk hazards (2nd train)
• Various cognitive and motivational factors likely to underpin risky behaviour were detected:
  e.g., information processing failures (misjudgement of train speed); goal directed behaviour (“I had to be at work on time”)
• Dynamic effects of the system performance emerged:
  e.g., changes in pedestrians’ perception of risk following the implementation of rather new safety measures or past collisions

Given the limited research in this area, qualitative methods are most suitable to look at the problem from a systems perspective:
• Allowing to examine a multitude of factors underlying pedestrians’ crossing behaviour and its origins
• Allowing to detect emerging factors (i.e., unidentified in the literature)
• Providing a valuable baseline evidence for future research, be it qualitative or quantitative

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