Evaluating Pedestrian Safety Infrastructure Projects: 
Are we making a difference?

TAC Webinar Thursday 16 July 2020

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The webinar will cover

Assessing the effectiveness of small-scale infrastructure projects to improve pedestrian safety

- The Safe System applied to pedestrians
- A framework for evaluating pedestrian safety projects
- A Safe System-aligned checklist
- Some examples
Safe System principles applied to pedestrians

- Safe System - reaffirmed as global best practice*
- Belief in aiming for zero
- Acceptance that humans are imperfect
- Awareness that survivability is low in common crashes at legal speeds
- Understanding
  - the fundamental importance of kinetic energy
  - the value of system-based design
  - the need to focus on systemic risk
- Acceptance of our professional responsibilities
  - to build safe infrastructure
  - to set safe speed limits

* 3rd Global Ministerial Conference on Road Safety, Stockholm, February 2020
A framework for evaluating pedestrian projects

- Community support
- Pedestrian support
- Perceptions
- Other road user support
- Population health and wellbeing
- Environment/climate change
- Sustainability
- Liveability
- Social connection
- Other impacts
- Outcomes
  - Pedestrian fatalities
  - Pedestrian serious injuries
  - Pedestrian other injuries
- Risk
  - Injury risk in a crash
  - Crash likelihood
  - Exposure to crash possibilities
Overview of risk-based evaluation

- Injury risk in a crash
  - Key metric: impact speeds
  - Target: <30 km/h

- Crash likelihood
  - Key metric: travel speeds
  - Target: <30 km/h

- Other metrics
  - pedestrian crossing devices
    - Target: devices which secure vehicle speeds to < 30 km/h
  - road width
    - Target: 1 or 2 lanes
  - number of directions of traffic to negotiate
    - Target: one direction per crossing stage
  - sight distances
    - Target: unrestricted/3+ seconds of perception-reaction time

- Exposure to crash possibilities
  - Key metric: vehicle volumes per unit time (e.g., hr/day/week)
  - Target: minimise vehicle volumes
Safe System Speeds

Aspirational operating speeds

- 30 km/h – vulnerable road users vs passenger vehicles
- 50 km/h – right angle collision between passenger vehicles
- 70 km/h – head on collision between passenger vehicles
- ≥100 km/h – no possible side or frontal impact between vehicles or impacts with vulnerable road users

Towards Safe System infrastructure: a compendium of current knowledge
Multiple studies of pedestrian fatal injury risk, as a function of impact speed

- have found varying results
- suffer from a range of scientific/methodological problems
- are not unanimously accepted
However, we know that higher travel speeds mean:

- Greater information processing loads on drivers
- Less likely that drivers will give way to pedestrians
- Disproportionately longer stopping distances
- Higher impact speeds
- More severe injuries
We also know that

- An ‘average’ pedestrian struck at 30 km/h is likely to be severely injured, possibly even killed.
- Increasing impact speed above ~30 km/h increases crash risk and rapidly increases injury risk.
- Older, mobility-impaired and child pedestrians are at even greater risk.
- Larger vehicles (e.g., trucks, buses and trams) further elevate injury risks.
- Pedestrians being struck at 30 km/h is unacceptable.
- The travel speed is often the impact speed.
- Adopting boundary condition speeds helps in the practical translation of Safe System principles into real-world practice.
Overview of risk-based evaluation

Evaluating Pedestrian Safety Infrastructure Projects: Are we making a difference?

Key risk-based evaluation criteria:
- Injury risk in a crash: Key metric: impact speeds, Target: <30 km/h
- Crash likelihood
  - Key metric: travel speeds, Target: <30 km/h
  - pedestrian crossing devices, Target: devices which secure vehicle speeds to < 30 km/h
  - road width, Target: 1 or 2 lanes
  - number of directions of traffic to negotiate, Target: one direction per crossing stage
  - sight distances, Target: unrestricted/3+ seconds of perception-reaction time
- Exposure to crash possibilities: Key metric: vehicle volumes per unit time (e.g., hr/day/week), Target: minimise vehicle volumes
Overview of risk-based evaluation

Key risk-based evaluation criteria

- Injury risk in a crash
  - Key metric: impact speeds
  - Target: <30 km/h

- Crash likelihood
  - Key metric: travel speeds
  - Target: <30 km/h
  - Other metrics
    - Pedestrian crossing devices
      - Target: devices which secure vehicle speeds to < 30 km/h
    - Road width
      - Target: 1 or 2 lanes
    - Number of directions of traffic to negotiate
      - Target: one direction per crossing stage
    - Sight distances
      - Target: unrestricted/3+ seconds of perception-reaction time

- Exposure to crash possibilities
  - Key metric: vehicle volumes per unit time (e.g., hr/day/week)
  - Target: minimise vehicle volumes
A Safe System-aligned checklist for assessment

Which boxes can we check?

- Have we secured speeds to 30 km/h or lower?
- Have we provided a device to help pedestrians cross safely?
- Have we simplified the task of choosing a safe gap?
- Have we broken the crossing into separate stages?
- Have we minimised the width of road to be crossed?
- Have we provided adequate sight-lines/stopping distances?
- Have we minimised vehicle numbers (/day)?
Using the assessment criteria – 40 km/h shopping street
Using the assessment criteria – side street intersecting 40 km/h shopping street
Some examples for discussion

• Webinar participants to assess designs against the check list of risk criteria and share thoughts

• Can email questions or comments, if preferred, after the webinar (askus@tac.vic.gov.au)
A Safe System-aligned checklist for assessment

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Kerb outstands, median and zebra (40 km/h)

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Local street intersecting with 40 km/h shopping street

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Local street traffic calming (50 km/h default)

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Roundabout with wombat crossings

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Using the assessment criteria – 40 km/h shopping street

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Pedestrian refuge in 40 km/h speed limit

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Roundabout in 40 km/h speed limit

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Wombat crossing in 40 km/h school zone

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Threshold treatment and shared zone

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Shared zone

Which boxes can we check? Have we:

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• **minimised vehicle numbers (/day)?**
Raised signalised intersection

Which boxes can we check? Have we:

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Threshold treatment - 50 km/h default speed limit

Which boxes can we check? Have we:

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- broken the crossing into separate stages?
- minimised the width of road to be crossed?
- provided adequate sight-lines/stopping distances?
- **minimised vehicle numbers (/day)?**
Wrap up

- Safe System remains global best practice
- A systematic framework for evaluation
  - outcomes
  - risk
  - perceptions
  - other impacts
- Today – a focus on risk
  - injury severity given a crash
  - crash likelihood
  - exposure to vehicles
- The critical importance of
  - walking to society
  - vehicle speeds to safety
  - innovation to progress
- How to use the evaluation criteria