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# **IPENZ Transportation Group 3M Traffic Safety Innovation Award**

**Safer Roads and Roadside: Innovative Use of Thriebeam Safety Barrier**



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# Innovative Use of Thriebeam Safety Barrier

## Safe Systems: Safer Roads and Roadsides

- Barriers are used to reduce risk of running off road, but
- Barriers in themselves can present hazards to errant vehicles
- This innovation concerns opportunities to reduce risks at:
  - interim reinstatement of damaged concrete barrier, and
  - temporary barrier installations

# Innovative Use of Thriebeam Safety Barrier

## First risk to be addressed

- Some older concrete barriers
  - comprise individual concrete segments
  - lack founding and end shear connection
- overturn or break off under impact
- Vehicle may
  - yaw violently,
  - rollover, or
  - stop almost instantaneously.

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Examples of barrier risk (1) – overturned barrier launches vehicle



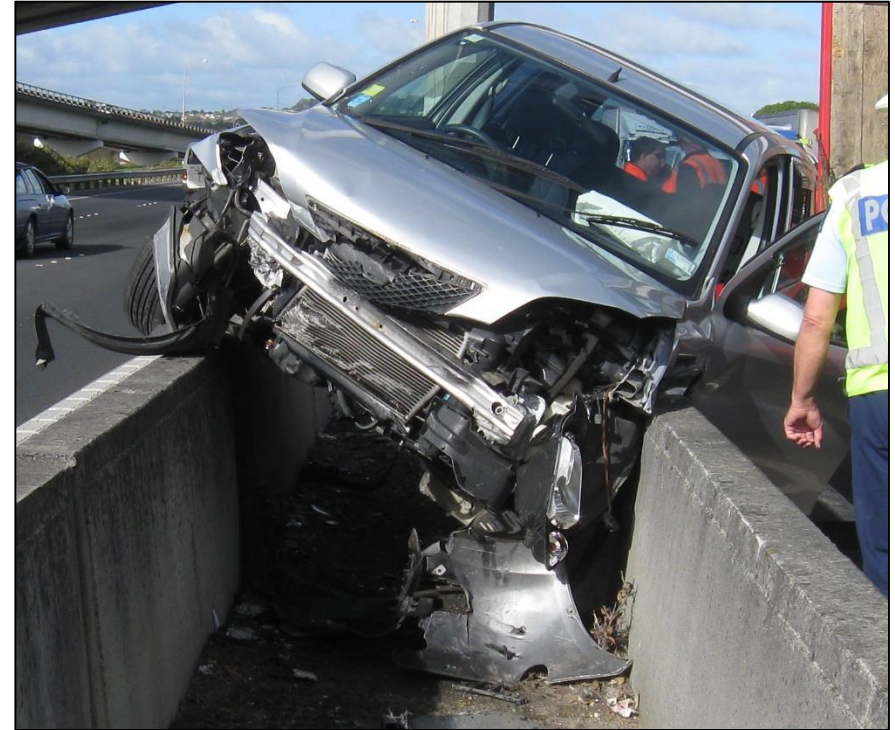
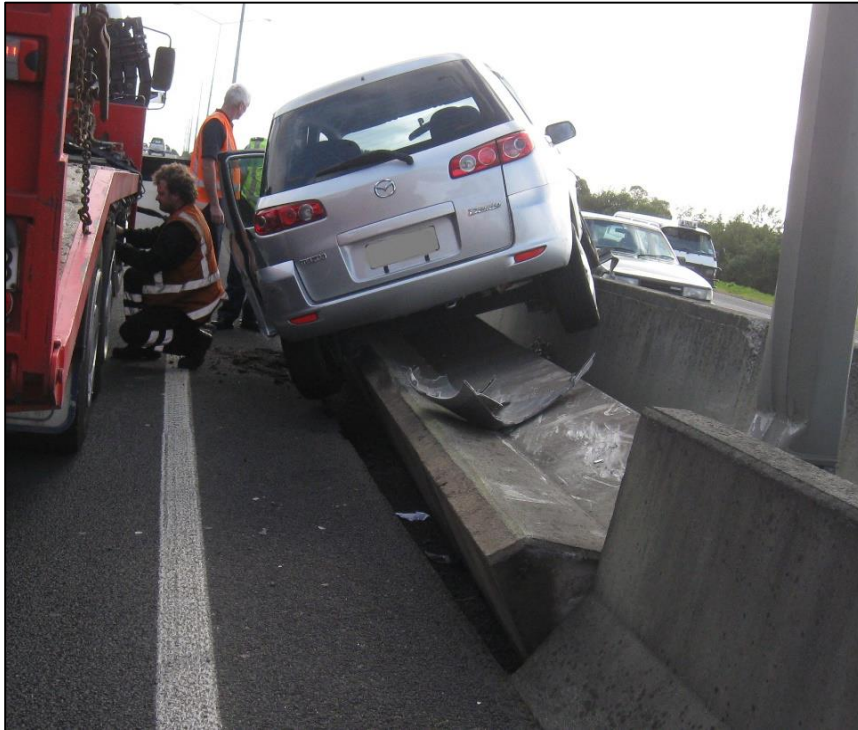
# Innovative Use of Thriebeam Safety Barrier

Examples of barrier risks (2) – exposed blunt end impact



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Examples of barrier risks (3) – exposed blunt end impact



# Innovative Use of Thriebeam Safety Barrier

First innovative use: Interim reinstatement of damaged barrier

- Thrie-beam installed across upper face of damaged barrier
- Re-connects segments and protects vehicles from engaging blunt ends



# Innovative Use of Thriebeam Safety Barrier

First innovative use: Interim reinstatements of damaged barrier

- Protects damaged sections till permanent repairs arranged





# Innovative Use of Thriebeam Safety Barrier

## Second innovative use: Protecting temporary barrier leading ends

- Connecting a temporary barrier in front of a permanent barrier with a tapering Thrie-beam rail allows for smooth redirection of vehicles sliding along the system
- Superior to crash cushion where vehicle would have an offset frontal collision with the cushion:



- Impact risk greatly reduced

# Innovative Use of Thriebeam Safety Barrier

Second innovative use: Protecting temporary barrier leading end

Example: crash cushion offset frontal impact leading to roll over



# Innovative Use of Thriebeam Safety Barrier

Second innovative use: Protecting temporary barrier leading end

Example of Thriebeam alternative leading end treatment:



# Innovative Use of Thriebeam Safety Barrier

## Second innovative use: Protecting temporary barrier leading end

Important to ensure:

- ✓ Sufficient taper length that the transition has a compliant flare rate
- ✓ Barrier toes at the leading end are protected by the rail or are cut back
- ✓ Leading structure connector flush against concrete, or recessed
- ✓ Structure connectors and rails correctly lapped
- ✓ Rails nested and well supported to minimise the risk of pocketing. Either:
  - closely spaced block-outs and nested rails, or
  - continuous support (concrete infill)

# Innovative Use of Thriebeam Safety Barrier

Second innovative use: Protecting temporary barrier leading end

Example of Thriebeam alternative leading end treatment:



# Innovative Use of Thriebeam Safety Barrier

Third innovative use: Connecting temporary barrier to permanent

- Controls movement of temporary barrier from exposing blunt end in highly constrained locations

Example of Thriebeam connection of temporary to permanent:





# Innovative Use of Thriebeam Safety Barrier

## Conclusion

Innovative use of Thrie-beam on Auckland's motorways have proven

- cost effective
- quick to install on site
- superior safety
- reduced traffic disruption through faster repairs



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