

The Enhanced Crash Investigation Study (ECIS)

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Background

- MUARC have collected in-depth real-world crash data for the last 20 years.
- These data have been used for:
 - Identifying crash and injury problems for vehicle occupants
 - Helping our Federal government implement new safety regulations
 - Helping the auto industry build safer vehicles
- Recently, we undertook a study using in-depth crash data to help road safety stakeholders identify new and innovative safety initiatives – the ECIS project

ECIS Project Objectives

- To gain a more comprehensive account of the factors involved in road crashes
- To use this information to introduce a Safe System, innovative approach to crash reduction in the state
- To assist in meeting the road safety targets specified in the “*arrive alive*” strategy for Victoria

The Safe System Approach



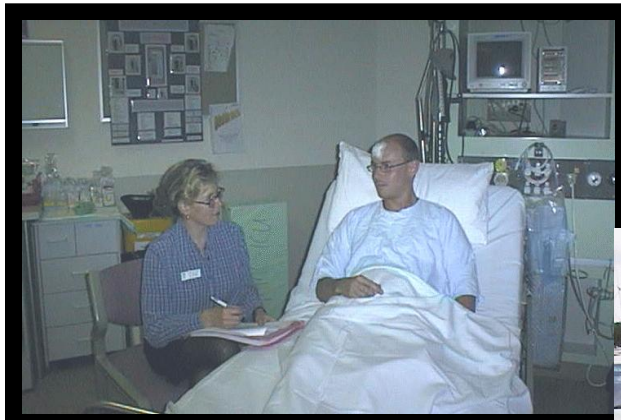
- Crashes will continue to occur in spite of best to prevent them (human error)
- Humans should not be killed or seriously injured in a crash (human tolerance to violence)
- Safe System involves safe speeds, vehicles, roads and infrastructure, and safe behaviour
- Safe System approaches aims to manage crash energy to minimise trauma

Individual drivers still expected to drive safely but the system must also be forgiving when mistakes invariably happen

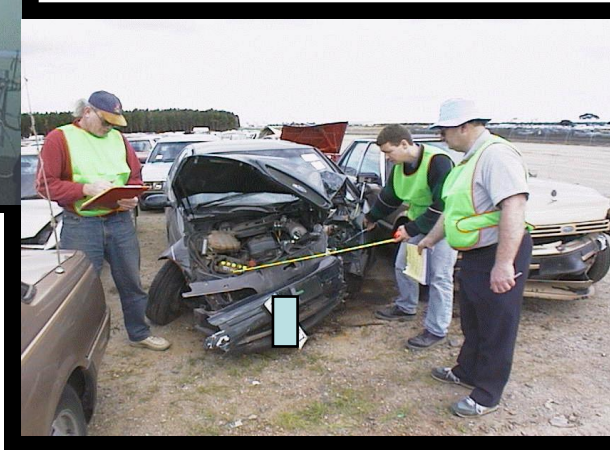
ECIS Method

- Collect in-depth data on severe non-fatal crashes that occurred in each of the 7-state transport regions in Victoria
- Take those cases back to the regions where they occurred and go through these in detail with those responsible for road safety in the region
- Encourage them to take a safe-system approach to road safety improvement
- Monitor what developments occurred as a result of the ECIS collaborative approach

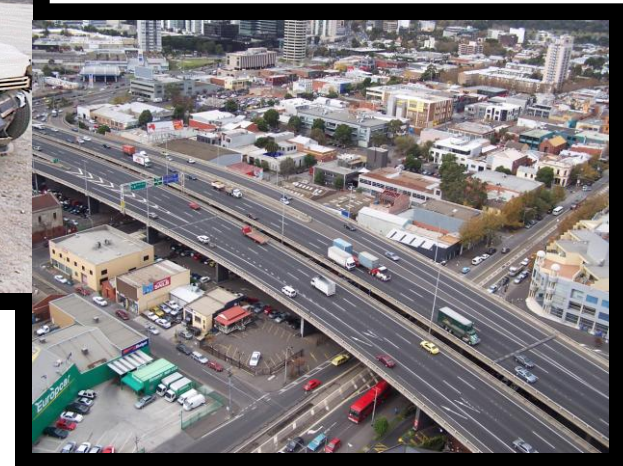
In-Depth Investigation Process



1. Hospital Interview



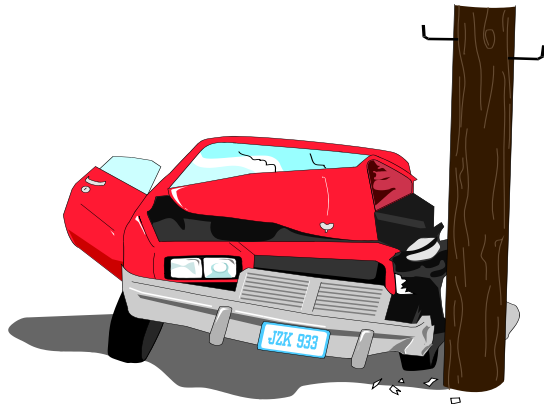
2. Vehicle Inspection



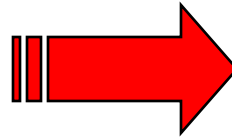
3. Site Inspection

Over 1200 factors collected for each crash

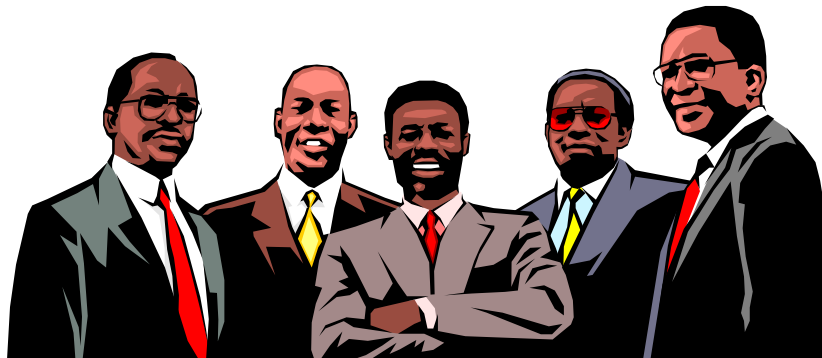
Case Analysis Summary



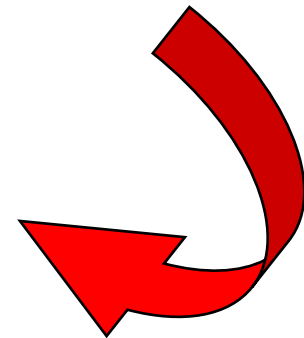
MUARC



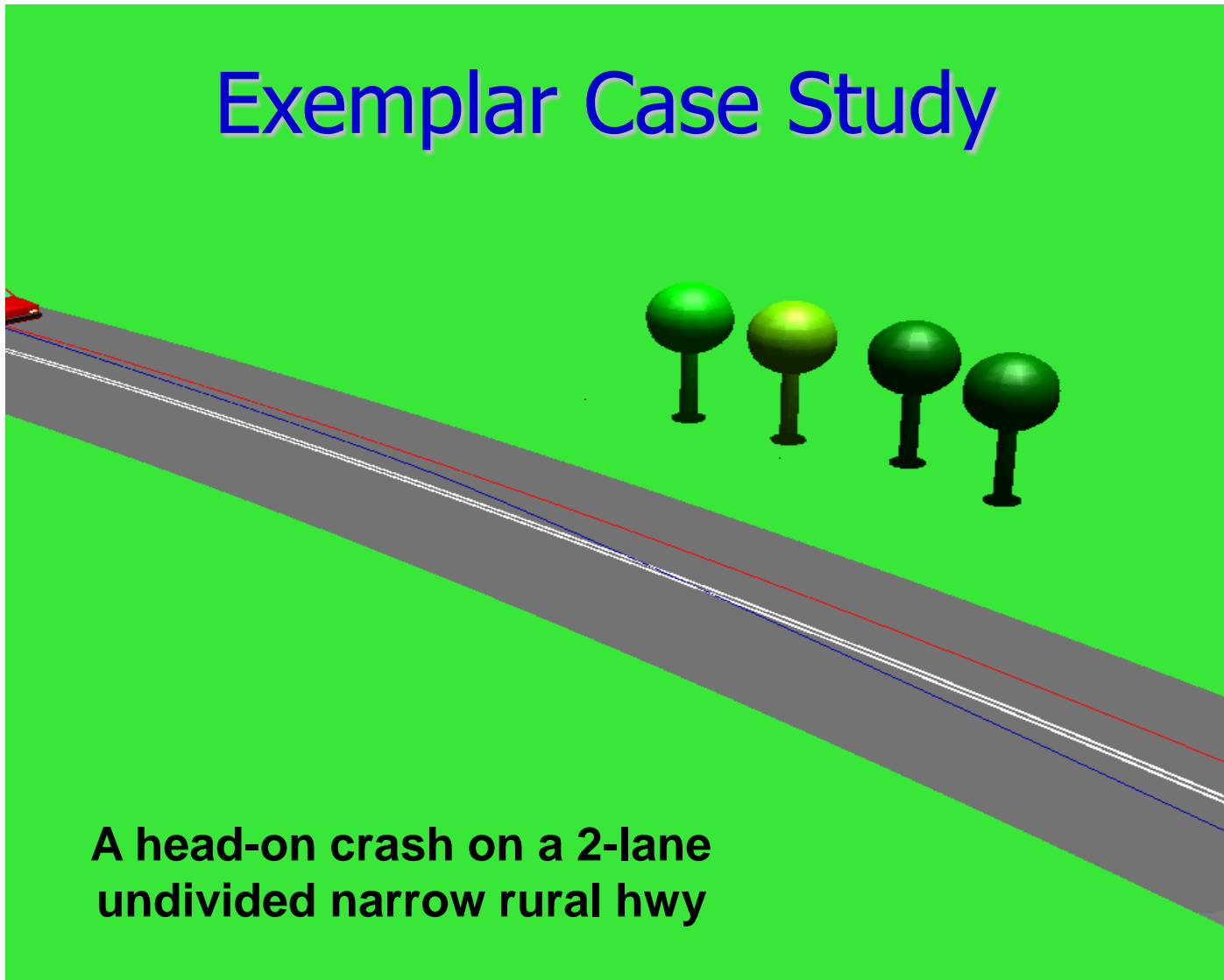
Regional Panel



Central Panel



Exemplar Case Study

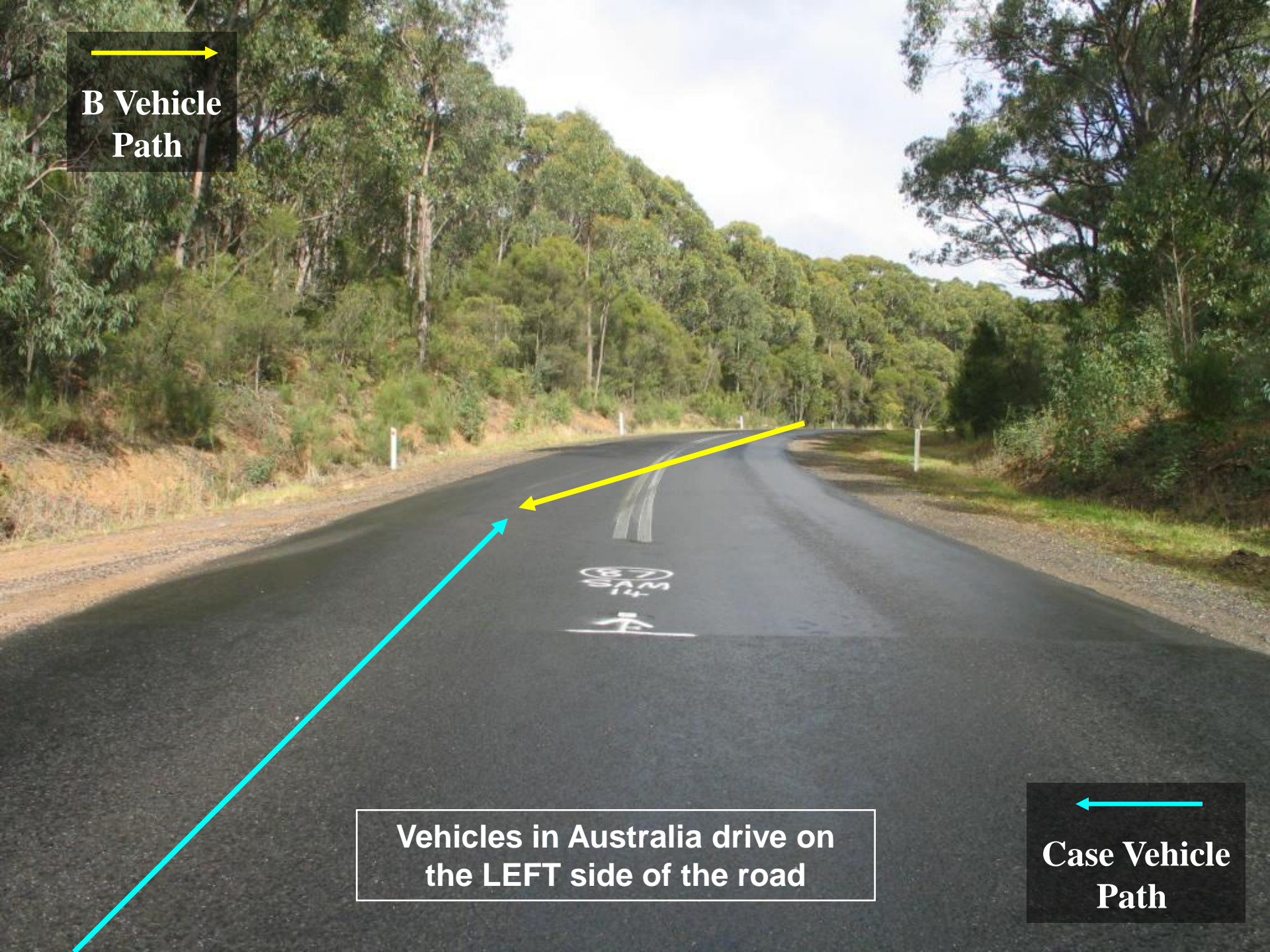


**A head-on crash on a 2-lane
undivided narrow rural hwy**

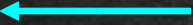
Crash Description

- A two-lane narrow undivided rural road in state of Victoria
- Monday 13.30 in September, 2005
 - *Dry and clear, light winds*
- Case vehicle - 2002 large Australian passenger car
 - *42yr male driver in front seat plus 39yr female and 2yr child in rear seat*
 - *Collided with an older smaller passenger sedan that was turning right into small road across double lines*
- 100 km/h speed zone


**B Vehicle
Path**



**Vehicles in Australia drive on
the LEFT side of the road**


**Case Vehicle
Path**



Case Vehicle





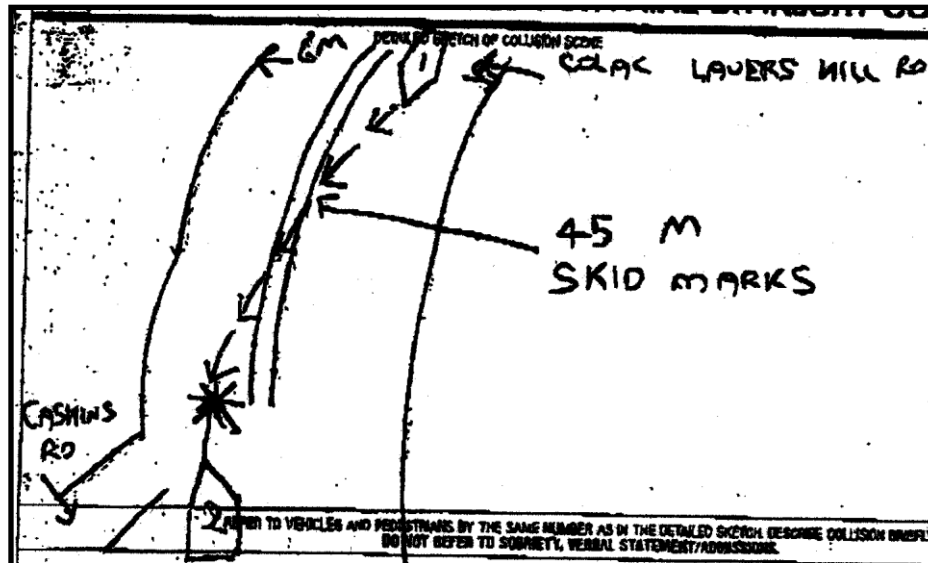


Non-Case vehicle



Police Report

“ Vehicle 1 [non-case] travelling north on Lavers Hill Road and intending to turn right into Cashins Road. Crossed double lines and struck unit 2 [case] travelling south on Colac – Lavers Hill Road”.



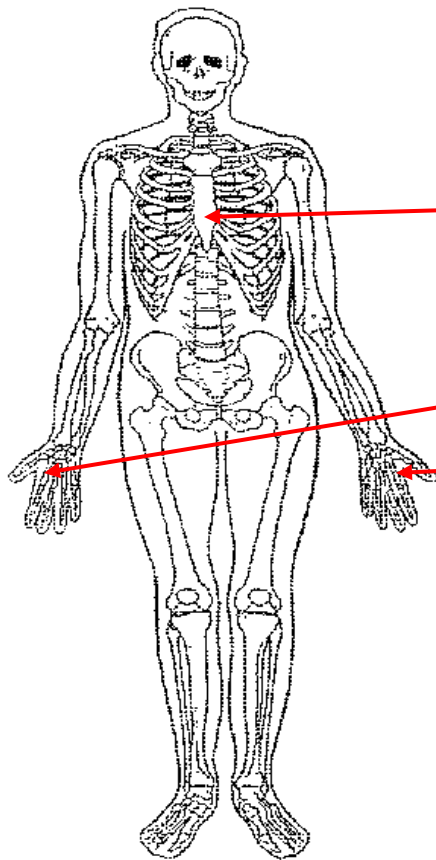
Driver Interview

- Driver's Description:
 - *“We were going to the Otway Fly Tree Top Walk...from Melbourne...and were about 20 minutes from there. The other vehicle ran off it's lane at a small curve and hit us. Everything happen too quick”.*
- Reports confirmed that the driver had left the road surface attempting to avoid the oncoming vehicle
- The verge area of the road was poorly designed and maintained and the driver lost control

Vehicle and Crash Details

- 2002 Large Australian passenger sedan (CASE)
 - 4.0 litre, automatic, 1700kgm
- 1990 Small passenger hatchback sedan (NON-CASE)
 - 1.6 litre, manual, 900kgm
- 1 o'clock impact (Case vehicle)
 - Offset to driver's side
- Impact Severity (Delta-V)
 - 35km/h (Case), 75km/h (Non-Case)
- Maximum crush depth:
 - 920mm (Case), 1160mm (Non-Case)

Driver Injuries



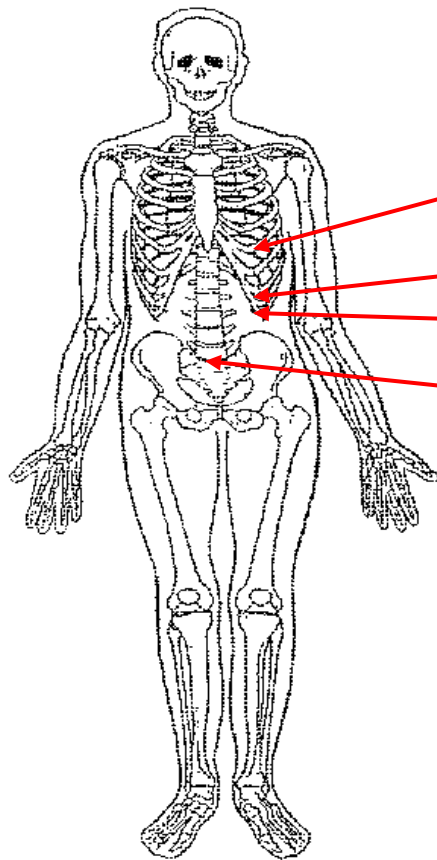
1. Bruising to chest (around sternum) (AIS1)

2. Lacerations to right hand (AIS 1)

3. Bruising to left hand (AIS1)

ISS = 2

Female Passenger Injuries



1. Fractures to four ribs (bilateral, R6-9) (AIS 4)

2. Bruising to spleen (AIS 2)

3. Laceration to left kidney (AIS 3)

4. Bruising to abdomen (AIS 1)

ISS = 25

Most injuries attributed to poor alignment of the seat belt

Vehicle Assessment

- Both vehicles were roadworthy and in reasonable condition
- Used car safety ratings
 - *Case vehicle* – “significantly better than average”
 - *Non-case vehicle* – “average”
- Case vehicle restraints
 - *Usage markings on driver and adult passenger’s seat belt assemblies*
 - *Steering wheel and fascia airbags deployed*
 - *Driver’s pretensioner activated*
 - *Plastic housing on passenger’s seat belt tongue cracked*
 - *No pretensioners, load limiters, to rear seat belt assemblies*

Crash Site

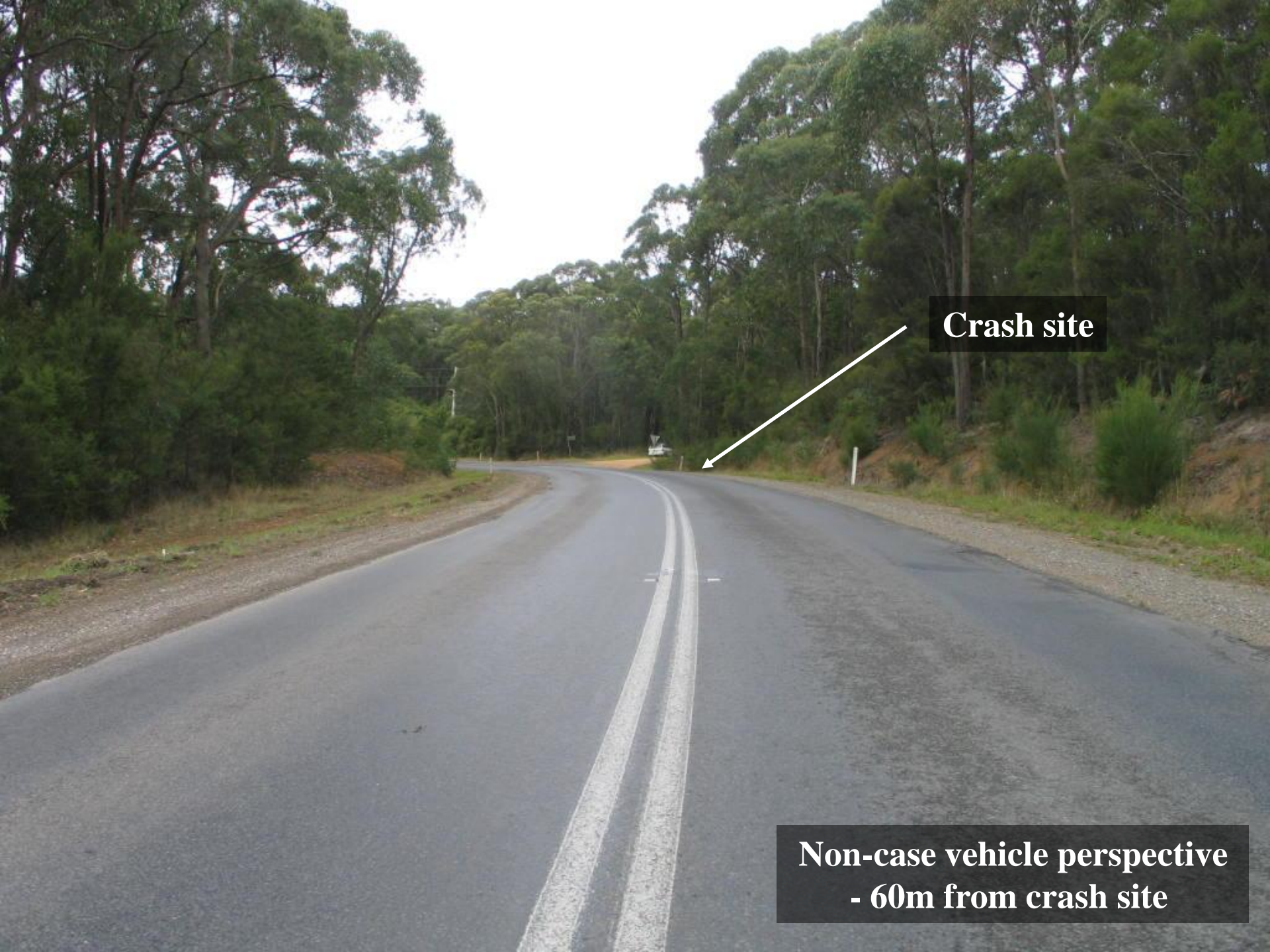
- Gentle uphill slope
- Right-hand curve, radius 250m
- Undivided 2-lane hwy, each lane only 3m wide
- Nearside shoulder 2m wide, unsealed, poor drop-off
- Offside shoulder 2.7m wide, unsealed, poor drop-off
- 100 km/h speed zone
- 900 vehicles per day (average)
 - *Mainly commercial (timber) route*

Crash site



**Case vehicle perspective
- 90m from crash site**





Crash site


**Non-case vehicle perspective
- 60m from crash site**



CRASH

Crash site, B vehicle perspective

Crash Causation Summary

Road/Roadside Setting	Vehicle	Case Vehicle Driver
Speed zoning (crash/injury severity)	Case vehicle OK (rear seatbelt align?)	None identified
Poor road surface/edging	Poor crashworthiness (non-case vehicle)	Non-Case Vehicle Driver
Poor road delineation		Failure to observe traffic control
Restricted sight distance due to alignment No curve chevrons		Driving without due care and attention???

Post-Crash Intervention



**Post-crash shoulder treatment
case vehicle direction**



**Post-crash shoulder treatment
non-case vehicle direction**

ECIS Project Outcomes

- Panels held: 27 (79 crashes)
 - *Metro SE (6), Metro NW (6), Rural Regions (15)*
- Crash types
 - *Run-off-road: 46%*
 - *Intersection: 20%*
 - *Other types: 34%*
- 225 separate road safety issues raised
- 40% action items attended to between meetings



Key Factors Identified

- 1. Road, infrastructure and speeding**
 - Inappropriate speed limits
 - Intersections between high and low speed roads
- 2. Roadside setting**
 - Proximity of narrow, rigid objects to road
 - Lack of run-off-road/median protection (eg. barriers)
- 3. Road geometry**
- 4. Motorcycles**
 - Lack of conspicuity to other road users
 - Lack of use of protective clothing
- 5. Occupant extraction**
 - Hard metal locations on vehicles
 - Safety feature notification (body plate, rescuer guide)

Other Issues

- High use of prescription drugs, esp. anti-depressants
- High level of fatigue in urban and rural crashes
- Motorcycle conspicuity
- Effective barrier design for urban environments
- Development of low-cost treatments at curves on minor roads
- Low volume road maintenance (verge)

Participant's Responses

- Overall impression
 - 97% said good or excellent
- Involvement beneficial
 - 90% responded positively
- Responsiveness by organisations
 - 40% have implemented countermeasures
- Other benefits
 - 60% claimed involvement led to a more strategic approach to their work

Conclusions

- In-depth study has been very successful in achieving its objectives
- Program has led to significant positive outcomes in safety improvement in regions and state-wide
- Greater awareness in the regions
- Positive feedback from those who participated

The End!

More details can be provided

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