NCAP Rating for Far-side Occupant Protection

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- **GM Holden** - L. Sparke and S. Smith; **General Motors** – R. Lange;
- **Ford** – S. Rouhana;
- **MoT, Australia** - C. Newland.
Far-side Project Publications 1

Far-side Project Publications 2

Far-side Project Publications 3

Far-side Project Publications 4


Far-side Project Publications 5


Far-side Project Publications 6


Side Impact Crashes

Near Side

Far Side
HIII Dummy in Far-side Crash

Shoulder Belt
HIII Dummy in Far-side Rollover

Shoulder Belt
What are the far-side countermeasures?
Toyota Center Rear Seat Air Bag
Available in Japan
Autoliv Far-side Countermeasures

Rucksack Belt

Center Air Bag
Takata Far-side Countermeasures

See Mercedes 2009 ESV
Air Curtain Head Protection
(Shown for near-side protection)
Inflatable Near & Far Side and Protection
Ford Belt Concepts, Detroit 2001

V Belt

X Belt
Pre-tensioned Belt
Far-side & Rollover Activation Required
How big is the far-side injury problem?
Annual Injured Occupants
Far-side vs. Near-side

Far Side

Near Side

Planar Rollover

AIS 3+

Belted Unbelted

Annual Injuries

16,000 14,000 12,000 10,000 8,000 6,000 4,000 2,000 0

Planar Rollover

AIS 3+

Belted Unbelted

Annual Injuries

16,000 14,000 12,000 10,000 8,000 6,000 4,000 2,000 0
Far-side vs. FMVSS 214

Far Side Planar + Roll

- Annual Injuries: 20,000
- AIS 3+: 15,000
- Planar + Roll

Belted
Unbelted

Near Side Planar - 214

- Annual Injuries: 20,000
- AIS 3+: 15,000
- Planar

Belted
Unbelted
What are the impediments to developing far-side countermeasures?
A suitable dummy is needed
Research Questions in Far-side Protection

What dummies are suitable for evaluating countermeasures?

Approach:
• Determine far-side occupant kinematics by cadaver tests.
• Subject dummies to the same tests.
Candidate Far-side Dummies

WorldSID

THOR-NT
Initial Questions Regarding Conventional Belt Evaluation in Far-side Crashes

• Does the dummy load the belt properly?
• Does the dummy’s head get to the correct place?

Illustration to follow is from 1 of 18 cadaver/dummy comparisons
Far Side Impact Sled Test Results

Belt Loading

TEST 1: THOR-FSDS155 vs WS-FSDS119 vs PMHS-FSCS104

Shoulder Belt Force

Belt Force (N)

PMHS

WorldSID

THOR

100 N Pre-Tension

30 km/h run
Far Side Impact Sled Test Results

Head Excursion –

TEST 1: WS-FSDS119 vs PMHS-FSCS104 vs THOR-FSDS155

Conclusion: THOR and WorldSID are both suitable for far-side tests
Observations of Test Results

- Either dummy performs well in high severity tests with conventional 3-point belts when measuring
  - Shoulder belt load
  - Head kinematics
- Chest instrument relocation is needed for both
- Either dummy would be suitable for evaluating far-side protection offered by conventional belts in tests run by IIHS and NHTSA SNCAP tests
Australian DoT Test Results

Conducted side impact tests with both near-side and far-side dummies (WorldSID)

Results:
- The far-side dummy did not influence the measurements by the near-side dummy of injuries from the intruding side structure.
Conclusions

• Number of injuries in far-side planar crashes and rollovers exceed those in near-side planar crashes
• THOR and WorldSID are suitable for evaluating countermeasures in far-side crashes
• The presence of a far-side dummy does not interfere with the near-side injury measurement
• Numerous far-side countermeasures are under development
• There is no far-side safety consumer information
Observations

• Currently safety standards and consumer information tests do not deal with far-side countermeasures.

NCAP tests would provide the **first step**
• Include a far-side THOR or WorldSID in all NCAP Side Tests
• Provide a far-side rating based on head excursion limits.

Eventually:
• Use all far-side dummy readings to determine star rating
• Conduct tests without near-side dummy
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