

Transport Canada / Transports Canada

Commercial Vehicles and Vulnerable Road Users

Canada

1

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THE ISSUE

Vulnerable road users (VRUs) are at significant risk when they are involved in collisions with large commercial vehicles.

4

2



NATIONAL COLLISION DATABASE (NCDB)



- Approximately 2,000 fatalities each year
- 19% are pedestrians and cyclists
- Most collisions occur in urban environments (71%)
- 54% of collisions occur at intersections, most of which are controlled by traffic lights, stop signs, or pedestrian crossings

3



STUDY GENESIS - 2004

- 2004 - Judgements of Inquiry, British Columbia Coroners Service
- 7 pedestrian fatalities involving heavy trucks
- Recommendation to Transport Canada:

Require crossover mirrors on heavy trucks (similar to those required on school buses)



4

2005 - 2006

- 2005 - Implemented a study of pedestrians and cyclists interacting with heavy-duty vehicles (trucks and buses)
- 2006 - There are external pressures to mandate side guards as a result of a fatal collision in Montreal



5

Data Summary: Collision Investigations

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COMMERCIAL VEHICLES AND VULNERABLE ROAD USERS

ASFC DATA SUMMARY 2004-2015

6



DATA SOURCES

- British Columbia Coroners Service:
Pedestrian fatalities (2000 - 2003)
- Transport Canada:
Causes of Fatal Collisions (2004 - 2009)
Special Collision Investigation Programme (2005 - 2015)
- Database of 85 fatal crashes
57 crashes with pedestrians (67%)
28 crashes with cyclists (33%)

7

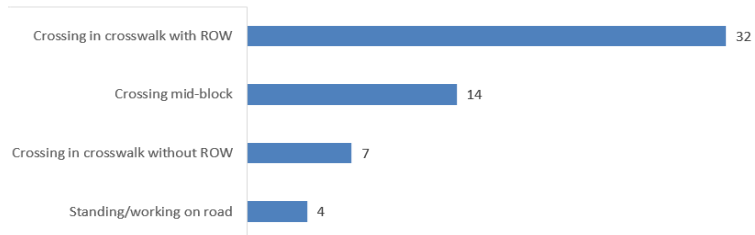


COLLISION OCCURRENCE

- 93% in clear weather conditions
- 84% during daylight hours
- 74% at urban intersections
(usually controlled by stop signs or traffic lights)
- 91% of pedestrians cyclists were run over
by the heavy truck or bus
- 55% made initial contact with the front of the vehicle
- 38% with the side of the vehicle (91% right side)

8

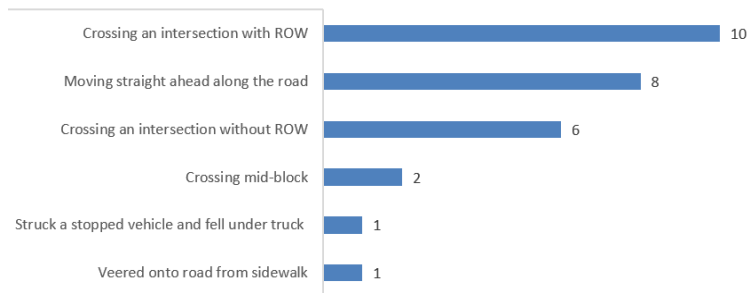
PEDESTRIAN CRASHES



- 56% occurred when pedestrians were crossing the road at a marked or unmarked crosswalk and had the right-of-way
- 12% involved crossings in a crosswalk without the right-of-way
- 25% were crossing a road mid-block or just outside of a crosswalk
- 68% involved a vehicle initially stopped and subsequently turning left or right, or continuing straight ahead

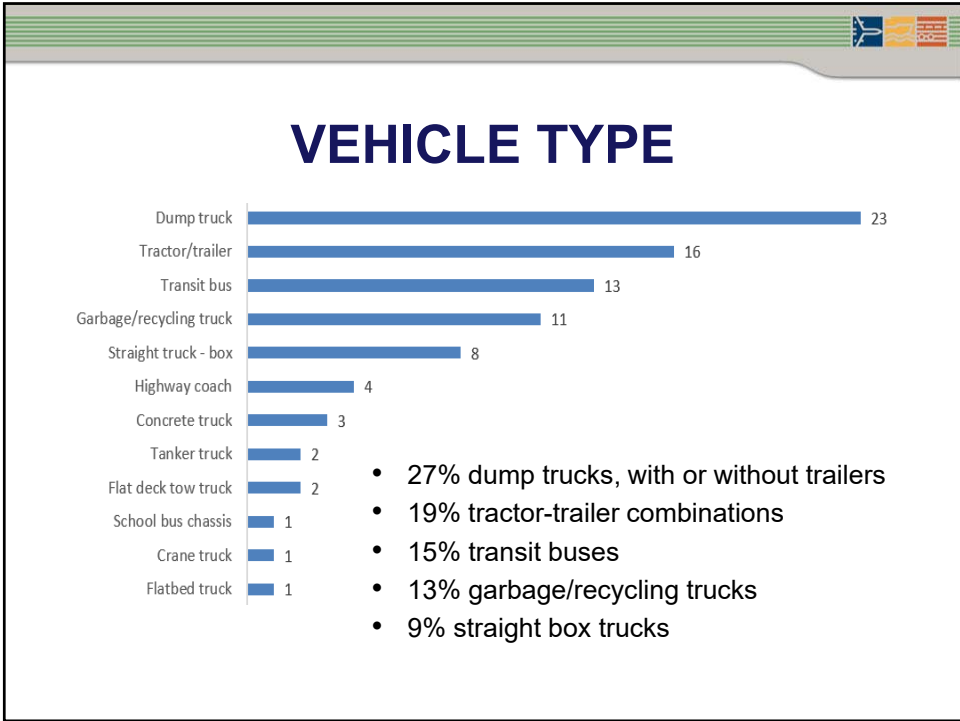
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CYCLIST CRASHES

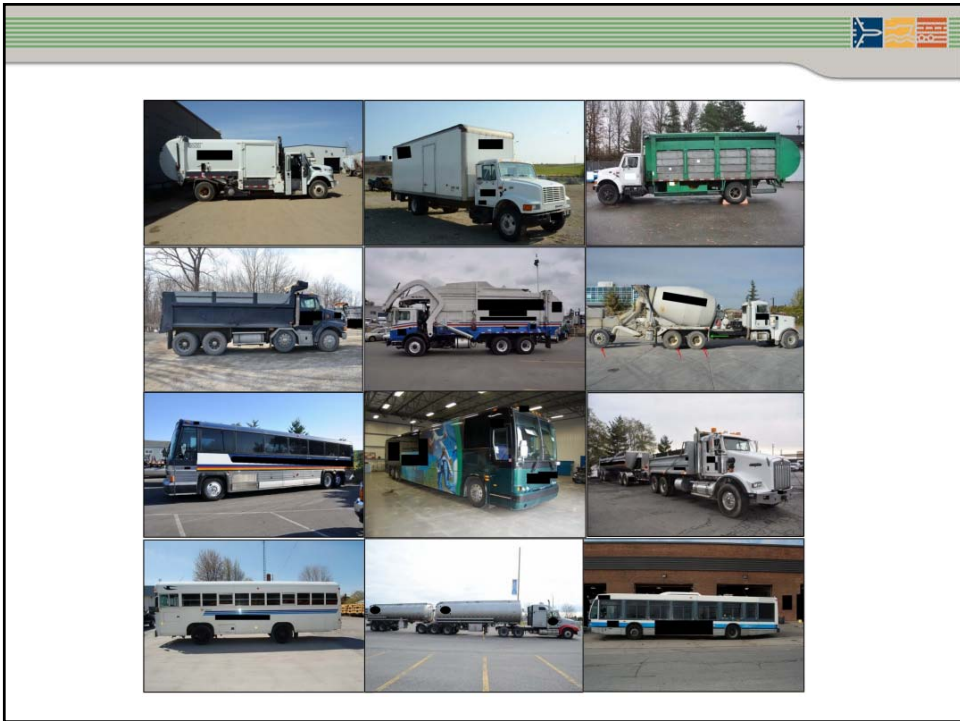


- 57% occurred when cyclists were crossing an intersection with or without the right-of-way
- 75% involved a vehicle starting from a stop and turning right

10

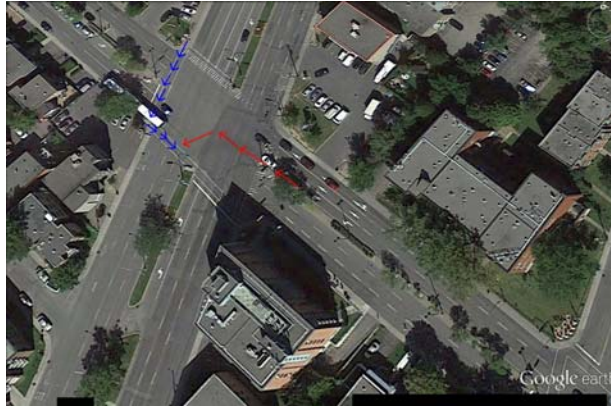


11



12

TRANSIT BUS - PEDESTRIAN



- A low-floor transit bus and an 42-year-old pedestrian.
- Pedestrian had ROW, was crossing road in the pedestrian crosswalk.
- Transit bus waiting for oncoming traffic to clear intersection

13

TRANSIT BUS - PEDESTRIAN



- Bus turned left and struck pedestrian with left-front mirror
- Pedestrian knocked to ground and run over by the rear wheels

14



DUMP TRUCK - CYCLIST



- 2007 Kenworth T800 dump truck and a Midland 4-axle dump trailer
- Truck and cyclist were eastbound in the lane next to the curb
- As the cyclist cleared the intersection he moved left to avoid the curb
- At the same time the cyclist was overtaken by the dump truck
- After the truck passed the cyclist, the cyclist steered or drifted into the roadway a though he thought it was a single dump truck

15



DUMP TRUCK - CYCLIST



- A witness reported that the left shoulder of the cyclist was clipped by the lead fender on the first set of tandem wheels of the trailer
- The cyclist fell to the ground and was run over by the second set of tandem wheels

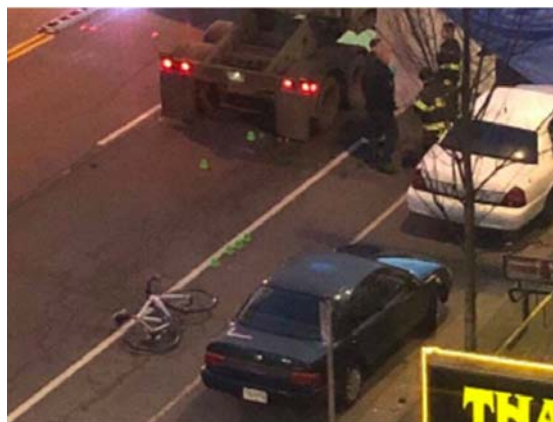
16

CYCLIST HIT BY TRUCK AFTER COLLIDING WITH OTHER BIKE



17

“WHY ONE CYCLIST STRUCK THE OTHER, I’M NOT CLEAR AT THIS POINT, BUT WE WILL DETERMINE THAT THROUGH THE COURSE OF THE INVESTIGATION.”



18



COUNTERMEASURES

Side guards

- Review of pedestrian fatalities, Chief Coroner, Ontario (2014)
- 47 countries have regulations requiring side guards
- Side guards are in widespread use in 65 countries
- Japan has the most stringent ground clearance requirement of 450 mm while most jurisdictions allow 550 mm
- In practice, clearances tend to be in the range 380-400 mm

Note that the ground clearance for the Prevost highway coach was only 280 mm



19



COUNTERMEASURES

Camera-Monitor Systems (CMS)

- Backup cameras are in widespread use in light-duty vehicles
- Some light duty vehicles install a camera right-side mirrors
- CMS can replace or enhance conventional side mirrors
- On-board system can provide warnings to the driver
- Warnings could be issued to adjacent pedestrians and cyclists
- System could trigger collision-avoidance measures



20

CRASH-AVOIDANCE RESEARCH

- Potential benefits of sensors to detect VRU's and provide warnings to HDV drivers
- Cameras, image recognition, radar, ultrasonic sensors
- Tests to simulate high risk, low speed, city environment
- Right turns, left turns, crossing in front of a dump truck
- 50th percentile adult male, 7-year-old child, adult cyclist
- Targets moved into truck's path with a computer-controlled towable platform
- Camera/image recognition system performed best
- Field operational test underway in 5 Canadian cities



21

HEAVY-TRUCKS AND BUSES



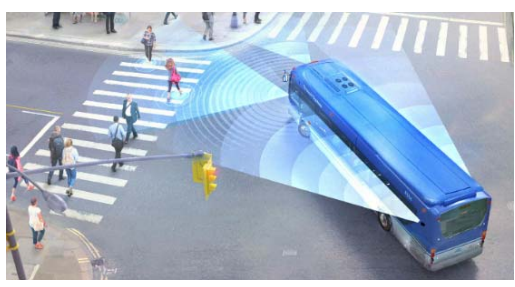
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CONCLUSIONS

Two primary countermeasures:

- (1) On-board driver-assistance safety systems
- (2) Promotion of greater public awareness of the dangers posed by heavy vehicles in urban environments.



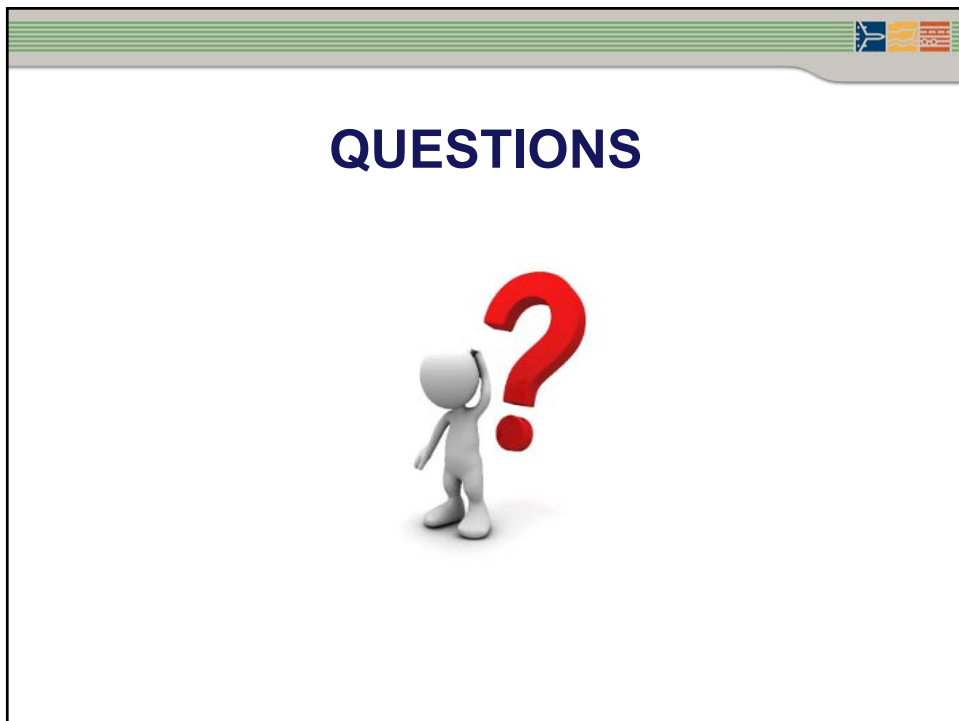
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24



25



26