Highway Safety Division

Managing Highway Incidents

September 2008

Social Impact

- In the GTA highway closures can cost up to $600,000.00 an hour
- One minute of traffic delay for each trip translates into $170 million each year.

In Ontario:

- Fatality — $13.6 million.
- Major injury — $280 thousand.
- Minor injury — $48 thousand.
- Minimal injury — $18 thousand.

Analysis and Estimation of the Social Cost of Motor Vehicle Collisions in Ontario
Final Report August 2007 - Transport Canada

Our Environment

- The GTA alone is expected to grow by more than a million people over the next decade.
- Some of the busiest highways in North America
- 2 lanes to 16 lanes
- 80% of Ontario's trade with the United States moves by truck.
- Over 60% of Canada's total trade enters or exits the country through three Ontario borders
- "Just in time" delivery
- Commuting to work

Traffic Incident Management

- **Traffic incident management consists of the following major stages:**
- **Detection is determining that a traffic incident has occurred.**
- **Verification is determining the precise location and nature of an incident.**
- **Motorist information is the activation of a variety of communications**
- **Response is the activation, coordination, and management of the appropriate personnel, equipment, and communication links**

Traffic Incident Management

- **Site Management includes the investigation and information collection.**

- **Traffic Management is the application of traffic control measures at the incident site.**

- **Clearance is the removal of vehicles, wreckage, debris, spilled material and other items from the roadway and the immediate area.**

- **Recovery consists of restoring traffic flow at the site of the traffic incident.**

Incident Management

Rapid Clearance Versus Investigative Excellence

- Clearance is a priority
- Investigative excellence
- Needs to be a balance

Driving Change

- An exponentially higher risk to public safety through secondary collisions occurring in traffic backups
- An increasingly negative impact on the regional, provincial and national economy created by delays to the free-flow of commerce
- A degradation of overall air quality caused by engine emissions from thousands of idling vehicles
- A consistent approach to investigative excellence through uniform investigation by highly trained and skilled members

Evolution of the Team

- 1990's - Detachment based
- 1995 - Regional Teams
- 2002 – New Schedule
  - Red tape Commission
- 2005 – Consolidated Team
- 2007 - Supervision/Leadership
  - Provincial Traffic Review Project

Skills

- Reconstructionist
- Technical Traffic Collision Investigator
- CMV Investigator
- Dangerous Goods Investigator
- Forensic Mechanic
- Wreckmaster
- SOCO

Crash Team Profile

- 6-7 members / team
- Team Leader = Area Traffic Sergeant
- 2 x Reconstructionists
  - Each with full kit of necessary equipment
- Technical Traffic Collision Investigators
  - Some Level II, (At Scene course)
  - Most are Level III
  - Some are also SOCO

Crash Team Profile

- Commercial Vehicle Investigators
  - CVSA Trained
  - Receive additional training / cross-trained TCI
  - Dangerous Goods
- Forensic Mechanics
- Dangerous Goods
- Many positions are cross-trained
  - Recon / CVSA
  - TCI / CVSA
  - TCI / SOCO

Team Leader Role

- Benchmark Collision Investigation Policy
- Area Traffic Sergeant has ultimate responsibility for investigation
  - Must attend calls team attends
- Major Case management style
  - ATS as major case manager
- Directs investigation starting at scene
- Continues to manage through court / inquest

Resources

- Total Stations – Robotic Units
- CDR Kits
- Vehicles – Cars vs Trucks
- Proper equipment
- Communication
- Mobile Support Unit

Partnerships

- Ministry Partners
- Fire
- Ambulance
- Towing Industry
- Media
- Recovery

What have we achieved

- A deployed team with 24 hour – 365 day a year coverage
- The highest skilled and motivated members with best training
- The most efficient and high tech equipment available
- Cross trained flexible team that can take on virtually any complex collision investigation and clear it quickly while maintaining investigative excellence

Rapid Clearance

- Systematic investigation
  - Can team document unaffected areas (lanes) first
    - Partial re-opening
  - Conduct investigation around cleanup / recovery
  - Arrange staging of equipment / resources
- Liaison with other responders
  - Fire / Ambulance / MTO / MOE / 407 ETR resources
  - Clean-up company / towing industry partnerships

Make a plan so both investigation and clearance can proceed simultaneously

Crash Team Approach

- Advise Media Officer of reportable info / facts
- Scene communication
- “10-4” phones
  - Reasonable cost
  - One of the best additions to enhance communication between team members
  - Time savings though effective communication
    - Enroute and at scene

Scene Mapping

- Effective of use of tools available
- Embracing new technologies
- Changing mindsets of investigative steps
  - Need for hand-drawn “field sketches”?
  - Efficient measurement techniques vs. “short-cuts”
- Training, knowledge of and practice with tools available

Scene Mapping

- Where we started……
  - Tape measures
  - Two-person operation
  - Slow and reasonably accurate
  - Post-scene processing = time intensive

Scene Mapping

- The Next Step:
  - Total Stations / Reflectorless Total Stations
    - two-person operation / Reflectorless may be single
  - Reduction in scene mapping time
  - Ability to gather large volume of evidence in reasonable time
  - Better Investigation
  - Highly accurate
  - More effective court presentation
  - Reduced post-scene time

Scene Mapping

- Latest Technology = Robotic Total Stations
  - Recently acquired – 25 units Provincially
  - One person operation – Station Tracks Rover
  - Recon observes evidence points themselves
  - Tracking reduces sighting and measurement time
  - Increased quality / reliability
  - Results to-date indicate scene mapping time ***reduced by ≈ 50%***

Scene Mapping

- Technologies studied and tested:
  - LiDAR Scanners
    - Large Volume in short period of time
    - Allows scene work while mapping
    - Only rated for above freezing
    - Best Imaging capabilities limited to daylight
    - Other atmospheric conditions limit use
      - i.e. ran, snow, fog
    - $250,000 / unit
    - Approx. $10,000 / year in maintenance

Scene Mapping

- Photogrammetry - SpheronVR
  - Limited Range
  - Requires adequate lighting
    - Best in daylight / much slower in dark conditions
  - Extensive post-scene processing time
  - Software / training costs
  - Approx. $100,000 / unit

Best Practices / Tools

- OPP are adopting standardized scene mapping / drawing tools
- Used together, aids in rapid clearance.
- MapScenes Evidence Recorder
  - Only data collector for Recons that supports Robotic Stations
- MapScenes CAD drawing program
  - Tools integrate with Evidence Recorder

Electronic Crash Data

BOSCH CDR

Pre-crash data

Parameter	-5 sec	-4 sec	-3 sec	-2 sec	-1 sec
Vehicle Speed (MPH)	92	90	89	86	80
Engine Speed (RPM)	3200	2496	2432	2368	2176
Percent Throttle	0	0	0	0	0
Accelerator Pedal Position (percent)	5	5	0	0	0
Antilock Brake System Active (If Equipped)	No	No	No	No	No
Rear Door(s) Status (If Equipped)					Closed

Power Mode		
Cruise Control Active (If Equipped)	No	No
Cruise Control Resume Switch Active (If Equipped)	No	No
Cruise Control Set Switch Active (If Equipped)	No	No

Pre-crash data

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Vehicle Speed (MPH)	92	90	89	86	80
Engine Speed (RPM)	3200	2496	2432	2368	2176
Percent Throttle	0	0	0	0	0
Accelerator Pedal Position (percent)	5	5	0	0	0
Antilock Brake System Active (If Equipped)	No	No	No	No	No
Lateral Acceleration (feet/s²) (If Equipped)	Invalid	Invalid	Invalid	Invalid	Invalid
Yaw Rate (degrees per second) (If Equipped)	Invalid	Invalid	Invalid	Invalid	Invalid

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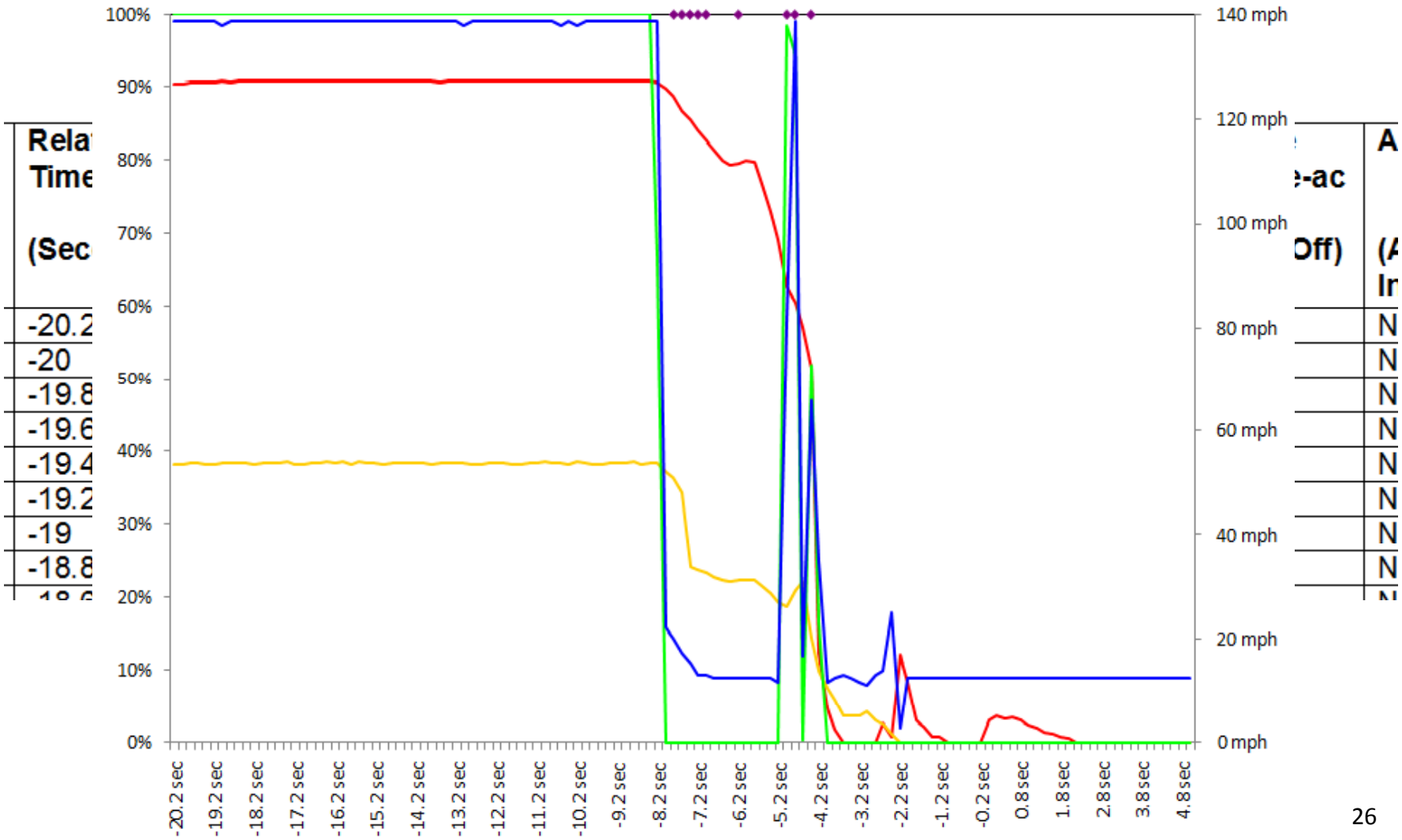
Electronic Crash Data



CMV EDR Example - DDEC

DDEC® Reports - Hard Brake #1

Print Date: Apr 05, 2008 02:03 PM (EDT)

OPP

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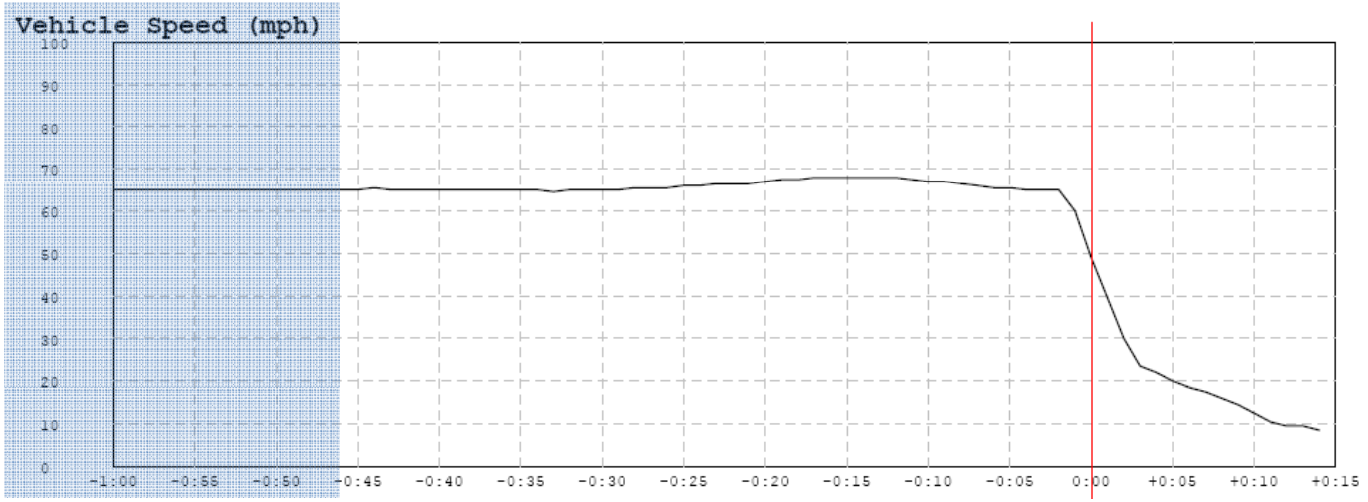
Trip: 08/03/02 09:36 AM (EST) to 08/31/2007
Vehicle ID: 38996
Driver ID:
Odometer: 794415.4 mi

Trip Distance	794415.4 mi	Trip Time	19944.57
Trip Fuel	114364.75 gal	Fuel Consumption	5.73 gal/h
Fuel Economy	6.95 mpg	Idle Time	5749:08:18
Avg Drive Load	40 %	Idle Percent	28.83 %
Avg Vehicle Speed	56.0 mph	Idle Fuel	2517.38 gal

Incident Time: 08/31/2007 04:16:38 (EST)

Incident Odometer: 794415.3 mi



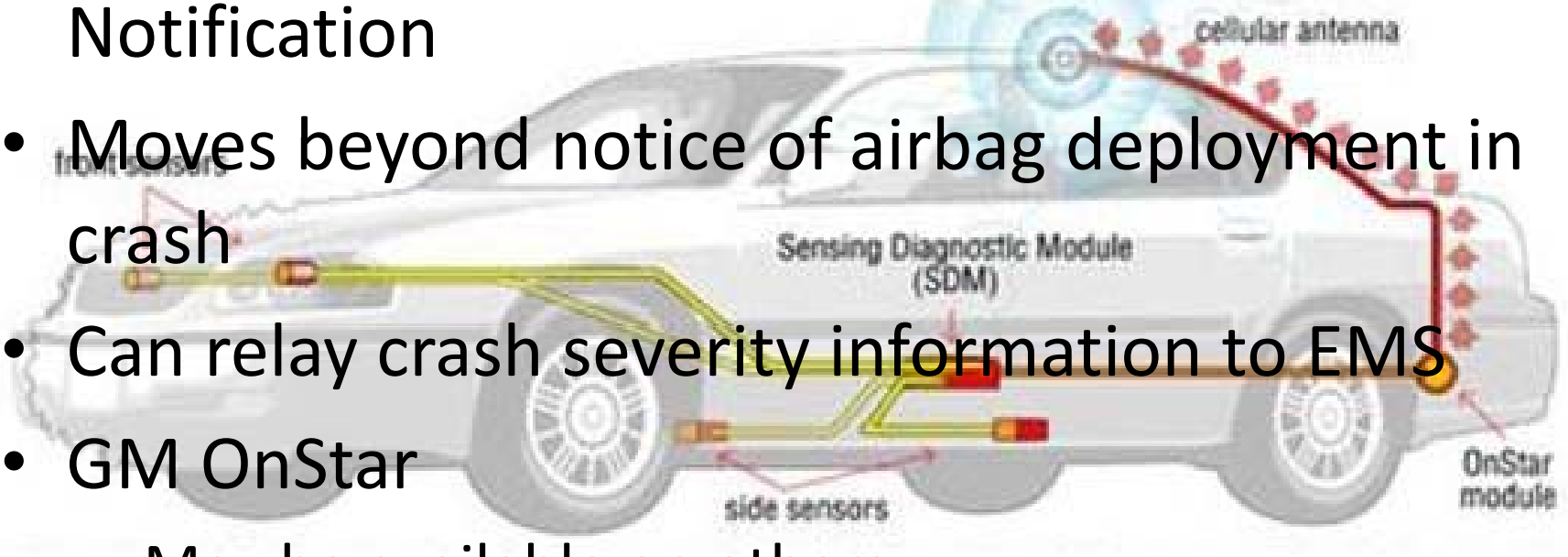
CMV EDR Example - Cummins

Time (Seconds)	Vehicle Speed (mph)	Engine Speed (rpm)	Engine Load (%)	Throttle (%)	Brake Status	Clutch Status	Cruise Status	Lamp Status
-9	63	1424	80.7	76.3	-	-	-	-
-8	63	1429	80.3	76.0	-	-	-	-
-7	63	1434	79.1	75.0	-	-	-	-
-6	64	1440	69.8	68.0	-	-	-	-
-5	64	1445	57.4	64.0	-	-	-	-
-4	64	1448	55.6	63.0	-	-	-	-
-3	64	1447	55.2	62.3	-	-	-	-
-2	64	1432	19.0	12.0	-	-	-	-
-1	63	1429	0.0	0.3	-	-	-	-
0	56	1420	43.8	100.0	On	-	-	-

Time (Seconds)	Vehicle Speed (mph)	Engine Speed (rpm)	Engine Load (%)	Throttle (%)	Brake Status	Clutch Status	Cruise Status	Lamp Status
1	47	1802	0.0	0.0	On	On	-	-
2	38	1085	0.0	0.0	On	On	-	-
3	31	559	0.0	0.0	On	On	-	-
4	23	588	0.0	0.0	On	On	-	-
5	15	599	0.0	0.0	On	On	-	-
6	5	582	0.0	0.0	On	On	-	-
7	0	604	0.0	0.0	On	On	-	-
8	0	599	0.0	0.0	On	On	-	-

Advance Crash Notification

- AACN – Automatic Advanced Crash Notification
- Moves beyond notice of airbag deployment in crash
- Can relay crash severity information to EMS
- GM OnStar
  - May be available on others
- Timely notification – appropriate response



Highway Cameras

- Real-time recording?
- 401 – MTO – 6 second clips
  - Recorded camera switches from east to west
  - Incident recorder may be manually initiated
- Highway 407ETR
  - Real-time recording of all cameras
  - Digital format
- Access to this footage at scene?
- May save time at evidence identification stage

Highway Cameras

- May not capture crash
  - Setup to
  - Road conditions / traffic volumes
  - visibility

Successes to date

- Team approach:
  - Investigative excellence / Case management
  - Court Successes
  - Quicker clearance times without compromise to investigation
  - Reduction in complaints from public
- Relationships with other stakeholders
  - Enhanced cooperation in scene management and clearance

Questions?