Leadership for Zero Road Deaths and Serious Injuries: What can you do?

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9th International Conf on Urban Traffic Safety Banff Aug 2017
Acknowledgements

• 29 Members of ITF/OECD Working Group
  (24 countries incl Canada, 5 global organisations)

• Members of the Editorial Committee:
  – Saul Billingsley (FIA Foundation), Colin Brodie (NZ), Iain Cameron (Australia), Shalom Hakkert (Israel), Peter Larsson (Sweden), David Ward (Global NCAP),
  – Wendy Weijermars (Netherlands).

• Peer Reviewers:
  – Eric Howard (Australia),
  – Fred Wegman (Netherlands)

• ITF Secretariat
Overview

1. **Why?** (act now for a safe system)
2. **What?** (is a safe system)
3. **How?**- (example journeys to implement a safe system)
4. **ITF/OECD Recommendations**
A Social Licence for Change in Road Safety

Customer (Community)

Communication

Leadership

Lens
Why?

• Burden -
  - global, urban, most vulnerable, deaths + injuries
• Growth in city living
• UN SDG’s - 50% reduction by 2020
• Leave a sustainable legacy for the next generation
UN Decade of Action Goal and Sustainable Development Target (millions people killed)
Blind Spots Limit Progress in Leading Change

• Road safety problems & solutions are not always obvious & must be addressed by leaders mobilising support for change.

• Our view affected by the lens we use. E.g-
  • windscreen vs helicopter
  • Iceberg-deaths vs injuries,
  • “I am a good driver”, “the road meets standards”, low vs high speed, risk vs error
Inherent, blind spots of risks, hinder progress
(Swedish Transport Agency)
Blind Spot of low level speeding:
Attributable Fraction Analysis of Illegal Speeding & KSI Crashes in Perth 60kph zones

<table>
<thead>
<tr>
<th>Speed of vehicle</th>
<th>p</th>
<th>v</th>
<th>RR</th>
<th>PAR</th>
<th>KSI</th>
<th>KSI(100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;60 kph</td>
<td>0.534</td>
<td>60*</td>
<td>1.0</td>
<td>0.00</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>60-69 kph</td>
<td>0.396</td>
<td>65</td>
<td>1.8</td>
<td>0.16</td>
<td>110</td>
<td>30</td>
</tr>
<tr>
<td>70-79 kph</td>
<td>0.062</td>
<td>75</td>
<td>7.6</td>
<td>0.20</td>
<td>140</td>
<td>39</td>
</tr>
<tr>
<td>80+ kph</td>
<td>0.008</td>
<td>85</td>
<td>44.4</td>
<td>0.16</td>
<td>113</td>
<td>31</td>
</tr>
<tr>
<td>Total</td>
<td>1.000</td>
<td>NA</td>
<td>NA</td>
<td>0.52</td>
<td>362</td>
<td>100</td>
</tr>
</tbody>
</table>
Global Opportunity for Visionary Approach

Strong global mandate for a Safe System approach.

Safe System first endorsed by the OECD/ITF in 2008 report.


Global Plan endorsed by the 2nd High Level Global Conference on Road Safety in Brasilia (Nov 2015) and by UN General Assembly in April 2016 (A/Res/70/260).

The inclusion of road safety in the Sustainable Development Goals for health and cities with 50% target by 2020 is the UN’s strongest ever commitment to road injury prevention.
Policy Instruments Mix: ‘Traditional’ vs Safe System

Rebalancing the Road Injury Prevention Effort

- **Traditional**
  - Behavioural: 70
  - Road Design: 20
  - Vehicles: 10

- **Safe System**
  - Behavioural: 40
  - Road Design: 40
  - Vehicles: 20
Leadership for Policy Rebalancing

Behavioural measures have immediate impact but are hard to sustain.

Infrastructure measures require ‘up front’ investment but can achieve permanent reductions in road injury.

Vehicle measures can secure permanent improvements but take up to 15 years to fully penetrate vehicle fleet.

Increasing integration opportunities across pillars of behaviour, infrastructure, speed and vehicles. Overall the ambition should be to gradually reduce the reliance on behavioural instruments.

Shared strategy ‘road maps’ needed to help rebalance policy instruments for a Safe System and zero fatalities.

Leadership is vital to make the shift.
Principles Underpinning a Safe System

1. People make mistakes that can lead to crashes;
2. The human body has a limited physical ability to tolerate crash forces before harm occurs;
3. A shared responsibility exists among those who design, build, manage & use roads & vehicles & provide post-crash care to prevent crashes resulting in serious injury or death;
4. All parts of the system must be strengthened to multiply their effects; and if one part fails, road users are still protected.

• Use as design principles for a Safe System
What is a Safe System?

SAFE SYSTEM

Road and roadside
- Educated, mostly compliant, make errors, physically vulnerable
- 70 (speed)
- Vehicle
- Operator
- Legislators
- Influencers
- Advocates
- Corporations
- Users
- Builders
- Designers
- Monitor

Post-crash response and medical care
- 50
- Vehicle
- Operators
- Legislators
- Influencers
- Advocates
- Corporations
- Users
- Builders
- Designers
- Monitor

Managerial tools
- Data
- Research
- Report
- Manage

Shared responsibility

Towards Zero Foundation
The Paradigm Shift to a Safe System

From crash reduction to injury prevention
Primary Crash Types

Motor Vehicles
- Run off road
- Head on
- Intersection

Vulnerable Road Users
- Powered two wheelers (Motorcyclists)
- Cyclists
- Pedestrians
Run off Road Crashes

Safe impact speed

**Primary treatment:** Roadside barriers to protect road users

Self explaining roads to minimise driver/rider error

**Vehicle technologies:** Electronic Stability Control & Lane Departure systems

Speed management to reduce incidence and outcome of crashes
Head-on Crashes

Safe impact speed

**Primary treatment:** Median barriers to eliminate head on crashes

Electronic Stability Control & Lane Departure Warning System

Speed management on undivided roads
Intersection Crashes

Safe impact speeds

**Primary treatment:** Understanding and managing impact forces through speed and angle

Roundabouts

Speed management – raised platforms

V2I & V2V technologies
Pedestrians & Cyclists

Safe impact speeds

**Primary treatment:** Speed management through planning & design.

Segregated facilities

**Vehicle Technologies:** Detection, avoidance & protection systems
Powered Two Wheelers (Motorcyclists)


Segregated lanes

Vehicle & Rider Protection Technologies
The Economics of the Safe System

Estimated Reduction in Fatal and Serious Injury Crashes
with cost-effective infrastructure improvements

Estimated % reduction in FSI
- Run-off
- Head-on
- Intersection
- Ped along
- Ped Crossing
- Bicycles
The Economics of the Safe System

Estimated Reduction in Fatal and Serious Injury Crashes with cost-effective infrastructure improvements

- Safe Speeds
- Safe Vehicles
- Safe Road Users
- Post Crash Response
Three key crash avoidance systems are today’s priority vehicle technologies:

**Electronic Stability Control (ESC)** anti-skid system with capacity to reduce up to 40% of run-off road crashes. Mandatory in most high income countries.

**Autonomous Emergency Braking (AEB)** automatically applies the brakes if the driver does not react and can cut collisions at low speed by 20%. Pedestrian systems are also appearing and will become an important injury prevention technology.

**Motorcycle Anti-lock Brakes (ABS)** improves stability and braking performance. Motorcycles equipped with ABS have rate of fatal crashes 37 per cent lower than same models without.
Self Driving Cars Forecast Global Sales by 2035: 11.8 Million or just 2.68% of the global light duty fleet. (IHS Automotive 2015)

So self driving cars will make no impact at all on road injury prevention by 2030. The policy priority should be driver assistance systems already in use and which are pathways-foundations towards autonomous vehicles. These include:

- Electronic Stability Control
- Autonomous Emergency Braking
- Intelligent Speed Assistance

There is a real risk that ‘hype’ about self driving cars will divert policy makers from mandating the technologies that can greatly contribute to road injury reduction to 2030 and beyond.
Five steps to an Urban Safe System

1. Data (spatial, KSI, analysis beyond behavioural “lens”)
2. Leadership (look beyond current paradigms, outcome+back cast)
3. Reduce speed
4. Invert design hierarchies
5. Sustain and build
(WRI) Urban safety design principles that:

• Reduce need for vehicle travel & foster safe speeds
• Calming-reduce speed, safe crossing
• Arterial corridors safe for all
• Network of connected cycleways
• Pedestrian facilities+access to space
• Safe access to mass transit corridors
some example journeys

towards understanding and implementing a safe system
Social Licence for Towards Zero/Safe System in Western Australia 2008-2020

• “share the science to engage and build support”. 2 years
• 44+ community forums (from Ministerial invitation to all MP’s)
• Online feedback
• Extensive opportunistic media
• Parliamentary Committee
• Bipartisan support (Parliament)
• Options/debate/discussion:-
  • partner with stakeholders
  • encourage shared implementation
Community Consultation-Strategy Options?

Optimum strategy
(15,300 less people KSI)

Recommended strategy
(11,000 less people KSI)

Projected cumulative savings in numbers killed and seriously injured 2008-2020 MURAX best possible strategy (OSSO).
Management by Results - Priority Business Cases based on priority crash types e.g.-

1. Metropolitan intersections
2. Run off road crashes
3. Impaired driving
4. Inappropriate and Excess Speed
5. Vehicle Occupant Safety and Vulnerable Users
<table>
<thead>
<tr>
<th>Indicator</th>
<th>Starting point</th>
<th>2012</th>
<th>Target year 2020</th>
<th>Trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>N.o. of fatalities on the roads</td>
<td>440</td>
<td>286</td>
<td>220</td>
<td>In line with required trend</td>
</tr>
<tr>
<td>No of seriously injured on the roads</td>
<td>5500</td>
<td>4400</td>
<td>4100</td>
<td>In line with required trend</td>
</tr>
<tr>
<td>Percentage of traffic within speed limits, national road network</td>
<td>43%</td>
<td>46%</td>
<td>80%</td>
<td>Not In line with required trend</td>
</tr>
<tr>
<td>Percentage of traffic volume within speed limits&lt; municipal road network</td>
<td>63%</td>
<td>63%</td>
<td>80%</td>
<td>Staring year for the measurement- the trend cannot be assessed</td>
</tr>
<tr>
<td>Percentage of traffic volume with sober drivers</td>
<td>99.71%</td>
<td>99.77%</td>
<td>99.9%</td>
<td>In line with required trend</td>
</tr>
<tr>
<td>Percentage of those wearing a seatbelt in the front seat of passenger cars</td>
<td>96%</td>
<td>98%</td>
<td>99%</td>
<td>In line with required trend</td>
</tr>
<tr>
<td>Percentage of cyclists wearing a helmet</td>
<td>27%</td>
<td>33%</td>
<td>70%</td>
<td>Not In line with required trend</td>
</tr>
<tr>
<td>Percentage of moped riders wearing a correct helmet</td>
<td>96%</td>
<td>96%</td>
<td>99%</td>
<td>Staring year for the measurement- the trend cannot be assessed</td>
</tr>
<tr>
<td>Percentage of passenger cars with the highest Euro NCAP score</td>
<td>20%</td>
<td>46%</td>
<td>80%</td>
<td>In line with required trend</td>
</tr>
<tr>
<td>Percentage of safe motorcycles (ABS)</td>
<td>9%</td>
<td>28%</td>
<td>70%</td>
<td>In line with required trend</td>
</tr>
<tr>
<td>Percentage of traffic volume on roads with speed limits above 80km/h with median barriers</td>
<td>Approx. 50%</td>
<td>71%</td>
<td>75%</td>
<td>In line with required trend</td>
</tr>
</tbody>
</table>
E.G- Safe System Working Groups Approach

- For a road/area/project:
  - Identify potential crash types (new) or data analysis (existing).
  - Use safe system principles in design to manage each anticipated crash type below human tolerances.
  - Back cast from 0-exceed standards
Safe System
Transforming thinking for new possibilities
New Zealand Results Focussed Management for a Safe System - reframing to safe system

- Undertake Safe System signature projects
- Establish Safe System partnership programme
- Reframe the road safety conversation
- Continue and expand Safe System training
- Continue reviews of systems guidelines, processes and procedures
Intersection crashes - towards safe system

• From user blame to safe system principles

• How do road users *use* infrastructure?

• Can we design our roads to achieve survivable impact speeds?

• How do we mitigate crash frequency *and* severity? *(e.g. roundabouts)*
Run-off road crashes to safe system

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Crash Reduction Factor</th>
<th>Time to Treat with Current Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seal shoulders</td>
<td>40%</td>
<td></td>
</tr>
<tr>
<td>Audible edge lines</td>
<td>20%</td>
<td>over 25 years</td>
</tr>
<tr>
<td>Safety barriers</td>
<td>90%</td>
<td></td>
</tr>
</tbody>
</table>

- Safety barrier
- Sealed shoulder
- Audible edge line
Worked Example:
Using a safe system lens with KSI data for risk taking vs error analysis:
## Example Risk and Error KSI Analysis

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Baseline 2005-2007</th>
<th>2013 Actual</th>
<th>% change to baseline</th>
<th>2020 Target</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatal</td>
<td>200</td>
<td>161</td>
<td>-19.5%</td>
<td>120</td>
<td>+41</td>
</tr>
<tr>
<td>KSI</td>
<td>3074</td>
<td>2500</td>
<td>-19%</td>
<td>1844</td>
<td>+656</td>
</tr>
<tr>
<td>Alcohol Fatal</td>
<td>61</td>
<td>38</td>
<td>-38%</td>
<td>37</td>
<td>✓</td>
</tr>
<tr>
<td>Alcohol KSI</td>
<td>335</td>
<td>184</td>
<td>-45%</td>
<td>201</td>
<td>✓</td>
</tr>
<tr>
<td>Speeding Fatal</td>
<td>66</td>
<td>34</td>
<td>-48%</td>
<td>40</td>
<td>✓</td>
</tr>
<tr>
<td>Speeding KSI</td>
<td>490</td>
<td>238</td>
<td>-51%</td>
<td>294</td>
<td>✓</td>
</tr>
<tr>
<td>Seatbelt Fatal</td>
<td>47</td>
<td>24</td>
<td>-49%</td>
<td>28</td>
<td>✓</td>
</tr>
</tbody>
</table>
Example: Risk and Error KSI Analysis

<table>
<thead>
<tr>
<th>Indicator KSI</th>
<th>Baseline 2005-2007</th>
<th>2013 Actual</th>
<th>% change to baseline</th>
<th>2020 Target</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intersections</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All</td>
<td>1301</td>
<td>1040</td>
<td>-20%</td>
<td>781</td>
<td>+259</td>
</tr>
<tr>
<td>Error/judgmt</td>
<td>1056</td>
<td>888</td>
<td>-16%</td>
<td>634</td>
<td>+254</td>
</tr>
<tr>
<td>% Error/judgmt</td>
<td>81%</td>
<td>85%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Run-off Road</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All</td>
<td>1108</td>
<td>870</td>
<td>-22%</td>
<td>665</td>
<td>+205</td>
</tr>
<tr>
<td>Error/judgmt</td>
<td>615</td>
<td>609</td>
<td>-1%</td>
<td>369</td>
<td>+240</td>
</tr>
<tr>
<td>% Error/judgmt</td>
<td>55%</td>
<td>70%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Intersections (42%) and run-off crashes (35%) comprise 77% of all KSI.
Safe system - risk taking vs error
How do we get to a Safe System?

Shift to a safe system is a social, political & professional challenge - not technical or economic.

So we need:

Strong and Sustained Leadership to:

– Overcome persistent community/professional awareness & demand deficits in the problem & solutions by communicating to build support

– Press the political system to embrace a safe system shift for zero deaths and injuries
Leadership

• Leading change involves identifying & closing gaps: - two types -

1. **Performance gap** - “We are” vs “we should”
2. **Opportunity gap** - “We could”

• Good competitive, customer service, results at **1**.
• Delight your customers between “should” & “could” **safe system?** - need change management
• (Prof Linda Hill, Harvard Business School)
Leadership and Networking

- Networking is a way to identify and close gaps
- **Strategic network** - helps you find gaps
- **Operational network** - helps you close gaps
- No substitute for meet and greet.
- Meet with and introduce people to each other who you need to help you
3 Imperatives in Leadership

1. **Managing Yourself** (energy & how to match intent with impact).
2. **Managing your network** (people you don’t have control over but need deeply).
3. **Managing your team** (pick right people).

Wrong team overwhelms you and limits your capacity for 1 and 2.
ITF Recommendations for the journey to a safe system (1)

1. Think safe roads, not safer roads
2. Provide strong leadership for change- Political Leadership is vital
3. Use 4 principles to guide the journey to a safe system (design?)
4. Underpin aspirational goals with interim targets to build confidence
5. Establish shared responsibility
6. Leverage all parts of a Safe System for greater overall effect
7. Build data collection, analysis & research to show hidden problems and communicate to build support for new approach and new solutions.
A Social Licence for Change in Road Safety

Customer (Community)

Communication

Leadership

Lens
Look in our blind spots to see the mistakes people make and make a paradigm shift to a safe system.

Thank you

What can you contribute in your community’s journey?

www.internationaltransportforum.org
Questions? (Swan & Canning rivers, Perth)
The Safe System – 2nd Principle

The human body by nature has a limited physical ability to sustain crash forces:
Managing Road Safety by Results

*Figure 1: The road safety management system*¹
## Example Risk and Error KSI Analysis

<table>
<thead>
<tr>
<th>Indicator KSI</th>
<th>Baseline 2005-2007</th>
<th>% change to baseline</th>
<th>2020 Target</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age 17-20</td>
<td>468</td>
<td>-38%</td>
<td>281</td>
<td>+8%</td>
</tr>
<tr>
<td>Age 17-24</td>
<td>820</td>
<td>-34%</td>
<td>492</td>
<td>✓</td>
</tr>
<tr>
<td>&gt;60</td>
<td>339</td>
<td>+6%</td>
<td>204</td>
<td>+154</td>
</tr>
<tr>
<td>Pedestrian</td>
<td>209</td>
<td>0%</td>
<td>125</td>
<td>+84</td>
</tr>
<tr>
<td>Motorcyclist</td>
<td>366</td>
<td>+18%</td>
<td>220</td>
<td>+212</td>
</tr>
<tr>
<td>Cyclist</td>
<td>100</td>
<td>+37%</td>
<td>60</td>
<td>+77</td>
</tr>
<tr>
<td>Driver</td>
<td>1615</td>
<td>-25%</td>
<td>969</td>
<td>+241</td>
</tr>
<tr>
<td>Passenger</td>
<td>784</td>
<td>-35%</td>
<td>471</td>
<td>+30</td>
</tr>
</tbody>
</table>
## Business case for infrastructure interventions

<table>
<thead>
<tr>
<th>What could be achieved</th>
<th>Low-income countries</th>
<th>Lower-middle income countries</th>
<th>Upper-middle income countries</th>
<th>High-income countries</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improve 10% of highest risk roads</td>
<td>108 000 km</td>
<td>610 000 km</td>
<td>992 000 km</td>
<td>1 546 000 km</td>
<td>3 255 000 km</td>
</tr>
<tr>
<td>Build viable countermeasures (USD)</td>
<td>8 billion</td>
<td>61 billion</td>
<td>149 billion</td>
<td>464 billion</td>
<td>681 billion</td>
</tr>
<tr>
<td>Reduction in fatalities over 20 years</td>
<td>384 000</td>
<td>1 483 000</td>
<td>1 528 000</td>
<td>283 000</td>
<td>3 678 000</td>
</tr>
<tr>
<td>Reduction in fatalities and serious injuries over 20 years</td>
<td>4 224 000</td>
<td>16 313 000</td>
<td>16 808 000</td>
<td>3 113 000</td>
<td>40 458 000</td>
</tr>
<tr>
<td>Economic benefit over 20 years (USD)</td>
<td>83 billion</td>
<td>663 billion</td>
<td>2 766 billion</td>
<td>2 202 billion</td>
<td>5 715 billion</td>
</tr>
<tr>
<td>Benefit cost ratio</td>
<td>11</td>
<td>11</td>
<td>19</td>
<td>5</td>
<td>8</td>
</tr>
</tbody>
</table>

Consultation- benefits/costs

- *Towards Zero* will **save 11,000 people** from being killed or seriously injured

- estimated financial cost
  - of those injuries $6.6b ($600,000/KSI)
  - to prevent them $2.5b ($230,000/KSI)

- immeasurable emotional cost to victims and loved ones

- benefits beyond safety
  - free up hospital resources
  - encourage active lifestyles
  - reduce energy consumption
  - liveable neighbourhoods