Catalogue of ‘Good’ and ‘Bad’ examples

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ROAD SAFETY SEMINAR
Lome, Togo
October 2006
Format of talk

- Highway Factors – Road Design
- What is Road Safety Audit?
- What is Road Safety Inspection?
- Purpose of Catalogue
- Structure of the Catalogue
- How to use the Catalogue
- Examples
Highway Factors – Road Design

- Geometric design
- Visual Messages
- Misleading Information
- Lack of Provision
What is Road Safety Audit?

Systematic process for checking road safety implications of new schemes and highway improvements

- New motorways to
- Small local improvements e.g. pedestrian crossings

Carried out at formal design and post-construction stages

Requires independent staff with experience of road safety engineering to undertake Safety Audit
What is Road Safety Audit?

Safety Audit report is a formal document, describing a problem...

- “who can be hurt and in what way?”

...and a recommendation

- How the risk can be removed or reduced

Report is produced for the scheme client
Client decides how to respond to the recommendations
Important to document the Safety Audit process
A Road Safety Inspection (RSI) is an on-site systematic review of an existing road or section of road to identify hazardous conditions, faults, deficiencies that may lead to serious accidents.
Purpose of Catalogue

- To give a readily understood presentation of problems
- To suggest a range of potential solutions
- To give an indication of comparative solution costs
- To facilitate prioritisation of work
Structure of Catalogue

Headings taken from RSA and RSI Checklists

- Function
- Cross Section
- Alignment
- Intersections, Junctions, Traffic Signals
- Service and Rest Areas
- Parking, Loading and Deliveries
- Traffic Signs, Marking and Lighting
- Roadside Features
- Passive Safety Installations
- Public Transport Stops
- Pedestrians, Non-Motorised Users and Bus Stops
PIARC TC 3.1
Interaction between RSA and RSI

ROAD SAFETY AUDIT (RSA)
How to use the Catalogue
(as part of the RSA process)

- Consider the subject area (e.g. intersections)
- Use examples of what can go wrong as a guide during the design process
- Use indicative costs to decide on most cost-effective solution
- Implement design
- Monitor
Alternative way to use the Catalogue
(as part of the RSI process)

- Review the area/network of concern
- Consider the potential accidents that could occur from the individual sections of the guidance e.g. intersections
- Look at potential remedial measures
- Estimate accident savings and economic benefits
- Decide on remedial measures
- Prioritise work
- Implement remedial measures
- Monitor
### Examples of Potential Accident Reduction

<table>
<thead>
<tr>
<th>Accident problem</th>
<th>Remedial treatment</th>
<th>Schemes</th>
<th>Average cost (£)</th>
<th>Reduction in accidents (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wet skidding accidents</td>
<td>Anti skid surface</td>
<td>34</td>
<td>8620</td>
<td>57</td>
</tr>
<tr>
<td>Loss of control on bends</td>
<td>Chevron signs</td>
<td>14</td>
<td>2505</td>
<td>43</td>
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<tr>
<td>Darkness accidents</td>
<td>Lighting</td>
<td>14</td>
<td>9709</td>
<td>21</td>
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<tr>
<td>Accidents at existing signals</td>
<td>Signal improvement</td>
<td>16</td>
<td>17095</td>
<td>22</td>
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<tr>
<td>Right turn accidents</td>
<td>Right turn lane</td>
<td>12</td>
<td>11849</td>
<td>48</td>
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<tr>
<td>Poor visibility</td>
<td>Visibility improvement</td>
<td>12</td>
<td>7890</td>
<td>27</td>
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<tr>
<td>Vehicle accidents at junctions</td>
<td>Junction improvement</td>
<td>34</td>
<td>18513</td>
<td>44</td>
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<tr>
<td>Fail to give way at junctions</td>
<td>New traffic signals</td>
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<td>40717</td>
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<tr>
<td>Junction accidents</td>
<td>Mini roundabout</td>
<td>18</td>
<td>14769</td>
<td>49</td>
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<tr>
<td>Inappropriate speed on links</td>
<td>Speed camera</td>
<td>28</td>
<td>18236</td>
<td>13</td>
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<tr>
<td>Pedestrian accidents on link</td>
<td>Controlled crossing</td>
<td>73</td>
<td>15916</td>
<td>31</td>
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<tr>
<td>Pedestrian accidents on link</td>
<td>Refuges</td>
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<td>10387</td>
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<tr>
<td>Pedestrian accidents at existing crossing</td>
<td>Crossing improvement</td>
<td>35</td>
<td>11057</td>
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<tr>
<td>Pedestrian accidents</td>
<td>Guard rail</td>
<td>28</td>
<td>6230</td>
<td>30</td>
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<tr>
<td>Various</td>
<td>Markings</td>
<td>43</td>
<td>2020</td>
<td>34</td>
</tr>
<tr>
<td>Various</td>
<td>Markings and signs</td>
<td>63</td>
<td>2537</td>
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<tr>
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<td>Package of measures</td>
<td>97</td>
<td>22099</td>
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<td>Resurfacing</td>
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<td>Road improvement</td>
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<td>15882</td>
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<tr>
<td>Various</td>
<td>Warning signs</td>
<td>36</td>
<td>553</td>
<td>46</td>
</tr>
</tbody>
</table>

(Source – TMS Consultancy)
### Examples

#### Right Turn Conflicts

**Description:** Right turn conflicts are the most crash-prone manoeuvres at an intersection as the right turning traffic slows down with the intention to cross the path of the straight ahead fast moving traffic. Any gap acceptance errors or misjudgements of speed can lead to severe crashes.

**Treatments & Their Benefits**

- **T 1:** Staggered intersection to spread out the conflict area due to right turns
- **T 2:** Roundabout provision to reduce the conflicts that arise due to right turns
- **T 3:** Traffic signals to control vehicular movements on the right turn

**T 4:** The provision and maintenance of good skid resistant surfaces

**Affected Users:** All users

**Crash Types:**
- Side collisions
- Rear Shunt collisions

**Potential Solution**

**Comparative Cost**

| Treatment | Benefit | Cost
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>T 1: Staggered intersection</td>
<td>Reduces accidents by some 60%</td>
<td>$$$</td>
</tr>
<tr>
<td>T 2: Roundabout provision</td>
<td>Reduces accidents by 30% or more</td>
<td>$$$</td>
</tr>
<tr>
<td>T 3: Traffic signals</td>
<td>Controls vehicular movements on the right turn</td>
<td>$</td>
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</tbody>
</table>
**Examples**

**Description:**
Right turn conflicts are the most common crash-prone manoeuvres at an intersection. The right turning traffic slows down with the intention of crossing the path of the oncoming fast moving traffic. Any gap acceptance errors or misjudgement of speed can lead to severe crashes.
Examples

**Treatments & Their Benefits**

T 1: Staggered intersection to spread out the conflict area due to right turns

![Staggered Intersection](image1)

T 2: Roundabout provision to reduce on the conflicts that arise due to right turns

![Roundabout](image2)

T 3: Traffic signals to control vehicular movements on the right turn

![Traffic Signals](image3)
Examples

### Treatment Types & Costs

**T 1:** The replacement of a rural crossroad intersection by a staggered intersection has been shown to reduce accidents by some 60%. $$$

**T 2:** The conversion of the intersection to a roundabout. This has been shown to reduce accidents by 30% or more. $$$

**T 3:** The conversion of the intersection to traffic signal control. $$

**T 4:** The provision and maintenance of good skid resistant surfaces $

### Crash Types

- Side collisions
- Rear Shunt collisions

### Affected Users

All users
Examples
Examples
Thank you all very much for your attention