

Evaluation of Road Safety Audit Reports

Peter Monahan

5th April 2016

Task Overview

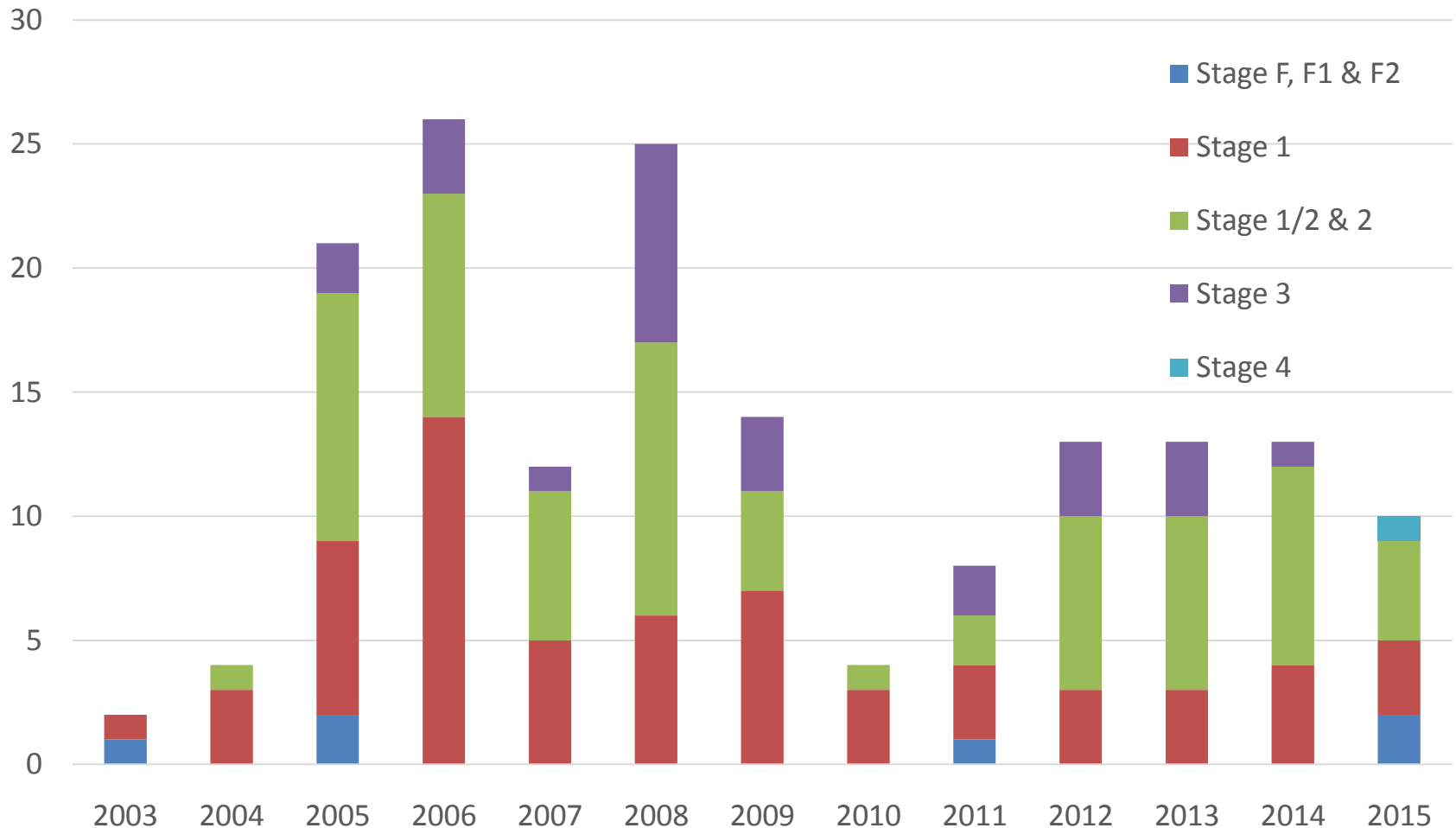
Review sample of RSA Reports in TII Database and:

1. Identify the most commonly recurring Problems or category of Problems
2. Identify the most commonly recurring Recommendations for each Problem/Problem Category
3. Assess the need for changes in current design standards and practices to address the most commonly recurring Problems
4. Review each Report for Completeness with respect to applicable RSA Standard

RSA Reports Reviewed

- 167 Reports
 - 6 Stage F
 - 62 Stage 1
 - 34 Stage 1/2
 - 33 Stage 2
 - 31 Stage 3
 - 1 Stage 4
- 70 Urban
- 97 Rural
- 13 Motorway
- 15 Dual Carriageway
- 1 Dual/Single Carriageway
- 58 Single Carriageway
- 41 Junction Improvements
- 35 Development Schemes
- 4 NMU/Pedestrian Crossings

Distribution of Sample Reports by Date



1,691

Team

Project Manager

P. Monahan

Review Team

M. O'Brien

N. Bruton

A. O'Reilly

Checking/Validation

E. Conlon

Compliance Report

M. O'Brien

Problem Report

N. Bruton



Methodology – Compliance

- Applicable Standards:
 - HD 19/01 21 Reports
 - HD 19/04 78 Reports
 - HD 19/07 0 Reports
 - HD 19/09 31 Reports
 - HD 19/12 30 Reports
 - HD 19/15 3 Reports
- Check against Mandatory Elements
- Check against Recommended Elements

Mandatory

- Scheme
 - clearly defined Brief
 - Audit Stage clearly identified
 - Stage F carried out in 2 Phases
- Audit Team
 - Minimum of two Audit Team Members
 - Audit Team clearly identified
 - Independence from Design Team

Mandatory

- Site Visits
 - Site Visit undertaken
 - Stage 3 visits in daylight & darkness
 - Invitations sent for Stage 3
- Audit Report
 - Problems/Recommendations included
 - Deals with Road Safety under all conditions
 - Signed Audit Statement Included
- Audit Close-Out
 - Designer's response received
 - ATL signed feedback form

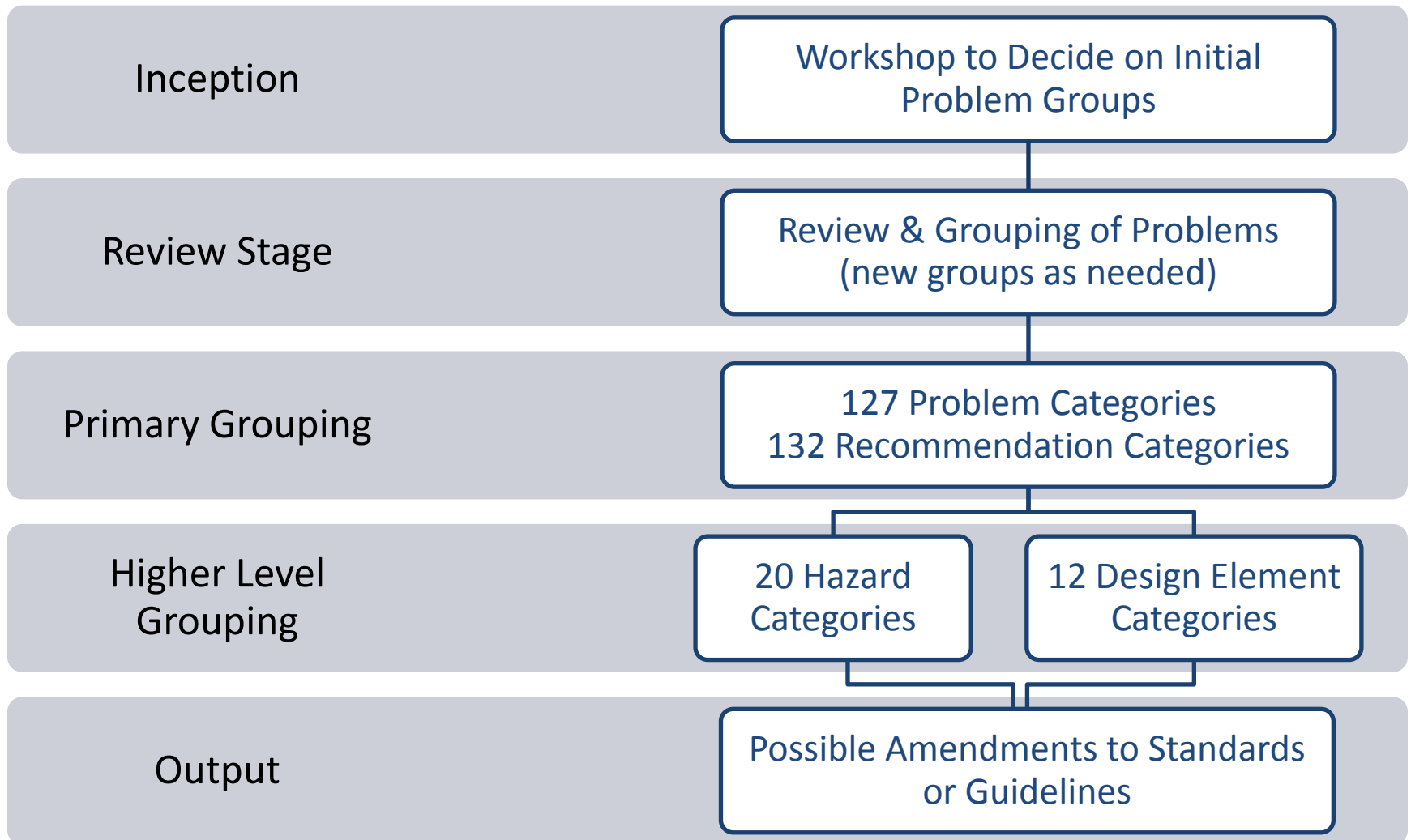
Analysis to-date

- Overall compliance with all criteria – 31%
 - Most Common non-compliance issue was lack of a Feedback Form or Designer's Response (48%)
 - Audit Reports not Completed
- Not clear in all cases that: -
 - Audit Team independent
 - What the details of the Scheme being audited are (Urban/Rural; Speed Limits; Cross-section; etc.)
- Not possible to assess certain criteria
 - Road Safety of all road users considered
 - Road Safety under all conditions

Interim Findings on Compliance

- Audit Statement could be enhanced
 - Include statements that all conditions and all users considered
 - Confirmation that enough information provided to undertake an RSA, or to list the information not made available
- Extend for all schemes the PMG requirement to complete RSA prior to next PMG Phases
- Guidance on information to be included in scheme background/description
- Revised Sample Report to demonstrate all proposed enhancements/changes

Methodology – Problems



Hazards - Total

1. Other/Scheme Specific
2. Hazards – insufficient warning
3. Junction Layout
4. Hazards - edge of carriageway
5. Alignment and Cross section
6. Misleading/incorrect signs & markings
7. Lack of maintenance
8. NMUs - Inadequate facilities - pedestrians
9. Insufficient visibility - Links
10. NMUs - No facilities for pedestrians
11. Poor junction strategy/planning
12. Insufficient visibility - Junctions
13. Incomplete data to audit
14. Hazards - Inadequate Safety Barrier provision
15. High Speeds
16. Hazards - within carriageway
17. Issues with Tie-ins
18. Inconsistent public lighting levels
19. NMUs - Inadequate facilities - cyclists
20. Parking

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Hazards – By Stage

Stage 1	Stage 1/2 & Stage 2	Stage 3
Poor junction layout	Hazards at edge of carriageway	Hazards without sufficient warning
Alignment and Cross section	Poor junction layout	Hazards at edge of carriageway
Poor junction strategy/planning	Hazards without sufficient warning	Lack of maintenance
Hazards without sufficient warning	Misleading/incorrect signs & markings	Misleading/incorrect signs & markings
Inadequate facilities for pedestrians	Alignment and Cross section	Inadequate Safety barrier provision
Insufficient visibility at Junctions	Inadequate facilities for pedestrians	Incomplete – could not audit

Hazards – By Stage

Stage 1	Stage 1/2 & Stage 2	Stage 3
Poor junction layout	Hazards at edge of carriageway	Hazards without sufficient warning
Alignment and Cross section	Poor junction layout	Hazards at edge of carriageway
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Hazards without sufficient warning	Misleading/incorrect signs & markings	Misleading/incorrect signs & markings
Inadequate facilities for pedestrians	Alignment and Cross section	Inadequate Safety barrier provision
Insufficient visibility at Junctions	Inadequate facilities for pedestrians	Incomplete – could not audit

Analysis of Collisions (2013)

- KSI – National & Side Roads (200m)
- 3 Years CT68 / PC16 - '09 – '11
- Categorise Collisions
 - Road elements contributing to Incident
 - Road elements contributing to Severity
- Minor Injury Collisions within 250m of Road related KSI incidents (252 in Total)

Analysis of Collisions (2013)

- 500 KSI Collision Records Reviewed
- 43% Discounted
 - 8% Insufficient Information
 - 35% Non-road related
- Urban v Rural distinction
 - 82% Rural
 - 18% Urban

Analysis of Collisions (2013)

- Collision Analysis
 - 30% of fatalities & 22% of Serious Injuries in 2009 to 2011 occurred on national single carriageways
 - 50% of all KSIs reviewed involve Roadside Hazard
 - Road considered a factor in 57% of all KSIs
(not necessarily a cause)
- Where Road is a Factor
 - 25% at Junctions
 - 83% with Rural Roadside Feature
 - 92% with Urban Roadside Feature
 - pedestrians 31% of Urban
 - pedestrians 5% of Rural

Safe Systems

- Road Users are fallible
 - Collisions will occur
- Humans are Frail
 - Forgiving Road System
- Designers accept and share responsibility for the safety of the system
- Road Users accept responsibility for complying with the rules and constraints of the system
 - Legible Roads

Design Elements

1. Signs and Markings
2. Junctions
3. Other
4. Paved areas
5. Alignment
6. Barriers
7. Visibility
8. Drainage
9. Earthworks
10. TTM
11. Pavement
12. Lighting
13. Fencing











Recommendations

- Many Problems address issues already covered in Standards/Other Documents
 - Traffic Signs Manual & TD 41-42 - Issues addressed in these, but still appear as Problems
- Some Problems originate in early Design Stages
 - Landtake fixed
 - Decisions affect design options in future
 - Existing Hazards not considered
- Improvements required to design co-ordination
 - Include checklists to be considered in early design stages to limit known safety issues
 - Add checklists of commonly occurring RSA Problems and for Designer to confirm have been checked before RSA undertaken
 - TD 19 - Existing Hazards to be identified and rated as per Appendix D
 - PMG - Prescribe 'overlay' drawings to identify interaction between various design elements.

Recommendations

- Vehicle Restraint Systems
 - TD 19 - Require drawings to be prepared showing VRS working width alongside all roadside furniture items (possibly addressed more readily as BIM adopted)
- Visibility
 - Visibility Problems occur regularly, but well covered in Standards
 - TD 9 & 41-42 - Drawings should show visibility envelopes to be kept clear
- Tie-ins and Adjacent Road Network
 - Provide sections in various volumes of DMRB, soon to be TII Publications, similar to TD19 where on-line realignments are treated in a separate chapter - Chapter 8, as many issues relate to tie-ins and existing constraints.
 - TD 27 - Tie-ins – especially XS width
 - TD 41-42 - Many issues at, or just beyond, Scheme extents – esp. on Development projects
 - TD 9 - Long-sections to include existing roads for distance outside extents (e.g. up to 1.5 x SSD of FOSD as appropriate)
 - Issues at Urban/Rural Transitions
- MCDRW – consider new RCDs for common issues
 - e.g. series of single chevron signs on bends