Urban Intersection Visibility – The Impact on Road Safety and Urban Design

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Format

• What are we talking about?
• What’s the problem?
• Why has this happened?
• Was it justified?
• What are the impacts?
• Progress to date.
• What still needs to be done…
What are we talking about?

- Distance a motorist can see unobstructed when waiting at a minor arm.
- Adequate inter-visibility between vehicles on major and minor arms.
- Dependant on vehicle speeds, deceleration rates and driver reaction times.
What’s the problem?

• Local Authorities applying standards without consideration of impacts.
• Visibility splays standards have been used as a checkbox against new developments and proposals.
• Little evidence to suggest excessive visibility results in improved road safety.
• Can have significant implications for vulnerable road users.
• Negative implications on urban design.
• Disjointed connectivity for pedestrians and cyclists.
• Engineers reluctant to accept new guidance.
Historic Visibility Splays - UK

DMRB and DB32

- Visibility required to ensure operation of major road is not effected by minor road turning movements – OPERATION!

- Visibility provided will also maintain SSD for major road traffic thus improving road safety.

- Large visibility splays were common!!!

<table>
<thead>
<tr>
<th>Speed</th>
<th>DMRB</th>
<th>DB32</th>
</tr>
</thead>
<tbody>
<tr>
<td>50km/hr</td>
<td>90m</td>
<td>60m-90m</td>
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</table>
NZ/AUS Standards

- Approach Sight Distance (ASD)
- Safe Intersection Sight Distance (SISD)
- Minimum Gap Sight Distance (MGSD)
- Stopping Sight Distance (SSD)

'intersection should be designed to provide the more conservative value of SISD or MGSD…’

<table>
<thead>
<tr>
<th>Speed</th>
<th>SISD (m)</th>
<th>MGSD (m)</th>
<th>SSD (m)</th>
<th>NZS 4404:2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 km/hr</td>
<td>97</td>
<td>69</td>
<td>55</td>
<td>65</td>
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</table>

‘…wherever it is physically and economically practicable designers should therefore consider the provision of a more generous sight distance than those tabulated in this section.’
12 Case studies assessed to determine relationship between crashes and visibility.

8 out of 9 turning crashes at sites with visibility over 90m.

Increases traffic speeds at sites with high visibility.

Pedestrian and cyclist crashes only observed at sites with visibility 90m and over.
Findings.

- Excessive visibility does not guarantee road safety.
- Improved visibility correlates with increases in speed – MfS research.
- Excessive visibility detracts from immediate conflicts such as pedestrians and cyclists.
- Reduced visibility does not result in poor road safety!
- Can reduce potential for development.
- Can negatively impact on urban design.
- Can have negative economic impacts.
- Historic processes place traffic above other demands including pedestrians and cyclists.
Good urban design provides ease of movement which promotes accessibility and permeability, putting people before traffic. The facilitation of 'real' pedestrian and cycle desire lines can be incorporated within good urban design. Visibility splays break down the relationship between building and kerb line. Streets should be designed as public spaces (rather than traffic routes)…likely to be more convenient to for all users.

Good urban design has been shown to add value by increasing economic viability of development. Good quality street design can add at least 5 per cent to the price of homes. The general public are willing to spend more money on council tax and public transport costs if it results in improved street design in their own area.
Progress in the UK

- Withdrawal of old redundant standards – all non-trunk roads
- New guidance based on research and empirical evidence
- Encourages us all to think – ‘An Engineer should think, not follow!’
- NO TICK BOXES!!

<table>
<thead>
<tr>
<th>Speed (km/hr)</th>
<th>Visibility (m)</th>
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</thead>
<tbody>
<tr>
<td>50</td>
<td>45m</td>
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</table>
Transit New Zealand (2005)

The objective of it’s urban design policy is to ‘achieve an affordable state highway network that New Zealander’s can be proud of in future.’

‘Urban design initiatives should not attempt to disguise a road rather they should enhance its integration with the surrounding environment.’
IPENZ (2009) –
‘the current standard gets in the way of modern thinking in urban design and is partially responsible for what many consider to be our ‘soul less’ suburban landscape’.

‘in practice many TA’s consider the complying standards as the only solution and treat alternatives differently in the RMA process, and some simply obstruct different design solutions.’

‘something of a straightjacket…’
‘highly uniform solutions…’
‘no consideration of context or place..’
NZS 4404:2010

All roads shall be designed with sight distances that match the target operating speed. Reducing a driver’s field of vision in conjunction with other design and management measures is a recognised method for achieving an appropriate speed environment.

Arterial and connector/collector routes, sight distance criteria at intersections should be applied in accordance with relevant Austroads or NZ guides.

…designing to a target operating speed…reference can also be made to MfS.
What still needs to be done?

- Local Authorities should document design processes suitable for their city/district/region.

- Designs should adopt MfS (or similar) philosophies based on experience and supported by research and evidence – sound engineering judgement!

- All engineers need to push boundaries whilst using accepted approaches which are well documented and can therefore be supported.
Innovative Solutions

- Do not need to be expensive.

- Should be based on engineering experience and sound judgement.

- Research appropriate locations and treatment methods.

- Undertake appropriate audits with suitably qualified personnel – Quality Audits, Road Safety Audits etc.

- Future monitoring to inform future decision.
Any Questions?

‘a road is a tribute to space. Every stretch of road has meaning in itself and invites us to stop. A highway is a triumphant devaluation of space, which thanks to us has been reduced to a mere obstacle to human movement and a waste of time.’