Economically Justified Traffic Control Systems

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NZ’s Motorway Network
- 200km access controlled, high speed
- <2% of State Highway Network
- Carries 10% of NZ’s traffic
- Towards capacity, few dominant bottlenecks

How do Managed Motorways Work?
- Technology
  - Monitor
  - Detect
  - Control / Inform
  - Enforce
- Traffic Officers
  - Manage
  - Respond
  - Control
  - Coordinate
Efficiency / Safety / Environmental

- Capacity +7 to 9%
- Journey time reliability + 22%
- Users experience no congestion +7%
- Journey times - 24% (NB) & 9% (SB)
- Speed compliance ≥ 94%
- Personal Injury Accidents - 42%
- Vehicle emissions – 4 to 10%
- Fuel use – 4%
- Noise – 1.8 to 2.4 dB

Cost Estimate

<table>
<thead>
<tr>
<th>Managed Motorway Component</th>
<th>Cost / km</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shoulder Pavement Strengthening</td>
<td>$0.7m</td>
</tr>
<tr>
<td>VMS signage, say 4km @ $50K each, commissioned</td>
<td>$0.2m</td>
</tr>
<tr>
<td>Gantries, signals, shoulder and median, $450K each @ 2km</td>
<td>$0.9M</td>
</tr>
<tr>
<td>Combined VSL/LCS roundels, $8K each * 4 lanes (each direction) @ 2km</td>
<td>$0.7M</td>
</tr>
<tr>
<td>Civil works</td>
<td>$1.9M</td>
</tr>
<tr>
<td>Traffic Management Plans</td>
<td>$0.5M</td>
</tr>
<tr>
<td>Design and supervision</td>
<td>$0.4M</td>
</tr>
<tr>
<td>Operations and maintenance assumed to be 2.5% of capital cost</td>
<td>$0.1M</td>
</tr>
</tbody>
</table>

- Approximately $4.5M / km / direction of travel
- 25% the cost of widening?

Benefit : Cost Ratio (BCR)

- UK's M42 Pilot Scheme
  - BCR: 5.6
- UK's M4/M5 Managed Motorway
  - BCR (estimate): 7.1
- Auckland Managed Motorway Project, Business case and outline BCR
  - BCR (high level estimate): 4.7

Managed Motorways in NZ?

- Congestion
- Design Guidance
- Relevant NZ <-> UK Difference:
  - Speed limits
  - Driver behaviour
  - Constructed motorway environment
  - Enforcement
- How can the potential be assessed and quantified?

Traffic Modelling

- Real time simulation of individual vehicles
- Influence model operation
- Interrogate model performance
- Speed – flow relationship

Microsimulation Modelling

- Traffic Characteristics
- Design input
- Establish Economic Benefits
- Assess VMSL and HSR
- Value of Enforcement
- Response to Incidents
- Subtle Complexities
Conclusion

- Design Guidance
  - Excellent BCRs
  - Assessment Tools

THE END
Questions?