Measuring the Cost of Operational Resilience on State Highways

Thanura Rabel, REAAA Conference
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Presentation Outline

1. Operational Resilience – High probability Low Impact Events
2. Strategic Context
3. NZ Transport Agency’s Current Guidance
4. Introduction to Assessment Methodology
5. Case Studies
6. Conclusions and Outcomes
7. Lessons Learnt and Final Thoughts
High Probability Low Impact Events

- Incidents which occur in an operational sense
- Short duration – typically resolved in a matter of hours not days

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Context

- Government Policy Statement Draft 2018
- Predictable Journey’s
- Customer satisfaction

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Resilience Planning - NZTA

- Resilience Planning Tools
- Traffic Road Event Incident System (TREIS)
- One Network Road Classification
- Economic Assessment – MERIT Tool
# Basic Methodology

1. **Assess Probability**
   - Annual frequency of Occurrence

2. **Assess Consequence**
   - Travel time delay

3. **Determine Lifecycle Cost**
   - Economic Evaluation Manual

### Case Study One: Simple (First Principles)

### Case Study Two: Complex (Traffic Modelling)
Case Study One

- ONRC Regional Strategic Highway
- Suffers from frequent road closures from slips, crashes and weather events
- Only alternative route is a 175 minute diversion
- Response time over 45 minutes
- As such, some vehicles are known to wait through entire duration of closure
- Option to provide improved route and capacity

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Case Study One

1. **Assess Probability**: TREIS records for partial and full road closures. Confirmation with NOC operator

2. **Assess Consequence**:
   - Full road closure
   - Partial road closure

3. **Determine Cost**: Economic Evaluation Manual

*Preliminary results show that HPLI benefits account for 15% to 19% of the total PV benefits package*
Case Study Two

- ONCR National High Volume Urban Road
- Suffers frequent crashes during peak hours with slips and flooding also common
- Strategic level transport model for the surrounding network available
- Option to provide alternative route

Other considerations for Urban Context

- Differences in effect between AM and PM Peak
- Working from Home
- Modal Shift
- Communication

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Case Study Two

1. **Assess Probability**: TREIS records for partial and full road closures. More detailed analysis to categorise into time periods (i.e. AM, PM and Inter-peak)

2. **Assess Consequence**: Transport modelling used to assess network wide impacts
   a) Full road closure: Link fully closed and vehicles are required to use alternative routes
   b) Partial road closure: Capacity reduced on link to emulate one lane.
   c) Effects on traffic already using alternative routes

3. **Determine Cost**: Economic Evaluation Manual
Preliminary results again show that HPLI benefits account for 10% to 15% of the total PV benefits package.
Conclusions

- HPLI resilience benefits are there and worth pursuing at the right sites!
- Establish site context. These are the key drivers for HPLI benefits:
  - What are the alternatives and associated delays?
  - Traffic volumes
  - Obvious problems with road closures?
- Access to incident records (alternatives to TREIS is the NZTA twitter feed)
- Benchmarking through performance regime based on ONRC – much like PPP projects
Lessons Learnt

- Variability in TREIS data. Duration of closure is not necessarily the actual duration of closure but rather when it was logged
  - Important to confirm TREIS data with NOC operator
- Uncertainty always going to be there!
  - Sensitivity testing
- NZTA Incident Management Tool
Final Thoughts

Resilient Transport Network

Capacity

Ownership/Governance

Diversity

Inter-Connectivity
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