World Road Association (UK) 2012 Congress
Maximising growth through transport

WITH THANKS TO THE CONGRESS SPONSORS:
Dr Andrew Murray
Road maintenance funding and delivery - the Northern Ireland perspective

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Road Maintenance Funding and Delivery
The Northern Ireland Perspective

Presentation to
World Road Association - 2012 Congress

Dr Andrew Murray
Director of Network Services
31 October 2012
The Road Network – a vital asset

- 2½ times more roads per head than England
- NI: 99% of freight moves by road  GB: 64%
- asset worth around £30bn
- almost everyone uses roads & footways every day
An integrated road authority

- Sole roads authority in Northern Ireland
- Responsible for entire road network:
  - 25,800 km of road
  - 9,900 km of footway
  - 5,800 bridges
  - 265,000 street lights
  - 360 car parks
Cost of Maintaining the Network

Structural Maintenance Budget 12/13*

- resurfacing / strengthening £38.6m
- surface dressing £11.5m
- patching £23.3m
- structural drainage £5.0m
- footway maintenance £2.5m

- Total Structural Maintenance £80.9m

* Figures as at end August 2012
What is needed?

- Funding need based on Structural Maintenance Funding Plan (SMFP).

- An independent assessment of the funding required for the structural maintenance of the Northern Ireland’s 26,000 km road network.

- Updated annually it provides a comprehensive assessment of the level of investment required by Roads Service.
Funding Shortfall

- Budget 2010, i.e. 2011/12 to 2014/15
- Funding £120/£81/£65/£65 million
- Around £330million over 4 year budget period
- Around £170million less than levels recommended in the SMFP
Managing Shortfall

Sub-optimal budget strategy developed

- Resurface motorways & trunk roads once every 20 years. (a Roads Service key performance objective)
- Patching only where necessary for safety
- Minimum footway expenditure compatible with public liability claims
- Maximise surface dressing
Structural Maintenance
Historically dependent on additional in-year funding.

12/13 figures as at end August 2012
Consequences of Underfunding

- More patching – poor value for money
- Increase in public liability claims
- Maintenance backlog increases - more expensive reconstruction in later years
- Accelerated deterioration
- Increased accidents and transport costs
- Criticism from public, elected representatives and local construction industry
Current Procurement Methods

• Use of in house contactor – Roads Service Direct (RSD)

• Term Contracts

• One off competitive tenders

• Currently two DBFO contracts in place for maintenance of the majority of the motorway network along with a small percentage of the trunk road network

• Around 90% of structural maintenance delivered by external contractors.
Alternative Procurement Methods

• Managing Agent Contracts (MAC’s)
• Managing Agent / Term Maintenance Contracts
• Construction Management Contracts
• Highways Maintenance Private Finance
Comparison of costs

- Managing Agent Contracts – Scotland Wales
- PFI / PPP – Birmingham Portsmouth Existing Roads Service PPP contracts
- Comparison of in house (RSD vs. Term Contracts)
- Winter Service
Outcome of Review

- Current arrangements provide maintenance considerably cheaper than other parts of the UK

- No financial basis for a move from public to private sector model

- Possible need for internal workforce to focus on a reduced range of activities to drive down unit costs and improve competitiveness with private sector

Status Quo should largely be maintained
QUESTIONS?
Karl Johnson & Chris Parkman
Economic, Environmental and Social Impacts of Road Maintenance

WITH THANKS TO THE CONGRESS SPONSORS:
Economic, Environmental and Social Impacts of Road Maintenance

*Experience on Scottish trunk and local roads*

Karl Johnston
Head of Road and Rail Economics
Transport Scotland

Chris Parkman
Technical Director
Transport Research Laboratory
Introduction

• 2011 Government National Road Maintenance review following Audit Scotland report

• How is the road network in Scotland managed and maintained?

• Steering group and four Working groups

• A workstream to look at: Wider Economic Issues, Costs and Benefits
Steering Group

SCOTS

COSLA

THE OFFICE OF THE SCOTTISH ROAD WORKS COMMISSIONER

TRANSPORT SCOTLAND

solace Scotland
Working Group

• Membership

Transport Scotland, SCOTS, COSLA, Institute of Advanced Motoring, RAC, Guide Dogs for the Blind (representing Mobility and Access Committee), Living Streets, Sustrans, Road Haulage Association Ltd, Confederation of Passenger Transport and Freight Transport Association

• Terms of Reference

Estimate the economic and social impacts of changes (focussing mostly on reductions) in trunk and local road maintenance expenditure over a ten and twenty year time period
How did we go about this?

• Assessment of impact of reduction in maintenance spend
• Uses Scottish Transport Appraisal Guidance
• Environment, Safety, Economy, Integration, Accessibility and Social Inclusion
• Quantitative and Qualitative assessments
• Presentation focuses on the overall impact
• Undertaken by TRL
# Approach

## Scenario 1
- Maintain current (2010/11) funding levels for 20 years

## Scenario 2
- 20% reduction over first 10 years, Scenario 1 spending levels over next 5 years and annual increase of 2.5% over final 5 years

## Scenario 3
- 40% reduction over first 10 years, Scenario 1 spending levels over next 5 years and annual increase of 2.5% over final 5 years
Approach

- **Qualitative**
  - Against each of the STAG criteria
  - Sub-criteria assessed
  - Comprehensive literature review

- **Quantitative including sensitivity testing**
  - Vehicle operating costs
  - Travel time costs
  - Accident costs
  - CO₂ emissions

- **Assumptions**
  - How reductions are allocated across maintenance activities
  - Sample approach for the Local Roads analysis

- Environmental impact
- Safety impact
- Economic impact
- Integration impact
- Accessibility and Social Inclusion impact
Results - Qualitative

- Noise and vibration, global and local air quality, water quality and drainage, geology, biodiversity and habitats, landscape, visual amenity and cultural heritage, agriculture and soils
- Air quality benefit from less planned maintenance activity, but worsen by more unplanned interventions
- Landscape, visual amenity and cultural effects significantly affected by poorly maintained streets and public spaces
- Poor walking environments and transport links leave areas isolated and damage community cohesion
- Noise and vibration effects will worsen

- Accidents and security
- Deterioration in footways and cycle-tracks
- Lower spending on key structures, increased frequency of emergency incidents with local disruptions
Results - Qualitative

- Transport economic efficiency
- Journey reliability and quality deteriorate
- Road condition deteriorates due to delays in maintenance and a rise in temporary repairs
- Increased risk of emergency incidents on strategic infrastructure will divert resources from maintenance budgets
- Wider economic disbenefits - reduced tourism and local economic activity

- Policy integration
- Numerous Scottish Government cross-cutting strategies
- Lower quality footways and cycleways mean disincentives to physical fitness
Results - Qualitative

- Community accessibility and comparative accessibility
- Remote communities likely to suffer - reduced budgets focus on most significant risks and traffic
- Community accessibility suffers if emergency closures needed
- Vulnerable pedestrians (visual or mobility impaired) are most affected by increased defects on footpaths
- Customer satisfaction decreases
Results - Quantitative

- Carriageway condition deterioration means increased vehicle operating costs (fuel consumption and wear and tear)
- Analysis based on HDM-4
- Scenario 3 (40% reduction) - increased cost* of £3.59b

- As carriageway condition deteriorates, journey times increase
- Analysis only applicable to trunk roads and A class local roads (based on earlier work done in the UK)
- Scenario 3 (40% reduction) - increased cost* of £0.25b

* Discounted cost over 20 years
Results - Quantitative

- Skidding accidents - on trunk roads, negative effect only for Scenario 3 (40% reduction)
- Lighting - In 2010/11, around 2000 night-time accidents, increase by 50 for Scenario 3 (40% reduction)
- Scenario 3 (40% reduction) - increased cost* of £0.06b

- Reduce maintenance - less work - lower emissions from maintenance work
- Scenario 3 (40% reduction) - decreased cost* of £0.07b

* Discounted cost over 20 years
## Results – Quantitative Summary

<table>
<thead>
<tr>
<th>Cumulative discounted costs (£m 2002 Prices)</th>
<th>Trunk Roads</th>
<th>Local Roads</th>
<th>All Roads</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Scenario 1 (Base Case)</td>
<td>Scenario 2</td>
<td>Scenario 3</td>
</tr>
<tr>
<td>Financial Costs to Government</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance works</td>
<td>2,152</td>
<td>-266</td>
<td>-568</td>
</tr>
<tr>
<td>Impacts on Society</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Vehicle operating costs</td>
<td>73,223</td>
<td>+376</td>
<td>+625</td>
</tr>
<tr>
<td>Travel time (surface condition related)</td>
<td>362</td>
<td>+57</td>
<td>+94</td>
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<tr>
<td>Accidents (skid related)</td>
<td>345</td>
<td>0</td>
<td>+21</td>
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<tr>
<td>Delays (through roadworks)</td>
<td>119</td>
<td>-25</td>
<td>-38</td>
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<tr>
<td>Lighting (accidents)</td>
<td>128</td>
<td>+1</td>
<td>+2</td>
</tr>
<tr>
<td>CO₂ Emissions</td>
<td>5,765</td>
<td>-36</td>
<td>-58</td>
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<tr>
<td>Overall impact on society</td>
<td>79,942</td>
<td>373</td>
<td>646</td>
</tr>
<tr>
<td>Economic analysis</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Works costs reduction</td>
<td>Base Case</td>
<td>266</td>
<td>568</td>
</tr>
<tr>
<td>Increase in user costs</td>
<td>Base Case</td>
<td>373</td>
<td>647</td>
</tr>
<tr>
<td>Net Present Value</td>
<td>Base Case</td>
<td>-107</td>
<td>-79</td>
</tr>
</tbody>
</table>
## Results - Quantitative

<table>
<thead>
<tr>
<th>Sensitivity tests</th>
<th>Trunk roads</th>
<th>Local roads</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Scenario 2 (20% cut)</td>
<td>Scenario 3 (40% cut)</td>
</tr>
<tr>
<td>Base analysis (20 years, standard growth and indexing assumptions)</td>
<td>-107</td>
<td>-79</td>
</tr>
<tr>
<td>Reduced (10 year) time period analysis</td>
<td>112</td>
<td>263</td>
</tr>
<tr>
<td>Higher inflation rates on works costs</td>
<td>-62</td>
<td>44</td>
</tr>
<tr>
<td>Vehicle operating costs: No traffic growth or fuel price increases</td>
<td>307</td>
<td>983</td>
</tr>
<tr>
<td>Scaling up methodology for local road sample to network effects</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
Conclusions

• Savings on road maintenance spend would be significantly outweighed by wider additional costs. (E.g. 40% reduction saves £2 billion, but costs Scotland’s road users and communities £3 billion).

• £1 reduction in road maintenance results in a £1.50 cost to the wider Scottish economy and society

• Qualitative findings further reinforce this.

• Impact is greater for local roads (qual and quant)

• Most significant quantified impact - increase in vehicle operating costs

• Public dissatisfaction with road conditions is likely to increase

• Investing in the maintenance of this significant capital asset delivers economic and social benefits to Scotland
Questions
Thank you

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Dr. Karl-Josef Höhnscheid

Germany’s PPP & assessment tools of master plan

WITH THANKS TO THE CONGRESS SPONSORS:
Germany’s transport infrastructure master plan, assessment tools and PPP
When history meets future - from the Federal Transport Infrastructure Plans to PPP

Today: Tax-based financing of infrastructure investments

Project overview: Transport Infrastructure Master Plan and Framework Investment Plan

Project selection: Decisions based on the results of the application of the Transport Infrastructure Master Plan’s assessment tools

Since 2003: PPP-models used for infrastructure investments

Since 2005: Motorway Toll for Heavy Commercial Trucks, revenues used for PPP-models
Federal Transport Infrastructure Plan


Taking into account the annual appropriations of around 10 billion euros, the total level of funding available for the rail, road and waterway modes for the period from 2001 to 2015 is around 150 billion euros.

Source: Federal Government / Bienert
Draft 2011 – 2015 framework investment plan submitted

The framework investment plan is required by law and represents the guideline, on which the Federal Government will base its investments during the relevant period.

The new framework investment plan has a project volume of around 41 billion euros. This sum covers all projects that will be launched, continued or completed between 2011 and 2015.

In the new framework investment plan, structural maintenance is clearly preferred over the construction of new infrastructure. The funds set aside for the structural maintenance of the existing infrastructure account for around two thirds of the overall sum: 28.1 billion euros have been earmarked for the structural maintenance of the federal railway infrastructure, trunk roads and waterways.
FTIP project evaluation tools

Combined approach: BCA combined with two non-monetary approaches

Expressed in monetary values

Benefit-cost analysis (BCA)

Expressed in non-monetary values

Spatial impact assessment (SIA)

Environmental risk assessment (ERA) with Habitats Directive Assessment (HDA)

Benefit-cost-analysis

Benefit components

- Reduction of transportation costs (NB)
  - NB1 Decreased vehicle standby costs
  - NB2 Decreased vehicle operation costs
  - NB3 Changes in transport costs due to modal shifts

- Transport infrastructure preservation (NW)
  - NW1 Transport infrastructure renewal
  - NW2 Transport infrastructure maintenance

- Increased traffic safety (NS)

- Improved accessibility of destinations (NE)

- Spatial advantages (NR)
  - NR1 Employment impacts from building transport infrastructure
  - NR2 Employment impacts from operating transport infrastructure
  - NR3 Contributions to promoting international relationships

Benefit-cost-analysis

More benefit & cost components

- Environmental relief (NU)
  - NU1 Reduction in noise exposure
  - NU2 Reduction in exhaust emissions
  - NU3 Reduction of community severance
- Impacts from induced traffic (NI)
- Improved links to and from seaports and airports (NH)
- Fulfilment of non-transport functions (NF)
- Investment costs (K)

Pavement condition values for German highways 2010

Source: Verkehrsinvestitionsbericht für das Berichtsjahr 2010, Deutscher Bundestag Drucksache 17/8700, Berlin 2012
Condition values for German trunk road bridges 2010

Source: Verkehrsinvestitionsbericht für das Berichtsjahr 2010, Deutscher Bundestag Drucksache 17/8700, Berlin 2012
Funding road infrastructure investments

- HGV tolling scheme
- Public budget (tax based)
- Public Private Partnerships
- European project bonds
- Emissions trading system (EU ETS)
From HGV tolling on German highways to PPP

- Earmarking of toll revenues for system operation and enhancement of transport infrastructure
- Toll revenues are entitled to the federal government, revenues and expenses are displayed in federal budget

Source: Böger, T., PPP decision models and procurement process, Presentation at the COST-P3T3-Conference, Weimar 2012
A-Model pilot projects and new projects

1. Bavaria A8 (AS Augsburg West – AD München-Allach) completed
2. Thuringia A4 (Landesgrenze Hessen/Thüringen – AS Gotha) completed
3. Lower Saxony A1 (AD Buchholz – AK Bremen) awarded
4. Baden-Wuerttemberg A5 (Malsch – Offenburg) awarded
5. Bavaria A8 (AK Ulm-Elchingen – AD Augsburg-West) awarded
6. Thuringia A9 (AS Lederhose – Border to Bavaria) awarded
7. Schleswig-Holstein A7 (Bordesholm – Hamburg) in tender

Source: Böger, T., PPP decision models and procurement process., Presentation at the COST-P3T3-Conference, Weimar 2012
A-Model: General specifications

• Concession to private

• Enhancement from 4 to 6 lanes

• Operating and maintenance

• Start-up financing and compensation through toll revenues of the section

• Modified model with transport and revenue risks, but without risks in changing toll charges (A8)

• Modified model with availability risks (A9)
Risks and responsibilities

• Technology risk for toll collection is not borne by the concessionaire (done by Toll Collect)

• Traffic risk

In the first A-model the traffic risk was borne by the concessionaire and he had to accept the development of the toll revenues

The risk to the concessionaire in the latest A-model is depending on the availability of the road

• Finance, construction and management risks remain with the concessionaire

Source: Böger, T., Opening statement, Session „Project Financing: delivering the new realities”, IBTTA 79th Annual Meeting & Exhibition, 14th Sept. 2011
F-Model: General specifications

• Legally limited to passes, bridges and tunnels of federal trunk roads

• Concession to private for construction, operation and maintenance

• Tolling scheme established by the concessionaire

• Two projects realized:
  - Warnowquerung, Rostock (opened 2003)
  - Travequerung/Herrentunnel, Lübeck (opened 2005)
Benefits from PPP – Experiences so far

Early and efficient realization of important projects

Shortening of traffic-disturbance with the aid of building measures

Efficient preparation of the roadways

Benchmarks for conventional procurement

New impulses for public administration

⇒ Increase in efficiency and user orientation

But: The impact of the financial crisis has influenced the European PPP-market
New threats???

The impact of the financial crisis on the European PPP market has reduced the funding volume due to a change in risk perception.

Contract durations decreased, credit margins increased, higher cover and equity ratios are required.

Solutions:

- availability models?

- state guarantees or state bank involvement to attract private banks participation?
Break
Tea & Coffee

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