Building a Relief Road: Relieving Congestion – Reducing CO$_2$?

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Outline

• Introduction
• Study Project
• Emissions Modelling
• Instantaneous Emissions Modelling
• Microsimulation Model
• Study Results
• Other Applications
• Conclusions
Introduction

• CO$_2$ and Climate Change
• Road Transport 21.7% of UK CO$_2$ Emissions
• 10 Year Trends
• ‘Traditional Thinking’
  • More Roads
  • More Cars
  • More Pollution
Study Project

- Sub-standard Motorway
- Peak Time Congestion
- Proposed Parallel Motorway
- Confidential
Emissions Modelling

- Strategic Traffic Model (SATURN)
  - Average Flow
  - Average Speed

- TUBA and Bespoke Tool

- 4%-7% Increase in Traffic Volumes

- 3%-7% Increase in CO$_2$ Emissions

- Over Simplification
Instantaneous Emissions Modelling

- DMRB requirement for ‘complex situations’
- Vehicle Emissions Database
- MODEM
  - 150 vehicles
  - 12 vehicle classes
  - Matrix of Measured Emissions
  - HC, NO\(_x\), CO, CO\(_2\), PM
- VERSIT+, PHEM
Instantaneous Emissions Modelling
Microsimulation Model

- VISSIM
- 14 Hour Modelled Period
- Driver Behaviour
- Random Variation
- Calibration
- Validation (MIDAS)
  - Hourly Flow
  - Instantaneous Flow
  - Instantaneous Speed
Microsimulation Model
Microsimulation Model
Study Results

• 4-7% Increase in Traffic Volumes
• 5-7% Reduction in Total CO$_2$
• 14% Reduction in g/km CO$_2$

• Tonnes of CO$_2$ per day

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Other Applications

- ‘Traditional Thinking’
  - More Roads
  - More Cars
  - More Pollution

- Study Outcome
  - More Roads
  - More Cars
  - **Less** Pollution
  - Reduced Congestion

- Other Highway Improvement Schemes

- Individual Merit
Conclusions

- Focus CO\textsubscript{2} Emissions
- ‘Traditional Thinking’
- May Reduce Emissions
- Case-By-Case Basis
- Embodied Carbon
Questions?