FUTURE RESILIENT TRANSPORT SYSTEMS
June 28th 2012
Tebay landslip
Overall delays

- 2500 delay minutes between 15:30 – 09:30 the following day
- Propagation within route and to wider network
Overall delays

- 4900 delay minutes between 12:00 - 00:30
The effect of other extreme weather on UK transport operation
July 2007
FUTURE RESILIENT TRANSPORT SYSTEMS
Programme

- **FUTURENET** (Prof C Baker)
- What does the future look like? (Dr A Quinn)
- Modelling system resilience (Prof N Dixon)
- Using **FUTURENET** methodology (Mr J Dora)
- Summing up (Prof C Baker)
- Questions with panel
The context

- Climate Change Act
- Adaptation reporting requirements
  - Network Rail
  - Highways Agency
  - London Underground
- Research Councils
  - Living with Environmental Change
  - Adaptation and Resilience to Climate Change
ARCC projects

- **All in One**: Feasibility analysis of supplying all services through one utility product, Dr Fatih Camci, Cranfield University
- **ARCADIA**: Adaptation and Resilience in Cities: Analysis and Decision making using Integrated Assessment, Prof. Jim Hall, Newcastle University
- **ARCC-Water**: Water System Resilience, Dr Mark New, University of Oxford
- **ARCoES**: Adaptation and Resilience of Coastal Energy Supply, Prof. Andrew Plater, University of Liverpool
- **ARIES**: Adaptation and Resilience In Energy Systems, Prof. Gareth Harrison, University of Edinburgh
- **BIOPICCC**: Built Infrastructure for Older People in Conditions of Climate Change, Prof. Sarah Curtis, Durham University
- **CLUES**: Challenging lock-in through urban energy systems, Prof Yvonne Rydin, UCL
ARCC projects

• DeDeRHECC: Design & Delivery of Robust Hospital Environments in a Changing Climate, Prof. Alan A Short, University of Cambridge
• FUTURENET: Future Resilient Transport Networks Prof. Chris Baker, University of Birmingham
• ITRC: The UK Infrastructure Transitions Research Consortium, Prof Jim Hall, Newcastle University
• Land of the MUSCos: Multiple-Utility Service Companies, Dr Julia K Steinberger, University of Leeds
• RESNET: Resilient Electricity Networks for GB, Prof. Kevin Anderson, University of Manchester
• Retrofit2050: Re-engineering the city 2020-2050: Urban foresight and transition management, Prof Malcolm Eames, University of Cardiff
ARCC projects

- **SECURE**: Self-conserving urban environments, Prof Margaret Bell, Newcastle University
- **SHOCK (not) Horror**: Prof Stephanie Glendinning, Newcastle University
- **SNACC**: Suburban neighbourhood adaptation for a changing climate: identifying effective, practical and acceptable means of suburban re-design, Prof. Katie Williams, University of the West of England
- **STEP-CHANGE**: Sustainable Transport Evidence and modelling Paradigms: Cohort Household Analysis to support New Goals in Engineering design, Prof Miles Tight, University of Birmingham
- **TUCP**: Transforming Utilities’ Conversion Points, Dr Liz Varga, Cranfield University
- **Undermining Infrastructure**: Avoiding the scarcity trap, Prof Phil Purnell, University of Leeds
Other projects

- EU FP7
  - EWENT
  - WEATHER
  - MOWE-IT

- RSSB – TRaCCA
FUTURENET

• ARCC funded project 2010-2013
• Project addresses two issues
  – What will be the nature of the UK transport system in 2050, both in terms of its physical characteristics and its usage?
  – What will be the shape of the transport network in 2050 that will be most resilient to climate change?
Climate change?

• Quote by Sir John Beddington, Government Chief Scientific Advisor
  “Anyone is allowed to have their own opinion, but not their own facts”
• Those who doubt the influence of man on climate change should look at the facts
  http://www.newscientist.com/topic/climate-change
Climate change forecasts

• A clear message from the models is that variability and occurrence of extreme events will increase.

• Standard deviation of precipitation and temperature events are forecast to change \(2X\) that of mean values.
• Definition of resilience
  – Resilience is the ability to provide and maintain an acceptable level of service in the face of challenges to normal operation
  – Acceptable service level different for different sectors
FUTURENET

• Three viewpoints
  – Policy maker
  – Infrastructure manager
  – Traveller

• Quantitative and qualitative approaches
  – Numerical values of “resilience”
  – Consideration of different futures
The approach – model integration

• Integration of
  – Social scenario studies
  – Travel behaviour studies
  – Meteorological / climate studies
  – Transport modelling
  – Weather effects on infrastructure and vehicles
The approach

• Levels of calculation
  – Calculation of resilience of complete routes (London-Glasgow chosen as example)
  – Detailed calculations of local effects of different weather events (landslip, flooding etc)

• Ideal calculation would begin with local modelling and aggregate results for complete route
Case study route

- London-Glasgow route corridor chosen
  - Economically important
  - Climatic factors vary
  - Geographic diversity
  - Significant sub-routes
Outputs

• Resilience calculation methodologies for
  – Complete routes
  – Specific infrastructure

• Identification of issues to be addressed
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