TfL/DfT
Developing Innovative Technology for Roadworks
Bob Collis, TRL
October 2013
Background to Project

- In June 2012 TfL introduced a Lane Rental scheme.
- TRL commissioned by TfL in June 2011 to investigate new technology to reduce congestion by minimising the road occupancy time.
Project Organisation and Aims

- Steering and Working Groups formed of **representatives** from Highway Authorities, Utilities, Manufacturers, Material Suppliers, and HSE

- Joint TfL/DfT funded project to provide **guidance** on how to reduce congestion at street works and highway works through the use of innovative technology

- Project aimed at providing the **evidence** that changes in approach were possible and to provide guidance on the use of alternatives
How much could be saved?

- For a S2AP road with 20,000 Average Annual Daily Traffic (AADT), savings of approximately £80,000 per day

- For a D2AP road with 45,000 AADT, savings of approximately £30,000 per day

- Lane Rental charge savings where applicable
Techniques Investigated

- Road Plating
- Temporary Backfill
- Rapid cure
- Other Techniques / Technologies
Plating

- Consultation with Utilities and Manufacturers
- Plates existed for narrow transverse but not for longitudinal, large openings and large transverse
- Some products developed specifically for this project
- Products tested included:
  - large thick steel plates;
  - small profiled steel plates;
  - composite plates with locking mechanism; and
  - modular systems for large access chambers
Testing

- Products assessed for resilience in our Pavement Test Facility and for effect of speed, braking and traction on TRL Test track
Testing

 Trafficking up to 60mph on TRL Test track
Large rectangular opening (Mabey Hire Services and Steelway)
Composite plates with locking mechanism (Radlock Highway Systems)

- Assessed surface mounted and recessed
- Transverse and longitudinal
- Multiple road user types
Thick plain steel plates (Road Plate Hire)

- Recessed and tested on TRL track for suitability
- Handed over to Highway Works contractor (Ringway Jacobs)
- Successfully used on site
- 4 days lane rental charges avoided
- Minimised disruption to traffic (no additional time on site)
Thick plain steel plates – case study

- Another successful use by utility contractor on site

- Surface mounted and welded together for strength and stability

- Left in place for extended period (6 weeks) in heavy traffic environment
Plates - key elements and lessons

- Several options are feasible for use on site
- Speed generally unaffected if plates are recessed flush with surface
- Speed restrictions may be needed for raised plates
- Some large plates have already been successfully used on site
- Composite road plate designs refined (strengthened) as a result of testing – now recommended for site use
- Fixings are key, particularly for surface mounted options
Temporary backfill trials

- Trialled on large openings
- Use of Type 1 and sharp sand and pea gravel (all commonly available) in combination with thin asphalt surface course
- All combinations demonstrated they were feasible options for short term trafficking
Rapid cure concrete

- **Materials**
  - Large range of mixtures assessed from low to high strength (with and without accelerator)

- **Laboratory Results**
  - Rapid-cure concrete does what it says on the tin

- **Site Testing**
  - Rapid-cure not regularly used
  - Strengths sometimes below expected
  - Greater quality control needed

- **Specification Developed**
  - Adopted by TfL
  - Several days curing time saved
Rapid cure – case study

- M20 surface slab replacement
  - Works carried out overnight
  - Strength gain sufficient for trafficking in less than 6 hours
  - Demonstrates it can be done
Other techniques

- A range of other options were reviewed that could provide a reduction in works duration
  - Core and Vac (keyhole)
  - Mapping the underworld
  - Extended working hours
  - Automatic alarm systems
Early dissemination and quick wins

- Throughout the project we were encouraged to provide early dissemination of project findings
- Monthly update reported to the TfL utility meetings
- Development of QWIRC Notes
  - Quick Win Innovation to Reduce Congestion
- Development of Project Webpage with access to Interim Reports and QWIRC Notes

http://www.trl.co.uk/reducingcongestionfromhighwayworks
QWIRCs

- QWIRC Note 1: Core and Vac
- QWIRC Note 2: Rapid Cure
- QWIRC Note 3: Use of road plates
- QWIRC Note 4: Requirements for trafficking of cementitious mixtures
- QWIRC Note 5: Mapping the Underworld
- QWIRC Note 6: Temporary Backfill
- QWIRC Note 7: Rapid cure foam
- QWIRC Note 8: Extended working hours
- QWIRC Note 9: Hydraulically bound mixtures
Reports

- Reducing Congestion from roadworks (4 main detailed reports, plus an overview report):
  - Part 1, Use of road plates
  - Part 2, Use of temporary backfill
  - Part 3, Early strength gain (rapid-cure) concrete for reinstatements
  - Part 4, Other techniques
  - Overview summary document
Next Steps

- Develop Case Studies from works using new approaches and materials
- Share Best Practice across the industry (TfL Utilities Forum, HAUC) to further increase use
- Development of QWIRCs into TALs by DfT.
- This will encourage new approaches as Standard Practice rather than the exception
- The change has started so we don’t want to lose the momentum
Thank you