Sustainability and Whole Life Costs

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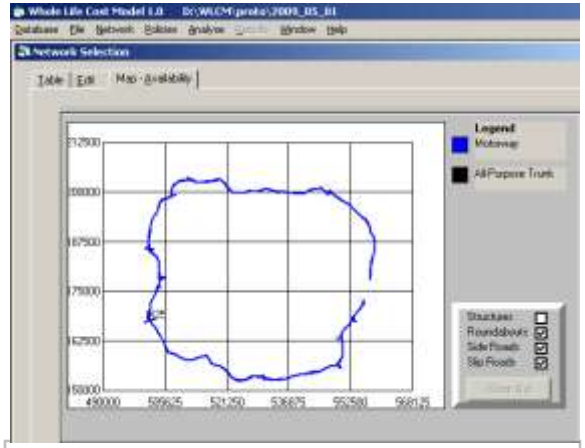
12 June 2012

Whole Life Value

From Network Analysis to Product Evaluation



- Network Whole Life Cost Modelling
- Informs clients of the impacts of changes in maintenance budgets or network condition

- Scheme Level Whole Life Costing
  - Pavements
  - Structures
  - Geotechnics
  - Drainage
  - Lighting etc.

- Product Life Cycle Evaluation
- Demonstrates the economic and environmental benfits that can be achieved from using new and innovative materials, technologies and methods of working

Whole Life Cost Analysis of Maintenance Schemes

- Whole Life Cost of each option:
  - Systematic consideration of all costs
    - Initial Cost
    - Analysis Period - Operations and maintenance
    - End of life – Renew / decommission
  - To include all costs (now and in the future):
    - Direct costs
    - Indirect costs (Users, Society, Environment…)
    - Residual value

Whole Life Cost Analysis of Maintenance Schemes

- Whole Life Cost:
  - Total costs over the lifetime (or Analysis Period) of the asset
  - Discount the costs from each year of the Analysis Period back to the base year
  - Net Present Value of all costs arising in the Analysis Period

Whole Life Cost Analysis of Maintenance Schemes

3 stage process: WLC of Renewals Maintenance

Stage 1

- Define the scheme details
- Setup default variables applied throughout the analysis

Stage 2

- Establish maintenance Options to compare WLC:
  - Apply Treatments
  - Include required Traffic Management, Access and any other costs arising

Stage 3

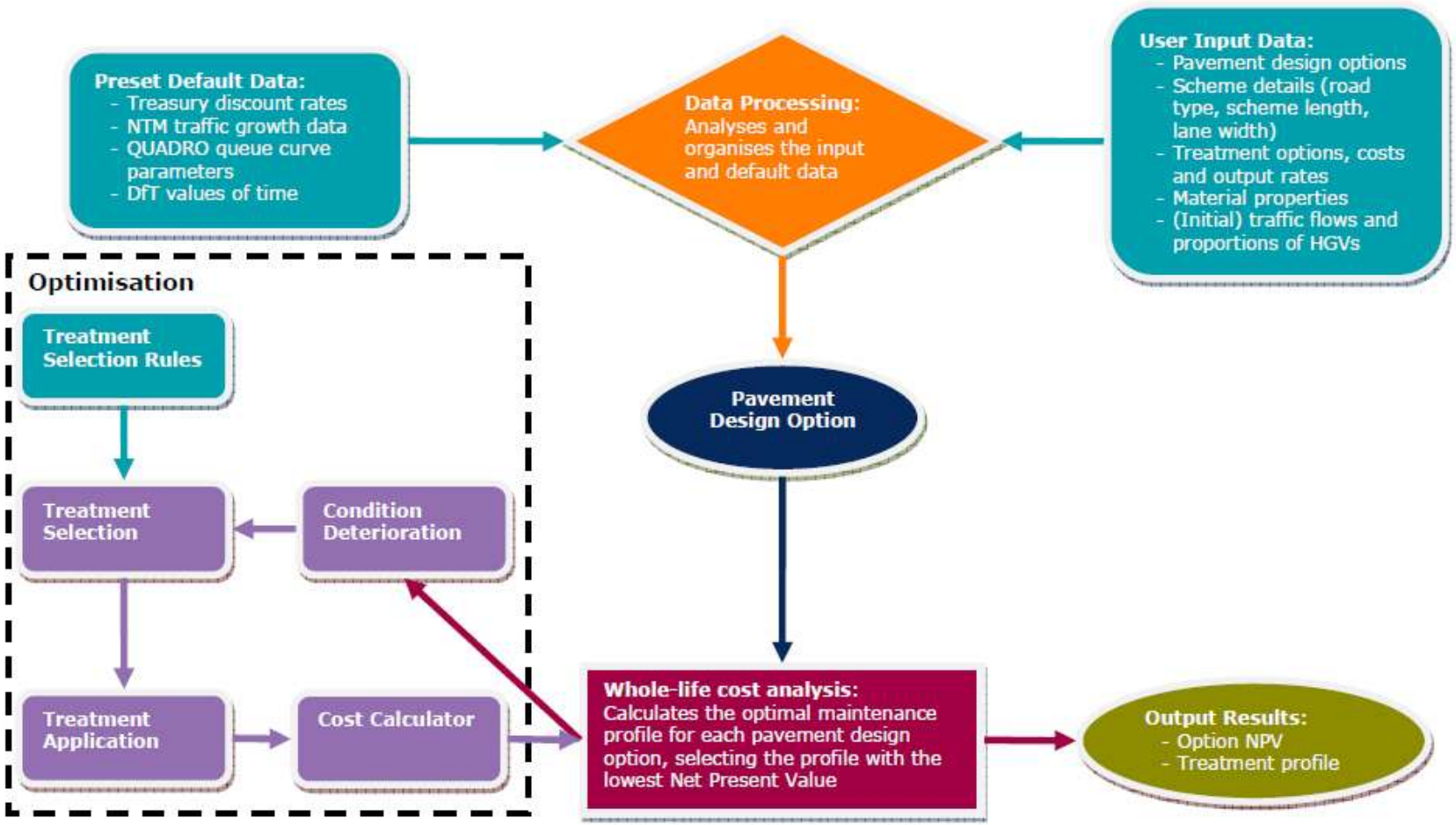
- Assess the Whole Life Costs of the Options
- Select a chosen Option for the Scheme

Product Evaluation

- TRL has undertaken product evaluation for a number of clients. This has included:
  - Evaluation of Life Cycle Carbon Emissions from new products (i.e. New asphalt mixes, using the TRL developed, industry led, asPECT tool).
  - Evaluation of the optimum whole life cost savings achievable from using a product, treatment or system of work.
  - Sensitivity analysis to investigate the whole life impact of variations in the unit cost (price) of new materials.

- The above has allowed our customers to demonstrate the whole life benefits that can (in theory) be delivered from using their products in preference to conventional solutions.

Product Evaluation – Modelling Approach



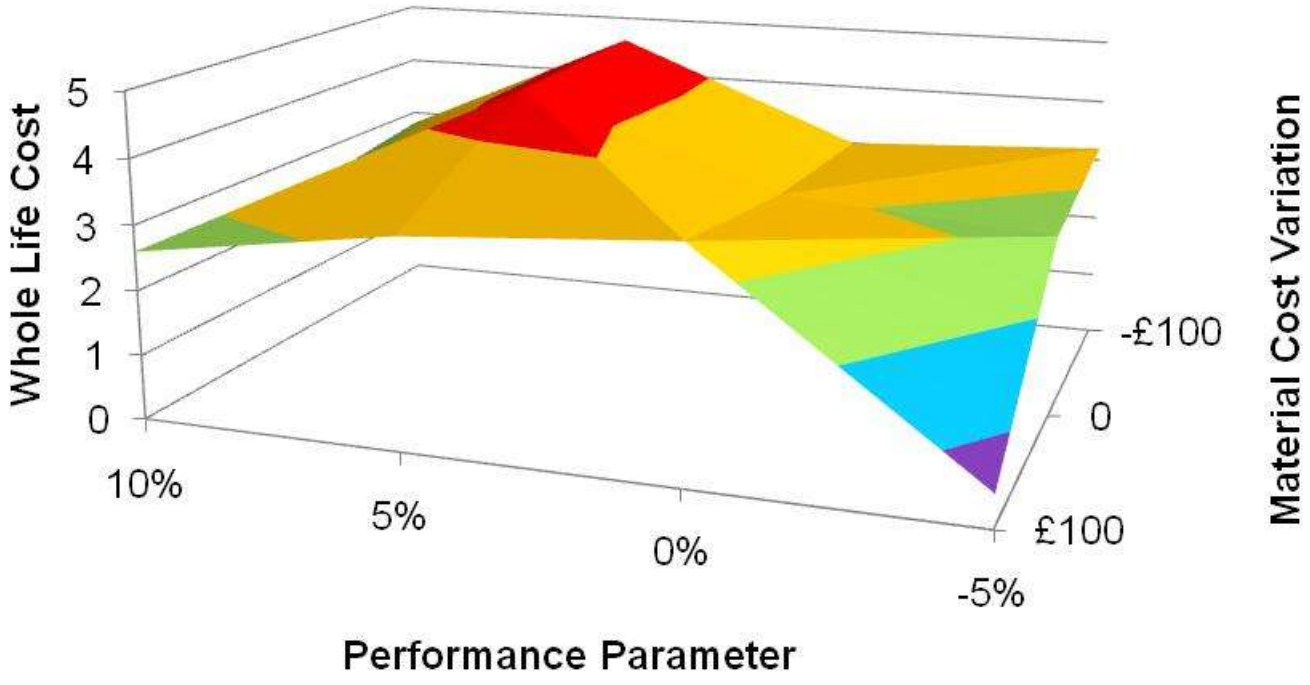
TRL's pavement test facility

Product Evaluation - Reverse Whole Life Costing

- Where performance data (e.g. Expected life; durability) is not available an analysis based on assumed levels of performance can be carried out.
- Perturbing the performance parameters in the analysis and evaluating the resulting changes in whole life cost can be used to target the development of new products: to meet the performance criteria that deliver the greatest savings in whole life cost for a given application scenario.

Product Evaluation - Reverse Whole Life Costing

- Example output from reverse whole life costing approach.



Example of Environmental Assessment

The asphalt Pavement Embodied Carbon Tool (asPECT)

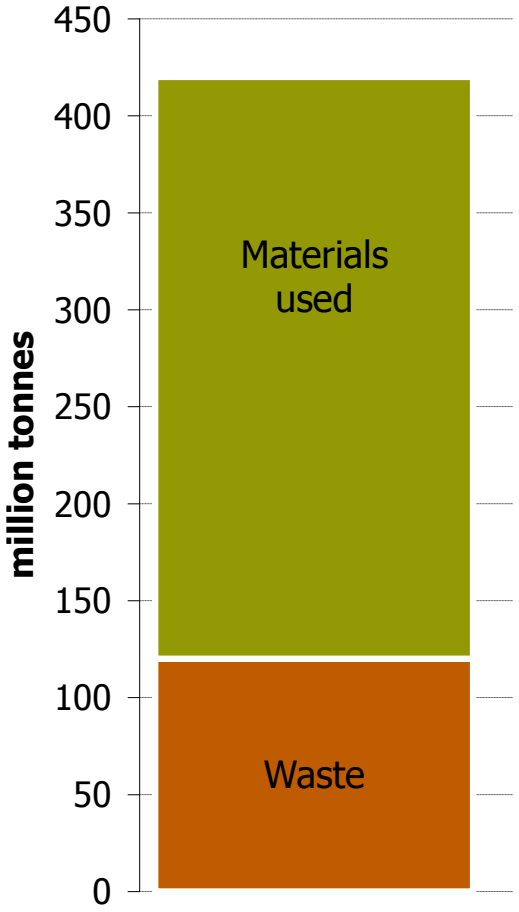
4 components of asPECT

- Protocol – a defined set of "rules" for footprinting asphalt products and applications
- Guidance – explains the decision making process behind the Protocol and provides worked examples
- Software – faciliates the calculation for those that choose to use it (calculations can alternatively be embedded into other company systems)
- Software User Guide

www.sustainabilityofhighways.gov.uk

Why resource management?

- Materials consumed
  ~**420** million tonnes pa
- Waste generated
  ~**120** million tonnes pa
- Waste sent to landfill
  ~**13** million tonnes pa
- Cost of wasted materials
  ~**£1.5** billion pa



Working with the Supply Chain

Clients	Set requirements in project procurement
Contractors	Set requirements in sub contractor procurement
Trade & Specialist Subcontractors	Avoid waste on site by proper handling, storage and use of materials
Designers & Consultants	Identify or create design solutions that use resources efficiently
Manufacturers & Suppliers	Use more recycled materials and reduce packaging
Waste Management Contractors	Increase waste recovery rates