




2012 Study Tour Key Topics

1. Long life pavements
 - o Experience, design systems, use, durability & performance
2. High performance asphalt & binders
 - o High modulus asphalt (EME, HiMA), modifiers
3. Sustainability
 - o RAP/WMA, bitumen substitutes, carbon calculators & energy analysis
climate change impacts, societal concerns
4. Health & Safety
 - o Construction of road works, health considerations for bitumen and asphalt products
5. Procurement Systems
 - o Proprietary products (Avis Technique, HAPAS, etc.), "green" procurement, REACH, responsible sourcing, PPP and contract models

Topic 5: Procurement Systems

Overview of reasons

- Australia has tried to set up systems like Avis Technique & HAPAS but have been unsuccessful
- The benefits of innovation and declining skills in the road authorities point to its greater use.
- Lessons learnt, benefits of the systems used, changes to purchasing to accommodate and implications for road authority expertise is sought.
- Use of the systems to promote innovation and product development in new areas such as CO₂ reduction, energy efficiency, noise reduction etc.
- The use of procurement systems from PPP, Alliancing, DBOM, ECI including normal contracts, long & short term contract maintenance systems.
 - o What key performance characteristics over time?
 - o How to retain the culture of stewardship in the contracting agency?
 - o How to retain expertise on the road authority to manage / ensure value-for-money?



Report contents

1. Innovation and product certification systems
 - o Avis Technique
 - o Charte d'Innovation
 - o HAPAS
 - o ETA – Award approval
2. New tools for sustainable procurement
 - o asPECT
 - o SEVE
 - o DuboCalc & CO₂ progression ladder
 - o Netherlands "Innovation Test Centre"

Report contents

3. Procurement system options
 - o United Kingdom – Highways Agency
 - o Netherlands




Basis of innovation systems

1. Innovation by industry, client encourages with performance outcome needs
2. Proof of performance on functional tests from bodies formed through mutual cooperation between client & industry
3. Product acceptance covers:
 - Field of application, performance characteristics, practical experience*



1. Innovation and product certification systems

- Avis Technique
 - Long history, many products, most copied system
 - Controlled by committee of industry and road agency
 - Accepts product & performance submission (where used)
 - Committee provides “advice” on how to be used, design input, comparison to standard products.
- Charte d’Innovation
 - Client invitation (road map)
 - Contractors propose
 - Description of product, system
 - Description of application method
 - Results of tests and trials
 - The price
 - Reference to works that have been executed with the product

Client driven innovation

Public ceremony and award for innovations

1. Innovation and product certification systems

- HAPAS
 - Follows Avis Technique approach
 - Run by British Board of Agreement
 - HiTAC technical advisory committee: *with wide range of industry, associations, HA and Local Government*
 - Has 10 specialist groups covering:
 - *high friction surfacing, crack sealing, thin surfacing, modified bitumen for bitumen surfacing, microsurfacing, bridge deck waterproofing, permanent cold lay materials, coloured surface treatments, anti-corrosive paints*
 - Each specialist group has experts from industry but assessment and evaluation done by BBA staff
 - *Process requires over two years including trials*
- ETA – Award approval

BBA HAPAS Product Approval Scheme

2. New tools for sustainable procurement

- asPECT

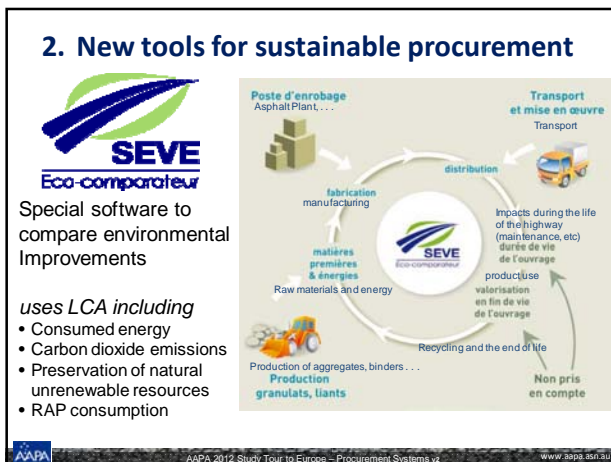
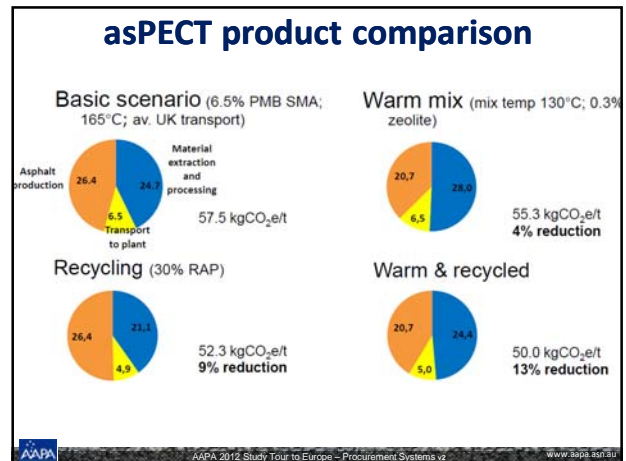
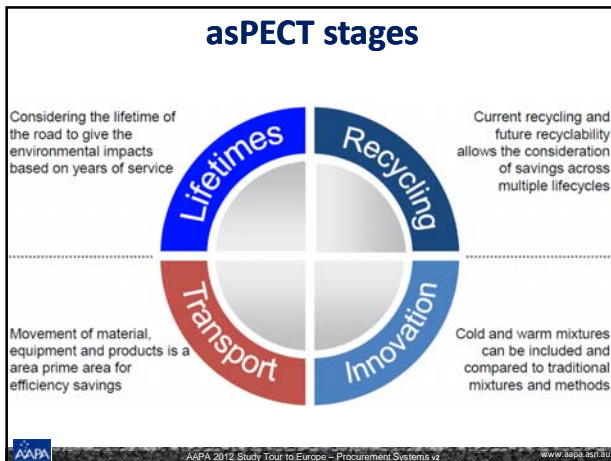
asPECT
asphalt Pavement Embodied Carbon Tool

Sponsored By: CO₂, RRL, HIGHWAYS, mpa

Supported By: WOP, ADEPT

Life-cycle stage	Description
1 Raw Material Acquisition	Winning of raw materials from the natural environment with the input of energy
2 Raw Material Transport	Linking the winning of raw materials to processing of raw materials
3 Raw Material Processing	Crude oil refining, rock crushing and grading, recycled and secondary material reprocessing
4 Processed Material Transport	Linking the processing of raw materials to the manufacture of bitumen bound highway components
5 Road Component Production	Production of bitumen bound mixtures
6 Material Transport to Site	Delivery of bound materials to site
7 Site Preparation, Laying and Compacting	Included for new road construction: capping, sub-base, base, binder course, surface course
8 Scheme Specific Works	Installation of geosystems, traffic management etc.
9 Maintenance	Interventions to maintain the road. Re-surfacing, surface dressing works, patching, haunching etc.
10 End of Life	Deconstruction and material management

Use



- ### 2. New tools for sustainable procurement
- o DuboCalc & CO₂ progression ladder
 - DuboCalc part 1 of LCA based tool
 - Uses international standards database
 - Eleven environmental effects evaluated
 - Controlled by government & applied on contracts
 - Analysis is project specific
 - Results reported as an Economic Cost Indicator expressed in Euros or tonnes of CO₂e

DuboCalc – environmental cost indicator

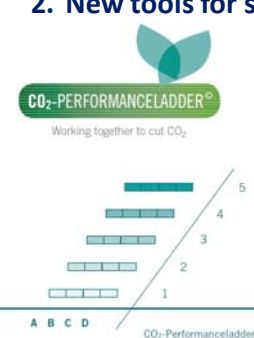
MilieuKostenIndicator (MKI) Materials and processes

Milieu effect categorie	Items (M/P)	Equivalent unit (kg)	Env. Cost [€/kg]	
equivalent]	1. Climate change	5,8	CO ₂ eq	€ 0,05
	2. Effect on ozone layer	etc	CFK-11 eq	€ 30,--
	3. Human toxicity		1,4-DCB eq	€ 0,09
	4. Ecological toxicity, sweet water		1,4-DCB eq	€ 0,03
	5. Ecological toxicity, salt water		1,4-DCB eq	€ 0,0001
	6. Ecological toxicity, land		1,4-DCB eq	€ 0,06
	7. Photochemical reactivity Smog)		C ₂ H ₄ eq	€ 2,--
	8. Acidification		SO ₂ eq	€ 4,--
	9. Over fertilisation		PO ₄ eq	€ 9,--
	10. Depletion of non renewable materials		Sb eq	€ 0,16
	11. Depletion of fossil fuels		Sb eq	€ 0,16

DCB= dichloorbenzeen

MKI XX

2. New tools for sustainable procurement



The CO₂-Performanceladder (Least contribution plus best bid)

5 The company has a CO₂ emissions inventory of its most important suppliers. The company can demonstrate that the objectives for levels 3 and 4 have been attained. The company is publicly committed to a government or ISO CO₂ reduction programme, and is able to demonstrate that it is making a relevant contribution to an innovative CO₂ reduction project.

4 The company has identified its chain emissions in outline terms, and chain analyses have been carried out for two relevant chains. The company has quantitative objectives for its chain emissions. The company is in dialogue with relevant parties (government bodies and social organisations) and can demonstrate its role as the instigator of sector and chain initiatives in the field of CO₂ reductions.

3 The company has an official CO₂ emissions inventory that has been drawn up in accordance with the ISO 14064 standard, and which has been verified by an independent organisation. The company has quantitative objectives for its own (scope 1 and 2) CO₂ emissions, its communication – internally and externally – in relation to its CO₂ footprint on a structural basis and actively participates in at least one sector and chain-based CO₂ reduction initiative.

2 The company has quantified its energy flows and formulated a qualitative objective for saving energy and using renewable energy. Internally, the company communicates its energy policy on a structural basis and takes a passive role in at least one sector and chain-based CO₂ reduction initiative.

1 The company has identified its energy flows in qualitative terms and has a list of potential options for saving energy and using renewable energy. Internally, the company communicates its policy in relation to energy saving and renewable energy on an ad hoc basis and is aware of sector and chain-based CO₂ reduction initiatives.

Objectives:
 A = 40%
 B = 30%
 C = 20%
 D = 10%

Legend:
 A = Image
 B = Reduction (ambition) in CO₂ emissions
 C = Transparency (internal and external)
 D = Participation in CO₂ initiatives

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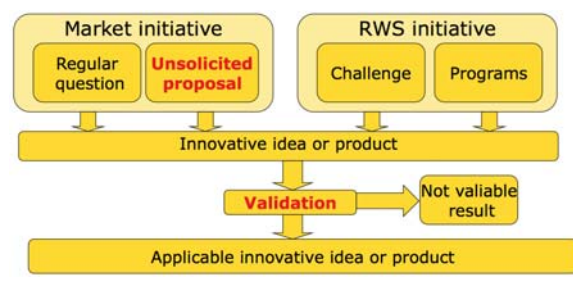
CO₂ performance ladder

	Vanaf From	Maximale trede Maximum rungs	Aftek Reduction per trede
Prestatiecontracten, Variabel Onderhoud en Renovatie projecten Complex project, variable maintenance & rehabilitation	1 augustus 2011	3	1%
Prestatiecontracten, Variabel Onderhoud en Renovatie projecten	1 januari 2013	5	1%
Aanleg > M€ 35 Construction / addition	1 augustus 2012	5	1%
Aanleg > M€ 1,5 en < M€ 35 Construction / addition	1 augustus 2012	3	1%
Aanleg > M€ 1,5 en < M€ 35 Construction / addition	1 januari 2013	5	1%
Ingenieursdiensten > k€ 130 Engineering service	15 augustus 2012	5	1%

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2. New tools for sustainable procurement

o Netherlands “Innovation Test Centre”



Market initiative: Regular question, Unsolicited proposal

RWS initiative: Challenge, Programs

Innovative idea or product

Validation → Not valuable result / Applicable innovative idea or product

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Value of Innovation Test Centre

- Knowledge of market possibilities
- Client’s knowledge is shared
- Mutual acceptance of the validation plan
- Test and demonstration projects
- Performance is known
- Entrepreneur determines price in a competitive market
- Client can make justified decision on tender award

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3. Procurement system options

o United Kingdom – Highways Agency



M25

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3. Procurement system options

o United Kingdom – Highways Agency

- Use a similar range of contract models to Australia
- Have 13 large PPP contracts running on DBFO



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HIGHWAYS AGENCY		DBFO Contract Information
M25 Orbital	Area 5	
Located In	Area 5	
Scheme Type	Design, Build, Finance, Operate	
Length of Project Road	102 km (63.4 miles) (400km/248.5 miles includes operational & maintenance) 2761.034 Lane Kilometres 248.6 Miles 400 kilometres	
Estimated Construction Cost	6.2 billion (includes operational & maintenance)	
Contract Award	20 May 2009	
First Opened to Traffic	Spring 2012	
End of Contract Period	May 2039	
Type of Road	Motorway	
DBFO Co	Connect Plus	
Shareholders	Balfour Beatty 40%, Skanska 40%, WS Atkins 10% & Egis projects 10%	
Contractors	Balfour Beatty, Skanska, WS Atkins, Egis Projects	

M25 Orbital

The widening of the M25 under a Design, Build, Finance and Operate (DBFO) contract commenced on 9 July 2009. Approximately 102 kilometres of the M25 will be widened by adding a lane in each direction, making the majority of it a 4-lane motorway. The widening is to be undertaken around the north side of London between Junctions 16 (M40) and 30 (A13 Interchange) and between Junctions 5 (M26) and 7 (M23) around south-east London.

3. Procurement system options

- o United Kingdom – Highways Agency
 - Public Private Partnership – motivation → DBFO**
 - to ensure that the project road is designed, maintained and operated safely and satisfactorily so as to minimise any adverse impact on the environment and maximise benefit to road users;
 - to transfer the appropriate level of risk to the private sector;
 - to promote innovation, not only in technical and operational matters, but also in financial and commercial arrangements;
 - to foster the development of a private sector road-operating industry in the UK; and
 - to minimise the financial contribution required from the public sector.

3. Procurement system options

- o United Kingdom – Highways Agency
 - Maintenance - Term Service Contracts
 - Major Contracts
 - o Prequalification of contractors
 - o Restricted Procedure for tenders
 - asset, capability, technical capability, financial, H&S
 - o Most Economically Advantageous Tender (MEAT?)
 - price / quality ration 50:50 to 20:80
 - 6 criteria: product, service, right first time, cost & time, H&S, sustainability
 - specific project changes emphasis of each criteria
 - HA retains and collects information to remain as and informed client & asset manager



3. Procurement system options

- o Netherlands
 - Four main type of Functional Contracts
 - o Performance contracts
 - o Engineering and construct (E&C) contracts
 - o Design and construct (D&C) contracts
 - o Design, build, finance and maintain (DBFM) contracts
 - State retains the “what” is wanted and moves the “how” it is done to the private sector
 - Functional specification & contracts promote innovative solutions



3. Procurement system options - Netherlands

- Engineering & Construct (E&C) contracts

Performance assesment during warranty period

property	assessment method	criteria
Skid resistance	86% slip trailer	> 0.38
Transversal evenness	ARAN laser rut depth measurement	rut depth < 18 mm
Longitudinal evenness	ARAN IRI - measurement (D&C)	IRI - value < 3m/km
Transversal slope	Aran slope measurement (D&C)	no uniform criteria
Raveling	visual inspection	<ul style="list-style-type: none"> < 20% stone loss/m² < 25m/100m with 11-20% stone loss/m² no loss of deeper stones
Cracking	visual inspection	<ul style="list-style-type: none"> crack width < 21mm Δh over crack < 11mm less than 7 transversal cracks per 100m less than 30m longitudinal cracks per 100m connected cracks may not contain loose elements
Combined damage	visual inspection	moderate raveling + cracking may not have great extent

3. Procurement system options - Netherlands

- Engineering & Construct (E&C) contracts

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3. Procurement system options - Netherlands

- Engineering & Construct (E&C) contracts

Performance assesment after construction

property	assessment method	criteria
Transversal slope	geodetical survey	according to: <ul style="list-style-type: none"> design (D&C) specifications (E&C)
Longitudinal evenness	Viagraph	C5 - value < 3%
Skid resistance	86% slip trailer	> 0.40
Brake deceleration	Instrumented test vehicle	> 5.2m/s ²
Δh over seams	straight edge	Δh < 5mm
Δh at pavement edges	straight edge	Δh < 70mm
layer thicknesses	cores	according to: <ul style="list-style-type: none"> design (D&C) specifications (E&C)
noise	<ul style="list-style-type: none"> single layer PA twin layer PA thin wearing courses and thin inlays 	<ul style="list-style-type: none"> void content & layer thickness permeability test (Becker apparatus) verification of composition, compaction and layer thickness
raveling	visual inspection	no raveling
cracking	visual inspection	no cracking

3. Procurement system options - Netherlands

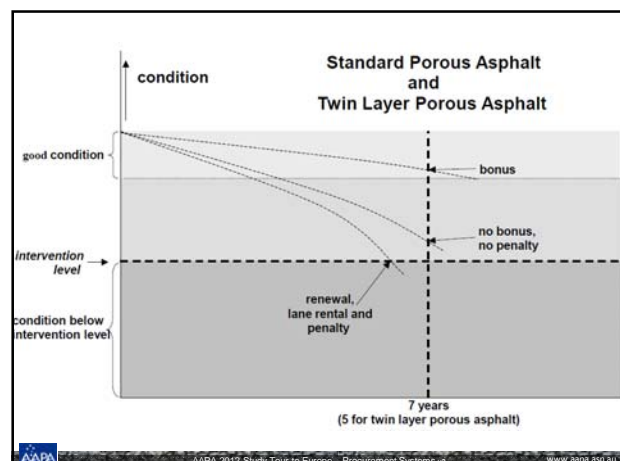
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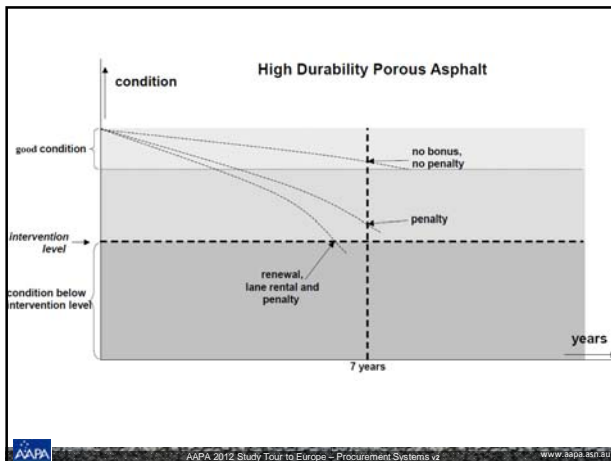
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3. Procurement system options

- Netherlands
 - Design and construct (D&C) contracts
 - Similar assessment to (E&C) contracts
 - New designs, reconstruction, widening
 - Attempt to have 7 to 10 year warranty
 - For structures & pavements a design verification substitutes for warranty
 - Design, construct, finance & maintain
 - Contractor has full responsibility to deliver
 - 20 to 30 years of performance risk
 - Paid on availability fee, bonus, improvements





Summary

- Similar complexity of procurement systems
- Decades of experience in product certification systems – promotes cost reductions / innovation
- Greenhouse gas calculators being used to change behaviour and promote sustainability
- Increasing use of functional specification and contract models – outcomes & performance
- Significant DBFM/O projects (PPP) – long term, funding streams differ, most 20 to 30 years

Whole-Brain thinking for the 21st C

Goals Driven: Analytical Intelligence	Vision Driven: Creative Intelligence
Results Driven: Operational Intelligence	People Driven: Relational Intelligence

Adapted from HBCA
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Recommendations

1. Promote, and seek methods of establishing, a national system to support innovation in cost reducing road products and systems and their commercialization.
2. Support and motivate for the transfer to functional specifications and contracts.
3. Evaluate the Australian greenhouse gas calculators in comparison to the European tools to assess their value in comparing industry products and systems.

Topic 5: Procurement Systems

Questions

- Systems
 - Avis-Technique systems – are they working / cost effective?
 - Lessons learnt, still promoting innovation?
 - How are underperforming products addressed?
- Functional and performance requirements
 - Are performance based specifications used?
 - What test methods used to measure performance / proprietary?
 - Functional specifications and fitness-for-purpose assessed over time – how is this done?
 - How are environmental / traffic loading changes included in the assessment?
 - Define what a “warranty” means, for how long, end state?
 - Can proprietary product systems replace performance-based specs?
 - Can “green procurement requirements fit into the system (CO₂, energy)



Topic 5: Procurement Systems

Questions

•Product sourcing and life cycle assessment

- Has REACH impacted on the product selection and use in Europe, are their benefits?
- Are there any “responsible sourcing” influences on product selection?
- What methodologies and inputs are used to assess WOLC for pavements?

•Contract & procurement models

- Are PPP widely used to fund and deliver European road projects?
- Do PPP affect the products chosen and warranties required?
- What are the dominant contract models for services, construction & proprietary products? Are there case studies showing cost differences?
- Are non-price criteria used in assessing tender submissions—and how?
- On contracted maintenance:
 - How is culture of ownership or stewardship for the network retained?
 - How do road authorities retain skills to be an informed client?

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climate change impacts, societal concerns
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 - Construction of road works, health considerations for bitumen and asphalt products
5. Procurement Systems **END**
 - Proprietary products (Avis Technique, HAPAS, etc.), “green” procurement, REACH, responsible sourcing, PPP and contract models

