Asphalt Pavement Recycling for Hong Kong

Seminar on Road Pavement Recycling
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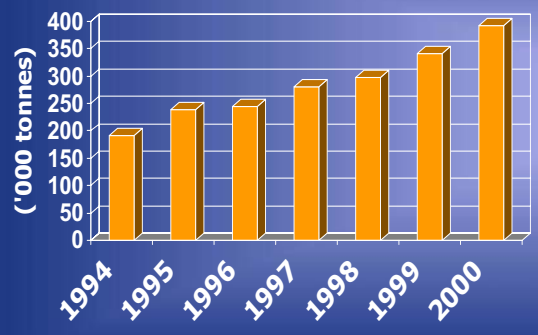
The Special Administrative Region of Hong Kong

- Area of 400 square miles
- Population of 6.5 million
- 1900 km road network
- 75% asphalt surfaced

Flexible Pavement Waste – A Growth Industry



The Waste Reduction Challenge – (HK is About Making Money!)

- To find ways to make money by conserving resources
- To forge "win-win" partnerships between key stakeholders

Construction & Demolition Waste

- Hong Kong produces 12.0m tonnes each year!
- Australia (three times Hong Kong's population) produces 6.5m tonnes
- Pavement waste is only a small part (3%) of Hong Kong's C&D waste volume

Recycling Pavement Waste in Hong Kong

- Ideal environment for recycling
- Small, densely populated area
- Immense competition for available land
- HK surfacing very consistent

Asphalt Pavement Recycling for Hong Kong

- Project duration: June 2000 to March 2002
- Literature Review
- Workshop in Hong Kong
- Preliminary Guidelines
- Laboratory Assessment
- Preliminary Catalogue of Designs

Appropriate Processes for Hong Kong

- Structural pavement failure rare
- Close proximity of residential and commercial properties
- Complex geometry and topography
- → Hot in Plant Recycling (HIPR)

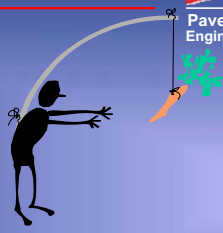


Workshop in Hong Kong

- Interviews with key stakeholders
- Suitability of HIPR confirmed
- "Breakout Sessions" in 3 sub-groups

Group A – Policy and Planning: Issues

- "Carrot" and "Stick"
- Selection and storage of RAP
  - Cheaper land!
  - Co-ordination by EPD
- Development of a suitable specification



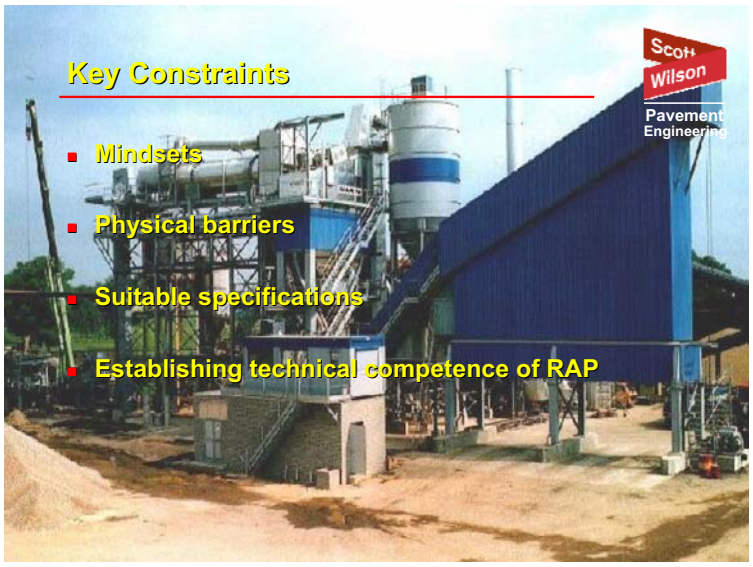
Group B – Specification, Design, Compliance: Issues

- Site investigation and materials testing
- Small % RAP: little change required
- Large % RAP: binders / rejuvenators / plant currently unavailable
- Maintenance work/ low % RAP: recipe
  Major work / high % RAP: performance

Group C – Minimising Excess Supply: Issues

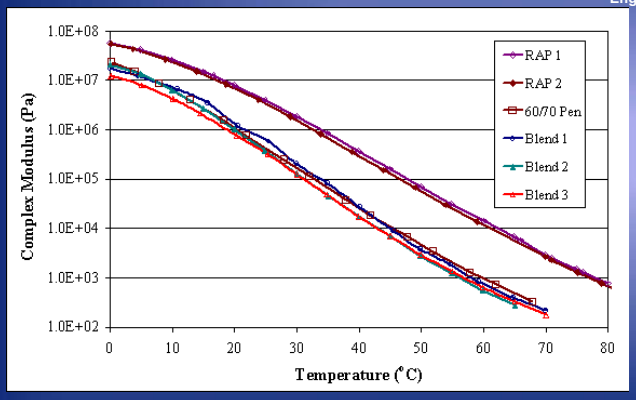
- Co-ordinated approach by Government (HyD, TD, EPD)
- Cultural change
- Alternative uses for RAP (e.g. in concrete)
- Longer lasting pavements

Key Constraints

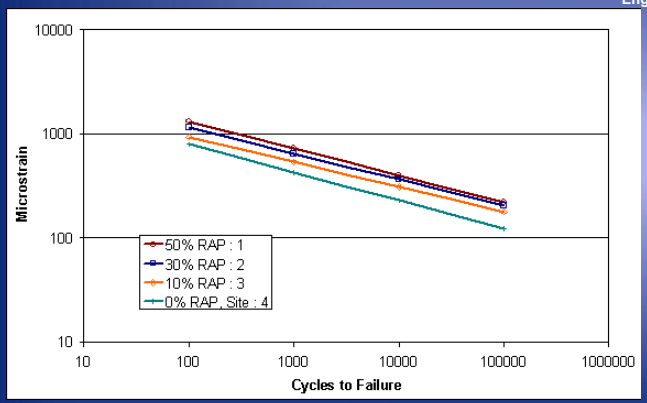


- Mindsets
- Physical barriers
- Suitable specifications
- Establishing technical competence of RAP

Laboratory Testing: Binder Properties



Laboratory Testing: Mixture Fatigue



The Hong Kong Asphalt Market

- 1.2 million tonnes / annum
- 4 suppliers
- Approximately 50/50 new/maintenance
- Prior to 1998, no suppliers with dedicated asphalt recycling capability

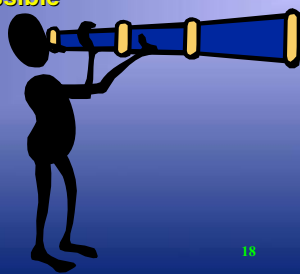
Government Policy

"The environment is an important part of Hong Kong's future development"

Tung Chi Wah, Chief Executive, HKSAR, 1998

One Contractor's View

- In 1998, Anderson Asphalt decided their next plant would have recycling facility
- Invested HK$20m in double drum batch plant (conventional HK$14m)
- Incorporation of 60% RAP possible



Implementation

- First steps : 1st August 2002
  - Up to 15% RAP in (road) base
  - Draft Particular Specification
- RAP in other layers to follow as experience gained

Full Scale Trials

- Rehabilitation / widening of major HK highway in 2003
- 5700 m^3 RAP to be recycled in base (binder) / roadbase (base)
- Landfill costs of HK$ 712,500 saved
- Reduced transport / air pollution

One Contractor's View

Pavement Engineering

- Sums do not add up – yet!
- Slow, conservative market
- Some initiatives have not materialised (e.g. premium for using RAP)
- Long term initiative - others will follow

Client's View (HyD)

Pavement Engineering

- Conventional contracts
  - Risk with Government
- Move to performance testing and contractual risk sharing
  - → Greater utilisation of recycling