

Cases for and against hot mix road surfacings

Coated macadam (or asphalt concrete)—
the “traditional” option for minor roads

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Introduction

- What is a coated macadam (asphalt concrete)?
- How were these materials developed?
- Performance
- Summary

coated macadam (asphalt concrete)

- A continuously graded material relying on aggregate interlock for its mechanical properties
- Not generally used on heavily trafficked sites
- Surface courses are 14, 10 or 6mm nominal size with binder contents around 5%
- Binder has usually been 100/150 or 160/220 grade bitumen but emulsions and other proprietary types now being used
- Bitumen binders can be cut back to provide deferred set materials

coated macadam (asphalt concrete)



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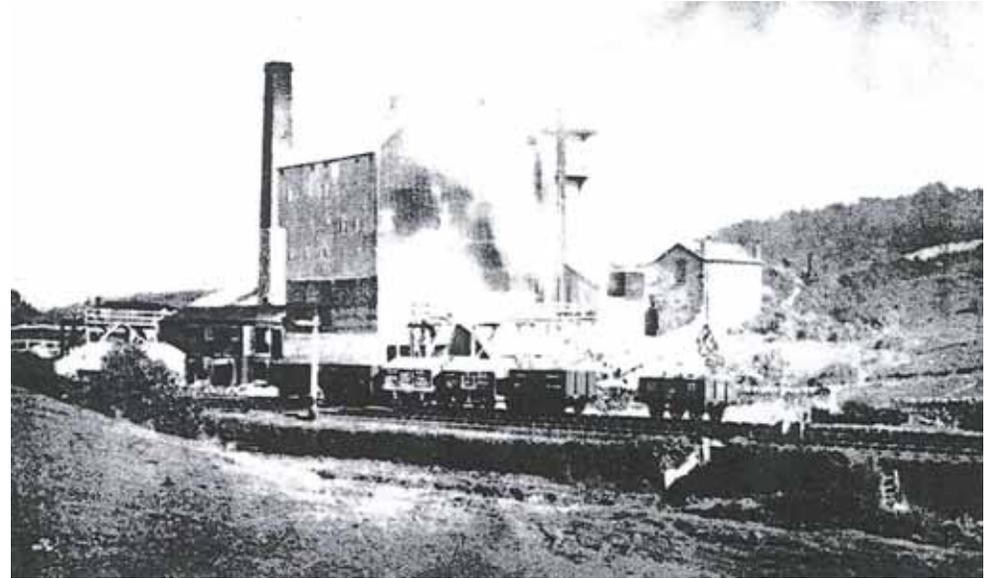
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Development of macadam

- The oldest form of coated material in the UK
- 1832 Footways in Cheltenham
- 1884 Nottinghamshire
- Initially developed as a proprietary material which often had widespread regional use
- e.g. Quarrite patented in 1900 by James Ward (the New Northern Quarries) and produced at Trowbarrow, Lancashire

Development of macadam

- Demand supported a new coating plant new being built at Sandside in 1925
- Performance variable due to quality and variability of tar



Development of macadam

Blackpool 1904 - laying Quarrite



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Development of macadam

- Produced separately from the asphalt industry

'..not to be confused with objectionable mixtures of gas tar and ashes'

Val De Travers publicity

Limestone paving – Birmingham 1888

'..the finished surface is like asphalt in appearance, and while not equal to it in actual wear, has superior properties in resilience, foothold and noise'

T Aitken

Road Making and Maintenance 1907

Development of macadam

- Further developments during the 1950's involving local highway authorities

British Standards

- **BS 802** Tarmacadam (granite, limestone and slag aggregate) – *first edition 1938*
- **BS 1241** Tarmacadam (gravel aggregate)
- **BS 1242** Tarmacadam for footpaths, playgrounds etc
- **BS 1621** Bitumen macadam with crushed rock or slag
- **BS 1690** Fine cold asphalt
- **BS 2040** Bitumen macadam with gravel aggregate

British Standards

- **BS 4987:1973 Coated macadam for roads and other paved areas**
- **BS EN 13108-1:2006** (amended Jan 2008)
Bituminous mixtures – Material specifications – Part 1: Asphalt Concrete
- **See also PD 6691 for guidance and BS 594987 for details of installation**

Performance

- **Durability**
- **Safety**
- **Stability**

Performance - durability



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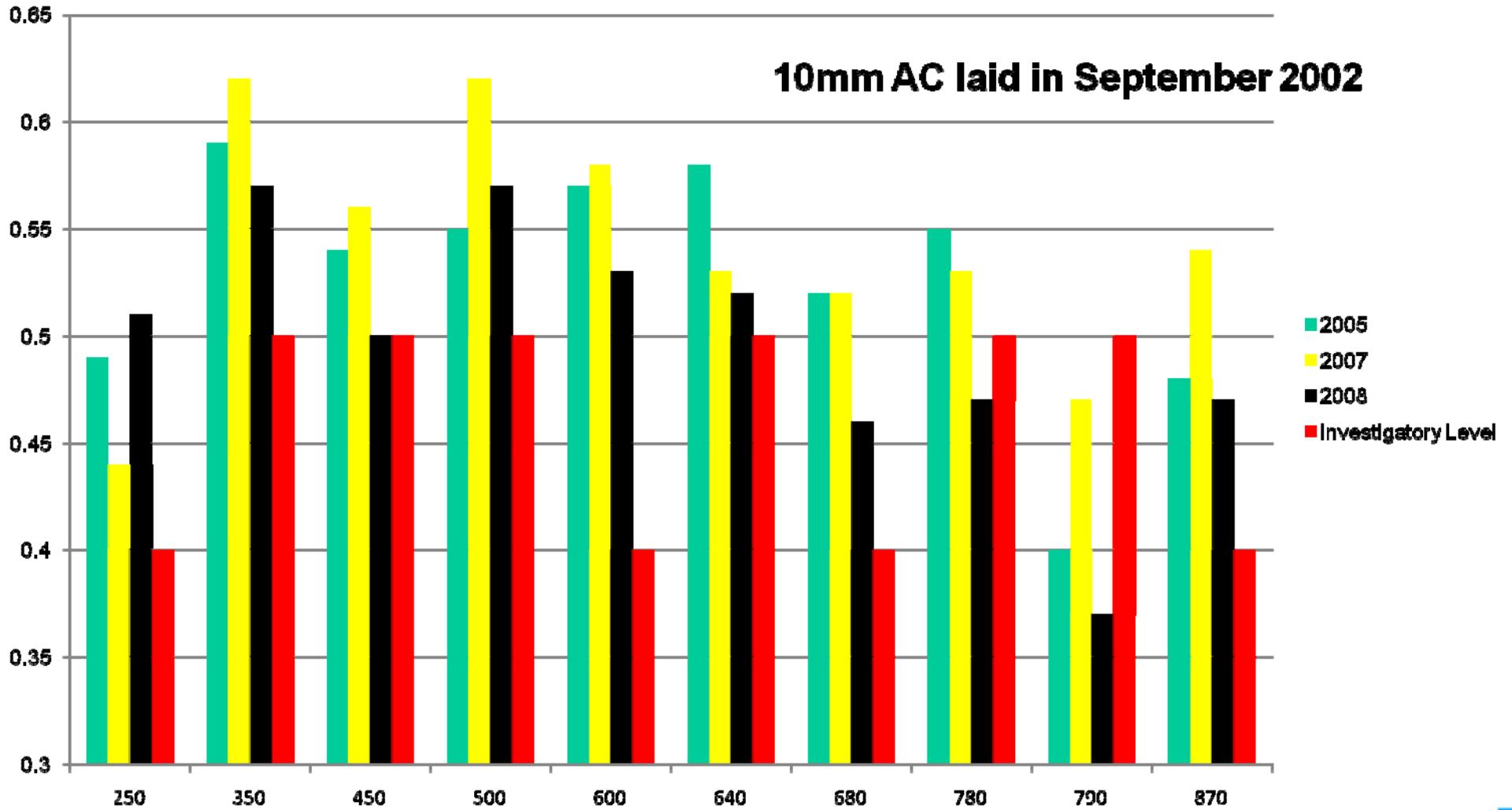
Performance - durability



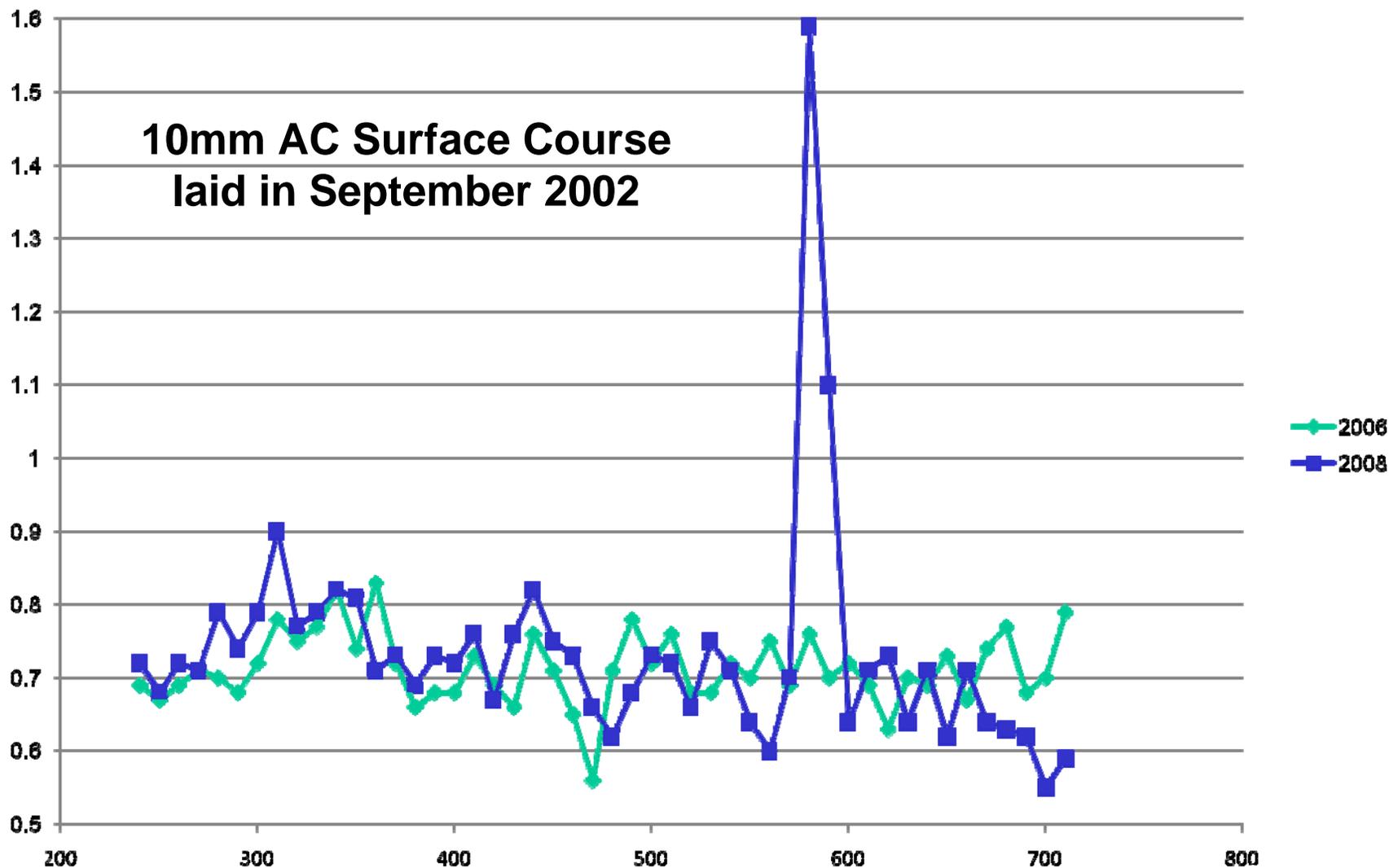
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Performance – safety – SCRIM survey data



Performance – safety – Texture depth – 10m average values



Performance - stability



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Performance - stability



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Benefits compared with other surfacing materials

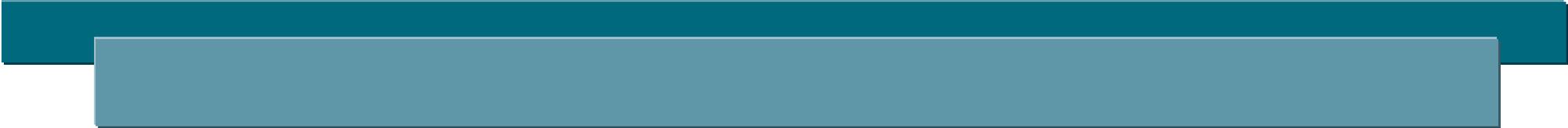
- Lower binder content, hence less expensive
- Has a continuous grading, hence better utilisation of aggregate production
- Generally uses softer grades of binder and requires lower mixing temperatures
- Suitable for the production of cold lay materials

Disadvantages compared with other surfacing materials

- Higher void contents than other surfacing materials and tends to be less durable
- Less capable of coping with deferral of maintenance due to inadequate funding
- More susceptible to fretting and mechanical damage
- Once initiated, failure can be rapid

Summary

- Long history of use of these materials
- Suited to lower traffic levels on carriageways
- Susceptible to fretting and mechanical damage from slow moving or stationary vehicles
- Consider use of modified materials for parking areas
- Once initiated, failure can be rapid



Thank you for listening

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