DEVELOPMENTS ON TREATMENTS AND PRODUCTS

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Cold Paving Technology & Surface Treatments

6 March 2014

ABOUT US

- Established in 2000

Aims:

- To increase awareness of the asphalt industry and the benefits of asphalt
- Campaigning on highway maintenance issues and funding

CONTENT

- What have been drivers for development in the recent past?
- Surface Dressing – Back in Fashion?
- What's new in the market?

SO WHAT WERE THE DRIVERS?

SO WHAT WERE THE DRIVERS... AUGUST 2006

- Air temperature 36.5°C
- Road temperature 53°C

SO WHAT WERE THE DRIVERS... JUNE 2007

- 140mm of rain (Hull, Sheffield)
- 70mm of rain in <12h
- Roads under water for several days

SO WHAT WERE THE DRIVERS... JANUARY 2010

- Air temperature -15°C
- Prolonged zero/ sub-zero temperature

GREENHOUSE GASES

UK NEWS

MENACE OF POTHOLES DOUBLES ON BRITAIN'S ROADS IN JUST A YEAR

Potholes: There were 133 per cent more at the end of August than at the same time in 2009 – Friday, October 1, 2010

By Nathan Rao

BRITAIN'S roads are pitted with twice as many potholes as last year, safety campaigners claimed yesterday.

It adds further weight to the Daily Express Let's Get Britain Moving Crusade, which demands a fairer deal for drivers.

THE EFFECT OF CLIMATE CHANGE 3CAP'S HIGHWAY NETWORK AND STANDARDS FINAL REPORT – FEB 2009

- From the risk and probability assessment carried out it has been identified that the existing policies and standards for resurfacing, overlay, reconstruction and surfacing dressing will be affected by all four of the main climate change types investigated:
- Hotter and dryer summers
- More intense rainfall
- Stronger winds and more storminess
- Warmer winters

PRIORITIES

- Minimise greenhouse gases
- Improve water management
- Responsible use of finite resources
- Maximise asset life
- Use economics as principle metric
- Protect stakeholders

POTHOLES AND UTILITIES

AIA
ASPHALT INDUSTRY ALLIANCE

Supertrench®-footway

ALARM SURVEY 2013

Finding	England (ex-London)	London	Wales
Percentage of Budget used on reactive maintenance	25%	33%	30%
Number of potholes filled in the last year	1,909,000	102,000	156,000
Average cost to fill a pothole	£52	£62	£47
Amount paid in road user compensation claims	£23.8m	£6.3m	£7.4m
Staff time working on claims (per year)	38,560 days	8,500 days	2,750 days

SURFACE DRESSING BACK IN FASHION

AIA
ASPHALT INDUSTRY ALLIANCE

SURFACE DRESSING BACK IN FASHION

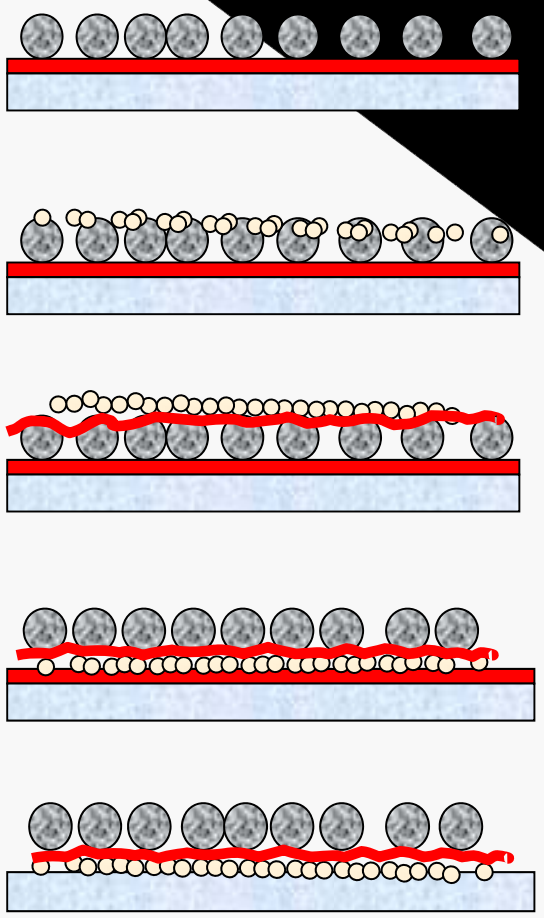
AIA
ASPHALT INDUSTRY ALLIANCE

WHY SURFACE DRESSING?

As a preventative tool, it can help to:

- Seal road surface, preventing water reaching lower layers
- Prevents further disintegration of structural layers and prolonged life
- Improve lost skid resistance
- Reduce surface spray
- Enhance appearance
- Help prevent the formation of potholes in a cost effective way
- It does not, however, add structural strength to the pavement, nor is it a structural repair

TYPES OF SURFACE DRESSING



SINGLE DRESSING

Uses least amount of material, limited tolerance to stresses

RACKED-IN DRESSING

Mainly used where traffic is heavy or fast

DOUBLE DRESSING

More robust than racked in and used on binder lean surfaces

INVERTED DOUBLE DRESSING

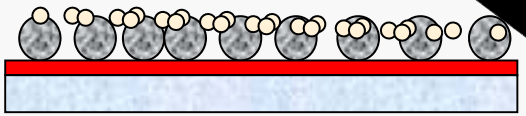
Used on roads of uneven hardness or surfaces that are very hard

SANDWICH DRESSING

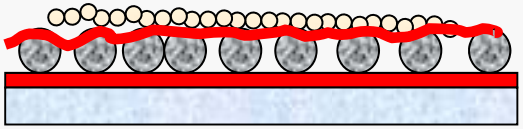
Used on Binder rich surfacing

TYPES OF SURFACE DRESSING

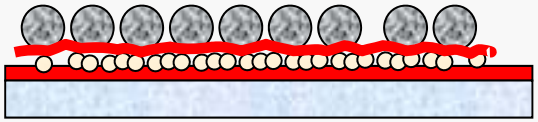
SINGLE DRESSING



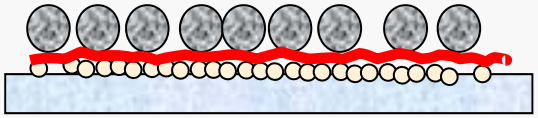
RACKED-IN DRESSING



DOUBLE DRESSING



INVERTED DOUBLE DRESSING



SANDWICH DRESSING

- Better performance binders = better chip retention
- Improved emulsion break control = better early life chip retention
- Reduced emulsion application temperature
- Recycling of sweepings
- Sourcing of local aggregates
- Improved plant design increasing application accuracy of binder
- CE marking

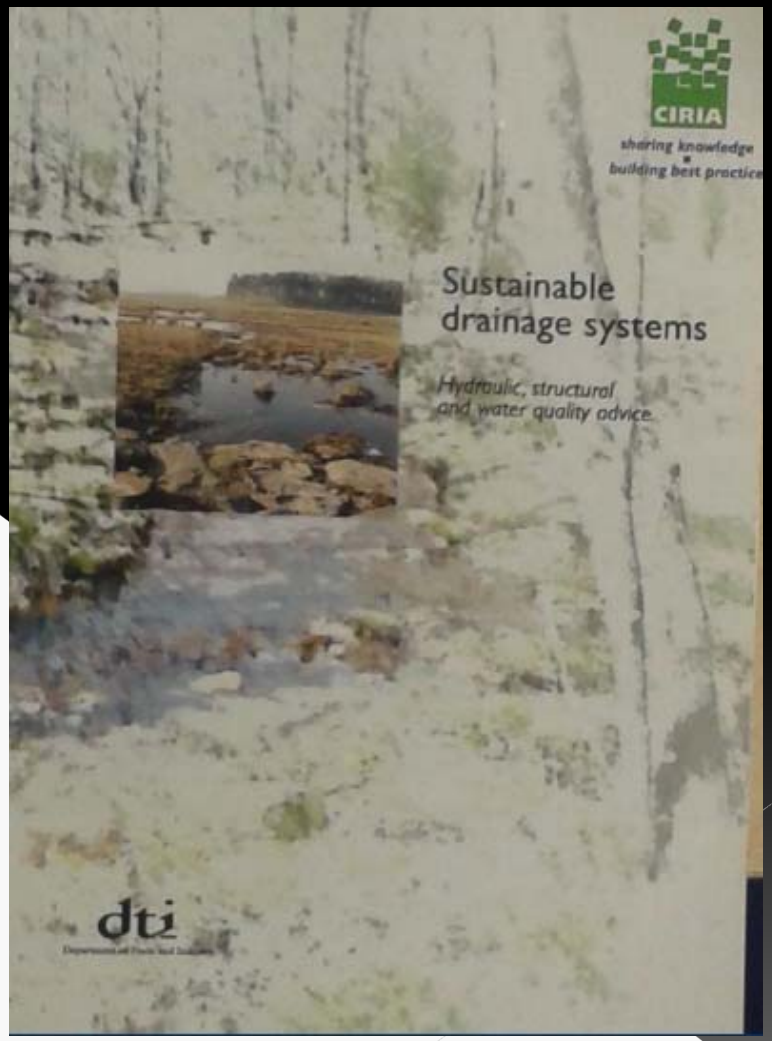
RECENT DEVELOPMENTS IN ASPHALT SUSTAINABILITY

- **Water Management**
  - SUDS
- **Energy Reduction**
  - Low Temperature Asphalt
- **Product Stewardship**
  - Increased Recycling
  - Managing Hazardous Wastes
  - Maximise Asset Life

IMPROVE WATER MANAGEMENT

- Substantial research has established how roads can be designed to accommodate water, providing option to make space for water
- We find little appetite for these technologies to be specified by clients in highways

HIGHWAYS CAN PROVIDE FLOOD PLAIN DEVELOPMENT SUDS



MINIMISE GREENHOUSE GASES

- Reduction in carbon footprint was identified as a development area for the asphalt industry to invest and develop

- We have developed technologies and the means of quantifying benefit but we find little appetite from clients to specify

LOW TEMPERATURE ASPHALTS

EAPA DEFINITION

- **Hot Mix**
  - Produced and mixed at temperatures roughly between 120 and 190 °C
- **Warm Mix**
  - Produced and mixed at temperatures roughly between 100 and 140 °C
- **Half Warm Mix**
  - Produced with heated aggregate at a mixing temperature (of the mix) between approximately 70°C and roughly 100°C
- **Cold Mix**
  - Produced with unheated aggregate and bitumen emulsion or foamed bitumen

WHAT ARE THE INDIVIDUAL DRIVERS FOR LOW TEMPERATURE ASPHALT

- **The Contractor**
  - Wants improved cold weather workability without compromising durability
- **The Government Body**
  - Wants to reduce upfront energy use and carbon generation.
- **The Client (in today's climate)**
  - Wants reduced upfront cost ?
- **Internationally**
  - Reduced emissions and improved worker safety

Evolution of Warm Half Warm Mix

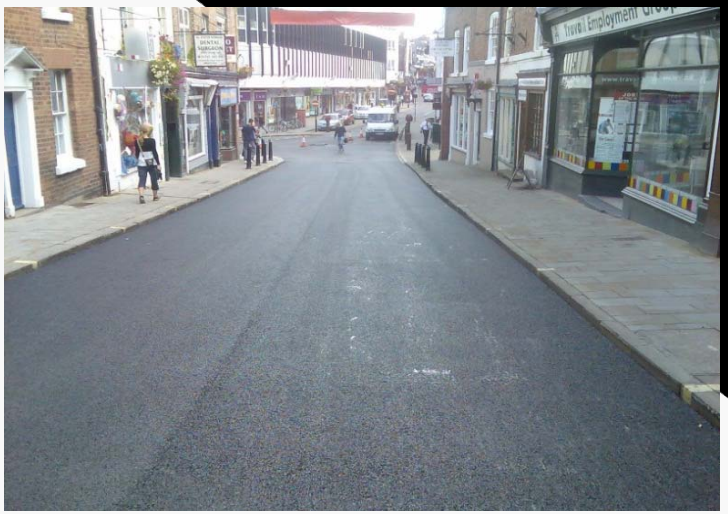
- Developed in Europe during the late 90s early 2000s
- Technologies embraced and evolved faster outside of Europe
- Numerous technologies now available internationally
- Technologies slow to be adopted in the UK

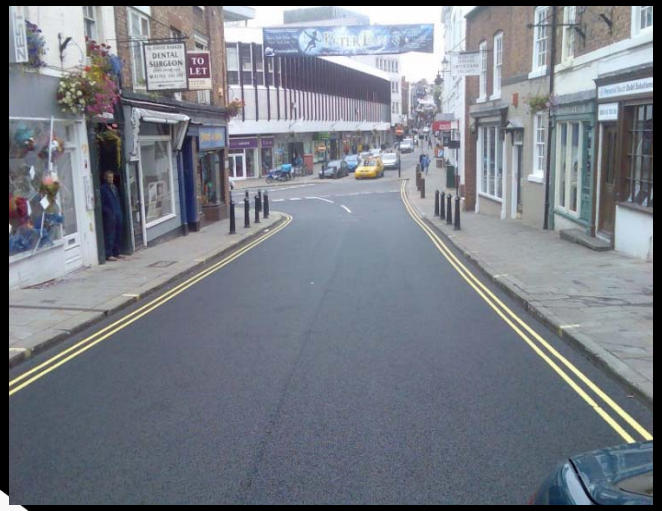
Why Warm mixes

- **Initially** it was to enable the reduction in temperatures at which Asphalt mixes are manufactured and laid to improve workability.
  - Through reduced viscosity at lower temperatures.
- **Later** the driver was to reduce energy utilisation and impact on climate change.

REPORTED/PERCEIVED BENEFITS OF WARM/HALF WARM MIX

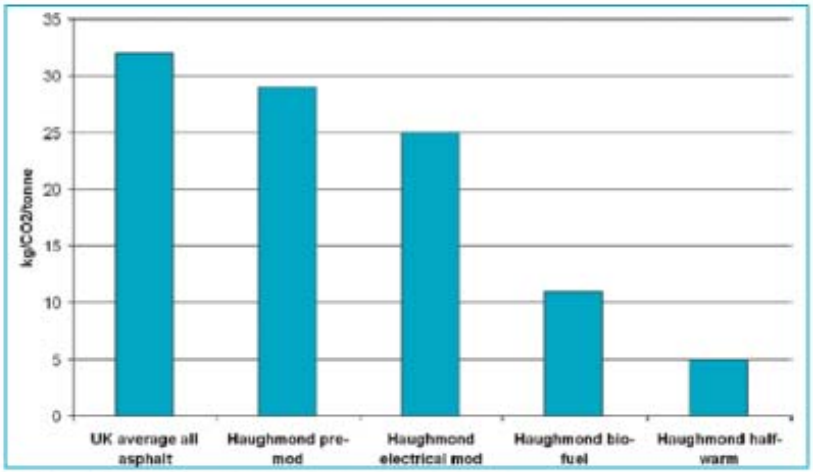
- Reduced ageing of the binder
- Reduced fuming in production
- Elimination of fuming at worksite
- Substantial savings in energy use
- Substantial reduction of greenhouse gas emissions
- Improved workability
- Longer paving window
- Early opening to traffic
- Lower voids
- Improved density of joints
- Improved worker safety
- Community friendly urban plants
- Clean equipment &vehicles after discharge
- Elimination of odours
- Improved durability (thicker binder film & reduced ageing)
- Easier to compact
- Compactable down to 60°C
- Increased use of RAP
- Improved ride quality
- Pavement blacker longer






PHARMACY
Prescriptions
RINGWAY

THE WMHA SHROPSHIRE TRIAL – APRIL 2009 (130 TONNES)



Client - Worcestershire County Council

Contractor - Ringway Infrastructure Services

Supplier - Bardon Aggregates,

Quarry - Haughmond Hill, Shrewsbury

Specification - AI 14mm LIFE 40/60 with a 65PSV

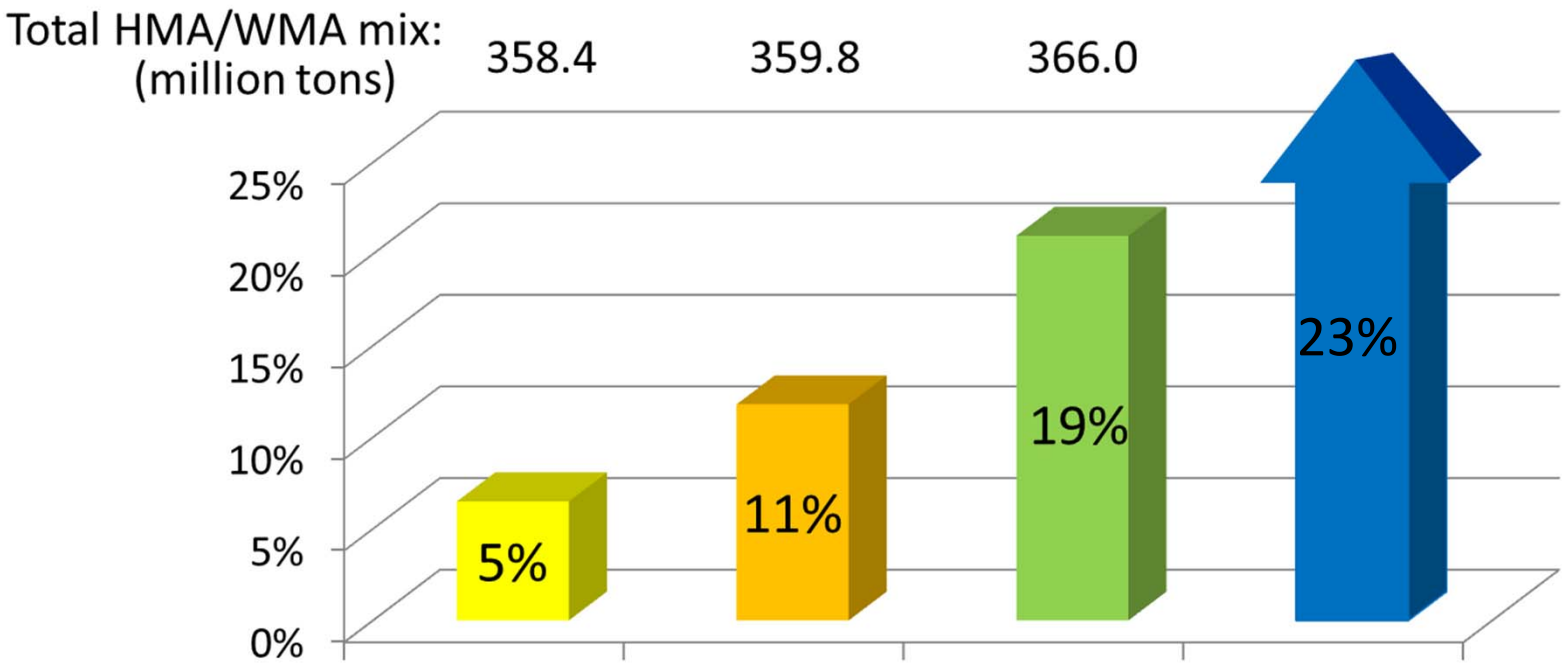
Surface Course - 400 tonne @ 40 mm

Distance travelled - 65 miles (approx. 1.5 hours)

Weather - Light drizzle , approx 14-15 degrees

WMA Usage in HMA/WMA

*Proportion of **Total** Mix Production in USA*



2006
WMA trials begin

2009
16.8 million tons

2010
41.1 million tons

2011
68.7 million tons

87 Million tons

Source: Draft annual survey presented during Feb. 2013 NAPA Annual Meeting

WEST MIDLANDS HIGHWAYS ALLIANCE

- Agreed to a 20% useage (200k tonne) by 2015
- Agreed action plan
- Low Carbon Concordat launch – 30th September
- All 14 WMHA Members signed up
- HTMA and Aggregate Suppliers signed up!

CAREFUL RECYCLING OF ASPHALT REDUCES USE OF FINITE RESOURCE

RESPONSIBLE USE OF FINITE RESOURCES

- Beneficial use for waste materials in performance-enhancing applications - minimising demand on prime finite resource

- Big challenge to manage the client's duty of care where road tar is identified in old asphalt, whilst still maximising the re-use of the asset

COLD MIX

- **Utilises use of**
  - RAP
  - Tar-bound materials
  - Secondary aggregates
  - Virgin aggregates
  - Bitumen (as emulsion or foam)
  - Water
  - Hydraulic binders
    - PFA
    - IBA
    - Slag Dust
    - Cement

Safer roads, better journeys.

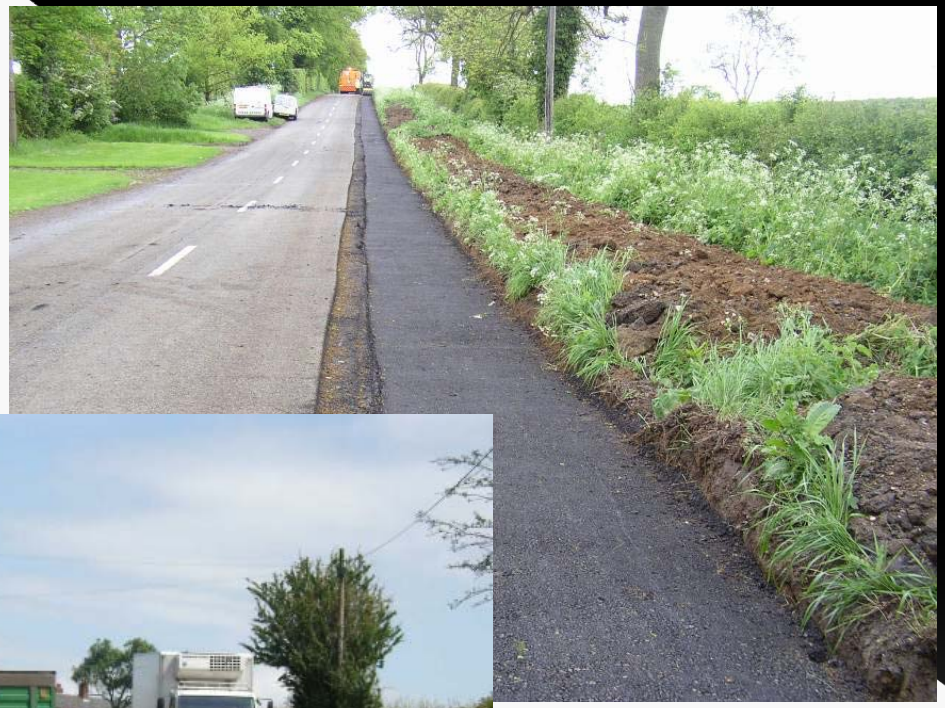
Gloucestershire HIGHWAYS

Gloucestershire County Council & Atkins


FJ54 SYX


50

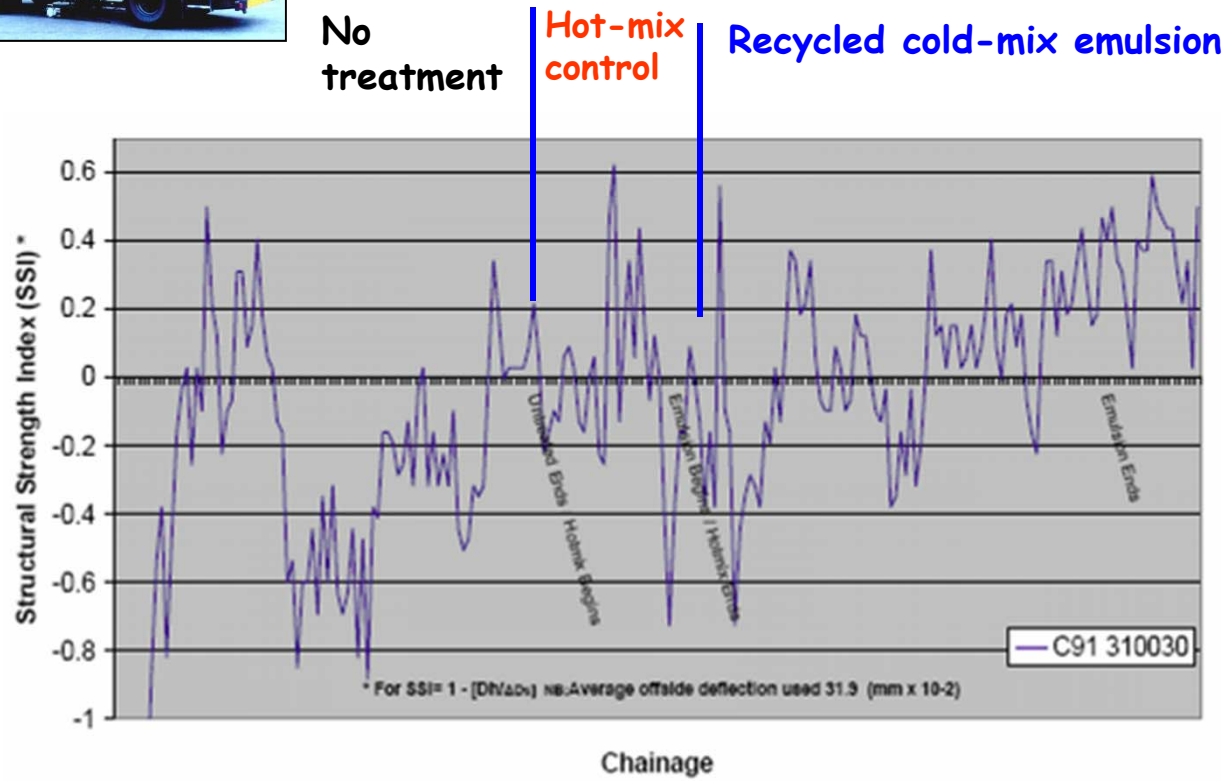
LOCAL ROADS



Cold emulsion: Prototype trials 2006

Structural Course In-service performance

Deflection survey

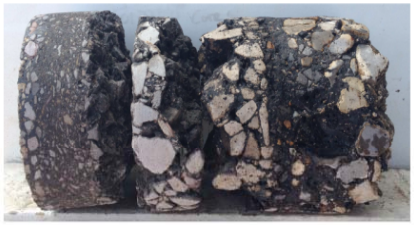


Performance evaluation after service life of 6 months

MANAGING RECLAIMED ASPHALT - HIGHWAYS AND PAVEMENTS

An ADEPT Guidance Note

ADEPT
ASSOCIATION OF DIRECTORS OF ENVIRONMENT, ECONOMY PLANNING AND TRANSPORT



Transport Research Laboratory
Creating the future of transport

PUBLISHED PROJECT REPORT PPR666

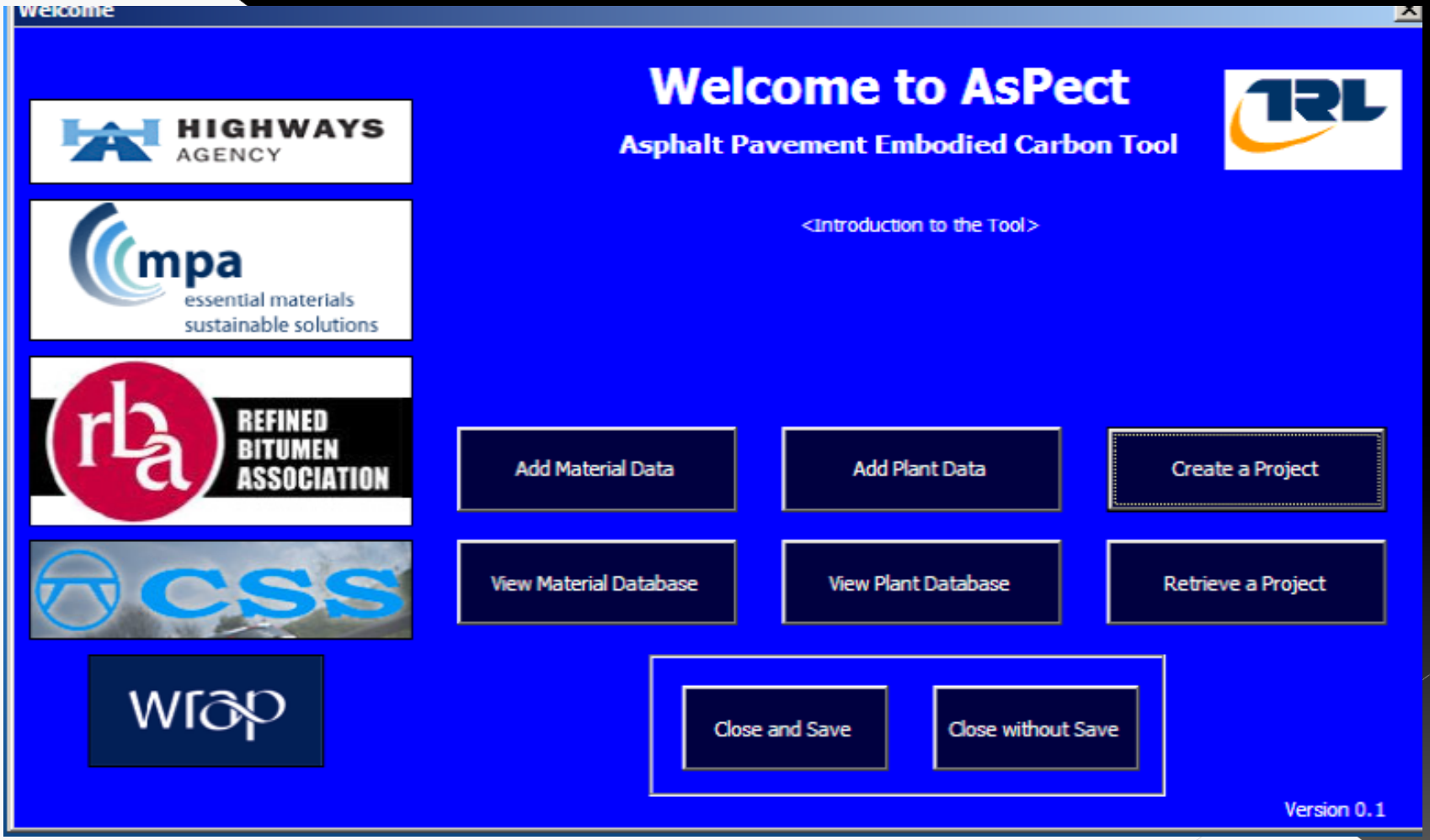
Specification for Low Temperature Asphalt Mixtures

J C Nicholls (TRL), H K Bailey (TRL), N Ghazireh (Lafarge Tarmac) and D H Day (Nynas)

Prepared for: Lafarge Tarmac
Project Ref: 11112397

Quality approved:
Cliff Nicholls (Project Manager)
Michael McHale (Technical Referee)

MEASURE THE CARBON FOOTPRINT



MAXIMISE OUTPUT LIFE

- The highway asset continues to degrade due to lack of maintenance
- A high proportion of highway maintenance is undertaken at night or in winter which is not maximising service life
- Possession is not based on minimising joint failure in terms of joint frequency or their position
- Pothole and reinstatement technologies have been developed to improve repair performance

CONCLUSION

- Climate variability requires better risk management when applying surface treatments
- Poor maintenance planning can result in increased reactive maintenance costing the client more
  - Increased insurance claims
  - Erosion of budget
- Increased planned maintenance frequency may be required to deliver value for money
- Substantial energy savings can be achieved with warm/half warm and cold mix
  - regular volume throughput is required
- Use of SUDS would assist water management issues

THANK YOU FOR YOUR ATTENTION