

# ○ Recycling and “Green” Initiatives in the City of Cape Town

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- [Dilbert 'The Knack' Engineer Video.mp4](#)

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# Background

- City stockpiles large quantities of RA through road works projects
- Currently being used by depots as a “gravel” for:
  - Repair of gravel shoulders
  - Hard stands for housing
  - Fill for flood alleviation
- Effective use of quality aggregate and valuable residual binder?



# Background

- Better, economical use for RA:
  - Reuse in Asphalt – BTB and surfacing
  - Use in base rehab as BSM
  - In situ recycling into base rather than milling off – kerb and channel geometrics often restrictive
- This resulted in Camps Bay BSM and Weltevreden RA in BTB
- Minor use also of RA in WMA trial

# Camps Bay Drive: Background

- Consultants: Worley Parsons RSA: Glynn Llewellyn and Werner Jeppe
- Need for rehab and widening due to condition and geometrics
  - Scenic route and CBD feeder = high traffic vol. and many busses
  - Narrow & winding
  - Last rehab 30 to 40 years ago
  - Many holding actions = non-uniform pavement structure



# Camps Bay Drive: Why BSM

- Existing non-uniform pavement and widening made CIR impossible
- Short construction period required:
  - BSM can be stockpiled off site and paver laid
  - BSM can be trafficked if need be
- Chance to use City's stockpiled RA economically
- Increased quality of off-site blending

# Camps Bay Drive: Pavement

- BSM pavement design (TG2):
  - 50 mm AC Surfacing
  - 200 mm BSM 1
  - In situ/selected G7 material (min 200mm)
  - Will be checked using deviator stress ratio
- Alternative design (SAMPDM)
  - 40 mm AC Surfacing
  - 150 mm G2 base
  - 150 mm C4
  - In situ/selected G7 material (min 200mm)

# Camps Bay Drive: Mix design

- Three options allowed for in tender
  - 100% RA,
  - blending with G4 and
  - Blending with crusher dust
- Level 1 Mix designs show BSM 1 with 100% RA, 2.2% binder, 1% cement
- Level 3 Mix designs, 100% RA, 2.1% BC, 1% Cement
  - Cohesion = 251 kPa, Friction Angle = 43.4°
  - Retained cohesion = 63%



# Weltevreden Drive: RA in BTB

- Consultants: GIBB: Alan Moffett
- Background:
  - All RA remains city property
  - RA to be transported from site to plant
  - Viability of use of RA depends on haul distance, % RA and % binder saving
  - Cost analysis carried out using assumptions
- Tendered at min 20% RA in BTB as per TRH 21



# Wetevreden Drive: RA in BTB

- Costing Assumptions:
  - Reduction in BC = 0.3% per 10% RA
  - Cost of RA haulage = R2.30/t.km
  - Crushing and screening of RA = R95/t
  - Virgin aggregate cost = R250/t
- Tendered at min 20% RA in BTB
- Haulage from site = 30 km
- Estimated saving =  $\pm$ R50/t ( $\pm$ R7 for aggregate,  $\pm$ R43 for binder)

# Weltevreden Drive: RA in BTB

- Comparison of recently tendered rates:
  - Approximately R25/t saving on BTB rates tendered 1 year ago in similar area for similar works
  - Actual saving taking into account Rise and Fall, escalation, market etc. = ?????

# Warm Mix Trial: Olieboom Road

- Consultants: GIBB: Alan Moffett
- Contractor: Zebra Surfacing
- Supplier: Much Asphalt
- Background:
  - Why? Green/emissions? Fuel Savings?
  - Compaction benefits
  - City does night work in winter – compaction window a definite benefit

# Warm Mix Trial: Olieboom Road

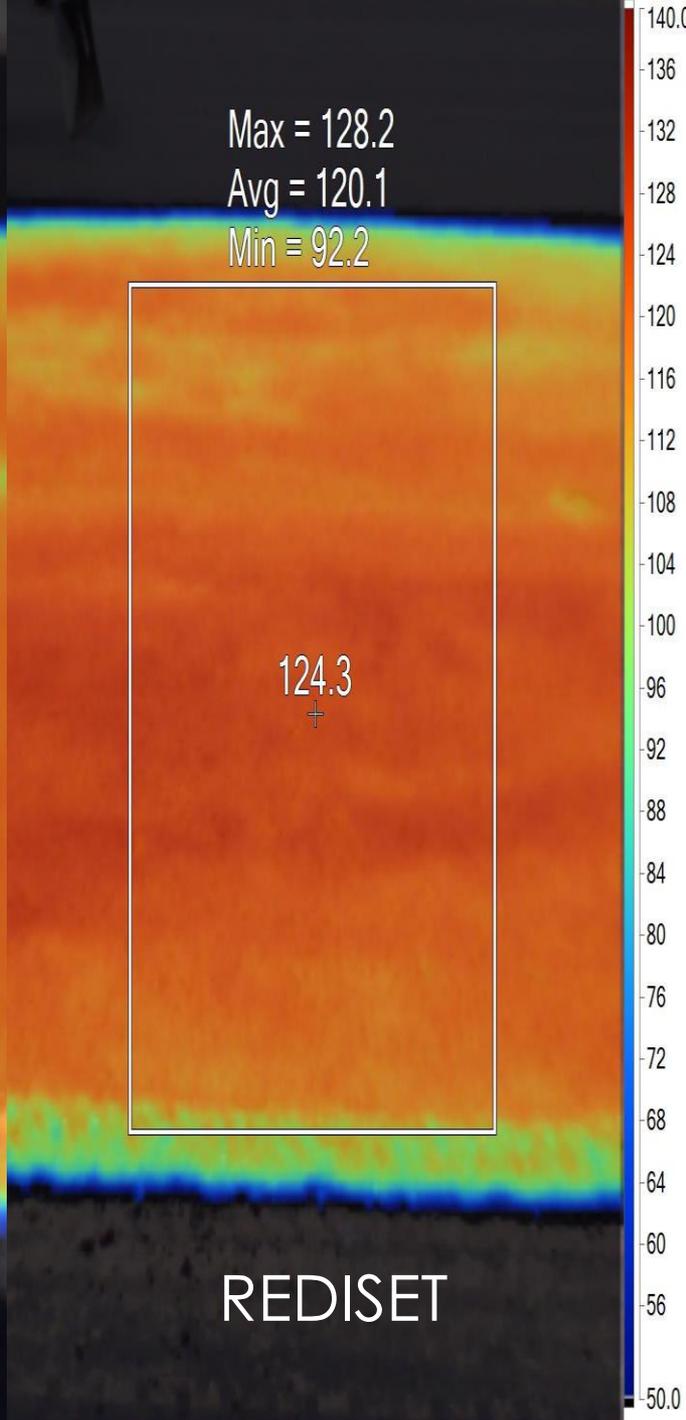
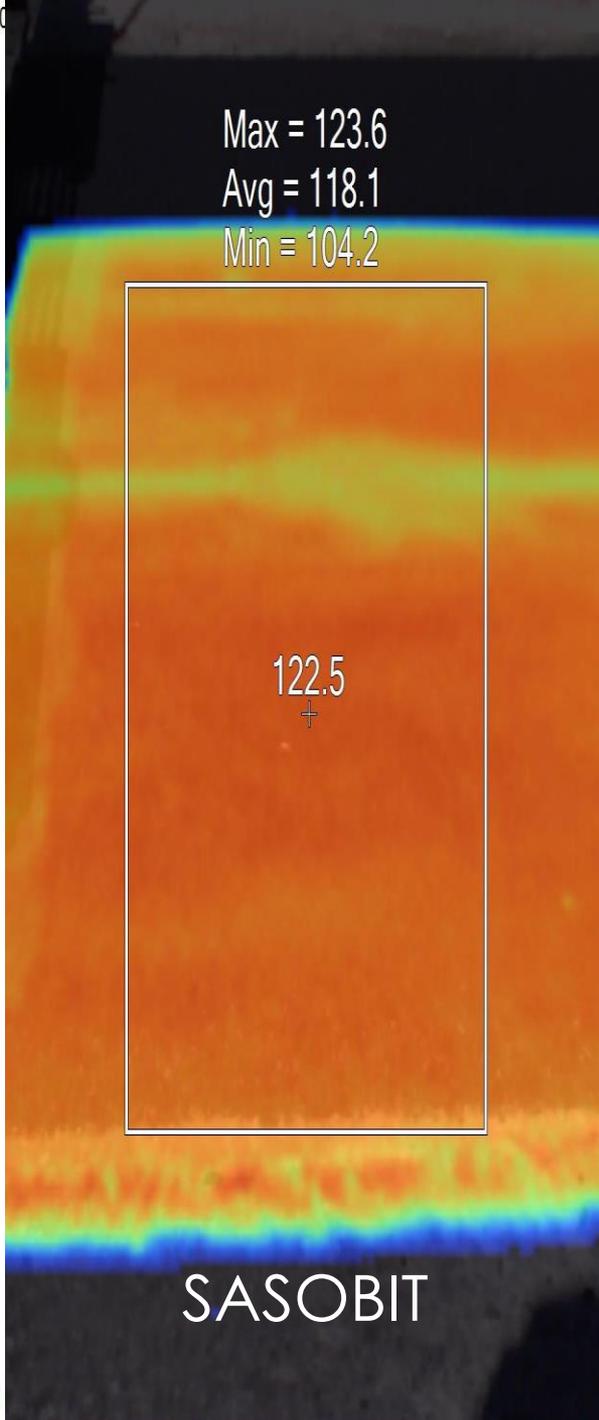
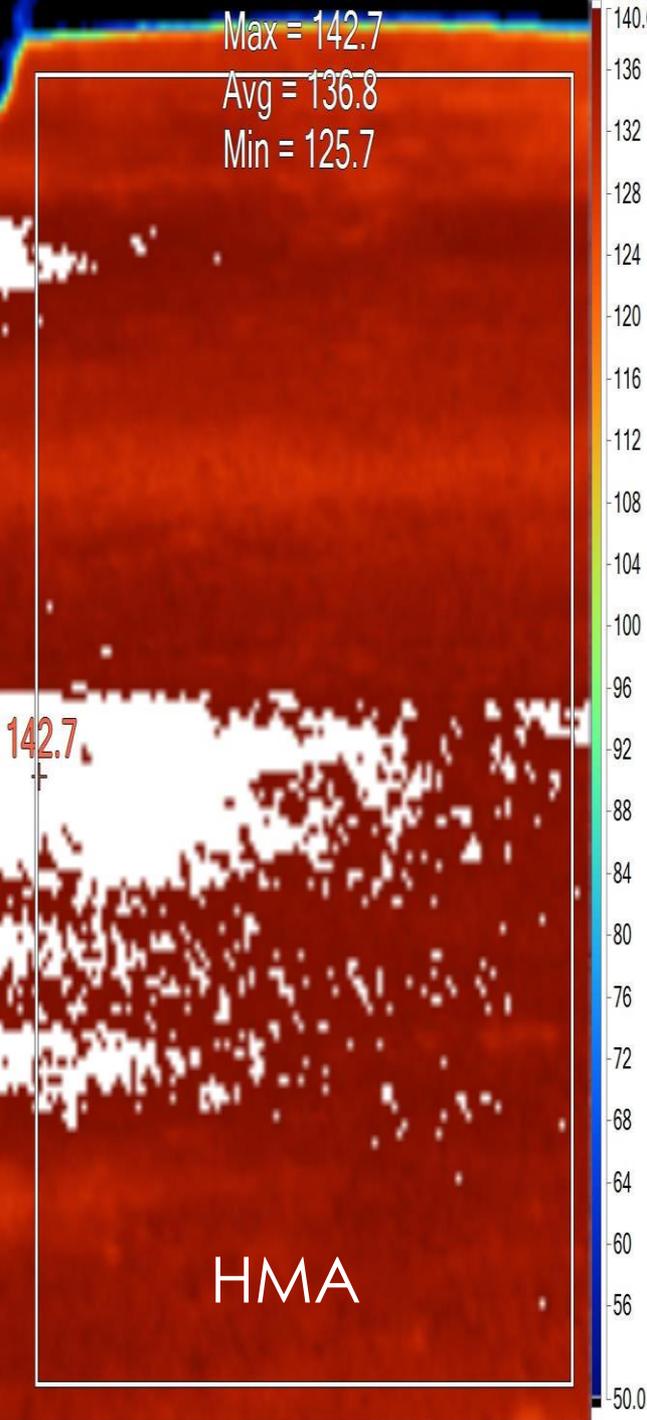
- Facts and figures:
  - 3 mixes used:
    - CCC 50/70 (control mix),
    - 1% Rediset® (volumetrics as per CCC mix)
    - 1.5% Sasobit® (volumetrics as per CCC mix)
  - ± 350 tons CCC
  - ±200 tons of each warm mix technology
  - 10% RA in all mixes
  - Placed on BSM 1 base (emulsion)
  - Estimated ES 3 traffic

# Warm Mix Trial: Olieboom Road

- Mixing Facts and figures:
  - CCC mixed at 155°C to 160°C dispatched at 150°C to 155°C, on site at 120°C to 142°C, behind paver at 100°C to 125°C (Ave 111°C)
  - Sasobit® mixed at 138°C to 142°C dispatched at 135°C to 140°C on site at 120 to 130, behind paver at 90 to 105 (ave 100)

# Warm Mix Trial: Olieboom Road

- Mixing Facts and figures:
  - Rediset® mixed at 140°C, dispatched at 135°C to 140°C, on site at 120°C to 140°C, behind paver at 100°C to 120°C (ave 109°C)
- No compaction issues (over or under) experienced





# Where to from here?

- BSM's:
  - We await the results of the current project
  - Looking for suitable new projects
  - Major hurdles are:
    - Economies of scale – off site vs. in situ, when does plant establishment become viable?
    - Availability of plant in Cape Town
    - Marketing and “education” to broader TCT and consultants
  - Business case for CoCT to establish term tender for or its own RA processing and BSM blending plant?

# Where to from here?

- RA in Asphalt:
  - Not new technology, no reason not to roll it out further in TCT
  - Looking for suitable new projects with enough RA and within viable haul distances
  - Major hurdles are:
    - Increasing % RA to 30/40% in BTB and 15/20% in surfacing - are CT suppliers able?
    - Suitable projects with enough RA and BTB
    - Marketing and “education” to broader TCT and consultants

# Where to from here?

- Warm Mix:
  - Cost Savings (if any) only realised on large scale daily production – City seldom has projects of this nature – premium attached to warm mix
  - Major advantage in night work compaction windows: cost premium = reduced risk - worthwhile but then not warm mix



Thank You



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