

# Project Scope

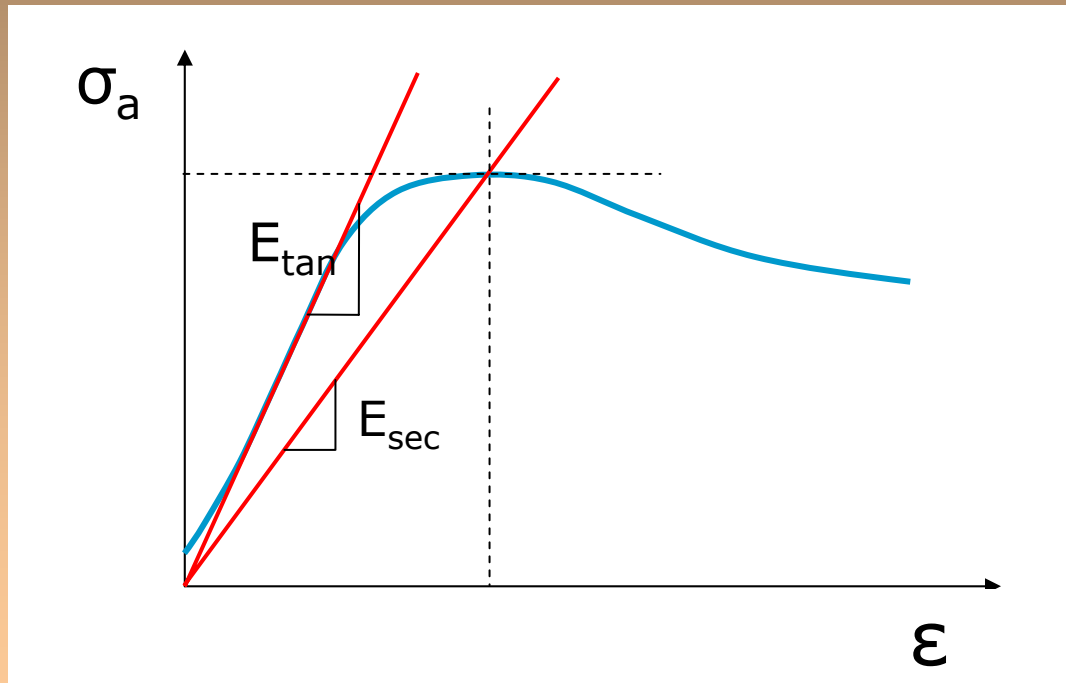
- Task 1: Standardised specimen prep for triaxial testing (SAPDM)
- Task 2: Simple Triaxial Test
- Task 3: Stiffness correlation (1)
- Task 4: Stiffness correlation (2)
- Task 5: Advanced classification system (1)
- Task 6: Advanced classification system (2)
- Task 7: Curing protocol (1)
- Task 8: Curing Investigation (2)
- Task 9: Moisture Sensitivity: Lab sim.
- Task 10: Moisture Sensitivity : Acc. sim.
- Task 11: Durability In Terms Of Binder Ageing
- Task 12: Compaction Investigation

# Task 2: “Simple” Tri-axial

- Main issues:
  - Specimen geometry : 150 mm  $\varnothing$  x 300 mm
  - Monotonic tests :
    - 4 confinement pressures : 0 , 50, 100, 200 kPa
    - Loading rate : 2 [% $\epsilon$ /min]
  - Dynamic tests :
    - Not required from commercial labs

# Task 3: Stiffness correlation

- Investigated  $E_{\tan}$  and  $E_{\sec}$  from monotonic tests  $\rightarrow E_{\tan}$  useable



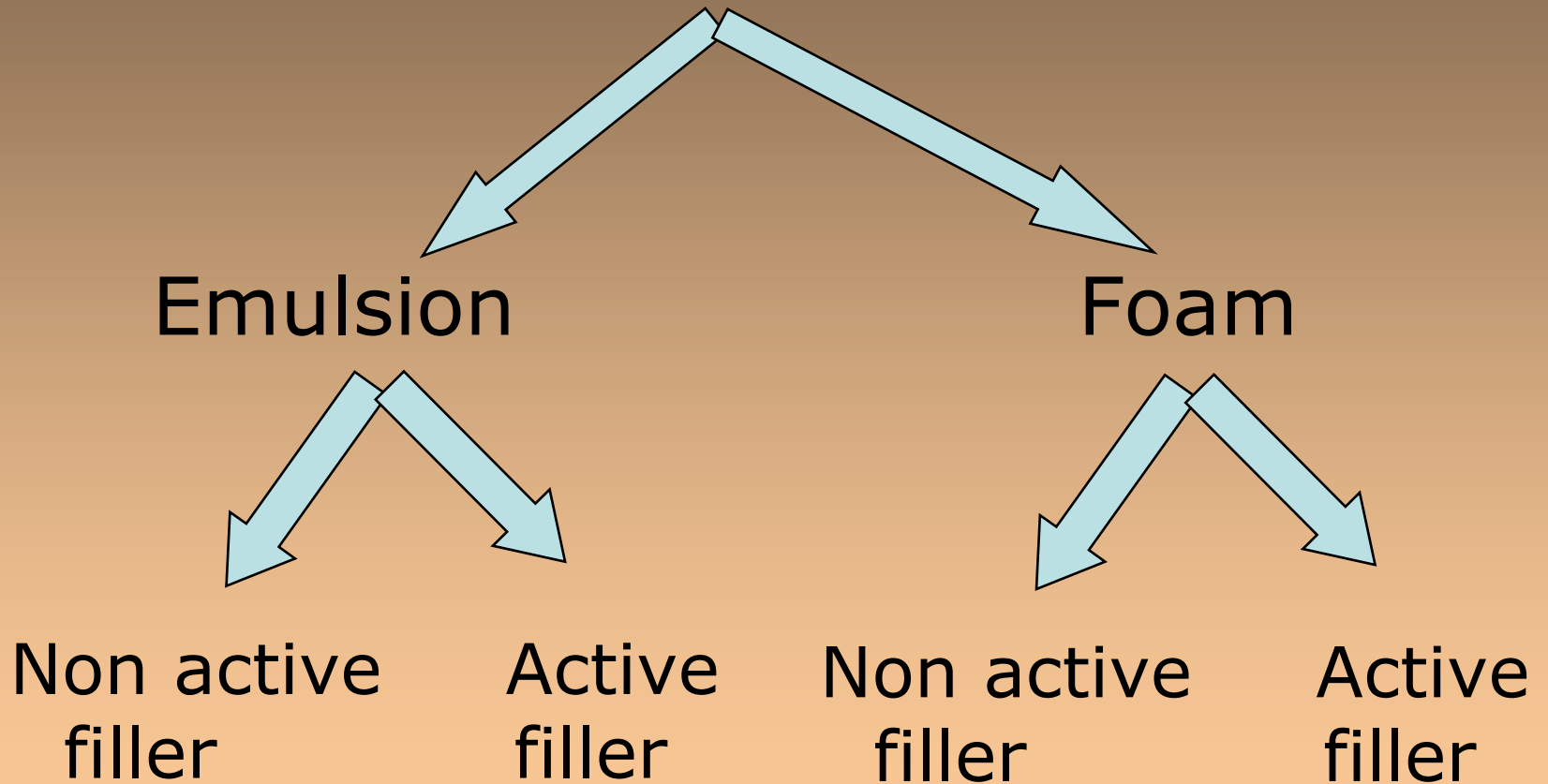
# Task 3: Stiffness correlation

- Strain rates:
  - Monotonic test → 0.1 % strain/sec
  - Dynamic test →  $\pm 1.0$  % strain/sec
- Comparable stiffness range:
  - $E_{\text{tan}}$  → 50 – 200 MPa
  - $M_r$  → 500 – 2000 MPa
- $E_{\text{tan}}$  reveals same trends as  $M_r$
- Relationships between  $E_{\text{tan}}$  &  $M_r$  (Task 4)

# Task 6: Advanced classification system

- Monotonic, short-term dynamic & long-term dynamic testing on recycled materials (N7) treated with emulsion (anionic 3.3% and 1% cement) has commenced.
- Scheduled for completion by the end of June 2008 to tie into the drawing up of a final report and guideline document

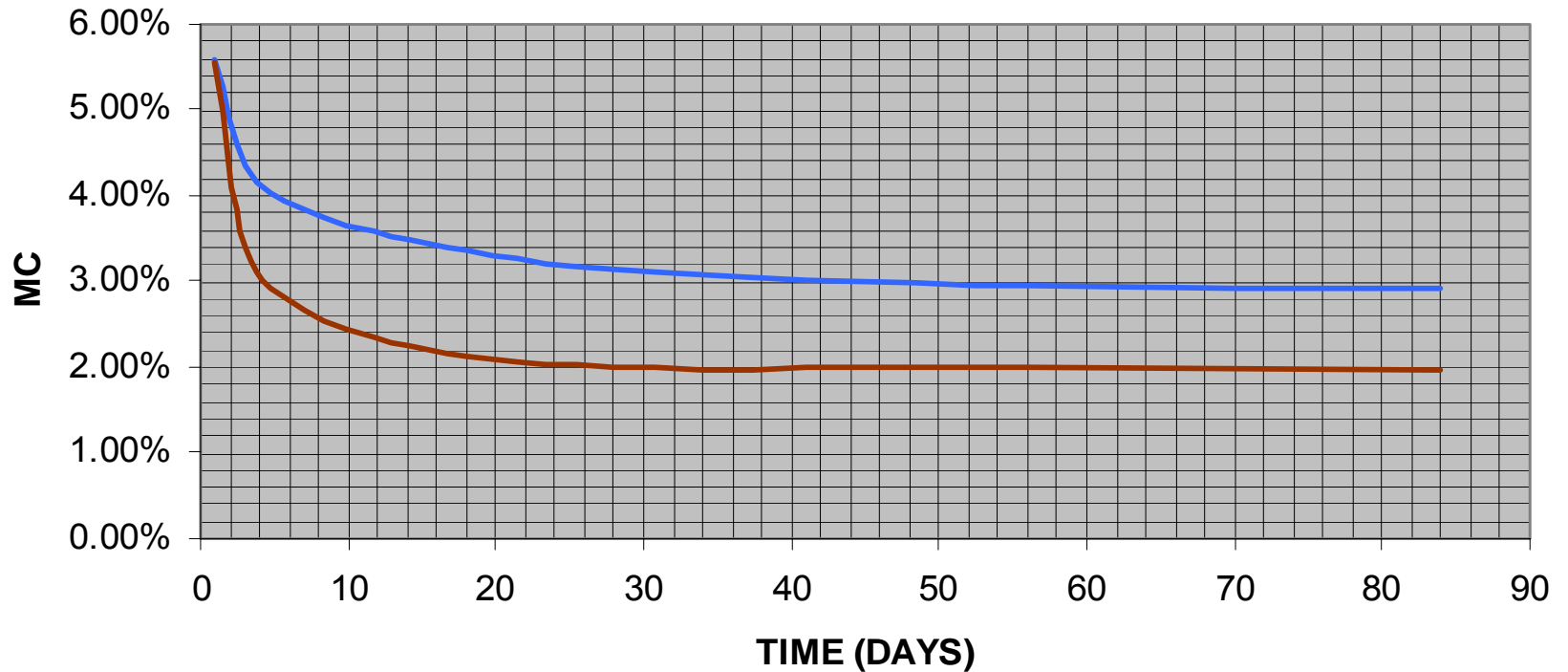
# Task 7: Curing (lab protocol)



# INFLUENCE OF SPECIMEN SIZE

**CURING COMPARISON OF GRADED CRUSHED STONE MATERIAL:  
150X250 SAMPLES VERSUS 150X150: 3% Emulsion (NO BINDER)  
STONES (OMC = 5.6%)**

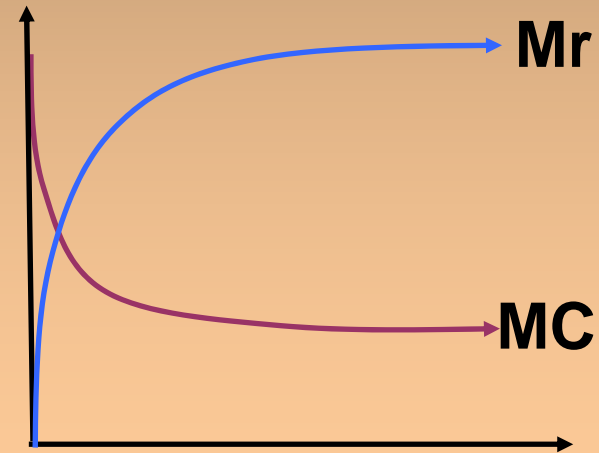
— STONE 150X250 — STONE 150X150



# TASK 8: CURING VALIDATION



BASE  
PROPERTY

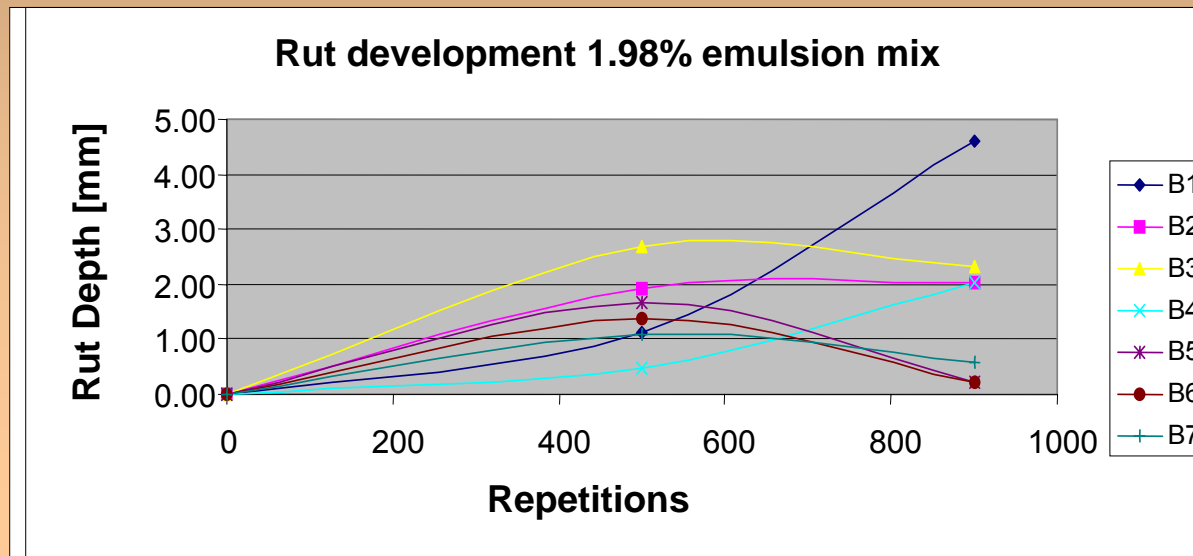
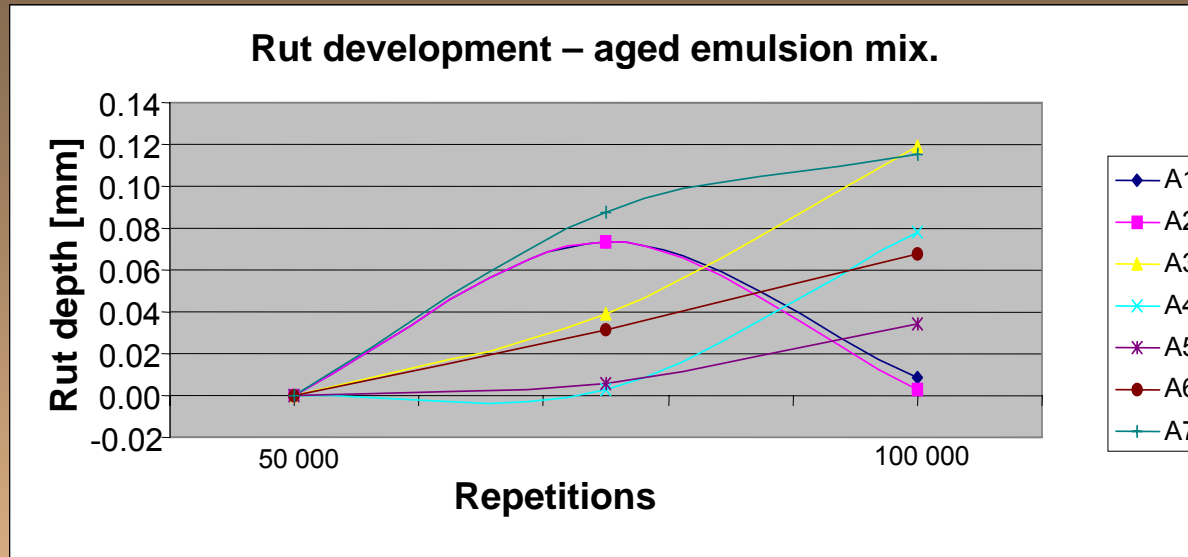


# TASK 9 : Moisture sensitivity: Improved Tests



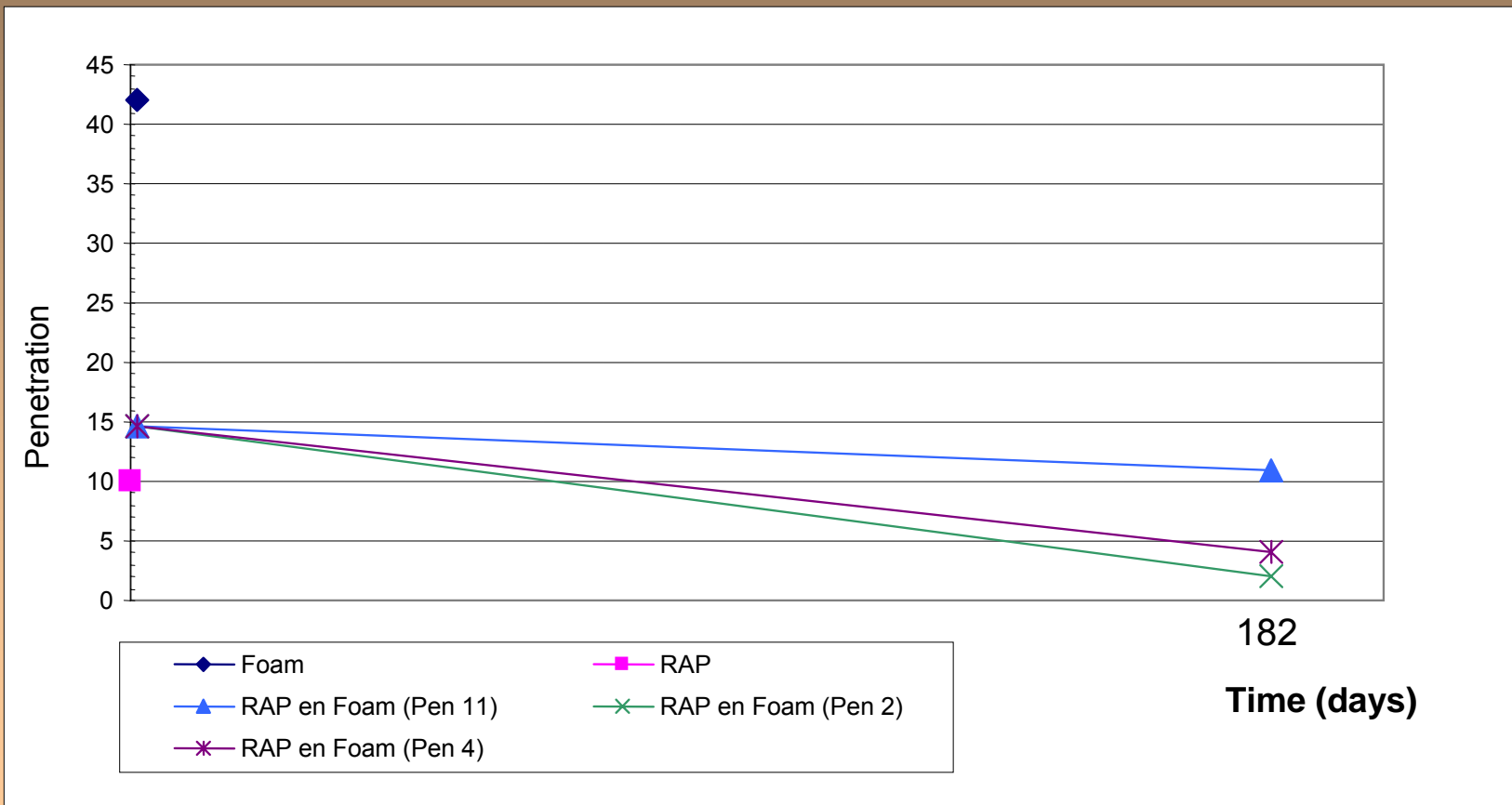
Moisture Induction Sensitivity Test MIST

# Task 10 – Moisture sensitivity (MMLS3 with H<sub>2</sub>O)

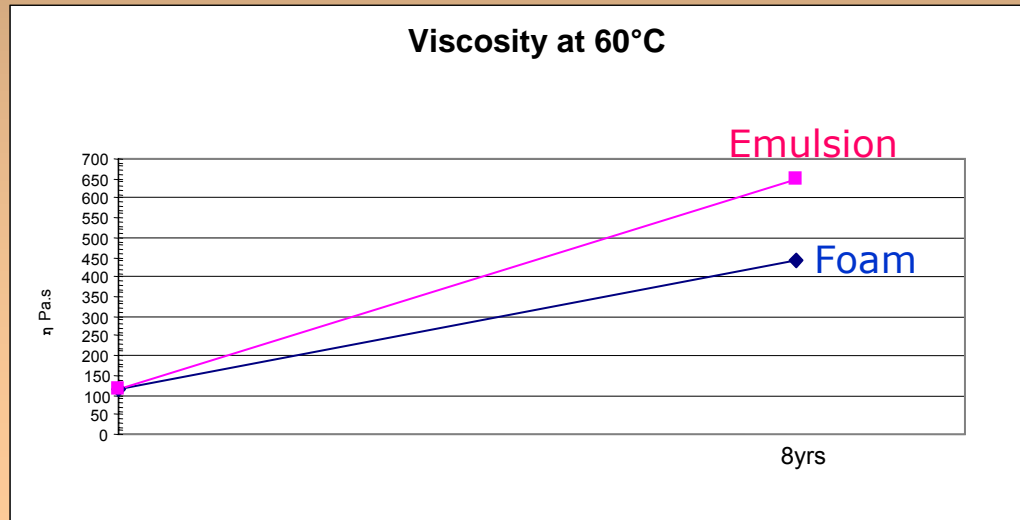
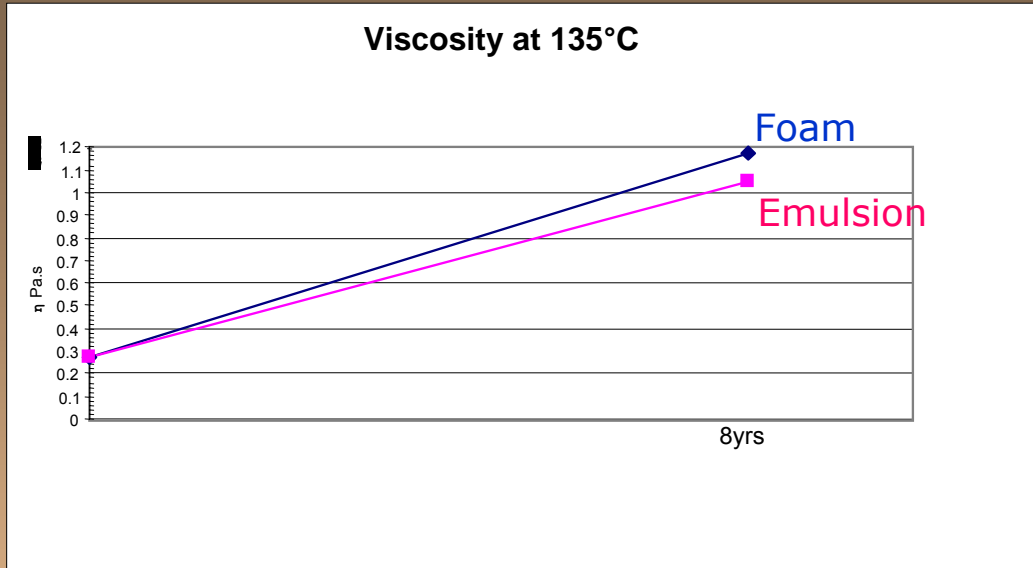


# Task 11 Durability In Terms Of Binder Ageing :

## Saudi Arabia Penetration Values



# Viscosities - Grassy Park

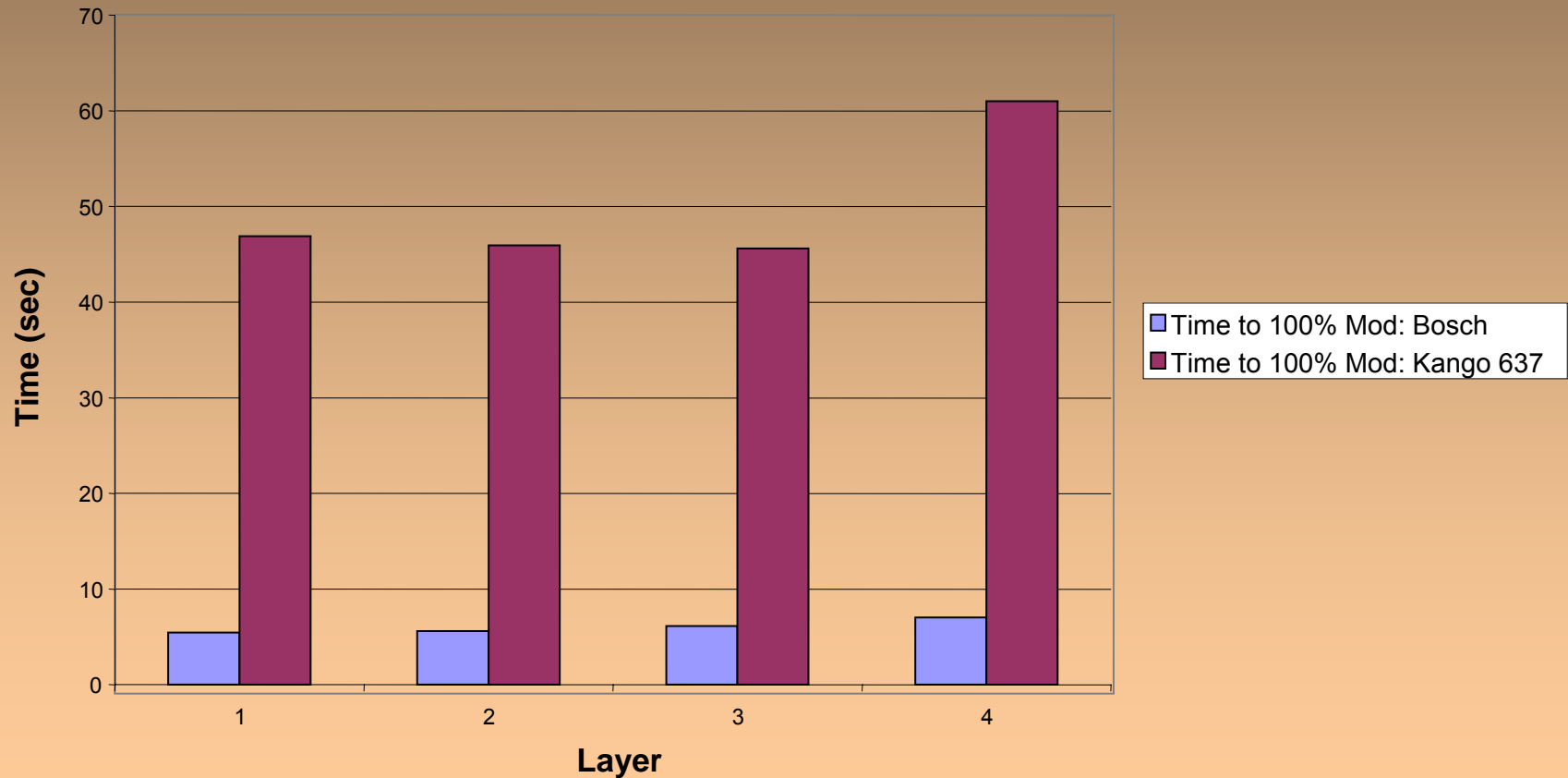


# Task 12: Laboratory compaction

- *Emulsion mixes:*
  - Temperature variation experiments (50°C, 150°C and 350°C) - complete
  - Compaction of N7 material at room temperature - relation between field and laboratory compaction - complete
  - Dry density vs. moisture content plot has been done and compared to Mod. AASHTO curve
- *Foam mixes:*
  - Repairs to the plant appears to be near completion and experimentation will continue forthwith.
- Scheduled completion date (February 2008) - needs to be revised

# Comparative compaction energy

Kango 637 vs. Bosch GSH 11E: Time to 100% Mod AASHTO  
80% OMC 10kg Surcharge



# Observations

- An interim comprehensive project report - submitted end March
- Indication of provisions to be made in the preparation of the manual for outcomes that may only materialise after June 2008.
- Concerns regarding the outcomes of Task 10 - requires attention in the process of developing a laboratory curing protocol.
- The significance of the observed binder ageing needs to be examined.
- The ongoing commitment by Gautrans to finance the guideline document needs to be established.