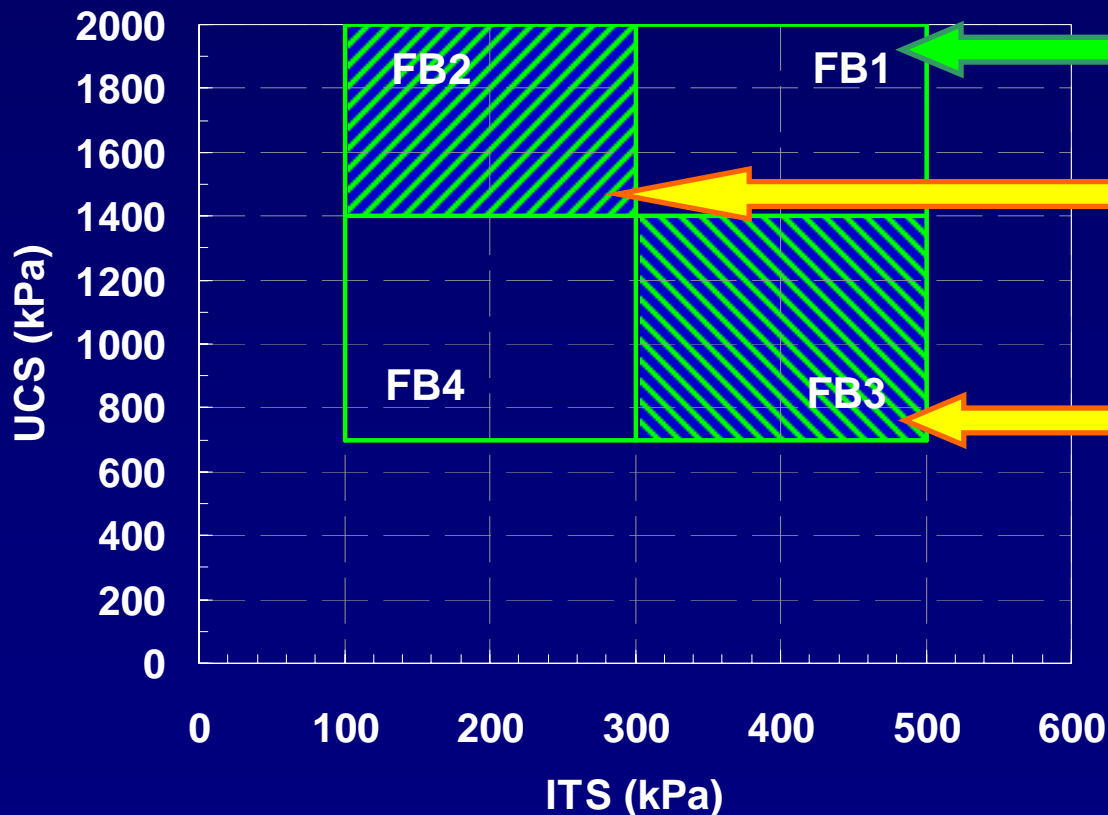


Testing emulsified bitumen on the N7

*APT Steering
Committee Meeting
17 July 2003*

Why foamed bitumen on N7

- ◆ Previous testing and compilation of TG2 highlighted need for further testing



Supplement
material
classification and
design method

Tested on road
P243/1 M,
TG2 material
classification and
design method

Why test EBTM on the N7?

- ◆ Idea sparked at HVS Technical Meeting
- ◆ Comparison of
 - Untreated crushed stone
 - Foamed bitumen treated
 - Emulsified bitumen treated
- ◆ Is this the correct site to do this?
 - Good quality G2
 - Foam showed little benefit compared to untreated crushed stone – need to analyse data in more detail

Issues

- ◆ HVS Technical Committee recommended same residual binder content for emulsion
 - Facilitate comparison
- ◆ Contractors say such a high residual binder content puts emulsion at disadvantage
 - Lower binder content for equal performance

Foam ↔ Emulsion

◆ Are foam and emulsion the same?

◆ YES

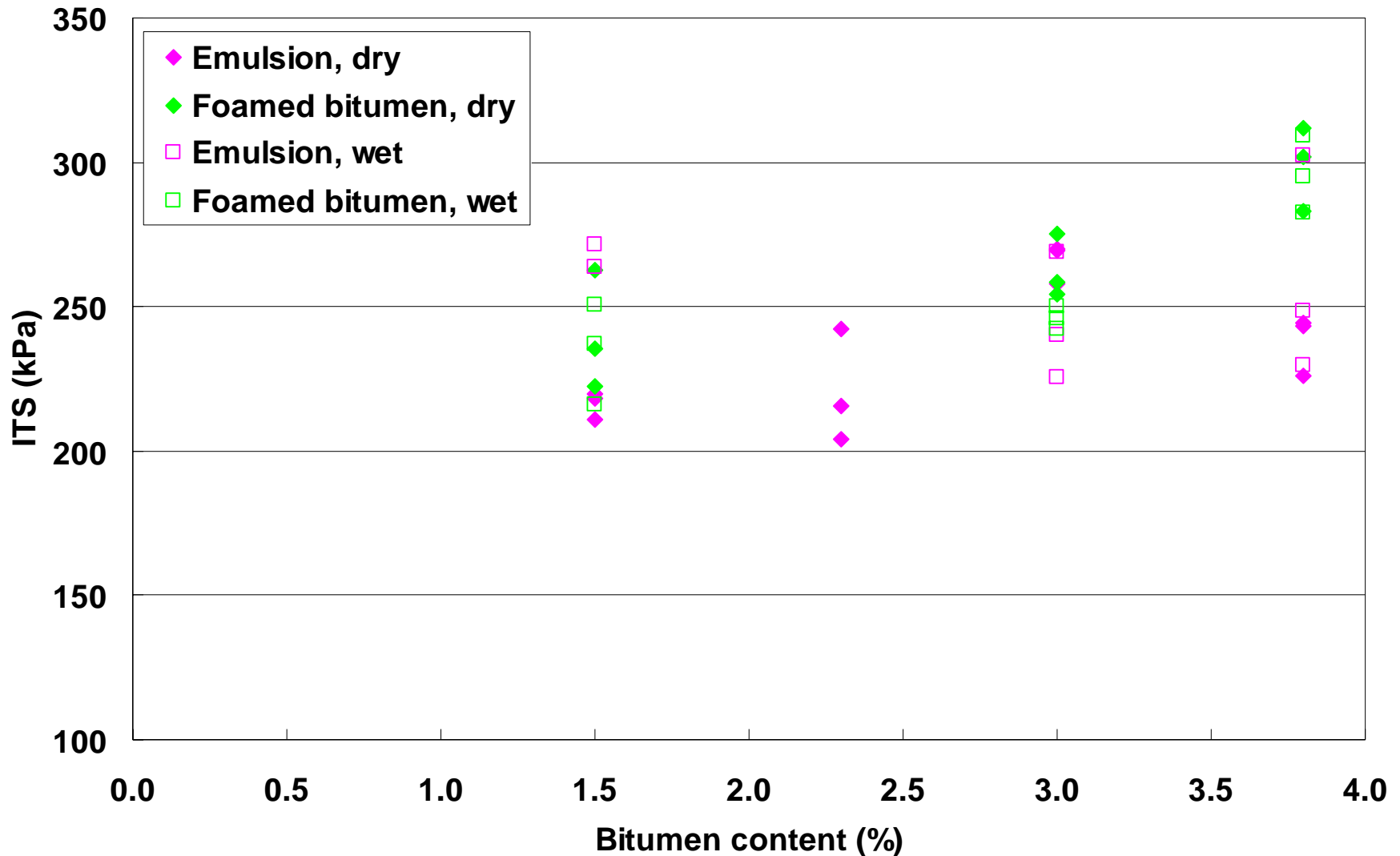
– Do not need ETB testing on N7

◆ NO

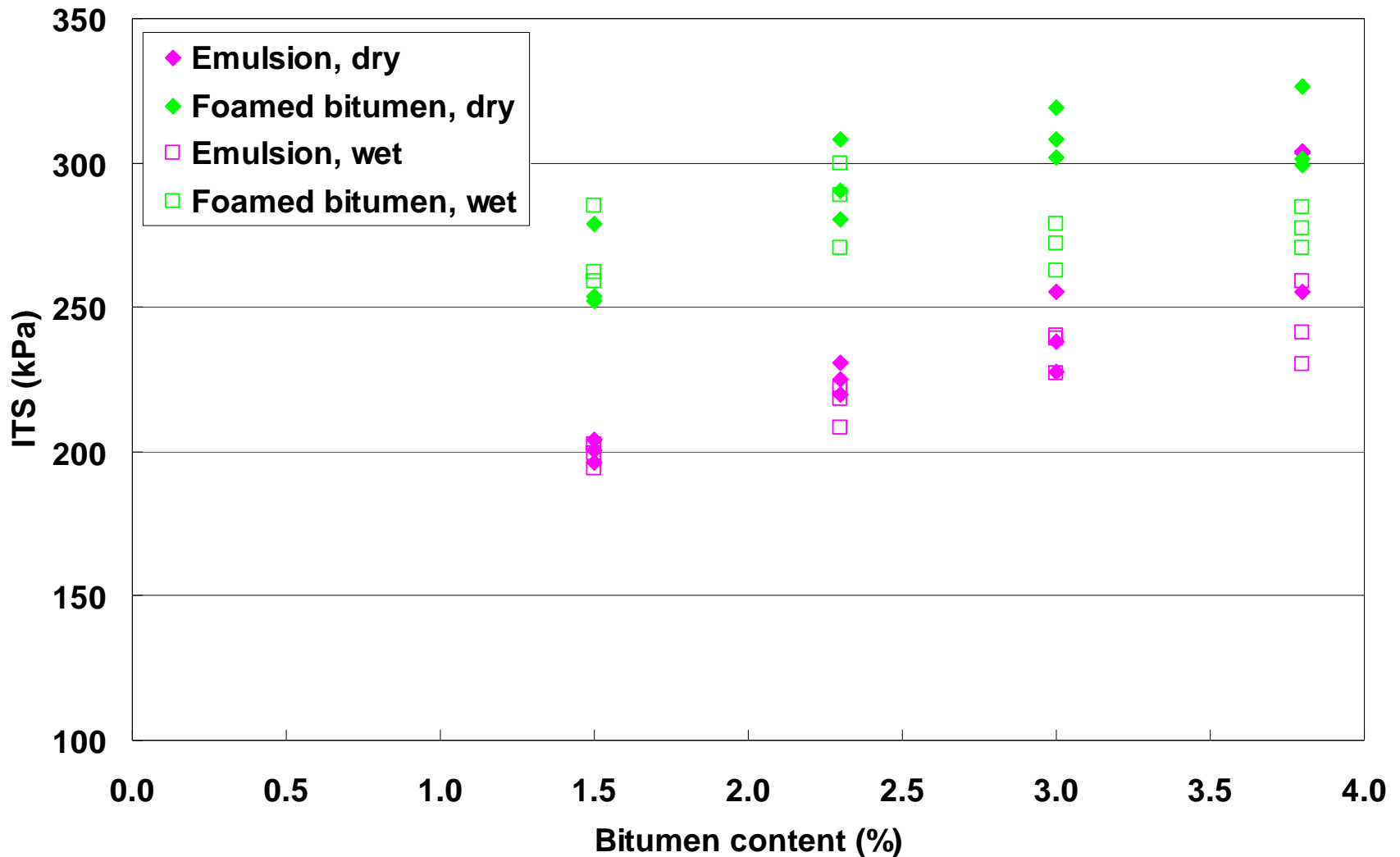
– Test ETB on N7

» *Which binder content?*

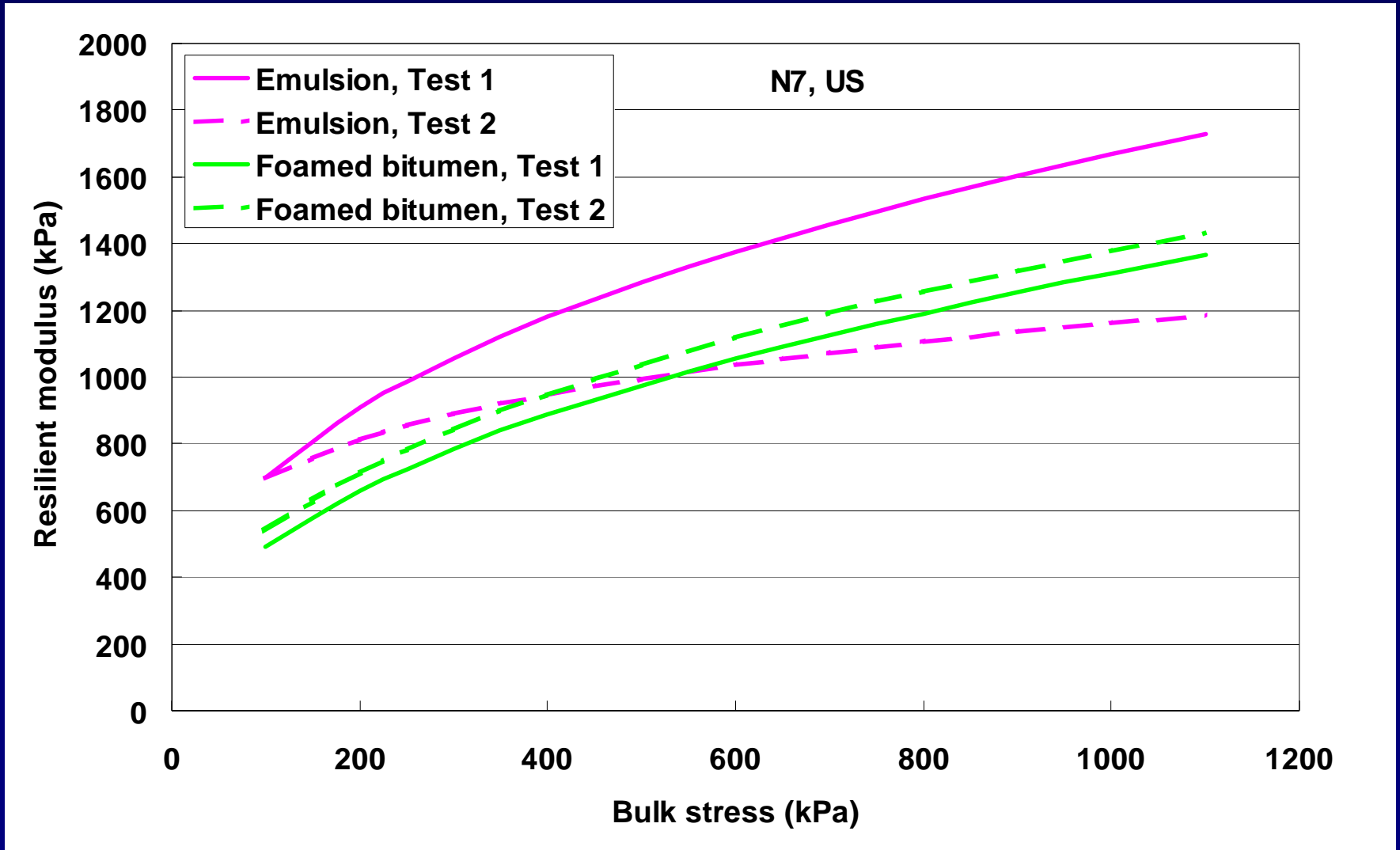
N7 Mix Design Results: 1st batch



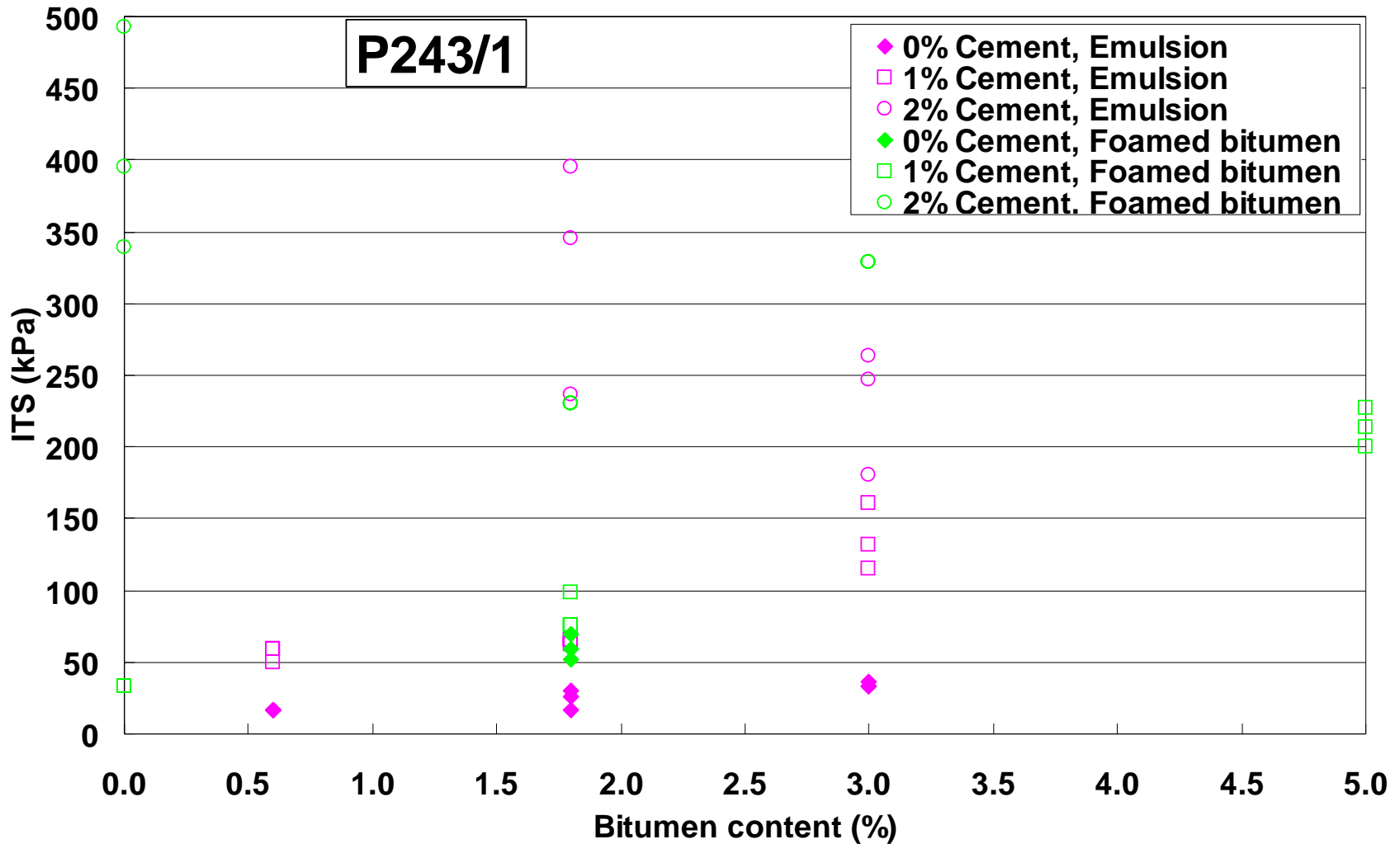
N7 Mix Design Results: 2st batch



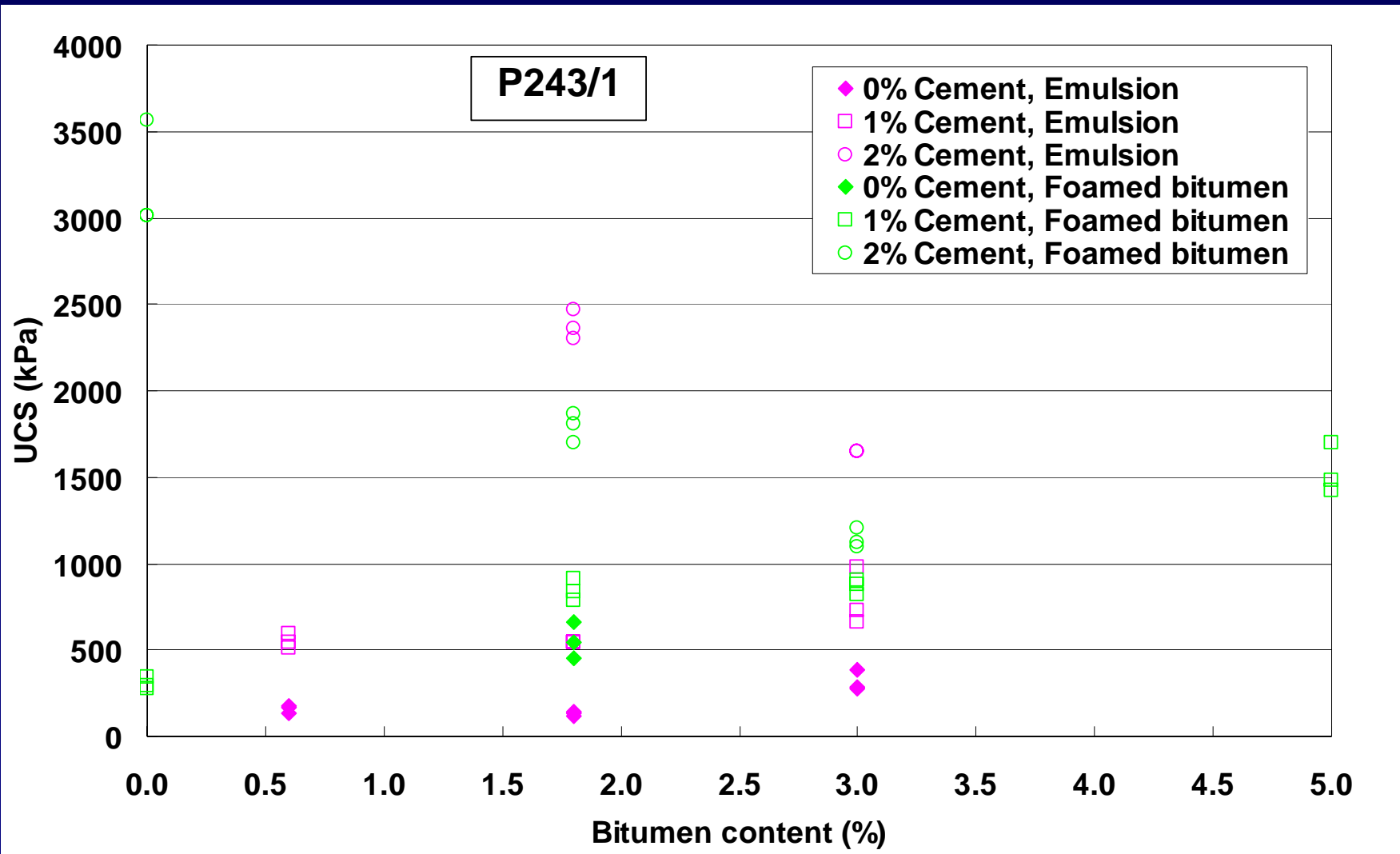
N7 Resilient Modulus



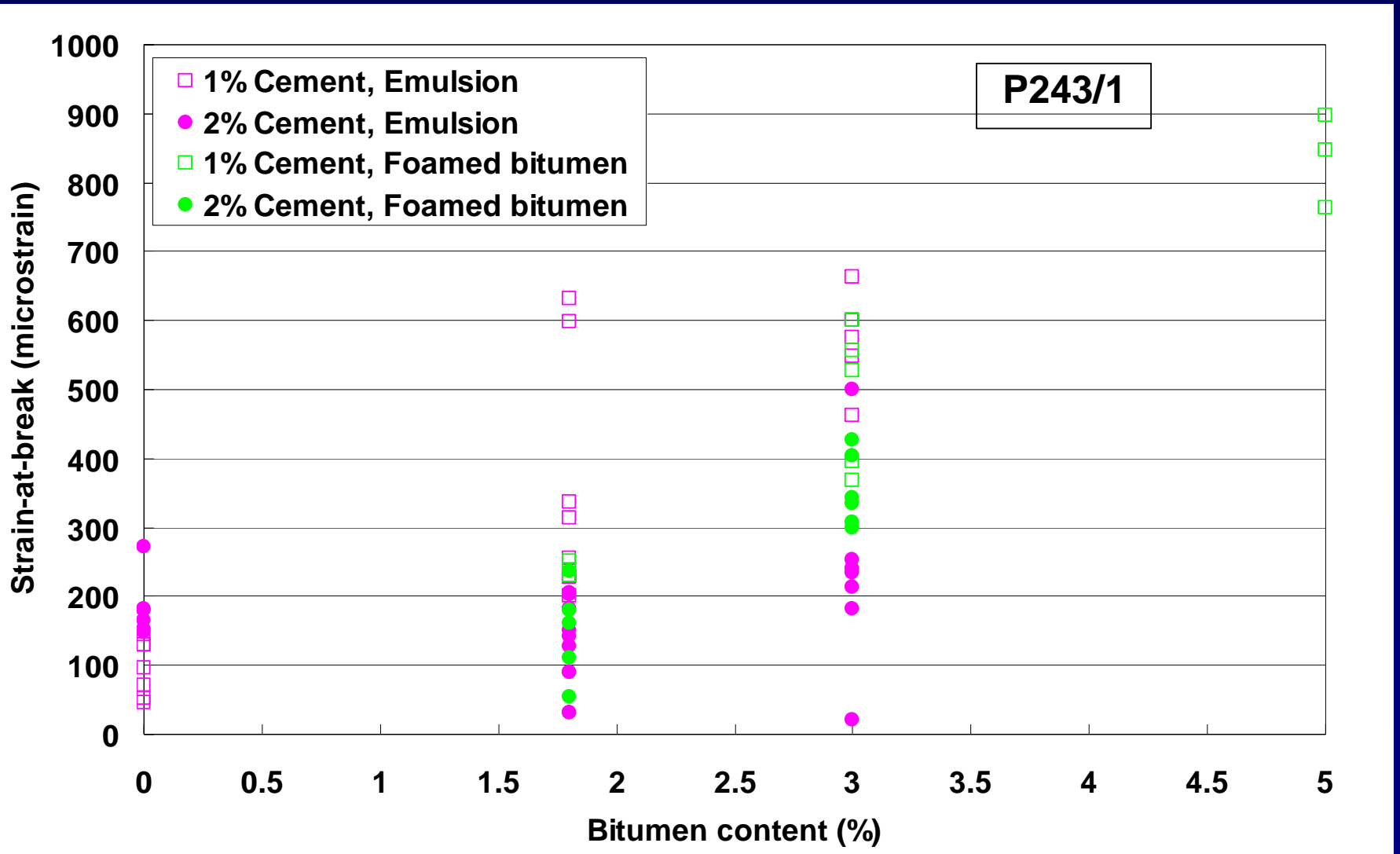
Results from P243/1 (Vereeniging)



Results from P243/1 (Vereeniging)



Results from P243/1 (Vereeniging)



Summary of results

- ◆ No clear differentiation between performance of foamed bitumen and emulsified bitumen treated materials
- ◆ Rankings dependant on
 - Grading
 - Type of test
 - Material
 - Numerous other factors

Foam ↔ Emulsion

◆ Are foam and emulsion the same?

◆ YES

– Do not need ETB testing on N7

◆ NO

– Test ETB on N7

» *Which binder content?*

Mix design for N7

- ◆ Performed by University of Stellenbosch
 - Foamed bitumen and emulsified bitumen
- ◆ Recommended 2.3% for foamed bitumen

Constructability

- ◆ 2.3% residual binder = 3.8% emulsion
- ◆ OMC of N7 crushed stone = 5.8%
- ◆ Difficult to get such high moisture into material
 - Not insurmountable

Comparisons between test sections

- ◆ Experience has shown that if variables differ
 - Comparisons are difficult
 - Attribute differences to which variables?
- ◆ There will be differences between foamed bitumen, crushed stone and emulsified bitumen
 - Density
 - Support
 - Environmental
- ◆ *Recommend differences are limited by using the same binder content*

Suggestion

- ◆ Two laboratory projects will provide input to decision
 - Compaction potential study
 - Comprehensive testing of emulsified-bitumen-treated crushed hornfels
 - » *Engineering properties (UCS, ITS, permeability)*
 - » *Mechanical properties (M_p , Shear strength, plastic deformation)*
 - » *Durability (Erosion, soaked ITS)*
- ◆ Some results should be available by December 2003 – final decision