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Seminar on Road Pavement Recycling, Warsaw October, 2002

UK experience of in situ recycling with cement for the structural maintenance of pavements

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UK EXPERIENCE OF IN SITU RECYCLING WITH CEMENT

Introduction

Background to current guidance

Current guidance

SMART

UK EXPERIENCE OF IN SITU RECYCLING WITH CEMENT

INTRODUCTION

COLD IN SITU RECYCLING

'… the procedures using specialist plant to pulverise and stabilise existing road materials, in-place, at ambient temperature with the addition of hydraulic and/or bitumen binder…'

LINEAR QUARRY PROJECT

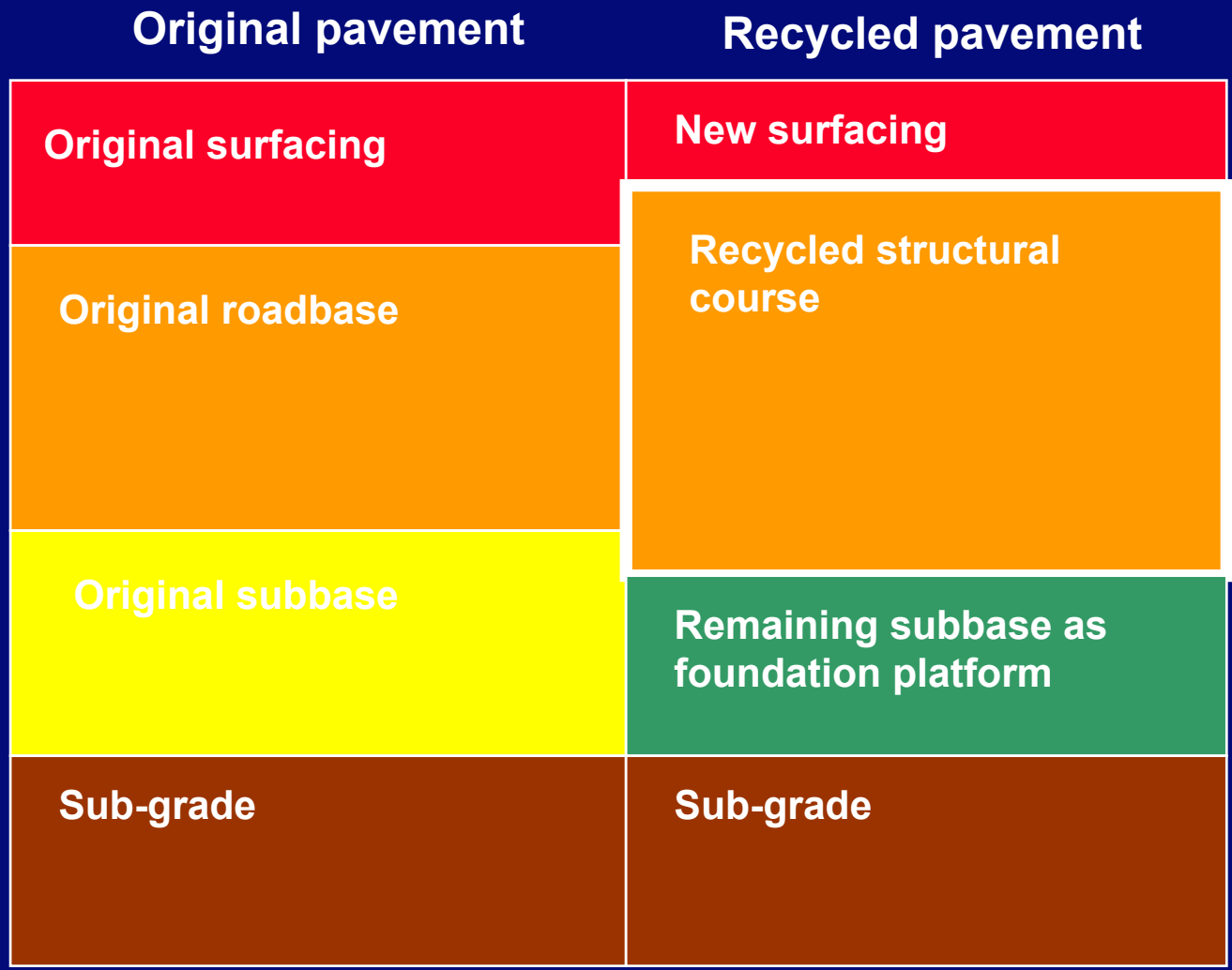
'Every deteriorated road is a source of aggregate for its own structural maintenance by cold in situ recycling.'

TRL 386 (1999)

UK EXPERIENCE OF IN SITU RECYCLING WITH CEMENT

INTRODUCTION

Pavement thickness design



BACKGROUND TO CURRENT GUIDANCE

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THE LINEAR QUARRY PROJECT RESEARCH METHODOLOGY

Examination of nine in-service roads maintained by cold in situ recycling

- 7 foamed bitumen
- 2 cement

Construction and monitoring of two full-scale road trials on A3008 Cartgate Road in Somerset

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BACKGROUND TO CURRENT GUIDANCE

CARTGATE ROAD TRIAL PHASE 1

- 2.5 lane kilometres
- 8 trial sections
  - 4 cement
  - 4 foamed bitumen
- 2 control sections

CARTGATE ROAD TRIAL PHASE 2

- 2.4 lane kilometres
- 2 trial sections
  - 1 cement
  - 1 foamed bitumen

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BACKGROUND TO CURRENT GUIDANCE

DATA COLLECTION FROM ROAD TRIALS

- Extraction of cores
- Falling Weight Deflectometer
- Visual inspection
- Particle size distribution
- Moisture content
- Cube refusal density
- As placed density by NDM
- Thickness of recycled layer
- Cube compressive strength

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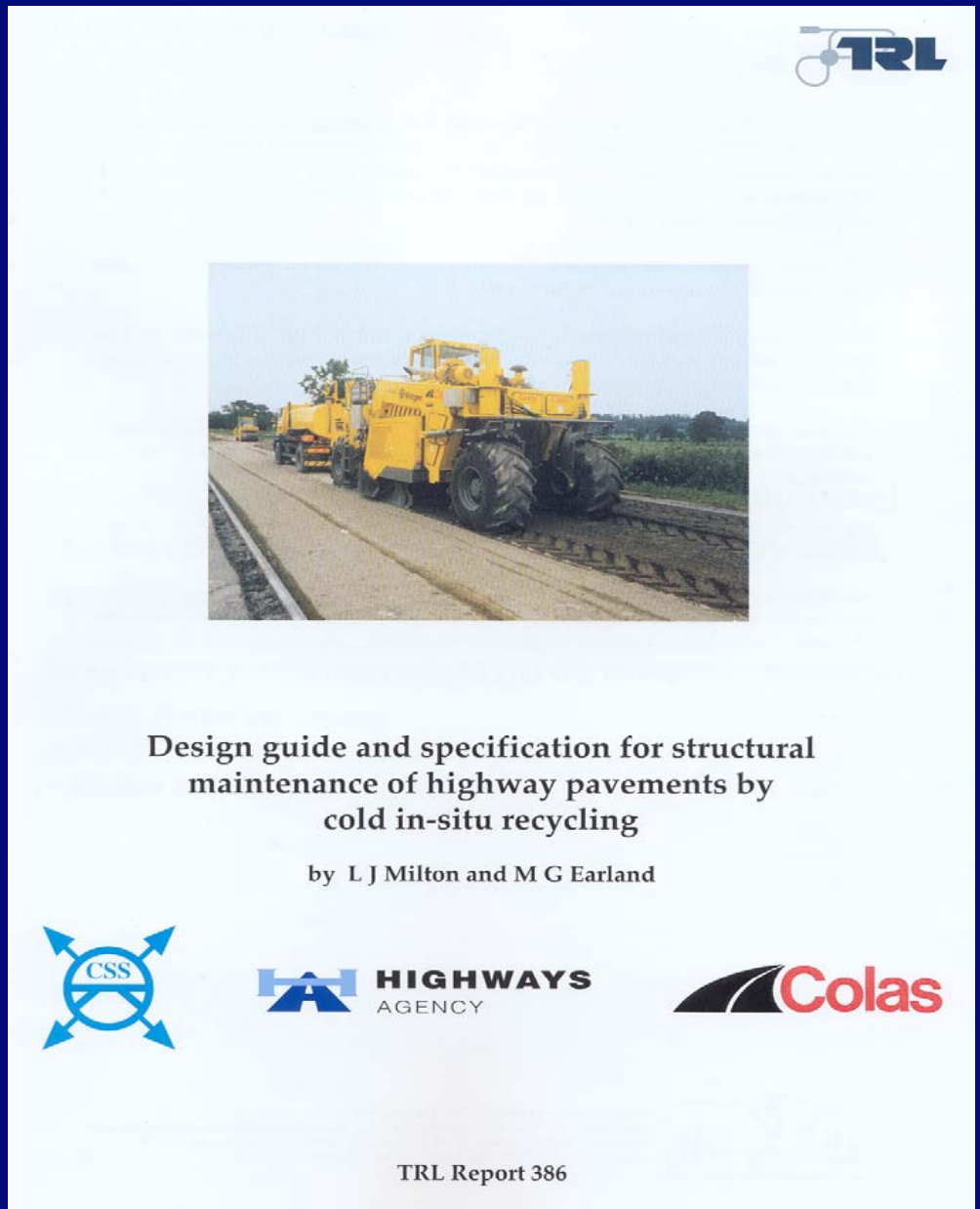
CURRENT GUIDANCE



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UK EXPERIENCE OF IN SITU RECYCLING WITH CEMENT

CURRENT GUIDANCE

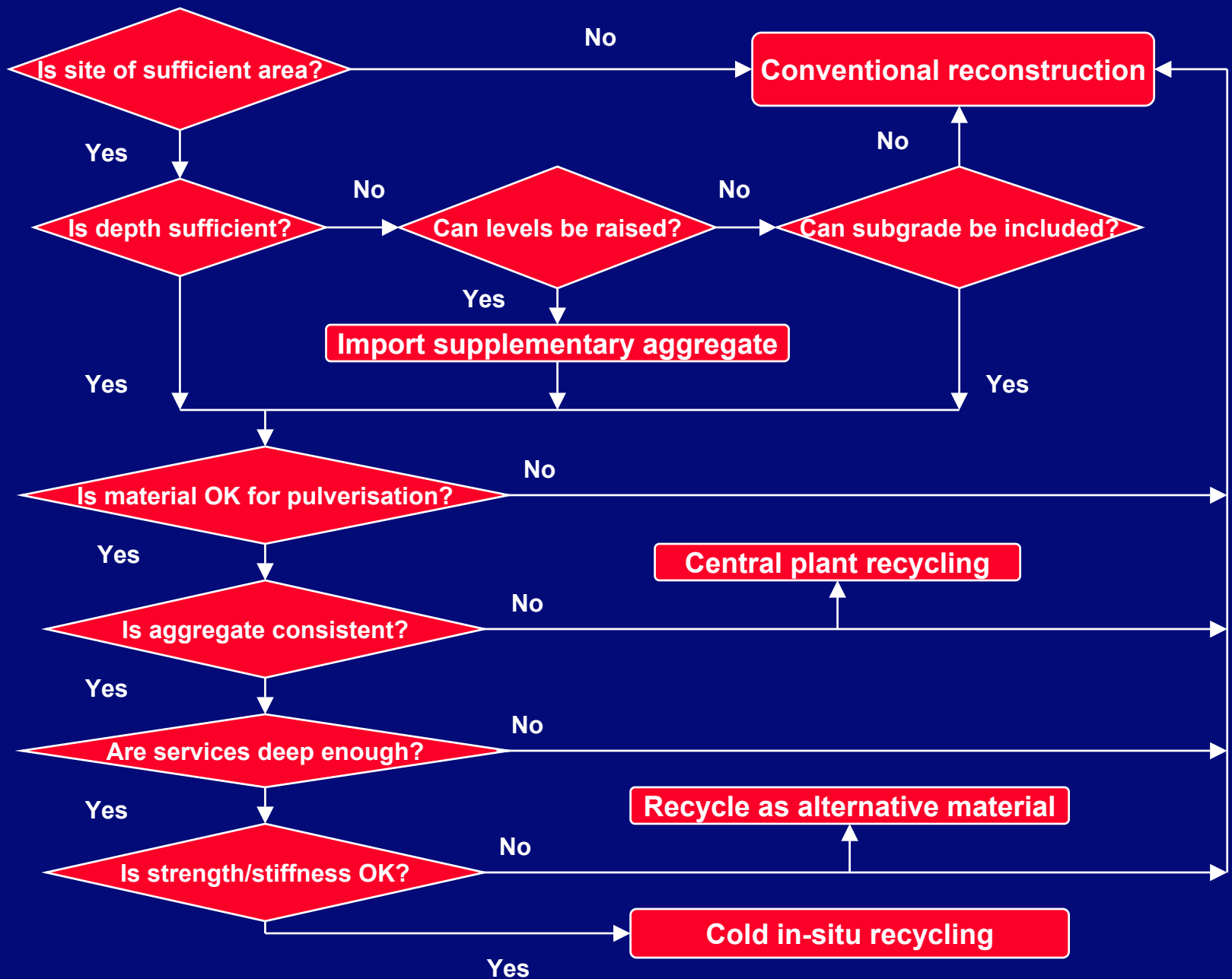
PART ONE

- Environmental considerations
- Cold in situ recycling
- Site evaluation
- Design of recycled material
- Pavement design
- Specification
- Construction

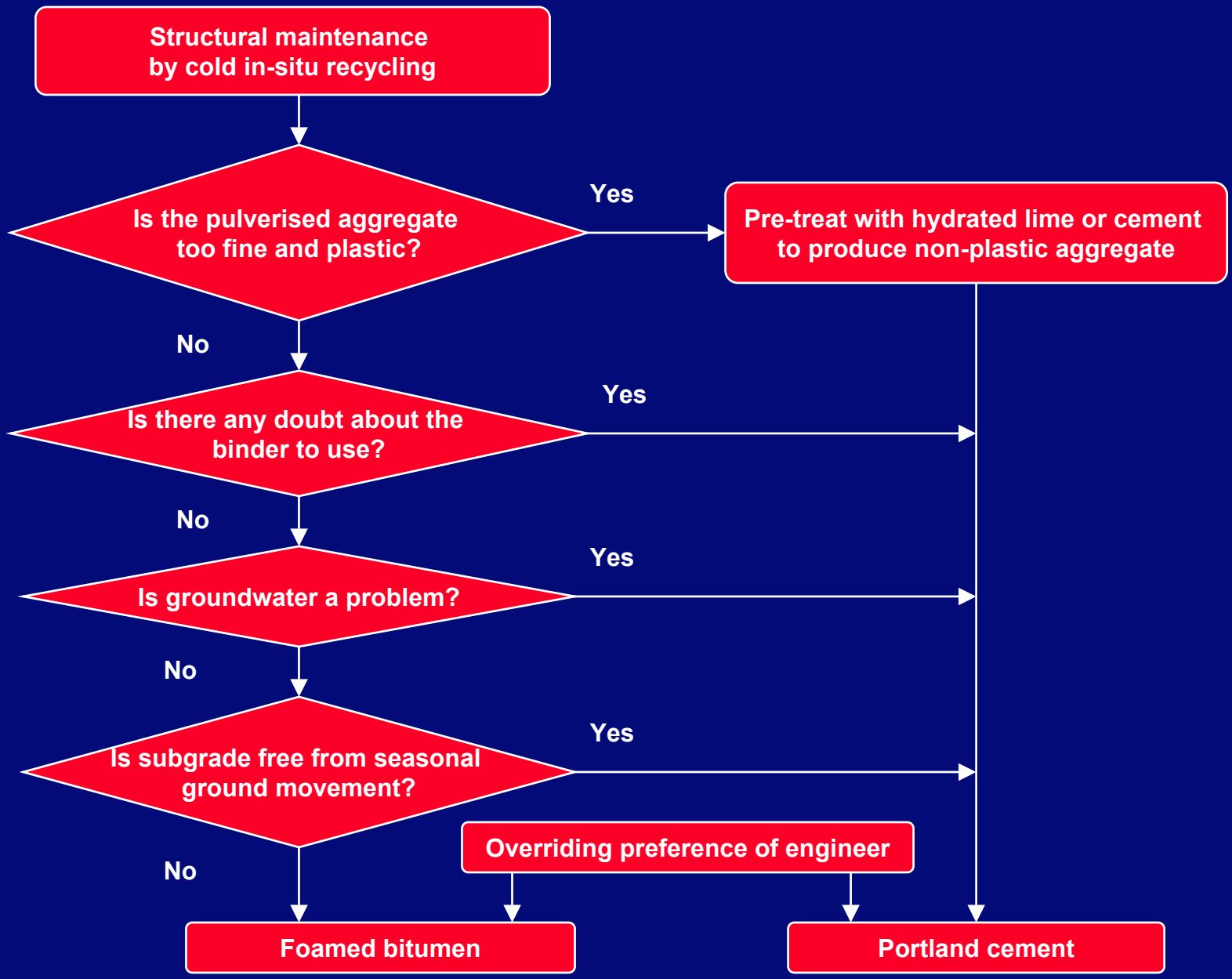
PART TWO

- Specification
- Notes for Guidance

FLOW CHART A: SITE EVALUATION



FLOW CHART B: PRIMARY BINDER SELECTION



UK EXPERIENCE OF IN SITU RECYCLING WITH CEMENT
CURRENT GUIDANCE

LIMITATIONS

- Limited to in situ recycling
  - restricts depth of recycled layer
- Generally limited to cement and foamed bitumen binders used separately
- Prescriptive in nature

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SMART PROJECT

Sustainable MAintenance of roads using cold Recycling Techniques

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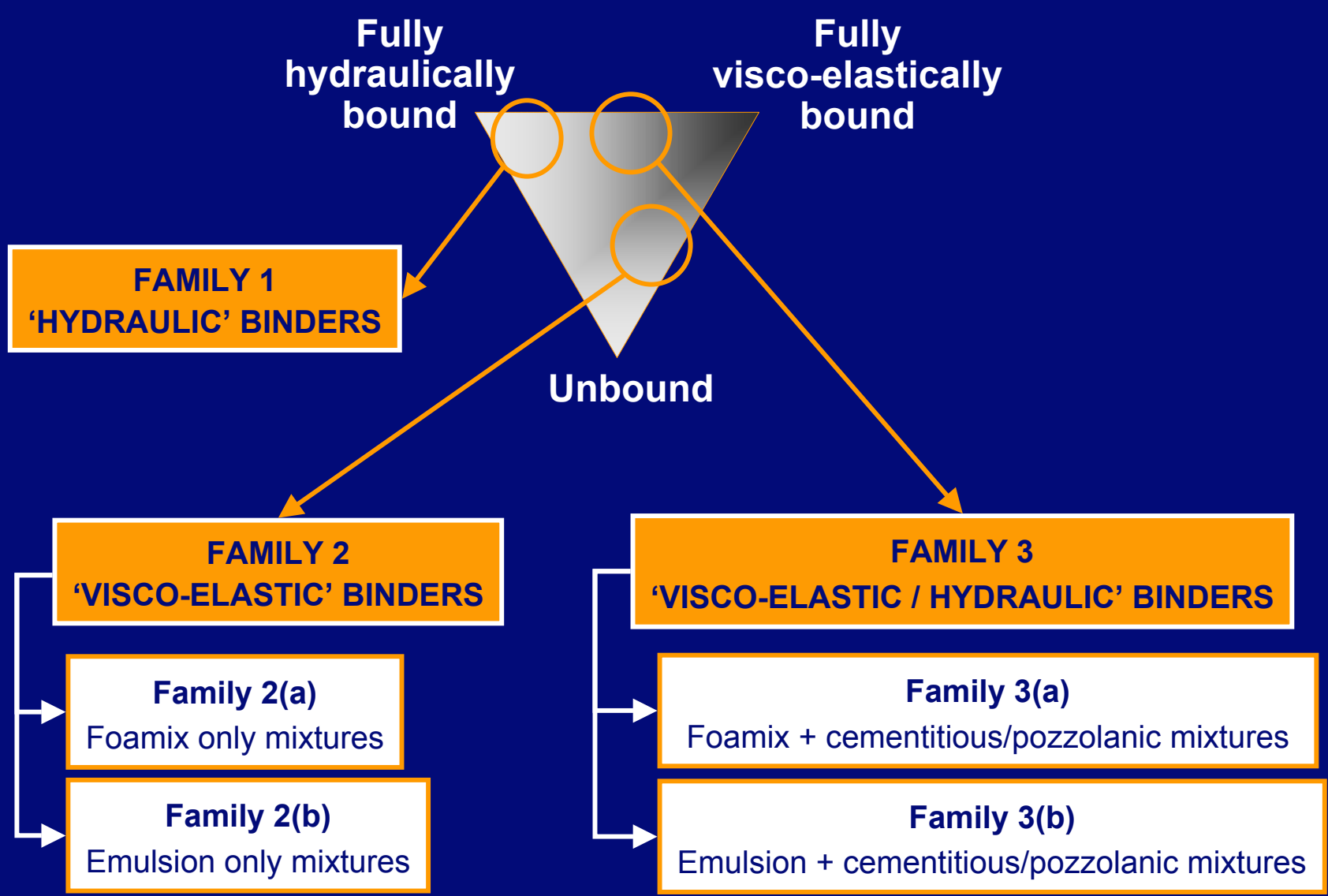
MATERIAL 'FAMILIES'



TEST METHODS TO BE CARRIED FORWARD

- PRIMA
- Norwegian Torsion Meter
- Geogauge

Controls:

- German Dynamic Plate
- FWD
- Nuclear Density Gauges

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A36 TOTTON: NTM TESTING

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NTM: SPIKED BASE

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GEOGAUGE TESTING

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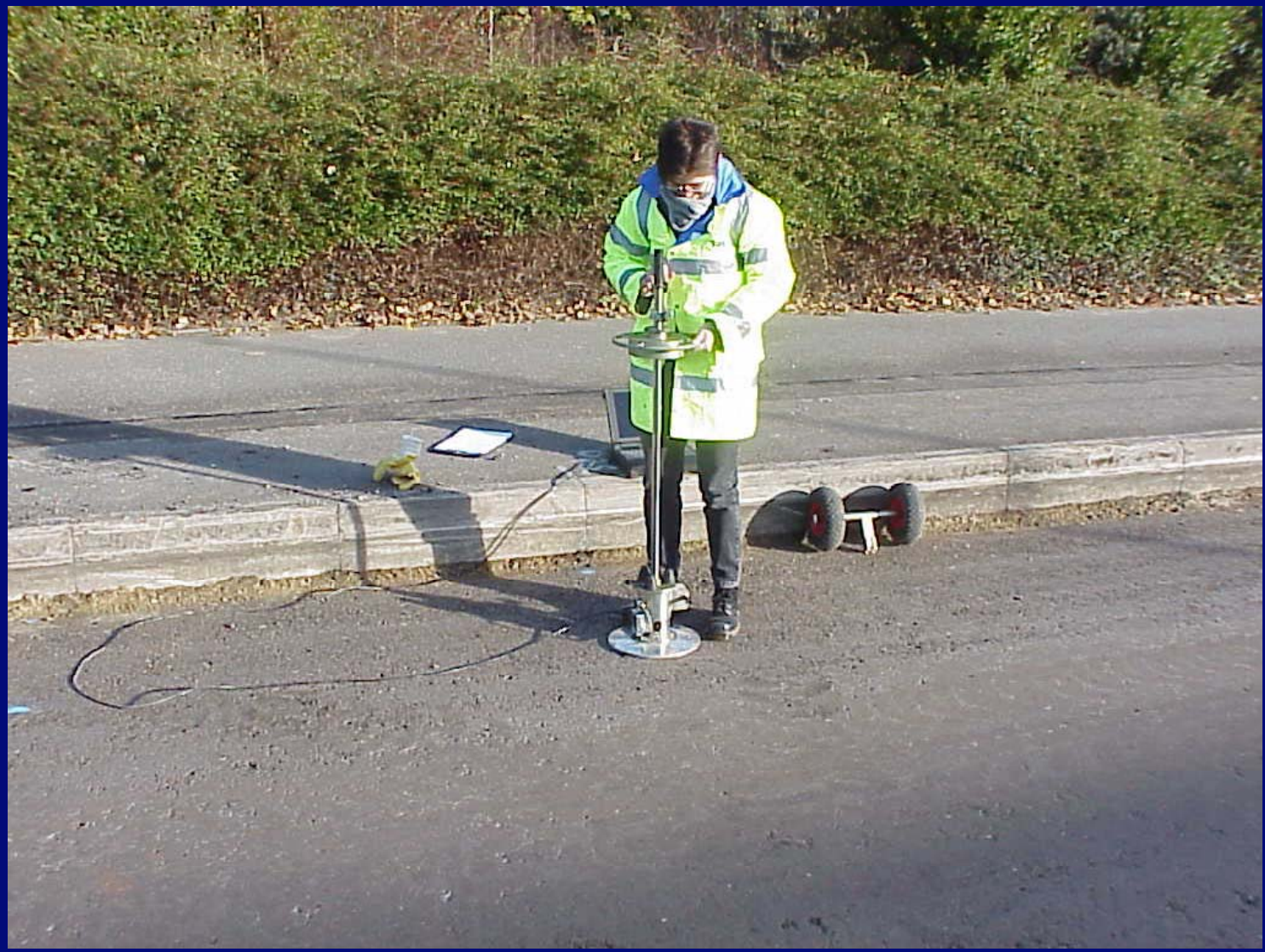
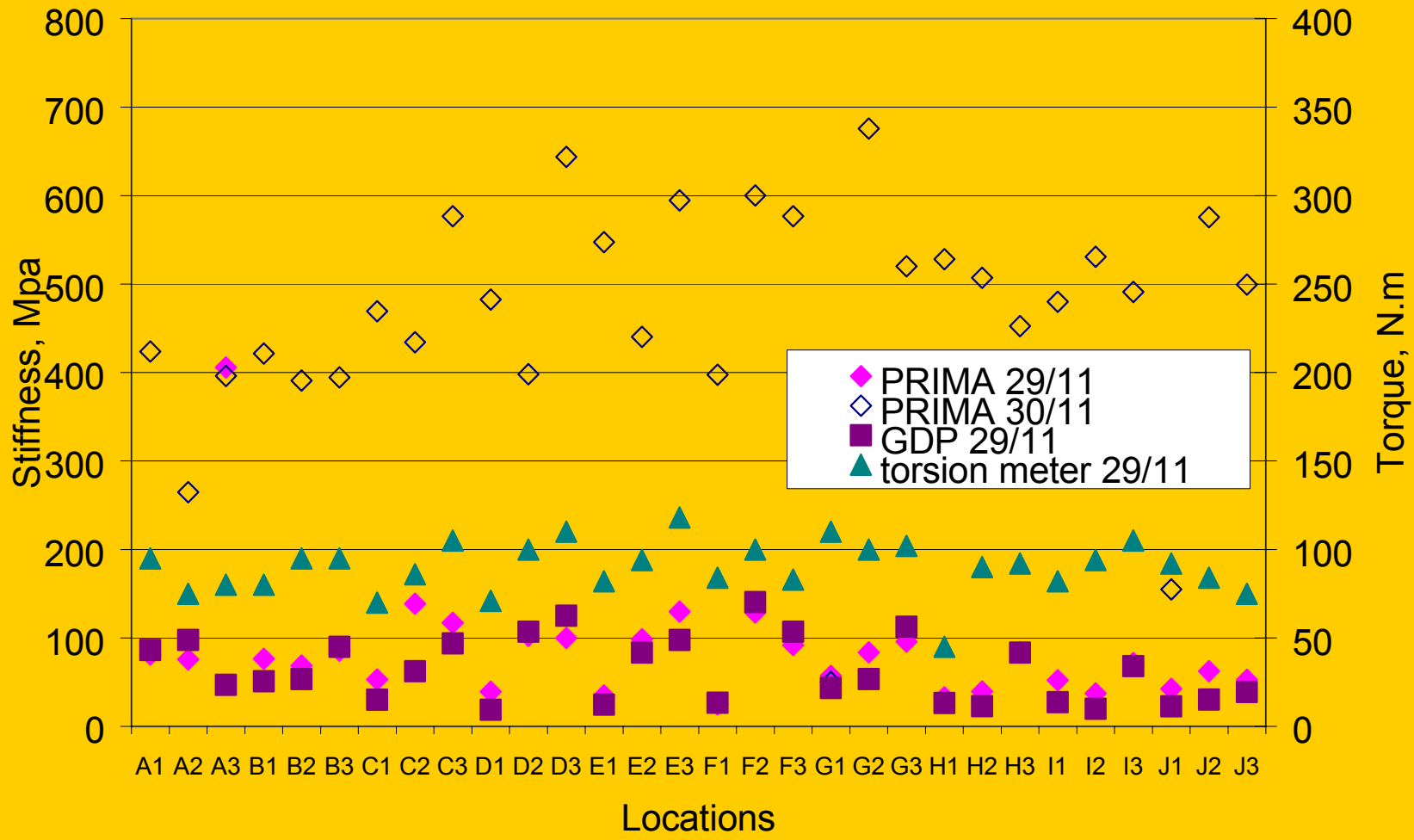
PRIMA TESTING



COMPARISON OF IN SITU TEST EQUIPMENT



CONCLUSIONS

- The development of a performance based specification should broaden the use of cold recycling
- Recycled cold mix material can be cored during early life
- After achieving its design life, the recycled material is in place to be recycled again

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