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Water damage assessment of roads using surface energy

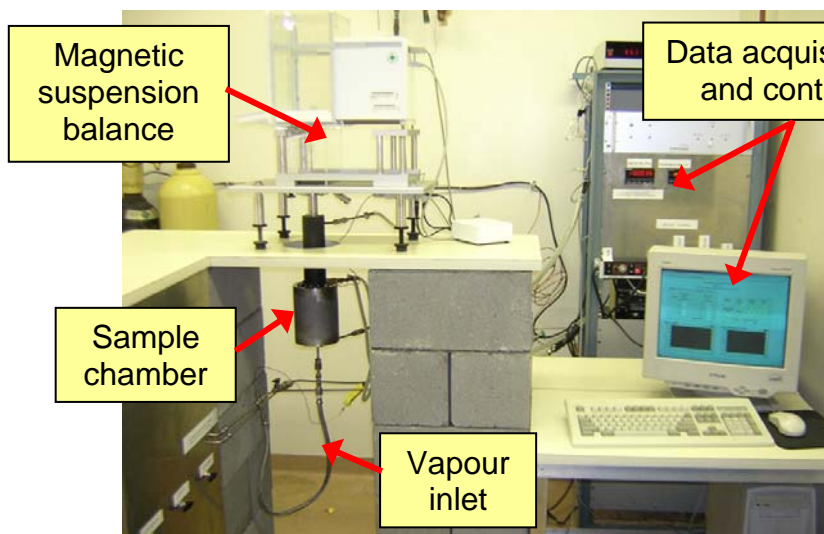
Dr Gordon Airey, University of Nottingham
Texas A&M University, USA

Introduction

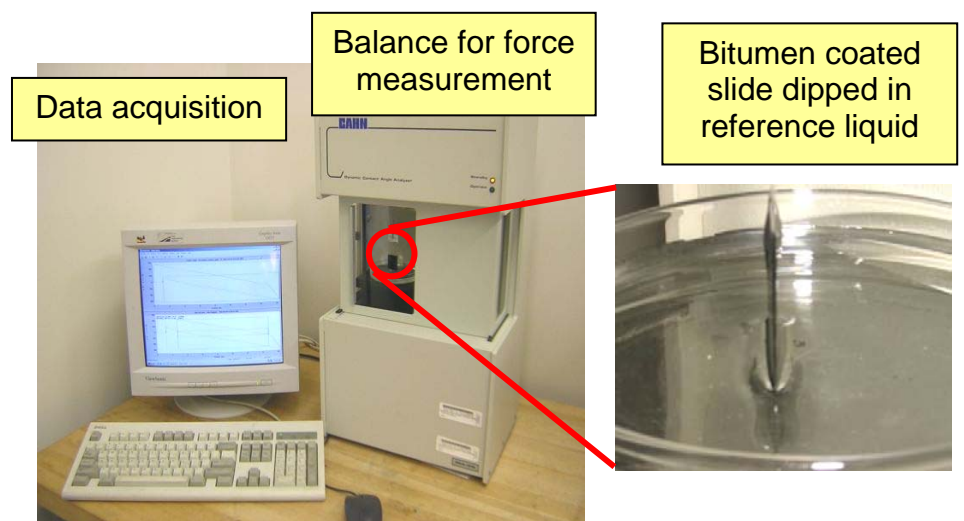
- Moisture damage associated with a loss in stiffness or strength due to **adhesive** and **cohesive** failure of the road material
- Mechanical tests only provide a comparative analysis of the moisture damage
- **Surface energy** measurements provide a fundamental means to quantify aggregate and bitumen adhesion and cohesion and thereby screen suitable water damage resistant road material combinations



Surface Energy Measurements



Universal Sorption Device



Wilhelmy Plate Method

Screening of Material Combinations

- **Energy ratio** of dry versus wet adhesive bond energy for bitumen & aggregate combinations

$R^{Total} = \frac{ \Delta G_{12}^a }{\Delta G_{132}^a}$	Granite A	Gravel A	Gravel B
Bitumen A	0.40	1.05	0.58
Bitumen B	0.65	1.98	1.00
Bitumen C	0.49	1.48	0.76



Texas A&M University



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