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Highway Maintenance using in-situ recycling
and HBM's

Overview:

- Experience of in-situ HBM's
- Norfolk's network , and Budgets
- Specification: Low strength & high stiffness
- Identifying suitable roads: Site Assessment
- Pavement design
- Performance testing
- Future trials

Experience of in-situ HBM's:

- Client lead innovation
- In-situ recycling for 20 years
- Recycled over 50 projects
- Extensive use on Fen roads

Norfolks Network

- A Road 770 km
 - B Road 660 km
 - C Road 3440 km
 - U Road 4900 km
 - Total 9700 km
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- 85% of the Network is U's and C's
 - informally evolved roads with thin construction

Routine Maintenance Budget Allocations 2008/9

Winter Maintenance	£3,320,621
Drainage	£3,830,572
Verges, Hedges, Trees, Weeds and Grass Cutting	£3,108,064
Signs and Road Markings	£1,860,377
Emergency Cleaning, Sanding Roads	£999,783
Repairs to Footways, Fencing, Safety Fencing, Potholes, Structures	£1,685,610
Patching	£7,412,334
Street Lighting (including energy)	£4,050,000
Illuminated signs (inc above)	£0
Traffic Signals	£1,309,000
Bridge Repairs	£1,048,000
Condition Surveys, HMMS etc	£394,550
Total	£29,018,913

Structural Maintenance Budget Allocations 2008/09

	£			
District	Surfacing	Haunching	Footways	Drainage
North	388,023	288,420	346,510	443,100
Broadland	506,183	227,213	744,970	345,000
Gt Yarmouth	84,775	100,805	418,523	391,000
West	259,862	403,219	380,059	818,800
Breckland	594,577	506,036	470,545	242,400
South	595,456	504,024	578,388	696,500
City	321,143		720,498	50,000
Total	2,750,019	2,029,717	3,659,493	2,986,800

11,426,029

Countywide	£
Surface Dressing	5,631,000
Principal Roads	4,377,971
Area Managers Schemes	800,000
Footways - category 1/2 works	800,000
Carry-over costs etc.	950,000

23,985,000

Specification:

- No procurement as we have long term arrangement with LT
- TRL 386 / 611 , IAN73/05 surface modulus
- Low strength & high stiffness
- Target strength: C3/4; C5/6
- Minimising cracking
- Slow strength gain; 365 day design tables
- Curing at 40°C

Identifying suitable roads:

- Structural failure: crazing; cracking, pot holes, rutting
- Profiling & levels: ride quality; safety improvement; drainage
- Soft & moving ground: fen roads; peat and clay foundations

Identifying suitable roads:

- Asset management , developing programme
- Site investigation:
 - Cores: 200mm
 - LWD
 - DCP
 - Tar
- Drainage assessment
- Site history: local knowledge

Pavement Design:

- Road Type construction thickness
- Traffic management
- Time of year in programme
- Foundation soil type
- Drainage
- Early contractor Involvement

Pavement Design:

- Typical designs based on TRL 386
- Also use principles in IAN 76
- And Experience of our geology

Performance testing:

- In-situ testing requirements
 - Thickness
 - Gradings
 - Moisture
 - Spread rate of binder
 - Surface modulus
 - Density
 - Sampling for lab testing

Future trials:

- Surface Dress with geotextile surfacing
- Pulverise Reprofile and compact without binder ,(possibly include reinforcement) seal with surface dressing
- SPL's Flood Defender "PolyRoad"

Case Study:

- Practical design exercise: