

Cost-effective solution to potholed roads



Erode to nowhere: The A81 main road had deteriorated due to frost damage, leaving it rutted and worn

An in-situ road recycling project, using products from ScotAsh, at the A81 near Gartmore has highlighted how a sustainable alternative to full pavement reconstruction can be delivered economically, quickly and with environmental benefits.

The project, completed in April 2011, is an example of how roads authorities can deliver essential improvements at a time of considerable pressure on capital budgets.

The worst December weather ever recorded in Britain, with snow lying thick for almost a month and temperatures plunging to minus 20, has left one in five of the nation's roads in a state of disrepair at the start of 2011.

More than £100 million of extra cash, to assist roads authorities in repairing potholed roads, has been pledged by the UK and Scottish Governments.

But the Annual Local Authority Road Maintenance (ALARM) survey of local councils, by the Asphalt Industry Alliance, estimates it would require £10.65 billion to make good the rutted carriageway surfaces in England and Wales alone.

North of the border, where only 63% of roads are in an acceptable condition, Audit Scotland estimates that £2.25 billion is needed to bring all of Scotland's roads up to an acceptable standard.

Potholes and degraded road surfaces pose a real threat to the safety of road users while authorities face an increasing number of civil actions over damage to vehicles – almost £20 million was paid out by councils in compensation during 2010 (ALARM).

Roads in poor condition slow down traffic, increase fuel consumption and have a negative impact on productivity.

Auditor General for Scotland Robert Black said: "The public are increasingly dissatisfied with the condition of our roads.

“ Audit Scotland estimate that £2.25bn is needed to bring Scotland's roads up to an acceptable standard ”

A sustainable solution with substantial



Road recycling in action: left, from top, the A81 is pulverised by Stabilised Pavement's Wirtgen 2000; ScotAsh's Hydraulic Binder is delivered in 30-tonne loads and transferred to the road recycler; the Hydraulic Binder next to a surface where the material has already been mixed with the recycled aggregate; and the road is levelled. Main pic, appropriate PPE is worn as the Hydraulic Binder is mixed in.

environmental, cost and speed benefits



“The pattern of spending and scale of the backlog means that the value of these public assets is not being maintained.

“By deferring essential expenditure on infrastructure, public bodies are storing up problems for the future and passing on a burden for generations to come.”

The pressure on roads authorities to take action comes at a time of increased constraint on the public purse. The people who manage road maintenance budgets are demanding value for money, as well as a job well done.

The Project

The A81, the main road between Aberfoyle and Glasgow, had deteriorated severely during the winter months.

Stirling Council placed a contract with Leicester-based Stabilised Pavements Ltd for the in-situ recycling of approximately one kilometre of road as a long-term solution.

Around 152 tonnes of Hydraulic Binder from ScotAsh was used during the works.

The damaged road was pulverised to a depth of 240mm and the arisings were recycled in situ using Stabilised Pavements’ Wirtgen 2000 road recycler.

This mixture was then injected with ScotAsh’s Hydraulic Binder, a pozzolanic and hydraulic material custom blended by ScotAsh.

Following the addition of water and rotoavation, the mixture was compacted back down, giving a good result using nearly 100% recycled materials.

Gerry Howe, managing director of Stabilised Pavements, said: “The road had badly deteriorated, probably due to frost damage and the severe winter weather.

“We recycled 240mm of carriageway, about 7,000 square metres in total, over a length of about one kilometre of road. Recycling in situ is more cost effective and saves on natural resources – the road is our quarry, providing all the aggregate we need.

“The ScotAsh product we use is a binding material, a cement mixed with pulverised fuel ash (PFA).

“The thermal effect created by the ScotAsh Hydraulic Binder allows us to go for a 28-day curing strength, instead of seven days, which gives us a wider window of working. Also, by using the ScotAsh product with a PFA-blended material, this avoids cracking that is normally incorporated with CBM materials that gain high strength in a short space of time.

“Another advantage is that if we are working on a tar-bound road, recycling with

“A win-win situation,” says Stirling Council

“ The A81 roadworks were completed a week faster than resurfacing by conventional means ”

PFA locks in the contaminants. We use cement with PFA all the time. We wouldn't use cement on its own, we would always use it blended with PFA, or PFA with lime.

“Stabilised Pavements has completed hundreds of contracts in the UK using this technique. I think that with the constraints now on local authority budgets, this process will come to the forefront because it is faster and cheaper – you get more for less.”

Environmental benefits

The conventional approach to road maintenance incurs a huge environmental burden – the disposal of excavation spoil to landfill, the use of primary aggregates and the fuel consumption, carbon emissions and road safety impacts of using heavy vehicles to transport materials.

In-situ recycling has significant environmental benefits by negating the waste, raw materials and transport involved in conventional pavement treatments.

The A81 was closed to traffic during the works and a lengthy diversion was put in place – but the in-situ technique ensured disruption was kept to a minimum.

Although the project was extended by a few days due to torrential rain and strong winds, the roadworks were still completed a week faster than resurfacing by conventional means – reducing inconvenience for local people and motorists.

Stirling Council was pleased with the completed road scheme and a spokesman said: “This innovative project helped us save around 20% on costs, one week's work time and not having to transfer aggregate to landfill resulted in fantastic environmental benefits. It's a win-win situation.”



Rip it up and start again: The Wirtgen 2000 road recycler pulverises the pitted and worn road surface



Back in business: The busy A81 is reopened to traffic following completion of the road recycling project

> COST BENEFITS

- Savings of up to 30% compared with conventional treatments
- Effective solutions within restricted budgets
- Less expenditure on imported materials
- Lower transportation costs
- Long-term savings from longer-lasting treatment.

> EFFICIENCY BENEFITS

- Faster completion – as much as 60% quicker than other repair and maintenance methods
- Up to 1500m² treated each day
- Recycled road foundation can accept surfacing and traffic quickly
- Less traffic congestion and need for long-term diversions.

> ENVIRONMENTAL BENEFITS

- Recycling in-situ material conserves natural resources
- Fewer lorry movements, saving energy and reducing impact on communities
- Fewer disposals to landfill sites
- Reduced CO₂ emissions and carbon footprint.

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