

Hanson

Client satisfaction, public response, bonus earned – by what ever measure, Hanson Construction Project's resurfacing of the M20 can only be gauged a success

Hanson wins approval on the M20

Government departments generally receive more brickbats than bouquets so it is hardly surprising that the Highways Agency hastened into print recently when one of its contracts went spectacularly right.

"Local people including Kent County Council have applauded the agency for the reduction in noise from a resurfaced stretch of the M20 which opened early and under budget," proclaimed a news release.

The plaudits had poured in, it seems. "We are very pleased about the early completion of these works....people are enjoying the benefits of reduced noise much sooner than expected," said the release.

Ostensible hero of the piece is the thin wearing course Tuffgrip with which the motorway's dual three lane carriageways have been resurfaced. But behind the surfacing is the story of a substantial civil engineering contract whose successful completion owes much to the skills and resources of the job's main contractor, Hanson Construction Projects (HCP).

The section of M20 which has been transformed from one of the noisiest and bumpiest in England to among the smoothest is from junction three to junction five of the old Maidstone bypass. Eight kilometres long, the original 30 year old carriageways were made of concrete which had been patched in the early 1990s and surface dressed.

"This maintenance work served well as a holding operation," says HCP's Commercial Director Mark Holland. "But by last year it was clear that the condition of the slabs had deteriorated. The joint sealing had failed and water was seeping into the sub base and formation, to further weaken the road."

Holland's company won the subsequent contract to put matters right, using the crack and seat method to turn the existing rigid concrete pavement into a well seated flexible base (see box), and overlaying this with a dense bitumen macadam roadbase topped with 30mm of Tuffgrip.

"It was the Highways Agency's plan to make maximum use of the material already on site to save on cost and transport. Crack and seat exploits the residual strength of the old concrete," Holland says.

"Then just the right thickness of asphalt – it worked out at 120mm – is laid to accommodate any differential movement in the slab below, and to resist wheel tracking above from the high numbers of HGVs that use the road."

The £6.4M contract was let as a lane rental scheme, with a maximum period to do the work in of 112 days. Bonus charge was set at £25,000/day. HCP bid a construction period of only 100 days and completed 28 days early, earning a hefty bonus.

HCP's Regional Director responsible for the Kent project is Alan Macey. He attributes his company's fast progress on the M20 to three principal factors.

The first of these was HCP's ability to draw on group resources. It was not just a matter of HCP carrying out the construction but other Hanson companies supplying all the materials – 125,000t of macadam, 4500m³ of concrete for drainage channels plus the Tuffgrip, a Hanson product – and recycling the old concrete which had to be broken out. The contract included an amount of full depth carriageway reconstruction, for example beneath overbridges where headroom had to be maintained.

"It was very much a group effort, in a sense reflecting the fact that the M20 was somewhat of a flagship project for us, the first major contract carried out wholly under the Hanson banner," Macey says. "It stands as a good example of what we can achieve."

The second factor he mentions is the experience

of HCP's workforce employed on the Kent contract. "We've carried out plenty of lane rental work in the past and the team used on the M20 really knew what it was doing," he says.

Twenty four hour working was the order of each day although some operations, for instance guillotining or pulverising concrete, were forbidden at night. About 40% of the surfacing was laid during the hours of darkness. Carried out during the summer months of 1999, the contract's daytime work was occasionally hampered by hot weather.

"The main problem was getting people to go home and rest. You tend to get the bit between your teeth with lane rental, and not know when to ease up."

Macey's third factor was the fact that the project was run as a partnership, at the behest of the client. "I know the concept raises eyebrows, but it really can work, even on lane rental schemes which are traditionally highly adversarial," especially over matters to do with bonus computations."

HCP entered into an informal partnering agreement with the Highways Agency and the

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Highways Agency

agency's Engineer, WS Atkins. The declared intention was to work together to resolve all problems as quickly as possible, to the benefit of all parties. A no blame culture was fostered.

"Our subcontractors were drawn into the agreement too, and it worked very well. Admittedly, no real problems emerged during the contract; it might have been different if they had," Macey says.

"But looking back, it seems we were all able to inject more value into the project, not having the normal battles to fight."

Mark Holland rounds off by saying that traffic disruption was kept to a minimum during the M20 works and by expressing pride that the new surfacing has been so well received. "All in all, it was a very successful job for us, for which we've been complimented by the Highways Agency."

Another section of M20 is now due to receive the overlay treatment, east of Maidstone towards Ashford. "If there is any natural justice, that contract should come our way too," says Holland. It is clear from his manner that he is not joking.

Cracking system The crack and seat system can make good economic and environmental sense, reusing a material already in situ and greatly reducing the amount of waste to be carted off site or otherwise disposed of.

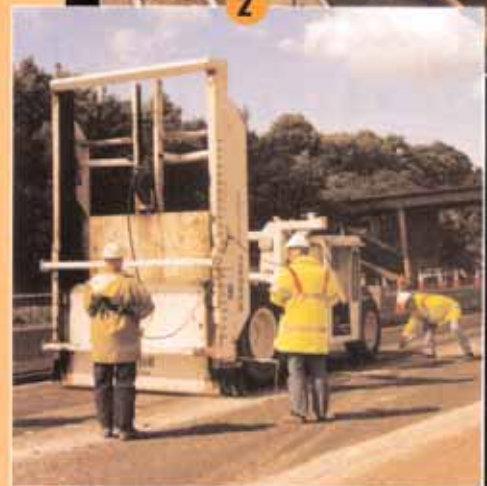
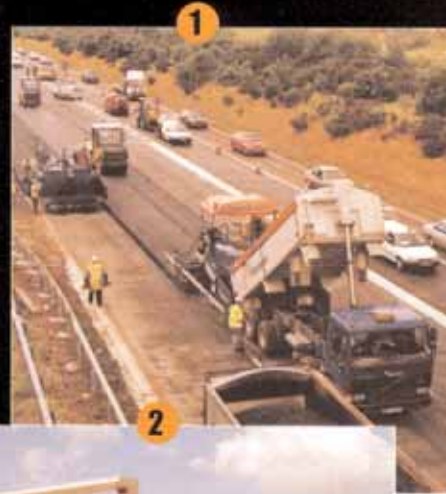
In essence, the system involves transversely cracking a rigid pavement (usually one with foundation problems) into a series of small slabs making sure each of these become well seated on the ground beneath, to form collectively a well-founded flexible base. This is then overlain with asphalt.

The process is as follows. First of all, studies are carried out on the stability of the existing carriageway and the state of the sub base and formation. From the results, overlay thickness can be calculated to provide the design life required. Next, trials are carried out with a guillotine to determine the best drop height to effect the required crack through the existing slab; and at what centres these cracks should be made, to achieve the most stable surface.

The contractor then gets on with its work. On the M20, a 7t guillotine was dropped 450mm to achieved cracks at 600mm centres. Maximum consolidation was achieved by use of rubber tyred rollers.

Cores are taken to ensure the slab is cracking properly and not laminating or becoming pulverised. Testing is then carried out with falling weight deflectometers to confirm sufficient strength is being achieved in the new flexible slab.

Following confirmation of strength, overlaying can begin. Maximum crack and seat output at the Kent site was about 1800m²/hour. In all, the area of crack and seat extended to 147,000m².



1. **Hanson's resources, the experience of its surfacing teams and partnering brought the M20 contract home four weeks early.**
2. **Crack and seat was used to create a well seated flexible base for the Tuffgrip overlay.**
3. **Asphalt was laid to a depth of 120mm to accommodate differential movement and to resist wheel tracking from the high numbers of HGVs that use the M20.**