

RMC

Birmingham's viaducts revived

Motorways crossing three concrete viaducts north of Birmingham are being refurbished using an 'upside down' method of road renewal to stop surface rutting and ingress of water.

Congestion on the M6 may have eased with the opening of the M6 Toll (formerly known as the Birmingham Northern Relief Road) but the effects of heavy trafficking on the older and un-tolled route continue to be felt. High volumes of slow moving, often weighty vehicles crossing motorway viaducts over many years have caused damage to elevated sections of carriageway, which is now being put right.

Asphalt surfacing on several viaducts near Birmingham had begun to rut and potholes were appearing with increasing frequency. Percolation of water through the defects caused construction layers of the road to separate, leading to further disintegration of the surface. Damage to the underlying waterproofing membrane resulted in a hazard to drivers and an increased risk of deterioration of the concrete deck slab due to the ingress of chlorides from de-icing salt.

Road refurbishment specialist RMC Surfacing was called in to renew carriageway on two of the viaducts in June 2004, as surfacing supplier to the Highways Agency's Area 9 Construction Management Framework team. Work on the Tame Valley viaduct on the A38(M) Aston Expressway finished in September.

"The viaduct work on the M6 and A38(M) represents the largest contract to date carried out using this refurbishment system." Gordon Lemon

Carriageway renewal on the northbound carriageway on the western section of the Bromford viaduct on the M6 is due to complete by the end of this year.

RMC's viaduct refurbishment system begins with installation of a durable

waterproofing and protection membrane by waterproofing specialist Laser Special Projects. A proprietary SA-1030 bond coat is then applied to give a strong bond with the next material, a Clause 943 hot rolled asphalt. This conventional surface course is laid to a depth of 45mm, to act as a preliminary binder course. Next comes an SMA binder course of RMC's Viabase, laid as a regulating layer to a depth of up to 55mm. The road renewal system is finished off with a 30mm layer of Viatex thin surfacing.

RMC's Framework Manager Nick Ash says: "This specialist treatment system is essentially an upside down method of road construction and involves laying a traditional surface course material as a binder course.

"The hot rolled asphalt material has a high polymer modified bitumen content which means it is dense, voidless and flexible. The end result is designed to give a tremendous resistance to rutting," he says.

Works on the M6 and A38(M) began with planing of the existing carriageway to reveal a worn out deck protection system including a layer of red pigmented sand carpet above the old waterproofing. These were stripped and concrete repairs were carried out to areas of the bridge deck damaged by water ingress before RMC and Laser set to work on laying their road renewal system.

Over 4,700t of asphalt was specified on the A38(M) and around 12,500t will have been used on the M6 when work finishes

Application of the new waterproofing membrane was quickly followed by surfacing to help ensure a secure bond





Overall thickness of the surfacing was closely controlled to comply with strict weight limits on the viaducts

later this year. Coated material arrives on site from the nearby Washwood Heath asphalt production facility in a convoy of up to 15 insulated lorries carrying a total of 300t of material.

Surfacing has to be carried out to closely follow the protection layer going down in order for a secure bond to be formed between the membrane and the asphalt. A soap solution was sprayed on to the wheels of each lorry to prevent them from peeling membrane from the bridge deck.

Overall thickness of carriageway construction is being closely controlled to comply with strict weight limits on viaducts and to meet the original surface profile. A Vogele Super 1900 tracked paver with a fixed screed was preferred to a wheeled paver to ensure accuracy with laying thicknesses and to eliminate pick-up of the SA-1030 bond coat. Material compaction was achieved with a Hamm HD90 tandem roller.

Work on the Tame Valley viaduct entered RMC's programme at a relatively late stage due to an innovative partnership between the Highways Agency and Birmingham City Council. RMC Surfacing's Major Projects Director Richard Butterfield says

Birmingham City had originally agreed to defer the work to the A38(M) Aston Expressway, one of its key transport arteries, until summer 2005, to permit the urgent M6 repairs to take priority. However, the Highways Agency's Area 9 team worked alongside Birmingham City Council to set in place a combined programme of work that was designed to suit both client and end users.

"Starting renewal of both routes at the same time cut the construction programme down from 11 months to six. Typically, no-one would plan several major renewal schemes to take place in the same area at the same time, but our work cannot be carried out in wet weather and the programme coincided with the school summer holidays which meant traffic volume in the area was reduced. The timing was good to work on all the viaducts simultaneously," Butterfield says.

RMC is confident that the refurbished viaducts near Birmingham will only require surface course renewal in future years. But there are further opportunities for use of the viaduct carriageway renewal system on other heavily trafficked structures on the UK's principal road network, as well as on key local authority routes.

"The viaduct work on the M6 and A38(M) represents the largest contract

carried out to date using the refurbishment system," says RMC's National Technical Manager Gordon Lemon. "We anticipate the Highways Agency will publish a guidance note for use of the system by the end of the year."

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MANAGING CONSTRUCTION THROUGH PARTNERING

Construction Management Framework is the Highways Agency's innovative approach to partnering with the supply chain with the aim of delivering "industry leading performance through partnership, co-operation, and commitment".

CMF is managed and delivered by a dedicated community comprising the Highways Agency, its agents and more than 20 providers of specialist services. See www.highways.gov.uk/roads/projects/misc/cmef_files/cmef_intro/index.htm for more details.

The principal team on the M6/A38(M) contract included AmeyMouchel, Dew Construction, H W Martin, Interserve, Laser Special Projects and RMC Surfacing