

## State of the Art Cement Bound Materials in Highways

Sitebatch Technologies and Needham & Cullen worked together on many road projects throughout the 1990's and early 2000's in the UK, ranging from trunk roads to major motorways. Over this period, many improvements and innovations in the methodology behind the mass production and laying of a tightly controlled quality CBM product have evolved.

Both companies are now part of Aggregate Industries UK Ltd and trade as Roller Compacted Concrete Company. This coming together coincided with an unprecedented road building programme in Ireland and the resurgence of CBM as the subbase and base material of choice among designers and contractors seeking the most cost-effective pavement solution.

Average daily output in the 1990's was around 500m<sup>3</sup>. Now average output in the region of 800m<sup>3</sup> per day is commonplace, with peaks of up to 2500m<sup>3</sup> being achieved. In terms of scale and speed, there has been a quantum leap forward in both production and laying systems.

The current generation of continuous mixing plants in the company's fleet feature computer

controlled weigh systems and offer a range of production rates which are matched to the programme and logistical constraints of each project.

Heavy duty tracked pavers with dual compaction screeds, which are capable of paving up to 12m wide and up to 300mm thick in one pass, are the backbone of the laying fleet.

This is a far cry from paving half the width of the carriageway at 150mm depth, pulling back and paving the other half, then waiting seven days for the CBM to cure before putting another 150mm layer on top!

Induced cracking is now a requirement of the Specification and Needham & Cullen have improved the original method of crack insertion involving a vibrating plate compactor with fin, to the current method using a roller-mounted groove former with simultaneous bituminous emulsion injection.

The transportation of the CBM has, of necessity, had to improve to keep pace with increased outputs of the mixing and paving plant. On Irish projects, 40 tonne dump trucks

are now commonly used, whereas it would have been normal to use 25 tonne dumpers or 20 tonne road wagons on a typical UK road project in the past.

Since 2004, in the region of 172km of newly constructed motorway/dual carriageway in Ireland have incorporated CBM in the pavement. A further 230km are under construction in 2008/9/10.

Recent changes in the Highways Agency's Design Manual for Roads & Bridges, including the introduction of Interim Advice Note 73/06, must surely herald the renaissance of cement bound material (now CBGM) on UK roads and the opportunity to capitalise on the vastly improved methodologies for mixing and paving tried and tested in Ireland.

The acceptance of the concept of Immediate Bearing Index (IBI) in the Specification for Highway Works now means that with suitably designed mixtures giving a mechanically stable material, subsequent layers can be paved over the CBGM without waiting for the traditional 7 days for strength to develop.

