

No. RW/PL-17(8)/76-NH-Stds.

Dated the 9th February, 1988

To,

1. Chief Engineers of all States PWDs/UTs dealing with National Highways
2. Director General (Works), CPWD, New Delhi.
3. Director General Border Roads, New Delhi.

Subject: Construction of Water Bound Macadam overlays for strengthening of existing road pavements having bituminous surfacing/wearing course — Guidelines on

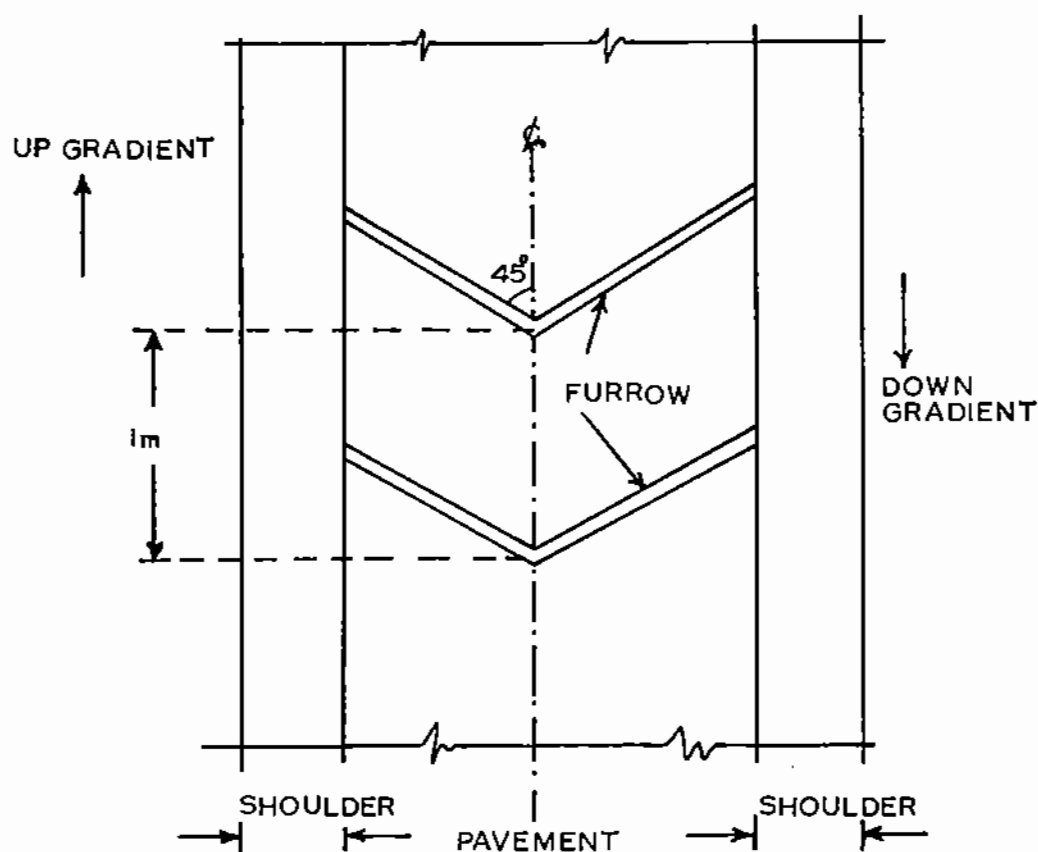
Water bound macadam (WBM) has been the mainstay of construction of new road pavements in the country from economical and other considerations and is also being generally used as overlay for strengthening existing pavements having thin bituminous wearing course where the strengthening requirement is of large magnitude i.e. more than 150 mm.

2. Specifications for construction of sound WBM are contained in Clause 404 of the Ministry's "Specifications for Road and Bridge Works" as also in the IRC Standard on the subject (IRC : 19-1987). Despite this, failures have been observed in some cases, particularly where this material has been used as an overlay for strengthening existing bitumen surfaced pavements.

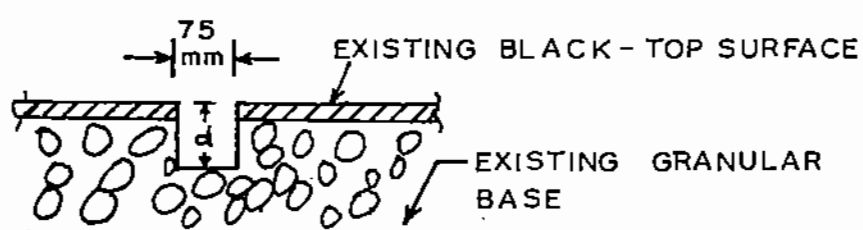
3. Apart from others, the special requirements for ensuring good performance of WBM overlays essentially relate to good bonding with the existing pavement and availability of adequate facility for drainage at the interface of the existing surface and the WBM overlay course. For durable performance and for avoiding any premature failure of pavements with such overlays, it is emphasised that the following points should be specially kept in view for all strengthening works with WBM overlays on the existing bitumen surfaced roads :

- (i) Normally, WBM overlay is suitable for strengthening existing inadequate pavements with thin (thickness upto 40 mm) bituminous wearing course which usually will be in a distressed and/or worn out condition. For such cases, the existing bituminous wearing course should be completely picked out, removed and the existing WBM courses rebuilt after providing an appropriate profile corrective course prior to laying of WBM overlay. The WBM overlay should be of Grading No. 3 coarse aggregate as per Clause 404 of the Ministry's Specifications.
- (ii) As far as possible, WBM overlay on existing thick (thickness greater than 40 mm) bituminous surfacing (base course + wearing course) should be avoided. Instead, bitumen-bound courses like built-up spray grout (single course only), bituminous macadam, dense bituminous macadam etc. as appropriate in accordance with the guidelines contained in the Ministry's Circular No. RW/33059/29/87-NH-Stds. dated 7th May, 1987 should be adopted.
- (iii) However, in exceptional cases, in locations where the annual rainfall is low i.e. upto 150 cm, and the existing bituminous surfacing/wearing course is not distressed, and the strengthening requirement is of large magnitude i.e. 150 mm or more, WBM can be laid over the existing thin/thick bituminous surface after cutting on the surface 75 mm wide furrows at an angle of 45° to the centre-line of the pavement at 1 metre intervals. The direction of the furrows should be such that they also function as interceptor of surface/sub-surface drainage of the pavement layer (s). Depth of the furrows should be a minimum of 75 mm and should expose the existing granular base course (see Fig. enclosed). Further, for improving lateral drainage and to quickly dispose off water collected at the interface, the shoulders should be constructed with granular sub-base material corresponding to Clause 401 of the Ministry's Specifications. However, when it is not possible to provide granular material in the shoulder due to paucity of funds, longitudinal and lateral drains at appropriate depth be provided for the drainage requirement of the existing granular pavement layers.
- (iv) Screening or blinding material used for filling the voids in the WBM layer should be predominantly non-plastic, with PI not exceeding 6.
- (v) The WBM layer should be compacted as per Clause 404 of the Ministry's Specifications for Road and Bridge works till the coarse aggregates are well keyed and firmly set to their full depth.
- (vi) The top of the WBM strengthening course should be primed in accordance with the guidelines given in the Ministry's Circular No. NHVI-67(11)/85 dated 31.1.86 prior to application of any bituminous course.
- (vii) Suitable arrangements for management and diversion of traffic during execution of the work should be made in accordance with the guidelines given in the Ministry's Circular No. RW/33038/1/87-NH-Stds. dated 7.10.87.

4. It is requested that the contents of this Circular be brought to the notice of all officers of your Department engaged on National Highways works or other Centrally aided road works. Feedback on the subject will be welcome.



(A) PLAN



d- DEPTH OF FURROW SHOULD BE A MINIMUM OF 75mm AND SHOULD EXPOSE THE EXISTING GRANULAR BASE COURSE

(B) CROSS-SECTION OF FURROW

SKETCHES ILLUSTRATING DETAILS OF
FURROWS TO BE CUT ON EXISTING
BLACK - TOP PAVEMENTS PRIOR TO
APPLICATION OF WBM OVERLAYS