

No. RW-11015/1/87-RMP

Dated the 2nd December, 1987

To

1. The Chief Engineer & Joint Secretary (Expressway), R&B Department, Block No. 14, New Sachivalaya, Gandhinagar-382010
2. The Chief Engineer (NH), UP, PWD, Lucknow
3. The Chief Engineer (Central), Punjab PWD (B&R), Patiala
4. The Chief Engineer (NH), Haryana PWD (B&R), Chandigarh
5. The Chief Engineer, NH 45 Project, 29, Eldams Road, Teynampet, Madras-18
6. The Addl. Chief Engineer, Duragapur Expressway, Pusta Bhawan, Salt Lake, Calcutta
7. The Chief Engineer (PW), Bombay Region, 25, Murzban Road, Bombay-1
8. The Chief Engineer (NH), PWD, Errum Manzil, Hyderabad

Subject : National Highways Projects —

- (a) Being executed with World Bank Assistance under Loan 2534-IN.
- (b) Strengthening of NH. 3 in Thane to Nasik Section.
- (c) Strengthening of NH 7 in the reaches km 390-440 and 22/0 to 120/2.
- (d) Nhava-Sheva Port Links — NH 4B

You are aware that the above projects are to be executed to the International standards. To achieve this objective discussion was held with you in the Ministry on 24.4.87 and subsequently Seminars were held in the States to explain in detail in-built specialities incorporated in the tendered documents of these projects with regard to the specifications, quality assurance, process control and use of modern equipment. Further to continuously monitor these projects monthly review meetings are to be held as per Ministry's letter No. RW/PL-29(8)/85, dt. 19.6.87.

2. One of the main requirements in this regard is that the methodology and equipment to be used on each activity concerning these projects should be obtained from the Contractors and approved by Engineer in advance of commencement of work. However, it has been noticed that in some cases this requirement has not been followed. It is therefore, reiterated that the procedure for obtaining complete methodology and equipment to be used as per the in-built provision in the contract documents should be strictly followed and under no circumstances the work should be allowed to commence without fulfilling the above requirements. Full use of the specific authority available to Engineer in this respect in terms of the contract should be made.

3. For the convenience of the Engineer special conditions for the use of equipments as applicable to the above projects are enclosed as Annexure 'A' to this letter.

ANNEXURE 'A'

## SPECIAL CONDITIONS FOR THE USE OF EQUIPMENT FOR CONSTRUCTION OF ROADS

## Embankment

- (a) **Earthwork** : The type of machines/combination of machine to be used for excavation and carriage of earth shall be got approved from the Engineer before commencement of work depending upon the lead and lifts involved and other site conditions.
- (b) **Spreading** : Irrespective of the type of machines used for excavation and carriage of earth Motor Grader shall be used for spreading the earth in layers which shall have hydraulic controls for initial adjustment of the blade and maintain the same so as to achieve the specified slope and grade.
- (c) **Adding of water** : When water is required to be added to bring the moisture content to the optimum level, a truck/trailor mounted water tanker capable of applying water uniformly and in controlled quantities to variable widths of surface without any flooding shall be used.
- (d) **Compaction** : Vibratory Roller of 8-10 static weight having other appropriate characteristics as per Ministry's letter No. RW-14021/2/86-RMP dated 20.8.87 with plain or pad-foot drum depending on the type of soil shall be used.

**(2) Production of Aggregate**

Whenever crushed stone is to be used as aggregate in construction of pavement layers, it would mean that aggregate shall be obtained through the use of integrated crushing plants having primary and secondary crushers of Jaw type with serrated jaws, gyratory (cone) crusher, granulators and vibratory screening units of suitable capacity and type so as to produce cubical aggregate fulfilling the specified requirements of grading, flakiness index etc.

**(3) Macadam Bases/Sub Bases**

- (a) **Aggregating spreading :** For different types of macadam bases/sub-bases as for example coarse aggregate, penetration macadam, macadam filled with fines, WBM and wet-mix macadam the spreading of aggregate/mix shall be done either by a Motor Grader of the type specified in items (1) (b) or by a paver finisher or by an aggregate spreader as required by the Engineer.
- (b) **Compaction :** For compaction of granular bases/sub-bases vibratory roller of 8-10 static weight with other appropriate characteristics as per Ministry's letter No. RW. 14021/2/86-RMP dated 10.8.87 shall be used.

**(4) Production of Mix for Wet Mix Macadam**

The mix for the wet mix macadam shall be produced in a suitable mixing plant like concrete batching plant capable of achieving requisite grading and having facility for adding water in the requisite quantity. For spreading the mix, use of paver finisher is to be preferred to motor-grader.

**(5) Preparing the Existing WBM Surface for Laying Bituminous Course**

The surface shall be cleaned by using a mechanical broom and the dust removed in the process shall be either blown off with the help of compressed air or picked up by the appropriate device in the mechanical broom itself.

**(6) Applications of Binder/Tackcoat :**

A self propelled or towed bitumen pressure sprayer having self heating arrangement and designed to spray bitumen uniformly (unbroken spray) at the specified temperature and rates shall be used. It shall therefore be equipped with a separate power unit for the bitumen pump, temperature controls and full circulation spray bars with nozzels.

**(7) Bituminous Pavement Courses**

For all bituminous pavement courses like bituminous macadam, dense bituminous macadam, asphaltic concrete and semi-dense carpet involving the use of Hot Mix Plant and Paver Finisher the equipment shall fulfill the following minimum requirements :

- (a) **Hot Mix Plant :** Batch type or continuous type of Drum Mix Type which shall have following coordinated set of essential units
  - (i) Cold aggregate feed system with minimum 3 bins for providing blended aggregate in the correct proportions
  - (ii) Dryer drum fitted with turbojet or any other type of suitable burner capable of heating the aggregate to the required temperature without any visible unburnt fuel or carbon residue on the aggregate and to reduce the moisture content of the aggregate to the specified level.
  - (iii) The dryer unit shall be fitted with thermometric instruments at appropriate places so as to indicate or automatically record/register the temperatures of heated aggregate before adding binder and automatic control of temperature of aggregate, so as to maintain the specified temperature range and temperature difference between hot aggregate and binder.
  - (iv) **Gradation Control :** Except in case of drum mix plant, other two types of plants mentioned above shall have :
    - (a) A screening unit for accurate sizing of hot aggregate and feeding the same to mixing unit by weight or volumetric control as per the specified job mix with semi-automatic/Automatic controls.
    - (b) Paddle mixer unit capable of producing a homogeneous mix with uniform coating of all particles of the mineral aggregate with binder.
    - (c) In case of drum mix plant, the cold feed system shall have variable speed belt conveyors for regulating the accurate proportioning of aggregate into an even feed flow automatically from a centrally operating/control cabin.
    - (v) **Bitumen Control Unit :** Capable of measuring/metering and spraying required quantity of bitumen at specified temperature range with automatic synchronisation of bitumen and aggregate feed.
    - (vi) **Filler system :** A fines feeder system suitable to receive the supply of filler material and its additions to the mix in the correct quantity and position.
    - (vii) **Dust control :** A suitable built-in dust collection/control equipment for dryer to contain in the exhaust of fine dust in atmosphere within permissible limits for environmental control and arrangement for feeding the collected dust to the mix.
- (b) **Paver Finisher :** Spreading of hot mix material shall be carried out by means of a self propelled paver finisher having the following features :
  - (i) Free-floating self levelling type screed.
  - (ii) Fully hydro-static drive.
  - (iii) Moving hopper sides.
  - (iv) Two feed conveyors and corresponding spreading screens with variable speeds independent of traction.

- (v) Hydrostatically operated flow gates with suitable feed control/limit switches/synchronising device.
  - (vi) Screed with both tamping and vibrating arrangement and internal heating system.
  - (vii) Necessary control mechanism so as to ensure that the finished surface is free from any surface blemishes.
  - (viii) Optional : Electronic sensing devices for automatic level and profile control if specified in NIT.
  - (c) **Compaction :** For compaction of bitumen layers the initial break-down rolling shall be done with 8-10 ton static rollers, intermediate rolling with suitable vibratory rollers and final rolling with 8-10 ton Tandem rollers as approved by the Engineer.
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