

**No. PL-67 (29)/76-NH-VI**

*Dated the 28th June, 1979*

**To**

**The Engineer-in-Chief/Chief Engineers/Addl. Chief Engineers of State P.W.Ds and Union Territories dealing with National Highways. The Director General, Works, C.P.W.D., New Delhi.**

**Sub :** Measures to mitigate the adverse effects of rains and floods on traffic operation and performance of Highways

It has been the general experience that rains and floods effect traffic operation and the performance of road pavements, and in certain cases are cause of severe damage. Adverse effects of this kind can, however, be mitigated to a great extent by timely action based on inspections and close monitoring of the road condition. During rainy season close watch should be kept on flood levels, possibility of overtopping of road sections general flow pattern of the runoff water, proper functioning of drains and culverts etc. so that prompt measures can be taken to regulate the flow of traffic, and to evolve permanent remedial measures wherever warranted.

**2. For safeguarding the National Highways in this respect, the following points should be specially kept in view :**

- (a) Advance action prior to rains :**
  - (i) Roadside drains, catch water drains, catch pits etc. should be cleaned of all debris.
  - (ii) Any blockage in the waterways of culverts should be cleared.
  - (iii) Protection works such as slope pitching on embankments, bed flooring and other erosion control provisions at culverts should be inspected, and kept in good order.
  - (iv) Scoured areas in the vicinity of abutments piers of culverts, which are likely to endanger the safety of the structure, should be appropriately filled with stones/boulders.
  - (v) Road construction materials should be stored in areas not likely to be effected by floods.
  - (vi) Any potholes, cracks, pitting in the pavement surface should be properly repaired and filled up.
  - (vii) Berms should be dressed and made good in profile so that water does not stagnate but flows off during rains.
- (b) Action during the rainy season :**
  - (i) Close watch should be kept on flood levels along the National Highways, and the HFLs. recorded. Stretches specially susceptible to rain/flood damage should be frequently inspected.
  - (ii) In locations where flood water rises fast to danger levels, or has the tendency to overtop the road, it should be ascertained whether this phenomenon is due to inadequacy of waterway at cross-drainage structures, low road level, or some other reason. This will be helpful in designing permanent remedial measures against overtopping.
  - (iii) Potholes and other incidental damage occurring to the pavement should be promptly repaired and the road maintained in traffic-worthy condition.
  - (iv) In certain cases, it may become unavoidable to suspend or divert traffic if the road section gets heavily damaged or breached by rain/flood waters. This will call for appropriate measures to regulate the flow of traffic and warn it of the danger ahead so as to obviate any accidents. Detailed instructions in this behalf have already been issued vide Ministry's letter No. NHIII-33 (125)/72 dated 20th March, 1973, and relevant extracts are enclosed for ready reference.
- (c) Post-rainfall period :**
  - (i) After cessation of rainfall, the road should be inspected carefully to assess the total damage and devise a concrete action programme for restoration. The objective should be to repair the road to a traffic-worthy condition in the least possible time.
  - (ii) Utmost priority should be given to the repair of any breaches and blockages so that the flow of traffic can be resumed as expeditiously as possible.
  - (iii) Any stagnant water on the road surface or shoulders should be drained out promptly. Similarly, blocked drains and culverts

should be attended to as early as possible.

- (iv) Road stretches subject to recurring damage should be studied closely to ascertain causes for the same so that appropriate permanent remedial measures could be planned.
- (v) In some situations, water may get locked up within the road crust which can be highly injurious to the pavement. This generally shows up in the form of wet patches on the surface or water oozing from the berms and side slopes. In such cases, the excess water should be drained by providing suitable lateral drains on the shoulders.
- (vi) Potholes, cracks, pitting in the pavement surface etc. should be promptly repaired and filled up.
- (vii) Road repairs should be so planned and executed that the flow of traffic is not hampered unduly. In this connection, the contents of Clause 105 "Arrangements for Traffic During Construction" in the Ministry's "Specification for Road and Bridge Works" should be adhered to as closely as possible.

(d) Miscellaneous :

Behaviour record of road stretches should be studied with a view to improve the Specifications for future construction.

3. It is requested that the points emphasised in this letter may be given careful attention, and the same brought to notice of all officers concerned in your Department for compliance.