No. PL-67 (29)/76 *Dated the 31st August, 1978*

To

All the Chief Engineers of States/Union Territories dealing with National Highways and other Central Sector Bridge Works

Sub : Periodic inspection of highway structures on National Highways and other Centrally financed bridge works-Observation of river behaviour during floods and prompt attention to any adverse effects noticed

The need for conducting periodic inspections of highway structures on National Highways has already been brought to the notice of the State Chief Engineers vide this office circular letter of even number dated 26th May, 1977, wherein it was desired that all bridges shall be got inspected by a responsible officer of the Public Works Department once a year and the data compiled, to begin with, latest by 30th June, 1977. So far no information as to whether such inspections have been carried out and bridge registers completed, has reached this office. A report on the present stage of action taken on the above circular may please be sent to this office immediately.

2. It has recently come to the notice of this Ministry that in the case of some major highway bridge structures built across alluvial rivers, with or without guidebunds, and having deep well foundations resting on clay/sand/silty soil, deep scours have occurred near some of the piers, even with discharges much smaller than those for which the bridges were originally designed for. This could perhaps be due to development of some adverse flow conditions in the river such as curved or oblique flow, concentration of discharge in only a few spans, etc., resulting from meandering nature of the river, which could cause dangerous scours which are not specifically quantified or formulated in the relevant codal stipulations. Such deep scours have resulted either in settlement or tilting of foundations/piers and consequent dislodgement of the superstructure beams from the bearings, particularly of the segmental or the cut-roller type, causing serious dislocation to traffic. It is felt that such situations could have been avoided if the data on the hydraulic behaviour of the structures has been recorded periodically and analysed to ascertain the necessary and timely protective measures to be undertaken. In order to avoid such unpleasant and undesirable situations in future the State Chief Engineers are advised to ensure proper attention to the following points :

(i) To take soundings before, during and after each flood at all foundation locations for all bridges built across major rivers with alluvial beds (foundations seated on soils), particularly where the rivers show a tendency to meander and give rise to concentrated flows, and maintain a permanent record of the same.

(ii) To observe the high flood level, discharge, obliquity of flow, erosion of banks, functioning of the bridge waterway, changes in flow pattern, etc., as already brought out in the circular letter of even number dated 26th May 1977.

(iii) In cases where such records reveal that scour as observed have a tendency to exceed the earlier anticipated/design scour depths, appropriate protective steps like dumping of boulders around the foundation locations or resorting tofullfledged garlandingof the foundations laid at suitable levels which will not cause adverse or deteriorating flow conditions of the river round piers, may be resorted to after obtaining necessary approval of the Competent Authority.

(iv) In some cases,it may even be found necessary to train the river and guide the flow more uniformly through the various openings, by means of proper training works, such as guidebunds, or spurs, etc.

(v) Since even small settlement of foundations may adversely effect the safety of super-structure resting on bearings, particularly cut-roller bearings, it is suggested that suitable concrete blocks/wooden packings be provided under the beams near the bearings to ensure that in the event of the superstructure getting dislodged from the bearings, it would ultimately rest on such concrete blocks/wooden packings, avoiding the risk of a total collapse. Also observations on the movements and tilts of the rollers be periodically made and a permanent record of the same maintained. If in any case the bearings are found to be in a critical condition, immediate action has to be taken for lifting the spans and resetting the bearings.

3. The above requirements are of utmost importance for the safety and proper functioning of the bridge structures.The State Chief Engineers are requested to kindly accord top most priority to such inspections and

ensure that the suggestions made above are carried out latest by 31st December, 1978 under intimation to this Office.