

2023.

No. NHIII/COORD/2/84

*Dated the 19th May, 1984*

To

All Chief Engineers dealing with  
National Highways in the States and Union Territories

Subject : Inventory of the National Highway system by car-mounted instrument system

As you are aware, an accurate inventory of the National Highway system is the basic requirement for future planning. It will help in identifying stretches with poor geometrics and bad riding quality and it will give information on the width of pavements. All these data will be of invaluable help in proper planning.

The Central Road Research Institute have acquired the technique of measuring the route characteristics through an instrumented car. The Ministry have recently sanctioned an estimate in favour of this Institute for carrying out the inventory on the full N.H. system. The work is expected to begin in June and will be completed in a year's time.

For ensuring the success of this interesting project, the active participation of and cooperation from the State PWDs are necessary. This can be achieved in the following way :—

- (1) The Executive Engineer in charge of the Division will himself travel in the car in his jurisdiction and furnish all information such as land width, soil type, bypass alignment, missing links culverts and bridges etc. He should, therefore, keep these information in advance.
- (2) The Ministry's Regional Officer or his representative will also be present during the survey.
- (3) The State PWDs will extend help in accommodation at PWD Guest houses for the party.

The proformae on which the information will be collected are enclosed herewith. Form I will be filled from readings from the instruments. Data for Form II should be supplied to the observer in the car by the State P.W.D. Executive Engineer during the survey. Instructions for filling the forms are also enclosed.

The progress to be achieved per day will be roughly 125 km. The detailed programme is being drawn up in consultation with the Central Road Research Institute and will be intimated in due course.

It is requested that the above opportunity be availed of to expose the P.W.D. staff to the new technique of route characteristics measurement and full cooperation be extended to the team.

## INSTRUCTIONS FOR NATIONAL HIGHWAY INVENTORY

1. Pilot studies shall be carried out to ascertain the practical difficulties, if any.
2. Before starting the work the entire network of National Highways shall be broken into links and nodes with proper identification numbers. A link could be a small length of National Highway connecting two towns. Whenever the work has to be stopped for malfunctioning of instruments or for any reason, a new node has to be created at that point. Junctions of National Highways shall be given a node number.
3. The CRRI Survey party will be accompanied by representative from PWD and Roads Wing's Regional Office.
4. Data will be collected in two types of forms, one for recording the readings of the instruments and the other for recording visual observations/information collected from PWD.
5. Kilometrage and name of the starting and end stations shall always be noted.
6. The Distance Count (D.C.) reading at every visible kilometre stone on the National Highway shall be noted.
7. The Distance Count reading shall be noted for city/town/municipal limits. The city limits should be entered in column 1 of Form I.
8. Distance Count readings at location of Traffic Census count stations shall be noted.
9. Wherever bypasses for National Highway are provided, the geometry for the bypass shall be measured. The Distance Count reading at the beginning and end of the bypass shall be noted. The description of start of bypass and end of bypass should be entered in Column 1 of Form I.
10. Distance Measuring device shall be able to measure distances with a least count of 10 metres.
11. Rise, Fall and Roughness Readings shall be noted at  $\frac{1}{2}$  km. interval. Distance count reading at state boundaries and district boundaries shall be noted.
12. Distance count readings at cross drainage works, ROB/RUB, railway crossings shall be noted. In case of Major and medium bridges (Road/Rail), D.C. at beginning and end of the bridge shall be noted, wherever possible.
13. Wherever missing links are encountered, the D.C. at the beginning and end of the missing link shall be noted. The actual length of the missing link shall be obtained from the Executive Engineer, PWD accompanying the survey car. The survey car will, however, go along the alternate route. The actual length as ascertained by the P.W.D. shall be entered in the Remarks Column.
14. The Executive Engineer, P.W.D.'s opinion on the necessity of providing a bypass to a particular town and the necessity of ROB/RUB at road/rail intersection shall be obtained, and recorded in the Remarks Column of Form I.
15. Wherever periodic renewals were done the type of PR (Seal coat/carpet) and thickness provided shall be obtained from Executive Engineer, P.W.D.
16. The type of soil based on visual inspection of the abutting land on both sides of the road shall be noted. The D.C. wherever the soil type changes shall be noted. The assistance of Executive Engineer PWD may be obtained in this regard.
17. Wherever Zero km. stones for National Highways are located like in major cities, the survey work shall be done upto these points. If Reduced Level of these points is available the same may be noted.
18. It is preferable to do not more than 120 kms. of survey each day subject to proper working of the instruments and other exigencies.
19. At the end of each day's work, the data collection forms shall be completed including data based on visual inspection/information to be obtained from PWD official. The data shall be kept in safe custody.
20. Calibration of the car mounted bump integrator with towed fifth wheel bump integrator shall be done once in a fortnight or after 1000 kms. of survey. Calibration shall be done on road stretches of minimum 200 m. length and of roughness varying from 2000 mm/km to 12,000 mm/km as far as possible. The distance counter per km. should be noted when the roughness calibration is done. For this purpose, the car should be run over a measured distance.

## ROAD GEOMETRY MEASUREMENT

## FIELD DATA COLLECTION FORM I

Date : \_\_\_\_\_ State : \_\_\_\_\_  
 Survey Vehicle No. : \_\_\_\_\_ District : \_\_\_\_\_  
 Roughness Equation No. : \_\_\_\_\_ N.H. No. : \_\_\_\_\_  
 Distance Count per Km : \_\_\_\_\_ Link : \_\_\_\_\_

Name of Station	Code No.	Km. stone reading	Distance Counter reading	Curve Type	Gyro Reading at		Gradient		Bump Integrator Reading (Cumulative Counts)	Remarks
					Beg. of curve	End of curve	Positive Reading	Negative Reading		
1	2	3	4	5	6	7	8	9	10	11

Note : Curve Type Right Turning — R Left Turning — L

**ROAD GEOMETRY MEASUREMENT  
FIELD DATA COLLECTION FORM II**

Date :

State :

Survey Vehicle No. :

District :

Roughness Equation No. :

N.H. No. :

Distance Count Per Km. :

Link :

Name of Station	Node No.	K.M. Stone Reading	Distance Counter Reading	Land use	Pavement		If periodic Renewal done		Soil Type	Shoulder	
					Width	Type	Year	Type & Thickness (cm)		Type	Width
1	2	3	4	5	6	7	8	9	10	11	12

Note :

**1. Land Use**

Urban  
Rural  
Semi Urban

- U Cement Concrete  
- R Black Topped  
- SU WBM  
Gravel  
Earth

**2. Pavement Type**

- C Single Lane  
- B Intermediate Lane  
- W Double lane  
- G Dual Carriage  
- E way 4-lane  
Dual carriage-  
way 6 lane

**3. Pavement Width**

- SL Seal Coat  
- IL Carpet  
- DL  
- DC4  
- DC6

**4. Periodic Renewal****5. Soil Type**

Clay  
Sand  
Black Cotton

- C  
- S  
- BC

**6. Type of Shoulder**

Earth  
Gravel  
WBM  
Brick

- E  
- G  
- W  
- B

**7. Junction Type**

Right Turning  
Left Turning  
Level Cross Road  
Road under Road  
Road Over Road

- R  
- L  
- C  
- RUD  
- ROD

**8. Inction Cross Road**

National Highway  
State Highway  
Major District Road  
Other Road

- NH  
- SH  
- MDR  
- ODR

**9. Railway Gauge & No.**

Broad Gauge  
Meter Gauge  
Narrow Gauge  
2 lines of BG

- BG  
- MG  
- NG  
- BG2

**10. Railway Crossing Type**

Level  
Rod Under Rly.  
Road Over Rly.

- L  
- RUR  
- ROR

**11. Cross Drainage**

Major Bridge  
Minor Bridge  
Submersible  
Culvert

- M  
- MR  
- S  
- C

**12. Formation**

Cutting  
Embankment

- C  
- E

Date :

State :

Survey Vehicle No. :

District :

Roughness Eqn. No. :

N.H. No. :

Distance Count Per Km. :

Link :

Junction		Railway Crossing		Cross Drainage		Road land width (m)	Formation	Remarks
Type	Cross Road	Type	Gauge & No. of lines	Bridge	Culvert			
13	14	15	16	17	18	19	20	21

## 203      ECONOMIC EVALUATION

<i>Code No.</i>	<i>Circular No. &amp; Date</i>	<i>Brief Subject</i>	<i>Page No.</i>
203.1.	RW/NHIII/Coord/86/84 dt 17.9.84	Use of Computer based Model for Economic Analysis of Highway and Bridge Projects	203/1
203.2.	NHIII/Coord/86/84 dt 18.3.85	Economic Analysis for Major Highway Projects	203/1
203.3. 7600	RW/RD/Misc/5/81-OR dt 22.3.85	Computer based Simulation Model	See Code No. 7600
203.4.	RW/NHIII/Coord/86/84 dt 3.5.85	Economic Analysis for Major Highway Projects	203/2
203.5. 7600	RW/RD/Misc/5/81-OR dt 28.5.85	Computer based Simulation Model	See Code No. 7600
203.6. 7600	NHIII/Coord/86/84 dt 26.6.1985	Data for Economic Analysis of Highway Projects	See Code No. 7600
203.7. 7600	NHIII/Coord/86/84 dt 12.7.85	Economic Analysis of Typical Highway Projects	See Code No. 7600