

No. RW/DR/Misc./5/81-OR

Dated the 28th May, 1985

CIRCULAR

Reference is invited to earlier circular of even number dated the 22nd March, 1985, issued by Shri L.R. Kadiyali, Chief Engineer (Planning) concerning the development of a computer-based Simulation Model and for conducting analysis of one case from each Project Zone, included in the Annual Plan 1985-86, by application of the Model. The Project Chief Engineers have since been requested to identify one project in their zone, which could be for widening from single lane to intermediate lane or two-lanes, or widening two-lanes to four-lanes or improvement to geometrics etc.

For carrying out the desired analysis through application of the Model, certain Road and Traffic Data would need to be compiled. Annexure I to this circular contains the details of data required to be obtained from the State PWD or collected from the project proposal received from the PWD, to be used as input data for the Simulation Modelling of the selected project. Annexure II indicating salient details of a pavement widening project and the input data in respect of a 3.2 km stretch of Shillong-Jowai section of N.H. 44 in Meghalaya is also enclosed for illustrating the methodology of data collection.

The Project Chief Engineers in the Roads Directorate are requested to arrange for the requisite data collection for the Model input for running the Simulation Model at I.I.T. Kanpur.

To

All Technical Officers in the Roads Directorate at the headquarters.

ANNEXURE I

INPUT DATA TO THE SIMULATION MODEL

- (i) **DATA DESCRIBING THE ROAD ALIGNMENT (HORIZONTAL ALIGNMENT AND VERTICAL PROFILE) AND TRAFFIC REGULATION.**

Normally it is to be obtained by field measurements with special instrumented vehicles for the road stretches used for simulation (data like curvature, slope, roughness and space coordinates).

Since it may not be feasible to carry out field measurements with special instrumented vehicles, the data could be computed from the alignment plans and longitudinal sections of the selected section. Roughness values could be assumed depending upon the type of surfacing as per the guidelines circulated vide Ministry's letter No. RW/NHIII/P/10/84 dated the 25th July, 1984.

(ii) **DATA ON TRAFFIC TO BE SIMULATED**

Field observations on traffic movements (traffic counts) in conjunction with special traffic generation models.

1. **ROAD DATA :** (i) Road is described for each direction as a series of homogeneous blocks having the same geometrics and other details.

- (i) Space coordinates for the beginning of each block (m) (It means the chainage of the beginning of each block)
- (ii) Carriageway width (m)
- (iii) Hard shoulder width (dm)
- (iv) Speed limit (km/h)
- (v) Curvature (10^4 m^{-1})
- (vi) Slope (m/km)
- (vii) Roughness (mm/km)
- (viii) Sight distance
- (ix) Indicate whether there are any overtaking restrictions in any section of the selected reach.
- (x) Indicate the existence of a hard shoulder/climbing lane and give chainage of its beginning and end.

2. **TRAFFIC DATA :**

Furnish peak hour traffic in terms of number of i) Cars, jeeps and vans ii) Buses iii) Trucks iv) Motor cycles v) Slow moving vehicles like bullock carts etc. vi) Cycles.

SALIENT POINTS OF THE STUDY PROJECT

ANNEXURE II

1. 3.2 km. stretch of Shillong — Jowai section of N.H. 44 in Meghalaya has been selected for Traffic Simulation Modelling and economic evaluation. The work of widening of this reach (mile 31 and 32) stands included in the Annual Plan 1984-85. At present the reach has a single lane pavement with inadequate formation width. The work of widening and strengthening of the carriageway to 5.5 metres (Intermediate Lane) upto 15 mile from Shillong has been sanctioned and is in good progress.
2. Due to recent discovery of coal bearing area near Jowai the Traffic map significantly increased. The average Daily Traffic count recorded on 26th Dec., 1983 to 1st January 1984 was :

FAST MOVING VEHICLES

(i) Cars, Jeeps, Vans, etc.	450 Nos.
(ii) Buses	114 Nos.
(iii) Trucks	1022 Nos.
(iv) Motor-Cycles, Scooters	8 Nos.

SLOW MOVING VEHICLES

- (i) Cycles

3. The Terrain of N.H. 45 from Shillong to Jowai is predominantly hilly with sharp curve and steep gradients. The state P.W.D. has been requesting the Ministry to consider widening the carriageway to double lane in view of increasing traffic volume considering the overall implication of the pavement widening project covering a significant length of road vis-a-vis the financial involvement it was considered prudent to conduct economic evaluation of the various alternative strategies also using the recently developed traffic simulation model, so that a techno-economically viable alternative could be adopted.

Various options considered were :

- (i) Widening to 2 lane pavement
- (ii) Widening to intermediate lane pavement
- (iii) Retain the existing single lane (Null Alternative)

4. **CUMULATIVE RISE AND FALL**

1st km = 31.53 m 2nd. km = 29.85 m 3rd. km = 21.17 m
4th. km (Part) 13.0 m/km

In view of the prevailing gradients the terrain has been taken as rolling

PEAK HOUR TRAFFIC CONSIDERED FOR ANALYSIS

Type of vehicle	Traffic in 1983 in No. of vehicles per hour	in,Projected 1986	Traffic in 1991	1996
(i) Cars, Jeeps & Vans	45	56	80	115
(ii) Buses & Trucks	114	142	203	292
(iii) Motor Cycles	1	2	2	3
Total	160	200	285	410

ASSUMPTION MADE FOR ANALYSIS

- (i) Peak hour traffic considered 10% of adt
- (ii) Growth rate as 7.5% per year
- (iii) Period of construction as 2 years
- (iv) Equal directional distribution

Chainage in m	Space Coordinate	Width of carr- iageway in m	Width of hard shoulder in m	Speed limit in km/hour	Gradient in m/km	Curvature in 10^{-4} m	Road Roughness in mm/km	Sight Distance in mm
48000	0	7.0	0	50	0.000	0.000	3000	100
48150	150	7.0	0	50	56.700	208.300	3000	90
48220	220	7.0	0	50	56.700	208.300	3000	70
48228	228	7.0	0	50	11.400	0.000	3000	50
48274	274	7.0	0	50	-16.700	151.520	3000	70
48279	279	7.0	0	50	-40.000	151.520	3000	120
48324	324	7.0	0	50	-77.330	200.000	3000	120
48368	368	7.0	0	50	-68.800	0.000	3000	120
48390	390	7.0	0	50	-70.000	109.890	3000	120
48410	410	7.0	0	50	-33.300	0.000	3000	120
48460	460	7.0	0	50	13.800	0.000	3000	120
48508	508	7.0	0	50	37.700	131.580	3000	120
48529	529	7.0	0	50	50.700	0.000	3000	120
48614	614	7.0	0	50	21.700	113.640	3000	120
48650	650	7.0	0	50	21.600	113.640	3000	120
48661	661	7.0	0	50	-24.500	0.000	3000	100
48721	721	7.0	0	50	-13.900	70.920	3000	120
48785	785	7.0	0	50	-18.000	0.000	3000	70
48805	805	7.0	0	50	-50.000	114.940	3000	70
48853	853	7.0	0	50	-32.700	0.000	3000	70
48874	874	7.0	0	50	-32.700	131.580	3000	60
48886	886	7.0	0	50	23.300	131.580	3000	100
48967	967	7.0	0	50	35.050	54.350	3000	120
49070	1070	7.0	0	50	16.300	0.000	3000	150
49143	1143	7.0	0	50	-7.200	0.000	3000	150
49235	1235	7.0	0	50	-17.800	109.890	3000	120
49283	1283	7.0	0	50	-13.670	0.000	3000	120
49343	1343	7.0	0	50	-16.700	54.640	3000	120
49370	1370	7.0	0	50	0.000	0.000	3000	120
49392	1392	7.0	0	50	-2.350	40.980	3000	120
49431	1481	7.0	0	50	-11.670	0.000	3000	150
49537	1537	7.0	0	50	-8.890	54.640	3000	150

Chainage in m.	Space Coordinate	Width of carr- iageway in m	Width of hard shoulder in m	Speed limit in km/hour	Gradient in m/km	Curvature in 10^{-4} m	Road Roughness in mm/km	Sight Distance in mm
49580	1580	7.0	0	50	5.400	54.640	3000	150
49700	1700	7.0	0	50	-25.300	54.640	3000	150