

Indian Highway Capacity Manual – 2017 (First Edition)

Presented by

Prof. Satish Chandra
Director,
Central Road Research Institute (CRRI),
New Delhi

The Need



- The main hypothesis behind conceiving the project was that **Indian traffic characteristics are fundamentally different** from those in the developed economies and even the **driver behaviour is vastly different** from the developing economies like China, Taiwan, Malaysia and Indonesia.

The Need



- ❑ Consequently, the development of an indigenous manual was undertaken on priority **in the form of a mission mode project by CSIR – CRRI** by considering the **various categories of Indian roads** like Expressways, National Highways (NHs), State Highways (SHs), Major District Roads (MDRs), Other District Roads (ODRs) and Urban Roads (UR) as well as various forms of pedestrian facilities on urban roads.

- ❑ Maiden attempt made by **CSIR - CRRI** to execute the project with several expert faculty members from premier institutes including **3 IITs i.e. (Roorkee, Bombay and Guwahati), SPA (New Delhi), NIT (Surat), IEST (Kolkata) and Anna University, (Chennai)**

Objectives of the Study

- ❑ To study the nationwide road traffic characteristics, and
- ❑ To bring out a manual for determining the roadway capacity and Level of Service (LOS) for varying types of inter-urban roads and urban roads including Intersections and pedestrian facilities.

Structure of the Manual

Chapter -1	Basic Concepts
Chapter - 2	Single lane, Intermediate and two lane roads
Chapter - 3	Multilane Highways
Chapter - 4	Expressways
Chapter - 5	Urban Roads
Chapter - 6	Roundabouts
Chapter -7	Unsignalized Intersections
Chapter - 8	Signal controlled intersections
Chapter - 9	Pedestrian Facilities
Chapter- 10	Travel time Reliability for Urban Roads

Teams Involved

- ❑ Central Road Research Institute (CRRI) – Nodal Agency

Seven Team Members

- ❑ Indian Institute of Technology (IIT) Roorkee
- ❑ Indian Institute of Technology Bombay
- ❑ Indian Institute of Technology, Guwahati
- ❑ School of Planning and Architecture, New Delhi
- ❑ Anna University, Chennai
- ❑ Indian Institute of Engineering Science & Tech, Kolkata
- ❑ National Institute of Technology (NIT) Surat

Modus operandi

- ❑ Nine work packages (WP-1 to WP-9)
- ❑ One Regional Coordinator (RC) for each package
- ❑ Other teams to support data collection
- ❑ Standard data collection procedure for each package
- ❑ Nation wide data collection for each package
- ❑ Constitution of task force committee of external experts
- ❑ Half yearly meeting of task force committee
- ❑ Yearly workshop for assessment of the progress

Regional Coordinators



Work Package (WP)	CSIR-CRRI	IIT Roorkee	SVNIT, Surat	IIT Bombay	SPA, Delhi	IEST, Kolkata	AU, Chennai	IIT, Guwahati	Total
WP-1	√	√	√				√	√	5
WP-2	√				√	√	√		4
WP-3	√		√		√	√			4
WP-4	√			√		√	√	√	5
WP-5-A	√	√		√			√		4
WP-5-B	√	√	√		√				4
WP-6 & 8	√	√		√	√			√	5
WP-7	√	√	√	√		√			5
WP-9	√		√						2

Innovativeness of Indo-HCM

- ❑ Modus Operandi of Indo-HCM is itself innovative as there has not been any such attempt in the past in India.
- ❑ Dynamic Passenger Car Unit based on Area and Speed of a vehicle.
- ❑ Development of Stream equivalency factor
- ❑ Relation between Operating Speed and Capacity for highways

Innovativeness of Indo-HCM

- ❑ A new LOS Parameter on Interurban Undivided carriageways - the Number of Followers per Capacity (NFPC).
- ❑ Level of Service (LOS) estimation for Signalized Intersection through User Perception
- ❑ Gap acceptance model for analysis of roundabouts
- ❑ Occupancy time method for estimation of critical gap at unsignalized intersections
- ❑ Concept of travel time reliability for urban roads.

- Each chapter deals with the procedure for the estimation of capacity and Level of Service (LOS) through a series of steps and culminates with typical illustrative examples.
- It is expected that this document can serve the society as a basic guide for the practicing engineers and decision makers towards capacity augmentation of various types of road and pedestrian facilities in India.

Accomplishment



✓ Societal impact created: provides realistic capacity values evolved in this manual for planning of new facilities instead of using either the obsolete values / procedures available in the relevant Indian Roads Congress (IRC) documents or directly adopting the values given in other manuals which are not directly applicable to Indian traffic scenario.

Accomplishments (Contd...)

- ✓ The manual is expected to help the Engineers / Planners / Bureaucrats to make appropriate allocation of budget for road sector development in the country.

Outputs



1. Periodical Reports Submitted to CSIR:

- Periodical submission of Progress Reports to CSIR which included methodology finalization workshop report titled, “Methodology for Indian Highway Capacity Manual” (MICHAM) in January 2013.
- Followed by yearly review workshop reports titled, “Review workshop of Indian Highway Capacity Manual“ i.e. RIHCAM-2014, RIHCAM-2015 & RIHCAM-2016.
- In addition, 9 Task Force Committee (TFC) meetings were conducted for continual monitoring of the progress and minutes of the Workshops and TFC sent to CSIR.

2. Publications:

- i. Total number: 144 (which included 54 in Referred Journals and the remaining in International / National Conferences)
- ii. Cumulative Impact Factor (IF): 21.60
- iii. Average IF: 0.90
- iv. Average IF per Scientist / Faculty: 0.81

3. Human Resource generated:

Ph.D. / Masters Dissertation

(a) 9 completed; 6 ongoing

(b) Masters Thesis : 63 numbers completed.

4. Skills imparted:

Further, 45 students have undergone Summer / Winter Internships during the tenure.

Output

- ❑ A manual for Indian Traffic Conditions
- ❑ 144 Research Papers including 54 in Referred Journals
- ❑ 14 Ph. D. dissertations
- ❑ 63 Masters Theses
- ❑ 45 undergraduate students trained during their summer internships

Challenges Faced

- ❑ Non Uniformity of vehicles types across India resulting in traffic heterogeneity to be addressed during the development of capacity norms for varying typologies of roads.
- ❑ Different gradient conditions
- ❑ Road User behavior
- ❑ Varied vehicle composition from city to city and National Highways to Rural Road Network
- ❑ Handling huge database at CSIR - CRRI server

CRRI

Indian Highway Capacity Manual (Indo-HCM)



2012-2017



 **CSIR**
CRRI
November, 2017



सी एस आई आर - केंद्रीय सड़क अनुसंधान संस्थान, नई दिल्ली-110025
CSIR - CENTRAL ROAD RESEARCH INSTITUTE
NEW DELHI-110025



CSIR-Central Road Research Institute

(An ISO 9001-2008 Institution)
Mathura Road, New Delhi
110 025
<http://www.crridom.gov.in/>



Thank You