

Bio-Data of Dr.S.Velmurugan

1. Name : Dr.S. Velmurugan

2. Date of Birth : 17.02.1966

3. Current Position and Official Address: Chief Scientist
 Former Head¹, Traffic Engineering and Safety Division,
 CSIR - Central Road Research Institute (CSIR-CRRI),
 Mathura Road, New Delhi - 110 025.

E-mail Address: vms.crri@nic.in; vms_04@yahoo.co.in; vmssathya@gmail.com

4. Educational Qualification:

a: Academic Qualifications beginning with Bachelor's Degree

S. No.	Degree	Year of Passing	University / Institute	Subject	Division / Class / Grade
1	B.E.	1987	Annamalai University, Chidambaram, Tamilnadu	Civil Engineering	First Class
2	M.E.	1989	Anna University, Guindy, Chennai,	Traffic and Urban Engineering	First Class with Distinction
3	Ph.D.	1995	IIT (Bombay), Mumbai, Maharashtra	Transportation Systems Engineering: 8.71 (CGPA in Theory Subject only) Ph.D. Thesis Title: Modelling for Impact Assessment of Expressway Projects in India	

¹ I served as Head of TES Division from 1.4.2013 to 18.4.2016. During this tenure, I assumed the **role of Project Coordinator in all the Sponsored projects handled by the Traffic Engineering and Safety (TES) Division** by rendering my overall guidance and expertise to the scientific staff of TES division as well as gelled well with the scientists of Transportation Planning (TP) Division and couple of scientists in Pavement Evaluation Area (PEA) of the Institute. Since 1st April, 2013, this had helped in garnering an average **External Cash Flow (ECF) of around Rs.36 million every year in the TES Division alone** coupled with timely completion of more than **20 Sponsored Projects**.

More importantly, due to my active involvement in **planned research projects**, the number of **research publications in SCI Journals and other reputed journals** emanating from the scientific staff of the **Traffic Engineering and Transportation Planning (TTP) Area** had also **increased**. About a dozen papers emanated out of Indo-HCM project were accepted either in SCI Journals or in refereed Conferences like World Conference on Transport Research (WCTR), CTRG, TRB, RATE, etc.

Moreover, I had made concerted efforts to streamline the procedure for reporting of the results in respect of the testing related projects handled in the TES division.

5. Employment / Other Research Experience:

a. Employment Profile:

S. No.	From	To	Name of the Organization	Position Held**
1	Since, 17.09.2016		CSIR - CRRI	Chief Scientist
2	September, 2011	September, 2016		Senior Principal Scientist
3	September, 2006	September, 2011		Principal Scientist
4	September, 2002	September, 2006		Senior Scientist
5	September, 1998	September, 2002		Scientist
6	September, 1993	September, 1998		Scientist-B

** The undersigned has been successful in securing promotion to the next grade within the minimum residency period fixed by CSIR time to time up till now.

b. Research Experience i.e. Post-Doctoral Research (PDR) stints² at Belgium and Australia:

University	Subject Area of PDR ^{\$}	Duration, Year and Name of the Scholarship / Fellowship
Transport Systems Centre, University of South Australia, Adelaide	Microscopic Traffic Simulation and Transport Environment	Six month duration i.e. from 1 st May to 31 st October, 2008 by availing Australian Endeavour Research Fellowship
University of Antwerp, Antwerp, Belgium	Estimation of Air Pollution of Emissions from Passenger Transport in Belgium	10 month duration i.e. from 17 th January to 16 th October 1998 by availing Belgium Government Scholarship

^{\$} The experiences gained from the above two PDR stints were appropriately adapted at CSIR - CRRI while dealing with the issues related to estimation of traffic and air pollution in respect of assessment of road projects.

6. Areas of Specialization: Traffic Engineering, Transportation Engineering, Road Safety, Transport Economics and Transport Environment

7. Honors / Awards received:

- The undersigned was bestowed with the **Outstanding Scientist Medal** by the Construction Industry Development Council (CIDC) in March, 2015 during the 7th Viswakarma Award Function. (Copy enclosed as **Annexure - I**). My candidature was nominated by the Director, CSIR - CRRI.
- Second person in the history of CSIR - CRRI to secure the **prestigious IRC-Pandit Jawaharlal Nehru Award in 2008** in recognition of my 'notable contribution to the highway profession' during the preceding five years i.e. prior to the year 2008. Letter of Appreciation issued by the **Director General (DG), CSIR** after securing the above **IRC award** (Copy enclosed as **Annexure - II**).
- I and my Co-authors were given **Cash cum Best Article Award** honor during the year 2009 by the Association of State Transport Undertakings (ASRTU) for the best research publication in the Indian Journal of Transport Management (IJTM). Also bestowed with **Bihar PWD Medals** twice in **2005 and 2011** by Indian Roads Congress (IRC) for being **adjudged the best research publications** in the Journal of Indian Roads Congress titled, "Updation of Road User Cost and Revised Software for Evaluation of Highway Projects", Journal of Indian Roads Congress, Volume 64 (2), pp. 207-267, December, 2003" and "Critical Evaluation of Roadway Capacity of Multi-Lane High Speed Corridors Under Heterogeneous Traffic Conditions through Traditional and Microscopic Simulation Models" Journal of Indian Roads Congress, Vol. 71 (3), pp. 235 - 266, November, 2011.

2 Vishwakarma Award is instituted by CIDC (An organisation started by the erstwhile Planning Commission, Government of India and the Construction fraternity) aimed at motivating individuals and organizations to raise their performance in their specific domain leading to significant contribution for the growth and development of the Indian Construction Industry. - **The first ever person in CSIR - CRRI to acquire such a distinction.**

- Successful in securing **Belgium Government Scholarship in 1998** and **Australian Endeavour Research Fellowship in 2008** through **global competition** for pursuing PDR stints. Based on my personal success, I was instrumental in guiding my colleagues to **apply for International Fellowships** for pursuing research / training programs abroad and some were successful too.

8. a. Professional Affiliations:

- Served as the **Honorary Executive Secretary of Transportation Research Group of India (TRG)** from 28.05.2010 till 27.05.2016 wherein concerted efforts were put forth time and again to leverage the image of CSIR – CRRRI other than performing the activities of TRG.
- Life Member, Indian Road Congress (*IRC*) and Institute of Urban Transport (*IUT*), India.
- Member Secretary of **Transport Planning and Traffic Engineering Committee i.e. H-1 Committee** since 1.1.2009 till 31.12.2014 and thereafter, as an Expert Member since 1.01.2015. Also, Expert Member of **Road Safety and Design Committee i.e. H-7 Committee** since 1.4.2013 - **Details of my accomplishments in the above two Committees are presented in Annexure-IV.**
- Serving as **Expert Member of Cost Committee of the Ministry of Road Transport and Highways (MoRT&H)** - To decide on the Cost Estimates for augmentation of the National Highways falling under the MoRT&H and National Highways Authority of India (*NHAI*).
- Served as Member of the Expert Committee for the evaluation of the study titled, “**Detailed Project Report for Setting up and maintaining a Database on Urban Transportation**”. This study was conducted by Central Institute of Urban Transport (*CIRT*), Pune on behalf of Institute of Urban Transport, (*India*) and sponsored by Ministry of Urban Development, Government of India.
- Served as the **Expert Member of the National Steering Committee on Intelligent Transport System project** sponsored by Department of Information and Technology, Government of India.
- The undersigned was invited by the **Centre for Engineering Research and Development (CERD) Government of Kerala** in November, 2012 as an invited expert for the review of Grant-In-Aid projects related to Transportation and Road Safety.
- Member of the Advisory Committee of the **Centre for Transportation Research (A Centre of Excellence funded by Ministry of Human Resource Development)** setup at **two** National Institute of Technology (*NITs*) namely, **NIT (Calicut) and NIT (Tiruchirappalli).**
- **Serving / Served as an Expert Member of the Technical Committee of Delhi Traffic Police (DTP) since 2006** in finalizing the technical specifications and functional requirements of the new installations being procured by DTP as part of the Intelligent Transport System (*ITS*) initiatives:
 - Electronic (*E-*) Challaning System
 - Red Signal and Speed Violation Detection Enforcement System
 - Gantry Mounted Speed Detection System
 - Variable Message Signs (*VMS*) for Traffic Management.
 - Modernization of Police Bikes with State of the Art Equipment for Traffic Management
 - Common Wealth Games - 2010 (*CWG-2010*) for Traffic Management
 - Design for Portable New Jersey Barrier deployed for Security purposes during CWG-2010.
 - Intelligent Traffic Management System

8 b. Research and Academic Affiliations:

- Completed the CSIR Sponsored project (*under the XII Five Year Plan of CSIR*) titled, “**Indian Highway Capacity Manual (Indo-HCM)**” assuming the **role of Champion**. This is a **maiden effort** made in the country to **develop an indigenous manual considering the traffic conditions at pan India level**.
- Completed one Module (*as Module Leader*) in the Supra Institutional Project (*SIP-030*) titled, “**Development of Road User Cost Models for High Speed Corridors**” in September, 2012 under Eleventh Five Year Plan. Similarly, completed one Module (*as Nodal Officer*) under the Tenth Five Year Plan titled, “**Development and Application of Intelligent Transport Systems for Indian Traffic Conditions - Pilot Studies**” in April, 2007.
- It is evident from the above that since **April 2002**, the undersigned has exhibited his leadership skills in a significant manner by executing research projects since the start of the 10th Five Year Plan.
- Academic pursuits of the undersigned including Reviewer roles in Journals Conferences and Thesis Review; Details of the above *presented in Annexure - VI*.

9. (a) **Number of Research Publications: 123** (*The detailed list of publications presented in Annexure - VII.*)

(b) Best 5 publications during the last 10 years: (**5 best from the SCI only listed here**)

1. Mukti Advani, Neelam J. Gupta, **Velmurugan S**, Madhu E, and Satish Chandra, (2020), Defining and Analyzing Forceful Gap Behavior at Unsignalized Intersections”, Transportation Research Record, Transport Research Board, Online Published June 19, 2020 <https://doi.org/10.1177/0361198120925258>.
2. Ramesh Chandra Majhi and **Velmurugan S**, (2020) “Analyzing Driver’s Response to Yellow Indication Subjected to Dilemma Incursion Under Mixed Traffic Condition”, Journal of Traffic and Transportation Engineering (*English Edition*), Available online 9 December 2019, DOI: 10.1016/j.jtte.2019.05.005.
3. **Velmurugan.S**, Padma.S, Madhu.E, Anuradha.S, Gangopadhyay.S (2013) "A Study of Factors Influencing the Severity of Road Crashes Involving Drunk Drivers and Non Drunk Drivers", A paper published in the **Research in Transportation Economics (An Elsevier Publication) Volume 38, Issue 1**, ISSN-0739-8859; pp. 78 -83.
4. **Velmurugan. S**, Madhu E., Nataraju. J., Ravinder K., (2013), “Development of Congestion Cost Equations for Multilane Highways in India”, Published in the **Transportation Research Record Volume Number: 2317; Publisher: Transportation Research Board**; ISSN: 0361-1981; pp. 121 - 130.
5. A. Mehar S. Chandra and **S. Velmurugan** (2013) “Passenger Car Units at Different Levels of Service for Capacity Analysis of Multilane Interurban Highways in India” **Journal of Transportation Engineering**, American Society of Civil Engineering (*ASCE*) Volume 140 (1) pp. 81 - 88. [*ISSN (online): pp. 1943 - 5436*].
6. Ashish Verma, **S. Velmurugan**, Neelima Chakraborty, Sushma Srinivas (2012) “Recommendations for Driver Licensing and Traffic Law Enforcement in India Aiming to Improve Road Safety and Mobility”, A paper published in the **Special Issue of Current Science Journal** on “Sustainable Transportation System for Cities of Developing Countries Volume 100, No.9, pp. 1373 - 1385.

10. **Dissertations Guided:**

- (a) Ph.D. : **1 Completed; 2 Ongoing**
 (b) Post-Graduate : **45 Completed; 2 Ongoing**

11. **Number of Thesis Reviewed**

- (a) Ph.D. : 15 nos. (*12 from various IITs and NITs of India*)
 (b) Post Graduate : 45 nos.

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Annexure

**Annexure-I: A.I Outstanding Scientist Award by CIDC at the
7th Viswakarma Award Function at New Delhi**



**Annexure-II: Letter of Appreciation letter issued by the
Director General, Council of Scientific and Industrial Research (CSIR)**

प्रो. समीर के. ब्रह्मचारी
महानिदेशक, वै.औ.अ.प.
एवं सचिव, भारत सरकार
वैज्ञानिक तथा औद्योगिक अनुसंधान विभाग

Prof. Samir K. Brahmachari
Director General, CSIR
& Secretary, Government of India
Department of Scientific & Industrial Research



वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद्
अनुसंधान भवन, 2, रफी मार्ग, नई दिल्ली-110001
COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH
Anusandhan Bhawan, 2, Rafi Marg, New Delhi-110001

No. DG/PS/2009-19/383
November 13, 2009

DRRI
Bevels, TES
23/11

Dear Dr. Gangopadhyay,

I am delighted to learn that Dr. Velumugan, Scientists, Central Road Research Institute (CRR) has been honoured with the Pt. Jawaharlal Nehru Birth Centenary Award 2009, for "notable contribution to the profession".

It goes without saying that news such as this fills my heart with happiness for Team,- CSIR for it fulfills the dream I have of seeing CSIR Scientists being lauded for their scientific contributions. It is with great joy that I extend my heartiest congratulations to Dr. Velumugan and the extended CSIR-CRR family.

I am sure you will communicate this news to CSIR News (email: meenakshi@niscsir.res.in) and CSIR-website Manager (itweb@csir.res.in) along with a copy of the address that Dr. Velumugan will deliver on the 16th of this month, so that it may be widely disseminated and serve as a source of inspiration for younger scientists. Please do convey my personal congratulations to Dr. Velumugan.

With warm regards,

Yours sincerely,

Samir K Brahmachari

[Samir K Brahmachari]

Dr. S Gangopadhyay
Director
Central Road Research Institute
P.O. CRR, Delhi-Mathura Road
New Delhi 110020.

23/11/09

Annexure III: Major Accomplishments in the IRC Committees

A-III (a): Transport Planning and Traffic Engineering Committee

The undersigned served as the **Member Secretary of H-1 Committee** of IRC for six years since 1.01.2009 till 31.12.2014. During the last 6 years, either in the capacity of Member Secretary (*2 documents in this role*) or Principle Member of the Sub Group (*5 documents in this capacity*), the undersigned was instrumental either in the formulation or revision of the following publications of IRC by extending his dedicated involvement:

- i. **IRC:SP-88 (2010)** titled, "Manual on Road Safety Audit" - **New Document**
- ii. **IRC:53 (2012)** titled, "Road Accident Forms A-1 and A-4 (*First Revision*)"
- iii. **IRC: 67 (2010 and 2012)** titled, "Code of Practice for Road Signs (*Second Revision and Third Revision*)"
- iv. **IRC:SP-55 (2013)** (*Second Revision*) titled, "Guidelines for Traffic Management in Construction Zones"
- v. **IRC:35 (2015)** titled, "Code of Practice for Road Markings" (*Second Revision*) and
- vi. **IRC: 108 (2015)** titled, "Guidelines for Traffic Prediction on Highways" (*First Revision*)

A-III (b): As Core Member in IRC-SP-30 Revision under H-1 Committee

Further, prior to becoming the Member Secretary of H-1, the research works carried out by the undersigned has served as the backbone for finalizing the updated version of the following IRC document which is released in 2009 and subsequently in 2020.

- vii. **IRC: SP-30 (2009 and 2020)** titled, "Manual on Economic Evaluation of Highways Projects in India (*Second and Third Revision*)".

A part of the Road User Cost (*RUC*) Updation work published by the undersigned along with his colleagues in the Journal of IRC was eventually awarded the **Bihar PWD best research medal in 2005 as well as in 2013**. In this manual, the undersigned introduced a simplified dynamic method for updating the RUC values through the Wholesale Price Index (*WPI*) published every week by the Ministry of Commerce and Industry. Presently, efforts are on to update the **IRC: SP-30 based on the RUC output** derived for the multi-lane divided carriageways *i.e. Speed - Flow and RUC equations encompassing up to eight lane divided carriageways*.

As mentioned earlier, the above research findings have emerged from the XI Five Year Plan project titled, "**Development of Road User Cost Models for High Speed Corridors**", which was recently accomplished at CSIR - CRRI under my stewardship.

A-III (c): Road Safety and Design Committee

The undersigned is presently serving as **Co-Convener of H-7 Committee** since 1.01.2018. In this committee, the undersigned has contributed towards the finalization of the following documents:

- viii. **IRC: 119 (2015)** titled, "Guidelines for Traffic Safety Barriers" - **New Document**
- ix. **IRC:11 (2015)** titled, "Recommended Practice for the Design and Layout of Cycle Tracks" (*First Revision*)
- x. **IRC:65 (2017)** "Guidelines for Roundabouts" (*First Revision*)
- xi. **IRC: SP-88 (2018)** "Manual on Road Safety Audit" (*First Revision*)
- xii. **IRC:79 (2019)** "Code of Practice for Road Delineators" (*First Revision*)

A-III (d): Usefulness of the conceived IRC Documents in Safe Road Construction as well as for Road User Cost Estimation

The above mentioned **IRC documents** are extensively referred by the practicing road engineers / planners / police officials during the phase of road construction, maintenance, road safety and capacity augmentation address the following:

- Deployment of the **appropriate safety measures / practices for the deployment of** appropriate road signs, road marking, crash protection measures coupled with the development of typical Traffic Management Plans (*TMP*) for the road construction zones.
- IRC-108 can be used as a reliable source to estimate the base year and horizon year future traffic.
- Use of the simplified recording and reporting format for road crash recording.
- **RUC Equations** - While performing Economic and Financial Feasibility Analysis of Highway projects.
- **The document on Road Safety Audit (RSA) i.e. IRC: SP-88 wherein the undersigned was involved during the finalization of the new document and its revision** is serving as the **principal resource document** for the practicing engineers to **address the road safety issues** in an effective manner aimed at mitigating road crashes at various stages of the road project including preliminary and detailed design, construction, maintenance and pre-opening stages of road projects.

Annexure - IV: As Champion in the CSIR Sponsored Project i.e. Indo-HCM

As part of my endeavor to pursue application based research for road sector development, a research proposal titled, “**Indian Highway Capacity Manual (Indo-HCM)**” submitted by the undersigned (*with inputs from my fellow colleagues*) was eventually sponsored by CSIR in October, 2012 under the Inter Agency Project (*SINP*) category during the **XII Five Year Plan period from 2012-17**. Incidentally, I was assigned the role of Champion to steer this project.

I have conceived the methodology as the lead person of this study. I am providing vital inputs during data collection / collation process, data analysis and also monitoring the progress achieved in the nine Work Packages of this project by 10 Scientists of CSIR - CRRRI associated in this project. Moreover, the undersigned interacted with more than dozen number of faculty representing seven reputed academic institutes spread over the country which are termed as Regional Coordinators (*RCs*). The *RCs* associated in this study include 3 IITs *i.e. IIT (Bombay), IIT (Roorkee) and IIT (Guwahati)*, one NIT *i.e. SVNIT (Surat)*, and three Central / State Universities / Institutions *i.e. SPA (New Delhi), IEST (Kolkata) and Anna University (Chennai)*. The age profile of the faculty involved in this research study ranged from 33 to 63 years spread across the above institutes which will amply **signify my managerial capability** as well in steering the project. The project was completed in December, 2017 and the project report was released on 12 February 2018 by Mr. Nitin R. Gadkari, Minister for Road Transport and Highways (MoRT&H), Government of India.

Ironically, this is the first ever endeavor undertaken at CSIR - CRRRI to associate with multiple academic institutions located in different regions of the country. In this project, four National Level Workshops and five Task Force Committee (*TFC*) meetings were conducted under my stewardship to monitor the progress achieved by the Work Package Leaders *i.e. Scientists of CRRRI as well as by each of the RCs*.

Finally, national level dissemination Workshop was organized by the undersigned in coordination with Co-Champion of the Project (Dr.K. Ravinder, Principal Scientist, CSIR - CRRRI) on 20th and 21st February 2017 at CSIR - CRRRI inviting comments from the stakeholders including the academicians, engineers, planners, bureaucrats and consultants on the draft final report presented during the workshop. Final report after incorporating the comments is under printing.

Annexure V: Major Academic Pursuits and Reviewer Roles

A-V (a): Academic Accomplishments

1. Contributed as the coordinator for the preparation of Curriculum for the Core subject titled, **“Traffic Engineering and Safety”** and **“Economic Evaluation of Transportation Projects”** for **M.Tech. (Transportation Engineering)** offered by **Academy of Scientific and Industrial Research (AcSIR)**. Handled 3 hours per week **both the subjects** during alternate Semesters **since 2010** till 2015 (course discontinued since then) at CSIR - CRRI.
2. Member of the **Expert Committee of Birla Institute of Technology, (BITS) Pilani** - Formulated the Course Curriculum for the Degree titled, **“Master of Engineering (Highway and Transportation Engineering)”** in 2006.
3. Serving as a Guest Faculty at SPA, New Delhi since 2007 accomplishing the following:
 - Taught one Core Subject titled, **“Traffic Engineering”** for II Semester Master of Planning with Specialization in Transport Planning since 2007 in alternate Semesters.
 - Providing Guidance for II Semester Master of Planning (*M.Planning*) students of SPA, New Delhi in their Studio Exercise work since 2007 during every autumn Semesters.
 - Served as **External Guide** for Dissertation Work of 6 M. Planning (Transport) students during 2014 and 2015.
4. **Guided 45 Dissertations leading to the award of the Post-Graduation Degree** in the capacity of **Internal / External Guide** at CSIR - CRRI representing **various IITs, NITs, AcSIR (New Delhi), M.S. University (Vadodara), SPA (New Delhi) and JNU (Hyderabad)**; Three PG Thesis being guided at present is at the verge of completion.
5. **Guided one student from IIT, (Roorkee) leading to the award of Ph.D.** and three Ph.D. Guidance under progress; one at SVNIT (*Surat*) and two at PGRPE (*AcSIR*) are under progress.
6. **Member of the Expert Committee of NIT, (Tiruchirappalli)** which revised the M.Tech. (*Transportation Engineering*) Course curriculum in 2012.
7. **Member of the Expert Committee of Anna University, Chennai** which revised the M.E. (*Transportation Engineering*) Course curriculum in 2011.
8. Served as **Reviewer cum Examiner** for **15 Ph.D. Theses** submitted to IIT, (*Bombay, Kharagpur and Roorkee*), SPA (*New Delhi*), Kuvempu University, (*Shimoga*), Rajiv Gandhi Proudyogiki Vishwavidyalaya, (*Bhopal*), Anna University, (*Chennai*), College of Engineering, (*Trivandram*) and Jawaharlal Nehru University, (*Delhi*) during the last six years.
9. Contributed as **Reviewer cum Examiner** for the Post Graduate (*P.G.*) Theses submitted to IIT, Delhi (*7 nos.*) and Anna University (*8 nos.*) and IIT, Roorkee (*7 nos.*) in 2012.
10. Serving as a Member in the Review of the project titled, **“Development and Application of Technologies for Sustainable Transportation (SUSTRANS)”** at CSIR - CRRI.
11. Served as a **Mentor cum Faculty** in 10 numbers of **Road Safety Audit (RSA)** Certification courses conducted jointly by International Road Federation (*IRF*), **CSIR - CRRI** and Australian Road Research Board (*ARRB*) in July 2010, February 2011 and July 2013.
12. Served as **Examiner for P.G. Theses (2 nos.)** submitted to IIT, Delhi in 2015 and 2016. Similarly served as examiner for P.G. Theses (*9 nos.*) submitted to NIT, Warangal in 2016.

A-V (b): Reviewer Role in International / National Journals, Conferences and Member, Selection Committee

1. Journal of Transportation Engineering, American Society of Civil Engineering (ASCE).
2. Journal of Advanced Transportation
3. Transportation Research (Part-D).
4. Journal of Modern Transportation
5. European Transport Journal.
6. Pertanika Journal.
7. Transportation Letters: The International Journal of Transportation Research
8. Journal of Transport Policy
9. Case Studies on Transport Policy
10. Research in Transportation Economies
11. Journal of Traffic and Transportation Engineering (English Edition).
12. Current Science, Indian Institute of Science.
13. Journal of Indian Roads Congress.
14. Transportation in Developing Economies
15. Indian Journal of Transport Management.
16. **Served as Member of the Scientific Committee** of the First Indo - US Symposium on Advances in Mass Transit and Travel Behaviour Research-2008 (**MTTBR-08**), IIT Guwahati.
17. Served as the Review Chair on the topic '**Road Safety**' during 1st and 2nd 3rd 4th and 5th International Conference of Transportation Research Group of India (CTRG) held in 2011, 2013, 2015, 2017 and 2019 respectively.
18. Served as Reviewer for the Conference titled, "**Recent Advances in Transportation Engineering (RATE-2012)**" conducted by SVNIT (Surat).
19. Reviewer for the Technical Papers submitted for the IRC Seminar on "**Recent Trends in Highways Development**" at India Habitat Centre, New Delhi on 10th and 11th October, 2012.
20. Invited by the **Institute of Mobility Research (ifmo)**, Munich, Germany to attend (by providing TA/DA for the trip) the Seminar on Global Mobility Monitor Network (GMMN), held at Munich, June 25 - 26, 2012. The objective of this Seminar was to discuss the common denominators as well as useful and feasible indicators on mobility across different countries. During the above foreign deputation visit, the undersigned presented the format for the preparation of the countrywide report on Mobility Indicators. This materialized as a project which was jointly completed by IISc, Bangalore and CSIR - CRRI [(<http://www.ifmo.de/publications.html?t=40>).weblink for the report].
21. Contributed as Reviewer for the Technical papers submitted at the National Conference on "**Urban Mobility - Challenges, Solutions and Prospects**", conducted by IIT Madras, July 13-14, 2012.
22. Served as a **Member of the Selection Panel** for the Admission of Scientists in May, 2013 under the Quick Hire Scheme for the M.Tech. (Transportation Engineering) at CSIR - CRRI as well as **Member of the Selection Panel** for Ph.D. Program in June, 2013 under AcSIR.
23. Served as Review Chair on the Theme, "**Non-Motorized Traffic**" in the International Conference titled, "**Transportation Planning Methodologies for Developing Countries**" -2012 (TPMDC-2012) as well as during TPMDC-2014.
24. **Co-Convenor cum Reviewer** for the RATE-2015 and RATE-2018 conducted jointly by SVNIT, Surat and CSIR-CRRI.
25. Served as the Review Chair i.e. PC Member for the Theme titled, "**Air, Water and Rail Transport**", in the 3rd CTRG to be held at Kolkata from 17th to 20th December, 2015; Also served as a Reviewer for more than **dozen papers** submitted to 3rd CTRG under the broad subject themes namely, Traffic Engineering, Road Safety, Transportation Planning and Transportation Planning.
26. **Member of the Selection Panel** for the recruitment of **Senior Project Fellows** under the Indo - HCM project in July, 2013 as well as in June, 2015
27. Served as a Member of the Selection Panel for the recruitment of Professor at School of Planning and Architecture (SPA), New Delhi in December, 2016.
28. Serving as Chair of the Committee for Short listing of Candidates for the post of Scientist at CRRI.

Annexure VI: List of Research Publications

[Categorized under Publications in Scientific Citation Indexed (SCI) Journals and Other Refereed Journals and Conferences]

A.VI (a): Publications in SCI Journals (in Reverse Chronological Order)

1. Mukti Advani, Neelam J. Gupta, **Velmurugan S**, Madhu E, and Satish Chandra, (2020) Defining and Analyzing Forceful Gap Behavior at Unsignalized Intersections”, Transportation Research Record, Transport Research Board, Online Published June 19, 2020 <https://doi.org/10.1177/0361198120925258>.
2. Ramesh Chandra Majhi and **Velmurugan S**, (2020), “Analyzing Driver’s Response to Yellow Indication Subjected to Dilemma Incursion under Mixed Traffic Condition”, Journal of Traffic and Transportation Engineering (*English Edition*), Available online 9 December 2019, DOI: 10.1016/j.jtte.2019.05.005.
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102. **Velmurugan. S.**, Purnima Parida, Gangopadhyay, S., Nanda P.K., (2007) "Success Story of a Pilot Project on Advanced Parking Management System", A technical paper presented in the International EU-INDIA e-Safety Workshop, New Delhi, February, 2007.
103. **Velmurugan.S**, Kayitha Ravinder, Gangopadhyay S. (2007) "Estimation of Traffic Pollution Loads based on Vehicle Kilometers Traveled - A Case Study of Delhi", Proceedings of the World Congress on the Urban Infrastructure in Developing Countries, New Delhi, pp. III 61-73.
104. **Velmurugan.S**, Gangopadhyay S. (2006) "Urban Road Traffic Scenario and Air Pollution in Major Metropolitan Cities of India", A technical paper presented at the International Conference on "Sustainable Transport Development" held at Environmental Studies, Jawaharlal Nehru University, New Delhi, Nov., 2006.
105. Ravinder.K., **Velmurugan.S**, Gangopadhyay S., (2006) "Quantitative Welfare Analysis of Road Pricing / Toll Pricing and Applicability to Indian Conditions", Proc. (in CDROM) of the International Workshop on Transportation Planning Methodologies for Developing Countries (TPMDC-2006), IIT Bombay, India, December, 2006 [pp. 48-49 Abstract].
106. **Velmurugan.S**, (2006) "An Integrated Approach for Sustainable Urban Transport Planning and Policy Development", A technical paper presented at the International Seminar on Sustainable Urban Development held at Jamia University, New Delhi, March, 2006.
107. **Velmurugan.S**, Errampalli, M., Reddy, T.S., Prasada Rao. I.P., (2005) "Traffic Operating Characteristics and its Impacts on Air Pollution in an Urban Area - A Case Study of Chennai, India" A paper published in the Proceedings of the Eastern Asia Society for Transportation Studies, Vol. 5, pp. 1799 - 1814.
108. Reddy T.S., **Velmurugan S.**, Nataraju J., (2005), "Traffic Management Plan for a Suburban Traffic Corridor in Delhi" A paper published in the International Conference on Structural and Road Transportation Engineering (START) held at IIT Kharagpur, January, 2005.
109. **Velmurugan S.**, Gangopadhyay S., Reddy T.S., Prasad Rao (2005) "Road Development Plan and Traffic Engineering Study for an Industrial Plant - A Case Study of TISCO Works, Jamshedpur", A paper published in the International Conference on Structural and Road Transportation Engineering (START) held at IIT Kharagpur.
110. Kayitha Ravinder, Reddy. T.S., Santosh Jalihal, **Velmurugan. S.**, (2004) "Externalities in Transportation and Estimation of Traffic Pollution - A Case Study", A paper published in the 10th International Seminar on Transport Research Symposium (ISSOT-2004) held at Hanoi, Vietnam, November, 2004.

111. **Velmurugan S.**, Reddy T.S., (2004) "Road Investment Decision Software for Evaluation of Highway Projects", Proc. (in CDROM) of the International Workshop on Transportation Planning Methodologies for Developing Countries (TPMDC-2004), IIT Bombay, India, December, 2004 [pp. 25-26 Abstract].
112. **Velmurugan S.**, Reddy, T.S., Madhu. E., (2004) "Evaluating Speed - Flow Characteristics on Indian Highways", A paper presented in the 10th World Conference on Transport (WCTR), Istanbul Turkey, June, 2004.
113. **Velmurugan.S**, Madhu. E., Reddy T.S., (2004) " Traffic Operating Characteristics on the Major Arterials in an Urban Area - A Case Study of Chennai", A paper presented and published in the International Conference on Transportation System Planning and Operations, IIT, Madras, February, 2004.
114. **Velmurugan S.**, Madhu. E., Reddy, T.S., (2004) "The Impact of Traffic on Air Pollution in Major Cities of India", A paper presented and published in the Proceedings of the International Conference on Transport Policy and Operation (TRANSPOL), IIT, Chennai, India, February 2004, pp. 709-718.
115. Rakesh Kumar, Anuradha Shukla, **Velmurugan S**, Reddy, T.S., (2003) "Role of Road Transport Control in Mitigating Air Pollution", A paper presented and published in the National Seminar on Road Transport and Pollution, held at CRRI, New Delhi, September, 2003.
116. **Velmurugan.S**, Madhu. E., Reddy T.S., (2002)"Changing Speeds of Operation on Rural Highways", A paper published at ROTRAN-2002, IIT Kharagpur, September, 2002.
117. **Velmurugan.S**, Reddy T.S., Suthar H.H., (2002) "A Method of Evaluating Private Investments in Road Projects" A paper presented and published in the International Conference on Advances in Civil Engineering, IIT, Kharagpur, January, 2002.
118. Dhingra S.L. **Velmurugan.S**, (2001) "Methodology for Environmental Impact Assessment of Expressway Projects for Sustainable Development" A Paper presented at the International Seminar on Sustainable Development in Road Transport, New Delhi, September, 2001.
119. Reddy T.S., **Velmurugan.S**, Suthar H.H., (2000) "Traffic Forecasting and Evaluation of Toll Options for Private Sector Participation through Stated Preference Technique - A Case Study", A paper published in the Seminar on Financing, Implementation and Operation of Highways in 21st Century, 2000.
120. **Velmurugan.S**, Verbruggen, A., (1998) "Estimation of Air Pollution of Emissions from Passenger Transport in Belgium", A Paper presented at the International Workshop on Sustainable Transport Development in India held at Brussels, October, 1998.
121. **Velmurugan.S**, Dhingra S.L., (1994) "Environmental Impacts - A State of the Art" A paper presented and published at the IEATP-94, IIT Bombay, 1994.
122. Dhingra S.L. **Velmurugan.S**, (1993) "Impact Assessment of Expressway projects", A paper published in the Transport Econometrica Conference held at France, 1993.
123. **Velmurugan.S**, Dhingra S.L., (1992) "Modeling for Impact Assessment of Transportation Projects" - A paper presented at the 5th World Conference on Transport Research (WCTR), Lyon, France, 1992.

Annexure-VIII: List of Study Reports, Lectures Delivered and Sessions Chaired
(In Reverse Chronological Order)

A.VIII (a): International Study Reports

1. Assumed the role of Co-Principal Investigator in the project titled, “**Global Mobility Monitor Network (GMMN) - Historical Development and Future of Mobility in BRIC Countries**” sponsored by Institute for Mobility Research (*ifmo*), Munich, Germany in September, 2014. (<http://www.ifmo.de/publications.html?t=40>).

A.VIII (b): National Study Reports in the Capacity of Project Leader / Project Coordinator / Nodal Officer / Principal Investigator
(In Reverse Chronological Order)

2. Performance Evaluation of Bus Rapid Transit System in Bhopal (*BRTS*) - Serving as Project Coordinator Sponsored by Bhopal City Link Limited, Government of Madhya Pradesh (*Feb., 2020 to Sep., 2020*).
3. Road Safety Audit of Selected State Highways under North Bihar Circles in Bihar (*February, 2019 to May, 2020*).
4. Road Safety Audit of Selected State Highways in Chhattisgarh State. (*August 2019 to July, 2019*).
5. Road Safety Audit and Associated Black Spot Treatment on Selected Major District Roads, Other District Roads and Village Roads in the State of Uttar Pradesh (*2019 - Ongoing*).
6. Manual on Road Safety Audit [*IRC: SP-88 (2010) and revised in (2019)*] - *technical expertise rendered in the preparation of main document and its revision for Indian Roads Congress (IRC)*.
7. Joint Coordinator for 15-day Certification Course "Road Safety Audit (*RSA*) and Other Road Safety Related Aspects", for the Road Safety Auditors / Highway Engineers / Traffic Engineers / Transportation Planners and Student Interns - **A total of 234 personnel have become certified Road Safety Auditors through the above program as of now.**
8. Operation and Maintenance Stage RSA of Sambalpur-Rourkela Section of SH-10: (*Km 4/900 to Km 167/900*) (*Two Visits: Between January, 19 to May, 2019*).
9. Pre-Opening Stage RSA of Sambalpur - Rourkela Section of SH-10: (*Km 4/900 to Km 167/900*) (*December, 2018 to January, 2018*).
10. Construction Stage Road Safety Audit of Sambalpur - Rourkela Section of SH-10: (*Km 4/900 to Km 167/900*). (*Five Visits: Between January, 16 to August, 2017*).
11. Road Safety Assessment of 2500 Kms of State Highways and Major District Roads in the State of Odisha. (*March, 2016 to July, 2017*).
12. Road Safety Audit of Eight Lane Divided Outer Ring Road in Hyderabad (*2018*).
13. Customized Training Programme on "Road Safety Audit (*RSA*) and Other Road Safety Related Aspects" for the Highway Department Engineers of Tamilnadu". (*March, 2017*).
14. Customized Training Programme on "Road Safety Audit (*RSA*) and Other Road Safety Related Aspects" for OWD Engineers at Bhubaneswar". (*December, 2016*).
15. Design Stage Road Safety Audit of Sambalpur - Rourkela Section of State Highway - 10 from Km 4/900 to Km 167/900. (*June, 2016 - December, 2016*).
16. Road Safety Audit of Sarita Vihar Interchange including Flyover with Underpass (*RUB*), Cloverleaves, Approach Roads, Slip Roads and Cycle Tracks. (*March, 2015*).

17. Evaluation of Psychophysical Traits of Drivers and Applicability of ITS Based Traffic Law Enforcement for improving Road Safety and Mobility in India. *(July 2012 to July, 2014)*.
18. Road Safety Audit PVNR Expressway *(2013)*.
19. Development of Road Safety Strategy and Generating Awareness on Traffic and Road Safety - Package VII *(Phase-II) - A World Bank Sponsored Project (Dec. 2013)*.
20. Road Safety Audit of Delhi - Noida Expressway *(October, 2013)*.
21. Road Safety Audit of Eastern and Western Expressway Highway in Mumbai *(September, 2012 to March, 2013)*.
22. 5-day International Training Courses on RSA conducted jointly by International Road Federation (IRF), CSIR - CRRRI and Australian Road Research Board (ARRB) *in July 2010, February 2011, July 2013 and February, 2016 - Total of 16 courses conducted*.
23. Safety Consultancy for Public Private Partnership (PPP) projects of NHAI covering 1200 Kms of selected National Highways in the states of Andhra Pradesh, Himachal Pradesh and Uttar Pradesh. *(December, 2011 to December 2013)*.
24. **"Road Safety Audit of Sarita Vihar Interchange including Flyover with Underpass (RUB), Cloverleaves, Approach Roads, Slip Roads and Cycle Tracks"**, Study completed in March, 2015 - Sponsored by Delhi Development Authority (DDA) - **As Project Coordinator**.
25. **"Development of Traffic Circulation Plan for Achieving Signal Free Movement at Mohan Nagar Intersection, Ghaziabad, Uttar Pradesh"** - Project Completed in March, 2015 - Sponsored by Ghaziabad Development Authority (GDA) - **As Project Coordinator**.
26. **Evaluation of Retro Reflective Sheets** - 9 such evaluation reports submitted to various user agencies during the last 5 months since January, 2015 - **As Project Coordinator**.
27. **"Intersection Improvement Plans for Four Intersections in Meerut City, Uttar Pradesh"**, Completed in April, 2015- Sponsored by Meerut Development Authority - **As Project Coordinator**.
28. **"Identification of Sites for the Display of Advertisement Hoardings in Gurgaon Town"**, - Completed in November, 2015 - Sponsored by Municipal Corporation of Gurgaon (MCG) - **As Project Coordinator**.
29. **Study on the U - Turn Provision through Modifications on the Delhi - Noida - Delhi (DND) Flyway at the Delhi Border** - Noida Toll Bridge Company Ltd. (NTBCL) in November, 2014 - **As Project Coordinator**
30. **Evaluation of Psychophysical Traits of Drivers and Applicability of ITS Based Traffic Law Enforcement for improving Road Safety and Mobility in India** - A CSIR project jointly with Indian Institute of Sciences, Bangalore, July, 2014 - **Served as Co-Principal Investigator**.
31. **Assessment of the Need for Capacity Augmentation of Mumbra Bypass** - Submitted to Maharashtra PWD, Panvel Region in July, 2014 - **As Project Coordinator**.
32. **Development of Road User Cost Models for High Speed Road Corridors in India** A report prepared on behalf of CSIR in July, 2014 - **As Module Leader**.
33. **Development of Improvement Plans for Selected Roundabouts and Technical Feasibility Study towards the Provision of Grade Separation Facility on Lohia Path in Lucknow City** - Submitted to UPPWD in March, 2014 - **As Project Coordinator**.
34. **Augmentation of existing facility on Pune - Shirur Road (SH-60) from Km 10/600 to Km 64/000 on DBFOT Basis** - Submitted to Maharashtra PWD, Pune Region in March, 2014 - **As Project Coordinator**.
35. **"Development of Road Safety Strategy and Generating Awareness on Traffic and Road Safety - Package VII (Phase-II)"**, - Report Submitted to PRBDB, Punjab in Dec. 2012 *(A World Bank Sponsored Project)* - **As Project Leader**.
36. **"Evaluating Bus Rapid Transit (BRT) Performance from Ambedkar Nagar to Moolchand"**, undertaken by him in the capacity of **Project Leader** as per the directions of the Director, CSIR - CRRRI in March, 2012. The undersigned led a 7 member team of scientists in this study and showcased his leadership skills through successful submission of the study findings to the Government of National Territory of Delhi (GNCTD) and the Honorable High Court of Delhi.

37. **“Appointment of Safety Consultants for PPP projects on DBFO Basis”** - More than two dozen Reports submitted to NHAI from December, 2011 to December 2013 - **As Project Leader.**
38. **“Comprehensive Mobility Plan for Ghaziabad City (Phase-I): Traffic System Management Plan”** Technical report submitted to Ghaziabad Development Authority, Jan 2011.- **As Project Leader**
39. **“Design of Rotary at Englishia Intersection, Varanasi”**, Final Report submitted to Uttar Pradesh Public Works Department (UPPWD), Varanasi, December 2010. - **As Project Coordinator.**
40. **“Traffic and Transportation Study for Delhi Metro Phase – III”**, - *Project Sponsored by Delhi Metro Rail Corporation, 2010.* - **As Principal Investigator.**
41. **“Video Incident Detection System (VIDS) and Loop Based Traffic Incident Detection System (TIDS)”** A report submitted to Monitoring Committee constituted by CSIR in December, 2006 - **As Nodal Officer and Task Leader.**
42. **Advanced Parking Management System”** - A report submitted to Monitoring Committee constituted by CSIR in March, 2007 - **As Nodal Officer and Principal Investigator.**
43. **“Design of Interchange at Kapashera Intersection”** - A report submitted to Delhi Development Authority, New Delhi, March, 2007 - **As Project Leader.**
44. **Modelling Time Mean Speed and Space Mean Speed for Heterogeneous Traffic Conditions (2007)** - *An In-house project report submitted at CSIR-CRRI.*
45. **Evaluation of Interchange at Kapashera on NH-8**-Submitted to Delhi Development Authority (2007).
46. **Examination of Plans of the ITPO Complex for the Proposed Optimum Development Plan (ODP) and Traffic Studies on Roads Leading to Pragati Maidan**, December, 2006 - Submitted to Delhi Development Authority - **As Principal Investigator.**
47. **“Evaluation of Speed Characteristics on Selected Sections of National Highways”** - A report submitted to NHAI, New Delhi, April, 2006 - **As one of the Principle Investigators.**
48. **“Feasibility Study of Delhi Metro Extension of Badarpur - Faridabad Corridor and Mundka - Bahadurgarh Corridor”**, A report submitted to Delhi Metro Rail Corporation Ltd. in February, 2006 - **As one of the Principle Investigators.**
49. **Assessing Impact of Regulations on Ambient Air and Health in Delhi (2006)**, *A report submitted to The Energy and Research Institute* - **As Project Leader.**
50. **“Traffic Studies for Widening of Shantipath, New Delhi”**, A report submitted to New Delhi Municipal Council, September, 2005 - **As Project Leader.**
51. **“Measurement of Traffic and Air Pollution at Selected Intersections in Delhi”**, A report submitted to Society of Indian Automobile Manufacturers Association (SIAM), March, 2005 - **As Principle Investigator.**
52. **“Study of Impact of New High Rise Buildings on Road Traffic at Tardeo, Mumbai”** - A report submitted to S.D. Corporation, Mumbai, July, 2005 - **As Project Leader.**
53. **“Traffic Management and Design of Pavements of Connecting Roads of TISCO Works to NHs / SHs”** - A report submitted to Towns Division, Tata Steel, August, 2004 - **As a Principle Investigator.**
54. **“Road Development Plan and Traffic Engineering Study for TISCO Works, Jamshedpur”** A report submitted to Tata Steel, March, 2004 - **As Project Leader.**
55. **“Traffic Management Plan for a Suburban Traffic Corridor in Delhi”** - A report submitted to National Highways Authority of India, September, 2003 - **As Project Leader.**
56. **“Design of Road Signage System for Flyovers in Delhi”** - A report submitted to Transport, Department, Government of NCT Delhi, July, 2003 - **As Project Leader.**
57. **“Urban Road Traffic and Air Pollution in eight metropolitan cities”** - A report submitted to Ministry of Petroleum and Natural Gas, July, 2002 - **As one of the Principle Investigators.**
58. **“Development and Application of Traffic Simulation Models”** - A report submitted to Ministry of Road Transport, (MoST) July, 1999 - **As Principal Investigator.**
59. **“Study of BOT Options for Anik - Panjarpol Link of Eastern Freeway in Mumbai”** - A Report submitted to Maharashtra PWD, 1998 - **As Project Leader.**
60. **“Study of Toll Options for Ahmedabad - Vadodara Expressway”** - A Report submitted to Reliance Industries in March, 2007 - **As Principle Investigator.**

A.VIII (c): Invited Lectures delivered in Foreign / Indian Institutes and Sessions Chaired in Overseas and National Forums

International

1. Delivered Invited Lecture at **Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany** in June 2012 on the topic, "Evaluation of Roadway Capacity of Multi-Lane High Speed Corridors in India using Traditional and Microscopic Simulation Approaches", on 27.06.2012.
2. Made an Invited Presentation in the **Special Session - 1 (SS-1) of the 14th WCTR** on the ongoing Project, "Development of Indian Highway Capacity Manual (Indo-HCM)" sponsored by CSIR.
3. Made an Invited Presentation in the **SS-1 of 14th WCTR** on the ongoing Project, "Development and Applications of Technologies for Sustainable Transportation (*SUSTRANS*)" sponsored by CSIR.

National

4. Made an invited presentation in the National Level Symposium on the Project, "Indian Highway Capacity Manual (Indo-HCM)" in October, 2018 held at IIT, (*Kharagpur*).
5. Made an invited talk on the topic, "Evaluation of Road Safety Audit Benefits through Cost - Benefit Analysis" in the National Workshop on "Engineering Interventions for Road Safety" at Vigyan Bhavan as part of the Observance of Road Safety Week-2018 organized by MoRT&H on 23rd and 24th April, 2018. Further, organized many activities as part of National Road Safety Week observance at CSIR - CRRRI in April 2018.
6. Made an invited talk on the topic, "Road Safety Audit Benefit Evaluation" at the 8th Annual Conference on "Operations, Maintenance and Tolling in the Road Sector" organized by India Infrastructure Publishing Pvt. Ltd. on 14.11.2018.
7. Made an invited presentation on the topic, "Case Studies on Road Safety Audit" at World Road Safety Meet held in November, 2018 by International Road Federation (IRF), Geneva.
8. Delivered Key Note address on the topic, "Advances in Traffic Engineering" at the **Transportation Young Researchers Symposium (TYReS-2015)** held at NIT, Warangal in May, 2015.
9. Delivered Invited Lecture at **University of South Australia, Adelaide** on the topic, "Urban Road Traffic and Air Pollution in Indian cities" on 27.06.2008.
10. Served as Member of the **Steering Committee** for the **International Conference on Transportation Planning Methodologies for Developing Countries-2008 (TPMDC-2008)**, IIT Bombay, India. **Chaired one technical session** on the topic: **Traffic Simulation at the 13th TPMDC and 14th TPMDC** held at IIT (*Bombay*), in December, 2012 and December, 2014 respectively.
11. Delivered an Invited Talk titled, "**Intelligent Transport System Applications for Enhancing Road Safety**", At the Seminar on "Information and Communication Technology in Road Safety" organized by IETE, Pilani Centre, CSIR-CEERI in June, 2013.
12. Shared the experiences on pilot Indian Intelligent Transport System (*ITS*) studies and also passed on the expertise in the field of ITS by **Chairing the Session on Intelligent Transport System in the Fourth 2012 Indo - US Frontiers of Engineering Symposium** held at **Washington D.C.**, from February 29 to March 3, 2012. The undersigned also **led the team of delegates from India** including **Prof. Tom Mathews** of IIT (*Bombay*), **Prof. V. Lelitha** IIT (*Madras*), **Dr. Sudeshna Mitra** of IIT (*Kharagpur*) and **Ms. Deepti Swamy** of Indian Energy Foundation, Bangalore for the above Symposium.
13. **Delivered more than 50 Invited / Guest Lectures** at IIT (*Kanpur*), IIT (*Roorkee*), IIT (*Delhi*), IIT (*Bombay*), IIT (*Kharagpur*), IISc (*Bangalore*), Anna University (*Chennai*), BITS, (*Pilani*), SVNIT (*Surat*) and College of Engineering (*Trivandram*) during the last 9 years.
14. Delivered Lectures at reputed Multi-National Companies (*MNCs*) like M/s Larsen & Toubro (*L&T*) IDPL (*Chennai*) and M/s Systra Infra Limited (*Navi Mumbai*) on the topics, "**Road User Cost Models and Equations**" and "**Road Safety Audit**" which enabled their staff to understand the nuances of the above for **their deployment in their professional careers**.
15. **Delivered many lectures** at the Periodical Refresher / Customized Training Courses conducted by **CSIR - CRRRI** in the field of Traffic Engineering, Road Safety, Transport Economics, Public Transport Evaluation in respect of Bus Rapid Transit. Similar lectures were also imparted at the Quality Improvement Programs (*QIP*) organized by IISc (*Bangalore*), IIT (*Roorkee*), IIT (*Delhi*) and CEPT (*Ahmedabad*).

16. Delivered an invited lecture on the topic **“Transport and Road Planning Issues for Enhancing Safety in Hazardous Goods Transport”** at the Training Programme on **“Transport of Hazardous Goods: Risk Management and Emergency Response”** organized by NIDM 22-23 July 2010.
17. Delivered an invited lecture on the topic **“Road Safety in India”** at the Workshop on **“Innovative Techniques in Road Safety Management”** held at Sriram Engineering College, Chennai in July, 2010.
18. Delivered five invited lectures during the Workshop titled, **“Need for Different Stages of Road Safety Audit for National Highways”** on 31st July 2010 conducted for the engineers of NHAI in the Southern Region, Tiruchirappalli Zone.
19. Made the presentation of the revised IRC Codes titled, **“Code of Practice for Road Markings: IRC-35 (2015)”** and **“Guidelines for Traffic Prediction on Highways: IRC-108 (2015)”** on behalf of the H-1 Committee of IRC during the Council Meetings held in August, 2014 - **Documents were eventually approved.**
20. Delivered an invited talk at the CiSTUP@CiSTUP on the topic **“Estimation of Roadway Capacity of Multi Lane Inter-Urban Corridors”** in November, 2010.
21. Delivered an invited talk at the 9th International Workshop on Transportation Planning Methodologies for Developing Countries on the topic, **“Estimation of Roadway Capacity of Urban Expressways”**, in December, 2010.
22. Delivered a Key Note talk on the topic **“Using ITS Solutions To Effectively Manage Traffic”**, at the **“Intelligent Transport Systems India Conference - A step towards better transport system** held at New Delhi, February, 21- 22, 2011.
23. Made a presentation in front of the World Bank Review Committee on the Punjab Road and Bridges Development Board (PRBDB) sponsored project titled, **“Development of Road Safety Strategy and Generating Awareness on Traffic and Road Safety - Package VII (Phase-II)”**.
24. Made an invited talk on the topic, **“Effectiveness of Various Stages of Road Safety Audit (RSA) Implementation: A Case Study”**, at the 2nd International Conference on Traffic Technologies conducted by Central Academy for Police Training, Bhopal on 25.02.2020.
25. As part of National Road Safety Week observance at CSIR - CRRI in January 2020 (13.07.2020 to 17.01.2020) the undersigned was instrumental in conceiving and organising **Road Safety Pledge** taken by the entire staff of **CSIR - CRRI** as part of the above event.
26. Made an invited talk on the topic, **“Impact Evaluation of Road Safety Audit through Benefit - Cost Analysis”**, Organized by Policy Perspective Foundation in association with Ministry of Health and Family Welfare on 28.2.2020.
27. Made an invited talk on the topic, **“An Overview of Traffic Control Devices: Road Signs, Road Markings and Road Lightings”** for the officials of Delhi Traffic Police (DTP) on 21.12.2019.
28. Made a presentation at the Haryana State Road Council Presentation highlighting the findings of the project titled, **“Road Safety Audit and Development of Geometric Design Improvement Plan for Surajkund - Badkal - Gurugram Road Intersection”** for M/s. TRAX Society Limited.
29. Made an invited talk on the topic, **“An Overview of Road Safety Audit (RSA)”** for the Graduate Students of Vellore Institute of Technology (VIT), Vellore Campus on 12.09.2019.
30. Made an invited presentation on the topic, **“An Overview of Road Safety Audit (RSA) Implementation on a Typical Build Operate and Transfer Project from Design Stage to Operation and Maintenance (O and M) Stage Audits”** at the Faculty Development Programme in **“Advances in Transportation and Geotechnical Engineering”** organised by VVCE, Mysore on 26.7.19.
31. Made an invited presentation on the topic, **“Intelligent Transport System (ITS) Applications in India”**, for the Post Graduate students of College of Engineering, Anna University on 9th April, 2019 as well as at VVCE on 26.7.2019.
32. International Training Course on **“Road Safety Engineering and Audits in Africa” (August, 2018)** - Served as one of the **International Faculty cum Mentor** during the above training program conducted at **Dar-Es-Salaam, Tanzania from 13th to 17th August, 2018.**
33. Extended my technical inputs for the conduct of the International Conference on **“Safe Riding Initiative for Two Wheelers”**, at CSIR - CRRI in April, 2018 and also served as Chairman during one of the technical sessions.

Annexure-IX: Any other Achievements / Information

A.IX (a) Skill Development: *(Courses served in the capacity of Course Coordinator)*

S.No.	Subject Areas	Type of Program	Name of the Organisation along with the number of Beneficiaries
1	Traffic Engineering and Road Safety	Regular Refresher Course Training Program	<ul style="list-style-type: none"> • Approximately 45 personnel are imparted training every year since 2013 - Delegates represent different Government and private organizations across the country.
2	Road Safety Audit	Customized Training Programs	<ul style="list-style-type: none"> • Sikkim Transport Department - 50 nos. • AECOM, India - 35 nos. <i>(A Multi-National Company head quartered at the United States of America [USA])</i> • Uttar Pradesh Public Works Department (UPPWD) - 350 Nos. • Odisha, PWD - 153 nos. • HRS, Chennai - 99 nos.
3	Training and Testing of Special Protection Group (SPG) Drivers	Customized Training Programs	<ul style="list-style-type: none"> • Number of beneficiaries varies from course to course from 10 - 25 nos.

A.IX (b) Social responsibility in serving the community /City / Surroundings:

- **Attended the Court Related matters *(either High Court or Supreme Court)* which included evaluation studies covering the following:**
 - ✓ Evaluation of Bus Rapid Transit (BRT) System Performance from Ambedkar Nagar to Moolchand, Delhi,
 - ✓ Streamlining of High Security Number Plate (HSRP) Testing Procedure.
 - ✓ Service Tax Determination for collection of Toll Tax at Delhi Borders - Report Submitted to Municipal Corporation of Delhi.