

LANDMARK GREEN INITIATIVES

1. Registration of IRC Website and e-correspondence on Government Domain (www.irc.nic.in)

As an imperative action warranted under the Green Initiatives in order to protect the exclusivity of the record and data of the IRC, under the sustained aegis of the MoRT&H at the highest level, we succeeded in our untiring endeavours in hosting IRC website on Govt Domain (www.irc.nic.in) w.e.f. 06.11.2015 after duly security audited from the reputed firm within a record one week time. The e-correspondence of the following major divisions of IRC has now been installed through Govt Domain:

- (i) Secygen.irc@gov.in
- (ii) tc.irc@gov.in
- (iii) sale.irc@gov.in
- (iv) membership.irc@gov.in
- (v) publication.irc@gov.in

2. Institution of e-membership

Aiming towards flagship National Mission "Skill India" and in order to enlarge the long awaited membership base, on the initiatives of IRC Sectt towards Green Initiatives, the council in its 206th meeting held at Srinagar (J&K) on 25th June 2015 appreciating the endeavours of IRC Sectt approved the new simplified guidelines and fee of e-membership as under:

- i. **For Life Membership:** Graduate Engineer or equivalent (AMIE) or Diploma with 10 years experience or engineers/scientists having experience in relevant field for more than 10 years.
- ii. **For Individual Associate Membership:** All professionals other than eligible for Life Membership
- iii. **For Student Membership:** Any engineering student.
- iv. **FEE (Inclusive of Service Tax) TO BE PAID ALONGWITH APPLICATION FORM:**

India & SAARC Countries	
*E-Life Membership	Rs 5000/-
**Non E-Life Membership	Rs 10000/- (upto age of 45 years)
	Rs 7500/- (above age of 45 years)
Foreign Countries	
*E-Life Membership	US\$ 150
**Non E-Life Membership	US\$ 500
Individual Associate E-Membership	
*E-Life Membership	Rs 5000/-
**Non E-Life Membership	Rs 15000/-
E-Student Membership	
Rs 500/- per annum	
*For e-membership periodical materials and correspondence by e-mail only	
**For non e-membership periodical materials and correspondence by post	

Corporate E-Membership (Annual)	
Annual turnover upto Rs.5 Cr.	Rs. 21000/-
Annual turnover above Rs.5 Cr. and upto Rs.10 Cr.	Rs. 51000/-
Annual turnover above Rs.10 Cr. and upto Rs.25 Cr.	Rs. 100000/-
Annual turnover above Rs.25 Cr. and upto Rs.100 Cr	Rs. 500000/-
Annual turnover above Rs.100 Cr.	Rs. 1000000/-

Corporate E-Membership (Foreign Countries) (Annual)	
US \$ 350	

NEW FORM OF APPLICATION FOR LIFE/ INDIVIDUAL ASSOCIATE/STUDENT MEMBERSHIP

(TO BE FILLED IN CAPITAL LETTERS)

- I. NAME:
- II. NATIONALITY:
(Passport No. & Date of Issue, if Foreigner):
- III. DATE OF BIRTH (attach matriculation certificate as proof):
- IV. QUALIFICATIONS:
- V. DESIGNATION AND ORGANIZATION:
- VI. CONTACT (Mailing) ADDRESS:
(Postal with Pin Code):
Telephone with STD/Mobile:
Email:
- VII. BRIEF OF EXPERIENCE IN HIGHWAY
SECTOR (Period; Office/post held & Nature of duties performed)
- VIII. PROFESSIONAL AREA OF SPECIAL INTEREST:
- IX. PAYMENT MODE FOR LIFE/INDIVIDUAL ASSOCIATE/STUDENT MEMBERSHIP FEE:

Through Non-Refundable Demand draft/cheque No. _____ Dated
_____ issued by _____
drawn in favour of Secretary General, IRC payable at New Delhi amounting
Rs. _____ as Membership fee is enclosed.

- X. I hereby request to become Life/Individual Associate/Student Membership (please tick ") of the IRC and undertake to abide by the bye-laws of IRC and promote the objectives of the Society to the best of my ability.

Date:

Signature

For Official Use

Receipt No:

Roll No:

Date:

Amt. Received:

Authorized Signatory of IRC

NEW FORM OF APPLICATION FOR CORPORATE (ASSOCIATE) ANNUAL MEMBERSHIP

(FOR GOVT. DEPTTS., INSTITUTIONS, CORPORATIONS, COMPANIES, ETC.)

(TO BE FILLED IN CAPITAL LETTERS)

- I. NAME OF ORGANISATION:
- II. CORPORATE ADDRESS (Mailing) (ATTACH REGISTRATION OF THE ORGANIZATION):
(Postal with Pin Code):
Telephone with STD/Mobile:
Email: Website:
- III. NATURE OF ACTIVITIES (ATTACHED PROFILE OF THE ORGANIZATION):
Categories: (Tick whichever applicable) (a) Machinery (b) Instrumentation
Material Testing & Others (c) Cement/Concrete/Chemicals (d) Consultant (e)
Contractor (f) Asphalt/Bitumen/Material etc. (g) Any other relevant category
- IV. ANNUAL TURNOVER (ATTACH DULY AUDITED BALANCE SHEET FOR THE PRECEDING THREE YEARS)
- V. BRIEF OF EXPERIENCE IN HIGHWAY/ROAD TRANSPORTATION SECTOR:
(Period & Nature of activities performed)
- VI. PAYMENT MODE FOR CORPORATE MEMBERSHIP FEE:

Through Non-Refundable Demand draft/cheque No. _____ Dated _____
issued by _____ drawn in favour of Secretary General, IRC payable
at New Delhi amounting Rs. _____ as Annual Corporate Membership fee is enclosed.

VII. FOR THE REPRESENTATIVE/NOMINEE:

- (i) Name
(ii) Designation
(iii) Qualification
(iv) Contact No. (Mobile/Email)

VIII. I (authorized representative) hereby request for Corporate (Associate) Membership of the IRC for the _____ (Name of Organization) and undertake to abide by the bye-laws of IRC and promote the objectives of the Society to the best of our ability.

Date:

Authorized Signatory

For Official Use

Receipt No:

Roll No:

Date:

Amt. Received:

Authorized Signatory of IRC

3. Institution of Lifetime Achievement Award and revival of Pt. Nehru Award

- (A) IRC Council in its 206th meeting held on 25.06.2015 at Srinagar (J&K) discussed and approved the following guidelines for long awaited IRC Lifetime Award recommend by 3 Member Committee comprised of Shri S.S. Nahar, SG, IRC (Convener), Shri O.P. Goel, Ex DG (Works), CPWD (Retd) and Shri R.S. Sharma, Ex. SG, IRC with an amendment viz IRC Life Membership for at least 10 years instead of 5 years recommended by the Committee as Eligibility Criteria:

Item	Guidelines
Purpose of the Award	To recognize life time contribution in highway engineering* made by eminent persons associated with IRC
Eligibility	A life member of IRC atleast 10 years
Criteria	An eminent Indian citizen who has made outstanding contributions in the field of highway engineering/engineering research engineering education/technology/engineering management related thereof which have been regarded as landmarks of technological development and brought prestige to the highway engineering profession.
Number of Awards	Upto maximum two Awards. May be given accompanied by a citation, a Plaque and Shawl etc. However IRC reserve the right not to recommend an award in a year
Nominations	There will be a Search Committee consisting minimum three members, appointed by the Executive Committee to suggest names of proposed professionals to be finally considered by the EC, whose decision shall be final. The nominations shall also include names posthumously.
Selection for the Award	
Value of the Award	The award shall consist of a Citation, a Plaque and a Shawl etc.
Presentation of the Awards	The award shall be presented at the Annual Session. The awardees will be requested to deliver a public lecture on an appropriate subject of their choice in any field of Highway Engineering/Engineering Research/ Engineering Education/Technology/Engineering Management thereof about her/his outstanding achievements at the IRC Annual Session. The text of the Award Lectures will be published in the Annals of IRC.

* Includes road/bridge/tunnel and road transportation including related field of R&D, Academic, consultancy, construction, environmental issue, LA and arbitration thereof etc. in highway engineering

The 5-member "**Search Committee**"/ Eminent Jury comprised of the following stalwarts was constituted to suggest the names of the outstanding highway professionals for **IRC Life Time Achievement Award, 2015**.

- (i) Shri K.K. Madan, Former DG (W), CPWD & Former Member UPSC; (Past President, IRC, 1995) (**Convener**)
- (ii) Shri Tribhuvan Ram, E-in-C (Retd.), UPPWD, Hon'ble Member, UP Vidhan Sabha (Past President, IRC, 2005) (**Member**)
- (iii) Shri H.P. Jamdar, Former Pr. Secy., Gujarat & (Past President, IRC, 1998) (**Member**)
- (iv) Mrs V.K. Sulochana, Chief Engineer (Retd.), Kerala PWD, Past Vice-President, IRC, Director, Institute for Societal Advancement, Thiruvananthapuram (**Member**)
- (v) Prof. Mahesh Tandon, CMD, TCPL (**Member**)

The Jury in its meeting held on 04.12.2015 (Friday) at 4 PM at IRC (HQ), New Delhi has recommended the following 5 names for the Award and IRC has resolved to confer the long due honor to these outstanding highway professionals during the 76th Annual Session scheduled on 18-22nd December, 2015 at Indore.

I. Dr. L.R. Kadiyali

II. Shri V.K. Sinha (1949 – 2010)

III. Shri K. K. Sarin

IV. Shri N.V. Merani

V. Shri D.P. Gupta

(B) In fulfillment of the commitment made to the August Governing body (Council) during 75th Annual Session at Bhubaneswar, the overdue for 3 years, IRC Pt. Jawaharlal Birth Centenary Award have been revived. It has been resolved to confer the recognitions as under:

I. IRC Pt. Jawaharlal Nehru Birth Centenary Award for the year 2012

- (i) Name: Ram Asra Khural, BRES (Roll No. LM 32193 (2006)
- (ii) Discipline: Modification to the design of Retaining Walls (Protective Works)
- (iii) Date of birth: 25 May 1971
- (iv) Academic qualifications: AMIE
- (v) Employment details: Presently he is working as Staff Officer (Executive Engineer) to CE, Project Vartak, Tezpur, Assam (BRO)

- (vi) He has published 13 Technical Papers primarily on Retaining Structures in Hill Roads. He has been handling outstandingly challenging tasks in the field specially North-Eastern Region. His significant contribution which warrants him for the Nehru Award is as under:

The proposed design of gravity retaining walls suggested by Sh Ram Asra Khural, will result into a great saving to the nation. On trial of modified retaining walls, it has been observed that these are technically sound and practically most suitable for hill roads. These are most suitable where the construction of conventional retaining walls is neither feasible due to steep slope nor hill cutting is economical as well as not feasible on ground. By adopting modified design of retaining walls, there will be about 10% saving in overall cost of the hill road project. Moreover it will result in speedy construction of the roads which is a need of the hour. The paper titled "**Cost and Time Effective Construction of Hill Roads**" is a great contribution of the officer for the country. If the suggestions proposed in the paper are implemented on ground, we can save upto 30% cost of the hill road projects in addition to the saving of the time and resources. Restricted formation width of NHDL hill roads as 8.5m from 12m will result in less damage to the environment. Edge to edge carpeting will result in dust free roads and will last more as the water, enemy of the roads, will not be allowed to enter in the road surface. If surfacing layers are designed based on experience instead of CBR value as suggested by the officer, the requirement of stone aggregates will reduce to about 50%. This will result in timely completion of the hill road projects, as this is the main reason for slippage of PDsC of the hill road projects.

II. IRC Pt. Jawaharlal Nehru Birth Centenary Award for the year 2013

- (i) Name: Dr. G.D. Ransinchung R.N. (Roll No. M-30881)
- (ii) Discipline: environmental related/non-renewable reserve of construction material (s)
- (iii) Date of Birth: **02.03.1978**
- (iv) Academic Qualifications beginning with Bachelor's Degree: B.E. (Civil), M.Tech, Ph.D.
- (v) Employment details including positions: He is working as Associate Professor at IIT Roorkee.
- (vi) His significant contribution which warrants him for the Nehru Award is as under:

He is also State Technical Advisor (STA) for PMGSY in collaboration with NRRDA, Govt. of India, New Delhi. He is also associated as Associate Manager and Treasurer with ABN Sr. Sec. School within the institute campus. Along with teaching UG and PG students,

developing new courses and reviewing curriculums, he's been guiding PhD research scholars and carrying out various consultancy and research projects and is also a member of recruitment panel at the institute. In addition to his teaching and research responsibilities he is secretary DAC, DFC and co-convener of Civil Engineering Consortium for CED, IITR. The nominee is also Task Force Manager for overall personality development of students and staff advisor for Football and Hockey sports. Among his most significant contributions through design and research very few are briefly discussed here, the nominee carried out techno-feasibility study and designed a four lane flyover bridge over old G.T. road from Chaukaghat to Englishia line crossing at Varanasi for P.W.D. Uttar Pradesh. The nominee designed an under pass road of Andra Pul at Varanasi City, U.P. using the concept of continuously reinforced concrete pavement which considerably reduced the congestion of city traffic. Nominee also introduced the concept of using Recycled Bag Filter Dust in Hot Mix Asphalts for the first time in India. Today, this material is being used as effective filler material in the highway construction industries. The nominee has been carrying out numerous consultancy projects for different state government departments, National and State Agencies, Public Sector Utilities, Indian Railways, NHAI etc. Among various consultancy projects carried out by nominee, he has also assisted as Special Investigator for Central Bureau of Investigation (CBI), Dehradun for few cases. Recently extensive research work on incorporations of wollastonite micro-fiber for part replacement of cement in pavement quality concrete was carried out under the supervision of the nominee. One PhD thesis and two M. Tech dissertations was guided by nominee regarding the work including wollastonite micro-fiber. Also one foreign student through exchange program was guided to work on a project concerning wollastonite inclusion in pavement quality concrete. Numerous publications in peer referred journals and conferences were published during this period. One research project funded by DST titled "Influence of moisture states on recycled aggregates for use in pavement quality concrete" was completed and submitted in January, 2015. Two doctorate students and 16 master's students have completed their research work and awarded with their respective degrees during aforesaid period. During this period nominee has also delivered a total of 12 expert lectures for different government departments and agencies. The nominee has also chaired a session of international conference held at Japan. Nominee has been a member of Draft Rules on "Construction and Demolition Waste" MOEF, Govt., India since February, 2014. Also the nominee was felicitated with "Bheem Rao Ambedker National Award 2014" for his contribution towards society upliftment at 30th National Dalit Writers Conference in New Delhi.

III. IRC Pt. Jawaharlal Nehru Birth Centenary Award for the year 2014

- (i) Name: Dr. Chalumuri Ravi Sekhar (Roll No. M-38960, Since 2003)
- (ii) Discipline: Traffic Engineering and Transportation Planning
- (iii) Date of Birth: 15.06.1971

- (iv) Academic Qualifications: B.Tech, M.E., Ph.D.
- (v) Employment details including positions: He is working as Scientist E-I in CSIR-CRRI, New Delhi.
- (vi) His significant contribution which warrants him for the Nehru Award is as under:

The Research work carried out by the nominee are primarily in terms of measuring travel time reliability of transportation system using Intelligent Transportation System (ITS) tools, methodological development for estimation of travel time, analysis of travel behaviour of commuters and use of the same for improvement of transportation system. The works are demonstrated with reference to various case studies and applications in India. The results are case specific. However, the approach and works have several direct benefits and impacts in improving traffic and transportation system in India. The contributions and Benefits derived are categorized as follows:

Measuring Travel Time Reliability of Transportation system Using ITS Data; Design of Survey Questionnaires and Data Collection for Travel Behaviour Analysis; Travel Behaviour Data Analysis and Modeling; Rational Estimation of Travel Demand; Evaluation of Pilot Based On-Site Visualization and Dust Measuring and Monitoring equipments in Delhi and Bengaluru Metro Projects. Further, he has been recipient of **Japan** Government Scholarship from March 2005 to September 2008 to do doctoral course work at Kobe University, Kobe, Japan. **Doctoral Thesis Title:** Measuring Travel Time Reliability of Road Transportation System and his research work selected for Inoue Foundation for Science (IFS), partial support for young researchers assistance (1,50,000 Japanese Yens Aprx. 60,000 Indian Rupees) for Participation of scientific Meeting International symposium on transport Network Reliability (INSTR), Delft University, Den Hague Nether Lands (2007) besides his research work selected for financial Assistance from Department of Science and Technology (DST) to attend 11th Eastern Asia Society for Transportation Studies(EASTS) , Organized at Cebu, Phillipines. He has been recognized with no. of awards and represented National/International Workshops / Academic Institutions.

4. To commemorate Platinum Jubilee of IRC, Publication of State-of-the Art Souvenir in creating awareness of the IRC Initiatives towards Introduction of Green Technology

Considering requisite consumption of stone aggregates, bitumen, cement and steel, fully non-renewable minerals in such a large quantities in construction and maintenance of Road network in the country would likely to offer irreparable damage to the environment and contribute to global warming caused by GHG emission, it is envisaged that India should be the lead country in earning carbon credit by introducing warranted green technology. In fulfillment of the commitment in its endeavors in promoting cleaner, less polluting construction techniques conforming to cutting edge technology, use recycled wastes and minimize drawing

of natural resources from the environment and to recommend the Government to lend support to its enterprises through her apt policy initiatives with a system of incentives and disincentives for mandatory use of such green technologies having inbuilt provision of indispensable social cost and cost of environmental safeguards in Highway Projects Estimates and Road Transportation invariably. The endeavours of IRC get reflected in its recently published IRC Codes/Guidelines, a few important documents briefly discussed below:

(A) **Environment Management Plan (EMP) (IRC:SP:108-2015)** is a statutory requirement for road projects beyond a size of 100 km based on the principles like less energy intensive technology by reclaiming the damaged or unserviceable pavement materials by milling, mixing fresh materials with reclaimed materials, and producing mixes (either in-situ or in plant) (***“IRC:120-2015: Recommended Practice for Recycling of Bituminous Pavements”***); substituting the crushed rocks with low embodied energy clean/waste alternative materials (**IRC:37-2012: Design of Flexible Pavements**)

(B) Economy in cement and steel consumption by producing high strength concrete and modified design procedures for concrete road bridges

“IRC:SP:70-2005: Guidelines for the Use of High Performance Concrete (HPC) in Bridges”. In this technology **silica fume**, a foaming agent as viscosity modifier is added @10% by weight in replacement of cement, in concrete mix, as a result, strength of concrete increases nearly 70%. This is fast construction technology besides economical as less consumption of stone aggregates and cement hence saving in time and energy. The second one is **“IRC:SP:71-2006 Guidelines for Design and Construction of Pre-tensioned Girder of Bridges”**. The fast construction technique is widely adopted for construction of metro track, expressways, etc. being safer (light structure); economical (less use of stone aggregates) and environment friendly (less polluted).

Taking clue from the practice in Japan for Self Consolidated Concrete (SCC) whereas mechanical consolidation is eliminated, the state-of-art technology in precast segmental structures, IRC has formulated **“IRC:SP:62-2014: Guidelines for Design and Construction of Cement Concrete Pavements for Low Volume Roads”**. However, for road carrying very high volume of commercial traffic, **“IRC:118-2015: Guidelines for Design and Construction of Continuously Reinforced Concrete Pavement (CRCP)”**, having low life-cycle cost has been published.

IRC has strived upon another environment friendly new cost-effective technology for construction of concrete road bridges. The new “IRC:112-

2011: Code of Practice for Concrete Road Bridges” is based on the ‘limit state design’ concept as opposed to the ‘working stress design’ principles in the earlier version. The code permits design and production of very high strength concrete approaching almost 100 MPa, nearly twice as much as that permitted under the previous versions. The code also provides for use of blast furnace slag upto 50% by weight in replacement of cement in construction of concrete piles in **coastal regions. This brings economy in consumption of cement and steel, two of the most polluting manufactured construction materials resulting reduction in carbon dioxide emission and consumption of energy.**

(C) Use of fly ash in construction

Taking advantage of IRC initiatives in formulation of Guidelines for promoting the use of fly ash in road embankments (IRC:SP:58-2001), MoEF issued an amendment to their fly ash notification which read as:

“No agency or person or organization shall within a radius of hundred kilometers of thermal power plant undertake construction or approve design for construction of roads or flyover embankment with top soil, the guidelines or specifications issued by the Indian Roads Congress (IRC) as contained in IRC specification No. SP:58 of 2001 shall be followed”.

(D) Use of warm mix asphalt technology

Most bituminous mixes are produced at a very high temperature (nearly 160°C), mainly because bitumen is very viscous at low temperatures and cannot coat the aggregates unless heated to high temperatures. There are technologies available, which can facilitate the coating at low temperatures by increasing the surface area of bitumen (foaming) or by reducing the surface tension at the aggregate bitumen interface with use of certain additives, thereby making the mixing possible at much lower temperature (typically 110°C), saving energy and releasing less pollutants in the atmosphere reducing GHG emission and hence earning carbon credit. *IRC has institutionalized the new environment friendly technology in new code namely "IRC:SP-101-2014: Interim Guidelines for Warm Mix Asphalt".*

(E) Use of waste plastic in bituminous construction

With the aim of safe disposal of waste plastic, a worst environment polluting agent being non bio-degradable wastes, IRC has already given breakthrough by institutionalizing the legitimate use of waste plastic in bituminous mixes in an environment friendly technology formulated in new code named as “IRC:SP-98-2013: Guidelines for the use of Waste Plastic.

Keeping in view the non-bio-degradability character and toxic nature of the waste plastic, the non-renewable substance, the provision for its use in road construction is recommended to be made "mandatory" due to indispensable advantages namely saving of 6-8 % in bitumen, non-renewable source by replacement of waste plastic and in turn would save foreign exchange besides improve environment amply.

As a result of IRC endeavours has succeeded to convince the Government to increase the use of waste plastic. The Government vide Circular No. RW-NH- 33044/24/2015-S&R (R) dated 09.11.2015, has taken a policy decision that:

"Bituminous mix with waste plastic shall be the default mode for periodical renewal (PR) works with hot mixes within 50 kms periphery of urban areas having population more than 5 lakhs...."

(F) Further, as an endeavor towards cost effective environment-friendly maintenance of bituminous pavements during adverse climate, IRC formulated "**IRC:116-2014: Specifications for Readymade Bituminous Pothole Patching Mix Using Cut-Back Bitumen**", a mix capable of being stocked for at least six months without stripping. Besides, "**IRC:SP:100-2014: Use of Cold Mix Technology in Construction and Maintenance of Roads Using Bitumen Emulsion**".

(G) Gap-graded bituminous mixes using crumb rubber

With the twin aims of which are to improve the pavement design as well as utilize the rubber waste in construction rather than disposing it into landfills and use land resources for disposal of waste or by disposing it by the crude method of burning, which is highly polluting, taking clue from the practices in Japan, IRC has developed standards and formulated the guidelines under the code named as "**IRC:SP:107-2015: Guidelines for Gap Graded Wearing Course with Rubberised Bitumen-Rubber**". ***Use of these wastes in bituminous construction is extremely environment friendly and makes economic sense as well (because of higher performance, durability and less maintenance needs).***

In addition, foreseen roll of Road Transportation Sector in Greenhouse Gases (CHG) Mitigation in addition to the significant policy initiatives taken by the Govt which includes (i) introduction of bio-diesel & bio-ethanol fuel and (ii) the recent decision for implementation of Bharat Stages (BS) – V & VI emission norms for vehicles w.e.f. 2019 & 2023 respectively, a year ahead the road map laid in the Auto Fuel Vision & Policy, 2025, following steps are envisaged for being the lead country in earning carbon & green credit:

- (i) It is warranted to mandate the diesel engine fitted vehicles to be phased out with clean (bio/ethanol) fuel in time bound manner in compliance with National Biofuel Policy.
- (ii) It is envisaged to mandate vehicle inspection and driving training on regular interval and phase out/dispose of or recycle old vehicles once reach warranted maximum life prescribed for the catalytic converter at the time of giving the type approval by the testing agency.
- (iii) The imposition of **new Green Tax or Environment Cess** in observance to the directives of the Honorable Supreme Court issued recently in the matter of commercial vehicles entering in the National Capital and in synergy with stakeholders on similar line of the Corporate Social Responsibility (CSR) under The Companies Act, 2013 as well GST Bill.
- (iv) It is warranted to fully align automotive standards compatible to the UNECE (UN Economic Commission for Europe: WP29) including that of crash tests and introduction of 'Bus Body Code' and 'Truck Code' with mandatory life saving features like Antilock Braking System (ABS) and Electronic Stability Control (ESC) Photograph of complete built up truck alongwith number of Original Equipment (OE) supplied leaf springs should be entered in the RC Book at the time of registration and no modification be allowed at the time of issuing renewal fitness certificate. It is proposed to mandate for the manufacturer of two-wheelers to ensure inbuilt life saving features essentially helmet for driver and pillion rider in order to curb brain injuries which have no full treatment. Helmet standard should be aligned with UN ECE Standards. Motor cycle more than 150 cc should be fitted with ABS. it is envisaged to introduce the new technology of V2V (Vehicle-to-Vehicle) and V2I (Vehicle-to-Infrastructure) communication and "pedestrian impact protection" compulsory and "*alcolocks*" in cars/buses to check drunken driving.
- (v) In order to bring **traffic discipline (curb over speeding / loading / theft) in turn to save wastage of fuel and reduce road accidents**, it is warranted to create a dedicated **Unified Highway Patrol Force (UHPF)** to start with over 24,000 kms 4/6 laned NHs under NHDP and built up gradually.
- (vi) In order to save human health and damages to eco-system and bio-diversity, It is inevitable to **enact an effective National Policy on Substance production and Use (Alcohol and Drugs)** in tune with WHO Global Strategy and in collaboration with Internationally recognized **NGOs like Patanjali Yogpeeth.**

- (vii) In order to save wastage of fuel due to congestions, it is warranted to mandate the development/upgradation of road network aiming to channelizing fast and slow moving traffic besides dedicated pedestrian-cum-cycle track in urban conurbation to start with high density corridors.

5. Submission of State-of-the Art Report of International Conference on Road Safety Scenario in India and Way Forward and to the 3 member Supreme Court Committee on Road Safety (CoRS).

In pursuance to recommendations of the Law Commission of India in its 234th Report (August, 2009) on 'Legal Reforms to Combat Road Accidents' and National Road Safety Policy formulated based on the recommendations of Sunder Committee, IRC organized an International Conference on 29th – 30th November, 2014 at New Delhi on 'Road Safety Scenario in India' in association with MoRT&H (GoI), World Road Association (PIARC), JICA, World Bank, IRF, ADB, NGOs and the Report alongwith recommendations has been submitted to the Hon'ble Supreme Court Committee on Road Safety for kind consideration. The Executive Summary and Recommendations (Gist) is as under:

- (i) India has one of the largest road networks in the world, of 4.699 million kilometers, consisting of 96,214 km National Highways, 1,47,800 km State Highways and 44,55,000 km District/Village roads. About 65% of freight and 85% of passenger traffic is carried by the roads. Motor vehicle population has recorded Compound Annual Growth Rate (CAGR) of close to 11%. Roads are used not only by the motorized transport but also by the non-motorized transport as well as pedestrians. Bulk transport vehicles (trucks & buses) make up only 8% of all registered motor vehicles, but causes about 40% of fatal accidents. India alone accounts for 11 per cent of the global road crashes, dubious distinction. In the year 2013, we had about half a million road accidents resulting in 137,572 fatalities and 4,90,000 serious injuries. This means one fatality in every four minutes. The total socio-economic loss due to road accidents is estimated at 4 per cent of GDP. The UN has declared this decade as the "Decade of Action for Road Safety 2011-2020" aiming to reduce road fatalities by 50% by 2020. Globally, road crashes result in fatalities of 1.3 million a year and in serious injury of 50 million more, disproportionately affecting the poor. Government of India has declared the current decade (2011-2020) as the decade of innovation for inclusive growth. The focus is now being shifted on the people and services for inclusive growth and the road safety. Bearing in mind the galloping trend in road accident and devastating consequences, the Hon'ble Supreme Court of India (SCI) has constituted a three member Committee under the Chairmanship of Hon'ble Justice Mr K. S. Radhakrishnan, former Judge of the Supreme Court of India to monitor the progress in the matter

and directed the Govt. to expedite the necessary amendments by legislature in its collective wisdom.

(ii) In order to offer prospective for generation of large scale employment and envisages as a potential means for India to become world leader in number of innovative fronts namely (i) to be the largest user of indigenously produced Bio-Diesel/Bio-Ethanol leading to energy security and climate change mitigation; (ii) to be the first country to introduce 'pedestrian impact protection' in vehicles compulsory and "alcolocks" in cars/buses to check drunken driving and (iv) to be the largest user of solar reflective technology based traffic safety devices etc. besides leverage to GDP growth rate by saving avoidable socioeconomic loss caused due to road accidents, once implemented thru much awaited Comprehensive Central Road Traffic Legislation, the recommendations are brought out in succeeding paragraphs.

(a) Road safety has been one of the priority areas of the Government. Box 1 indicates some of the key initiatives. However, there is need of an integrated road safety strategy with the objective of first reversing the trend of increase in fatalities and thereafter move towards the vision of zero death and zero serious injury from road crashes. The road authorities and the vehicle manufactures need to expand their safety tool kit so as to help the drivers and vulnerable road users (pedestrians and cyclists) in reducing mistakes. Human fallibility (HF) factor has to be reduced.

Box-1 Safety on Radar of Government

- Motor Vehicle Act, 1988 proposed to be overhauled, Introduction of Road Transport and Safety Bill, 2014.
- Road Safety Audit mandatory for all PPP projects in road sector.
- Government instructions to include safety engineering measures on all projects relating to NHDP, State Highways and PMGSY (rural roads).
- Prompt and appropriate medical care to accident victims in Golden Hour. Toll Free No.1033 and 24X7X365 Call Centre set up.
- Programs on Road Safety Education and Training.
- Support IRC in updating of road safety codes and standards with Technical Assistance of World Bank (GRSF) and ADB.
- Programs on setting up use in vehicles inspection and maintenance centres.
- Concerted efforts by Traffic Police in National Capital, State Capitals and other major cities.

(b) Much more work is required to integrate safe system into road safety tools in order to ensure qualitative results duly considering the following five obligatory pillars by the Government:

(b.1) Pillar-1: Strengthening Institutional Capacity for Road Safety

(b.1.1) Creation of Road Transport and Traffic Regulatory Authority of India

It is proposed to create Road Transport and Traffic Regulatory Authority of India at the centre to regulate safe and sure traffic flow including fixation/revision of fee relating to road user/vehicle registration/driving license/national permit and penalties for offences etc. However, at the State level Kerala State Road Safety Authority is an example worthy of study and adoption by the States. This is essential since the Motor Vehicle Act; National Highways Act and the subject matter of roads, traffic thereon & vehicles other than mechanically propelled ehicles falls in concurrent; union and state lists respectively in the Seventh Schedule of the Constitution and in order to implement the Government mandate given thru the Committee on Infrastructure (CoI) in its meeting held on 13th January, 2005 under the Chairmanship of Hon'ble Prime Minister.

(b.1.2) Creation of Unified Highway Patrol Force (UHPF)

It is proposed to create a dedicated UHPF with base unit mandatory to constitute 'integrated sectoral mobile sub-units' lace with toll free helpline under the overall administrative control of the proposed Road Transport and Traffic Regulatory Authority of India.

Box. 2 sectoral mobile sub-units

- Patrol (Enforcement) Sub-unit [Strict surveillance on Traffic; checking drug trafficking/mushrooming of unauthorized liquor vendors (ULVs)/entry of stray/wild animals, drivers fatigue etc.]
- First-aid/Para-Medical Sub-unit (prompt post-accident medical care in Golden Hours and prevention of communicative diseases)
- Traffic Engineering Sub-unit (Road Safety Audit)
- Revenue Sub-unit (to ensure Right of Way free of encumbrances)

It is warranted in line of international practices across the globe and the Railway Protection

Force, in order to sustain consistent patrol to enforce safe and sure traffic flow. This is roposed to start with over 24,000 kms 4/6 laned NHs under NHDP and built up gradually.

(b.1.3) Enactment of National Policy on Substance Use (Alcohol and Drugs)

It is proposed to enact an effective National Policy on Substance Use (Alcohol and Drugs)

in tune with WHO Global Strategy and in collaboration with Union Ministries of Social Justice and Empowerment; Health & Family Welfare and Food Processing Industries

besides Patanjali Yogpeeth, Social Activists and NGOs. It is inevitable to save avoidable and unaffordable socio-economic loss caused due to road accidents and deaths occurred as a result of Non Communicable Disease (NCDs) since nearly 40% fatal road accidents occur under the influence of intoxication/tobacco and consumption of alcohol have significant impact on deaths occurred as a result of NCDs including cancers, cardiovascular disease and liver cirrhosis whereas 2/3rd of these casualties occur in the age less than 40 years. It is, therefore, expected to support the judgement of Hon'ble High Court of Punjab and Haryana at Chandigarh in its Order dated 18th March, 2014 in the matter of CWP (PIL) No.25777 of 2012 between ArriveSAFE Society of Chandigarh and NHAI & others regarding removal of Unauthorized Liquor Vendors (ULVs) along NH-1 (Panipat – Jalandhar Section), against which the appeals have since been filed by the States of Punjab and Haryana separately in the Hon'ble Supreme Court of India vide SLPs (C) No. 8267/2014 & 971/2014 respectively.

(b.1.4) Establishment of Pool of Dedicated Fund for Road Safety

It is proposed to establish a pool of dedicated fund in synergy with private partnership under the Corporate Social Responsibility (CSR) availing tax exemption (100%) under Rule 11K (m) prescribed under Section 35 AC of the Income-tax Act, 1961 for carrying out programs for road safety. This would also facilitate the emergent relief through justifiable insurance coverage to accident victims.

(b.1.5) Setting up Centre of Excellence on Road Safety

It is proposed to set-up Centre of Excellence region/zone wise for scientific understanding road safety, data building and accident analysis of fatal road crashes in ascertaining the root-cause(s) resulting in corrective measures thereof.

(c) Pillar-2: Safer Roads and Mobility

(c.1.1) Road Safety Audit

It is proposed to comply with safety audit as an integral part of the road design in disseminating the outcome of two leading safety tools developed by PIARC Technical Committee namely "2011R01 PIARC Road Safety Audit Guidelines for Safety Checks of New Road Projects" and "2012R27 PIARC Road Safety Inspection

Guidelines for Safety Checks of Existing Roads". Keeping in view the scope for human fallibility factor as well as engineering measures, the audit is essentially to be carried out by independent and competent auditors. It is proposed to generate affordable and economically sound Safer Road Investment Plan to improve road star rating [ranging 1 (least safe) to 5 (safest)] and hence save lives. It is warranted to consider the support of International Road Assessment Program (iRAP), a registered charity and member of UN Road Safety collaboration already engaged for surveying nearly 6500 kilometres road in states of Andhra Pradesh, Assam, Gujarat, Karnataka, Kerala, Rajasthan, Uttar Pradesh & NHAI to create a requisite band of competent road safety auditors which are in acute shortage of supply currently.

(c.1.2) Creation of Dedicated Pedestrian-cum-Cycle Track in urban conurbation

It is proposed to mandate the channelization of fast and slow moving traffic besides dedicated pedestrian-cum-cycle track in urban conurbation to start with high density corridors while development/upgradation of road projects are undertaken.

(c.1.3) Introduction of Solar Reflective Technology for Enhancing Road Safety

It is proposed to create solar reflective technology based speed calming devices/ measures like alert/blinking road signs/markings at black spots (scarce visibility); CCTV cameras, junction improvement starting with vulnerable pedestrian zones.

(c.1.4) Introduction of New Porous Pavement Technology for Enhancing Road Safety

New Technology of porous pavement evolved by Japan is asserted to be introduced which enhances skid resistance during rain, reduces the risk of aquaplaning and improve visibility during rain.

(d) Pillar-3: Safer Vehicles

(d.1.1) Integration of Mandatory Life Saving Features in Vehicles Compatible to WP:29

- (i) It is proposed to fully align automotive standards compatible to the UNECE (UN Economic Commission for Europe: WP29) including that of crash tests and introduction of 'Bus Body Code' and 'Truck Code' with mandatory life saving features i.e. CCTV coupled with GPS and GPRS, door locks; Retarded system; Antilock Braking System (ABS); Forward/Reverse Collision Warning with cameras; Overload Control Devices; Blind Speed Cameras; Fatigue Warnings; Child Restraint System; Advanced Driver Assistance System

(ADAS) and the last but not least Electronic Stability Control (ESC) to take last minute decision for maneuvering vehicle safely.

- (ii) It is warranted that no commercial vehicle (trucks/buses) be allowed if it is not fitted with under run protection devices on in use at the rear, side and front.
- (iii) It is warranted that photograph of complete built up truck along with number of Original Equipment (OE) supplied leaf springs should be entered in the RC Book at the time of registration and no modification be allowed at the time of issuing renewal fitness certificate.

(d.1.2) Integration of Mandatory Life Saving Features in Two-Wheelers

It is proposed to mandate for the manufacturer of two-wheelers to ensure inbuilt life saving features essentially helmet for driver and pillion rider in order to curb brain injuries which have no full treatment. Helmet standard should be aligned with UN ECE Standards. Motor cycle more than 150 cc should be fitted with ABS.

(d.1.3) Introduction of Bio-Diesel/Bio-Ethanol Fuel in Reduction of Greenhouse Gases (GHG) Emission

It is proposed to mandate the diesel engine fitted vehicles to be phased out with Bio-Diesel/Bio-Ethanol fuel in order to reduce GHG emission in time bound manner in collaboration with Department of Bio-Technology (DBT), Patanjali Yogpeeth and Society of Indian Automobile Manufactures (SIAM).

(d.1.4) Introduction of Advanced Automotive Technology

- (i) It is proposed to introduce the new technology of V2V (Vehicle-to-Vehicle) and V2I (Vehicle-to-Infrastructure) communication in collaboration with Ministry of Communications & IT to allocate a requisite frequency node to make the technology operative in India to create driving support and enhances active safety (alert/warning on lane change/entry to x-ings departing / obstacle / sudden halt / congestion / real time response / hot pursuits and bad weather, parking etc).
- (ii) It is envisaged that India should be the 1st country to introduce new technologies of "pedestrian impact protection" compulsory and "alcolocks" in cars/buses to check drunken driving.

(d.1.5) Inspection of Vehicles and Maximum Life Thereof

It is proposed to mandate automated vehicle inspection certification for road worthiness to minimize human intervention and phase out/dispose of or recycle old vehicles once reach warranted maximum life prescribed for the catalytic converter at the time of giving the type approval by the testing agency.

(e) Pillar-4: Safer Road User Behaviour

(e.1.1) Enforcement of Traffic Regulations

(i) Strict and Vigorous Traffic Enforcement

There was consensus that strict and vigorous traffic enforcement is of prime importance in averting accidents as it plays critical role in controlling road users behaviour. A case example of Chennai City is given in

Box. 3 Enforcement Measures, a case example of Chennai City

- Road Accident Data Management System in place.
- Joint inspection of accident spots by team comprised of rap of Enforcement, Investigation and the Highway Authority.
- Target offences such as Over speeding, Rash and Negligent Driving, Drunken driving, Using Cell Phone while driving, Driving without seat belt/ helmet, jumping red signal, overloading, wrong side overtaking, driving without valid license.
- Award to traffic officials who performed excellently in detecting violations.
- Automatic generation of challan, use of IT in e-challaning.
- Enrolment of Road Safety Patrol (RSP) Volunteers.
- Introduction of Speed Check Posts during 2300 hrs. to 0500 hrs (Night Hours).
- Day to day scientific analysis of accident data and planning of detecting violations.
- Visible Police: 57 Traffic Patrol Vehicles.
- Fatal Accidents started decreasing since 2011.

(ii) Governance of over-speeding

It is proposed to mandate temperproof "speed governor" in motor vehicles confirming to optimum economic speed (range 50-80 kmph) starting with commercial/public vehicles and leverage RFID tags & check time to distance via mapped toll plazas starting with trunk routes and if it is over speed, fine to be imposed. It is essential to minimize risk of fatalities (over speeding alone constitute over 2/3rd of the casualties), huge loss of Forex reserves (due to reduced mileage) and increase in Vehicle Operating Cost (VOC) due to extra wear and tear.

(iii) Governance of overloading

It is proposed to audit of overloading at out-start itself i.e. at freight logistic parks/depots (near major urban conurbations), Rly siding, ports, steel/

cement plant site, quarries, factories etc. with video WIM (Weigh in Motion) technology making use of a load cell scale in right lane and quartz axle sensor array in left lane as prevalent in developed countries. Besides, provision for heavy penalties on defaulter in terms of fine and cancellation of insurance. It is warranted to minimize the risk of human health and deterioration of road exponentially, huge loss of Forex reserves (due to reduced mileage) and increase in Vehicle Operating Cost (VOC) due to extra wear and tear.

(iv) Introduction of Vehicle Tracking System (VTS)

It is proposed to mandate GPS/GPRS (General Pocket Radio Service) equipped with audio alarm (to alert driver) based VTS in all commercial vehicles/School buses/Taxis/Policing Vehicles to check social and financial crimes as well as policing speed limit more effectively in a time bound manner starting with trunk routes.

(v) Introduction of E-Challan for Violation of Traffic Regulations

It is proposed to introduce automatic generation of challan (e-challan) for violation of traffic regulations.

(vi) Introduction of Unified Driving License/Vehicle Registration

It is proposed to introduce single window unified biometric licensing and vehicle registration system being 100% deterrent against the likely offences.

(vii) Amendment to Anti-Corruption Law

It is recommended to impose penalties on erring traffic officials and reward to enforcement officials for their excellent endeavor in reducing road accidents.

(viii) Speedy Settlement of Claims

It is desirable to set up judicial commission and fast track courts (district level) to ensure speedy trials for settlement of claims.

(e.1.2) Education and Awareness

(i) Local Community Participation in Promoting Awareness Among Vulnerable Road Users (VURs) and Drivers

It is proposed to create reason based mass awareness in active support of Patanjali Yogpeeth and NGOs preferably in vernacular media through "marketed social media campaigns" on "target groups" of VRUs and drivers aiming towards 3 S "Surakshit & Suhana Safar" (Safe and Sure Journey) for example creating awareness among school children to wear helmet mandatory while driving two-wheeler since 1/3rd of the injuries are brain

injuries which have no full treatment hence warranted to be the best prevented.

(ii) Introduction of Traffic Regulations in School Curriculum

It is warranted to mandate traffic signs/regulations in school curriculum to catch them at young age.

(iii) Creation of Pool of Road Safety Patrol (RSP) Volunteers

It is proposed to increase awareness through mass media with the slogan of "start early reach early" and establish close contacts with schools besides interaction with public transport/auto-rickshaw/taxi-drivers on regular interval.

(f) Pillar-5: Post-Crash Medical Care

- (i) The proactive incident management system is warranted with due linkage to nearest trauma/medical centres for prompt and appropriate care to accident victims during Golden Hours in collaboration with WHO/Ministry of Health & Welfare/NGOs.
- (ii) It is proposed to establish chain of training centers at sectoral trauma/rehabilitation/pre-hospital emergency centers and hospitals to create a pool of trained doctors, nurses, para-medicos primarily for trauma care under the multi-prolonged strategy in collaboration with HO/Ministry of Health and Welfare/NGOs for being deployed in sectoral first aid/para medical sub-units of the proposed UHPF (Ref:P-1.2) and in trauma/rehabilitation/pre-hospital emergency centers and hospitals along highways for better injury prevention care techniques.

Hon'ble Supreme Court Committee on Road Safety (CoRS) in its meeting held on 6th November, 2015 under the measures envisaged to be taken by the MoRTH by 31st January, 2015 includes

"Constitute a Standing Committee to coordinate the issues between MoRTH and IRC on continuous basis"

The matter is under persuasion with the Ministry. It is mentioned herewith that the Road Safety Audit Manual "IRC:SP:88-2010" is under review (H-1 Committee) under the aegis of MoRTH through World Bank technical assistance as one of the sub-project under Road Safety component of "NH Inter-connectivity Improvement Project (NHIIP)' World Bank Loan Assistance".