

ROLE OF LEAD AGENCY IN DESIGNING SAFER ROADS IN INDIA

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Abstract

Of all the components of Road Safety, perhaps the two with the potential for maximum impact which can be brought in systematically are – Road Design and Construction and Road Safety Audit. While the former ensures that safety is ‘built-in’ the road, the latter helps with timely identification and rectification of errors. Both take into account the fact that providing a ‘safe system’ overall is required to help minimize the impact of expected and unexpected human errors, negligence and frailties. Road designs and construction is the foundation on which all other tenets of road safety policy can be raised. Many nations have come up with an idea of establishing a nodal agency or lead agency wholly responsible for setting standards and monitoring implementation of these standards by way of audits at both levels initial approval and periodical. They have laid down uniform guidelines and set the standards which are binding on the contractors and builders. In this paper, author will explore the issues concerning safe road engineering with particular emphasis on two interrelated concepts - road design and construction and road safety audits. In our discussion, we not just look at these issues from a domestic lens, but consider some international experience and perspective as well. Finally, author will make some policy recommendations comprising of - the composition, functions, and powers and funding of the lead agency so that it becomes capable of enforcing safe road engineering and audit.

KEYWORDS: Road Safety Design, Road Safety Audit, Lead Agency, Safe System.

Introduction

According to World Health Organisation (WHO), Road Traffic Injuries (RTIs) are a major public health problem as crashes kill more than 1.3

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million people and injure about 50 million people a year and 90% of such casualties occur in low and middle income countries. According to World Road Statistics 2018, India ranks first in the number of road accident deaths across 199 countries, followed by China and United States. In 2018 1.51 lakh people were killed and 4.69 lakh were injured. These RTI have increased by 0.6% as compared to 2017. In 2019, 1.54 lakh were killed in RTIs. This shows that every year RTIs are only increasing and not decreasing (MoRTHa).

One of the key recommendations of World Report on Road Traffic Injury Prevention for reducing RTIs is to identify a Lead Agency in Government to Guide the National Road Traffic Safety Effort. To develop institutional leadership and enhancing national road traffic safety effort it is necessary that each country should have designated lead agency for road safety. Numbers of institution can be established for road safety but it is necessary that lead agency created by any country should have authority and responsibility to make decisions, necessary control on resources, require coordinate efforts from all sectors of government health, transport, engineering, police and education, adequate financial provisions should be made in lead agency, lead agency should be accountable to public for its action. The most important aspect to ensure effectiveness of lead agency strong and sustained political support is required (Peden et al 2004a).

The lead agency plays crucial role in institutional road safety management. It has been observed in recent time lead agency proven to catalyst in making road safety effective in achieving targets. The lead agency makes government responsible for development of road safety policies and strategies. It makes inter-governmental coordination more effective both vertically and horizontally between national, states, regional and local governments. It also make makes coordination with other stake holders of road safety with government like NGOs, Civil Society, Business sectors etc...

It provides very comprehensive legislative framework which helps in securing sustainable funding source and resource allocation for road safety. Periodic monitoring and evaluation of road safety performance can be achieved through lead agency. One of the most important role lead agency is it provides key deliverable outcomes for effective road safety management (World Bank 2009)

Road Conditions in India

Poor condition of road is the major cause of the RTIs in India and situation become worse when actual road users can do very little about it. National and State Highway, which comprises of 5% of the total road network, account for about 55% of RTIs and accident relating killing of 61% in 2019. The road conditions that contribute to RTIs are road width, width and state of shoulders, deficiency in sight distance. Indian traffic and transport system has a number of drawbacks mainly heavy encroachments on roads, ribbon development, poor surface conditions and inadequate surface drainage etc...(Ranade 2010a)

Potholes on roads damages vehicle shocks and suspension and causes driver to lose control of the vehicle. When a vehicle hits a deep pothole, the impact is similar to that of a collision at 35 mph. (Sridevi 2020a). The discontinuous service roads lead to wrong side movements of traffic to avoid long detours. Poorly designed access roads from adjacent areas of the highways also leading to frequent conflict between different classes of vehicles (Ranade 2010b).

Road Network in India

In today's world, road transport has become necessary part for everyone. India has the largest road network in the world next to United States. Consequently, road length in India has increased from 4,00,000 km in the 1950s to about 58,97,671 km in 2017. In this, rural roads account for 61%, Public Works Department (PWD) roads account for 20 %, urban roads account for 9%, National Highways are 2% and State Highways 3% of the total length of roads. Project Roads account for 7%. These include roads built by various state departments like forest, irrigation, electricity, public sector undertaking like Steel Authority of India and Border Roads Organization etc. Since 2000, road network in the country has grown by 39%. But the number of registered vehicles has grown by about 158%. This increase in the number of vehicles on roads leads to traffic congestion and RTIs. (MoRTHb)

Classification of roads in India:

Based on speed limits, nature of the road, width of carriageway, etc., roads are classified as follows:

1. Expressway
2. National Highways
3. State Highways
4. District Roads
5. Village Road

Expressways:

Expressways are an advanced class of road. They are access-controlled i.e., the entrance and exit controlled by ramps that are built-in during its design. Speed limits on expressways in India vary from state to state and vehicle type. In 2018, the Ministry of Road Transport and Highways (MoRTHc) set the maximum speed limit on expressways 120 km/h (for national highways the limit is 100 km/h and for urban roads is 70 km/h) for M1 category of vehicles (passenger vehicle consisting of less than eight seats in addition to driver's seat). Furthermore, as expressways have witnessed numerous RTIs due to speeding, speed restrictions on expressways have been amended due to speeding as 120 km/h for cars and 100 km/h for buses from 2019.

National Highways and State Highways:

National Highways are roads that nationally important. They connect state capitals, ports and foreign highways and also include road of importance. They are financed by the Central Government. State Highways are important roads within each state. They connect important cities, district head-quarters in the state, National Highways, State Highways of neighboring states etc. They are financed by State Governments i.e., Roads & Buildings department of the state.

District Roads and Village Roads:

These are roads within district. They are financed by ZilaParishad. The two categories of district roads are Major districts roads and Minor district roads. Major district roads connect various District head-quarters, Taluk head-quarters, important towns in the district, production and market centers, etc., with each other. They also connect State Highways, National Highways and railways. Minor District Roads are usually given less importance. Village roads connect villages and nearby district roads. They are financed by Panchayats.(Sridevi 2020b)

Coordination issues with different agencies in India:

From above classification of roads it can be understand that all roads functions are differ on the bases of its geographical locations. All roads are also manage by different agencies and authorities due to which there is lack of co-ordination between all agencies and authorities which are responsible for managing and maintaining road network .The Indian Road Congress (IRC) contained codes of practice and standards of road designing in India. IRC codes are not mandatory to be followed by various agencies due to which IRC does not create any accountability. Apart from IRC there are no comprehensive guidelines for maintenance and repairing of existing road network in India. In near future major roads of the country will be in bad conditions without maintenance and repairing. As per the information/data given in Table 1 of the total number of RTIs, and persons killed in RTIs on National Highways including Expressways, Rural Areas and all roads for the calendar years 2017 to 2019 in the country clearly indicate that rural roads have witnessed more number RTIs and deaths than urban roads and National Highways which is very alarming.(MoRTHd):

Table 1: Total number of RTIs, and persons killed in RTIs on National Highways. Urban Roads and Rural Roads for the calendar years 2017 to 2019

Years		Number of Road Traffic Injuries (RTIs)	Number of Persons Killed
2017	National Highways	1,41,466	53,181
	Urban Roads	1,95,415	51,334

	Rural Roads	2,69,187	96,579
2018	National Highways	1,40,843	54,046
	Urban Roads	1,90,956	51,379
	Rural Roads	2,76,088	1,00,038
2019	National Highways	1,37,191	53,872
	Urban Roads	1,78,062	49,715
	Rural Roads	2,70,940	1,01,398

(Source: Ministry of Road Transport and Highways, Government of India)

Road Safety Engineering

Road safety engineering is a process is an application of engineering principles based on the analysis of road traffic fatalities information. Road safety engineering also useful in identifying road design and road safety management measure can reduce road traffic fatalities. It is road designing should be done in safety conscious planning of road users. While designing new roads it is important that road safety aspect should be consider. One of major problem is to assess the hazardous locations which cause more number of RTIs on particular location. One of the key aspects of Road safety engineering is to incorporate road safety aspects in existing and future roads to avoid future causalities on road. (Pedenet al 2004b)

Some key elements of Safe Road Engineering

In this regard, the role of engineers is paramount to ensuring roads are as safe as possible. From an engineering perspective, road safety can be enhanced by Highway Engineers into various stages of road projects, as follows.

- Planning Stage –for instance, through land use control policies; providing by-passes for congested towns; and creating Self Contained zones to avoid nonessential traffic in the neighborhood
- Design Stage - designing “Self Explaining Roads” and “Forgiving Road Side” by selecting the most desirable design standards (and NOT the minimum standards) involving:-
 - ☐ Design speed
 - ☐ Provision of service roads for segregation of slow and fast traffic
 - ☐ Designing effective road furniture, vis-à-vis guard rails, traffic signage, road-side illumination provisions, etc.

- Construction Stage - Proper separation of the construction zone through effective barricading; construction of proper traffic diversions; provision of road signage; environmental controls for reducing noise, dust, etc.
- Maintenance and Operation Stage - Providing an Automated Traffic Management System (ATMS) for safe operation of Traffic and Incident Management. This includes providing Mobile Communication Systems, Variable Message Signs, Weigh-in-Motion System, and Central Control Room.(Kapila 2013a)

Having a safe road infrastructure, complete with footpaths, cycling lanes, safe crossing points and other such traffic regulating measures can help significantly in reducing road crashes. To promote road safety ownership and accountability, the road authorities were to be encouraged to commit a minimum of 10% of road budgets to dedicate safer road infrastructure programmes. Besides the creation of safer road infrastructure, one critical imperative was to monitor the "safety performance of investments in road infrastructure by national road authorities, development banks and other agencies" (WHO). To sustainably increase the safety of road infrastructure, one important method was to promote the safe operation, maintenance and improvement of the existing road infrastructure

Factional Designing of Roads

It is very important that each road should be design according to its function. Controlling speed of vehicle on the road is one of the most important characteristics of well designed road. (Peden 2004c)

High-Speed Roads: To design safer high speed roads like highways, expressways it is necessary that there should be restricted entry for certain class of vehicles; all vertical and horizontal curves should have median barriers, graded separate junction with entry and exit. Looking into volume of vehicles in low and middle-income countries should have separate lanes for two-wheeler motorized vehicle.

Rural Roads: To design safer rural roads it is necessary that there should be periodic lanes for overtaking and oncoming traffic. There should be median barriers to preventing overtaking in dangerous roads. All rural roads should have proper installation of lighting at junction, advisory of speed limit before sharp bends, speed limits signs, rumble strips and all hazardous obstacles near road like trees and poles should be completely removed.

Transitional Roads: Transitional roads are connecting high-speed roads with low-speed roads to design transition roads it is necessary that road sign guide drivers in reducing speed in time. Rumble strips, speed bumps, visual warning should be properly used. To calm traffic in residential access roads speed limit should not be more than 30 km/h

Road Safety Audit (RSA):

The main objective of conducting RSA is to reduce the level of road users by adopting various procedure of assessment of safety measures on roads. (Sridevi 2020c)

Benefits of Road Safety Audit

1. It helps in planning to reduce road traffic injuries.
2. It helps in decision making for reduction of RTIs in the future.
3. It reduces long- tem cost related with planning.
4. It enables all kinds of road users to use roads freely.

Stages of Road Safety Audit

Wrisberg and Nilsson in 1996 recommended that RSA should be divided into five stages. They are as follows:

1. Feasibility Stage: In this stage, the starting point for the design such as number and type of intersections, relationship of new schemes to existing roads and relevant design standards, are determined.
2. Draft Stage: in this stage, horizontal and vertical alignment and junction layout is determined. After completion decision about land acquisition is taken.
3. Detailed design stage: in this stage, roads signing, markings, lighting, other road side equipment and landscaping are determined.
4. Pre-opening stage: Before opening new or modified roads, it should be driven, walked or cycled. It should be done at different conditions like bad weather, darkness
5. Monitoring of the road in use: in this final stage, the assessment of road is done, after the road has been in operation for few months, so as to determine whether utilization is as intended and whether any adjustment to design are required in the light of the actual behavior of road users.

Road Safety Audit in India

Various studies around the world suggest that RSA is highly cost-effective tool for accident prevention. There was no mechanism of RSA in India until 2014 it was introduced by World Bank finance Initiative, National Highways Interconnectivity improvement Project. Project brought various positive changes in India like installation speed reduction method, improvement in road designing, Installation of crash barriers etc... (Financial Express 2019)However India hasn't seriously considered using RSA properly is evident from the fact that it hardly figures in policy discussions around road safety.

Pillar2:SAFERROADSAND MOBILITY

Considering Road Safety as an area of immediate concern around the world, the United Nations (UN) has declared Decade 2010-2020 as the Decade of Action for Road Safety. It aims to save 5 million lives by 2020. One of the five “pillars” of the Decade is on “Safer Roads and Mobility” (Kapila 2013b). Pillar 2 promotes raising the inherent safety and protective quality of road networks for the benefit of all users, especially the most vulnerable: pedestrians, cyclists, and motorcyclists. It places an emphasis on greater operator and designer accountability for safety performance, enhanced land use, transport system integration, improved infrastructure safety rating and assessment tools, and related capacity building and knowledge transfer. (World Bank Group 2020) As per study conducted by WBG mentioned in Table 2 highlights various actions required to be taken by countries to achieve parameters mentioned in Pillar 2: Safer Roads and Mobility.

Table 2 Country Road Safety Measures

Pillar 2: Safer Roads and Mobility	India	Bangladesh	Bhutan	Nepal	Sri Lanka
Audits/star rating required for new road infrastructure	Partial	Partial	Yes	Partial	Partial
Design standards for the safety of pedestrians/cyclists	Yes	Yes	Yes	Partial	Partial
Inspections/star ratings of existing roads	Yes	Yes	Yes	Yes	No
Investments to upgrade high-risk locations	Yes	Yes	Yes	No	Yes
Policies promoting walking and cycling	No	No	Yes	No	Subnational
Policies and investment in urban public transport	Yes	Yes	Yes	Yes	No

(Source: World Bank Group)

Road Safety Lead Agency in India

On 22nd April 2014, the Supreme Court of India passed a judgment in Writ Petition (C) No 295 of 2012, on the prevention of road traffic injuries. The Petitioner, aggrieved by the state of affairs of RTIs in India, prayed that certain directions be passed. The Court noted that the said state of affairs were only getting worse. It stated, "the death rate in China, which had stood on a par with India at a certain point of time, has shown a significant downward trend while in case of India the said figures has shown a disturbing increase. ", The Court made the following observation: "Indian roads have proved to be giant killers demanding immediate attention and remedial action". Noting this urgency, The Court issued the following directions:

Each State Government may be directed to establish a Lead Agency as required by the Committee on Road Safety headed by a senior officer and with adequate staff to be solely dedicated to matters relating to

licensing, issuing of driving licences, and registration of vehicles, road safety, and features of vehicles, pollution and other allied matters.

On 23rd December 2014, Supreme Court Committee on Road Safety has directed Chief Secretaries of all States/UTs to Constitute Lead Agency exclusively deal with road safety Issues. The Committee also added that for effective coordination with other departments and resolution road safety issues Lead Agency should be headed by senior officer. It is also important that support staff should have domain knowledge to address road safety issues appropriately. Ideally Lead Agency should be constituted through Legislation passed by appropriate authority. Sometimes this channel can be proven time consuming in that case State government can decide to constitute Lead Agency by way of executive order and order should be duly notified by appropriate authority.

On 30th December 2017 The Court further added that Only few states has established Lead Agency as recommended by Supreme Court Committee on Road Safety. The States and Union Territories have not established the Lead Agency should do so before 31st January 2018 as recommended by committee.

Functions of Lead Agency as recommended by Supreme Court Committee on Road Safety:

- To work as a secretariat for the State Road Safety Council, arrange meetings of the Council issue its Minutes and monitor the implementation of the decisions of the Council by the concerned Departments of the State.
- To coordinate with the concerned Departments of the State Govt. to ensure implementation of the directions issued from time to time by this Committee and furnish Compliance Report in a time bound manner.
- To ensure implementation of the directions given by the Central Govt. from time to time.
- To notify annual targets for reduction of RTIs and fatalities as fixed by the State and draw up an Annual Action Plan to achieve the targets and monitor its implementation.
- To collate on a regular basis data on RTIs and analyse the data to identify areas /road stretches and categories of accident victims who should be focused upon.
- To manage the Road Safety Fund and ensure that the Fund is effectively utilized.

Present Status of Road Safety Lead Agency in India:

In India primarily responsibility of implementation of road safety is with State Governments. MoRTH is cross-sectional nodal agency plays important role of coordination, monitoring, evolution, follow-up and

goal setting at national level (Runji 2019).. It also plays important role in policy interpretation. In India all the States/ UTs has their own structure for Lead Agency. As per data mentioned in Table: 3 on statues of establishment of Lead Agency all States/ UTs have appointed Incharge of Lead Agency with representative from other stakeholder department i.e. Police, Health, Education and Road and Construction Department.(MoRTHd). Two states in India i.e. Kerala and Gujarat have created Road Safety Authority by way legislative action under which they have created Lead Agency.

Table 3: Institutional Mechanism for Road Safety in States/UTs

Sr No	Name of the State	Incharge of Lead Agency	Dedicated Staff Appointed
1	AndamanNicobar	Transport	Not yet, however 6 staffs ofTransport Department withadditional duty has beenentrustedtoworkintheRoadSafety Cell. Stakeholderdepartments have beenrequested to depute 2dedicated staffs on divertedcapacity in Road Safety Cellestablished in Transportdepartment. Inthis effort,Police Department has issuedorder for posting of 2 staffsand they are expected to joinsoon.
2	AndhraPradesh	Transport	Under Process
3	ArunachalPradesh	Transport	
4	Assam	Transport	
5	Bihar	Transport	
6	Chandigarh	Transport	
7	Chhattisgarh	Police	
8	DadarNagarHaveli	Transport	6
9	Daman& Diu	Transport	
10	Delhi	Transport	
11	Goa	Transport	
12	Gujarat	Transport	Under Process
13	Haryana	Transport	
14	HimachalPradesh	Transport	
15	Jammu&Kashmir	Transport	
16	Jharkhand	Transport	
17	Karnataka	Transport	
18	Kerala	Transport	
19	Lakshadweep	Transport	
20	MadhyaPradesh	Police	
21	Maharashtra	Transport	Under Process
22	Manipur	Transport	
23	Meghalaya	Transport	
24	Mizoram	Transport	Chief Executive Officer

25	Nagaland	Transport	Under Process
26	Orissa	Transport	
27	Pondicherry	Transport	
28	Punjab	Transport	
29	Rajasthan	Transport	
30	Sikkim	Transport	
31	TamilNadu	Transport	
32	Telangana	Transport	Under Process
33	Tripura	Transport	
34	UttarPradesh	Transport	
35	Uttarakhand	Transport	
36	WestBengal	Transport	

(Source: Ministry of Road Transport and Highways, Government of India)

Table: 4: Performance of Lead Road Safety Agency (in India (MoRTH)act as Lead Agency)

Management functions	Lead Agency Role	Yes/No/Partial Pending/	Explanation
Result Focus	1. High-level strategic review of Road Safety Performance 2. Road safety vision for the longer term 3. Medium term targets achieved 4. quantitative targets 5. partner and stakeholder accountability	Yes Yes No Yes Yes	It is provided in National Road Safety Action Plan To reduce RTIs by 50% It is included in Motor Vehicle Amendment Act, 2019
Coordination	1. Horizontal coordination 2. Vertical coordination 3. Specific delivery partnerships 4. Parliamentary relations between central and regional government	Partial Partial Partial Yes	Lack of Coordination Lack of Coordination With World Bank and WHO There are laws relating road safety at both central and state level
Legislation	1. Legislative review framework 2. Legislation for road safety strategy 3. Consolidating legislation 4. Legislative resources for road safety	Yes Yes Yes Yes	Supreme Court of India Strong Institutional Framework
Funding and resource allocation	1. Sustainable funding sources 2. Resources allocation of Road Safety Program	Partial Yes	Specific budget is allocated in both level
Promotion	1. Promotion of road safety vision	Yes	by MoRTH

	2.Promotion at a high level 3.Multi-sectoral promotion 4.In-house road safety policies? 5.Safety rating programs 6.National advertising for road safety	Yes Yes Yes No Yes	by MoRTH by MoRTH by MoRTH and State/UTs by MoRTH
Monitoring and Evaluation	1.Data system for progress 2.Review of road safety strategy 3. Make necessary changes to achieve the desired results	Yes Yes Yes	by MoRTH Periodically done
Research & Development and knowledge transfer	1.Capacity Building 2.National road safety research strategy and annual program 3. Sustainable funding for road safety research 4.Training and professional exchange 5. Good practice guidelines 6. Demonstration project	Yes Yes Partial Yes No No	by MoRTH Collaboration with Universities and other stakeholders by MoRTH

(Source: Ministry of Road Transport and Highways, Government of India)

Conclusion:

Designing safer roads is very complex task specifically in country like India where road design standards, construction, and maintenance of roads are determined by the authority under whose jurisdiction the road falls, which is failing due to the improper coordination between various bodies. One of most important toll which is missing in India is a well resourced and empowered National Road Safety Lead Agency at Central level for effective coordination with all stakeholders of road safety. To address this issue researcher has recommended structure of National Road Safety Lead Agency with specific focus on designing safer roads.

Proposed Structure of National Road SafetyLead Agency in India

Composition of the Lead Agency

The lead agency shall be established by the appropriate authority i.e. MoRTH from Central Government thorough Legislation in Parliament. The Lead Agency shall be an independent body corporate having perpetual succession and common seal.

The Lead Agency shall consist of following members

1. Minister of Road Transport and Highways as Chairperson

2. Minister of Home Affairs (Ex-officio member)
3. Minister of Health (Ex-officio member)
4. Minister of Education (Ex-officio member)
5. Ministers of all States/UTs of stakeholder department like Transport, Police, Health, Education and Road and Construction
6. Secretaries of all stakeholder department like Home Affairs, Health and Education
7. Representatives from National Highways Authority
8. Representatives from Automobile Manufactures
9. Road Safety experts, academicians, NGOs, Civil Society etc... nominated by the Government of India

Specific Functions of Lead Agency with reference to Designing Safer Roads

The Lead Agency shall discharge following functions:

- To monitor identification and rectification of accident black spots from all States/UTs.
- To issue directives on required compliance with safety design, construction and maintenance of standards.
- To notify detailed guidelines for RSA at all stages of road planning, design, construction and maintenance of all Highways.
- To take various traffic calming measures to reduce RTIs.
- To conduct training for all the stakeholders of Road Safety like Road Safety Auditors, Road Designers.
- To conduct capacity building program for the safe design construction and management of roads.
- To prescribe and enforce uniform road safety standards and procedures for designing safer roads.
- To adopt and implement best international practices on Safer Road Designing.

Other Functions of Lead Agency

- To advise all States/UTs government on road safety policies
- To implement National Road Safety Policy
- To formulate schemes, projects relating to road safety
- To coordinate with all stakeholders like Public and Private Institutions, NGOs and Civil Society
- To implement various road safety awareness programs

Funding of Lead Agency:

- The Lead Agency should be appropriately funded from various sources of Income of Government specifically from fees and fine collected.
- Government shall allocate separate budget for administration of Lead Agency.
- Government can also generate funding by way of Corporate Social Responsibility.

Powers of Lead Agency:

- The Lead Agency shall have power to give direction to all authorities involving in Road Engineering to fulfill any work or improvement on public roads as it may consider necessary.
- All the orders and directions by Lead Agency shall be binding to all relevant authorities in India.
- If any authority fails to comply with the order within time limit lead agency shall have power to impose fine on appropriate authority.
- The Lead Agency shall have power to ensure implementation of all laws, notifications, directions and orders relating to road safety.

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