FINAL NARRATIVE REPORT

NOVEMBER 2007 TO OCTOBER 2009

TRAFFIC CALMING STRATEGIES TO IMPROVE PEDESTRIAN SAFETY IN INDIA

SUBMITTED TO:

Sida

Swedish International Development Cooperation Agency
New Delhi

25 years 1983 2008 CUTS International

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1 Introduction

1.1 25 percent of India's poor live in urban areas and 31 percent of the urban population is poor. On one hand, the population of India's major metropolitan cities is increased by about 1.9 times during 1981-2001 and on the other, the number of motor vehicles went up by over 7.75 times during the same period. Jaipur has a population of 2,324,000 (census 2001), which has increased in recent years. Due to financial limitations middle class families prefer to buy inexpensive vehicles especially small cars and youths prefer to drive two wheelers. Jaipur lacks proper mass transit service due to which people are forced to opt for personal vehicles. Even in Jaipur every year over 112279 people get driving authorisation and above 127372 vehicles are added to the roads.

1.2 Further, with population growth, cities have tended to sprawl and increased travel distances have promoted use of non-motorised modes to save travel time. Travel in the city has become more risky with accident rates up from 1,60,000 in 1981 to over 3,90,000 in 2001. The number of persons killed in road accidents has also gone up from 28,400 to over 80,000 during the same period. This again has tended to impact the poor more severely as many of those killed or injured tend to be cyclists and pedestrians.

1.3 At present, road space gets allocated to whichever vehicle occupies it first. The focus is, therefore, the vehicle and not the people. In this process, the lower income groups have, effectively, ended up paying, in terms of higher travel time and higher travel costs, for the disproportionate space allocated to personal vehicles. Users of non-motorised modes have tended to be squeezed out of the roads on account of serious threats to their safety.

1.4 Lack of appropriate safety measures for road users is a common occurrence in India. The insensitive attitude among policy makers and road designers to ensure proper safety measures has made India a leading nation in terms of fatalities due to road rage. The fact has been corroborated by survey findings of the 'Global Status Report on Road Safety' released by the World Health Organisation (WHO) on June 15, 2009.

1.5 Almost all Indian cities have a high proportion of motorcycles, buses and trucks plying on the same road space with pedestrians, bicyclists and many other slow moving vehicles. But recent trends in road designs encourage high speeds without due consideration of pedestrians/bicyclists as equal road users. It appears that as

income increases, countries start investing in roads catering to high speeds and ignoring the safety and convenience of pedestrians and bicyclists. Such expensive investments generate attractive but chaotic under-passes and sky lanes for pedestrians, to be utilised under pressure.

1.6 However, most high-income countries have set-up road safety agencies and research groups that help reduce the incidence of road traffic injury in urban areas and intercity highways by providing safer designs of vehicles, roads, roadside furniture, and more effective police enforcement. At the same time in India, authorities are still unable to appreciate scientific research to monitor, analyse and expose the increasing road demands. Zebra, footpaths, speed breakers and many other road components are considered as part of tradition and policy makers in India are unable to realise the importance of these small but effective measures suitable to mitigate road accidents.

1.7 Moving towards road safety awareness generation and education CUTS brought Swedish technique called "Traffic Calming" in India by partnering with Lund University, Sweden with the assistance of Swedish International Development Cooperation Agency (SIDA). Jaipur became the first city in South Asia to experience the evidence based scientific treatment of roads responsible for accidents. The project assembled evidence to form series of happenings/consequences and recommended application of inexpensive but effective measures.

2 Need of the Project

2.1 Current Scenario of Road Safety: The magnitude of road traffic accidents, fatalities and injuries in India as per government's data is quantified in Table 1:

Table 1: Road Accident Statistics[1]

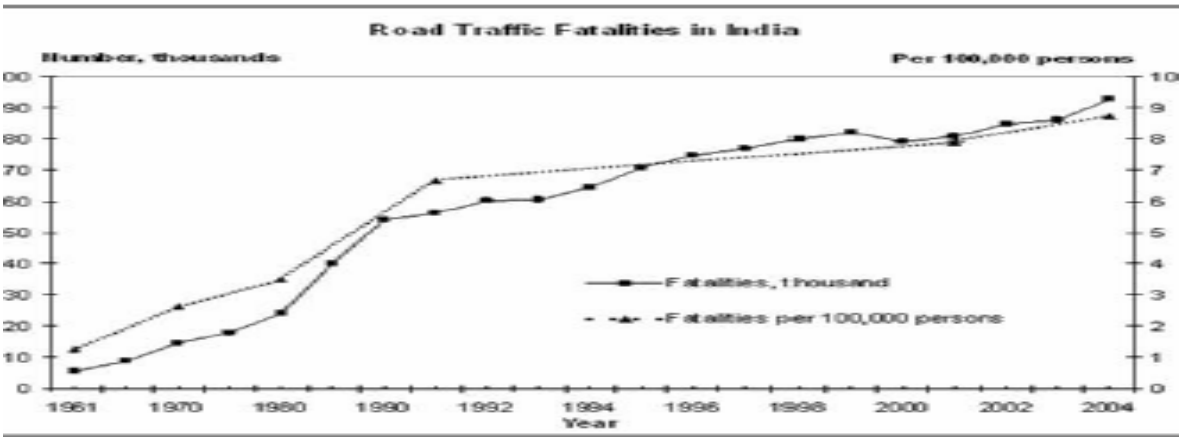
Year	All Roads			National Highways		
	Accidents	Persons killed	Persons injured	Accidents	Persons killed	Persons injured
1999	386456	81966	375051	103839	28713	98427 (P)
2000	397449	78911	399265	110508	30216	124600
2001	405637	80888	405216	115824	32108	119592 (P)
2002	407497	84674	408711	131738	33621	132307
2003	406726	85998	435122	127834	33153	131102
2004(P)	429910	92618	464521	130265	34723	143140

P (Provisional)

2.2 While the figure of fatalities may be close to the actual number of deaths in road accidents in India, the number of injuries reported appears to be underestimated. Various studies indicate that the actual number of injuries could be 15-20 times the number of deaths. Furthermore, these figures do not account for growth in the number of motor vehicles in the coming years.

2.3 The following figure shows the trend of road traffic fatalities in India over the past 45 years. It reveals that both absolute number of fatalities (bold line) and the fatalities per 100,000 population (dotted line) have been increasing monotonically.

[1] Source: MoSSRTH, 2006



It is apparent from the above figure that morbidity and mortality from road accidents is increasing rapidly. Road accidents victims are predominantly male, within the age group of 5-44years (>70 percent), the most productive section of our society. Children saved earlier from communicable and infectious diseases are now becoming victims of this man-made epidemic. However, there is no organised programme to combat morbidity and mortality on Indian roads while there are structured programmes to combat communicable diseases, with substantive allocation of plan funds.

Table 3: Disease-related Mortality and Plan Allocation[2]

Diseases	Number of deaths	Centrally Sponsored Schemes	Outlay Xth Plan (2002-2007) (in crore Rs)
Tuberculosis	37,639 (2004)	National TB Control Programme	680
Malaria	638 (2005)	National Vector Borne Diseases Control Programme (including Malaria, Kala-Azar, Filaria, Dengue and J.E.)	1370
AIDS	1094 (8286 cumulative till 2005)	National AIDS Control Programme including Blood Safety Measures and National S.T.D. Control Programme	1270
Road crashes	92618 (2004)	*	187

** No significant and major scheme*

[2]Source:Indiastat.comhttp://www.indiastat.com/India/ShowData.asp?secd=16&ptid=0&level=1m),Ministry of Shipping Road Transport and Highways(2006)& Tenth Plan Document(http;//planningcommission.nic.in/plans/planrel/fiveyr/10th/volume2/v2_app.pdf)

3 About the Project

3.1 Title of the Project

Traffic Calming Strategies to Improve Pedestrian Safety in India

3.2 Project Summary

3.2.1 Traffic safety is rapidly growing as a health problem all over the world, especially in the developing countries. In low and middle-income countries like India, road traffic injury account for about 85 percent deaths and for about 90 percent of annual disability adjusted life years (DALYs). Projections show that, by 2020, road traffic injuries will become the third leading contributor to the global burden of disease and injury, without appropriate action. This increase is primarily due to rising motorisation in developing countries resulting in many fatalities and injuries among pedestrian.

3.2.2 Traffic calming aims at reducing motorised traffic in an area and to slow down speeds. Holistic traffic calming strategies, when implemented, will result in a much more attractive environment for people living in the area or visiting it as a pedestrian or bicyclist. It will also reduce the feelings of insecurity and heavily reduce the risk of severe accidents (well designed speed reducing measures can reduce serious accidents by up to 90 percent!). It will help to create a more friendly, useful, and attractive environment with few(er) severe accidents, less noise and pollution.

3.2.3 The project aims at identifying accident-prone sites in Jaipur and near by area, studying the shortcomings and causes that make these sites accident-prone and developing and testing thereafter holistic traffic calming strategies on a "large enough scale" for Indian cities. The project intends to test and modify measures developed and found efficient from the safety point of view in Sweden and other highly motorised countries. The aim is to find out whether these measures will have a desirable local impact on the behaviour of different kinds of road users - primarily car drivers and pedestrians. Those measures that are found to be effective in Indian conditions will then be summarised in a manual for the Indian police and transport personnel, planners and engineers suggesting remedial road designs that would help in calming traffic. No such manual exists till date in India.

3.2.4 The results of this project will fill up the vacuum that currently exists in the filed of "Traffic Calming in India". The suggestions in the manual, when implemented, will directly help to better the quality of the environment on the roads, for the poor and pedestrians, and for people living besides and around the main arterial roads. It will indirectly help to reduce noise and air pollution and poverty by preventing loss of the breadwinner and the added burden of caring for members disabled.

3.3 Goals

3.3.1 The project will aim to pin point and bring to light the weakness of Indian road designs and provide a manual, first of its kind in India, suggesting remedial traffic calming strategies for important policy/decision makers, namely, Indian police and transport personnel, and engineers. Experiences from Sweden and other countries clearly demonstrate the significance of these strategies.

3.3.2 Today traffic injury, which is major, but neglected public health challenge, requires concerted efforts for effective and sustainable prevention. This project will enrich and add to the concerted effort of other group working in this area.

3.3.3 This project will, in the long term, prevent many families from being driven deeply into poverty by the loss of the breadwinner and the added burden of caring for members disabled.

3.4 Objectives (Expected Outcome, Results and Benefits of the Project)

3.4.1 The research component of the project will be to pin point and bring to light the weakness of Indian road designs and provide a manual, first of its kind in India, suggesting remedial traffic calming strategies for important policy/decision makers, namely, Indian police and transport personnel, and engineers. Experiences from Sweden and other countries clearly demonstrate the significance of these strategies.

3.4.2 This manual aims to become the basis for generating awareness among Indian traffic and transport personnel in the years to come. It would also help in launching of awareness generation programmes and workshops on Traffic Calming. Measures to reduce the number and severity of pedestrian and other vulnerable road user causalities in road traffic would be incorporated in the manual.

3.4.3 The recommendations of the project, when implemented, will directly help improve and better the quality of the environment on the roads, for the poor and pedestrians, and for people living besides and around the main arterial roads.. It will also heavily reduce the risk of severe accidents it will indirectly help to reduce noise pollution, air pollution and poverty by preventing loss of the breadwinner and added burden of caring for members disabled.

3.4.4 The project will provide an opportunity to build a partnership with Sweden. It will in the long run help to utilise more successful experiences from Sweden and other parts of the world in order to change the said Indian road safety scenario.

3.4.5 The project will be an appropriate beginning in the right direction to ensure equal protection for all road users, which would be the guiding principle to avoid an unfair injury and death of poorer people and vulnerable road users.

3.4.6 The project provides a scope for sharing and development of problem-oriented knowledge (i.e. traffic calming measures to solve the sad scenario on Indian roads). It contributes to the development of knowledge not yet known and widely available with the Indian transport experts. The authorities such as State Transport Departments, Police and Indian Road Experts would be involved in the project to benefit from the experience of Lund University, Sweden.

3.5 Area of Operation

3.5.1 The project was focused in Jaipur city and implemented in following critical locations of the city and near by area, to be identified based on the data provided by local authority. The critical locations connected with National Highways, State Highways, Major City Roads and Roads connecting outskirt villages of Jaipur city.

Altogether these roads also represent four directions incorporating different socio-economic pockets of Jaipur city.

3.5.2 This would facilitate cooperation of local police/decision makers, which is an important requirement of the project. 24 sites representing typical safety problems for pedestrian and cyclists were proposed to be selected on

the basis of data collected from the police department and recommended of authorities, if any.

3.5.3 Areas comprising schools, hospitals, shopping complexes, small cross section in rural areas and residences would be given preference.

3.6 Duration of the Project

The project started in November 2007 and the process of team formation at CUTS was completed in the first quarter. The project was formally launched on March 03, 2009 and concluded on October 31, 2009. The duration of the project was of two years, which was divided into eight quarters.

3.7 Proposed Project Activities

S.N.	Activities	Time	Responsibility
1.	Formation of Indian and Swedish team, Consultant and PCG a) Indian Team b) Swedish Team c) Consultant d) PCG	 Q1 Q2 (February 2008) Q2 (February 2008) Q1	 CUTS/Swedish Team
2.	Launch of the Project	Q2 (March 2008) First weak	Indian Team
3.	Training of In-house CUTS representatives on selection of sites cum formal launch of the project. (2 days)	Q2 (First weak of March 2008)	Indian Institute of Technology (IIT), New Delhi/Swedish Team
4.	Identification of sites	Q2 (March-April 2008)	Indian Team
5.	Training of Indian Team (21 days)	Q2-Q3 April-May 2008	Delhi IIT/Swedish Team
6.	Research Study 1) Field Study "Before" 2) Analysis of Before study 3) Analysis & Formulation of first set of Traffic calming measure 4) After studies field work	 Q3-Q4-Q5 Q5 Q5-Q6 Q6	 Indian Team/ Swedish Team
7.	Executing change & Making After studies	Q6 (Last two months)	Indian Team, Swedish Team and Consultant
8.	Analysis of finding	Q7 (First month)	Indian Team and Swedish Expert
9.	Expert Analysis	Q7 (First-Second month)	Consultant/Swedish team
10.	Workshops a) Jaipur: One-day b) Kolkata: One-day c) Bangalore: One-day d) Mumbai: One-day e) National Workshop at New Delhi: Two- day	Q7 (last month)	Indian Team
11.	Draft Manual	Q8 (First-Second month)	Indian/Swedish Team
12.	Final Manual	Q8 (Last Month)	Swedish Team

4 Project Management

4.1 Project team comprised of Indian and Swedish teams along with local consultants.

4.1.1 The project started in November 2007 and the process of team formation at CUTS was completed in the first quarter. Engineering with adequate experience and knowledge of social sector was one of the main criteria for selection for selection of team leader. Advertisements for various positions were uploaded on websites and published in various newspapers. Besides, services of head-hunters were also used. Based on the need of the project activities, Indian team outsourced services to professionals like engineers, consultants, surveyor, video filming profession, engineering software operator, radar gun operator and others different local area representatives for identified locations, besides CUTS' representative.

4.1.2 As per the approved project from SIDA, Swedish team was partnering the project, which comprised a team leader, Prof. Christer Hyden and/or a replacer along with members of the field analysis team and trained civil engineers.

4.1.3 Prof. Dinesh Mohan, Professor and Coordinator Transport Research and Injury Prevention Programme, IIT, New Delhi; and Prof. Geetam Tiwari, Department of Civil Engineering, Indian Institute of Technology Delhi were appointed as consultants for the project.

4.2 Formation of Project Consultative Group

4.2.1 Meetings and discussions with a range of stakeholders, namely, the Jaipur Development Authority (JDA) and the Jaipur Municipal Corporation (JMC), Department of Transport and Traffic Police were held and a Project Consultative Group (PCG) formed for guidance and inputs to the project.

4.2.2 The members of PCG were decided keeping in mind those departments that could directly or indirectly influence this project. The PCG included representatives from important stakeholders such as Superintendent of Police, Deputy Commissioner from the Transport Department, Senior Engineer from the Municipal Corporation and Additional Chief Engineer

from the JDA. Brief overview of the project was presented in the meetings and discussions.

4.2.3 Formation of PCG facilitated a network among government authorities and CUTS, which was supposed to helped in the smooth functioning/execution of project activities.

5 Project Activities

5.1 Project Launch Meeting

The project launch meeting was held in Jaipur, on March 03, 2008. Commissioner, Department of Transport, Chief Executive Officer, JMC, Deputy Inspector General of Police (Traffic), Representative of Central Road Research Institute, New Delhi and Secretary General, CUTS International were the key resource persons. Several voluntary organisations and media also participated. The meeting unanimously agreed to strengthen the traffic conditions, which has become more dangerous then diseases like HIV/AIDS, Malaria and others. Every one, including government officials, appreciated and welcomed the initiative and assured to provide all necessary support to the project as and when required. The event received a wider coverage in the national, regional and local print media *(Annexure A).* The Report of the launch meeting is available at *Annexure B.*

5.2 Two-day Training Programme

5.2.1 As a part of the project, a two-day training on selection of sites was organised for the Indian team. The objective of this training programme was to guide the Indian Team on the criteria of site selection. As the sample to be studied and analysed represented accident-prone sites, correct identification and selection of sample was essential. Prof. Christer Hydén along with Prof. Geetam Tiwari and Prof. Dinesh Mohan explained various issues important for selecting a site.

5.2.2 In addition, issues like need of the study, injury prevention and conflict technique were also a part of the training programme. Traffic police personnel, and experts from Malviya National Institute of Technology, Jaipur also participated in the training.

5.2.3 Prof. Christer Hydén, Prof. Geetam Tiwari and Prof. Dinesh Mohan shared their experiences in different states of India and abroad. It was decided that to identify high accident risk zones, a detailed study of the total number of pedestrian accidents in a year should constitute the first step. This would be the criterion for selection of sites and then the training on data collection would be planned.

5.2.4 Prof. Christer Hydén, Prof. Geetam Tiwari, Prof. Dinesh Mohan along with CUTS team visited various locations in Jaipur to see the actual

scenario of traffic on the roads of the city. Each location was discussed in for selection. The walled city was visited to examine the old road network planning, its current situation and scope of expansion if any. The Training Report is enclosed at *Annexure C*.

5.2.5 The programme facilitated face-to-face discussions with partners and experts and facilitated better understanding of project activities.

5.3 Preparations for Before Studies

5.3.1 Primary Data Collection for Selection of Sites

It was decided in the training programme to collect the details of accidents that occurred in Jaipur for the year 2006 as evidenced and recorded in First Information Reports (FIRs – a written document prepared by the police when they receive information about the commission of a cognisable offence) from the police. A format was developed to collect the information in systematic way covering, among others, accident severity (fatal/non-fatal), victim (type, sex and age), date and time, impacting vehicle, location (address and land marks). These details were from 37 different police stations in the city.

5.3.2 The accident details were noted manually by going through each and every FIR made in the year 2006. This assignment was one of the biggest tasks as the data had to be collected from *Rooz Namcha* written under 17 columns in scattered and difficult-to-read handwriting at different police stations. At few of the police stations one register was maintained to fill up the daily information whether it was crime or accident. The team visited all police stations and collected required details as per the criteria developed in the training programme. Detailed data collection is annexed with this report as *Annexure D*. Highlights of the findings are as under:

- Facts obtained from FIRs comprise 66 percent pedestrians, 21 percent drivers, 7 percent passenger and 1 percent unknown.
- 81 percent males were victims of accidents, out of which 41 percent fall under fatal category and 40 percent under serious injury.
- 19 percent females were victims of accident, out of which 12 percent fall under fatal category and 7 percent under serious injury.
- Occurrences of accident under two-wheeler are 35 percent out of which family vehicles (cars/jeeps) constitute 23 percent.
- 68 percent pedestrians were victims of accidents.

- People in the 19 to 29 age groups are the most vulnerable victims followed by those aged 30-40 (24 and 23 percent respectively).

5.3.3 **Data Plotting**

The next assignment was to plot each accident on the road map to show the specific location that has high rate of pedestrian accidents. A copy of detail road map was arranged from the JDA and accident data was manually marked over it and later drafted in Auto Cad programme.

5.3.4 **Tentative Site Selection**

A tentative site selection was identified, considering various factors such as locations at different types of roads as well as locations with high pedestrian accidents. A total of 33 (*Annexure E*) sites were identified for the purpose of training for 'Before Studies'. The team visited each location and observed the traffic and possibilities for a suitable camera location.

5.3.5 **Liaison with Stakeholders**

As the project envisioned 'After Studies', it was essential that local authorities be kept informed to support the recommendations and to implement them. The members of the PCG were forwarded updates for common understanding and for further action/guidance. Thus, to liaise with all stakeholders on a regular basis was decided as a strategy to develop their interest and involvement. Discussions and meetings were organised at regular intervals with Traffic Police Department, Transport Department, the JDA and the JMC. Often suggestions were received from the authorities to broaden the project objective and include more sites in our study.

5.3.6 **Arrangement for Training**

Selected sites were visited and various observations such as number of pedestrians, type of road/intersection and peculiarities related to probability of accidents were observed. Local authorities were also contacted for meeting with the Swedish Team experts.

5.4 Field Activity

5.4.1 **Designing of the Evaluation and Training Module**: The Swedish team and the IIT, New Delhi first design the evaluation and training module, which was used to study the effects of the selected sites. This evaluation tool worked out 'what to study' and 'how to study' in the 'before' and 'after' studies.

5.4.2 Training of the Indian Team for Field Intervention

- The main focus of this training was to train the Indian Team for recording conflicts and complete the field studies using the Conflict Technique. Information gathered through FIRs, visits and schedules were discussed and planned. Prof. Hydén highlighted the need of training and importance of video recording for observing conflicts. A very important pre-recording task is to synchronise the watches among the team members so as to match with the time recorded in camera as well as in the manually filled sheet.

- The training included in-house and out door sessions. A short film was also shown to elaborate safety efforts in Sweden. The film showed the importance of Conflict Technique. Prof. Hydén then presented and explained Conflict Technique. He emphasised a systematic evaluation/assessment of "everything that is done". A proper assessment with problem definition, hypotheses, empiric, conclusions, is the most efficient way of learning. Each conflict is recorded on a separate recording data sheet. The most important task for the observer is to estimate TA (Time to Accident), with the help of CS (Conflicting Speed) and distance, and to fill in the sheet correctly and to describe the events preceding the conflict "as complete as possible". Prof. Christer Hydén described in detail the importance and uses for better understanding and analysing the conflicts.

- Along with project team two hired skilled cameramen were also present for video recording, training for operating the camera and filming the required information. At several locations practical training was given during the programmes covering operating and recording with cameras.

- Along with Prof. Christer Hydén the team visited 31 sites and conducted their trainings at some selected locations. Prof. Christer Hydén explained the procedure of observing conflicts manually and through videos. A short conflict recording was shown and the participants were asked to guess TA and CS. Each time the guesses were analysed and ranked by Prof. Christer Hydén. Detailed conflict recording of Chomu Pulia (Site No.03) and Goshala (Site No.13) was conducted.

- Visits to field were planned to explain conflicts. The procedure of manual observation was discussed and explained. After manual recording, Prof. Hydén organised a session for testing speed and distance estimated by all trainees. The procedure of recording conflict was also explained because

chaos was seen at most of the locations, which hindered the manual process of recording conflict.

- Prof. Hydén also organised a session for testing speed and distance estimated by all trainees. The exercise was repeated several times until the scores were close enough to the actual. He presented the 'Conflict Recording Protocol Format' and 'Time to Accident Table'. The Swedish team analysed the scores of speed estimation exercise. They informed that the average deviation should not be more than 1 km/h and estimation of speed should not deviate by more than +/- 2 km/h. The results were compared within the team and also with the video. Prof. Hydén gave the actual values and trainees were asked to compare their scores.

- Meetings with local authorities were also arranged for updating them on the new technique being used for the study. Prof. Christer Hydén and Aliaksei Laureshyn along with CUTS team met with the Chief Executive Officer (CEO), JMC, Commissioner, JDA and Deputy Transport Commissioner. The aim of these meetings was to facilitate interaction with the Swedish team. All the authorities assured necessary support in implementation of this project.

- CEO, JMC elaborated his interest to the Swedish team to suggest measures for chaotic conditions at various locations in Jaipur, particularly at Sanjay Market crossing and at Johari Bazar. He said that at Sanjay Market there is mixed traffic and buses also stop here. Presence of shopkeepers, street vendors and stray animals, unorganised parking makes the situation worse. He expressed his willingness to provide all necessary support required for improving traffic management in these areas. Prof. Christer Hydén assured him to look into the matter.

- An examination was also organised for all participants and the results were compared among the team. Scoring and analysis of the examination was conducted based on the video recordings and the manually recorded sheets were submitted to Prof. Hydén.

- The training concluded with discussion on future schedule for Before Studies and also the next visit of Swedish team. A total 17 sites were selected for Before Studies. Looking at the number of sites for Before Studies, it was agreed to conduct four days conflict recording at each site, which included manual as well as video recording. The Indian Team was to complete data entry and conflict analysis for three days and the Swedish

Team would complete one-day data analysis. *Annexure F* contains a Report on the Training.

- A software was provided by the Swedish partner for data entry purposes, which itself provided the information related to seriousness of conflicts. Software was useful in judging the speed and conflict intensity. This strengthened the manual observation practices of Indian Team.

5.4.3 Field Before Studies

- After completion of training, CUTS team initiated the arrangements for Before Studies. The next step was identification of camera position and permission for installing the same. Permission from the police department and the owner of the building were the major task. Residents, shopkeepers and officials were contacted for their permission and cooperation. Due to regular interactions with authorities, JMC also agreed to provide their vehicles for fixing the camera on streetlights.

- **Recording at Identified Sites**: After completion of video recording at first seven sites by July 2008, recordings at other identified sites were started. A total video recording at 25 locations was done. Video recording for number of days was decided on the basis of frequency and volume of accidents, involving pedestrians in particular. Most of the sites were complex in nature and the recording was conducted for four days at each site. Details of video recording sites are as follows:

a). **Video Recording Sites**:

1. 4 No. Dispensary	(Site no. 10)
2. Imliwala Phatak	(Site no. 31)
3. Meena Petrol Pump	(Site no. 22)
4. RIICO Gate	(Site no. 11)
5. Chomu Pulia	(Site no. 03)
6. Gurjar Ki Thadi	(Site no. 27)
7. Tonk Pulia	(Site no. 18)
8. Gopalpura	(Site no. 29)
9. Galta Gate	(Site no. 21)
10. Kumba Marg	(Site no. 12)
11. Phakiron ka Mohalla	(Site no. 23)
12. Goshala	(Site no. 13)

13. Haldi Ghati Marg (Site no. 15)
14. Sector – 3 (Site no. 14)
15. Dadi Ka Phatak (Site no. 33)
16. Khaitan Hospital (Site no. 34)
17. Khirni Phatak (Site no. 35)
18. Shyam Nagar (Site no. 36)
19. Sodala Thana (Site no. 37)
20. Gandhi Path, Vaishali Nagar (Site no. 38)
21. Idgah (close to site no. 23) (Site no. 39)

b). **Video Recording along with Still Photography Sites**

22. Johari Bazaar (Site no. 32 A)
23. Chaura Rasta (Site no. 32 B)

c). **Still Photography Sites**

24. Bhaskar Marg Intersection (Site no. 40)
25. Tulsi Marg Intersection (Site no. 41)

5.4.4 **Topographical Surveys:** The teams understood the exact status of ground realities with problems and physical dimensions at each site, which helped towards suggesting the most suitable solutions.

- To suggest suitable accident reducing measures to the concerned government departments/officials, namely, JDA, Transport Department, police and JMC for the first seven sites, official submission process was enquired, from which emerged the requirement for "measurable topographical surveys".
- Several government-approved surveyors were identified and their capacities analysed after which the most suitable one was selected. To determine the exact geometric conditions at each identified road stretch along with determining the measurements of elements available per site, topographical surveys were done up to a distance of minimum 100 meters on all the arms of intersection, trisection, mid-block from the selected project site.

- **Incorporated Final Measures in Topographical Surveys**
  - Under the guidance of the Swedish partner all the above-proposed suggestions were incorporated in the final version of the topographical products. This exercise made the teams ready towards meeting with the stakeholders.
  - Presentations were prepared, mentioning the problems noticed across the city highlighting the ever-increasing pollution due to increased volume of fuel burnt by vehicles specifically with reference to pedestrian accidents.
  - After preparation of final suggestions, team members along with local consultants meet with several key officials at Transport Department, JDA, JMC and Traffic Police, Jaipur for getting their suggestions and opinion on the measure. To deal with the Indian Road Standard issues, representative of IIT, New Delhi accompanied the team.

5.4.5 Training of Indian Team on Speed Measurement using Radar Gun

- The mechanism involved in measuring speeds through Radar Gun was discussed and the members are practically trained on this mechanism by measuring the speeds of different type of road users (apart from the pedestrians). Besides, the speed of cars and motorbikes at different junctions where speed reducing measures such as speed humps, rumble stripes have been adopted were also recorded.
- Sites for the purpose were marked near two humps at various different types of locations across the city and measurements were made creating a prescribed distance of around 20 meters between the radar gun and road user. Several observations were made and the team members gathered an understanding of the mechanism involved.
- **Completion of Speed Measurement**: Looking at the uncooperative nature of Jaipur's authority in implementation of suggested measures, project team tried to convince the authority by analysing existing humps, which are still effective in "Traffic Calming". Swedish experts provided training to Indian team on speed measurement using Radar Gun.
- Therefore, a pre-visit was made to identify the existing humps in different locations of Jaipur city. 11 humps at prominent locations were identified for speed measurements. Equipment along with operator was outsourced from IIT, New Delhi. 2,208 vehicle's speed was recorded. Segment of vehicle selected for speed measurement were two wheelers, cars and trucks.

Findings were forwarded to Swedish partner for analysing in accordance with the Manual. Analysed outcome of the findings are as under:

CARS appr. 50 in each direction, i.e. 100 in total per site

SPEEDS (km/h)

Sites		Direction A			Direction B		Both directions	
	Mean	85perc	Max	Mean	85perc	Max	Mean	85perc
Near Temple	26	30	44	24	29	41	25	29
Chinkara Canteen	22	24	29	23	27	27	22	26
Near to BJP office	18	22	29	23	26	34	20	24
University Road	26	30	38	28	35	39	27	32
Near to JNN (Tonk Rd.)	18	23	26					
Lalkothi	22	24	30	14	20	24	18	23
Ridhi Sidhi (Rumbul)	14	20	37	15	20	28	14	20
4 seasons	13	15	19	23	27	38	19	24
Jhotwara	15	18	22	17	20	23	16	19
Iddhagha (rumble)	< 10	12	15					
Collectorate (humps)	21	24	27	21	24	33	21	24

MOTORCYCLES appr. 50 in each direction, i.e. 100 in total per site

SPEEDS (km/h)

Sites		Direction A			Direction B		Both directions	
	Mean	85perc	Max	Mean	85perc	Max	Mean	85perc
Near Temple	30	36	46	25	31	42	27	33
Chinkara Canteen	23	27	34	30	31	42	26	31
Near to BJP office	24	27	51	23	27	39	24	27
University Road	29	36	41	32	38	47	31	37
Near to JNN (Tonk Rd.)	24	27	35					
Lalkothi	25	29	37	19	24	36	22	28
Ridhi Sidhi (Rumbul)	24	29	38	27	38	45	26	31
4 seasons	22	25	31	14	18	22	18	23
Jhotwara	24	27	34	25	29	37	24	28
Iddhagha (rumble)				< 10	12	12		
Collectorate (humps)	21	25	27	23	27	29	22	26

TRUCKS: 08 Nos.
in each direction, i.e. 100 in total per site

SPEEDS (km/h)

Sites	Direction A			Direction B			Both	
	Mean	85perc	Max	Mean	85perc	Max	Mean	85perc
Ridhi Sidhi (Rumbul)	8	11	13	8	10	12	8	11

5.4.6. Organising Regional and National Level Workshops: Looking at the festival season and completion date of the project, both the teams mutually decided on the dates for regional as well as national dissemination meeting, i.e. in Jaipur, on October 01, 2009; in Bangalore, on October 06, 2009; in Mumbai, on October 08, 2009; in Kolkata, on October 10, 2009; and in New Delhi, on October 27-28, 2009 respectively. Apart from the mutual agreement for the dissemination meeting dates, feedback were also procured from CUTS well-wishers and centres regarding regional festival from the respective city to prevent date clash along with ensuring large number of participation from authority and policy makers.

- Indian Institute of Science & *Mumbai Grahak Panchayat* was the coordinating partner for conducting dissemination meetings at Bangalore and Mumbai. CUTS Calcutta Resource Centre was coordinating in organising meeting at Kolkata.
- As per the schedule, meetings were conducted smoothly with large number of participation from various departments and stakeholders, directly or indirectly responsible for road related issues. Ample attention was given to mobilise the officials from Urban Development Department, Development Authority, Municipal Corporations, Transport Department, Technical Educational Institutes and Media.
- Tedious job of identifying the experts, resource persons and partners were done through support of well-wishers and coordinating partners, whereas most of the addresses were procured through several hours of web-browsing. An average of +50 participants for each dissemination meeting participated in the dissemination programme.
- Prior visits to various destinations for follow-up and finalisation of venue along with concerned officials were part of dissemination meetings' planning. Constant contacts with authorities were developed to ensure fruitful outcome of the meetings.

- For better outcome of meetings, agenda was divided in two parts: representation of all available participants belonging to different professional backgrounds in order to obtain the suggestions, feedback and experience on the project findings. Copy of the agenda is enclosed as *Annexure G*. Accordingly, presentation by the project team was prepared, which was divided in two parts, i.e. beginning of the presentation was done by CUTS' representative and technical aspect was carried forward by the Swedish partners. CUTS project overview presentation can be viewed as *Annexure H* and Lund University's presentation on Theory of Traffic Calming and Empirical Trials as *Annexure I.*
- To provide an overview of the project along with the invitation brief background note (*Annexure J*) was submitted to expected participants, which sensitises the policymakers, engineers and agencies working on road safety.
- As per the schedule, regional dissemination meeting was conducted in Jaipur, on October 01, 2009; in Bangalore, on October 06, 2009; in Mumbai, on October 08, 2009; and in Kolkata, on October 10, 2009. National dissemination cum advocacy meeting was held in New Delhi, on October 28, 2009. Detailed dissemination report is enclosed as annexure K.
- Prior to the national dissemination cum advocacy programme a closer group meeting was conducted at CIRC office, which was attended by scientists from Central Road Research Institute (CRRI), which is national nodal agency cum consultant for finalising and approving road designs across India. Detail of the same can be viewed in *Annexure K*.
- **Making the Final Presentations**: More effective, compilation of each and every conflict and different sort of road users involved summed up on excel sheets along with marking the same on still images. This emerged as an essential component for summing up the analysed conflict details:
    - Synopsis for video presentation in the workshops
    - Selection of video clips showing "Safety Problems" for pedestrians and bicyclists to be taken into account
    - Selection of video clips showing "Interaction Problems" for pedestrians and bicyclists also to be taken into account
    - Traffic flow count, to locate at proper position for implementing measures at proposed mid blocks
    - Video of moving traffic prepared through recording traffic from inside the car passed through first set of seven sites

6 Analysis

Focused approach towards finalising a set of sites and most appropriate measures for implementation so it could become a model to be implemented across the state. The team successfully completed all the proposed activities in time.

6.1 Analysis of Data from FIRs: The details of accidents collected from 37 police stations of Jaipur through FIR data (*Annexure J*) were analysed to extract the most severely affected sites. The sites with i) higher number of road accidents especially involving pedestrians; and ii) high pollution levels due to increased volumes of motorised vehicles were short-listed to suggest suitable measures in terms of simple and innovative modifications in existing road geometry based on the Swedish technique in consultation with IIT, New Delhi.

6.2 Field Surveys: Project team physically surveyed the short-listed sites for converting them into safety models. Through these surveys, possibilities towards the most appropriate solutions were identified along with the identification of pedestrians' existing problems, which led to finalising the seven sites to work on with a mission to reduce the rate of accidents per site towards the end of project.

6.3 Interaction with Different Road Users: Prior to moving ahead in any direction for finding the suitability of measures to be proposed, pedestrians were approached at each short-listed site to know the actual problems faced by them on day-to-day basis and finding layman's solutions towards adopting a common accident redressal mechanism.

6.4 Identification of Existing and Actual Accident Causing Problems: Problems encountered by different road users and their frequencies/occurrences were identified through video recordings and documented by project team. These problems would become the basis of further exercises on each site to determining the volume of suggestions to bring perceptible changes at each site in terms of reducing the number of accidents.

6.5 Picking up Most Suitable Sites for First Round of Suggestions: After analysing the ground realities of existing problems, seven most suitable sites, namely, Gopalpura (Site no. 29), Galta Gate (Site no. 21), Phakiron ka Mohalla (Site no. 23), Goshala (Site no. 13), Haldi Ghati Marg (Site no. 15), Sector – 3 (Site no. 14) and Idgah (Site no. 39) were selected.

6.6 Final Comparative Analysis

On completion of topographical surveys, teams started finding the geographical indications of conflict pockets on surveyed images along with determining the

locations of to be proposed safety models. The sites were visited once again along with the surveyed maps. This exercise helped in combining the geographically required modifications with the exact demand per site.

6.7 General Problems Identified/Key Findings

6.7.1 No safe-guarding of pedestrians

6.7.2 Absence of facilities for pedestrians

6.7.3 No channelisation (zebras not visible nor properly located, improper bus stops, poor side markings)

6.7.4 Excessive space available at intersections

6.7.5 Ineffective compliance with speed and other traffic rules

6.7.6 Insensible interactional behaviour

6.7.7 The most vulnerable – children, youth and the disabled – are the most exposed

7. Suggestions

7.1 First Round of Tentative Suggestions

7.1.1 Soft copies of topographical surveys were forwarded to Swedish partner along with the inputs of Indian team and local consultants, keeping local factors in mind.

7.1.2 Final suggestions along with "standardised traffic calming model" was proposed by Swedish partner keeping all the local Indian indicators into account, which were considered to be taken in the form of amendments to the actual site conditions, making them visible and highlighting the same as suggestions on actual ground conditions. Teams were tentatively ready with the most appropriate accident reducing suggestions in the form of "standardised traffic calming model" for the stakeholders.

7.2 Second Round of Suggestions on Surveyed Images

7.2.1 Finding the suitability of initially proposed measures by the Indian team and local consultants in consultation with the Swedish partner, meetings were organised in Jaipur involving project team along with consultants from IIT, New Delhi. Brainstorming sessions were held and capacity of government authorities towards acceptability of making changes was analysed by the project partners, which lead to drafting of final proposal for the initially selected seven sites across Jaipur.

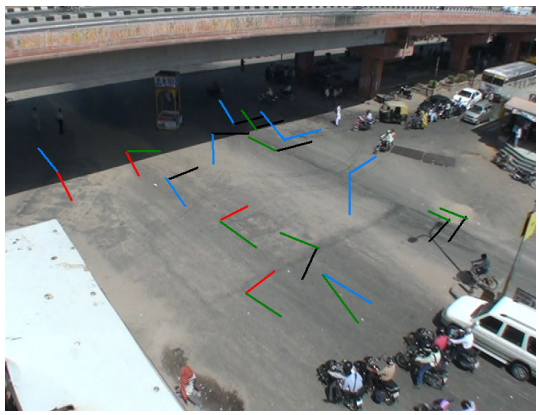
7.2.2 Finalisation of measures to be proposed and team started working on the presentations to be made for various stakeholders.

7.2.3 Table on general information of the sites prepared for the proposed implementation with a special data indicating predicted accidents for the year 2008, based on approximately 6½ hour conflict recording per day and Swedish conversion factors adapted to Indian conditions.

7.3 Finalisation of Measures (for first seven sites)

7.3.1 After consultation with all concerned, consensus emerged on the suggestions to be proposed for first set of seven sites, which was finalised on the surveyed topographical maps and final copies of final product was obtained, ready to be presented/submitted to the stakeholders. The suggestions proposed after thorough analysis of problems at each site were as follows:

- **Gopalpura Chouraha (Site No. 29): [HIGH PRIORITY SITE]**

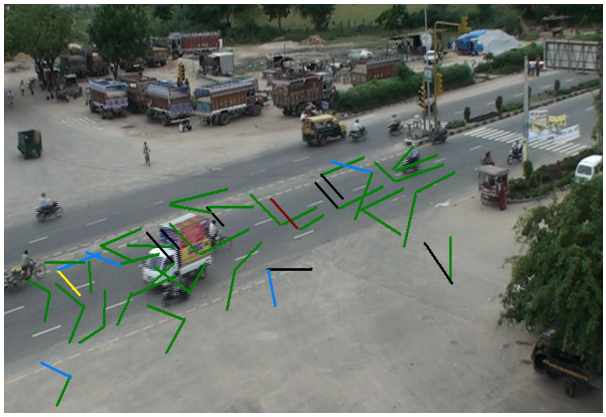


  - Median needs to be extended up to proposed zebra crossing
  - 20 cm raised pedestrian footpaths need to be made at a length of 30 meters on all four sides Hump – 3.6 m wide, circular top, 10 cm high at its peak, located 10-14m in advance of the pedestrian crossing
  - Raised Zebra crossing – Flat top, 5 m wide, 10 cm high, 1 m ramp
  - Islands/extension of medians, be connected with zebra crossing
  - Traffic lane lines and stop lines to be marked

- **Goshala (Site no. 13): [HIGH PRIORITY SITE]**
  - Hump – 3.6 m wide, circular top, 10 cm high at its peak, located 10-14 m in advance of the pedestrian crossing
  - Raised Zebra crossing – Flat top, 5 m wide, 10 cm high, 1 m ramp
  - Median needs to be extended up to proposed zebra crossings
  - Traffic lane lines
  - Islands/extension of medians, be connected with zebra crossing
  - Bus stop ahead of the zebra crossing along with waiting area for the pedestrians

- **Sector – 3 (Site no. 14): [HIGH PRIORITY SITE]**

  - Hump – 3.6 m wide, circular top, 10 cm high at its peak, located 10-14 m in advance of the pedestrian crossing
  - Raised Zebra crossing – Flat top, 5 m wide, 10 cm high, 1 m ramp
  - Traffic lane lines
  - Bus stop ahead of the zebra crossing along with waiting area for the pedestrians



- **Haldi Ghati Marg (Site no. 15): [HIGH PRIORITY SITE]**
  - Hump – 3.6 m wide, circular top, 10 cm high at its peak, located 14 m in advance of the pedestrian crossing
  - Raised Zebra crossing – Flat top, 5 m wide, 10 cm high, 1 m ramp
  - Median needs to be extended up to proposed zebra crossings
  - Traffic lane lines and Stop lines to be marked
  - Islands/extension of medians, be connected with zebra crossing

- **RIICO Gate (Site no. 11): [HIGHEST PRIORITY SITE]**
  - Hump – 3.6 m wide, circular top, 10 cm high at its peak, located 14 m in advance of the pedestrian crossing
  - Raised Zebra crossing – Flat top, 5 m wide, 10 cm high, 1 m ramp
  - Median needs to be extended up to proposed zebra crossing
  - Traffic lane and Stop lines to be marked

- **Galta Gate (Site no. 21): [HIGH PRIORITY SITE]**
  - Hump – 3.6 m wide, circular top, 10 cm high at its peak, located 10-14 m in advance of the pedestrian crossing
  - Raised zebra crossing – Flat top, 5 m wide, 10 cm high, 1 m ramp on all sides
  - Median needs to be extended up to proposed zebra crossing
  - Traffic lane and stop lines to be marked
  - Bus stop ahead of the zebra crossing
  - Triangular island towards Jaipur need to be designed in a way that can be used by the pedestrians while using the zebra crossing

- Triangular island towards Delhi need to be removed to increase the road width and make pedestrian area close to the temple
- Raised pedestrian footpaths need to be clearly demarcated within 30 meters on all sides

a. Phakiron Ka Mohalla (Site no. 23): [HIGH PRIORITY SITE] camera 1

- Hump – 3.6 m wide, circular top, 10 cm high at its peak, located 10-14 m in advance of the pedestrian crossing
- Normal zebra crossing
- Bus stop after zebra crossing on both sides of the road

b. Phakeeron Ka Mohalla (Site no. 23): [HIGH PRIORITY SITE] camera 2

- Open median needs to be closed

c. Phakeeron Ka Mohalla - Idgah (Site no. 39)

- Raised Zebra crossing - Flat top, 5 m wide, 10 cm high, 1 m ramp
- Hump – 3.6 m wide, circular top, 10 cm high at its peak, located 10-14 m in advance of the pedestrian crossing
- Bus stop after zebra crossings on both sides of the road
- Islands/extension of medians, be connected with zebra crossing
- Median needs to be extended up to proposed zebra crossing

Common suggestions for Tonk Road Sites and Galta Gate

- Almost similar models of intersection and mid-block can be suggested for all the locations
- Visible markings need to be made where buses should stop

7.3.2. **Suggested Traffic Calming Models**

Figure -A

Traffic Calmed Standardised Mid-block Pedestrian Crossing

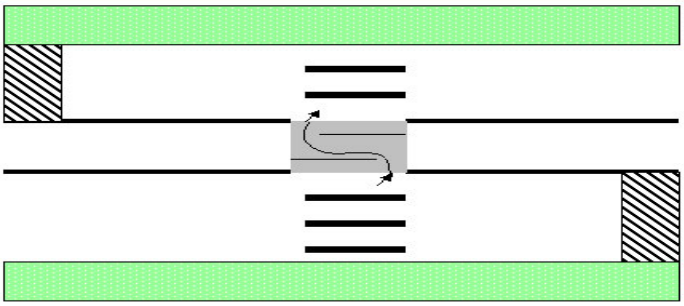
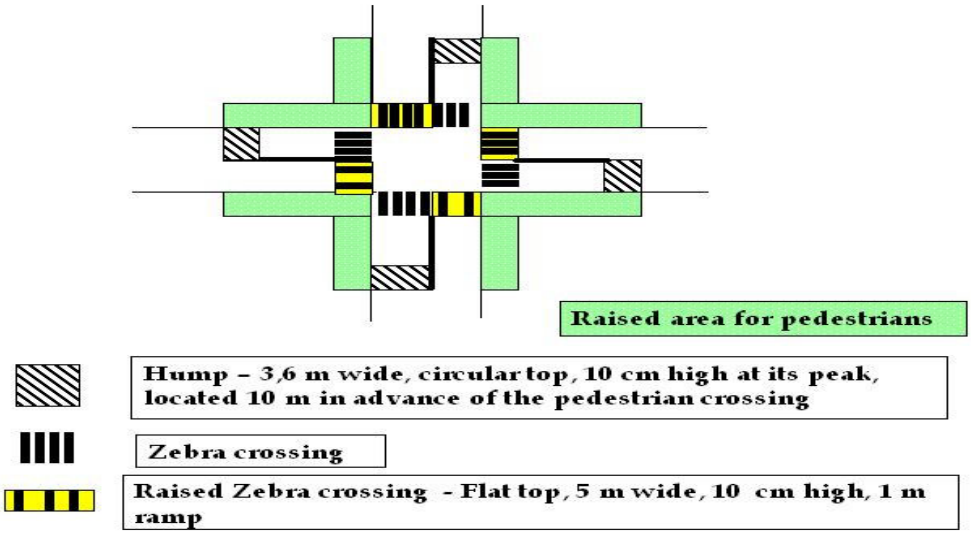


Figure - B

Traffic Calmed Standardised T- and Four Arm Intersection



For detailed dimensions of the suggested model please see "Finalisation of measures" under bullet 7.3.1

7.3.3. **Submission of Suggestion**: The above-mentioned suggestions detailed topographical survey were officially submitted (along with below mentioned Annexure) to JDA and S P Traffic, Jaipur on April 02, 2009 marking a copy to Transport Commissioner for appropriate action for implementation.

8 Ongoing Activities

8.1 Apart from dissemination meetings, Swedish partner visited Jaipur during May 08-15, 2009; February 24 to March 09, 2009; October 15-25, 2008; June 02-07, 2008; and February 29 to March 05, 2008; respectively. Local project consultants from IIT, New Delhi visited Jaipur, during February 24 to March 09, 2009; and March 03-04, 2008. Apart from regular follow-up meetings by the Indian team, specifically during these visits several meetings were organised with key stakeholders, namely, Transport Minister, Commissioner of JDA, CEO of JMC, Transport Commissioner, SP Traffic, Additional Collector and Urban Development Minister. Presentations were made before the stakeholders, suggesting suitable remedies towards traffic calming. This made the project team analyse the views of stakeholders and modify the suggested model as per their technical inputs. Finally, the hard copies of suggested measures were submitted to the stakeholders. Summary of the discussions made during these meetings along with the outcome is as follows:

8.1.1 Regular meetings were held with the top officials of the Transport Department along with Swedish partner and IIT consultants. These officials had shown their interest towards the project. Even the present Transport Commissioner recommended our suggestions to the JDA for implementation.

8.1.2 Meetings were held with the Police Superintendents along with Swedish partner and IIT consultants. Both these officials assured to favour the findings and recommend the proposed measures before the JDA from the perspective of reducing the number of accidents.

8.1.3 Few meetings were held with the JDA Commissioners also with the Swedish team and the consultants of IIT, New Delhi. The commissioners appreciated the study and forwarded the suggestions to the concerned Assistant Engineer for feasibility study of proposed model. Appropriate action is still awaited.

8.1.4 Meetings were held with the CEOs of the JMC. All of them appreciated the study and its findings. However, regarding implementation they assured to support the proposed suggestions before JDA. They provided permission to install video cameras at higher levels using their big vehicles.

8.1.5 The Additional Collector IV, Jaipur being a part of Road Safety Administrative Cell, was met with on several occasions. She appreciated the proposed measures and assured recommending the same to the JDA

8.1.6 The Collector, too, was convinced with the proposed measure and assured to support in getting it recommended to the JDA.

8.1.7 A meeting was held with the State Transport Minister who also appreciated the study and its requirement towards reducing accident rate but being extremely busy was unable to act directly in taking appropriate action, i.e. instructed the concerned department/s for early implementation of suggestions provided under TCS project.

8.1.8 The Urban Development Minister for State was approached and a couple of meetings were held with him. He appreciated the project findings and assured required action.

8.1.9 A meeting of the project team with SIDA officials at New Delhi was held at Swedish High Commission, on November 18, 2008. SIDA officials were briefed about the ongoing activities and future project planning. Working on the guidance being provided by SIDA officials with regard to wider coverage of demand side, a single fold "Project Brochure" was developed for general distribution creating awareness at required levels. Attach copy as *Annexure K*

The policy makers are now aware of the most suitable, innovative, simple, acceptable to common road user, i.e. pedestrians and cost effective solutions put forth by the project team. Greatly convinced with the proposed "Traffic Calming Model" the Transport Commissioner has written a recommendation note to JDA for its early implementation.

8.2 Future Project Activities

8.2.1 Conflict data is presented in an excel file containing information about time, severity, types of road users involved, etc. Swedish team finalised a proposal for content in the excel file. All conflict recordings – including the studies that are made by both Swedish and Indian team – shall be reported in the same way.

8.2.2 Indian as well as Swedish team did data analysis marking, which was second step of data analysis. The marking contains several colours, representing the conflicting vehicles/persons, actual position on road and direction to judge the point of maximum collision. Simultaneously, conflict marking of was recorded on a sheet, which will be incorporated in the Manual.

8.2.3 Swedish and Indian team mutually draw the conclusion on the following list of sites in future with the following solutions:

8.2.4 Khirni Phatak (Site No. 35): Proposed Measures: Footpaths connecting with bus stops, standardised humps along with zebra crossings and construction of a median on the side road.

8.2.5 Shalimar Crossing (Site No. 42): Proposed Measures: Circular flat hump with sharp ramp along with pedestrian area (A comparative study will be conducted between site no. 40 and 42).

8.2.6 Vaishali Nagar, Gandhi Path (Site No. 38): Proposed Measures: Footpath and bicycle lanes, zebra crossings adjacent to the present median with a small additional extension of the median at the other side of the crossing along with humps (standardised T-junction).

8.2.7 Sanganer, Malpura Gate (Site No. 43): Proposed Measures: Extension of median and a roundabout.

8.2.8 Dispensary No. 4 (Site No. 10): Proposed Measures: A semi-circle along with zebra crossings and humps and construction of a median on the side road.

8.2.9 Bhaskar Marg Intersection (Site No. 40): Proposed Measures: Circular hump along with properly marked pedestrian area (A comparative study will be conducted between site no. 40 and 42).

8.3.0 Tulsi Marg Intersection (Site No. 41): Proposed Measures: Humps along with zebra crossings properly connected to the visibly marked pedestrian area.

9. Achievements

9.1 First time in India, the project has triggered a realisation towards equal sharing of road, comfort and safety from pedestrian perspective.

9.2 The project has triggered a nation wide debate on the issue of pedestrian safety that has been long neglected in a country like India where majority of the road users are pedestrians and bicyclists. The dissemination meetings made the policy makers realise that the road is meant for pedestrian also and that they have equal right to use and feel safe and comfortable on road.

a) "pedestrian safety" issue in planning and designing roads, which was never taken into consideration in India.

b) brought in light the "Traffic Calming" solutions, which are not only easy to implement but also inexpensive and effective in reducing road accidents.

9.3 Bringing technocrat, bureaucrat, policymakers, enforcement agency, technical institutes, technical institutions and CSO on one platform in perspective with pedestrian safety on road.

9.4 Emergence for creating a separate department on road safety and mechanism to audit the road standards and policies implemented.

9.5 Wider acceptance of suggested measures as environment friendly and having positive potential impact on climate change, emission and noise pollution.

9.6 Paved path for scientific research, analysis, innovation through international partnership and treatments of road accident.

9.7 Project is being considered as challenge to the authorities with feudal mindset to adopt changes required for safety of vulnerable road users.

9.8 Institutionalisation of road safety technology and CUTS being recognised as only CSO having Swedish expertise.

9.9 Recent experience and research has shown that a comprehensive approach is most effective in creating safer walking environments. Pedestrian's safety problems cannot be solved simply by addressing the "three Es" (engineering, education, enforcement) in isolation but also require engineers, law enforcement, designers, planners, educators, and citizens should all play a role in identifying and implementing effective countermeasures for improving pedestrian safety.

10. Problems Encountered

10.1 There was great difficulty in plotting each accident to its corresponding location on the road map of the city as per details given by the police. The reporting system of police is not uniform and in many cases exact location of accident was not accurately mentioned resulting consumption of time for searching the location.

10.2 The permission to carry field studies was arranged with immense efforts and at many locations schedule for field studies had to be revised again and again because of unfavourable weather conditions and unsupportive nature of shopkeepers & residents.

10.3 While going through the training on data collection, unavailability of "Radar Gun" was a hurdle. But the seamless efforts of Prof. Hydén successfully trained CUTS team in analysing the speed and distance through several rounds of manual practice.

11. Challenges and the Way Forward

11.1 Lackadaisical attitude of the officials of the JDA and Traffic Police, Jaipur to implement the suggested measures that would have ensured pedestrian safety but no implementation on the sites stopped the project activity in between resulting in no 'After Studies' at all.

11.2 Due to regular elections, linkages established with government departments through formation of PCG became ineffective due to reshuffling of concerned authorities. Simultaneously, major problem faced in the initial phase of the project was to coordinate with the PCG and convene a joint meeting due to problems of protocol and hierarchy of the officials.

11.3 Continuous advocacy is the need of the hour to bring in a much-required change in the mindset of motorised vehicle users along with technocrats, bureaucrats, policymakers, enforcement agencies, technical institutes, technical institutions and CSOs to value that pedestrian have an equal right to safety on road.