

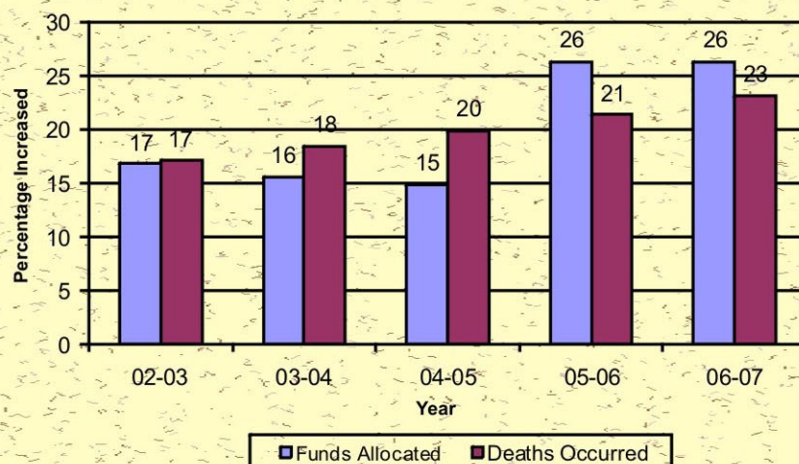
# Traffic Calming Strategies to Improve Pedestrian Safety in India

(An Indo-Swedish Collaborative Project)

November 2007 to October 2009



Comparative Statement of Funds Allocated for Road Development, which result in more speed and in turn more Deaths\*



\* Source: MoRTH Annual Report 2007-08 and National Crime Record Bureau



## Project Background, Interventions and Outcome

**R**ight to life and safety is a fundamental right of every citizen. This is guaranteed under the constitutions of every country in the world including India. Article 21 of the Indian Constitution guarantees 'Right to Life' as one of the fundamental rights. Right to safety is one of the basic consumer rights as well, as per the United Nations Guidelines on Consumer Protection (UNGCP) and Indian Consumer Protection Act (CoPRA) 1986. On the other side, as per the first ever 'Global Status Report on Road Safety', more people die in road accidents in India than anywhere else in the world. Taking into consideration the worsening traffic situation in India and the rights of the road users for safety and life, from a rights' perspective, a unique project was conceptualised entitled *Traffic Calming Strategies to Improve Pedestrian Safety in India* by Consumer Unity & Trust Society (CUTS International) and Lund University, Sweden in collaboration with the Indian Institute of Technology (IIT), New Delhi, and in partnership with the Swedish International Development Agency (SIDA).

The objective was to suggest appropriate remedial measures at accident prone sites across Jaipur, by studying the shortcomings and causes that made these sites accident-prone and then testing holistic traffic calming strategies on one of the selected sites in each of the locations. It planned to test, modify and implement Swedish measures that were efficient from safety point of view in the Indian context.

**Research:** The research component in this project primarily included Before Studies and its Analysis, After Studies and its Analysis and preparation of a manual. The Swedish Conflict Technique was used as the research tool under Indian conditions.

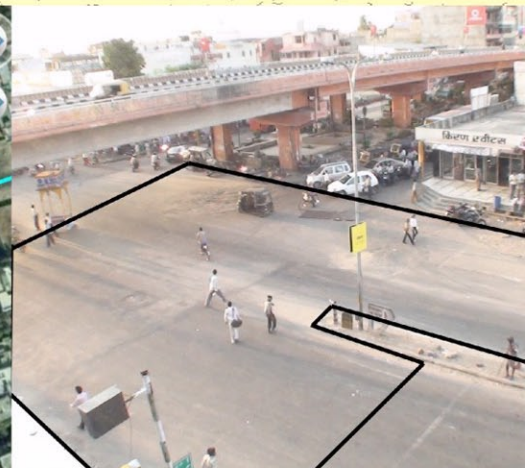
**Primary Survey:** A primary survey was carried out to collect accident details from registered First Information Reports (FIRs – a written document prepared by the police when they receive information about the commission of a cognisable offence), by visiting 37 police stations across Jaipur.

**Site Selection:** In all, 24 accidental sites were short-listed based on the accidents recorded in FIRs for the year 2006 out of which seven high accident prone sites were identified for intensive analysis.

**Conflict Technique:** Conflict technique primarily focuses on manual and video recordings of the split seconds before near accidents (which were, however, avoided). The technique considers only two road users for the analysis who were involved in a situation of a potential accident. The conflict technique observes two factors, namely;

- **Time to Accident (TA):** This records the split seconds that record the time a road user starts evasive manoeuvres to avoid a possible collision.
- **Conflicting Speed (CS):** Records the speed of vehicles (km per hr) including bicycles at the start of the evasive manoeuvre. (*refer to Graph*)

**Field Studies:** Field studies included video recording of traffic for four days at each site after which the Swedish experts and consultants from IIT, New Delhi provided remedial measures for each site. During intervention, video recordings up to 6½ hours of each day for four days at each site were done to obtain "conflicts" along with manual observations. Then these recordings were analysed, judged and verified altogether to obtain the results of behavioural studies,





counts, situation etc. Measures for each site in Jaipur were suggested based on the conflict technique, which resulted in the emergence of power model (Traffic Calming Technique). Power model emerged as the only possible solution under the project study. Internationally the model is recognised as best model in traffic safety science based on it's effectiveness in reducing the intensity of conflicts. The suggested measures are simple in nature and inexpensive too, which reduces the fatalities by minus 49 percent, so that vehicle's speed be calmed and pedestrian movement be free and safe. In order to justifying the effectiveness of properly designed speed breakers as a befitting traffic calming tool, speed measurements on different types of existing humps at various locations across Jaipur city were observed.

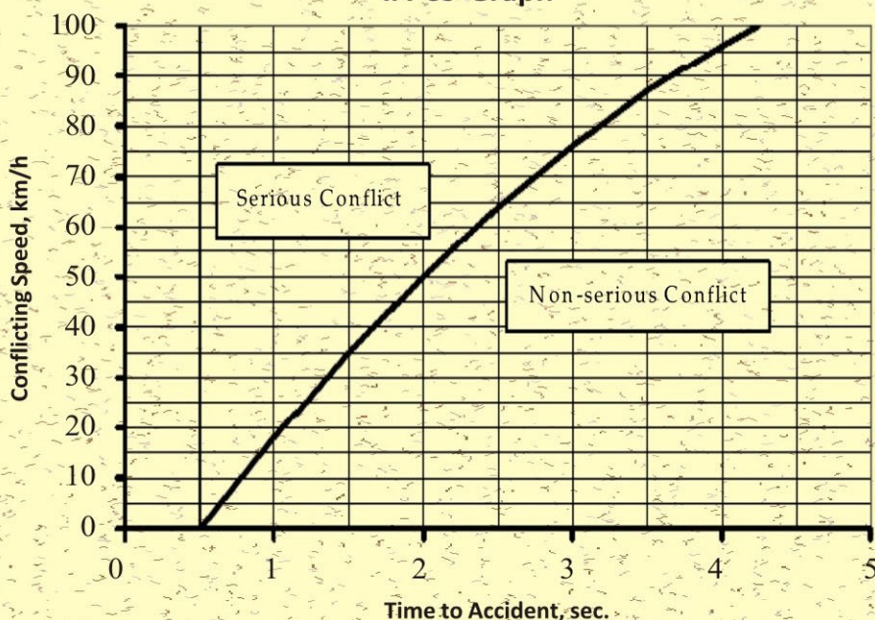
The major problems identified during the study from the pedestrians' perspective are as follows:

- Dearth of safeguard for pedestrians
- Absence of pedestrian facilities

- Lack of channelisation (zebras not properly located, improper bus stops, poor side markings)
- Unmarked excessive space available at intersections
- Ineffective compliance with speed and other traffic rules
- Improper locations of speed breakers and inappropriate design
- Insensible interactive behaviour
- Children, elderly and the disabled are the most vulnerable and exposed

**Submission of Suggested Measures:** During the field intervention project team met several authorities, empowered to decide the fate of city traffic, road design and policy too. Thus, to submit the emerged measures for implementation, a topographical survey was accommodated in the study. Remedial suggestions were marked on the topographical survey and submitted to the Jaipur Development Authority (JDA), SP Traffic, Jaipur and Rajasthan Transport Department for implementation.

TA-CS Graph



Severity of conflicts is defined by its position in the graph. There are primarily only two road users involved. There are two basic factors to be observed, Time to Accident (TA) and Conflicting Speed (CS). The 'time' (tenth of seconds) begins from the moment somebody starts evasive manoeuvres, until a collision would have occurred if the two involved road users had continued with unchanged speed and direction then it is known as TA. CS is the speed of the vehicle (km per hr) at the start of the evasive manoeuvre.





## Regional Dissemination Meetings

The main objective of the dissemination meetings was to share the findings of the study with wider audience and to receive their feedback on the project recommendations. Therefore, regional meetings were organised in Jaipur on October 01, 2009; in Bangalore on October 06, 2009 (in collaboration with Indian Institute of Science); in Mumbai on October 08, 2009 (in collaboration with *Mumbai Grahak Panchayat*); and in Kolkata on October 10, 2009 [in collaboration with CUTS Calcutta Resource Centre (CUTS CRC) and Bengal Engineering & Science University, Shibpur] respectively. Bureaucrats, technocrats and policy makers along with CSO representatives associated with road safety issues participated in the meetings and provided their feedbacks with a word of appreciation for conducting project and sharing of findings from pedestrian perspective.

Accessing equal safety and share on road for pedestrian and bicycle was realised and accepted by wider audience along with applicability of “Traffic Calming Model” across the country, emerged as inexpensive accident reducing tool.



“Traffic and transportation infrastructure should be sensitive to pedestrians’ needs and safety”.

**Saugata Roy**  
Minister of State, Urban Development  
Government of India



“CUTS has presented a unique thought before the Government machinery which may definitely help in reducing road accidents”.

**Brij Kishore Sharma**  
Transport Minister for Rajasthan



“Vehicular traffic has increased, but at the same time, due consideration be given to pedestrian safety that has been neglected for long”.

**Jose Thettayil**  
Transport Minister for Kerala



“There is an immense need of initiating such measures all across India to reduce road accidents”.

**A Pariong**  
Parliamentary Secretary  
Government of Meghalaya





## National Dissemination and Advocacy Meeting

Marking the conclusion of a two-year research project on “Traffic Calming Strategies to Improve Pedestrian Safety In India” and in continuation of the regional dissemination meetings, a National Dissemination cum Advocacy Meeting was held in New Delhi, on October 28, 2009.

Keeping the effectiveness and inexpensive nature of suggested measures and feedback/suggestions received by participants in regional dissemination meeting CUTS along with its partnering organisations conducted the meeting with an aim to disseminating the key findings (flaws in road geometry affecting pedestrians) to receive response from national level stakeholders. At the same time, sensitising the stakeholders for incorporating safety and equal share of road as rights of pedestrian & bicyclists.

Several state as well as national level experts on road safety including policy makers, researchers, bureaucrats, technocrats, law-enforcing agencies, CSOs and institution working on road issue attended the meeting. Apart from appreciation, need of developing, recognising and implementation of pro-pedestrian/bicyclist-policy to ensure safety emerged as key suggestions.

The responses received from national as well as regional dissemination meeting by various stakeholders and road safety experts on project recommendations for *remedial traffic calming strategies* are documented in the form of a report. The report will be submitted to the policy makers, primarily to the Department of Traffic Police, Transport, Municipal Corporation, Development Authority and Public Works.



“Pedestrians are the ‘most vulnerable’ road users, and more research needs to be undertaken in this regard”.

**Sumantra Choudhury**  
ACS, Transport Department  
Government of West Bengal



“The study is an eye-opener and recommendations are cost-effective and simple, emphasis should be laid on improving the infrastructure facilities especially for pedestrians”.

**S Z Pasha**  
M D, Bangalore Metropolitan Transport Corporation



“The framework is already existing, need of the hour is to show the willingness to ensure the required safety that has been long neglected for the pedestrians”.

**Gaurav Gupta**  
MD, Karnataka State Road Transport Corporation



“The research findings are commendable and if incorporated along with proper education and awareness then the ever increasing death rate can be brought down”.

**Amarjeet Singh**  
ACP, Traffic Police, Mumbai





## Important Project Stages

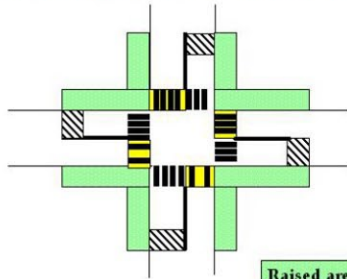
- Identification of accident-prone sites
- Before Studies (initial video recordings at identified sites)
- Analysis of Before Studies
- Speed measurements on selected speed breakers and rumble strips
- Initial set of implementation of proposed measures by the stakeholders
- Dissemination workshops at Jaipur, Mumbai, Bangalore, Kolkata and New Delhi by involving all the concerned stakeholders

## Outcome

- New era of scientific road accident 'treatment'
- Introduction of benchmark Swedish technique, which is cost effective as well as effective in reducing accident along with reduction in noise and air pollution
- First time in India, realisation of pedestrian's safety emerged as missing component in road plotting
- A manual, first of its kind in India, which brings out the flaws in the design of Indian roads.

## Traffic Calmed Standardised Models:

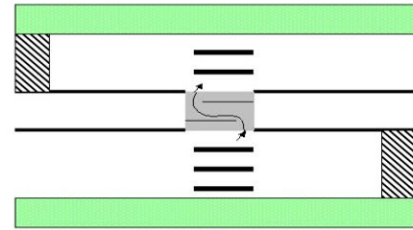
### Traffic Calmed Standardised T- and Four Arm Intersection



Raised area for pedestrians

- Hump - 3.6 m wide, circular top, 10 cm high at its peak, located 10 m in advance of the pedestrian crossing
- Zebra crossing
- Raised Zebra crossing - Flat top, 5 m wide, 10 cm high, 1 m ramp

### Traffic Calmed Standardised Mid-block Pedestrian Crossing



- Areas will be minimised for avoiding vehicles to select "unexpected routes".
- Vehicle entering intersections will have to slow down because of the humps at entrances.
- Raised foot-paths to differentiate road and pedestrian way, to keep away the vehicles and stopping pedestrians' jay walking.
- Zebra crossings have to be well marked and located at beginning and end of intersection with short distance between the crossings.

## Talks on pedestrian safety project

MAROOSHA MUZAFFAR  
NEW DELHI, OCTOBER 28

TO reduce the rate of pedestrian deaths on roads, the findings of a project on Traffic Calming Strategies were revealed on Wednesday at the India Habitat Centre, Lodhi Road.

The findings of a two-year project undertaken by an NGO, Consumer Unity and Trust Society

killed in Mumbai, Delhi and Kota are 79, 47 and 28 per cent respectively," CUTS officials said. "There is a need to take a holistic approach to pedestrian safety."

উভালপুলই কি যানজটে ভরসা, বিতর্ক প্রভাত শেখ



শিহরের গতি বাজতে হলে, যানজটের সমস্যা মোটেও হলে উভালপুলই কি একমাত্র ভরসা? নানা জনের নানা মত। কারও বক্তব্য, পথ শুধু পথচারীদের জন্য। উভালপুলই কি যানজটে ভরসা, বিতর্ক প্রভাত শেখ

Dissemination of CUTS International Jaipur and the Department of Technology and Society, Lund University under the Calming Strategies to Improve Pedestrian Safety in India Programme with Swedish Agency for International Development in cooperation with the Transportation Research and Injury Prevention Programme of the IIT New Delhi.

## 13 deaths every hour in accidents

BANGALORE, DRIVE: Calling for remedial measures to reduce the number of deaths of vulnerable road users - pedestrians, cyclists and other BMT (non-motorised transport) users - traffic experts on Tuesday organised a discussion for better awareness on the issue. Participating in a regional dissemination meeting, 'Traffic Calming Strategies to Improve Pedestrian Safety in India', were George Chetty, Executive and Head of CUTS International, Jaipur.

main problem is that road users are not offered any comfortable options. Existing crossings are not "pedestrian friendly," said Pradyumn from Lund University.

Jaipur was a pilot city for the project.

সহী হোঁ স্পীড ব্রেকার

যদিও স্পীড ব্রেকারের মাধ্যমে গতি নিয়ন্ত্রণ করা যায়, কিন্তু এটি মাত্র একটি অস্থায়ী সমাধান।

13 deaths every hour in accidents

said research studies being carried out in Jaipur, Bangalore, Mumbai and Kolkata will be disseminated in the form of a manual. It would be the first of its kind in India. CUTS officials have also organised a regional dissemination meeting in Jaipur on October 1.

The meeting will be held under the project 'Traffic calming strategies to improve pedestrian safety'.

## Improving pedestrian safety

HT Correspondent  
jive@hindustantimes.com

Seat belts are effective only to a speed of 60 km per hour. This fact was revealed in a recent study on Traffic Calming Strategies to Improve Pedestrian Safety in India.

Journal of Public Health, 2004, Professor Danish Mohan, from IIT, New Delhi.

trolling pollution and making the area more pleasant for the people. "Speed control is necessary, but it should be done by road design."

specifically pointed to the big problem of traffic in the walled city area. "We need separate lanes for specific vehicles. Subways are needed. The other problem is the lack of pedestrian crossings."

## Delay in JNNURM projects irks Sougata ...

statesman news service

KOLKATA, 10 OCT: The Union minister for urban development, Mr Sougata Ghose today blamed the state transport department for delay in floating tenders for buses to private operators under the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) scheme.

Addressing a seminar on 'traffic calming strategies to improve pedestrian safety in Kolkata,' at a city hotel, Mr Roy said that the state government should have procured by October, but the Centre had to extend the deadline till 31 December as the state transport department made inordinate delay in floating and finalising tender to give the buses to the private operators under the scheme. Mr Roy maintained there was no dearth of money for development projects and that the projects are being delayed due to the state governments' lack of initiative.

## Dissemination meet by Swedish varsity

recorded in 2006.

Each site was video recorded along with manual observation for 26 hours. The video recordings were used to judge and verify the behavioural studies, counts and situation.

Various suggestions emerged from the study were submitted to the Jaipur Development Authority (JDA) and the Traffic Police. The response of the two

policy makers and primarily by the police, Jaipur Municipal Corporation, JDA and Public Works.

Another step towards solving the problems arising out of growing traffic in the city was taken by the different NGOs and schools of the city.

Focussing on the reasons why people visit the city and what are the things that trouble them

for controlling the traffic in Jaipur.

Urban Development and Housing Minister Shanti Dhariwal and Art and Culture Minister Bina Kak were the chief guests on the occasion.

EACH ACCIDENT-PRONE SITE WAS RECORDED FOR 26 HOURS. THE

## CUTS Centre for Consumer Action, Research & Training (CART)



D-222, Bhaskar Marg, Bani Park, Jaipur 302 016, India  
Ph: 91.141.513 3259, 228 2821, Fax: 91.141.228 2039, 228 2485  
Email: cart@cuts.org, Web: www.cuts-international.org/cart/tcs