CHAPTER – I
INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Every trip, notwithstanding the various modes of public transport used in between, almost always consists of a number of journeys on foot – at least, one at the beginning and another at the end of it. The modal share of pedestrians in developing cities tends to be very high. But with the progress of urbanization the infrastructure, amenities, and services relating to pedestrians are often neglected.

Kolkata is the seventh biggest city of India in terms of area and population. Yet, Kolkata has a road to surface ratio of just 6% compared to 23% in Delhi and 17% in Chennai. Besides this, it has the problems of hawkers, illegal occupants, peak time traffic congestion and jaywalkers1 and therefore is unable to provide enough space for fast moving as well as slow moving vehicles.

Poor traffic management, specially in respect of the reckless driving of buses, minibuses and auto rickshaws, inefficient traffic control at intersections, poor road geometrics, lack of public awareness, road users’ indiscipline and inefficient movement, undefined bus stops, etc. are the major causes of road accidents in Kolkata. In the recent past, however, some measures regarding improvement of traffic operations have been undertaken in Kolkata. Some of these measures are a one-way road system on a number of major arterials, construction of flyovers, improvement of geometrics of the intersections, and greater attention to road markings and signage. As a result, there has been some improvements in the average travel speed of vehicles and substantial increase of the accident severity index.

Road accidents have increased significantly in Kolkata due to the fabulous growth of motor vehicles and the numbers of motor vehicles have increased because of the rapid population growth as well as rising economic behaviours of the people. During the period 2001-2005, the total number of accidents which include number of death, grievous and simple injuries, in Kolkata decreased by around 79.35% whereas 24.91% increased rate was observed during the period 2006-2010. The total number of accidents

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1 Annual Review, Kolkata Traffic Police-2010
went up by 25.66% during the period 2011 to 2012. The number of deaths due to road accidents increased by 10% during the period 2001-2005 but that percentage went down by 25.63% during the period 2006-2010. The rate of death was increased by 19.14% in 2012 over the period 2011.\(^2\) Pedestrians contribute highest among different groups of people involved in road accident cases in Kolkata.

The sad and loud grievances of the victims of road accidents and the hue and cry raised by the traffic managers have forced the city planners to undertake the construction of pedestrian bridge at prime locations in the city. The pedestrian bridges (it is also called as Footbridge or Foot-over Bridge) of Kolkata are unique in themselves. Over the time-span of two decades, ten pedestrian bridges have come up within the city. While a couple of them, given their derelict condition, seem best suited as spots for promoting horror tourism, others seem desperate to prove that all the money spent on these pedestrian utility systems has certainly not gone down the drain. Having said that, what strikes one most is the number of people who prefer to give these pedestrian bridges a miss and walk underneath them. They always seem to be outnumbering the ‘nerds’ who ‘actually use these time–eating dinosaurs!’

On a serious vein, given the lack of awareness of the general public about road-safety rules, one cannot blame the police and other government agencies alone for improper usage of the pedestrian bridges. But what they can certainly do is to keep them free from all kinds of misuses, reports of which are regularly cropping up in newspapers and creating enormous negative publicity for the pedestrian bridges. With bright and resplendent hoardings beautifully covering the interiors of even the most ill-maintained pedestrian bridges, like everyone else I could not help wonder whether earning revenue from advertisements had been the sole objective as far as construction of these white elephants were concerned.

The fulfillment of the objectives of a pedestrian bridge, in other words, the very basis of the existence of a pedestrian bridge, is achieved only if the bridges are used. The frequency of road accidents in which the unfortunate pedestrian is a victim, raises a question regarding the use as well as the misuse of these bridges. It is also relevant to find out the effects of different socio-economic factors on the incidence of use / non-use of pedestrian bridge and also to explore if there is any discernible pattern of use / non-

\(^2\) Annual Review, Kolkata Traffic Police-2001 to 2012
use of pedestrian bridges in Kolkata. The study is basically multidisciplinary in nature involving the applications of commerce, economics and statistics.

In this study an attempt has been made to evaluate the issues mentioned above under the area of Kolkata Municipal Corporation (KMC) and South Dum Dum Municipality (SDDM).

1.2 REVIEW OF LITERATURE

The concept of measuring the net advantages of a capital investment project from the social viewpoint in terms of society’s net utility gains was originated by J. Dupuit (1844). Dupuit wanted to assess the social benefit of a bridge for the use in terms of consumers’ surplus - the excess of the consumers’ willingness to pay for a good or services over and above the market price, as a measure of the net societal benefit from a project.

The idea of adding up all the benefits, and the third-party losses and gains had achieved formal recognition in the US in the 1930s. The ‘rules’ of application, in this context, was developed by M.D. Little and J. Mirrless in 1968 named as L–M Approach. L-M explained how to estimate the social values of goods and services. It relied heavily on international prices which they call ‘border prices’. L-M suggested that the total monetary cost of the non-tradeable item should be broken up into tradeable, labour and residual components. Tradeable and residual components can be converted into social costs by the application of standard conversion factor. Similarly, Shadow Wage Rate (SWR) represents the social cost of labour components.

Dasgupta and Pearce (1978) argued that in under-developed countries, the need to build an infrastructure of social capital or capital expenditure has necessitated large public expenditures, and the procedures of efficiency criteria should be designed in such a way that reduces the risk of waste. The appraisal techniques are already fairly well-developed for private investment decisions where the outcomes in term of profits or sales are well defined even though a dispute over the theory remains. These reasons have acted as a stimulus to the definition of social output as the objective of agencies acting “in the public interest”. Cost–Benefit analysis (CBA) extends the idea of efficiency to public expenditures.
A very large number of high-income countries (HICs) have estimated the costs of road traffic crashes over the past three decades. Calculation of direct and indirect costs of injuries, deaths and damages due to road traffic crashes started in the 1970s and many such analyses have been done in USA and Europe. **Mohan, D (2002)** studied the social cost of road crashes in India. He argued that the estimation of costs of road traffic crashes is a matter of great deal of discussion and debate because of the difficulties of putting monetary values to pain and suffering.

However, a critic like **Hauer, E (1994)** questioned the very basic principles of cost-benefit analysis where human lives, pain and suffering are involved, particularly the difficulty of putting monetary values on pain and suffering of the victim. According to him, putting a monetary value on human life is also ethically unacceptable.

**Mohan, D (2002)** further argued that as long as the cost-benefit or cost-effectiveness analysis does not force us to choose between benefits accruing to different classes of road users or against those who are disproportionately at risk, such calculation cannot be used effectively.

The rapid population growth and increasing economic activities have resulted in the tremendous growth of motor vehicles. This is one of the primary factors responsible for road accidents in many metropolitan cities, including Kolkata in India. The increasing number of road accidents is imposing considerable social and economic burdens on the victims, and various direct and indirect costs. Road accidents are essentially caused by improper interactions between vehicles and other road users and/or roadway features. The whole system of accident occurrence is a complex interplay of a number of factors such as pavement characteristics, geometric features, traffic characteristics, road users’ behaviour, vehicle design, drivers’ characteristics and environmental aspects.

A number of studies on road safety have been carried out in India, on different cities such as Delhi, Mumbai, Chennai and Ernakulam as well as on some highways. **Srinivasan and Prasad’s (1979)** studied on “Fatal accident rates in Delhi”; **Tuladhar and Justo’s (1981)** studied on “Analysis of accident rates - a case study”; **Valli and Sarkar’s (1997)** analysed the “Models for road accidents in India”; **Sing and Misra’s (2001)** surveyed on “Fatal accident analysis-a Case study of Patna”. It has been observed that the above-mentioned studies have confined their analysis on the road accident and road safety issues in India and emphasized on necessity of the construction of pedestrian bridges.
Jalihal, Reddy and Kayitha (2005) made an attempt in their paper to analyze the changing traffic composition trends, speed characteristic and travel patterns of Delhi, Mumbai and Bangalore cities of India.

In the study of Chakraborty and Roy (2005) the characteristics of passenger vehicles in Kolkata was observed and assessed. They observed that road safety level depends on some parameters, namely accident severity index, accident fatality rate, accident fatality risk and accident risk. Models for projection of future accident in terms of total fatality and injury types of accidents have been developed and they use these models as tools to measure the effectiveness of future safety improvements implemented in the city of Kolkata.

Most pedestrian crossing facilities are provided at grade (at the same level of the road) Pedestrian Bridge (PB) or Footbridge or Overpass and Subways are constructed at levels different from that of roads, having separated vehicular traffic from pedestrian flows. Compare to at-grade crossings, grade-separated crossing provide better safety protection to pedestrians and cause less disruption to traffic. Several studies have been conducted on the planning, provision and the utilization of pedestrian bridges and subways. Paddy Tillett (2005) in his paper ‘Leaping the Canyon-Footbridges, Used and Misused’ has argued that footbridges have enormous potential to improve the walking environments through safety, convenience and delight, yet are rarely used-and when used, are too often inappropriately.

In 2003, the Census and Statistical Department, Hong Kong, found in a survey that 58.5 per cent of respondents selected at-grade crossings as the most preferred type of crossing, and pedestrian bridges and subways without escalators were not preferred. So, the utilization of some pedestrian bridges and subways might be adversely affected by the presence of nearby at-grade crossings. Audit Commission, Hong Kong, 2007 has conducted a review and found that responsible authority does not have a standing practice of conducting a post-implementing review of pedestrian bridges and subways after its construction.

The study report of the World Bank (2008) revealed that pedestrians alone comprise almost 75 per cent of the road accident fatalities. The Dhaka City Corporation, Bangladesh carried out a feasibility study funded by the World Bank in March 2008, which revealed that most city dwellers have a serious aversion towards using pedestrian
bridges and subways. The study cited height, steep stairs and negative environment on the over bridge as the main reasons why pedestrians feel reluctant to use them.

**Firth, D.E. (1982)** stated that Pedestrian bridges, subways, and zebra crossings were all regarded as safe places for pedestrians to cross the road, but to be of value they must be used by the pedestrian and used effectively.

A study pertaining to pedestrian perceptions of crossing facilities was conducted in Scotland. **Sharples and Fletcher (2000) explained** that the main reasons cited for not using the overpass facility were that traffic was light or that it would take too long to cross the road.

A study was conducted to find out factors that influence use / non-use of pedestrian bridges in the central business district (CBD) of Ankara, Turkey. **Mikho Rasanen, Timo Lajunen Farahnaz Alticafarbay and Cunhur Aydin (2006)** believed that the bridge use or non-use was a habit and not coincidental behavior of pedestrian. The use rate may be improved, if the safety benefits and convenience of using the bridge without considerable time loss are clearly visible to pedestrians.

**Milton Mutto, Olive C Kobusingye and Ronsld R Lett** were conducted a study pertaining to assess the effect of a pedestrian bridge on the rates of pedestrian crashes and injuries in Nakawa on the Kampala-Jinja Highway, Uganda in 1999. Pedestrian had a high perception of risk which did not seem to influence pedestrian bridge use. The gender differences in choice of using pedestrian bridge were significant, while the age difference was not. There were more traffic crashes, and pedestrian injuries, but fewer fatalities after the construction of the bridge.

**Seneviratne and Morralla (1985)** analysed the factors affecting the choice of route of pedestrians and pedestrian movement in Bangkok. **Tanaboriboond and Guyano (1991)** observed that pedestrian discomfort, frustration and concern for safety increase as the level of congestion increases and high demand with limited capacity for pedestrians facilities result in a tremendous concentration of people.

According to **World Disaster Report (1998)** the road traffic crashes have been highlighted as major public health problem. The World Health Organisation’s Annual **World Report (2004)** focused solely on road traffic injuries, and forecast that traffic accidents would become the world’s third leading cause of disease by 2020 that was ninth leading cause of disease in 1990. Pedestrians are most vulnerable of traffic
fatalities in most developing counties (Downing A.J, 1991), and the large proportion of traffic injuries on urban roads (Barr P, Smith G, Baker S, 1998). Road infrastructural improvements are therefore critical in tackling this problem, although a combined strategy of public education, law enforcement, and environment modification has been recommended for the purpose (Avery J G, 1992).

1.3 RESEARCH GAP

Going through the above literatures survey, it is noted that almost all the studies are on road accidents and road safety issues in India and emphasised on necessity of the construction of pedestrian bridges. However, no study has been done so far as to their utilization pattern after their construction. Moreover, most of the studies are outside India, whereas Indian cities, being unique in different aspects may come out with totally separate findings. So, in this study, the emphasis has been given on the utilization pattern of the pedestrian bridges in one metropolitan city of India and its social and economic impact based on the empirical analysis.

1.4 OBJECTIVES OF THE STUDY

The broad objective of the present study is to ascertain the social and economic impact of pedestrian bridges in Kolkata and its adjacent areas, and to ensure the smooth flow of traffic and safety to the pedestrians. The specific objectives as derived therefrom are as follows.

• To give an overview on the history of Kolkata including its population and to analyse traffic characteristics including vehicles mobility of the survey area. In this context, to determine the Compound Annual Growth Rates (CAGR) of registered vehicles, the CAGR of the accidents both of injury and fatality cases and to assess risk intensity of every traffic accident, the probability of a definite traffic accident incidence both for all road users and pedestrians. (Chapter-II)

• To study in details the pedestrian bridges with respect to their structures, traffic flow and speed of vehicles underneath the bridges and social and financial implication of the projects. (Chapter-III)
• To study empirically the utilization pattern of pedestrian bridges in Kolkata with an attempt to enquire about the use / non-use of the pedestrian bridges and to examine if there is any discernible pattern between the two. (Chapter-IV)

• To evaluate the pedestrian bridge projects from the society’s point of view as a whole by means of Social Cost-Benefit Analysis (SCBA) approach. (Chapter-V)

• To conduct comparative analysis of different pedestrian bridges in Kolkata having based on the population of survey area, structural specifications, vehicle-wise traffic flow beneath the pedestrian bridges, traffic speed and congestion time and land use pattern in the vicinity of the pedestrian bridges etc. (Chapter-VI)

• To outline the social implication of the work and to give suggestions towards effective utilisation of pedestrian bridges. (Chapter-VII)

1.5 DATA SOURCE AND RESEARCH METHODOLOGY

This study is basically empirical in nature. The primary data have been obtained in a systematic way through the purposive and systematic questionnaires, interview and observation during the year 2011-12 among 2995 randomly selected pedestrians in the area of Kolkata Municipal Corporation and South Dum Dum Municipality. Secondary data have been collected from the published reports of different organizations, autonomous bodies, government etc. The survey-based data have been processed with the help of the standard econometric tools to derive results involving the socio-economic factors relating to the broader issues of the pattern of utilization of the pedestrian bridges in Kolkata and to formulate the appropriate strategies for the better cause of the society. However, as different chapters aim at different issues, specific methodology adopted is also diverse in different chapters which are mentioned separately in relevant chapters.

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In achieving the aforesaid objectives of the study, the following plan of work has been designed:


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Annexure

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