ADB-ASEAN Regional Road Safety Program

Accident Costing Report:







The Cost of Road Traffic Accidents in Myanmar

Asian Development Bank-Association of Southeast Asian Nations Regional Road Safety Program

Accident Costing Report AC 6: Myanmar

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ABBREVIATIONS

ADB	Asian Development Bank
MCDC	Mandalay City Development Committee
YCDC	Yangon City Development Committee

NOTE

In this report "\$" refers to US dollars.

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1 INTRODUCTION

1.1 Rationale of the Study

Transportation accidents, whether road, rail, air, river, or sea accidents, have undesirable consequences. The negative economic and social impacts on accident victims and their families and friends, as well as on nations, are considerable. until However, recently, road transportation accidents, unlike rail or air transportation accidents, have not been given much public attention, because road accident casualties come in ones and twos, while casualties from rail and air transportation accidents, which are less common, come in large numbers.

With the increase in motorization, road accidents are occurring more frequently in developing countries. These accidents are perceived as inevitable negative side effects of motorization. Moreover, road accidents are seen as random, unintentional, and unavoidable. Road accident costing is therefore needed to highlight the socioeconomic burden of road accidents on families of accident victims and on nations. Road accident costs are monetary, psychological, and emotional, and the socioeconomic impact on families of victims and on nations becomes more serious and widens with accident severity and when fatalities and disabled accident victims are younger and poorer.

Road transport accidents have been shown to cost between 1% and 3% of the annual gross domestic products of developing countries. These are large sums that few developing countries can afford to lose, yet road accidents are rarely perceived as a serious drain on economies.

Research on accident costs is necessary for Myanmar, since no such research has been conducted. Fixed payments for traffic deaths and injuries are made by the government-owned Myanmar Insurance Company. The current payment for a road transportation accident death is MK100,000 (equivalent to roughly the annual salary of a typical employee). This report, created under the Asian Development Bank (ADB)-Association of Southeast Asian Nations project, is the first attempt to estimate road traffic accident costs in Myanmar.

1.2 Objectives of the Study

The objectives of this study are to estimate national accident costs by severity; estimate national road accident costs to enable policy makers to understand the need to prioritize road safety; and suggest data system and road safety research improvements, to develop realistic estimates of road accident costs in Myanmar.

1.3 Scope and Limitation of the Study

Road accident cost data are for 2003. Available data and information are taken from ministries and departments concerned with road safety in Myanmar. However, getting a precise cost of road accidents is difficult due to deficiencies in data recording systems. The best use is made of available statistics, which are supplemented by data and information from personal interviews.

1.4 Organization of the Study

This report is organized into five chapters. Following this introductory chapter, Chapter 2 briefly presents six available methods of road traffic accident costing and a description of the gross output method, which is used in this report. Chapter 3 elaborates on and describes the cost components of the gross output method, together with a computation of the estimates of each cost component in Myanmar. Chapter 4 extends the cost computations to the national level. Chapter 5 presents major findings and makes some suggestions.

2 METHODOLOGY

2.1 Introduction

Determining the costs of road accidents is not an easy task. Road accident costs are monetary and psychological and involve economic and social costs, material and nonmaterial costs, private and public costs, and direct and indirect costs. In computing road accident costs, related component costs need to be identified first. A monetary value must then be placed on each component. Placing a monetary value on each cost component may not be easy, as this depends on the availability of data and the manner in which estimates are derived. If data are not available, certain assumptions will have to be made in estimating the cost components.

2.2 Available Methods

According to Babtie Ross & Silcock (2003), the following methods can be used to cost road accidents: human capital or gross output method, life insurance method, court award method, implicit public sector valuation method, cost of restitution method, and value of risk charge or willingness-to-pay method.

Among these methods, the two most common are the human capital method, also known as the gross output method, and the willingness-to-pay method.

The human capital or gross output method is based on assessing the economic consequences of road accidents, supplemented by a notional sum that reflects the pain, grief, and suffering of those involved and of the families and friends of those killed or injured. The willingness-to-pay method estimates the amount of money people affected would pay to avoid an accident and produces a higher valuation of accident costs.

Since the late 1980s, the willingness-topay method has increasingly been applied for accident costing in industrialized countries. However, the gross output method has been the most commonly used method in most countries over the past few decades. This is the method recommended by ADB for use when determining the cost of accidents in developing countries (under the ADB-Association of Southeast Asian Nations regional road safety project), and this method was used in this report.

2.3 Gross Output Method

The basis of the gross output method is the concept of a statistical life whose value is considered to be the output that an individual can produce over the period of a productive life. Based on this, the cost of an accident will then be the loss of output or the output foregone by the economy as a result of an accident. In general, the productivity of any casualty is assumed to be equal to the average in the economy. The overall cost to the national economy is then the accumulated lost output obtained. This method considers only work performed and ignores the value of leisure. Since it places no value on the emotional content of life, estimates produced by this method should be supplemented by а component of subjective costs, including pain, grief, and suffering (Chin and Tan 2003)

This conservative approach is recommended since it ensures an indisputable minimum value obtained for road accident costs in a country. An argument can be made that if the investment can be justified on such a minimum value, it will certainly be justified on any other value (ADB, 1997)

The cost components in the gross output method can be divided into two components: (i) those involving current resources that are consumed or diverted because of accidents and (ii) those resulting from a loss of future output. The former includes property damage costs, rehabilitation and medical treatment costs, and administration costs. The latter

may be due to absence from work because of medical leave, long-term or permanent disability, or death.

The cost of an accident is composed of casualty-related costs and accident-related costs. In other words, the cost of a road accident is the sum of casualty-related costs plus accident-related costs. Casualty-related costs include cost of lost output; cost of medical treatment; and value of pain, grief, and suffering. Accident-related costs include property damage and administration costs. The total cost of road accidents in a country is the number of accidents by severity multiplied by their respective accident cost.

Road accidents are classified, according to severity, into four categories: fatal,

serious injury, slight injury, and property damage only. A fatal road accident is one that results in the death of at least on person within 30 days of the accident. A serious injury accident is one in which there are no deaths but at least one person is seriously injured and requires at least an overnight stay in a hospital. A slight injury accident is one in which there are no deaths or serious injuries but a person is slightly injured and requires medical treatment but no overnight stay in a hospital. A damage only accident is one in which no one is injured but damage to vehicles and/or property is sustained (Babtie Ross & Silcock 2003).

The conceptual framework for estimating road transportation accident cost in Myanmar using the gross output method can be seen in Appendix 1.

3 COST COMPONENTS

3.1 Introduction

To estimate road traffic accident costs by accident severity, the gross output method requires that the following five cost components be determined: property damage costs, administration costs, costs of medical treatment, cost of output lost, and human costs.

3.2 Damage to Property

In road accidents, damage to property comes as damage to vehicles, damage to public infrastructure, or damage to goods carried within vehicles. In developing countries, vehicle damage costs are often the only property item valued. Vehicle damage costs include the repair or replacement costs, insurance claims, surveyor fees, and any business lost due to vehicles being out of commission.

The main potential sources of data on vehicle damage costs are insurance claims, vehicle fleet operating companies, vehicle repair workshops, and vehicle owners. Insurance claims, if available, are good sources for estimating property damage. However, in developing countries, there is a low rate of insurance coverage and, even when vehicles are insured, compensation is often less than damage costs. Vehicle fleet companies can be good sources of data, but in developing countries few of these companies have good record-keeping practices. Vehicle repair workshops can be good sources of data, but collection of data can be difficult and labor-intensive. However, data from this source can be more representative of the actual cost of vehicle damage.

In estimating property damage cost of road accidents in Myanmar, vehicle repair workshops in Yangon were surveyed for vehicle damage costs, and Mandalay City Development Committee (MCDC) and Yangon City Development Committee (YCDC) supplied public infrastructure damage cost data for 2003. Based on the data and information supplied by the vehicle repair workshops in Yangon, the average cost for damaged vehicles (automobiles) in 2003 was estimated to be MK643,752. YCDC is responsible for infrastructure development in Yangon, the capital city of Myanmar, and MCDC is responsible for infrastructure development in Mandalay, the second largest city in Myanmar. Based on the data supplied by MCDC and YCDC, average cost for damaged public infrastructure in 2003 was estimated to be MK77,167. Average total property damage cost for 2003 is therefore estimated to be MK720,919.

Information on the average number of each vehicle type involved and damaged in each crash type was not available. This made it impossible to determine the average total vehicle damage cost per crash severity.

It is assumed that MK720,919 is representative of property damage cost for all types of road accidents.

3.3 Administration Cost

Administration costs from road accidents largely consist of police service costs related to dealing with accidents, and insurance company costs and court administration costs. The costs are believed to be low, compared with other cost components.

Administration costs from road accidents in Myanmar include administrative cost of mainly general hospitals, Myanmar Insurance, city development committees, and traffic police. The administration cost of Myanmar Insurance Company was 12% of third-party insurance compensation payments, and the administration cost of city development committees was 15% of fines.

Based on 2003 data supplied by general hospitals, Myanma Insurance Company, city development committees, and traffic police, the total average administration

costs of fatal, serious injury, and slight injury accidents were MK84,575, MK152,470, and MK36,575, respectively.

Organiza- tion	Fatal	Serious Injury	Slight I njury
Hospital	30,000	100,000	15,000
Insurance	3,000	895	_
YCDC and MCDC	11,575	11,575	11,575
Traffic Police	40,000	40,000	10,000
Total	84,575	152,470	36,575

Table 1: Administration Cost of RoadAccidents (2003)

— = no data available.

MCDC = Mandalay City Development Committee, YCDC = Yangon City Development Committee. Source: Myanmar data.

3.4 Medical Costs

Medical costs of people injured in road accidents range from costs related to atscene services through to costs related to recovery or death. Costs cover first aid and ambulance services; hospital costs (e.g., cost of food, drugs, doctor and nurse services, X-rays, tests, scans, and operations); and rehabilitation costs (e.g., treatment and prosthetics). These are direct costs, with some being private costs and some being public costs. Medical costs are often the first and most tangible economic burden experienced by victims' families, even though medical costs account only for a small percentage of total road accident costs (Babtie Ross & Silcock 2003).

Basic sources of data on medical costs include hospital medical records, insurance payments, hospital research studies, and road traffic casualty surveys. In most developing countries, although much effort has been put into establishing national trauma and/or injury surveillance systems, these do not usually include cost data. Also, not all casualties are covered by insurance. Casualty surveys can give detailed information, but information collected is dependent on memory recall and honesty, and costs may not be representative.

For Myanmar, medical cost data related to accident casualties were road not available from hospital records. That being the case, specialist doctors of the Orthopedic and Traumatology Department, Yangon General Hospital, were interviewed as key informants. Road traffic casualties receiving outpatient treatment were also interviewed.

Yangon General Hospital is the largest public hospital in Myanmar, and the vast majority of road traffic casualties are treated at this hospital. Being the largest hospital in Myanmar, patients from all over the country are admitted to this hospital, either directly or through referral. Nearly 80% of the total admissions come from Yangon Division, while the rest come from other states and divisions. There are three sources of admissions, Emergency Receiving Center I, Emergency Receiving Center II, and Outpatients Department. Road accident victims are mainly taken care of by Emergency Receiving Center II.

Based on data and information received from informants in general hospitals, road accident victims, and caregivers (usually relatives of victims), it was estimated that in 2003 the average total private costs borne by a fatal casualty, seriously injured casualty, and slightly injured casualty MK67,860, MK326,200, were and MK27,500, respectively. These costs covered medicine, tests, operations, food, transportation to and from medical centers (for patients and/or caregivers), and other expenses.

Two assumptions were made when calculating medical cost. First, for fatalities, it was assumed that road traffic casualties died after spending an average of 3 days in a hospital. Second, for seriously injured casualties, it was assumed that casualties were inpatients in

a hospital for an average of 10 days (based on hospital statistics).

Appendix 2 contains some available data from general hospitals.

3.5 Lost Output

Lost output refers to the loss to the economy of the productive capacity from those affected by road accidents. It is typically the largest casualty-related resource cost incurred in developing countries and can range from as little as 1 day for a slightly injured casualty to decades of forgone work for a person killed or permanently disabled in a road accident (Babtie Ross & Silcock 2003).

Lost output of road accident casualties is calculated as average earnings (or wages) multiplied by working time (i.e., hours, days, months, or years) lost. Although not given priority, lost output calculations can also include lost output of caregivers and those experiencing travel delays due to road accidents.

The source of data on lost working time for fatalities is the average road accident fatality age (taken from published statistics produced by the Myanmar Police Force or hospitals) subtracted from the average retirement age.

For seriously and slightly injured casualties, the amount of working time lost may include time spent recovering from an accident, days lost due to visits to hospitals or clinics, and days lost searching for new jobs. However, the number of working days lost may not be recorded.

To make calculations of lost output, wage rates of victims should also be considered. This wage rate is dependent on the occupations and ages of casualties. However, since data may not be well documented, average annual wage rates or per capita gross domestic product can be used. When calculating the value of lost output in Myanmar, data on the occupations of casualties were not properly recorded in hospitals or police departments, and average annual wage rates were not available. Hence, real per capita gross domestic product (i.e., real gross domestic product divided by the number of people in the labor force) was used. The estimates of lost output by severity of casualty for Myanmar were MK3,334,740 for fatalities, MK55,579 for seriously injured casualties, and MK9,263 for slightly injured casualties.

In making these calculations, three assumptions were made.

Fatality. The average age of death is 30 years (according to hospital statistics). The retirement age is 60 years. Therefore, 30 years of working life is lost.

Seriously Injured Casualties. Based on interviews with key informants, the average working time lost is 6 months.

Slightly Injured Casualties. Based on interviews with key informants, the average working time lost is 1 month.

3.6 Human Costs

Apart from cost elements that directly and indirectly affect accident victims and the economy, accidents have other effects, including pain, grief, and suffering, that adversely affect quality of life. These human costs are therefore added to the overall estimate of road accident cost.

India and Nepal have used 20% of their lost output costs to reflect the human costs of road accidents (ADB, 1997). The following values are used to reflect pain, grief, and suffering in Myanmar and were suggested by Transport Research Laboratory:

- (i) 28% of the total cost of a fatal accident,
- (ii) 50% of the total cost of a serious injury accident,

- (iii) 8% of the total the cost of a slight injury accident, and
- (iv) 0% of the total cost of a damage only accident.

Human costs of road accidents in Myanmar for 2003 are estimated to be MK1,404,737 for a fatal accident, MK654,249 for a serious injury accident, and MK6,377 for a slight injury accident.

3.7 Aggregate Cost

Individual cost components for road accident casualties by severity are summarized in Table 2.

Table 2: Summary of Road Accident
Casualty Costs in Myanmar by
Severity (2003)

Cost Components	Fatal	Serious Injury	Slight Injury
Medical Costs	67,860	326,200	27,500
Lost Output	3,334,740	55,579	9,263
Human Costs	1,404,734	654,249	6,377
Administrative Costs	84,575	152,470	36,575
Other Costs ^a	125,000	120,000	—
Total Cost	5,016,909	1,308,498	79,715

— = no data available.

^a Other costs include lawyers' fees, transportation costs, and funeral costs (minimum) for fatalities.

Source: Myanmar data.

If the crude estimates of pain, grief, and suffering, otherwise known as the human costs of road accidents, are included in the road accident calculations, the total cost of a fatal casualty is estimated to be MK5,016,909, the total cost of a seriously injured casualty is MK1,308,498, and the total cost of a slightly injured casualty is MK79,715.

Most accidents involve multiple casualties. To calculate cost on a per accident basis, casualty rates per accident are established based on average Myanmar Police Force data for Yangon and Mandalay divisions. Table 3 gives the casualty rates for each class of accident for 2003.

Table 3: Casualty Rates By Accident Type (2003)

Type of Accident	Fatal	Seriously Injured	Slightly Injured
Fatal	1.103	1.230	0.260
Serious Injury	—	1.120	0.820
Slight Injury	—	—	1.400

- = no data available.

Source: Myanmar Police Force data.

The average total costs per fatal accident, serious injury accident, slight injury accident, and property damage only accident are MK7,884,749, MK2,251,803, and MK832,520, and MK720,919, respectively.

4 NATIONAL ROAD ACCIDENT COSTS

4.1 Introduction

Total national road accident costs can be determined after having estimated individual road accident costs. by aggregating all individual road accident costs.

Taking account of the possibility of underreporting and improper recording, which can affect the computation of national road accident costs, the number of accidents is expressed in the following ratio: 1:15:20:30, which represents fatal accidents to serious injury accidents to slight injury accidents to property damage only accidents, based on local police data and international experience.

4.2 Computation of National Road Accident Costs

National costs of road accidents in Myanmar for 2003 are calculated by multiplying the estimated individual road accident costs by the estimated number of road accidents (Table 4).

It can be seen from Table 5 that based on an estimated real gross domestic product value of MK3,155 billion, the cost of road accidents in Myanmar in 2003 was approximately MK94 billion, which is about 3% of gross domestic product.

Table 4: National Costs of Road Accidents	
(2003)	

Type of Accident	Cost of Accidents (MK)	Acci- dents ^a	Total Cost (MK million)
Fatal	7,884,749	1,186	9,357
Serious Injury	2,251,803	17,790	40,060
Slight Injury	832,520	23,720	19,747
Property Damage	720,919	35,580	25,650
Total	11,689,991	78,276	94,814 ^b

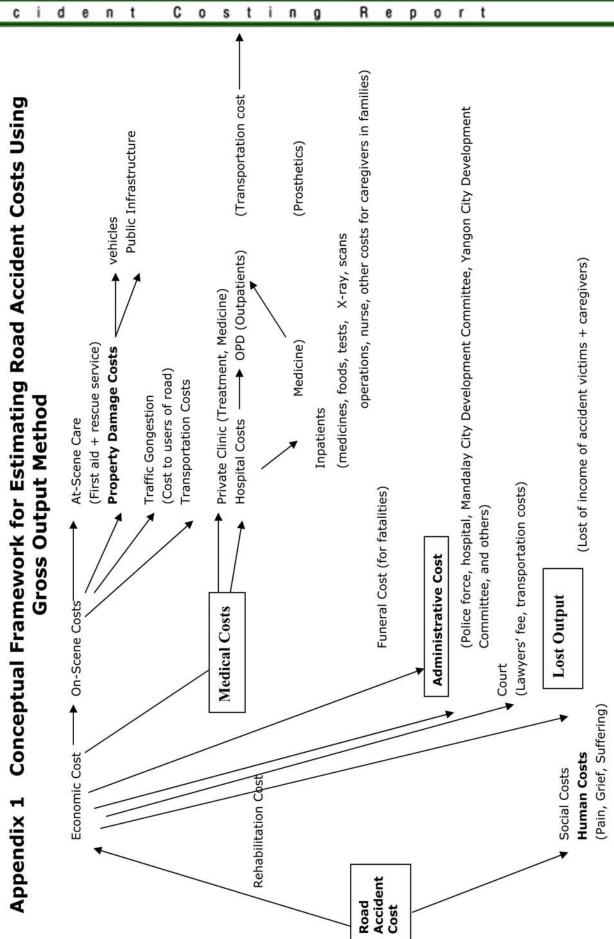
^a Based on local police data and international experience

^b This amount represents about 3% of Myanmar's real gross domestic product, which is estimated at MK3,154,969 million in 2000–2001 prices.
 Source: Myanmar data.

5 CONCLUSION

This report has shown that the cost of road accidents in Myanmar is high, even when conservatively estimated. In 2003, the annual cost of road accidents amounted to nearly MK94 billion, representing about 3% of Myanmar's gross domestic product.

It is therefore necessary for authorities to prioritize road safety when planning for the welfare of Myanmar's citizens.



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Appendix 2 Road Accident Data

Source: Myanmar Police Force; Traffic Police Branch

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Table A2.1: Reported Traffic Accidents by Division (2000–2003)

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Table A2.2: Number of Road Accident Inpatients by Age Group (2002)

Age Group		l	npatients				Death	s	
Age Group	Male	%	Female	%	Total	Male	Female	Total	%
1–4 years	22	2	10	2	32	1	1	2	2
5–14 years	132	11	56	10	188	4	3	7	5
15–24 years	326	27	145	27	471	15	7	22	16
25–34 years	307	25	111	21	418	26	3	29	22
35–44 years	203	16	92	17	295	31	3	34	25
45–54 years	114	9	55	10	169	10	7	17	13
55–64 years	59	5	29	5	88	6	3	9	7
65–74 years	27	2	19	4	46	5	2	7	5
75 years and over	21	2	9	2	30	5	2	7	5
Unknown	13	1	9	2	22	_	_	_	
Total	1,224	100	535	100	1,759	103	31	134	100

- = no data available.

Source: Yangon General Hospital.

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Ano Crow	드	patients	Inpatients Discharge & Death	le & Dea	ith		o	Outpatients and Death	and Dea	ath				
Age Group	Male	%	Female	%	Total	Male	%	Female	%	Total	Male	Female	Total	%
1-4 years	-	0.06	2	0.26	3	3	0.23	-	0.16	4	1		1	1
5-14 years	25	1.52	18	2.34	43	21	1.6	6	1.48	30	-	3	4	3.42
15-24 years	144	8.75	64	8.32	208	63	4.8	46	7.57	109	4	2	9	5.13
25-34 years	528	32.14	247	32.12	775	411	31.33	251	41.28	662	15	4	19	16.24
35-44 years	456	27.75	169	21.98	625	407	31.02	157	25.82	564	24	9	30	25.64
45-54 years	249	15.16	102	13.26	351	212	16.16	82	13.49	294	21	3	24	20.51
55-64 years	134	8.16	91	11.83	225	123	9.38	38	6.25	161	10	5	15	12.82
65-74 years	64	3.9	44	5.72	108	53	4.04	18	2.96	71	9	2	8	6.84
75 years and over	33	2.01	23	2.99	56	16	1.22	4	0.66	20	9	2	8	6.84
Unknown	6	0.55	6	1.17	18	3	0.23	2	0.33	5	2	1	3	2.56
Total	1,643	100	769	100	2,412	1,312	100	608	100	1,920	89	28	117	100
- no data available														

— = no data available.
 Source: Malanday General Hospital.

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Voor	Year Road Accidents		Total
real	Patients	%	Trauma
1991		19.5	
1992	3,034	31.8	9,541
1993	1,947	22.6	8,626
1994	1,790	23.0	7,937
1995	2,141	23.0	9,305
1996	1,962	25.0	7,698
1997	1,694	26.0	6,522
1998	2,498	31.0	7,874
1999	2,197	27.0	8,281
2000	1,242	25.0	5,040
2001	1,853	29.0	6,363
2002	1,634	17.0	9,479

Table A2.4: Percent of Distribution of Yangon General Hospital Admissions (Inpatients)

Source: Yangon General Hospital, Department of Medical Records.

Table A2.5: Percent of Distribution of Yangon General Hospital Admissions (Outpatients)

	Emergency Reco		
Year	Patients	%	Total
1992	10,468	34.6	30,295
1993	10,212	33.3	30,646
1994	_	30.3	29,670
1995	9,290	33.0	28,497
1996	7,631	28.0	27,165
1997	5,714	21.0	27,080
1998	6,726	25.0	26,469
1999	6,868	26.0	26,335
2000	7,565	26.0	28,791
2001	7,452	24.0	30,869
2002	8,244	27.0	30,315

- = no data available.

Source: Yangon General Hospital.

Table A2.6: Traumatology Ward in Yangon General Hospital

Year	Percent of Occupancy	Inpatients per Day (average)	Duration of Stay (days)	Patients per Bed per Year	Available Beds
1998	88.89	88	10	31.73	99
1999	84.75	83	9	33.68	98
2000	90.08	90	10	32.77	100
2001	107.40	107	11	34.81	100
2002	108.51	115	11	37.71	106

Source: Yangon General Hospital.

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