HANDBOOK ON LIGHTNING SAFETY

Dr. Chandima Gomes
Handbook on
Lightning Safety

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This Book is dedicated to
My Wife, Nilanthi
Preface

For the last 10 years, I have conducted a number of training and awareness programs on the protection and safety against lightning, in many countries, specifically in the developing world. However, I never thought of turning my presentations into a book, until I made the following observation at a boy-scout’s camp held in Colombo in August, 2008, which prompted me to write this book.

It was the first day of their camp. The sky was heavily overcastting, but the boy scouts, including my two sons, were very active in making tents, fences etc. despite of the thin drizzle which turned out to be a heavy down pour on regular basis. Although I knew, and even my sons new from their involvement with my work since the babyhood, that what they were doing is a gross violation of the outdoor safety against lightning, I was helpless as in the capacity of a parent I could not ask the masters-in-charge of a number of schools to stop the work of hundreds of enthusiastic scouts. My sons may also have thought that it is not fair to keep themselves inside a safe shelter while many of their friends were actively engaged with outdoor work. However, I felt very guilty that after educating so many people in many parts of the world, for being silent in such a grave situation where the lives of many hundreds of kids were at a risk.

I completed this book within one month of this incident, thanks to the persistent encouragement and enduring support of my wife, Nilanthi and my sons Ashen and Amesh.

In this book, while adhering to the scientifically proven facts of lightning safety, I went somewhat beyond the peripherals of the standards and guidelines practiced in the developed countries, in order to make the recommendations meaningful in the scenario of third world as well.

The book covers almost all practical aspects of lightning safety of human beings and animals, especially relevant to the practices of developing countries. Most parts of the book can be understood for a wide range of readership that has above primary level science education.

As I think, if the reading of this book could prevent at least one lightning caused death or injury, the whole purpose of writing this book will be served.
Acknowledgements

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~ Chandima Gomes
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Lightning claims 69 lives in Maharashtra, India
21 June 2006, The Times of India

Sixty-nine people including 16 women were killed and 12 injured when lightning struck them in Maharashtra over the past few days. A police officer said most of the victims were farmers on their way to work. The bodies were found in open farms and near lakes, the official stated.

A list released by the police on Wednesday evening revealed that the maximum deaths were reported from Latur, where 13 men and two women had been killed. In Mumbai a 19-year-old girl, Sakori More, died after being hit by lightning while strolling with friends at Chowpatty on Tuesday.

Lightning killed 15 in Latur, eight each in Satara and Jalgaon, seven in Ratnagiri, six in Jalna, five in Nashik, three each in Sindhudurg, Solapur, Parbhani and Aurangabad rural, two in Nandurbar and one each in Beed, Nanded rural, Buldana, Raigad, Sangli and Mumbai. While four persons were injured in Satara, one woman sustained burns in Raigad.

Sources said most of the victims were outside their homes when lightning struck them. "It is shocking, but lightning is a natural phenomenon and we can't do much to prevent these deaths. We are asking villagers to refrain from going out in the open during rains," the officer added.

Lightning Kills 5 in Bangladesh
12 September 2006, The Indian Express

Five people were killed and eight others injured on Tuesday when thunderbolts struck them in different villages in the Tangail and Sherpur districts in Bangladesh.
A local news agency reported that Monwar Hossain (14), Jahangir Alam (15) and Ehsanul Haque (14) were killed by lightning at Kalihati, Dhulutia and Amjani villages under Gopalpur upazila in Tangail district. Furthermore, Abul Kashem (30) and Mojibar Rahman (32) were killed when lightning struck them while they were working in their yard with three others, in Sherpue district.

**Bangladesh hit by storms, five killed by lightning**
28 May 2007, DPA

At least five people were killed as lightning hit rice terraces in northern Bangladesh with heavy showers pounding villages across the country, media reports said Monday. Three rice farmers were killed while they were working in soggy fields during thunderstorms in the worst hit Kurigram district near the India-Bangladesh border Sunday, the daily Bangladesh Observer said.

Further up north in Thakurgaon district, another farmer was struck down by lightning during an overnight storm.

A 12-year-old girl was also fatally hit by lightning when she was returning home from school in Sherpur district, the newspaper reported.

**6 killed in lightning in Bangladesh's southern districts**
08 August 2006, UNI

Six people, including two brothers, were killed today in lightning in Bangladesh's southern coastal districts of Pirojpur, Patuakhali and Bhola. The injured have been admitted to Bhola Sadar Hospital. They were stated to be "critical".

In Bhola, Giasuddin(50) and Oli Ahmed(55), died and another two suffered severe injuries when thunderbolt struck them in Medua Neyamatpur Char area of Doulatkhan sub-district.
In Pirojpur district, two teenage brothers, Nasiruddin(18) and Rubel Uddin(15) died instantly when lightning struck them at Dugi village in Nesarabad sub district at about 1300 HRS. "The brothers were struck when they were making a boat in their courtyard in a low-lying area of the district, the only transport in rainy season," an eyewitness says.

In another family tragedy, a villager Jalil Khan(32) and his 7-year old daughter Rabeya were killed in lightning at Alipura in Patuakhali while going to a nearby field to bring their cows back.

**Lightning strikes kill 9 in Bangladesh**  
*21 Mar 2008, Asia World News*

At least nine people were killed after being struck by lightning during seasonal storms which battered hundreds of villages in southern and central Bangladesh, reports said Friday. The daily Bangladesh Observer said that a newly-wed couple was among the four dead in the worst-hit southern Barisal province.

Three farmers were fatally wounded as they were working on rice terraces during a raging electric storm in Madaripur district in southern Bangladesh.

Two other workers were hit by thunderbolt in neighbouring Shariatpur district. They died on the way to hospital, it said.

**Lightning kills 30 people in Pakistan’s north**  
*20 July 2007, Reuters*

Lightning killed up to 30 people when it struck a remote mountain village in northwestern Pakistan on Friday, police said. The incident happened in Ushari Dara in Dir district, 190 km (120 miles) northwest of the capital, Islamabad.
"We have reports that 25 to 30 people were killed and about dozen houses were destroyed," police officer Faiz Mohammad at the police control room in Dir told Reuters. He feared the number of fatalities could rise.

**Lightning kills 8 in Pakistan**  
16 June 2007, Xinhua

Lightning during heavy monsoon rains Saturday struck a remote Pakistani village, killing at least 8 people and leaving several others injured, officials said.

The deadliest strike occurred overnight in the tiny hamlet of Matta, a town some 160 km northeast of Peshawar, capital city in the North West Frontier Province, local councilor Noor Alam said.

The lightning struck several homes of villagers, destroying them. At least four people were lying buried under the rubble.

**Lightning kills 4 soldiers, wounds 59 in Sri Lanka**  
01 April, 2008 (Reuters)

Lightning killed four soldiers and wounded 59 others during military training in north central Sri Lanka, the military said on Tuesday.

"When troops were gathered for the training at the training camp in Katukaleyawa in Polonnaruwa, all of a sudden lightning struck the place and four soldiers were killed and 59 injured," military spokesman Brigadier Udaya Nanayakkara said.
Lightning kills an entire football team
29 October, 1998; The Independent (LONDON)

Football fans in the central African state of Congo were hurling accusations of witchcraft at each other yesterday after a freak blast of lightning struck dead an entire team on the playing field while their opponents were left completely untouched. The bizarre blow by the weather to all 11 members of the football team was reported in the daily newspaper L'Avenir in Kinshasa, the capital of Congo.

"Lightning killed at a stroke 11 young people aged between 20 and 35 years during a football match," the newspaper reported. It went on to say that 30 other people had received burns at the weekend match, held in the eastern province of Kasai. "The athletes from Basanga {the home team} curiously came out of this catastrophe unscathed." The suspicion that the black arts might be involved arose firstly because the opposing team emerged unharmed and then again because the score at the time was a delicately balanced one all. "The exact nature of the lightning has divided the population in this region which is known for its use of fetishes in football," the newspaper commented. Much of the detail about the match remains obscure.

Witchcraft is often blamed for adverse natural phenomena throughout western and central Africa. It is relatively frequent for football teams to hire witchdoctors to place hexes on their opponents. In a similar, though less deadly incident in South Africa over the weekend, six players from a local team were hurt when lightning struck the playing field during a thunderstorm.
Biography

Dr. Chandima Gomes obtained his BSc (Physics Specil) Degree with First class Honours from the University of Colombo in 1993. From 1994 to 1999, he conducted research in Lightning Physics with high voltage laboratory experiments, mostly at Uppsala University, Sweden. In 1999 he obtained his PhD Degree. At present he is a Senior Lecturer at the University of Colombo. He is also a Chartered Engineer and an advisor in Lightning Protection and Electromagnetic Compatibility to institutions in several countries including USA. Dr. Gomes has coordinated a number of programs on Lightning Protection both at national and international level.

Other related publications of the author

Structural Protection Against Lightning

Lightning Surge Protection
ISBN 978-955-51230-2-0

Lightning
ISBN 978-955-51230-3-7

Rs. 250

The user of this handbook new to lightning protection is urged to study the introductory sections on lightning interaction and effects before utilizing the protection design sections of this handbook. Treatment of these topics begins on an elementary level and is aided by illustrations which should enable the non-specialist to proceed to an adequate understanding of important aspects. Lightning safety - human. Is it safe to use a mobile phone during a thunderstorm? YES. Most lightning safety advice only focuses on the direct strike. However, as shown in this diagram, direct strike is the least common way to be killed or injured by lightning. Instead, ground current which will cause step voltage is the most likely cause of lightning deaths and injuries. Source credit: Environment and Climate Change Canada (ECCC) Further reading: Cooper, M.A. and R.L. Holle, 2010: Mechanisms of lightning injury should affect lightning safety messages. Preprints, International Lightning Meteorology Conference, Vaisala, April 21-22, Orlando, Florida, 5 pp. Lightning safety - human