

South Asian Lightning Awareness Program (SALAP)

Sri Lanka Bangladesh and Bhutan

October 2004- March 2005

Organized by

Department of Physics, University of Colombo, Sri Lanka
Department of Physics, Jahangirnagar University, Bangladesh.
Technological Assistance for Rural Advancement, Bangladesh
Royal Bhutan Institute of Technology, Bhutan

Supported by

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&

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Last but not least, we forward our heartfelt gratitude to all the participants that attended the events in Sri Lanka, Bangladesh and Bhutan, without whose involvement the program would not have been successful.

Dr. Chandima Gomes, University of Colombo
Prof. Abdul Mannan Chowdhury, Jahangirnagar University
Dr. Munir Ahmed, TARA
Prof. Parashuram Sharma, RBIT

Background

Every year, in this part of the world more than 500 people die and several thousand encounter injuries of various degrees due to lightning. The damage caused by lightning in the power, communication and industrial sectors and even at domestic level, is over several hundred million dollars per year. Equipment damage is on the increase for the last few decades due to wide spread use of electronics equipment, extension of the national power grid into rural areas and the mushrooming communication towers all over the country. Many of the lightning threats can be minimised by giving proper education to engineers, scientists, administrators and general public regarding the lightning safety culture. However as the region is lacking experts in this field such education has not been given so far.

South Asian Lightning Awareness Program (SALAP) was launched with the objectives of educating the general public and engineering community in South Asia regarding the basics of lightning, lightning related hazards and lightning protection. The aim of the program is to curb the lightning related hazards and property damages to a minimum level so that especially, the quality of communication and power sectors in the region will be improved. As the region to be covered is vast, one organization would not be able to handle the complete program. Therefore, in the phase 1, the program was conducted through the University of Colombo, Sri Lanka, TARA (an NGO) and Jahangirnagar University, Bangladesh and Royal Institute of Technology Bhutan. The initial programs conducted in Bangladesh and Bhutan were treated as platforms for building Lightning Research and Awareness centres in the two countries. These centres are supposed to launch educational and awareness programs in the respective countries with a trained local team who get occasional support from the foreign experts. The centres have also planned to build up collaborations with international institutions with regard to research and awareness promotion.

Sri Lanka Program

Main Organizer: Department of Physics, University of Colombo, Sri Lanka

Collaborators: National Science and Technology Commission, Sri Lanka
Bangladesh Lightning Awareness Centre, Bangladesh

Period: 24-05-2004 to 31-03-2005

School Program

In contrast to Bangladesh and Bhutan, in Sri Lanka the lightning protection and safety education programs have been conducted at various levels for the last 6 years. Our experience reveals that in a country like Sri Lanka where the educational structure is well set and formidably organised, one of the best ways of conveying a message to the society is to channel it through the school students. The students of the age between 14 -17 years are the best to understand the basic phenomenon and convey the message to the family

members and neighbours. In the Sri Lankan rural society there is a respect for the ideas of the school children of that age by the elders who have not obtained that level of education. In urban areas too, the school students may cause a strong influence on their parents when it comes to scientific matters. Furthermore, students at many large-scale schools are involved with a number of social programs through which they can spread the knowledge. The method has been successful in several other cases too, such as “Safe use of pesticides” and “Mosquito related disease prevention” launched by the Ministries and NGOs.

School teachers are also powerful communication media between the experts and the society. Especially, in rural areas the school teacher plays a vital role in the community and most often takes the leadership in communal programs. Therefore, we have found that educating the school teachers should also be a part of the programs.

The concept of “Knowledge to the society through school programs” will be a dominant tool in the dissemination of knowledge in many parts of the South Asia as the culture and the educational networks are some what similar in the region. However, the structure of the events should be adjusted to suit different communities.

We have invited five schools from different parts of the country, where the lightning density is high, to organise seminars for the students and teachers on Lightning Safety. The originally selected schools were

1. Maliyadeva Boys College, Kurunegala
2. Ferguson Balika Vidyalaya (girls school), Ratnapura
3. St. Benedict’s College (boys school), Kotahena, Colombo
4. Rahula Maha Vidyalaya (boys school), Matara
5. Combined schools from Colombo

However, the venue at Rahula Maha Vidyalaya which is situated in one of the worst Tsunami-affected regions had to be changed due to the unavailability of auditorium facilities. The venue is now shifted to Thissa Maha Vidyalaya (mixed school) in Kalutara, another southern city. The seminar will be held on the 28th of March 2005. By the request of the Minister of Science and Technology, the combined school seminar which has been planned to be organised in collaboration with the Colombo Museum was combined with another ministerial program and will be staged in mid-April. The seminar will be held under the banner of the SALAP Phase-1 but the expenses will be borne by the National Science and Technology Commission. As we have to complete the five school seminars before the 31st of March 2005, we arranged the fifth seminar at Clifton Girls School, Colombo to be held on the 30th of March 2005.

The five seminars that have been held were very successful. All five were half-a day workshops attended by over 200 students in four cases and 48 in one case. In each seminar the main resource personnel Dr. Chandima Gomes or Dr. I. M. K. Fernando gave 4 presentations on the following topics. The presentations were given basically in Sinhalese language.

1. Present situation in the region with regard to lightning deaths and injuries and the objectives and brief description of SALAP PHASE-1

2. Basic concepts of lightning
3. Lightning safety guidance and international codes
4. Introduction to lightning protection of structures and equipment

At the seminar at Maliyadeva College, Kurunegala, the Physics teacher in the school gave an account on the lightning related accidents that have been reported in the area and the problems they have with respect to lightning.

At the seminar at Ferguson Girls School, Ratnapura, Dr. Munir Ahmed, the SALAP Coordinator-Bangladesh participated as a guest resource personnel. He gave a detailed account on the lightning awareness program in Bangladesh and also stimulated the interest among the students by conducting a quiz program.

At the seminar at St. Benedict's College, Colombo, Mr. K.N. Bandara, from the National Land Sliding Management Unit, NBRO, gave an invited presentation on Tsunami effects. The lightning safety of Tsunami Victims in temporary shelters was also discussed. Dr. J.C.N. Jayasuriya, Director, National Science and Technology Commission gave introductory remarks on the importance of this program.

The seminars at Clifton Balika Vidyalaya and Tissa Maha Vidyalaya were basically conducted by Dr. I.M.K. Fernando, Senior Lecturer and Research Scientist of Lightning Physics, University of Colombo. The academic staff at each institute has given a very good support in each case to make the event successful.

The presentations of the seminars were followed by a number of questions related to the subjects asked by the students. Many questions were forwarded in the written form. At Kurunegala and Ratnapura seminars almost all the questions were discussed during the program. However, at the seminar in Colombo the number of questions were too high (38 questions) so that an arrangement was made with the school coordinators to send the answers within a two week period. Apart from the questions on basic concepts, several students and teachers had personal discussions with the resource personnel regarding the lightning related problems that they have in their houses, especially in connection with the power and communication systems. The resource personnel promised to look into the matter after making inspection visits to the respective sites.

As an aftermath to the seminars, correspondences were made with the science teachers/principals at each school to form a team of students to promote lightning safety awareness in their regions. The team of students will be given a group seminar by the Lightning Research Unit at the University of Colombo and the students are also trained to prepare the awareness material. They will conduct seminars at other schools in the region with the help of their science teacher.

Lunch was provided to the resource personnel and the supporting staff after the workshop. The students and teachers were served with light refreshment

Summary of the program

Seminar-1

Venue: Auditorium, Maliyadeva Boys College, Kurunegala

Date: 07th of February 2005

Organizers: University of Colombo and a panel of school teachers and the principal

Resource personnel: Dr. Chandima Gomes

Number of students attended: 218

Age of students: 16-17 Years

Number of teachers attended: 06

Seminar-2

Venue: Auditorium, Ferguson Girls School, Ratnapura

Date: 25th of February 2005

Organizers: University of Colombo and a panel of school teachers

Resource personnel: Dr. Chandima Gomes and Dr. Munir Ahmed

Age of students: 15-17 Years

Number of students attended: 205

Number of teachers attended: 05

Seminar-3

Venue: Auditorium, St. Benedict's College, Kotahena, Colombo

Date: 01st of March 2005

Organizers: University of Colombo, National Science & Technology Commission and a panel of school teachers

Resource personnel: Dr. Chandima Gomes, Mr. K.N. Bandara and Dr. J.C.N. Jayasuriya

Number of students attended: 238

Age of students: 15-17 Years

Number of teachers attended: 07

Seminar-4

Venue: Auditorium, Clifton Girls School, Colombo

Date: 30th of March 2005

Organizers: University of Colombo, a panel of school teachers

Resource personnel: Dr. I.M.K. Fernando, a panel of school teachers

Number of students attended: 48

Age of students: 17 Years

Number of teachers attended: 06

Seminar-5

Venue: Auditorium, Thissa Maha Vidyala, Kalutara

Date: 28th of March 2005

Organizers: University of Colombo, a panel of school teachers

Resource personnel: Dr. I.M.K. Fernando

Number of students attended: 221

Age of students: 14-17 Years

Number of teachers attended: 04

Outcome

The students and teachers educated in lightning safety and protection will spread the knowledge among their communities. Thus the number of lightning deaths and injuries and the property and equipment damages will be reduced to a minimum number. One of the major victims of Lightning is the power network and the power network related equipment. By educating the students for the lightning protection and safety, the damages to these systems and equipment can be minimized. The program will help to promote the interest on lightning protection engineering among the students which will be beneficial to the country in long term.

Bangladesh Program

Workshop for School Teachers and Social workers

The workshop was organized by TARA - Technological Assistance for Rural Advancement on the 15th of December 2004, in collaboration with Department of Physics, University of Jahangirnagar, Bangladesh and Department of Physics, University of Colombo, Sri Lanka. Science teachers (Physics teachers) from different schools of Dhaka city were invited to attend in the workshop. In addition engineers from the department of Rural Electrifications, Meteorological department, T&T, Grameen phone, and Real Estate Companies were also invited to participate in the workshop. Twenty two participants were present at the workshop.

Dr Chandima Gomes, University of Colombo, Sri Lanka, gave the main presentations on the fundamentals of lightning, lightning protection and safety. After the presentations there was a group discussion succeeded by comments and recommendations from each group. Dr Chandima Gomes in his presentations, mainly focused on fundamental concepts of lightning, common lightning accidents in South Asia, Personal lightning safety, lightning safety of household equipment and promotion of lightning protection among the school children Dr Munir Ahmed, the Executive Director of TARA gave a welcome address on the occasion and highlighted about Lightning Physics. Prof. Dr Moniruzzaman, Department of Physics, Jahangirnagar University gave a brief description about the programme. Dr Alope Kumar Chakrobarty has given a short presentation on the status of lightning in Bangladesh.

Workshop for Scientists

The workshop was organized by Department of Physics, University of Jahangirnagar on the 17th of December 2004, , in collaboration with TARA - Technological Assistance for Rural Advancement Bangladesh and Department of Physics, University of Colombo, Sri Lanka.

There were 36 participants attended the workshop. The audience was represented by university professors, postgraduate students, administrative officers, journalists and military.

The presentations were based on the scientific background, engineering concerned and general safety of lightning. A major part of the program was conducted by Dr. Chandima Gomes, Senior Lecturer, Department of Physics of the University of Colombo, Sri Lanka and a part of the program was conducted by Prof. Dr. Md. Abdul Mannan Chowdhury, Department of Physics, Jahangirnagar University, Bangladesh.

Dr Chandima Gomes, in his presentation focussed mainly on lightning protection in communication system, lightning accidents, building protection, lightning protection in power system, lightning protection standards and codes, lightning safety of outdoor workers and alternative lightning protection system.

Prof. Dr. Md. Abdul Mannan Chowdhury, in his presentation focused on fundamentals of lightning and its status in Bangladesh.

Prof. Dr. Khandaker Mustahidur Rahman, Honorable Vice-Chancellor, Jahangirnagar University inaugurated the workshop.

Prof. Dr. Mir Md. Akramuzzaman, Chairman, Department of Physics, Jahangirnagar University gave a welcome address to the participants and the guests. Prof. Dr M. Muniruzzaman, Convener of the workshop and Vice-President, Bangladesh Physical Society gave a briefing to the audiences about the programme.

Bhutan Program

The workshop was conducted under the South Asian Lightning Awareness Program Phase-1, which is jointly funded by the UNESCO New Delhi and Winrock International under SARI/Energy Small Grants program. The Bhutan Phase was organized by the Royal Bhutan Institute of Technology (RBIT), Rinchending, Phuentsholing Bhutan and Sponsored by UNESCO, New Delhi office. It was held at RBIT conference hall on 27th and 28th December 2004. The workshop was conducted in English Language.

The workshop is mainly aimed at providing the first hand awareness and information about the Hazards of Lightning and the basic preventing methods to the Engineers, Teachers and Officials of the Royal Government of Bhutan. This workshop was an inter-disciplinary forum for the education and exchange of knowledge in the latest research and developments in the area related to lightning related atmospheric physics, lightning protection and discharge. It was also intended to be a platform to promote links and collaborations among the practicing engineers and scientists in the region.

The workshop was attended by 45 participants of whom the majority was engineers. Dr. Chandima Gomes, University of Colombo and Dr. Munir Ahmed from Bangladesh participated as resource persons. The presentations by the speakers followed a general discussion at which a proposal was seconded to form a Lightning Research and Awareness Institute in Bhutan.

Final Outcome

The Knowledge Imparted

The participants were educated in basic concepts of lightning, awareness of lightning threats, achieving low cost effective lightning protection and maintenance,

1. To have the lowest possible level of lightning damages in industries, service providing institutions, electronic and electrical storages, power plants, oil refineries, in Bangladesh and Bhutan so that the replacement cost of equipment and downtime losses will be kept at minimum level.
2. To have a power and communication systems with minimum exposure to lightning threats, so that a reliable and uninterrupted service can be provided to the consumers
3. To have a general public, knowledgeable in Lightning protection so that the lightning related human and live stock deaths, injuries and property damages at domestic level etc. will be kept at minimum.

The Formation of Lightning Research and Awareness Centers

One of the major outcomes of the SALAP Phase-1, so far, is the formation of a Lightning Research Centre (LRC) and a Lightning Awareness Centre (LAC) in each country where the program was so far completed. The LRC Bangladesh was established in Jahangirnagar University, under the leadership of Prof. Mannan Cowdhury while the LAC Bangladesh was established at TARA under the Leadership of Dr. Munir Ahamed. The LRC & LAC of Bhutan was formed under the umbrella of RBIT with Prof. P. Sharama taking the leadership.

The idea of the LRC and LAC in each country is to support the general public and engineering communities in respective countries to acquire the expertise knowledge and engineering skills and latest information on lightning protection technology from the highest international level. Especially the power and communication sectors will be immensely benefited from such institutions. The institutions are expected to impart the knowledge to various communities of the society starting from the metropolitan & industrial level to the rural and school level. The Bangladesh Chapter is already gathering momentum as the international lightning protection community has already pledged their fullest support for the operation of the institution.

Relevance to the SARI/Energy Program

Maintaining an uninterrupted smooth and reliable power distribution network is equally important as generating the energy. In many parts of South Asia Lightning causes a great threat to the quality of electrical power due to the system damages and over voltage surges that are injected into utilities through the power lines. The engineering and scientific communities in this region find difficulties in accessing the up to date information and technical skills in mitigating these lightning related hazards due to various reasons.

Furthermore, the region should be equipped with several research groups to study the lightning characteristics of tropical climates to improve the quality of protection technology. One basic outcome of such research work and development of technical skills is a reliable power supply to the nations in the region. The SALAP and its aftermath activities are targeting at achieving these goals.