



## MAJOR R&D HIGHLIGHTS OF PROJECTS

### Devastating Landslide and Flash Flood Consequent to the Abnormally High Precipitation (Cloudburst)

"Cloudburst" usually signifies the sudden and heavy rain fall over a short duration. This phenomenon occurs primarily due to the sudden upward drift of moisture-laden clouds as a tall vertical column termed as "Cumulonimbus clouds" usually associated with the cloudburst. The phenomenon of cloudburst is something about which the measurement concerning the sudden amount of downpour, at a particular location / place, is difficult. In recent years, it has been noticed that the phenomenon of cloudbursts, an extreme hydro meteorological condition, has greatly contributed towards destabilizing the slopes not only during the event of cloudbursts but also even after the event for a longer time. The after-effects of cloudburst result into flash food, which also generates landslides of recurring nature. In most cases of cloudbursts, the road had been the worst affected. The disruption of traffic by way of vanishing or partial damage or blockade of road due to occurrence of such events makes real challenges not only to the affected people but to the profession.

Very recently on 4th August 2012, a devastating event of cloudburst took place at Deodital village, near Sangam chatty, District Uttarkashi in the catchment of Ashi Ganga, which joins with Bhagirathi at Gangori (Figure 1). As a consequence of this devastating event, flash flood generated huge amount of debris slid from the bank of the river and its connecting drainages, which has washed off a very important bridge at Gangori on Rishikesh-Gangotri National Highway. In addition, considerable length of road stretches at various places along this National Highway have also got

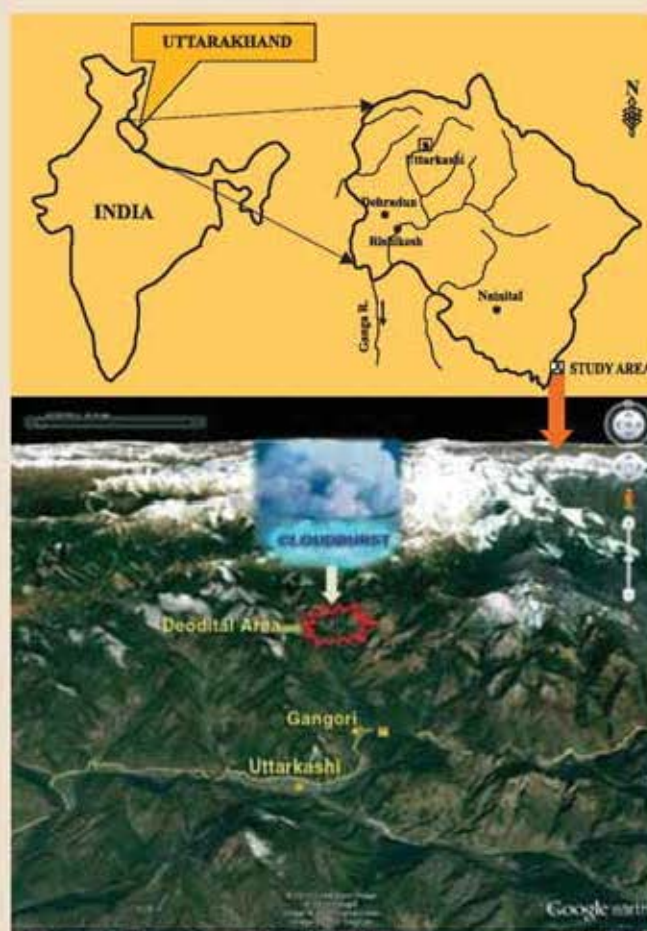


Fig. 1 : Location of the Study Area

completely damaged/washed off.

Following are some of the major observations based on field visit undertaken to the affected area by CRRI Scientists :

1. National Highway - 108 where the damages took place is one of the busiest routes in the region



because of its connectivity to Gangotri (one of the famous pilgrims in our country). As a result, millions of tourists visit this area annually from all over the country and any disruption to the connectivity can cause unrest as far as safety and well being of the people is concerned.

2. The economic dependability on the flow of tourists and also disruption free transportation of goods are very important for the socio-economy of the people and its region. Serious disruption to traffic for longer duration can create socio-economic unrest in the region.



**Fig 2: Breached roads at different places (from Chomoli to Gangotri), caused by failure of overburden and varied size of boulders**

3. A number of hydroelectric projects are under construction in the region. The progress and safety of these projects get adversely affected during such incidents/events.
4. As per the records maintained by the local administration, at least 60kms National Highway including 13 bridges (out of which six are footpath bridges) have got damaged. As many as 80 villages were found to be totally cut-off from rest of the region. A number of landslides, at various locations, have damaged the highway, as shown in Figure 2. Similarly, the flash flood has damaged the highway along with the settlements in many areas (Figure 3). As reported, the road was blocked for as many as 15 days.

5. It was observed during the field inspection that most of the landslides have taken place in the overburden material.
6. The landslides occurred are required to be investigated in details from geological and geotechnical considerations for designing long term remedial measures since leaving these landslides without remedy or improper / partial remedy will only aggravate and multiply the problems in future.

Since the frequency of high precipitation events like cloudbursts are increasing, it is recommended to map out the affected areas, including highways, vulnerable to failure/damage during such events. It is also recommended to apply the modern remote sensing & GIS techniques with the help of regional remote sensing centres established by Ministry of Space (MOS) in every state. This will help in doing a holistic mapping which could be used as a effective tool for pre-disaster planning instead of looking for only post-disaster restoration & rehabilitation. If we don't change the current approach we may end up with very serious consequences since there will be limited space available for low and moderate disaster prone category having high concentration of population making demand for better and safe livelihood.



**Fig 3: Road formation washed away through floods (A), Houses and Bridge destroyed at Gangotri (B & C), Bridge construction work is under progress at Gangotri (D).**

## Design of Noise Barrier at JJ Flyover, Mumbai

The JJ Flyover in Mumbai is passing along / above the residential area / colonies. The residents of these residential areas have expressed serious concerns not only with regard to noise and vibration generated by traffic using the flyover but also the loss of privacy due to the proximity of elevated corridor to their residences. Keeping in view these concerns, MSRDC entrusted the Central Road Research Institute, New Delhi to conduct a study dealing with noise, airborne vibration and privacy issues along

the JJ flyover, and thereafter suggest mitigation measures. Fig.1 presents a typical view of JJ flyover/corridor which is 25 kms long). A broad study methodology adopted is presented in a Flow Chart shown in Fig. 2. Sonogram (below JJ flyover) showing that frequency (20HZ – 20 KHZ) is highly affected is presented in Fig.3. Figure 4 exhibits Noise mapping (of top and bottom of JJ flyover) showing the affected area with different noise levels. As it is well known, noise barriers are the most



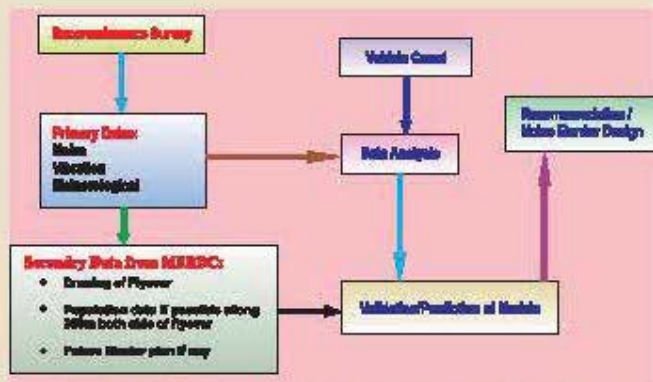


Fig. 2: Flow Chart showing the Study Methodology

effective method for mitigating the noise sources along roadway, railway, and industrial establishments. It is an exterior structure designed to protect sensitive land uses from noise pollution. Noise barriers, often referred to as 'Sound abatement walls' are commonly constructed by using steel, concrete, masonry, wood, plastics, poly carbonate, acrylic, insulating wool, or composites. Some noise barriers may also consist of masonry wall or earthwork, or a combination thereof in a given

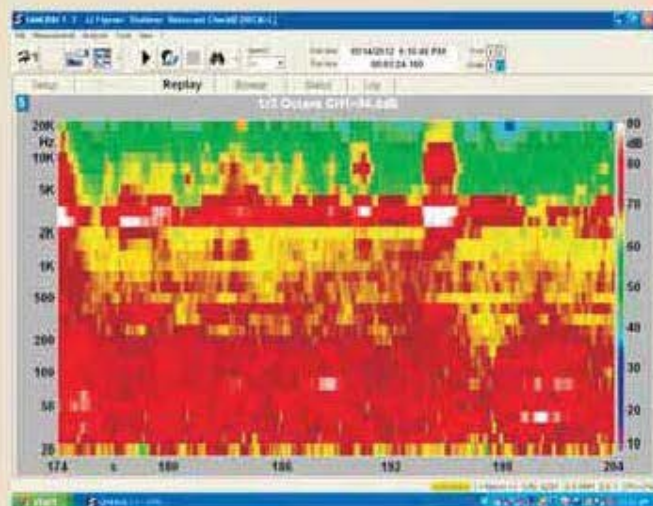


Fig.3 : Sonogramme (below JJ Flyover) showing that frequency (20Hz-20kHz) is highly affected

situation. Noise barriers fall in two categories: absorptive and reflective. Absorptive barriers, as the name suggests, absorb sound energy emanating from the source of sound.

The noise, vibration and privacy issues have been addressed at JJ flyover in the vicinity of residential

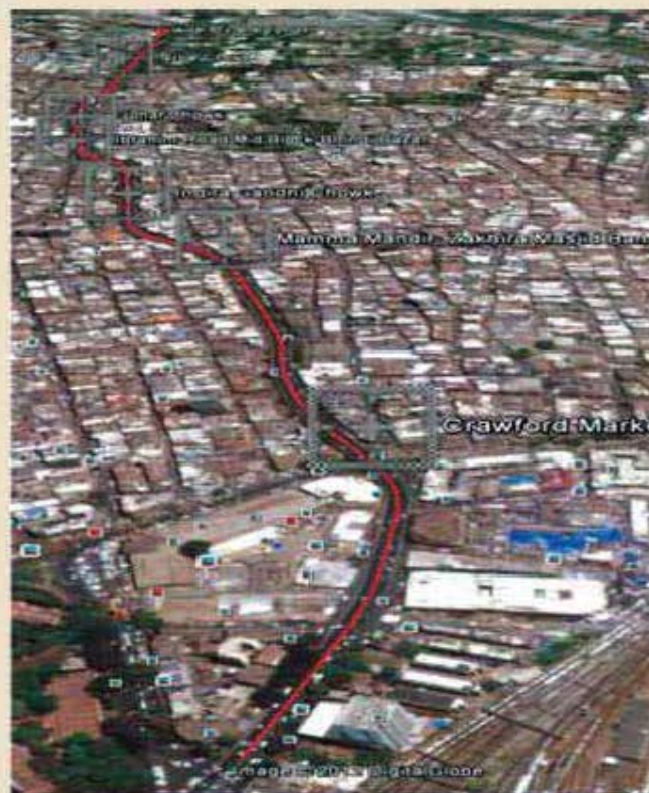


Fig 1. A typical view of JJ Flyover / Corridor (2.5 kms Long)

areas to achieve reduction of noise to 12 dB(A) level.

- The design of barrier has been suggested in three parts. Fig.5 gives different types of noise barriers suggested at JJ flyover. In all the flyovers, noise perforated aluminium Bi - Absorptive panel class A4-B3, based on EA-1793-94 standard with the best of specification, has been recommended. Height of the noise barrier suggested is 3.5m straight. In 3.5m height; half meter reflective transparent panel class B9 (15 PMMA) has been recommended along the flyover except in four turning of the flyover.
- At turning of the flyover, 3m height transparent steel metal reinforcement sheet and half meter top perforated aluminium B1 absorptive panel class A4-B3 based on EA-1793-94 standard, in a length of 4m, has been recommended.
- Keeping in view the length of flyover, Emergency Exit door on both sides of the flyover in the middle with half km gap has been recommended.



Fig.4 : Noise Mapping (Top/Bottom of JJ Flyover) showing the affected area with different noise levels



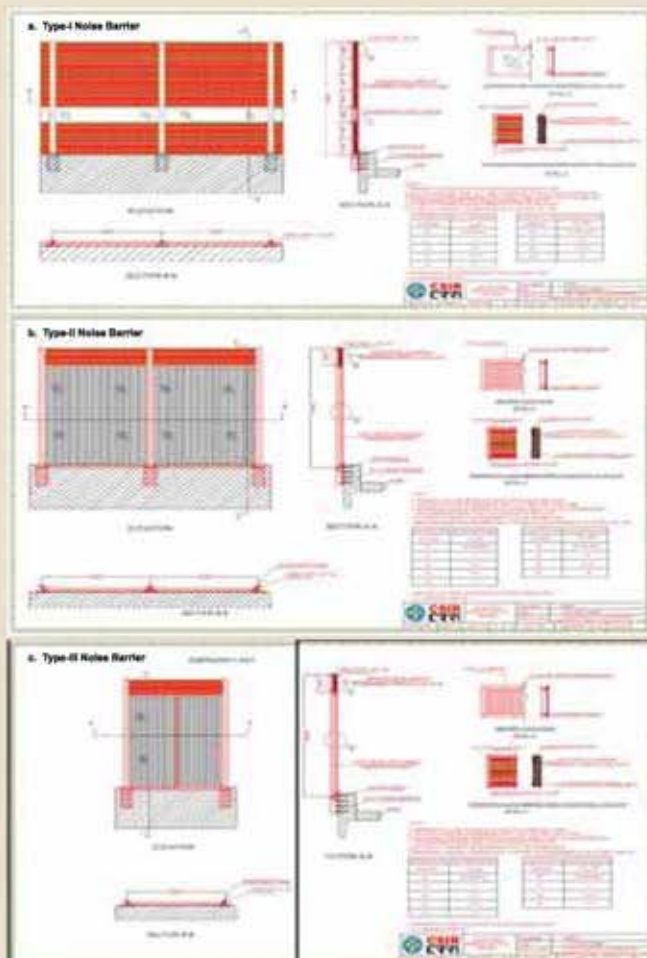


Fig.5.. Different Types of Noise Barriers suggested at JJ Flyover

## WORKSHOPS / MAJOR EVENTS

### National Workshop on Understanding of Real World Indian Driving Cycle and its Impact

A workshop was organized on Dec 4, 2012 at CSIR-CRRI, New Delhi. The main objective of the workshop was to understand driving cycle in the real world. In WP-29 agreement 1988, India has accepted to adopt the world organized driving cycle. There is thus a need to develop both road and vehicles to



Inauguration of the workshop in progress

meet various standards specified in this agreement.

The workshop was attended by more than 70 delegates from all over the countries. Participants were both from academia like IITs, NITs, IIP, CMRI, NEERI and also from Industries like Maruti Udyog Ltd., Indian Oil, S Paramics & SIAM. It was concluded during the workshop that Real World driving cycle can be useful to modify engine to meet the fuel economy. Driving behavior and gradient could be another reasons for effecting the driving cycle for Indian road conditions.

## Vigilance Awareness Week

Vigilance Awareness Week was observed at CSIR-CRRI during Oct 29 to Nov 3, 2012. On October 29, a Pledge administered by Dr. S. Gangopadhyay, Director, CSIR-CRRI was taken by all the staff members. Banners and Posters were displayed at prime locations in the Institute premises besides the Main Gate.

In this series, Debate Competition on "Advantages and Disadvantages of RTI Act 2005", and Slogan Writing Competition on "Prevention of Corruption" were organized for the staff members and the winners were awarded.



Celebration of Vigilance Awareness Week



## CONCLAVE on 12th Five Year Plan Projects

An in-house Conclave was organised during December 21-22, 2012 at CRRI on the 'Twelfth Five Year Plan Projects' recently undertaken by CSIR-CRRI. The main objective of this conclave was to review and sensitise all the staff engaged on various activities of these projects. The Champions, the Co-champions and the Work Package Leaders of the three major projects viz., (i) Development and Application of Technologies for Sustainable Transportation System (SUSTRAN), (ii) Development of Indo-Highway Capacity Manual (Indo-HCM) and (iii) Evaluation of Economic Loss due to Idling of Vehicles at Signalised Intersections and Mitigation Measures (ELSIM), presented the objectives, scope, methodology, expected outcome/output, progress made so far and work plan



In-house Conclave on 12th Five Year Plan projects In progress

for the next six months. The projects networked with other CSIR Laboratories were also discussed during the Conclave.

## Knowledge Dissemination Workshop at Coimbatore

CSIR-Central Road Research Institute, New Delhi (CRRI) organised one Workshop on 'Critical Infrastructure Information System in GIS for Maintenance of bridges on National and State highways' at Coimbatore Institute of Technology, Coimbatore on December 4th, 2012 to disseminate the knowledge generated under a project, sponsored by Department of Science and Technology, New Delhi (DST). Prof. DN Trikha, Member, PRC, DST and Prof.K Subramanian, HoD, CED, CIT, Coimbatore inaugurated the workshop. Prof. Trikha presented the overview of the project to the delegates. CRRI officials namely Dr. P. Lakshmy, Dr. Rajeev Goel, Dr. BK Durai, Dr VVLK Rao and Dr SK Sharma made the presentations during the workshop on various issues related to the topic such as Inventory and Inspection of Bridges; Deterioration Mechanism of Bridges; Load Carrying

Capacity Evaluation; Strengthening Measures and Budgeting; and Prioritisation Methodology for Maintenance of Bridges. In this workshop, a session was devoted on hand-on-software training to the delegates. Er Rajeev Sharma, Scientist DST made the presentation on various funding schemes of DST.

This workshop was attended by practicing engineers and government officials from various states including Tamilnadu, Karnataka, Andhra Pradesh, Goa etc. Besides this, teaching faculty and PG students of Civil engineering from several colleges/Universities also participated in this Workshop.

At the end of the Workshop, steps to be followed for exploring the possibility of implementing the developed software into the actual use was also discussed with the delegates.



Fig.4 : Noise Mapping (Top/Bottom of JJ Flyover) showing the affected area with different noise levels



## MEETINGS

### 111th Meeting of CSIR-CRRI Research Council

The 111th meeting of CSIR-CRRI Research Council was held on Oct 4-5, 2012. The meeting began with welcome address by Director, CSIR-CRRI followed by opening remarks from Prof. D.V. Singh, Chairman, Research Council. Presentations on 11th plan projects, 12th plan projects and selected sponsored/ongoing projects etc. were made by respective Project Leaders/Scientists. A number of valuable suggestions were made by the members of Research Council.



RC Meeting in progress

## EXHIBITION

The Institute participated in the following exhibitions and depicted its expertise, capabilities and R&D achievements:

- (i) Indian Road Federation – Exhibition 2012 at New Delhi, Nov 1-2, 2012
- (ii) International Exhibition and Conference (IGC - 2012) at New Delhi, Dec 13-15, 2012.
- (iii) 6th National Conference on Wind Engineering by ISWE & CSIR-CBRI, Roorkee at New Delhi, Dec 14-15, 2012.

## Agreements



Signing of agreement between CRRI and SPA, New Delhi

A formal Agreement was signed on Dec 24, 2012 between CSIR-CRRI and School of Planning and Architecture on Development of Indian Highway Capacity Manual. A similar Agreement was also signed on Dec 31, 2012 with Anna University, Chennai.

## VISITORS

Dr. Hari D. Sharma, Principal Geosyntec Consultant, Civil Engineering Department, Indian Institute of Technology, Delhi visited the Institute on Nov. 15, 2012. He also made a presentation on "Sustainability: Geotechnical Engineering and Waste Management".

Mr. Panny Li-chenn, Mr. Patrie vs Tang and Mr. Umesh Malik visited the Institute on Nov. 29, 2012. They also made a presentation on "Asphalt Pavements".



Visitor at CRRI



## TRAINING PROGRAMMES/COURSES

### Training Programmes/Courses

#### A) Regular Training Courses

Institute organized the following regular training programmes/courses for in-service Highway Engineers:

- (i) "Rigid Pavements: Design, Construction and Quality Control Aspects", Nov 5-9, 2012.
- (ii) "Pavement Evaluation Techniques and their Applications for Maintenance and Rehabilitation", Nov 19-23, 2012.
- (iii) "Environmental Impact Assessment (EIA) and Environmental Clearance Process for Roads and Highways Projects", Dec 3-5, 2012.

#### B) Customized Training Programmes

- (i) "International Course on Dissemination of HDM-4" from Oct 8-19, 2012 at CSIR-CRRI which was also attended by the participants from Nepal and Tanzania.

- (ii) "Air and Noise Pollution Modeling for Environmental Professionals" from Oct 29 to Nov 1, 2012.
- (iii) "Environmental Impact Assessment (EIA) and Environmental Clearance Process for Roads and Highways Projects and Road Safety Aspects" for the Engineers of RCD, Bihar at Patna from Nov 26-29, 2012.
- (iv) "Good Practices in Highway Construction and Quality Assurance and Quality Control Aspects" for Engineers of RCD, Bihar at Patna from Dec 3-5, 2012.



Glimpses of Training Programme

#### STAFF NEWS

##### Honours/Awards

Sh. Jai Bhagwan, Senior Principal Scientist has been nominated as Hon. Secretary of Indian Geotechnical Society for a period of two years i.e., from 2012 to 2014.

##### Retirements/Transfers/Resignations

The following staff members have retired from the service of Institute during the reporting period. CRRI welfare committee organized farewell party to bid them farewell.

Sh. P. Prasanna Kumar	Sr. Principal Scientist	30-11-2012
Ms. Kamlesh Verma	Asstt.(G) Gr.I	30-11-2012
Sh. Vijay Singh	Lab. Attendant	30-11-2012
Dr. Ram Kumar	Chief Scientist	31-12-2012
Sh. Ram Kishan	Chowkidar	31-12-2012
Ms. Pushpa Verma	Sr. Steno, ACP	31-12-2012



## Promotions / Assessment

The following Staff members of CRRI are congratulated on their promotion to the next higher scales / grades :

S.No.	Name	Present Designation	Designation (on Promotion)
<b>Gr. IV</b>			
1.	Sh. Deepak Mukherjee	Principal Scientist	Sr. Principal Scientist
2.	Sh. J.B. Sengupta	Principal Scientist	Sr. Principal Scientist
3.	Sh. D.C. Sharma	Principal Scientist	Sr. Principal Scientist
4.	Dr. R.K. Srivastava	Principal Scientist	Sr. Principal Scientist
5.	Sh. Subhash Chand	Sr. Scientist	Principal Scientist
6.	Dr. Ravinder Kumar	Sr. Scientist	Principal Scientist
7.	Dr. E. Madhu	Sr. Scientist	Principal Scientist
8.	Dr. Kirti Bhandari	Sr. Scientist	Principal Scientist
9.	Ms. Farhat Azad	Scientist	Sr. Scientist
10.	Sh. Anil Kumar Sinha	Scientist	Sr. Scientist
11.	Sh. Nitesh Kumar Goyal	Scientist	Sr. Scientist
12.	Sh. Ajay Kumar Jain	Scientist	Sr. Scientist
13.	Sh. Mukesh Kumar Meena	Scientist	Sr. Scientist
14.	Sh. Satish Pandey	Jr. Scientist	Scientist
<b>Gr. III</b>			
1.	Mohd. Irshad	Gr. III (1)	Sr. Tech. Officer (3)
2.	Sh. Bhoop Singh (Retired)	Gr. III (1)	Gr. III (5)
3.	Sh. M.S. Rana	Gr. III (1)	Sr. Tech. Officer (3)
4.	Sh. Y.N. Kaul (Retired)	Gr. III (3)	Gr. III (6)
5.	Ms. Sarita Rastogi	Gr. III (1)	Gr. III (5)
6.	Sh. S.K. Gupta	Gr. III (1)	Sr. Technical Officer (3)
7.	Sh. A.K. Soni (Retired)	Gr. III (1)	Gr. III (5)
8.	Sh. Ramesh Chandra (Retired)	Gr. III (1)	Sr. Tech. Officer (3)
9.	Sh. T.M. Vasudevan (Retired)	Gr. III (3)	Gr. III (5)
10.	Sh. H.L. Sharma (Retired)	Gr. III (1)	Gr. III (4)
<b>Administration</b>			
1.	Ms. Parveen Bhatia	Assistant (G) PB-5200-20200 with GP Rs. 2400/-	Assistant (G) PB 9300/- 34,800 with GP 4200/-
2.	Ms. Kunjmal B. Verghes	-do-	-do-
3.	Sh. Virendra Kumar Dussya	Assistant Gr. II (SP)	Assistant Gr. I

## सम्पादक मंडल

संरक्षक : डा. एस. गंगोपाध्याय, निदेशक

सम्पादक :

श्री बी. एम. शर्मा, मुख्य वैज्ञानिक, श्री टी. के. आमला, वैज्ञानिक एवं प्रमुख, सूचना, सम्पर्क एवं प्रशिक्षण  
श्रीमती अनिता अरोरा, तकनीकी अधिकारी; श्री मुकेश कुमार मीणा, वैज्ञानिक

फोटोग्राफी :

श्री अशोक कुमार