



N.14: Industrial and radiation safety in RRCAT

Industrial safety:

Internal safety inspection committees visited regularly the buildings in technical area, and the reports were submitted to Apex Safety Committee (ASC), RRCAT. BSO along with deputy BSO made sure that the observations were complied with by the expected completion date. Employees working on specific systems were given specific safety instructions, e.g., in cryogenics, where handling liquid helium and nitrogen is involved, all the employees used Personal Protective Equipment (PPEs) while handling these liquids. Job hazard analyses were carried out to identify the hazards during job execution. Support was provided by Fire Station staff, round-the-clock First Aid Centre and ambulance service to arrest the consequences of accidents, if any. Safety review committees and local safety committees are formed to check the safety issues in the design, modification, operation & maintenance etc. and give the recommendations to improve safety. The progress was monitored and compliance report was checked for each observation.

Internal Safety Inspection Team for Laser ensured that everyone using laser were aware of the risks, for example, watches and other jewellery that might enter the optical plane were not allowed in the laboratory; all non-optical objects that were close to the optical plane had a matt finish in order to prevent specular reflections; adequate eye protection was provided to everyone in the room if there was a significant risk of eye injury; alignment of beams and optical components were performed at a reduced beam power wherever possible.

Internal Safety Inspection Team for Accelerator ensured that radiation fields and other hazardous factors in accessible areas were within the relevant regulatory stipulated limits; no one remained trapped or was present inside the areas with high radiation fields during operation while the primary particle beam was switched on; there was protection against noxious fumes and gases that might be formed during the accelerator beam operation or in radiation processing of materials; an efficient fire protection system was in place; safety was adequately taken care of against all other conventional and industrial hazards, and non-ionizing radiation which might arise from operation in various sub-systems in the facility.

A separate safety committee is formed to look into safety concerns at construction sites. It was ensured that every worker was trained to use PPE during work like, full body harness, helmet, safety shoes & gloves etc. Construction Safety Committee gave recommendations based on the observations, and ensured compliance.

All the above committees submitted their reports to ASC, and

the reports were reviewed. ASC also reviewed the recommendations of AERB inspection team in this period i.e., Jan-Jun 2019. It also reviewed the status of occupational health of employees working in laser labs, workshops, chemical facility and radiation zone.

Safety shoes were issued to the employees. Availability of First aid boxes inside the buildings at easily accessible places was ensured, to take care of minor injuries. Fire mock drills were carried out to bring alertness in the working personnel.

Radiation safety:

Ensuring radiation safety is an important aspect of safety culture at RRCAT, which has several radiation facilities. Important among them are the Indus-1 (450 MeV) and Indus-2 (2.5 GeV) synchrotron radiation sources, industrial electron linacs (10 MeV), agricultural radiation processing facility at Sabzi Mandi site, infra-red free electron laser (IRFEL), high power laser plasma facilities, gamma irradiation chamber and many x-ray generators. In addition, there are many sealed radioactive sources and gamma camera used for testing and calibration of radiation monitoring instruments. In addition to ionizing radiations from these facilities, non-ionizing radiation like RF & MW is also present. Radiological Safety Officer advised the facility management on radiation safety matters, radiation safety systems like shielding, various engineered interlocks, radiation monitoring system, emergency plan to mitigate the consequences of any radiation emergency, provision for radiation related training, and issue and receipt of dosimetry devices, etc.

During the period Jan-June 2019, radiation surveillance was provided to Indus-1 with beam currents up to 125 mA @ 450 MeV and Indus-2 up to 195 mA @ 2.5 GeV. Special radiological safety coverage was given to commissioning of the undulator beamline BL-20 on Indus-2 along with other beam lines. Radiological surveillance during the commissioning of Linac-2 at ARPF was provided. Personal dosimetry for 493 workers was carried out during the period (on quarterly basis). Dose report from RPAD, BARC showed no personnel exceeding the annual dose limit of 20 mSv or quarterly investigation limit of 2 mSv. The database including biometrics of 38 radiation workers was uploaded on National Occupational Dose Registry System. For users coming from outside RRCAT for using the synchrotron radiation facility, an audiovisual training in radiation safety was imparted and an examination was conducted, before allowing them to work in the facility. 189 users were imparted training in radiation safety during Jan-June 2019.

Quarterly testing of the equipment of Emergency Response Centre was carried out and kept in a preparedness state.

*Reported by:
M. R. Jathar (jathar@rrcat.gov.in)*