

BARC Training School

Where India's Nuclear Specialists are made

The DAE's research and development activities, nuclear power programme, isotope production and application programme and various projects, which constitute the technological infrastructure for the nuclear effort, have burgeoned during the last 50 years.

In 1957, BARC had started a Training School at Trombay to prepare a select group of young scientists and engineers every year for responsible positions in various institutions and projects of DAE. Since its establishment, around 7000 young men and women from varied disciplines have passed through the portals of the School. They are contributing to all the segments of the nuclear programme.

The School admits about 100 Engineering graduates and Science post-graduates annually, mainly in the disciplines of Physics, Chemistry, Biology & Radiobiology, Engineering (Chemical, Mechanical, Electrical, Computer, Electronics and Metallurgy). They go through an integrated course for one year, which exposes them to the multi-disciplinary culture of the Department. There is also an additional entry channel via the DAE Graduate Fellowship Scheme (DGFS), which operates in collaboration with six IITs. About 40 graduates are sponsored for MTech in these IITs who join the department after obtaining the qualification. This group also through a 4-month induction course at the Training School.

The endeavour of the School is to produce an individual in whom there is an integration of a large number of sciences and technologies, that are demanded by any work in atomic energy today. The trainees in each of the disciplines are therefore exposed to important features of other disciplines. The courses are periodically reviewed and updated to keep up with advances in this frontier field.

The Training School has no per-

manent teaching staff. All the teachers are working scientists and technologists at BARC and associated institutions who continue to pursue their R & D work along with their teaching work at the School. There are nearly 300 senior scientists and engineers of BARC who take part in teaching at the School. In this way the scientists and engineers who teach, instead of being purely academic in their approach, bring to students their own research problems and discuss their own immediate work experience in their fields, in the class rooms. Some specialized engineering courses are also conducted by outside faculty.

In November-December every year, the School invites applications from young science and engineering graduates through advertisements published in all national papers. The qualifications for entry for science disciplines namely Physics, Chemistry and Bio-Science are an M.Sc. with 60 per cent or more marks. Short-listing for selection interview is carried out on the basis of written test/GATE score. While in engineering and metallurgy, the qualifications are BE with 60 per cent or more marks but they also have to appear for GATE in their respective discipline and they will be short-listed for selection interview on the basis of GATE score.

Other BARC Courses

BARC conducts a number of other special courses for direct engineering recruits of the Centre and other institutions and projects of DAE as well as personnel from other organizations in the country. Some of these courses are also attended by trainees from other countries. Refresher Courses in advanced topics such as Structural Engineering, Seismic Design of Nuclear Reactors, Computer Programming Languages and Preparedness & Response to Nuclear Emergencies are also conducted.

Some other courses conducted by various divisions of BARC are:

- | Radiation Medicine
- | Medical Radioisotope Techniques
- | Medical Radioisotope Techniques
- | Health Physics
- | Radiological Physics
- | Radiation Protection and Safety of Radiation Sources
- | Radiation Safety in Industrial applications of Radioisotopes and X-rays
- | Radiography Testing Techniques
- | Radioactive Waste Management
- | Safety Assessment of Waste Disposal
- | Radioimmunoassay and its Clinical Application
- | Chemical Analysis and NDT Techniques
- | Operation/Maintenance and Inspection of Research Reactors
- | Mutation Breeding of Tropical Crop Plants
- | Pesticide Residue Analysis

Affiliate Training Schools

To cater to the growing demands of DAE, BARC Training School now has affiliates for various specializations. The BARC Training School thus has associated with it the Training Schools at the Centre for Advanced Technology (CAT), Indore, the Nuclear Fuel Complex-Heavy Water Board (NFC-HWB), Hyderabad and the Nuclear Power Corporation of India Ltd. (NPCIL) Training School with centres at Tarapur, Rawathaba, Kaiga and Kalpakkam. Each of these training schools prepare the scientists and engineers for specific tasks as follows:

- | CAT Training School is for research and development in lasers, accelerators, cryogenics, superconductors, material science, power electronics and microwaves.
- | NFC-HWB Training School is for process development, design, engineering, construction, operation and maintenance of plants for production of heavy water.

NPCIL Training School is for training in operation and maintenance of nuclear power plants.

International Symposium on 'Challenges in the practice of evidence based oncology in developing countries'

The Tata Memorial Hospital (TMH) and the European Society for Therapeutic Radiology and Oncology [ESTRO] have arranged an international symposium to be held from February 28 to March 2005 at the Tata Memorial Hospital, Mumbai. Deliberation includes lectures and discussions on cost effectiveness of new approaches, impact and conduct of clinical trials, and management of head and neck, cervical, and urological cancers. The invited faculty includes a panel of experts both from India and abroad. The scientific programme has been structured to address specific issues of significance in the management of cancers and cancer research in developing countries.

For further details the web site <http://www.tatamemorialcentre.com> can be visited.

BARC Develops an Innovative Technique for Detecting Turbine Blade Vibrations in operating power plants

BARC has developed an on-line diagnostic system for providing early warning of incipient blade cracking and failure in steam turbines used in power plants.

Turbines are commonly used to drive generators to produce electricity in thermal and nuclear power plants. Several disks, fitted with blades at their circumference, are mounted on the rotor of a turbine. During operation of these turbines, steam is guided on the blades that causes the rotor to rotate at very high speed. Blade failure during turbine operation could cause wide spread devastation.

Periodic non-destructive inspection of these blades helps in identifying any defects and cracks. A recent turbine accident in South Africa is one such example. A blade vibration based reliable diagnostic system, which can detect change in vibration characteristics, can thus provide an early warning of incipient blade cracking and failure. Early warning about a problematic stage enables directed inspection instead of full-scale inspection. In view of this most desirable benefit, in terms of safety and availability of turbine, blade vibration and its detection is one of the active areas of research all over the world.

The development of such a system is extremely challenging. Discriminating blade related signals in extremely noisy steam environment is like picking up sound of pin drop in a noisy room. On top of it, detecting altered vibration characteristics of one defective stage among several healthy ones is a daunting task. The detection technique developed by BARC successfully meets these challenging requirements. This system can be implemented in an operating plant and it costs less than the existing system for shaft and bearing vibration monitoring. The technique has been tested and validated in both thermal and nuclear power plants. In principle, the technique is also applicable to large rotary compressors and gas turbines.

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