

The Particulars of organization, Functions and Duties.

Central Soil and Materials Research Station

The Organization:

Central Soil & Materials Research Station (CSMRS), under the Ministry of Water Resources is a premier institute in the country located at New Delhi which deals with field and laboratory investigations, basic and applied research, problems in geo-mechanics and materials of construction relevant to river valley projects construction all over the country and also in neighboring countries viz. Nepal, Bhutan, etc. essentially, the Central and State Government agencies and public sector undertakings responsible for construction of multipurpose river valley projects form the clients, though many organizations dealing with major industrial complexes, multi-storey buildings, thermal and nuclear power stations, etc. are also recipients of consultancy from CSMRS. Broadly, the activities of CSMRS covers the following Groups

A. **Groups**

Broadly the sphere of activities encompasses the following groups:

Soil Mechanics

Soil Mechanics group comprises of Soil divisions, Soil Chemistry division, Information Technology division, and Drilling division. Main activities are:

- Field and laboratory soil investigations viz. foundation and borrow area investigations of various river valley projects and civil engineering structures are taken up for characterization of soil and construction/foundation materials.
- Assistance are also offered to the projects for carrying out the foundation investigations and the field tests such as Standard Penetration test, Static Cone Penetration test, Plate Load test, Insitu Permeability test etc.
- Special investigations are also carried out for characterizing the problematic soils such as expansive and dispersive soils.
- Fly ash characterisation
- Quality Control/Assurance of Earth and Rockfill Dams.
- Numerical Modelling

- Chemical investigation on soil as a construction material.
- Information Technology Division

The Information Technology division is involved in various Information Technology related activities such as: Server Management, Management of DTP facility, Network Support, Computer Services Support (including NICNET services), Procurement of Computer and related Products Purchase, Automation of various user divisions/sections including Data Archiving & Retrieval (Digitization of records), Website Support & Maintenance, Call coordination for Repair & Maintenance, AMC related works of IT Products, Coordination for IT specific Training programmes. This division has undertaken a study on Information Strategy Plan (ISP).

- Drilling Technology Division

The Drilling division is equipped with deep drilling facilities, which can be best utilised in case the site is inaccessible, and explorations are to be made from the top. The Drilling division can also do the drilling required for in-situ investigations.

- Dissemination of expertise to in-service engineers of various State Government Departments by establishing regional testing laboratories and impart training in testing of soil.
- Impart training to engineers from within the country and from overseas for investigation and testing in the fields of Geotechnical Engineering.

ROCK FILL , SOIL DYNAMICS

Rock Fill, Soil Dynamics group comprises of Rockfill Technology division, Soil Dynamics division, and Geosynthetics division. Main activities are:

- Characterization of soil under dynamic loading condition including evaluation of liquefaction potential.
- Strength and deformation characteristics of rock fill materials.
- Evaluation of properties such as tensile strength, resistance, thickness, apparent opening size, permeability, interface friction and the pull out resistance of Geosynthetic materials under quality assurance.
- Numerical Modelling
- Dissemination of expertise to in-service engineers of various State Government Departments by establishing regional testing laboratories and impart training.

Rock Mechanics (I)

Rock Mechanics (I) group comprises of Rock Mechanics Field division, and Engineering Geophysics division. Main activities are:

- In-situ stress evaluation.
- The Geophysics division helps scan large areas, and helps unravel the secrets of the hidden earth.
- Field investigation facilities include a Remote Operated Underwater Vehicle (ROV) to detect the distress in concrete structures by scanning the upstream face of concrete dam in assessing the insitu quality of the structure (concrete and masonry) in question.
- Numerical Modelling.
- Dissemination of expertise to in-service engineers of various State Government Departments by establishing regional testing laboratories and impart training in in-situ testing of rock.
- Impart training to engineers from within the country and from overseas for investigation and testing in the fields of Geotechnical Engineering.

Rock Mechanics (II)

Rock Mechanics (II) group comprises of Rock Mechanics Laboratory division, Workshop & Instrumentation division, and Electronics division. Main activities are:

- For detailed and controlled testing of responses of rock under different loading conditions, the Rock Engineering Laboratory is well-equipped to undertake the holistic assessment of the detached rock.
- The involvement of Instrumentation division with Hydro-electric Projects starts at the pre-construction stage, and this association continues throughout the construction stage, and remains active even during the post-commissioning stage. To gain confidence in the functioning/safety of the structures involved, and to check the assumptions involved in the design of the structures, crucial importance of instrumentation cannot be over-emphasised.

- Monitoring the health of the existing structures.
- The Electronics division provides support and consultancy in Electronic Instrumentation, Preparation of specifications of electronic equipments, calibration and accreditation of laboratory testing facilities in addition to providing support on Testing, Installing newly procured electronic equipments. Repair & Maintenance of instruments.
- Dissemination of expertise to in-service engineers of various State Government Departments by establishing regional testing laboratories and impart training in laboratory testing on rock.
- Impart training to engineers from within the country and from overseas for investigation and testing in the fields of Geotechnical Engineering.

- Procurement Division

Procurement of equipments, instruments and consumables. Annual Maintenance contract for existing equipments. Preparation of purchase manual.

Concrete Technology

Concrete Technology group comprises of three Concrete divisions. Main activities are:

- Field and laboratory investigations of construction materials for major river valley projects in India and abroad. It has full fledged field and laboratory facilities for conducting standardized (BIS, ASTM etc.,) and specialized testing and analysis of concrete, masonry, cement, steel and other construction materials for evaluating the material properties, their failure and performance problems.
- Special testing facilities, housed in concrete laboratory, are utilized for studying the thermal properties of mass concrete, Alkali Aggregate Reaction in concrete, Abrasion Erosion Resistance.
- Permeability and Durability of concrete.
- Mix design of mass concrete as well as high performance concrete mixes.
- Construction quality control of concrete in the field for major hydraulic structures.
- Dissemination of expertise to in-service engineers of various State Government Departments by establishing regional testing laboratories and impart training in testing of concrete.

- Disseminating knowledge on Roller Compacted Concrete for the construction of dams in the country.
- In addition to the above, this Discipline has the State of the Art equipment facilities for carrying out studies on 'Behaviour of Concrete under Multiaxial State of Stresses' and long term behaviour of concrete under Creep.

Concrete Diagnostics and Chemistry

Concrete Diagnostics and Chemistry group comprises of Concrete Diagnostics division, Concrete Chemistry division, and Special Studies division. Main activities are:

- Field investigation facilities include deployment of non-destructive testing equipment by Ultrasonic Pulse Velocity method using PUNDIT in assessing the insitu quality of the structure (concrete and masonry) in question.
- Diagnostic investigation/Health Monitoring
- Material for repair and rehabilitation
- Petrography studies
- Chemical investigation of construction materials
- Durability of concrete
- Chemistry & Mineralogy
- Instrumental methods of analysis
- Water quality testing
- Alkali Aggregate reaction studies
- New material - Polymer, Grout etc.
- SC/SFRC/ HPC/HSC/CFRD
- Quality Control

Objectives and functions:

The CSMRS is responsible for carrying out field and laboratory geo-mechanical and construction materials investigations, basic / applied research and development activities in the fields of geo-mechanics and associated environmental issues and to function as advisers and consultants in the above fields. The objectives and functions of CSMRS are being periodically reviewed by the Governing Council under the Chairmanship of Secretary, Ministry of Water Resources and the Standing Technical Advisory Committee under the Chairmanship of Member (D&R), Central Water Commission.

Investigations: Undertaking site characterization, laboratory and field geo-mechanical investigations including stress and deformation measurements, instrumentation and other measurements of prototype structures to monitor their behavior and quality control for water resources projects and other complex civil engineering structures. Further, CSMRS is also responsible for construction materials survey and to evolve mix design of mortars, concrete, shotcrete and chemical analysis of all construction materials for use in projects.

Consultancy: Functioning as consultants for problems in the field of geo-mechanics and material sciences primarily for Central and State Government Organizations like Central Water Commission, Central electricity Authority, Ministries/Departments of Government of India, State Governments, Public Sector Undertakings etc. Such services are also available to private industry to the extent that they are not detrimental to these primary obligations. Further, CSMRS is also extending consultancy services to other countries through Water and Power Consultancy Services (India) Ltd. (WAPCOS) and to such other Government organizations functioning abroad besides consultancy works for International and regional organizations like organizations of the United Nations, Asian Development Bank, etc.

Research: Basic and problem oriented applied research in the field of Geo-mechanics, Materials Sciences, Concrete Technology and allied areas which have vital bearing on the irrigation and power development of the country and to evolve quality control procedure in the above fields. Further, CSMRS is also carrying out detailed studies on Geo-mechanics and associated environmental issues of the Himalayan region which poses complex problems for water resources projects.

Dissemination of Information: Create data base and function as an information centre for problems in Geo-mechanics, Concrete Technology and Construction Materials through its Library and Documentation Centre as well as through its information dissemination activities like organizing National / International workshops, Seminars, Training Courses, Publishing literature in the above fields , etc.

Linkages: Establish strong linkages with National Laboratories, State and other laboratories/Research Stations, Universities/IIT's, Geological Survey of India, NGI, RILEM etc. in carrying out the functions of CSMRS.

Training: Imparting training to engineers/Scientists from within the country and from overseas for Investigation and Testing in the fields of Geo-mechanics, Construction Materials and Concrete Technology.

Miscellaneous:

CSMRS also has to undertake special functions on behalf of Government of India as and when called upon to do so.

Information in respect of Central Soil and Materials Research Station is also available on its Web site : <http://csmrs.gov.in> The latest Annual Report of CSMRS is also available on the web site.