

Report on National Webinar on “Role of Engineering Geology on Concrete Construction Held on 28 February 2021

Date of Event	28.02.2021
Name and Type of Event	National Webinar on “Role of Engineering Geology on Concrete Construction”
Conducted by	Mr. Ashwini Kumar, ShatabhisaSinha and Dr. ChandrabhabhaSahu
No. Of Participant	156

National Webinar on “Role of Engineering Geology on Concrete Construction”

The Resource person Dr. Arvind Dewangan, Professor & Head of Department (Civil Engineering), Model Institute of Engineering & Technology, Jammu. He has professional teaching and industry experience of over 26years. Dr. Dewangan possesses M.Tech in Applied Geology and Ph.D. in Geology & Mining Construction. He has 149 publications in journals, conferences and seminars of National and International repute. The speaker gave informative and illuminating lecture with valuable content. The session was valuable not only for students but for faculties, research scholars, industry persons and other participants. Through this the participants were able to understand the Role of Geology on Concrete Construction, various Projects under consideration of Geologist, Quality of a building stone and how rock masses can be used as construction material.

About the Speaker

Dr. ArvindDewangan is currently working as Professor and Head of Department (Civil Engineering), Model Institute of Engineering & Technology, Jammu. He has professional teaching and industry experience of over 26years. Dr. Dewangan possesses M.Tech in Applied Geology and Ph.D. in Geology & Mining Construction. His vast academic landscape includes 149 publications in journals, conferences and seminars of National and International repute. He also has certain Project Grants sanctioned by AICTE and RTU to his credit. Dr. Dewangan knows the nitty-gritty of academic quality as his key attention areas comprise NBA, NAAC & Autonomous accreditations. He was honored with various awards some of which include the “Eminent Educationist” award and the “Innovation in Teaching” award.

About the Topic

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Engineering Geology is the application of geologic sciences to engineering practice to assure the safe location, design, construction, operation and maintenance of engineering works, which may not be adversely affected by potential geological problems. Working arena of engineering geologist is in the regions where geological processes and manmade structures interact and latter's safety and longevity are to be ensured. For this they have to investigate, analyze and provide geologic and geotechnical recommendations to ensure availability of proper construction material and safe founding ground.

Broadly, three aspects are mentioned here, first the study of "Rock Material", used in construction industry such as building stones. Secondly, the study of "Rock Mass" or founding rocky ground, over/under which engineering operations are to be carried out leading to loading or unloading of rock mass. Thirdly, the "endogeneous" and "exogeneous" geological processes which operate around the construction and either hamper it or affect its functioning in future.

Civil Engineering is an amalgamation of science, art, professional skills and engineering achievements. The requirement of the appropriate construction material of required specification plays an important role to achieve strength and construction economy of structure. As the geomorphological and geological processes operate relentlessly and subject an area to continual change, therefore geomorphic setup and geology of the site are vital for the success of all sorts of civil engineering works in general and for structures made in subsurface conditions in particular. Earthquake Engineering too need sound knowledge of tectonics and structural geology for identifying the Earthquake prone areas.

Engineering geologic studies may ensure at Initial Stage, to build up the logistics based on the office study of available literature (reports, maps, aerial photographs etc.) and accordingly the site or field studies can be planned. This is an important step as the Pre-construction planning or feasibility studies, cost benefit analysis, Environment Impact Analysis etc. are undertaken at this stage. During the Main Stage, it is decided that how to progress, what field studies, geological, geophysical, laboratory and insitu tests will be required, so that design parameters are decided. During the Review Stage, or Concurrent Stage, which may start with excavation and go with the construction phase wherein

unforeseen problems are encountered and according some changes are incorporated. The Final Stage, or post construction phase is basically a phase of project wherein monitoring is necessary throughout the design life structure or the project to pre-empt any problem in future.

A good knowledge of the construction site is required because of many reasons such as:-

All grounds are not “terra firma” and may lead to unstable foundations because of the fact that unstable grounds do exist.

Unforeseen situation can always occur because of infinitely variable ground conditions and more so due to inadequate site investigate.

Old mines and mining subsidence, development of brown field areas, land reclamation underground failure and caving, landslides and other slope failures are not uncommon.

Soft ground settlement and subsidence over clayey soil, marl, chalk, loess deposits etc., and caving in karsted region are encountered more than often.

Instability of hill slopes in residential locales, protection of road and rail network, in hilly areas need continuous attention.

Hence there are various problems varying from place to place depending upon their geographical and geological setup i.e. desert, flood plains, cyclone belts, permafrost conditions, erosion by river, wind and coastal waves, earthquake, tsunami and volcanic hazard prone areas etc. Civil Engineering designs can accommodate and response almost any geological problems, ground conditions and can counter or moderate natural hazards if they are correctly assessed. Some interface where civil engineers require geological information are given below:-

Geological Problems	Engineering Response
Soft ground and settlement	Foundation design to reduce and distribute loading
Weak ground and potential failure	Ground improvement and cavity filling; or avoid hazard zone
Unstable slope and potential sliding	Stabilize or support slope, or avoid landslide hazard prone areas
Severe river and coastal erosion	Slow down process with rock/concrete defences

Potential Earthquake hazard	Seismic zoning and structural design to withstand and evacuation plan ready
Potential volcanic hazard	Delimit and avoid hazard zone, predict eruption, have evacuation plan ready
Rocks as construction material	Resource exploration and estimation, testing and exploitation
Site survey and investigation	Photogrammetry, remote sensing, geophysical, and engineering geological investigations
Natural hazards mitigation	Flood, coastal hazards, landslides, earthquake, tsunami, volcanism, caving
Groundwater exploration	Hydrological properties of rocky aquifers, groundwater and rock strength
Rock mechanics and engineering	Rock mass classification and stresses in rock
Strategic storage facility	Underground storage of oil and gas for emergency
Nuclear waste disposal sites	Underground trapment in stable continental areas

Before starting a Construction project, the ground need to be assessed in terms of its suitability and probable difficulties that may come across during construction and also after its commissioning. The objectives of investigation vary with the size and nature of the project and include:

Cost-Benefit analysis

Site conditions and ground properties

Probable difficulties

Accessibility to the site and logistics involved

Availability of construction material

Legal and Environmental clearances

Data generation for designing the structure, etc.

The cost of ground investigation vary from project to project and site to site but is a must and only costs 0.05% to 0.2% for buildings, 0.2% to 1.5% for roads, 1% to 3% for dams and 0.5% to 4% for tunnels depending upon the size of structure and differing ground conditions. Once a project is started and complications start cropping up then the remedial measures alone can increase the project cost by 10%. It is common to see that construction projects are delayed due to unforeseen ground problems, poor interpretation of data, environmental and legal litigations.

The investigations should also recognize possibilities of difficult and unforeseen ground conditions in and around the proposed project so that alternate site can be considered or some engineering measures are taken to remedy or improve the site. Some common problems encountered in rocky areas are

Unconsolidated, soft and expansive ground material

Presence of glacial outwash, drift, colluvial and fluvial gravel deposits with varying thickness and depths.

Weathered, weak and profusely fractured rock outcrops and bed rocks.

Old or abandoned landfill or mining site.

Natural or manmade cavities within the bed rocks.

Shallow groundwater table, cutting or breach of a confined aquifer.

Creeping or active slopes or areas of land sliding.

Venue and Participants:-

Webinar was conducted on Google Meet. **Total participants registered were 224 from different University/Institutes across India.** Total numbers of attendees were 156.

Poster of the Event

DEPARTMENT OF ENGINEERING AND IT
NATIONAL WEBINAR ON

ROLE OF ENGINEERING GEOLOGY ON CONCRETE CONSTRUCTION



**ARKA JAIN
University**
Jharkhand (Jamshedpur)

DATE : 28TH FEB, 2021
MODE : GOOGLE MEET
TIME : 10.30AM

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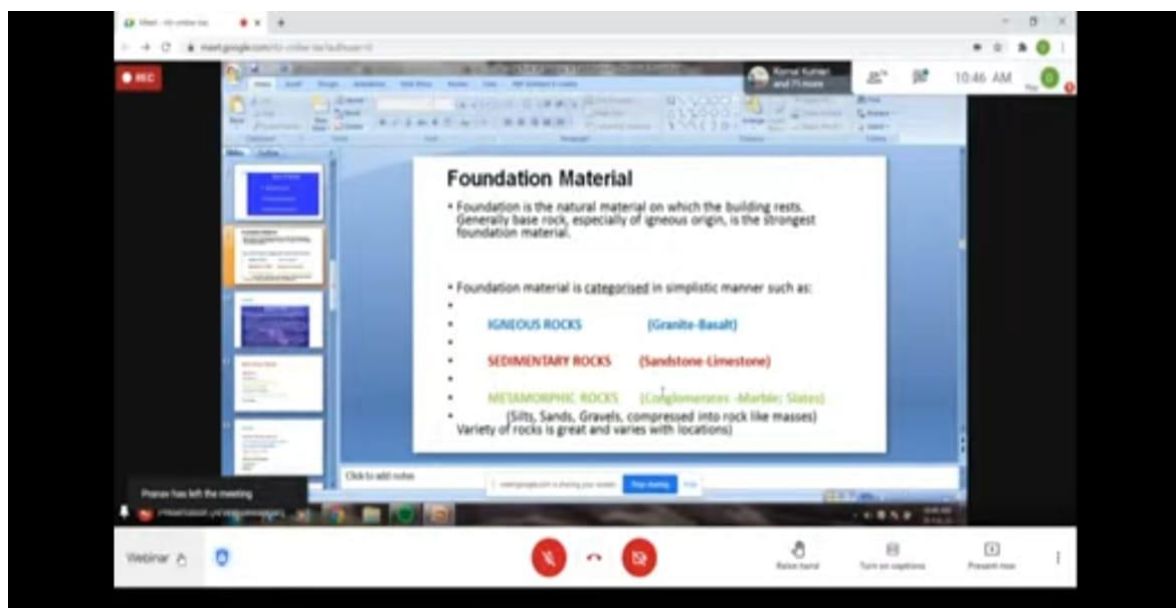
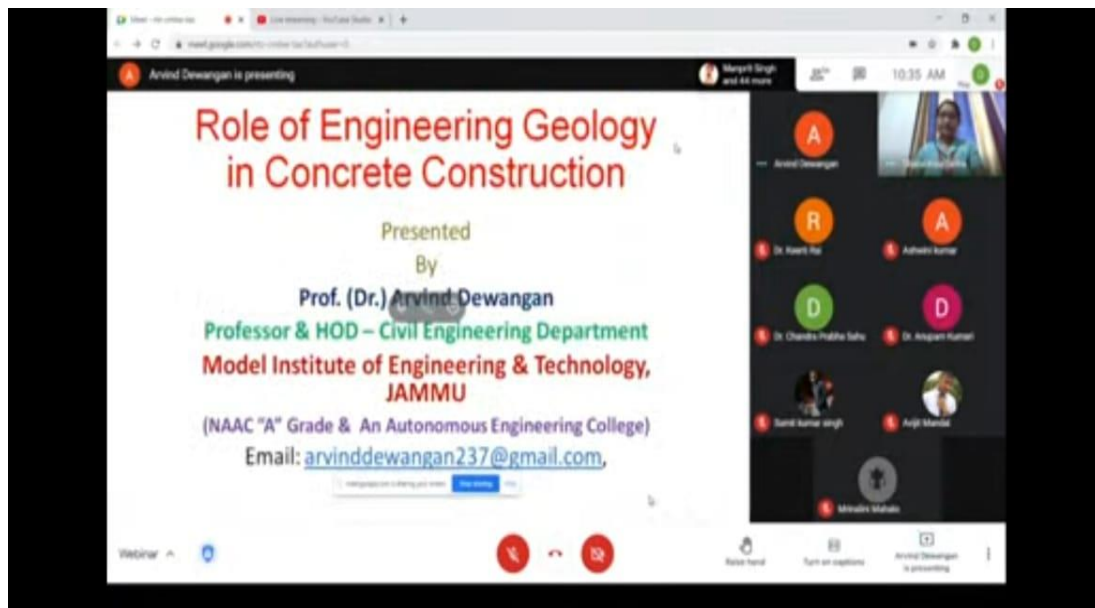


GUEST SPEAKER
Dr. Arvind Dewangan
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CONTACT : Mr. Ashwini Kumar, Shatabhisa Sinha, Dr. Chandraprabha Sahu

Photos of the Event



Certificate Template





