

Presentation for Indo-US Working Group on Coal

Thematic Area: Overburden Dump Stability



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Capability of Central Mining Research Institute in the field of Overburden Dump Stability

Dump Foundation

- Importance - >10million projects.
- Facilities available with CMRI
- In-Situ Direct Shear test facility for rock mass
 - Sample size 70 cm X 70 cm X 35 cm
- Laboratory Direct Shear test facility for rock and soil
 - Sample size - NX for rocks
 - Direct shear test for soil also
- Triaxial rock and soil testing machine.
- Geotechnical mapping of weak planes.
- Groundwater condition



Dumps

Same strength testing facilities,

Slope profiling for dump configuration (Surface profiler)

Optimum slope design of the dumps

Benefits: Land acquisition, Environment

Sensitivity analysis

To suggest remedial measures to check failures

Slope monitoring (Total station)

Recently Conducted Overburden Dump Stability Studies

- Dump slope stability conducted all over India in different geo-mining conditions
- **East** (Namchik Opencast Coal Mine, Arunachal Pradesh, APMDTCL, height 150m, **external-shovel-dumper** dump).
- **West** (Vastan Lignite Mine, Surat, Gujarat, GIPCL, **external-shovel-dumper** dump).
- **North** (Nigahi Opencast Coal Project, Singrauli, NCL, height 70m, **internal-dragline** dump).
- **South** (Neyveli Lignite Mine - I & Mine - II, **external – spreader – dumps** attached with bucket wheel excavator, height 60m & 130m respectively); OC-II, Ramagundam, SCCL, **Internal dump** height 184 m.



Problematic Areas during Overburden Dump Slope Stability

Groundwater Measurement

- Importance
- Problems
 - Drilling for installation of piezometers for regular groundwater monitoring in different geo-mining conditions.
 - Ground penetrating radar
 - Some times not possible to drain out water from the previous dragline cut for fresh dumping.



In-situ Shear Strength Measurement after Plantation

- We always suggest for plantation to increase the stability.
- Methodology to quantify the increase in the shear strength of the overburden after plantation.
- Importance



Slope Monitoring

- Importance
- Problems:
 - Methodology and equipments for prediction of slope failures of in-accessible portions of dumps.
 - Internal dragline dumps – NCL.
- Total station with reflectors
- Reflector less total station – reflectance -
- Acoustic emission technique
- Slope stability radar
- Methodology and cost effective equipments suitable for Indian Coal Mining Industry.

Proposed area of Research for Indo-US research Team in the field of Overburden Dump Stability

- **Determination of groundwater condition in dragline dumps for optimum dump slope design**
- **Determination of in-situ shear strength after plantation to assess the slope stability condition after plantation.**
- **Slope monitoring of inaccessible dragline dumps for the prediction of slope failure for the safety of men and material.**