

SUDARSHAN: THE NATIONAL GEOTECHNICAL CENTRIFUGE FACILITY

Physical modelling concepts have been successfully implemented in several engineering disciplines, including geotechnical and hydraulic specializations. The idea of testing a model in a geotechnical centrifuge is revolutionary, as it enables the body forces of geomaterials to be enhanced many times (N_g) than that of earth's acceleration field (g). As a result, the stresses in model and prototype are rendered identical, while achieving a proportionate reduction in model size, thereby making the task of converting model measurements to corresponding prototypes as precise and straightforward.

Make and Model:

Sponsored jointly by the Department of Science and Technology, Defence Research and Development Organization and the Ministry of Human Resources Development, the centrifuge has been indigenously fabricated and commissioned at IIT Bombay. NGCF is a true **MADE IN INDIA** indigenous equipment.

Features:

- Configuration: Beam type
- Platform radius: 4.5 m
- Model area: 1.0 m x 1.2 m (up to 0.66 m height)
- 0.7 m x 1.2 m (up to 1.2 m height)
- Acceleration range: 10 g to 200g
- Payload: 2.5 tons at 100g
- Capacity: 250 g-tons
- Run-up time to 200g: 6 minutes
- In-flight balancing range: 0 to ± 100 kN
- In-flight wireless data acquisition: 108 Ch.
- Cost-effective cooling system
- Good swing-out at g-level
- Low power consumption
- Indigenously built

Selected application areas

- Slope stabilization techniques
- Reinforced soil structures
- Landslides and Natural hazards
- Ground improvement techniques
- Environmental geotechnics
- Deep excavations and retention systems
- Geotechnical structures subjected to earthquake (under development)
- Subsidence
- Tunnels/Tunnel lining
- Foundations/Anchors



Selected tested models



Front elevation of GRSW constructed with marginal backfill subjected to rainfall at 40 g



Status of retention type earthen dam subjected to hybrid loading at 40 g

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