

TECHNICAL ACTIVITIES OF DR. GOPAL RANJAN RELATED TO SOIL DYNAMICS

1. RESEARCH ASSIGNMENTS

Undertook research assignments on "Dynamics Response of Coarse Grained Ground Materials for Evaluation of Seismic Safety for Energy Development Facilities" at the University of Tokyo, Japan in 1987 and "Pull-out Capacity of Foundations" at Concordia University, Montreal, Canada in 1988.

2. AREAS OF RESEARCH

The major R & D contributions of Professor Gopal Ranjan fall into following main areas:-

- Shear characteristics of sands and gravels under fast rates of loading.
- Vibro pile driving and response of vertical piles under vertical vibrations.
- Design and performance of machine foundations, (compressor, impact hammers, ball mill, cement mill).
- Pile behavior under liquefied soils.

3. PH.D THESES GUIDED

- Dynamic Behaviour of Embedded Block Foundation.
- Response of Piles Driven by Longitudinal Vibrations.

4. INSTRUMENTATION DEVELOPED

SET UP FOR VIBROPILE DRIVING

A working model for vibropile driving designed, fabricated with tested performance for the first time in the country. The model has the capacity of driving piles with

Frequency range - 1 to 45 cps

Dynamic force - 125 kg

Static force - 100 kg

The model has been used extensively for study on a vibropile driving under low frequency response. A 6 cm diameter instrumented pile has been used in the study.

5. SIGNIFICANT CONSULTANCY JOBS HANDLED

- Mobile foundations for oil drilling rigs **(an entirely new concept)**.
- Analysis, design and performance of machine foundations for compressor, forge hammers, raw mills, cement mills etc. **(planned instrumentation for monitoring)**.
- Dynamics analysis of pile foundations for blast loading and gas plants **(analysis for economical design)**.

6. TECHNICAL ACTIVITIES ORGANIZED

- SPECIALIST COURSES: **Organized UNESCO sponsored specialist course** on "ANALYSIS AND DESIGN OF MACHINE FOUNDATIONS" In 1979, 1981, 1983 and 1985. Participants from Nepal, Afghanistan, Sri Lanka, Bangladesh, Pakistan, Ethiopia, Indonesia, Iran, Jordan including India attended these courses.

7. RECOGNITION OF CONTRIBUTIONS AT INTERNATIONAL AND NATIONAL LEVELS

INTERNATIONAL:

- At UNESCO's invitation **delivered lectures** at the specialist course sponsored by UNESCO on "Behaviour of Foundations under Vibrations", University of Moratuwa, Sri Lanka, September 1990.
- **Chaired Session on** "Soil Dynamics and Geotechnical Aspects of Earthquake Engineering" at the 8th Asian Regional Conference on Soil Mechanics and Foundation Engineering, Tokyo, Japan, July, 1987.
- **Panelist-** session on Soil Dynamic and Geotechnical Aspects of Earthquake Engineering at 8th Asian Regional Conference on Soil Mechanics and Foundation Engineering, Tokyo, Japan, July 1987.

NATIONAL LEVEL:

- **Delivered Special Lecture** on "Vibro-pile Driving" at the conference on Geotechnical Engineering at Jawaharlal Nehru Technological University, Kakinada, March 1998.
- **Delivered Keynote Address**, National Seminar on Earthquake Resistant Design of Structures, New Delhi February 1990.