

Geotechnical Centrifuge MAEDA GC I

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Introduction

Geotechnical centrifugal loading test equipment is used to reproduce the behavior of real-scale ground in small size ground model using centrifugal force. Using small size ground model drastically reduces the cost and time required for experiment, and various cases can be done easily. MAEDA GC I was introduced in 2018. But in recent, several static and dynamic loading tests have been executed and specialized technique and experience are accumulated. Maximum centrifugal acceleration for MAEDA GC I is 100G ($1G \doteq 9.81m/s^2$) in radius of 3.5m.



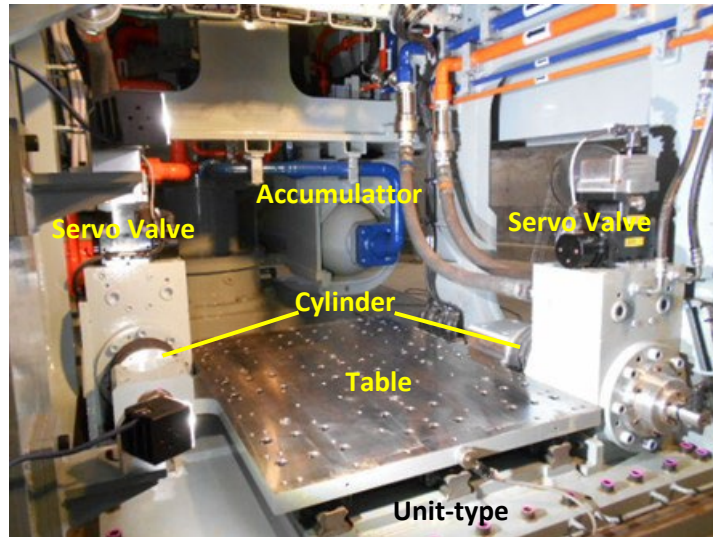
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Key Technical Specifications

Beam Centrifuge	
Manufacturer	Hitachi Industrial Products, Ltd
Year established	2018
Radius to base of platform	3.5 m
Capacity	Static: 200 Gton, Dynamic: 50 Gton, max G-level : 100G ($1G \doteq 9.81m/s^2$)
Bucket area	1.3 m x 1.3 m
Major equipment	Shaking table (Maximum excitation 20G) Vertical loading device Horizontal loading device Rainfall generation system Measuring instruments (48ch) High-speed camera / Imaging device

Shaking table

Shaking table is integrated with the centrifugal loading device. It is installed in the bucket area, and the small ground model mounted on the shaking table is vibrated by an electrohydraulic servo actuator. Sine wave, random wave, and seismic wave excitation can be used. Maximum acceleration is up to 20G.



Rainfall generation system

Special rainfall device adopts the two-fluid spray type nozzle, and can be installed up to 16 points. It can reproduce the natural rainfall in centrifugal loading test equipment and is used in experiments to investigate slope stability problems.

Paper Examples

Shaking table test

- 1) Purbashree Sarmah, Takeshi Ishiguro, Kenji Maruyama, Tianle Xue, Atsushi Yamawaki, Takeshi Katsumi, Atsushi Takai, Kiyoshi Omine and Yoichi Doi : Mechanical behavior of inert waste landfills under seismic condition, Journal of Material Cycles and Waste Management, published online, 27 July, 2022.
- 2) Masafumi Hirata, Takeshi Ishiguro, Tianle Xue, Kenji Maruyama, Hiroshi Yamanokuchi, Yuji Hayashi and Tsuyoshi Kameda : Investigation on ground reinforcement effect and mechanical mechanism of geotextile reinforcement embankment, Civil engineering and construction technology conference, Japanese Society of Civil Engineering, Nov., 2022.