

NK Centrifuge

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Location: Tsukuba City, Japan

Introduction

Figure 1 shows the NK centrifuge, which was designed and manufactured by Nippon Koei in 1996. Table 1 shows the applications of NK centrifuge. NK centrifuge play an important role in both research development and project. By using NK centrifuge, we have developed a lot of new technologies such as countermeasure method for uplift manhole due to liquefaction (float-less method), ground improvement method, seismic evaluation method for irrigation dam, pile foundation, etc.



Figure 1 NK Centrifuge

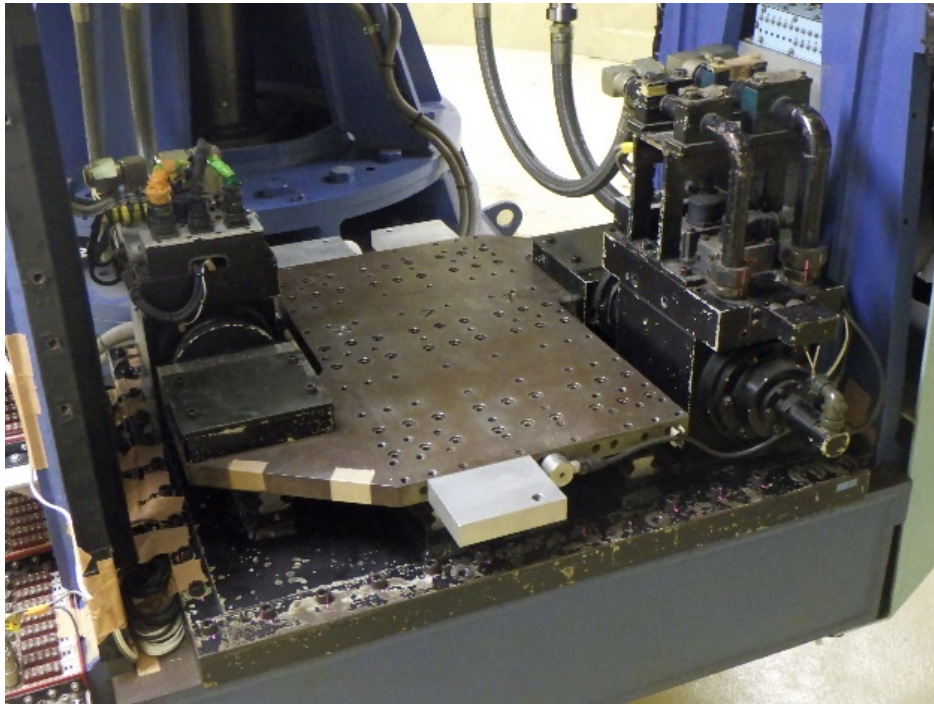
Key Technical Specifications

Table 1 Specifications of NK Centrifuge

Beam Centrifuge	
Manufacturer	Nippon koei Co., Ltd.
Year established	1996
Radius to base of platform	2.6m
Capacity	100 G ton
Bucket area	0.8m(L)×1.0m(W)×0.9m(H)
Major equipment	Cone penetration test, Vacuum chamber for saturating soil model, Loading Apparatus, Image Analysis System for measuring deformation of ground model, etc.

Shaking table

Specifications of the shaking table are shown in Figure 2.

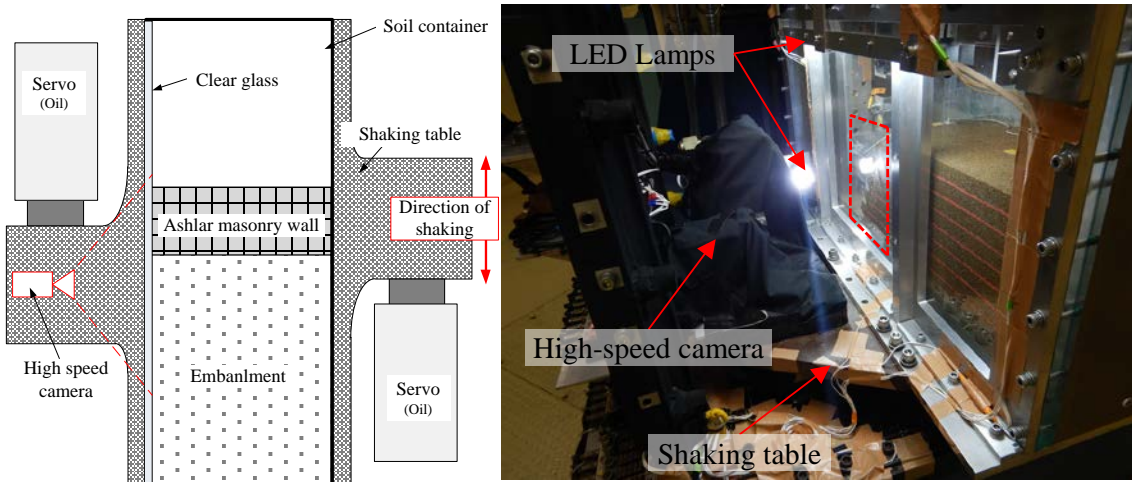


Shaking Control System	Electrohydraulic Servo Control
Max. Centrifugeal Acceleration	100G
Max. Shaking Acceleration	25G(1/30 model 818gal)
Max. Payload	250kg
Max. Displacement	±3.0mm
Frequency Range	10-400Hz
Max. Velocity	40cm/s

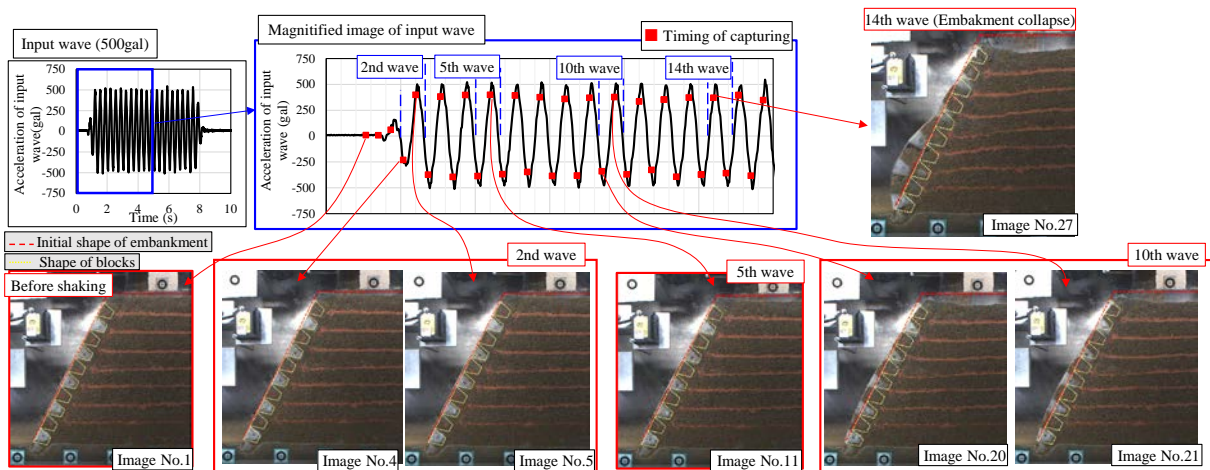
Figure 2 Specification of Shaking table

Image Analysis System for measuring deformation of ground model

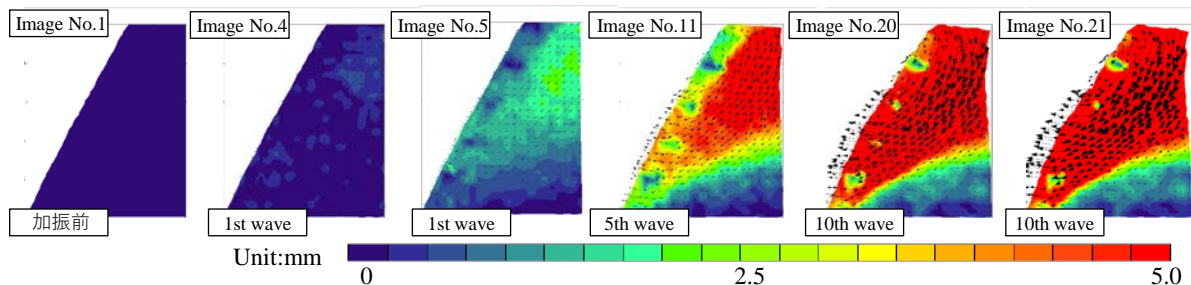
High-speed camera (Frame rate: 120fps) mounted on the shaking table (Figure 3 (a)). This camera can precisely observe the state of the soil structure during shaking (Figure 3 (b)). Image analysis is performed to observe the deformation behavior of model during shaking tests in centrifugal filed. (Figure 3 (c))



(a) High Speed Capturing system during shaking



(b) Images from high-speed camera in 0.25 seconds (20G field)



(c) Result of image analysis (total displacement)

Figure3 Image Analysis System for measuring deformation of ground model