Brief Description of Centrifuge Test CSP 2 by Wilson et al. (1997)

1. Soil Profile

The soil profile in the centrifuge test consisted of about 9 meter deep Nevada Sand with relative density of about 40% underlain by about 10.5 meter deep of dense Nevada sand with relative density of roughly 75%.

Pore fluid used for the centrifuge test was hydroxyl-propyl methyl-cellulose-water and the fluid table was located at the soil surface. The viscosity of this fluid was 10 times that of water alone. Table 1 below presents typical Nevada sand parameters based on the study of Popsecu and Prevost (1993).

Table 1. Nevada sand properties recommended by Popsecu and Prevost (1993).

Property	Nevada Sand		
	$D_r = 40\%$	$D_r = 60\%$	$D_r = 70\%$
Mass density — solid (kg/m^3)	2670·0	2670·0	2670·0
Porosity	0·424	0·398	0·384
Low-strain shear modulus (MPa)	25·0	30·0	35·0
Low-strain bulk modulus (MPa)	54·2	65·0	75·8
Reference mean effective normal stress (kPa)	100·0	100·0	100·0
Power exponent	0·7	0·7	0·7
Fluid bulk modulus (MPa)	2000·0	2000·0	2000·0
Friction angle at failure (compression and extension)	33°	35°	37°
Cohesion (kPa)	0·0	0·0	0·0
Maximum deviatoric strain compression/extension (%)	8·0/7·0	6·0/5·0	4·0/4·0
Dilation angle	30°	30°	33°
Dilation parameter	0·15	0·13	0·085
Permeability (m/s)	$6{\cdot}6 \times 10^{-5}$	$5{\cdot}6 \times 10^{-5}$	$4{\cdot}7 \times 10^{-5}$

The prototype permeability of saturated Nevada sand is 30/10 = 3 times the typical values presented in Table 1. Therefore, the prototype permeability is **2.0×10^{-4} m/s** for sand with D_r=40% and **1.4×10^{-4} m/s** for sand with D_r=75%.

2. Input ground Motion

The input ground motion had PGA of 0.22g (Event F) with total duration of 20 seconds. You can find the time history of the input acceleration in the spreadsheet "*Centrifuge Test _ CSP2_Event F_Measurements.xlsx*".

Note:

Further information about the test is available here in this **link**. Measurement at the free-field is of interest here so the records sufficiently far from the structural elements should be considered.