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Seismic Stability of Sands Sultonsayjor in the Example of a Dam

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ABSTRACT

Sultansanjar Fo is 15 km long, 22 m high, and its slope is 1:4 and 1:5.3. The dam is built of fine neogene sands, and some parts of dusty active sands. The amount of muddy sands is not very high, so it is found as a mixture in the dam. The thickness of the surface of the dam is 0.2 m. covered with concrete tiles.

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It is known that the density of 1,65 т/м^3 for dusty active sands is equal to 0.76 of their relative density. As many experiments show, this density does not ensure their dynamic stability. The results of our experiments on different sands using dynamic vibration equipment are presented in table 1 below.

When the density of dusty active sands is 1,65 t/m^3 (relative density 0.76), they maintain their stability under the influence of acceleration of 2600 mm/s^2. This condition means that the relative density for the slope at the time of acceleration is 0.92 and the soil density is 1.71 t/m^3. For fine Neogene sands, 1.65 t/m^3 corresponds to the state of the highest density (relative density >l). Such a situation cannot be achieved in practice. Dynamic stability of these sands during acceleration of 2600 mm/s^2occurs at a density of 1.57 t/m^3 (relative density 0.81).

Density indicators for ensuring soil stability in the slope

Soil	Acceleration, mm/s^2	Density, t/m^3	**Relative density**
Alluvial sand	2600	1,71	0,92
Neogene sand	2600	1,57	0,81
Aeolian sand	1300	-	0,64
Fine neogene sand	1300	-	0,55
-	1000	1,48	0,55

These indicators determine the dynamic stability of sandy soils using their relative density indicators (Table 2).

Table 2

Density parameters that ensure dynamic stability of sands under external load

The name of the soil	Acceleration, mm/s^2	Amount of external load, MPa		
		0,01	**0,02**	**0,03**
Aeolian sand	1300 2600	0,64 0,79	0,55 0,67	0,48 0,58
Fine neogene sand	1300 2600	0,55 0,70	0,45 0,58	0,32 0,48

1,000 for horizontal parts of the dam in cases where the external load is not affected Dam stagnation under t/m^3 acceleration at density 1.48 (relative density 0.55) is provided. When the amount of acceleration is 2500 t/m^3, the knot stability is 1.55 (relative density 0.76) is provided.

Table 3

Specific density of sand at the bottom of the dam under the impact acceleration

Type of soil	Acceleration, mm/s^2	Soil density, **g**/sm^3
Muddy sand	600 1700	1,50 1,59
Dusty Aeolian sand	400 1300 3000	1,56 1,60 1,72
Fine neogene sand	400 1200 3250	1,40 1,50 1,59
Fine alluvial sand	400 1250 2600	1,40 1,50 1,60

Thus, the density of sand in the background depends on the amount of acceleration acting on it. According to our research, the density of sand in the Sultansanjar dam should not be lower than the values of Table 3 below.

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