

## SEISMIC BEHAVIOR OF STEEL ELEVATED WATER TANKS DAMAGED IN EZGELEH KERMANSHAH, IRAN EARTHQUAKE (2017) WITH CONSIDERATION OF SOIL-STRUCTURE INTERACTION

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Elevated Water tanks are among the most important and vital urban and rural facilities which are widely used to supply the required water pressure in the water supply systems, as well as storing required water in residential and industrial areas. In the Ezgeleh Kermanshah earthquake, which occurred on November 12, 2017, a number of steel elevated water tanks damaged in Sarpol-e Zahab city, which in some cases led to the loss of tank storage water. In this study, the seismic performance of five elevated water tanks damaged in Ezgeleh earthquake, has been evaluated qualitatively. Also the effect of soil-structure interaction was investigated in the seismic behavior of the elevated water tanks. Mass and spring model represented by Hausner et al. (1998) was used for simulating the behavior of tank storage water. Also, the cone model of the soil has been used for calculating the interaction between soil and structure. The represented model consisted of a number of masses, springs, and dashpots for considering of vertical, horizontal, rocking and torsional motion of the soil.

The results of this study displayed the seismic behavior of steel elevated water tanks were underestimated without consideration of soil-structure interaction.



Figure 1. Helal Ahmar elevated water tank in Sarpol-e Zahab.

Table 1. Geometry characteristics and sections for Helal Ahmar elevated water tank Should be verified.

Vertical elevation to the bottom of the tank (m)	Height of shaft tank (m)	Tank radius (m)	Height of columns (m)	The angle of columns (degree)		
19.5	4	2.5	22.146	6.48		
story	Columns sections (cm)	Span length (Length of beams)(m)	beams sections (cm)	Diaphragms Lengths (m)	Diaphragms sections (cm)	Braced sections (cm)
base	2UNP24	5				$\phi$ 32
Story 1	2UNP24	4.375	2UNP10	3.78	2UNP10	$\phi$ 32
Story 2	2UNP24	3.75	2UNP10	3.247	2UNP10	$\phi$ 32
Story 3	2UNP24	3.125	2UNP10	2.706	2UNP10	$\phi$ 32

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