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Simplified Numerical Modeling of Elevated Silos for Nonlinear Dynamic Analysis

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Title:	SIMPLIFIED NUMERICAL MODELING OF ELEVATED SILOS FOR NONLINEAR DYNAMIC ANALYSIS
Year:	2015
Author:	Castiglioni, Carlo Andrea ; Kanyilmaz, Alper ; Bellos, John
Abstract:	<p>Silos are industrial facilities used for storing a huge range of different materials. They should be designed to resist several loading conditions, and their seismic behaviour, which strongly depends on the geometrical and mechanical behaviour of their supporting structure, and the nonlinear behaviour of the content, should be accurately investigated. This study aims to reach a better understanding of seismic response of elevated silos and tanks, by means of numerical analysis. Since the stored material in an elevated silo represents several nonlinearities (e.g. friction, content-silo wall interaction), nonlinear dynamic simulation of such systems can be very time-consuming, and most of the time unfeasible. In this study, different kinds of Finite Element Models (FEM) have been performed, by using the commercial code Straus7. A complete FE model made of bricks elements and a simpler FE model with distributed masses on the silo walls have been compared. It has been concluded that while simplified models may not provide very exact information in terms of local behaviour of the silo wall, they accurately predict the global response of the whole elevated silo system. This is mainly because the structural behaviour of the whole system is governed by the supporting structure.</p>