**STRUCTURAL RETROFIT OF A 90 METER REINFORCED CONCRETE STACK USING MASS DAMPER**

**DOI 10.37153/2686-7974-2019-16-811-811**

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**ABSTRACT**

Recent upgrade in the performance objectives of the facility owner,required the structural assessment of the 90-meter reinforced concrete stack in an Oil Refinery Located in a high seismic zone. Designed in 1979, the 90-meter exhaust stack fails to meet the performance objectives. Due to high importance of the operation, retrofit with minimal downtime was essential, thus a tuned mass damper alternative was opted. In this study, in addition to material and geotechnical tests, forced vibration and ambient vibration studies were executed as well. Based on the obtained data, analytical model was created with matching dynamic properties. Various TMD alternatives were evaluated prior to selection of tuned mass supported on high damping rubber seismic isolators alternative for this specific structure. This paper summarizes the design process including development of the analyses model, determination of actions on the structure and optimization of the selected retrofit configuration

*Keywords: Tuned mass damper, reinforced concrete stack, ambient vibration test, forced vibration test, seismic isolators*

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