

Seismic Protection of the Eskişehir City Hospital in Turkey

Raul Arranz, Christian Braun, Peter Huber

MAURER SE, Munich, BY, Germany

Contact: r.arranzdiez@maurer.eu

Abstract

The Eskişehir City Hospital with four main building blocks is located 250 km south east of Istanbul in a rather highly seismic zone of Turkey with up to 0,6 g PGA. To avoid any fatalities or damages to the structure and enable absolute continued functionality even after the MCE event, it was decided to apply seismic isolation with pendulum isolators.

This paper will show the design considerations to limit the base shear within the isolated building blocks for the MCE event down to less than 0.13 W (W = seismic weight = Dead Load + 0.3 Live Load) on isolator top level and max. 0.2 W on the upper floor building levels of the structure and the realization with suitable seismic pendulum isolators.

For these low shear level requirements the isolator performance was adjusted to 3.5 s effective period and 26 % damping.

Keywords: Isolation; earthquake protection; low base shear; no damages; pendulum isolator.

1 Introduction

In Turkey several new hospitals have been built during the past years. One of these is the Eskişehir City Hospital (Fig. 1) with 1081 nos. beds in the Odunpazari District of Eskişehir 250 km south east of Istanbul. Due to the high seismicity of this region with up to 0.6 g PGA the published standard [1] by Ministry of Health (MOT) required to apply seismic isolation for this structure with 977 nos. devices to reduce the base shear on the upper floor levels even down to less than 0.2 g [2]. For seismic isolation it was required to apply friction pendulum devices, lead rubber bearings or high damping rubber bearings. In the end, the friction pendulum type of isolator was identified to be the only one fulfilling the requirement of 70 years service life, technically the best, maintenance-free and even economically the

most economic solution considering the project requirements.



Figure 1. Rendering of Eskişehir City Hospital issued by DOST Construction

For the isolator design it was allowed to apply ASCE 7-10, EN15129 or IBC 2012 upon approval by the MOT.