

Design of Huge Complex Building of Two Structurally Independent Seismic Isolation Structures Coupled by Unique Expansion Joint

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Abstract

For large-scale complex facilities, the authors designed seismic isolation structures which were ensured the highest-level safety in a rational and economic way.

We split the building into two first, and then planned the buildings so that their spans and story heights might be optimum according to their uses, and performed the structural design of each building in pursuit of rationality and economic efficiency as well as safety. Finally, the buildings were integrated into one by connecting the two seismic isolation buildings with special expansion joint which was developed for these buildings.

Additionally, we considered long-period earthquakes and strong inland earthquakes that were larger than the reference earthquake of the Japanese Building Codes to ensure highest-level aseismic performance.

Keywords: Seismic isolation structure; Expansion joint; Long-period earthquakes; Strong inland earthquakes

1 Introduction

In Japan, there are further needs for seismic isolated buildings which are extremely effective in reducing the damage to them in mega earthquakes. On the other hand, the buildings tend to be larger-scale and more complex especially in the urban areas. Such buildings have differences in optimal span, number of stories and story height according to building uses, and shapes of the buildings tend to

be irregular both in plan and in elevation. For this reason, it is difficult to perform structural design of these buildings as a seismic isolated buildings in a rational and economic way.

For the large-scale complex facilities, the authors designed seismic isolation structures which were ensured the highest-level safety in a rational and economic way. This paper describes the details of the structural design process and technology which was developed for this buildings.

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