

DEMONSTRATION OF EFFECTIVENESS OF SEISMIC ISOLATION IN THE HANSHIN-AWAJI EARTHQUAKE AND PROGRESS OF APPLICATIONS OF BASE-ISOLATED BUILDINGS

TAKAFUMI FUJITA
Professor
Institute of Industrial Science
University of Tokyo, Japan

ABSTRACT

Since the Hanshin-Awaji earthquake of January 17, 1995 when the effectiveness of seismic isolation was demonstrated, base-isolated buildings have become more popular in Japan. This paper describes behavior of two base-isolated buildings in the earthquake, progress of applications and revised guidelines for safety evaluation of base-isolated buildings.

1. INTRODUCTION

When the Hanshin-Awaji earthquake occurred on January 17, 1995, there were two baseisolated buildings in a northern area of Kobe-city (Figure 1). One of them is the computer center of the Ministry of Posts and Telecommunications, and the other one is a laboratory building of a construction company. In both cases, good isolation performance was demonstrated. This success convinced structural engineers and architects of the very good earthquake resistance of base-isolated buildings. Since the earthquake, construction of base-isolated buildings has increased rapidly. This paper describes behavior of the base-isolated buildings, progress of applications of base-isolated buildings after the earthquake, and guidelines for safety evaluation of base-isolated buildings which were revised after the earthquake (Fujita, 1995; Fujita, 1997).

2. BEHAVIOR OF BASE-ISOLATED COMPUTER CENTER

Figure 2 shows the base-isolated computer center of the Ministry of Posts and Telecommunications, together with a smaller conventional office building. As shown in Figure 3, the superstructure of SRC-structure has 6 stories and a 46,823 m² total floor area, and the building is the largest base-isolated building in the world. Figure 4 shows the seismic isolation system comprising 54 lead-rubber bearings of a 1.2 m diameter and a 0.24 m total rubber thickness, 46 low-damping (natural) rubber bearings of a 1.0 m