

7. The Aging of Rubber Bearings in an Actual Building - Creep Characteristics of Natural Rubber Bearing -

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Via heat aging acceleration tests and other tests, we evaluated the characteristics of the rubber bearings used in seismic isolation structures, seeking to compare actual aging to predicted values. This effort addresses the absence of data on aging and variations in aging over the life of a building. We performed a tracking survey of the amount of creep in natural rubber bearings used in a seismic isolated building (Technical Research Institute Head office, Okumura Corporation) completed 33 years ago (September 1986).

We measured the amount of creep deformation and compared the results to values given by various predictive methods. The average amount of creep deformation for 25 bearings over the course of 33 years was roughly 2.4 mm (2.4% of total rubber thickness). Assuming a linear relationship between elapsed days and amount of creep, creep deformation after 80 years would be about 6 mm. A formula proposed by The Society of Rubber Science and Technology Japan also predicts a value of 6 mm after 80 years, within the design vertical clearance of 15 mm. The results confirmed that this seismic isolated building continues to offer requisite safety and durability 33 years after its completion.

Key words: creep characteristics, aging variation, natural rubber bearing, actual building