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STATE OF THE ART OF SEISMIC ISOLATION AND ENERGY DISSIPATION IN RUSSIA

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The first major research projects in the field of structural seismic isolation have been developed and implemented in Russia in the middle of the 20th century. In the Earthquake Engineering TsNIISK Laboratory theoretical studies have been carried out, as a result of which were developed different systems for seismic loads decrease through regulation (self-tuning) stiffness, and therefore natural frequencies of structures.

The effectiveness of adaptive systems for structural seismic isolation has been proved taking into account the uncertainty ground motion during future earthquakes. Studies were performed on the optimal design of such systems with reserve seismic elements.

The first mass application of adaptive seismic isolation system refers to the years 1976-78. All buildings in the city Severobaykalsk were designed using the bearing supports, the construction of which provides the ability to disable the special reserve elements with a consequent reduction of supports rigidity in the horizontal direction.

Were created also other effective system of seismic protection. For example, the system supports using sliding pairs of "steel-teflon", seismic isolation system using kinematic system supports as inverted mushrooms (aligning bearing). Besides the mentioned so called “intellectual systems” of seismic protection.

A project with the use of seismic isolation rubber bearings was started in high-rise buildings (up to 25-30 storeys) using a seismic isolation have been built in the city of Sochi, in seismic areas on the eve of the Sochi 2014 Winter Olympics. For example, the complex “Olympic university” consists of 5 buildings and settles down along coast of Black sea and has a wrong outline in the plan. Site seismicity is 8 MSK degrees, according to engineering-geological researches. Seismoisolation system in buildings is accepted in a kind rubber bearing support with lead cores. Now, construction of all buildings completed.

On the occasion of the 2018 FIFA World Cup our Center is engaged in designing stadiums being built in seismic regions: Stadium "Krasnodar“ in Krasnodar-City, «Rostov Arena» in City of Rostov-on-Don and Stadium in Kaliningrad-city.

The innovation approach to high-rise buildings seismoisolation has found large-scale practical application in Russia.

Work is underway on the design of high-rise multipurpose complex in height 400 m "Ahmad Tower“ now. The building symbolizes the Chechen medieval watchtower. This will be the most complex and highest technical construction in Russia, because the building is a 9 MSK degrees seismic zone.

Special energy absorbing elements were used in the construction of the Airport in the city of Irkutsk and the railway station in the Adler-city. Previously mentioned rubber bearings were manufactured in factories in China, Italy, Germany and other countries.