

KEFALONIA – A LIFE WITH EARTHQUAKES

The Greek Ionian island of Kefalonia, Lixouri and Argostoli cities and lots of fabulous fishing and mountain villages, are daily exposed to the shocks of earthquake. The team of experts from Center for Seismic engineering, System DC90, was on the Island in a period of February 18th to 21st this year, in order to record the state of the damaged buildings after a series of strong earthquakes.

In a tour of the most vulnerable areas there couldn't be seen a single significant damage to the modern tourist facilities built after the disastrous earthquake in 1953. Objects where we could notice significant damage is the old historical buildings, churches, new poorly built buildings and masonry buildings, and some of frame reinforced concrete structures for housing the lower social categories of the population of the Lixouri. What is the result of so little damage, if we know that the magnitude of the earthquake was 6.2 on the Richter scale? This can be explained by the effect of the nature of earthquake, ie the nature of the ground motion. The resulting fractures in the ground, in the epicentral area, caused such a ground motion that, by the frequency condition, was not familiar with tone frequencies of oscillation of the object, although the maximum amplitude of the ground acceleration was significant intensity. Thus there was no overlap in frequency the phase of the oscillation (resonance), which is the most unfavorable effect on the construction of facilities. It could happen at higher tones oscillation of frame reinforced concrete structures, but it did not happen because of the nature of ground motion.

If repeated significantly higher intensity of acceleration amplitude with similar frequency composition, objects wouldn't suffer a greater degree of damage.

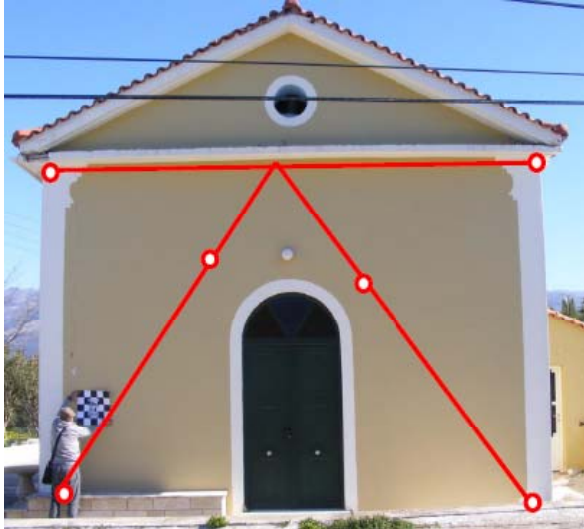
We can't give suggestions to tourists how to behave in these circumstances, but our team of experts certainly will often stay on the island of Kefalonia this year, in order to transfer our experiences, and to raise the level of safety facilities for much greater earthquakes.

On these photographs there are shown the elements of the system DC90 with shock absorber for damping vibrations that are planned for the damaged buildings on the island of Kefalonia.

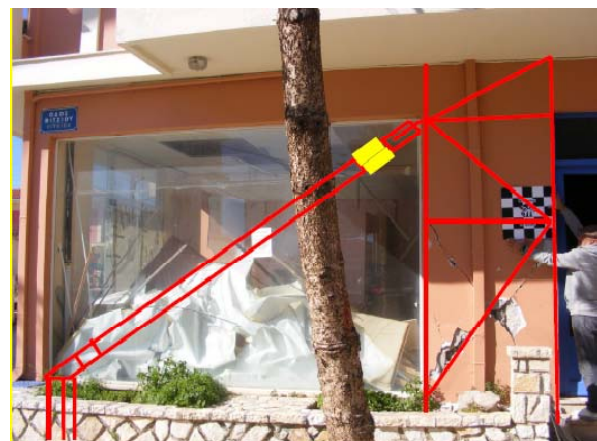
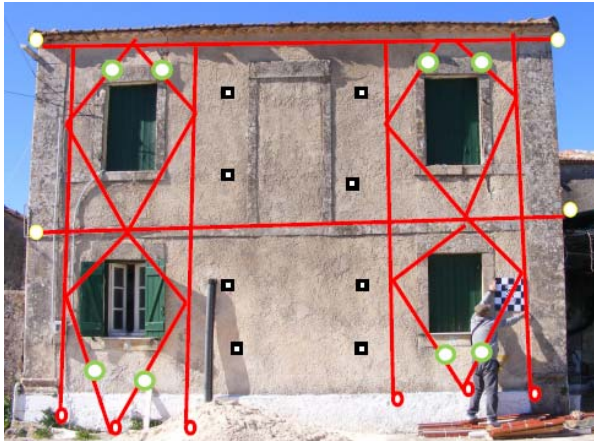
We have to mention and emphasize the great commitment, dedication and support that was given to us from our Honorary Consul in Kefalonia, his Excellency Mr. Viktor Rouhotas



Žarko Petrašković, civil engineer - an expert in seismic engineering, Dimitris Kekatos, civil engineer - representative of the Engineering Chamber of Kefalonia, Honorary Consul of Serbia PhD Viktor Rouhotas, and Zoran Petrašković PhD in civil engineering - author of System DC90,
from left to right after the lecture in the Engineering Chamber of Kefalonia



Technology of strengthening the Orthodox churches using the DC90 dampers, the image on the left. Badly damaged building of social housing can be saved by technology of vertical bracing with steel hysteresis shock Absorber System DC90, picture on the right



Preservation technology of historical masonry stone buildings by vertical stiffeners with shock Absorbers and horizontal shrinkage with compensators, shown at left. Method of raising security on reinforced frame systems, the picture on the right.

In the long term this island is under constant seismic shocks. Objects resist and survive. Only a small part of them, badly built, are damaged. But if we want to raise the level of safety of facilities, and if we want to eliminate the psychological impact and fears that arise with tourists and residents, it is necessary to apply modern technologies that are based on the control of force and deformation for raising safety facilities to a higher level. Incorporating these steel elements apparently (on the facades), as shown in the concrete construction of the building, residents and tourists will have a sense of security, and the facility would be provided for a large earthquakes.

Innovation Center for Seismic Engineering is thankful for the hospitality and given opportunities to present their experience and results of the application of technology for increasing the safety of buildings. We expect the beginning of the concrete activities on the fast and efficient raising safety of facilities on the Island.

Author of System DC90

Zoran Petrašković, PhD in civile engineering

President of the Academy of Inventors and scientists SAIN, Belgrade