

SISBRICK

DESCRIPCIÓN DE LA INVENCION

Researchers at the Universitat Politècnica de València have designed Sisbrick, a new device in the form of a brick that allows for the improvement in the way buildings behave under earthquake conditions. The key to this invention lies in the combination of materials to achieve results that are two-fold: Sisbrick is capable of absorbing horizontal movements resulting from earthquakes and of withstanding the vertical loads that can impact the structure of buildings. Due to its conventional brick form, it can be placed using traditional wall-building techniques, without additional processes or products.

Sisbrick comes in the form of a matrix whose particular design endows it with properties that enable it to ensure the desired seismic isolation. The elements inserted into its matrix also contribute to this effect, lending it improved properties outside the plane.

In the current market, there are building techniques and bricks that, due to the way they are linked or because of their form, allow the pieces to lock together more tightly, which can result in constructions that are more resistant to earthquakes. However, given that partition walls can exist inside a dwelling or not according to the needs of its inhabitants, and that the existence of interior walls is something that conditions to a large extent the behaviour of a building under earthquake conditions, constructing more resistant walls does not resolve the real problem that underlies the great deal of damage caused by earthquakes: the difference in behaviour of a building between the calculations and the actual construction due to the walls that exist.

Nowadays, the seismic calculations carried out in project offices only take into account the structure of

the building and don't consider the partitions, despite their notable and widely studied influence on the dynamic response of a building in the event of an earthquake

Bearing these circumstances in mind, the isolating device designed by ICITECH researchers at the UPV was conceived under a new philosophy, as it does not seek to make partitioning walls more resistant, which would condition to an even greater extent the behaviour of buildings during earthquakes, but rather look to seismically isolate the partitions from the rest of the structure, thanks to its capacity to absorb movement. It acts as an isolating barrier, avoiding the transmission of loads of these dividing elements to the structure, thereby not conditioning and limiting the seismic response of the building

According to the tests carried out at the ICITECH labs, the walls built with these devices display a behaviour under earthquake conditions that is closer to the actual calculations made in the building design, and have a greater capacity to absorb movement. By using a small amount of these devices to construct an interior wall, and the rest of the structure using conventional ceramic bricks, in the laboratory, researchers have been able to successfully test movement of up to three times greater by using "isolating bricks" than without them, thereby considerably reducing the tension withstood by the wall.

In terms of how to practically apply the invention, researchers at ICITECH indicate that it is not necessary to build complete walls with this type of brick, but rather that it is sufficient to apply them sparingly following predetermined layouts. Once the devices are adequately placed, they act as a safety system, blocking the transmission of forces between the structure and the partitions during seismic movement

SECTORS OF BUSINESS APPLICATION

The target sector to which this technology can be transferred and used is the construction sector.

TECHINICAL ADVANTAGES AND BUSINESS BENEFITS

- Protection of pillars from shear stress levels caused by diagonal compression struts under earthquake conditions
- Protection of partition walls by blocking the formation of compression struts during earthquakes.
- Reduction of stress in partition walls.
- It allows for a seismic response of the structure that is closer to provisions made during the design stage.

SISBRICK

- It allows for the use of traditional calculation methods based on the formation of plastic joints.
- It complies with seismic regulations that indicate that designs should consider or isolate those construction elements that can affect the seismic response of the structure.
- It allows for architectural flexibility by enabling the installation or removal of partition walls without the need to recalculate the original structure, as it enables structural isolation.
- It contributes to reducing economic and human losses in the event of an earthquake.
- It allows irregularities in the distribution of the wall, at both ground and elevation levels, which affect the overall rigidity of the building and can lead to additional torsional stress.
- It allows for the absorption of unforeseen movements in the structure such as sinkage, shrinkage or rheological phenomena, reducing the tension suffered by partition walls.
- The economic repercussions of its use in the overall cost of a building are extremely small.

STATE OF DEVELOPMENT OF THE TECHNOLOGY

Sisbrick has been designed and tested at the ICITECH labs

INDUSTRIAL PROPERTY RIGHTS

The property rights to the Sisbrick and its results belong to the Universitat Politècnica de València

COLLABORATION NEEDED

RELATED IMAGES

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