from the microscopic porosity of the wax to the outside of the layer in large accumulation sites. At the onset of shortening, many microscopic dilatant veins filled with the liquid open in the horizontal foliation. These veins are long (40–50 mm) and thin (<1 mm). This development is favoured by the mechanical anisotropy of wax.

During the development of the fold, the veins acquire a sigmoidal shape which results from their rotation and shearing in the limbs. This process involves deformation of the solid wax around and between nearby veins. The liquid segregates from these deforming areas into the opening veins because the liquid flows down the pressure gradients. The veins are concentrated in the concave side of the fold and in the limbs. The enlargement of the veins implies an increasing heterogeneity. When the shortening is higher than 25 %, the fold becomes asymmetric. One of the limbs thus defines a reverse shear zone in which the veins are deformed. According to their position and orientation with respect to the shear planes, their aperture increases or decreases. The closing veins expel the melt toward the sides of the model, perpendicularly to the shortening direction. These veins are therefore obliterated. Next, a shear band may develop when the vein density is locally around 15 %. Finally, our experiments show that during the main part of the shortening, an important horizontal melt migration occurs through interconnected veins toward the lowest pressure vertical sides of the model. The flow of melt is guided by the mechanical anisotropy. On the other hand, upward melt migration occurs through the shear band only after 30 % of shortening. Melt segregation and migration are highly strain-dependent mechanisms since the stress field within the folded layer is heterogeneous and changes during the progressive deformation.

A series of friction new bearings for seismic insulation

F. BARTOLOZZI

Via dei Carracci, 4, 21100 Varese, Italy, ciuciuzza@iol.it

The study describes in detail the composition and operating principle of six movable bearings for seismic insulation and also emphasises the most important characteristics of the respective systems; for example, the economical competitiveness with all other existing conventional or base insulation systems, the considerable decrease in the absorbed seismic energy and in the psycho-physical discomfort of the inhabitants of the building during an earthquake and the ease of maintenance.

The main principles of seismic insulation systems when using the proposed movable bearings are:

1. interruption of the solidarity between the building and the foundation-soil complex;
2. laying of movable bearings with sliding or rolling friction.

As regards their composition and the operating principle, the bearings may be classified as follows:

- mechanical
- natural
- mixed.

The centring and locking of the building after an earthquake, when using the first type of bearings, are not automatic because they occur by means of the activation of special electronically powered devices. The natural bearings are suitable for carrying out the self-centring of the building and, finally, the mixed ones are suitable for both centring the building automatically and also for mechanically safeguarding it against the danger of resonance.

Self-centring aseismic system with double natural frequency

F. BARTOLOZZI

Via dei Carracci, 4, 21100 Varese, Italy, ciuciuzza@iol.it

The proposed system is based on the following operations:

1. interruption of the solidarity between the building and the foundation-soil complex;
2. laying of multidirectional movable elastic bearings with sliding or rolling friction.

This application confers the building with the main properties of centring after an earthquake and of doubling the natural frequency of vibration during an earthquake.