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shape and therefore the distribution of masses and inertia forces, the actual disturb given by the irregularity to the lateral response is limited [7].

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In fact, a greater height can increase the natural period of the building, shi ing it in the range where the response ampli cation is lower. On the contrary, the ratio height, that is a shape factor, has to be controlled because it in uences the overturning of the building and the axial overloading of the external structural elements. Building shape is important because it has a decisive in uence on the dynamic behaviour and on the stress concentration [1]. e geometric parameters qualifying the building shape, commonly referred as in uence parameters of the seismic behaviour, are the vertical and plan regularity, the symmetry and the compactness. All these aspects are acknowledged by the major codes that provide design criteria penalizing buildings not having regular and compact shape. Penalization can consist of more stringent and detailed evaluation of the response or of a reduction of the allowed ductility factor for taking into account the reduced dissipative capacity [2]. e global shape irregularity can be a negative factor in itself, but, most of all, because it a ects the structural system. Irregularities in the seismic resistant system are determinant in reducing the good performance under seismic attack and are the factors especially controlled by seismic codes [3]. For example, Structural Engineers Association of California provides for both vertical and plan irregularities.

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Vertical irregularities do not only consist of irregular vertical geometry, but also of irregularities of the structural system, sti ness discontinuity, weight irregularity, discontinuity of vertical lateral force resisting elements, strength discontinuity. Also plrengil losystem, sti pl29e60os general criteria for resistant buildings, received by the advanced codes and guidelines, the suitable morphology has to be characterized by regularity. is essentially means that a symmetrical and compact shape should be the target when designing a seismic resistant building [5]. e reasons for wishing regular buildings depend on the need of avoiding unpredictable stress concentration that can cause local collapses and modi cation of the dynamic behaviour [6]. is is not generally true, in fact, if provisions are adopted for avoiding the dangerous local e ects and if the distribution of the lateral force resisting elements ts the global

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Analyses carried out by faella on morphologically irregular structures, like structures having a L-shaped plan, that can be de ned irregular according both to perceptive criteria and to irregularity rules provided by guidelines show that, if the diaphragms are rigid and the columns are distributed according to the shape, the irregularity is apparent and the disturb to the response induced by the irregularity consists of very slight torsional e ects that can be accounted for at design stage [8]. e current design philosophy of seismic resistant buildings provides for a resistance, to the forces induced by severe seismic attacks, relied to the capacity of the building to dissipate the energy furnished by the earthquake as shown in (Figure 1). is capacity is associated to plastic deformations that can develop in particular zones of the structural elements in a controlled way [9]. e capacity design allows

Figure 1: Design of seismic resistant buildings.

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