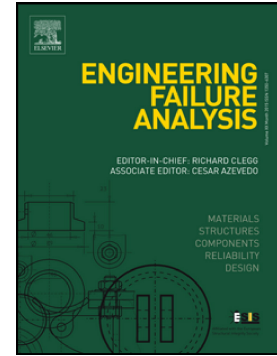


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Specific structural mechanics that underpinned the construction of Venice and dictated Venetian architecture

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Abstract

This paper demonstrates that Venetian architecture was the result of specifically conceived structural mechanics, novel failure analysis, and specially devised construction techniques, which allowed structural design to take full advantage of materials. Venice witnessed the creation of 'structural art' that drastically reduced the incidences of failure caused by extremely soft soils and aggressive environment, which extended the operating horizons of masonry and timber structural materials to the extent that very bold structures were obtained also before the pre-eminent materials of modern structures.

A further aim of this paper is to promote a greater knowledge and understanding of the attributes and capabilities of traditional engineering materials in the context of structural design, thereby contributing to the prevention of failures of cultural buildings in the future.

While normal masonry constructions can be governed by Euclidean geometry, Venetian buildings are far more complex and elusive in form. Venice and its architecture can be interpreted and comprehended only in the remit of structural engineering, which played a central role in enabling the construction of the city. The fundamental determinants of Venetian building morphology — the underlying logic of form in architecture — entailed a tectonic form midway between the masonry construction and the skeletal structure.

Keywords:

brackish water; skeletal masonry; soil settlement; space-saving structures; weight-saving structures.

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