

A generalized structural model for generating quasi-periodic formations

Rima Ajlouni¹

¹*School Of Architecture, University Of Utah, Salt Lake City, United States*
E-mail: ajlouni@arch.utah.edu

The discovery of ancient Islamic patterns with quasi-periodic symmetries has triggered significant interdisciplinary interest into understanding these puzzling artifacts. The interest in these mysterious symmetries was triggered by the discovery of quasi-crystals in the 1984; a new state of matter that exhibits non-periodic arrangements, which were perceived to be impossible for maintaining a uniformed atomic structure in the classical crystallography. Astonishingly, eight centuries before their discovery in modern science, craftsmen had constructed patterns with quasi-periodic formations [1, 2, 3]. Many studies have argued that these ancient formations were constructed by repeating predefined localized templates and without any understanding of their higher order. However, the fact that a wide variety of uniquely different quasi-periodic manifestations were conceived independently in different distinct parts of the Islamic world, suggests that ancient craftsmen used a consistent and flexible process to create such a wide spectrum of diverse solutions. Based on my analyses of ancient patterns, this paper argues that ancient craftsmen used a global proportional method that allowed for diverse creative expressions to be shaped by the local conditions; providing a dynamic vehicle for creativity across, ethnic, cultural and religious boundaries, as well as highlighting a unique example of how cultural heritage can inform some basic theories in modern science.

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