



## Analysis of Design drawing Process with Historiographical Documents special geometry knowledge

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Submitted: 2020-02-24

Accepted: 2020-04-26

### Abstract

Making use of plans to build structures dates back to a very long time ago. In doing so, two major elements were geometry and arithmetic. Since before embarking on building structures, drawing plans was unavoidable, mathematical science has been an integrated part in the process of designing and drawing. Nonetheless, the shortage of historiographical documents on this issue gives us no or little information on how the plans were drawn in the past. The main question here is this: What specific phases were involved in the process of drawing plans in the past? And what role have historiographical documents and mathematical science played in this regard? The present research aimed, to reexamine comprehensively the process of drawing designs in the past and to investigate the role of mathematics in this process based on historiographical documents. Historical resources and documents not only took into account drawing designs but also addressed the role of mathematical calculations and scrutinized drawing process. In addition, the process of drawing designs included four phases: Surveying and drawing the dimensions of the area intended; defining the limits of spaces; drawing spaces based on scales and proportions and finally, drawing the structure based on proportions approved by the client. In fact, one of the primary stages of building a structure is designing its architectural and structural maps, respectively. Upon gaining familiarity with such features as dimensions, topography, light and wind direction, and adjacencies and accesses, architects start designing architectural and executive maps. Preparing maps was considered an inevitable step in the construction process in the past, and one of the first maps, designed on clay board, is related to a residential house in the Mesopotamian civilization and the Akkadian empire. Despite the vast array of information on architecture, especially Islamic architecture, the unknown nature of some of these documents has kept them out of sight or resulted in one-sided judgments of some regarding the relationship between mathematics and architecture, architectural mapping and the status of mathematicians in the design process of maps. What is more, the principles used by craftsman master builders and their performance in the design process of mapping and the implementation process have remained uncertain to some extent; historians' recorded data suggest only a kind of tradition in architecture without illustrating the method of design and the type of implementation. The design method of past architectural structures, their implementation and construction have been neglected so far. Moreover, there exists no written document that clearly and extensively describes this process. There only exist a few scrolls that have been written on the ornaments used in buildings and their design. Included in these scrolls are some maps whose design process is unknown as no explanation accompanies them. Besides, not much effort has been made to search about Iran's history of architecture among Persian sources, and the status of historical texts in Iran's architecture has not been revealed. In fact, the procedure of constructing a building in the past, from theory to practice, was drawn from the experiences of architects and construction details passed down from generation to generation. Reviewing historical texts, the present study seeks to analyze the procedure of mapping where mathematics is used. The study also investigates the relationship between mathematics (and its sub-categories such as geometry) and architecture and represents the stages taken in mapping by consulting the experts. The research method is historical-analytical.

**Keyword:** Historiography in architecture, The place of mathematical science, Instrument drawing in the past, The process of drawing designs, Iranian Drawing design.

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