PAYKAREH
Volume 14 Issue 39 Spring 2025 Pages 16-35

Original Research Article

Design Scheme and Proportional Analysis of the Kufic Inscription on the Stone Mihrab of Turan Posht Mosque and Pilgrimage Site, Yazd

Sahar Salehi[1]; Mahnaz Shayestehfar[2]; Seyed Abu-Torab Ahmadpanah[3]; Mohammad Khazaei[4]

1. Ph.D. student in Islamic Arts, Faculty of Art and Architecture, Tarbiat Modares University, Tehran, Iran.
2. Corresponding Author, Associate Professor, Department of Islamic Art, Faculty of Art and Architecture, Tarbiat Modares University, Tehran, Iran.
E-mail: shayesteh@modares.ac.ir
3. Associate Professor, Department of Visual Communication, Faculty of Art and Architecture, Tarbiat Modares University, Tehran, Iran.
4. Professor, Department of Visual Communication, Faculty of Art and Architecture, Tarbiat Modares University, Tehran, Iran.

Received: 8 July 2024 Revised: 22 December 2024 Accepted: 31 January 2025

Abstract

Introduction: The Mosque and Pilgrimage Site of Turan Posht has a stone mihrab currently preserved in the Freer Gallery of Art in the United States. This stone mihrab features inscriptions in Kufic and Thuluth scripts. Based on the date inscribed on this stone mihrab, this artifact dates back to 549 A.H. and the Seljuk period. The Seljuk period was one of the eras when the diversity of design and attention to detail in Kufic inscriptions peaked. The Kufic inscription on this stone mihrab includes verses 17 to 19 of Surah Al-Imran. The research question is: «What is the design scheme and the application of proportions in this Kufic inscription?» This research aims to analyze the proportions and design principles in the Kufic inscription of the stone mihrab of the Mosque and Pilgrimage Site of Turan Posht to find the design scheme.

Research Method: This study examines the design principles and proportional systems governing the Kufic inscription on the Seljuk-era stone mihrab (549 A.H./1154 C.E.) of Turan Posht Mosque and Pilgrimage Site, Yazd. Using qualitative and historical-analytical methods, we identify a structured design scheme based on proportional units (1/44 and 1/56) that systematize the inscription's layout, letterforms, and plant (vegetal) motifs.

Findings: In the design or execution of the Kufic inscription on the mihrab of the mosque and Pilgrimage Site of Turan Posht, the inscription designer used a design scheme based on proportions. This aspect has also influenced the application of its visual features.

Conclusion: The research analyses indicate that the Kufic inscription on the stone mihrab of the Mosque and Pilgrimage Site of Turan Posht has a design scheme that has been formed based on fundamental proportions of $\frac{1}{44}$ and $\frac{1}{56}$. According to these proportions, the main guiding lines, middle guiding lines, and tabulations of this Kufic inscription have been executed systematically and in accordance with the fundamental proportions. The design and connections of the letters have also been made based on this design scheme, and no word has been designed outside of this plan.

Keywords

Mosques, Stone Mihrab, Turan Posht, Kufic Inscription, Design Scheme, Proportions

How to cite this article: Salehi, S., Shayestehfar, M., Ahmadpanah, S.E, & Khazaei, M. (2025). Design Scheme and Proportional Analysis of the Kufic Inscription on the Stone Mihrab of Turan Posht Mosque and Pilgrimage Site, Yazd. *Paykareh*, 14(39), 16-35.
DOI: https://doi.org/10.22055/pyk.2024.19772

©2025 by the Authours.This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0 license)
https://creativecommons.org/licenses/by-nc/4.0

Introduction and Problem Definition

The Seljuk period lasted approximately 160 years (429 A.H./1038 AD - 590 A.H./1195 A.D.)[1], during which many religious buildings such as mosques, schools, and shrines were constructed in Iran. These buildings usually featured decorations. Architectural decorations included geometric, plant, animal, and human motifs and inscription designs. Kufic inscriptions in Islamic religious buildings in Iran expanded over centuries under various governments; it can be said that in the early years of Islam's arrival in Iran, Kufic inscriptions were simple in terms of writing style[2], and over time, attention to detail and diversity in writing style increased. The Seljuk period is one of the historical periods where the art of inscription shows more diversity in design and attention to decorations in religious buildings compared to earlier periods. Many samples of Kufic inscriptions from the Seljuk period have survived in present-day Iran, one of which is the stone mihrab of the Pilgrimage Site and Mosque in Turan Posht. Based on the date inscribed in the Kufic script, this stone mihrab belongs to the year (549 A.H.) and is preserved in the Freer Gallery of Art in America. Kufic inscriptions were designed and executed in various styles, such as simple Kufic inscriptions, Kufic inscriptions with plant (vegetal) decorations (flowers and leaves), Kufic inscriptions with geometric decorations, and so on. Regardless of the style, these Kufic inscriptions follow three design systems: The script system, the geometric system, and the plant (vegetal) system. If we find the root of the word «system» in order, principles, and rules, and «system» in the sense of principles and rules based on which something is done, the following question arises: «What are these principles and how have they been applied in their design?» The case study of the Kufic inscription on the stone mihrab of the Mosque and Pilgrimage Site in Turan Posht from the Seljuk period has been selected to answer this question. The goal is to achieve the proportions used in the design scheme[3] of the Kufic inscription of this mihrab. The significance of this research lies in finding an answer to how this Kufic inscription was designed or executed, a question that has remained unanswered. Additionally, the importance of answering it is embedded in discovering the design scheme of this Kufic inscription. If a Kufic inscription is designed based on a predetermined design scheme with fundamental proportions, it is possible that other Kufic inscriptions also use a design plan with fundamental proportions. Finding them would help clarify the design methods of this type of Kufic inscription and preserve their design style, as well as the inscriptions in Islamic buildings in Iran.

Research Method

This research method is historical and analytical, and the data collection was carried out through a library study. The selected sample is the Kufic inscription of the stone mihrab of the Turan Posht Mosque and Pilgrimage Site. High-resolution images of the mihrab, sourced from the Smithsonian Institution, were analyzed using Adobe Illustrator to grid-map the inscription. Proportional ratios (e.g., 1/44, 1/56) were calculated with a precision tolerance of ±0.01 mm. Middle and ascender lines were identified to determine letter alignment and vegetal motif placement.

Research Background

Related articles include the following: An article entitled «Structure and Features of Decorative Kufic Inscriptions (Floral and Leafy) in the Seljuk and Ilkhanid Periods» was conducted by «Makinejad» (2018). In this article, the researcher analyzes samples of Kufic inscriptions from the Seljuk and Ilkhanid periods and states in one section that Kufic inscriptions follow three design systems: Geometric, plant, and textual systems, and not all Kufic inscriptions may have these systems. An article entitled «Analysis of the Structure and Visual Features of the Kufic Inscriptions of Imamzadeh Abdullah in Shushtar» by «Salehi, et al» (2020) was published, which discussed the use of main guiding lines for design, especially the base line for letter connections. An article entitled «Examining the Script Style and Visual Arrangements of the Grivar Inscription in the Davazdah Imam Mausoleum of Yazd» by «Mohammadi, et al» (2023) was published, in which the researchers demonstrate the guiding lines used in this Kufic inscription. In these introduced articles, which are related to the present research from a theoretical perspective, the aspect of proportions has not been addressed. Proportions are one of the fundamental structural and visual features in letter design and determining the placement of guidelines in the design scheme of Kufic inscriptions. This research will delve into the precise details of how it is applied in the design scheme of the Kufic inscription of the stone mihrab of the Mosque and Pilgrimage Site of Turan Posht. Other articles and books have also addressed the stone mihrab of the Mosque and Pilgrimage Site of Turan Posht, reading its written text and narrating its history. Among them is an article entitled «The Pilgrimage Site of Imam Reza (AS) in Turan Posht: Newly Discovered Documents and Inscriptions» by «Sadeghi Turan Poshti and Mir Hosseini» (2020), which aimed to achieve the historical background and onomastique of this place and introduced the documents and inscriptions belonging to this structure. «Ghouchani» also wrote a book in 2004 on the study of inscriptions on the buildings of Yazd, which was published by the Cultural Heritage Organization. In one section, the author delves into the reading of the inscriptions on the stone mihrab of the Mosque and Pilgrimage Site in Turan Posht. Another book entitled «The Coexistence of Design and Writing in Iranian Art», written by «Farid» (2021), examined the characteristics of Kufic inscriptions, considering the type of writing and their composition with decorations such as geometric and plant (vegetal) motifs and categorized them. Another noteworthy book in this research is «The First Kufic Inscriptions in the Architecture of Islamic Iran», written by «Blair» (2015), which generally addressed some characteristics of Kufic inscriptions and their reading. Despite the introduction of these works, which are the most relevant research works to the current topic, and other studies that have chosen Kufic inscriptions in various historical buildings in Iran for examination and analysis, the Kufic inscriptions on this stone mihrab and the design of the letters and the impact of proportions on this Kufic inscription have not been studied so far, an issue that the current research aims to address and is different from the conducted studies in this regard.

Cultural Policies and Inscriptions of the Seljuks

The Seljuk period of rule began in 429 A.H. (1038 A.D.) and lasted until 590 A.H. (1195 A.D.)[4]. During this period, some of the rulers were Sunni, while others leaned towards Imamite Shia or Ismaili Shia, which led to the presence and establishment of governments in the land of Iran that had their own religious views, and these views influenced cultural policies. In this section, the function of mosques as cultural bases during this period is noteworthy. Like in other eras, mosques in this historical period served as places for prayer

and communication with God. Since people gathered in mosques and performed prayers, they became places for the congregation of Muslims, making them suitable locations for conveying governmental commands to the people. From this perspective, it can be stated that the role of mosques in connecting people with governments and transmitting Islamic culture was also significant during this historical period. Architecturally, mosques in this period followed their own specific characteristics; for example, the most commonly used material in their construction was brick, and their decorations mostly featured plant (vegetal) motifs, geometric patterns, and inscriptions. «Inscriptions refer to writings executed on materials such as stone, brick, plaster, tile, wood, etc.» (Ghelichkhani, 2011, 310). Therefore, inscription design is an art related to writing, and every written piece has meaning. Given this, inscriptions can be considered to have conceptual and visual value. «The nature of inscriptions is communicative; thus, their concepts are variable and diverse. They often carry verses from the Quran; in some, there are mentions or prayers regarding prophets and descriptions of religious figures. Additionally, at the end of inscriptions, the names of artists, the date of construction, and the description of the endowments of the building are sometimes included» (Azizpour & Salehi Kakhki, 2013, 156). Various texts are written on inscriptions, but it can be stated that in religious buildings, most are verses from the Quran. «Islamic inscription, like calligraphy itself, is rooted in the Quran and derives from the sublime capacities of the word of God. The Quran is a book that, despite its intricate and cryptic nature, was revealed in the clearest expression for all worlds. Divine verses in epigraphy were used for the public declaration of God's word in architecture and other objects and utensils. Islamic calligraphy items were initially used to clarify, specify, and glorify the luminous verses of God's word, and this had a significant impact on inscription design» (Shahidani, 2018). It is important to note that the Kufic script «is the oldest script of the Islamic period, which transitioned from the stage of script (in the sense of recording and preserving language) to the realm of calligraphy in fine arts» (Ghelichkhani, 2011, 318). Thus, after the arrival of Islam in Iran, Kufic inscriptions spread on structures such as mosques, schools, Imamzadehs, pilgrimage sites, and so on. Gradually, the use of Kufic inscriptions, which were simple in writing style, became more visually diverse, and artists incorporated more details into their design and writing. Various names were given to each type of Kufic script. It is important to classify Kufic inscriptions because they are either simple or combined or integrated with plant (flower and leaf) and geometric decorations. One of the most significant developments in the art of Kufic inscription during the Seljuk period was the diversity in writing styles and greater attention to their details compared to previous periods. From this perspective, this period is considered one of the peaks of Kufic inscription art.

Mosque and Qadamgah (Pilgrimage Site) of Turan Posht

Building mosques is one of the manifestations of these cultural-religious institutions. «The history of temples and religious buildings is a narrative that dates back to the beginnings of human societies» (Shayestehfar, 2022). A mosque in Turan Posht, one of the villages in Yazd province, was built where the local people believed the Pilgrimage Site of Imam Reza (AS) was. «In the post-Islamic period, the first report of Turan Posht should be considered in relation to the migration of Imam Reza (AS) from Medina to Marv, where, despite differing opinions on the route and stops of the migration, Turan Posht is also mentioned as one of the stops. The most important reason that Turan Posht is considered one of the stops of the Prophet's migration is an inscription in 548 explicitly mentioning the mosque

Mashhad Ali ibn Musa al-Ridha (AS). This inscription belongs to the structure now known as the Pilgrimage Site of Imam Reza (AS)» (Sadeghi Turan Poshti, 2017). This Mosque and Pilgrimage Site was destroyed about 80 years ago, and the reconstruction took two years (Sadeghi Turan Poshti, 2017). The description of this Mosque and Pilgrimage Site states that «this Pilgrimage Site, before its destruction, had a wooden roof, and its ceilings and columns were adorned with verses from the Quran. Despite this information, today at this Pilgrimage Site, apart from a few severely weathered wooden remnants, no trace of the carved woods can be found, and the only thing that stands out in this Pilgrimage Site is a relatively small marble pulpit» (Sadeghi Touran Poshti & Mir Hosseini, 2020). Additionally, a stone mihrab from this Mosque and Pilgrimage Site has survived and is now kept in the Freer Gallery of Art in the United States. «Ghouchani» states: «In the Freer Gallery of Washington, a stone tablet belonging to the Mosque and Pilgrimage Site of Turan Posh is kept, which was carved by order of the then ruler there, named Junaid ibn Ammar ibn A'la. The date on the end of the tablet indicates 549 A.H.» (Gouchani, 2004, 36). The possibility of this stone mihrab being taken out of the country is also mentioned: «During the reign of the Sahib Divan, several Europeans stole some ancient stones from Turan Posh» (Afshar, 2006, 198). This stone tablet is likely one of the artifacts taken out of the country then. According to the readings of «Abdullah Gouchani», the text of this tablet resembles the mihrabs of mosques and probably served the same purpose in this building. This stone mihrab has inscriptions in Kufic and Thuluth scripts. Kufic inscriptions come in various types; the Kufic inscription on this stone mihrab is simple with a background of arabesque patterns and is also decorated in some sections with interlocking palmettes. Despite the absence of recorded names of the artists because «artists have always sought to hide their works during the unrests they have always faced» (Far, 2003, 38), it is possible that the decorated Kufic inscriptions were designed by artists who did not follow the rules of calligraphy, as the likelihood of designing decorations with calligraphy in these Kufic inscriptions is low.

Proportions in Inscriptions

By observing some of the Kufic inscriptions that are engraved on historical buildings or preserved in museums, the question arises in the viewer's mind: How were such written decorations created in various dimensions with precise details? Perhaps the answer to this question, in addition to the creativity of the artist's design and writing, lies in proportions. The term «proportions» is defined as follows: «Proportions are the rules of calligraphy and can, in a sense, encompass all the principles and rules of calligraphy, meaning that the ratio and harmony of other rules are also measured by the proportions among them» (Ghelichkhani, 2011, 99). In another definition, it is stated that proportions «are the relative and comparative relationship between different parts and the whole of an element. The measurement between two things creates a ratio, and harmony or proportion refers to the equality of these ratios» (Bemanyan, Okhovat, & Baghaei, 2010, 15). Here, mathematical calculations, numbers, and figures become important, initially determining the overall mathematical size, such as $\frac{1}{1}$, and other ratios are expressed in relation to this overall ratio. It should be noted that «without considering size or sizes as a rule, we can measure ratios and the greatness or smallness of something» (Ayatollahi, 2017, 182). Now, the importance of adhering to proportions in Kufic inscriptions is not hidden from us because Kufic inscriptions, with their grandeur and great precision, are engraved on historical monuments, and their acceptance is not possible without adhering to proportions. As it is stated, «No art

can reach its deserving perfection without relying on the science of ratios and proportions» (Najiboghlu, 2000, 256). Also, «proportion is one of the fundamental principles of a work of art that expresses the harmonious relationship between its components» (Bemanyan et al., 2010, 15). Adhering to proportions is one of the unavoidable principles for designing writing in Kufic inscriptions. The presence of primary proportions in design leads to the formation of visual qualities such as rhythm, symmetry, positive and negative spaces, unity, and so on in a Kufic inscription.

Design Scheme in the Context of Inscription

In response to the question, «What is a design scheme?» it can be considered one of the most important terms in the context of inscriptions based on design. The basis of Kufic inscriptions is assumed in two ways: 1. Kufic inscriptions are based on calligraphy, in which case they follow the rules of calligraphy and are then redesigned according to the dimensions available to the artist in the building, based on the determined proportions and executed in the building; 2. Kufic inscriptions are based on design, and the artist designs them from the beginning according to the design scheme they have determined, with creativity and writing principles, and finally executes them in the building. The term «calligraphy» is important in both cases in Kufic inscriptions, and «a noteworthy point in encountering many inscriptions that at least have a calligraphic aspect is the presence of another individual besides the calligrapher, religious figure, craftsman, plasterer, etc.» (Farid, 2021, 92). This individual is likely «familiar with the science of proportions, design, calligraphy, writing, and the science of imagery. Of course, these examples could have been the work of a single person, someone who, besides knowing calligraphy, also benefited from other sciences. Perhaps this individual was the same person who later became known as the 'Khan' in the Timurid and Safavid courts» (Farid, 2021, 93). The significance of this issue lies in the fact that the artist needed to know the science of proportions, design, and writing to create and execute Kufic inscriptions in buildings. Regarding how the science of proportions was used in executing these Kufic inscriptions, it can be stated that the «design scheme» is the key to answering this question. The design scheme in Kufic inscriptions involves using primary guide lines, middle guide lines, and tabulation layouts based on basic proportions. The importance of the design scheme in the context of decorative Kufic inscriptions is that the artist needs a plot to start designing the written text in the form of a Kufic inscription, which includes designing letters based on it and demonstrating features such as equal thicknesses of horizontal and vertical letters, determining the start and end of letter designs, and establishing letter connections at a specific point. Additionally, the artist has incorporated some visual features, such as equal positive and negative spaces, rhythm, symmetry, etc., into this design scheme. The mentioned elements create coherence and order throughout the Kufic inscription. In the design scheme of Kufic inscriptions, in addition to basic proportions, other features are also observed; these features include adhering to primary guide lines (base line, ascender line, descender line), middle guide lines, and tabulation layouts. The sum of these features, which the artist uses to design letters, is called the «design scheme».

Explanation of the Design Scheme and Proportions in the Kufic Inscription of the Stone Mihrab

In explaining the design scheme of the Kufic inscription of the stone mihrab of the Mosque and Pilgrimage Site of Turan Posht, we first address the Kufic inscriptions of this stone mihrab. According to Fig 1, numbers 1, 4, 7, and 10 include Kufic inscriptions, while the others are in Thuluth script. The decorative Kufic inscription around this stone mihrab, numbered 1 in Fig 1, has been chosen for this research because its writing is larger than the other Kufic inscriptions of this stone mihrab, and it has less damage.

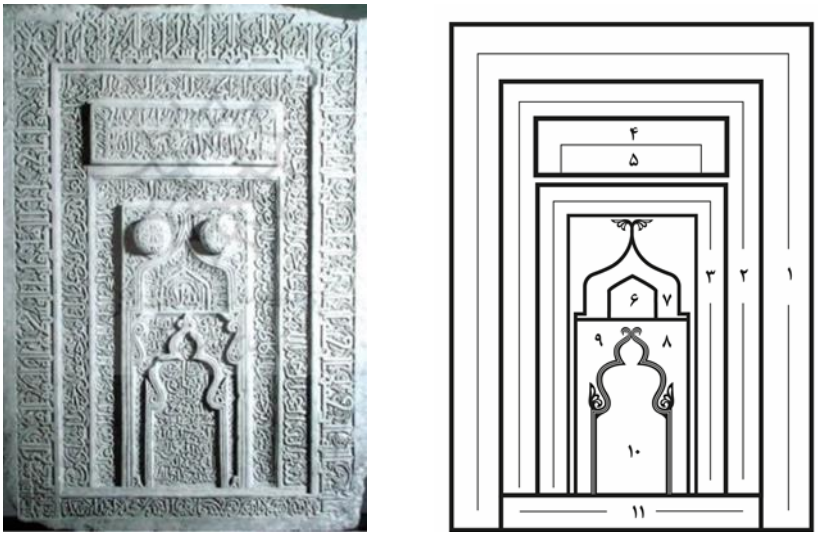


Fig 1. The inscription of the stone mihrab of the Mosque and Pilgrimage Site of Turan Posht in Yazd in Kufic, Thuluth, and Naskh scripts from the 6th century A.H., source: Ghouchani, 2004, 36. Inscription numbers by the authors.

In Section 1, verses (17) to (19) of Surah (Al-Imran) are inscribed in Kufic script. The Arabic text of this Kufic inscription is as follows: (بسم الله الرحمن الرحيم الصابرين و الصادقين و القانتين و المنفقين و المستغفرين بالاسحار. شهد الله انه لا اله الا هو و الملائكة و اولو العلم قائما بالقسط لا اله الا هو العزيز الحكيم. ان الدين عند الله الاسلام), This inscription starts from the lower right part of the rectangular form of the stone mihrab and extends to the lower left part of the rectangular form. Two lines are inscribed at the end of this inscription.



Fig 2. The right side of the Kufic inscription on the stone mihrab of the Mosque and Pilgrimage Site of Turan Posht in Yazd. Source: Authors.

PAYKAREH
Volume 14 Issue 39 Spring 2025 Pages 16-35



Fig 3. The upper side of the Kufic inscription on the stone mihrab of the Mosque and Pilgrimage Site of Turan Posht in Yazd. Source: Authors.



Fig 4. The left side of the Kufic inscription on the stone mihrab of the Mosque and Pilgrimage Site of Turan Posht in Yazd. Source: Authors.

On the right side of this stone mihrab, the text reads: (بسم الله الرحمن الرحيم الصابرين و الصادقين و القانتين و المنفقين و.). In the upper part of this stone mihrab, the text: (شهد الله المستغفرين بالاسحار. انه لا اله الا هو و الملائكة و اولو العلم قائما بالقسط لا اله الا هو العزيز الحكيم. ان الدين عند الله الاسلام) is written. On the left side, the text: ( ) is designed and executed. This Kufic inscription on the right and left sides is in simple Kufic script with a background of plant (vegetal) motifs. The upper part of the inscription is in Kufic script with plant decorations (two-lobed leaves) and a background of vegetal motifs. What is important in the analysis, interpretation, and creation of this Kufic inscription is embedded in the main vocabulary of this research, including design systems and design schemes, which encompass basic proportions, main guide lines, middle guide lines, and tabulation. Initially, the design systems of this Kufic inscription will be discussed, followed by a design scheme for the Kufic inscription of the stone mihrab of the Mosque and Pilgrimage Site of Turan Posht. Kufic inscriptions generally follow three design systems: The writing system, the geometric system (tabulations), and the plant (vegetal) system (flowers and leaves). «Not all inscriptions necessarily contain all three sections, but generally, decorative inscriptions somehow include these three sections» (Makinejad, 2018). The Kufic inscription of the stone mihrab of the Mosque and Pilgrimage Site of Turan Posht has two systems: The plant and writing systems. However, in other buildings where an inscription is one of the decorations, it is possible to find an inscription involving all three design systems. The Kufic inscription of the mihrab of the Mosque and Pilgrimage Site of Turan Posht on the right and left sides only has the writing system, and the upper part of the rectangular-shaped mihrab follows the writing and plant systems (Fig 4).

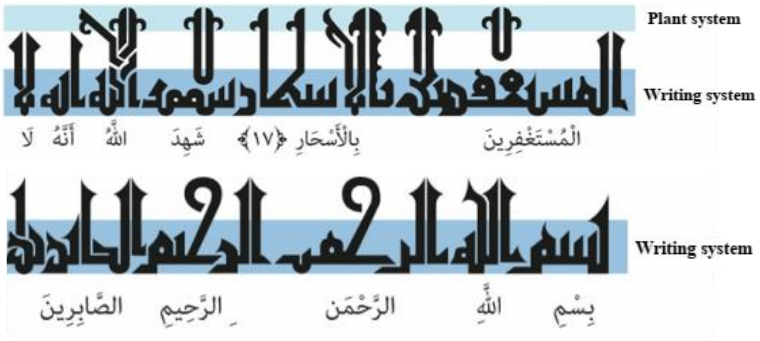


Fig 5. The Kufic inscriptions on the stone mihrab of the Mosque and Pilgrimage Site of Turan Posht are notable for their adherence to the writing and plant systems. Source: Authors.

In Fig. 5, this Kufic inscription has both a writing and a plant system. As shown in the figure, the plant system in this inscription is added to the simple Kufic inscription. It is designed with a specific distance from the ends of the elongated letters such as (الف), (ل), (ن), (ظ/ط), (ک), and (ح/ج/خ) and added to the Kufic inscription. The plant (vegetal) system is only connected to some of the mentioned letters, and the lower image of the inscription only has the writing system and is considered a simple Kufic inscription. The term "system" refers to the adherence to principles and rules in something, which can be an artistic work. An artistic work in which principles and rules are followed can be considered to have proportions because principles and rules are based on measurements, and these measurements are the basis of proportions in the design plan of this Kufic inscription. One can discern the presence of hidden proportions in the Kufic inscription on the stone mihrab of the Mosque and Pilgrimage Site of Turan Posht. It is likely that the artist divided the overall space of the Kufic inscription on the right and left sides of this mihrab as $\frac{1}{1}$ in a way that was equal to $\frac{44}{44}$ (Fig 6). In Kufic inscriptions, «the letters vary in shape and movement, and follow a specific order and defined rules. Despite their diversity and differences, vertical, horizontal, and curved movements adhere to a factor whose basis of measurement is the length, diameter, and thickness of the letters» (Azizpour & Salehi Kakhki, 2013, 155). The factor that serves as the basis for measuring the design of letters in Kufic inscriptions may be based on fundamental proportions.

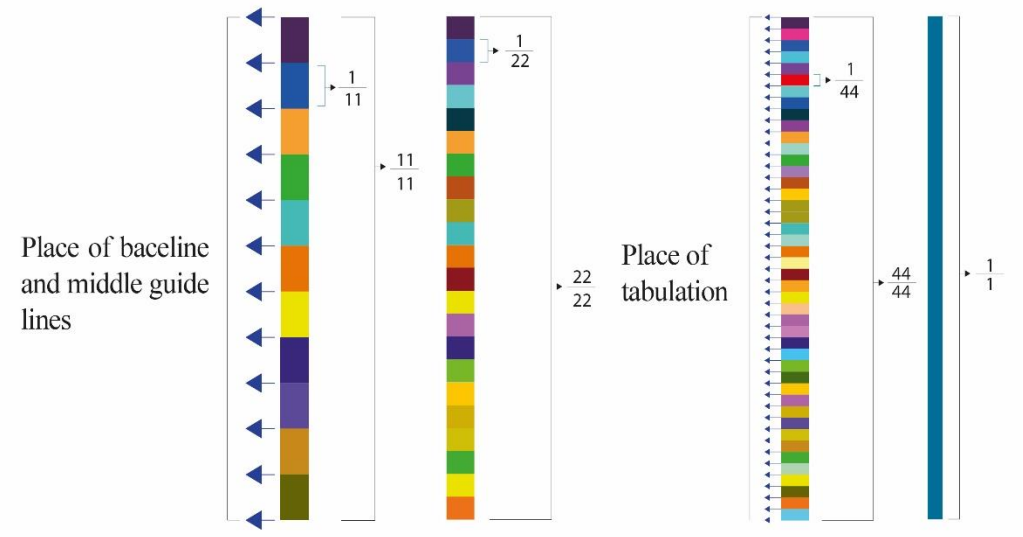


Fig 6. The horizontal proportions observed on the right and left sides of the Kufic inscription on the stone mihrab of the Mosque and Pilgrimage Site of Turan Posht. Source: Authors.

The importance of these proportions lies in how the artist uses them in letter design. The smallest unit used in the proportions of this Kufic inscription is $\frac{1}{44}$; therefore, it can be stated that the letters in this Kufic inscription are designed and executed based on units with sizes

of $\frac{1}{44}$, $\frac{1}{22}$, and $\frac{1}{11}$, in such a way that the design of the letters and their connections in this Kufic inscription do not deviate from these units (Fig 7).

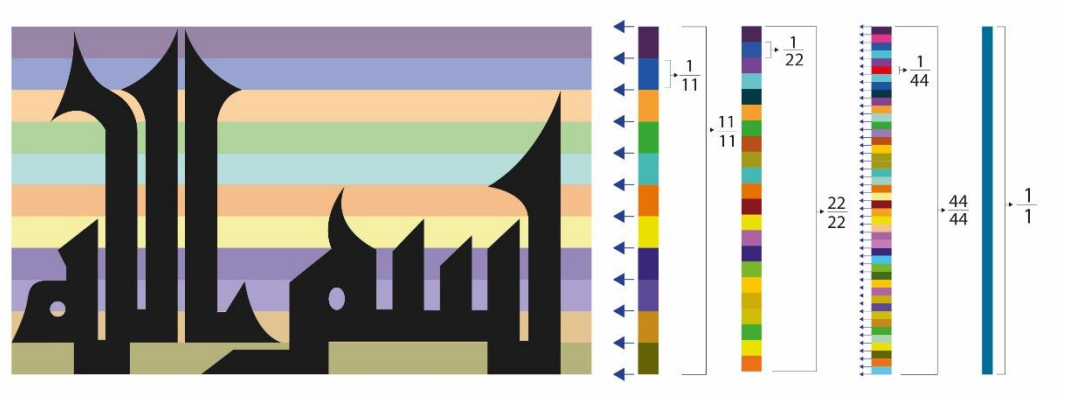


Fig 7. Letter design considering proportions in the Kufic inscription on the stone mihrab of the Mosque and Pilgrimage Site of Turan Posht. Source: Authors.

But the proportions in the upper part of this Kufic inscription are different and follow the $\frac{56}{56}$ proportions governed by the rules of the right and left sides of this Kufic inscription; however, to add a plant (vegetal) system to it, 12 units have been added to the $\frac{44}{44}$ proportions, which have reached the $\frac{56}{56}$ proportions (Fig 8).

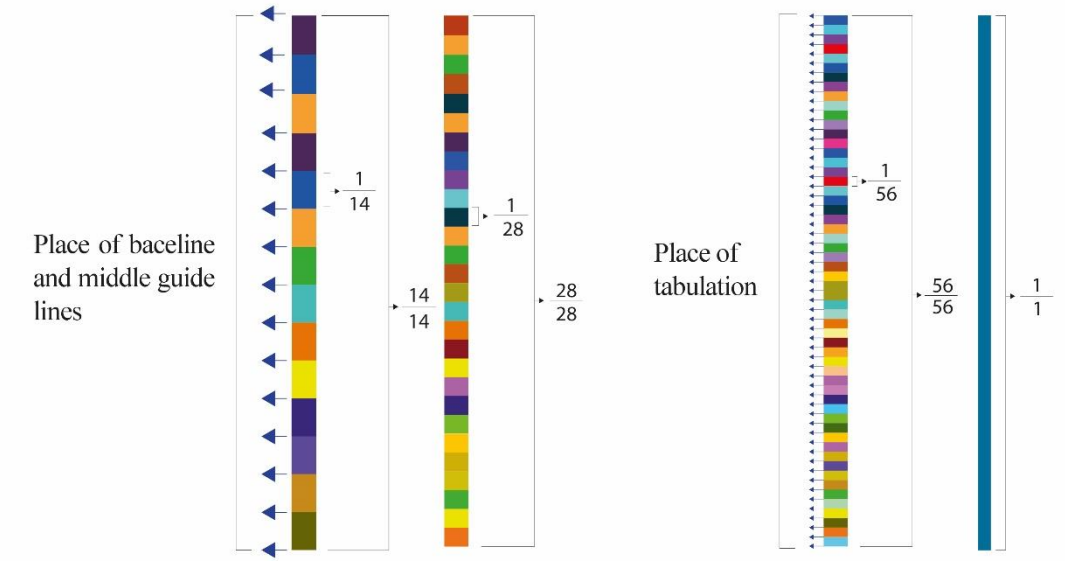


Fig 8. Proportions on the upper side of the Kufic inscription on the stone mihrab of the Mosque and Pilgrimage Site of Turan Posht. Source: Authors.

The smallest proportional unit in this section is based on the $\frac{1}{56}$ Kufic inscription, where the tabulation lines are formed, and the largest proportional unit in it, where the main and middle guide lines are formed, is $\frac{1}{14}$.

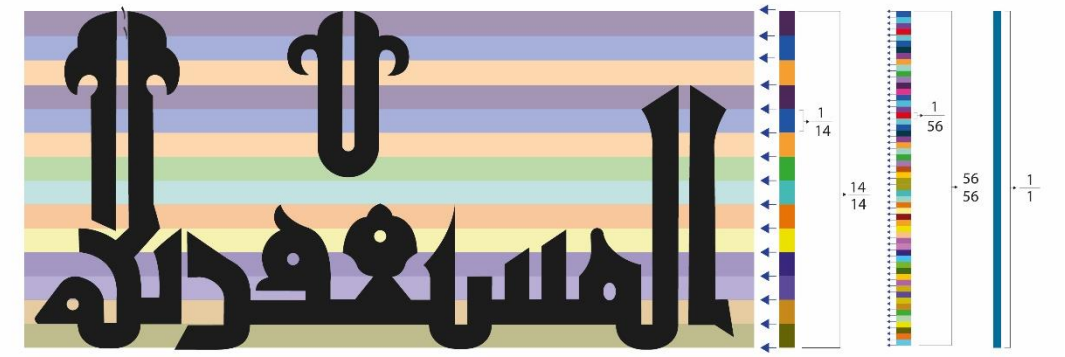


Fig 9. Proportions on the upper side of the Kufic inscription on the stone mihrab of the Mosque and Pilgrimage Site of Turan Posht. Source: Authors.

The plant (vegetal) system in this Kufic inscription is designed based on $\frac{3}{14}$ proportions where the guide lines are placed on these proportions, or in $\frac{12}{56}$ proportions are such that the tabulation lines are placed on it (Fig 9). The importance of adhering to these proportions for the artist is such that it serves as a plot for designing the letters of the Kufic inscription. These proportions determine how and within what range the letters are designed and where the connections are made in the Kufic inscription. The proportions are the main foundation of the design scheme, and other features of this plot, including the base lines, middle guide lines, and tabulations, are shaped by the inscription artist based on these proportions. The main guide lines, which include the base line, ascender line, and descender line, are placed according to the $\frac{1}{11}$ proportions on the right and left sides of this Kufic inscription, and at the top, it is based on the $\frac{1}{14}$ proportions (Fig 10). Usually, a baseline is used for the connections of letters in Kufic inscriptions. Other lines are used for the precise design of letters, which can be considered the guide lines for letter design in Kufic inscriptions. The middle guide lines are part of these lines that assist the designer in accurately designing the letters; this means determining which letters should be designed on which guide line, and it is with these lines that the letters are aligned, and order is implemented throughout the inscription. These lines are designed and executed based on the same $\frac{1}{11}$, $\frac{1}{22}$, and $\frac{1}{44}$ proportions. Considering the rules examined in the sample Figs 10, 11, and 12, the design scheme in the Kufic inscription of the stone mihrab of the Mosque and Pilgrimage Site in Turan Posht is addressed based on the fundamental proportions in the design scheme. It can be stated that there is an accurate design plan in the written section of the Kufic inscription of the stone mihrab of this Mosque and Pilgrimage Site, which, in addition to following the main guide lines, also uses the middle guide lines for letter design. Figure 10 shows this structure.



Fig 10. Visual examination of the guide lines of the Kufic inscription on the stone mihrab of the Mosque and Pilgrimage Site of Turan Posht in Yazd. Source: Authors.

As shown in the figure, the main guiding lines in this inscription are the baseline, the descender line, and the ascender line. The baseline (number 2 in Fig 11) is the same as the Kursi, and the connections of the letters in the words are designed on it. The descender line is where the ends of the letters rest, and the letters are designed between the descender line, and the ascender line, with all letters staying within these two guide lines.



Fig 11. Visual examination of the guide lines of the Kufic inscription on the stone mihrab of the Mosque and Pilgrimage Site of Turan Posht in Yazd. Source: Authors.

On the right and left sides of this inscription, all the written letters follow 12 guide lines, while its writing system uses 8 guide lines. The 12th guide line is used to determine the height of raised letters such as (الف), (ل), (ن), (ط/ ظ), (ک), (ح/ ج/ خ). In the middle distance from the base line to the ascender guide line, there are 9 middle guide lines, where the initial and final structures of the design and placement of the letters are horizontally positioned on these lines (Fig 12).

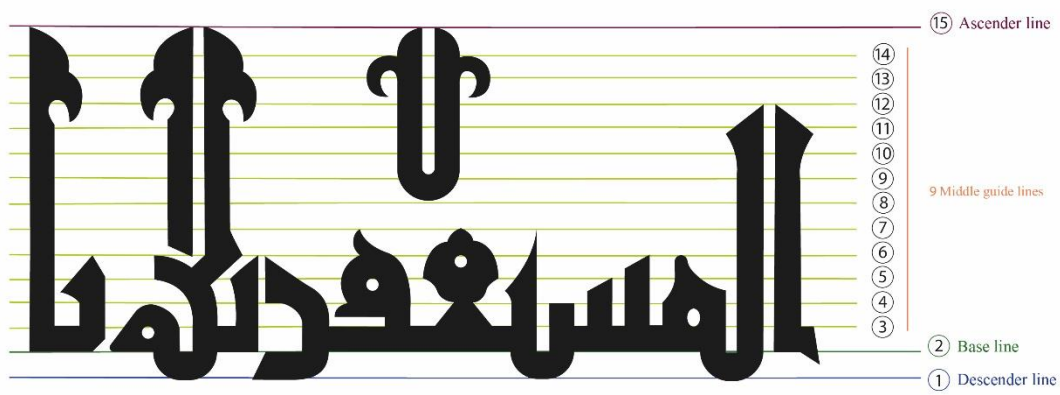


Fig 12. Visual examination of the guide lines of the Kufic inscription on the stone mihrab of the Mosque and Pilgrimage Site of Turan Posht in Yazd. Source: Authors.

In Fig 12, 15 guide lines have been used. This part of the Kufic inscription is located in the upper section of the mihrab. On the right and left sides of the mihrab inscription, the raised letters, such as (الف), are without plant (vegetal) decorations; however, in the upper part of this Kufic inscription, the raised letters, such as (الف), have plant (vegetal) decorations and two-lobed leaves. These leaves have been added to some of the raised letters, such as (الف), (ل), (ن), (ط/ ظ), (ک), (ح/ ج/ خ), and the letter (ل). The structure of this part of the inscription is designed above guide line 12. As seen in Fig 8, there are three guide lines above guide line 12 in the upper part of the mihrab inscription, which are for adding double plant (vegetal) decorations to the raised letters. The beginning and end of the raised letters in the upper part of this Kufic inscription, such as (الف), (ل), (ک), (ط/ ظ), (ن), are designed on guide line 15. In addition to the importance of the horizontal guide lines and how the letters are placed on them, the vertical letters are also noteworthy. The vertical letters in the entire text of this Kufic inscription are designed with equal thicknesses. Moreover, this thickness is equal to the thickness of the horizontal letters throughout the inscription. This feature resulted in the execution of uniform lines with the same thickness ratios of the horizontal letters $\frac{4}{44}$ on the vertical letters of this inscription (Fig 13).

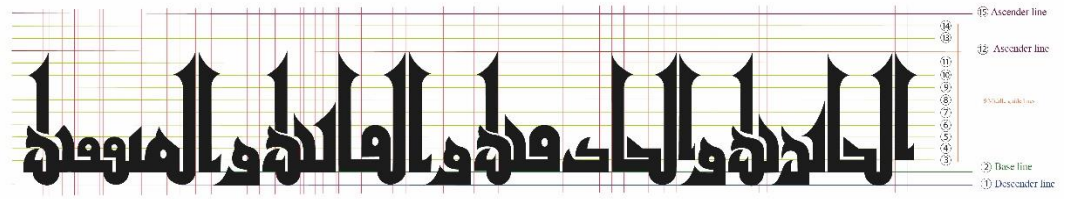


Fig 13. Visual examination of the vertical lines of the Kufic inscription on the stone mihrab of the Mosque and Pilgrimage Site of Turan Posht in Yazd. Source: Authors.

Vertical guide lines with $\frac{4}{44}$ proportions in horizontally thick letters were executed on vertical letters such as (الف), (ل), (ن), (ط/ ظ), (ک), (ح/ ج/ خ), and other letters whose writing style is vertical, and it was determined that these thicknesses follow horizontal $\frac{4}{44}$ proportions. In addition to vertical thicknesses, a series of fine spaces was also used to design the letters in this Kufic inscription. These fine proportions are based on the smallest horizontal $\frac{1}{44}$ proportions in this Kufic inscription (Fig 14).

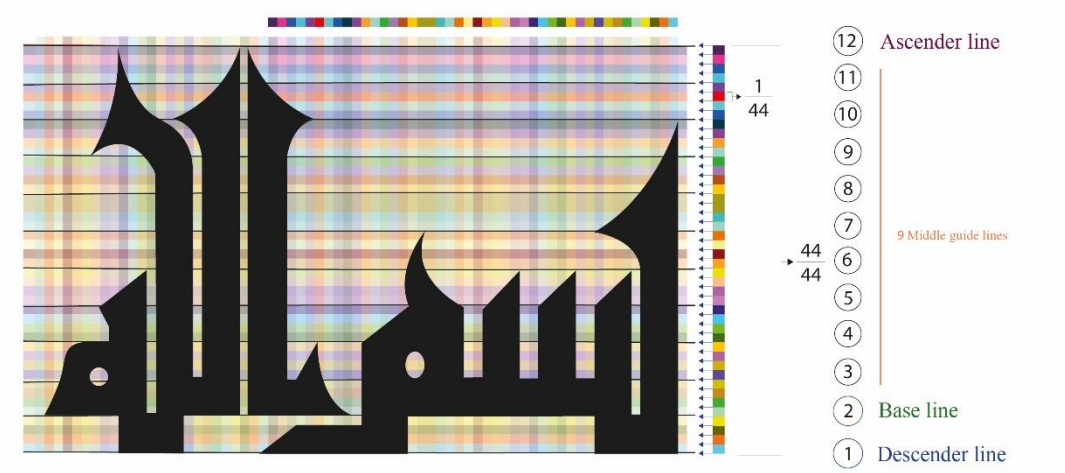


Fig 14. Fundamental proportions in tabulation of the Kufic inscription on the stone mihrab of the Mosque and Pilgrimage Site of Turan Posht in Yazd. Source: Authors.

Considering the presence of fundamental horizontal and vertical proportions in the design scheme of this Kufic inscription, one can also refer to the artist's use of precise tabulations based on proportions. These tabulations have a proportional basis, and the artist used them to determine the placement of the guiding lines. Even some letters designed outside the guide lines fall on the lines of these tabulations (Fig 15).

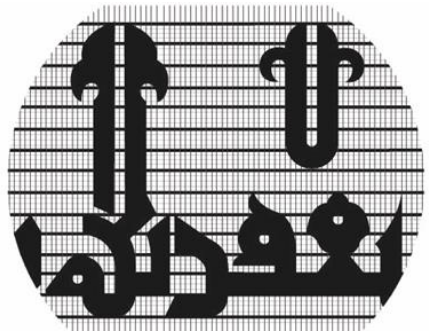


Fig 15. Tabulation and design scheme in the Kufic inscription on the stone mihrab of the Mosque and Pilgrimage Site of Turan Posht in Yazd. Source: Authors.

The tabulation in the design of Kufic inscriptions has effectively maintained uniform pen size in horizontal and vertical letters, ensuring the spacing between letters within a word and between words in a sentence and precisely maintaining the spacing between vertical letters along the inscription. The artist «determined the pen size by accurately calculating the usable space and dividing that space, and organized the decorative elements and letters appropriately according to the allocated space» (Azizpour & Salehi Kakhki, 2013, 156). The pen size, approximately equal to the thicknesses of the horizontal and vertical letters in the Kufic inscription, was determined based on fundamental proportions within the design scheme. Using the design scheme, the artist created order and overall unity in the Kufic inscription. This scheme, which the artist likely implemented before starting the Kufic inscription design, serves as a plot for adhering to all the mentioned aspects and helps maintain positive and negative spaces, rhythm, symmetry, and other visual characteristics.

«Iranian artists have always paid special attention to the balance of positive and negative spaces in addition to the appearance of the design, and this is considered one of the important features of motifs in Iranian art, especially during the Islamic period» (Danesh Yazdi, 2008, 57). The artist has focused on creating positive and negative spaces in Kufic inscriptions. Particularly when using elongated high letters in a Kufic inscription. In this Kufic inscription, due to the presence of elongated high letters like ,الف negative spaces created between letters have been utilized with plant (vegetal) motifs in the negative spaces created between the elongations of the letters. The more elongation between the high letters, the emptier the space is. «The space of a work of art consists of two positive and negative spaces. Here, the negative or positive space does not refer to its value or conceptual aspect, but rather to its visual values and the extent and size to which these two elements share and participate» (Makinejad, 2009). The presence of excessive negative spaces would reduce the balance in a Kufic inscription; therefore, «craftsmen added decorative elements to the top of the inscription to create a balance between the heaviness of the lower part of the inscription and the lightness of the upper part» (Blair, 2015, 65) or decorated this space with plant (vegetal) motifs. «The presence of plant and Khataei motifs in the interstitial space between the letters has further contributed to the principle of balance and visual harmony of the inscription» (Asl Rusta, 2012). This issue is evident in the Kufic inscription of the mihrab of the Mosque and Pilgrimage Site of Turan Posht in Fig 16.



Fig 16. Parts of the Kufic inscription on the stone mihrab of the Mosque and Pilgrimage Site of Turan Posht in Yazd. Source: Authors.

In some types of Kufic inscriptions, «the empty spaces of the letters largely influence the motifs and serve as a complement to the writing, filling the empty parts of the letters in the inscription; thus, they fill the surface of the inscription's frame» (Farid, 2021, 177). In this Kufic inscription, the empty spaces decorated with arabesque motifs are equal throughout the inscription, and this equality is repeated across the entire inscription. In Figs 17 and 18, the sections of the same color are almost equal in terms of the size of the negative space in this Kufic inscription. This repetition of equalities creates a rhythm of negative spaces in the Kufic inscription of the mihrab of this Mosque and Pilgrimage Site, contributing to the visual appeal and movement in the inscription. The artist filled these equal and uniform spaces with arabesque motifs and reduced the negative space in this Kufic inscription.

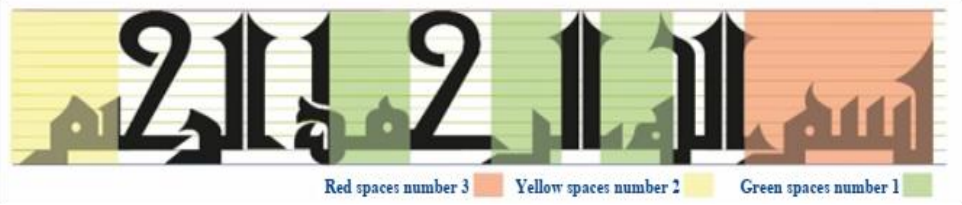


Fig 17. Equality of spaces between vertical letters in the Kufic inscription on the stone mihrab of the Mosque and Pilgrimage Site of Turan Posht in Yazd. Source: Authors.

PAYKAREH
Volume 14 Issue 39 Spring 2025 Pages 16-35

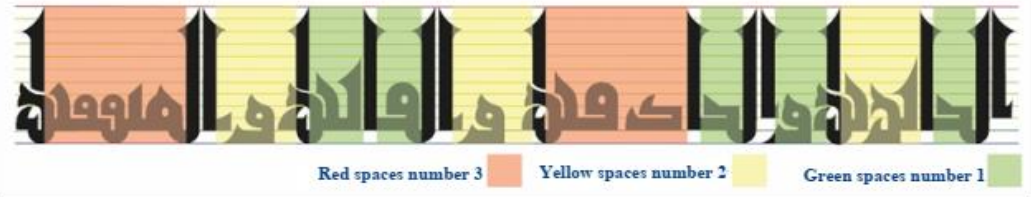


Fig 18. Equality of spaces between vertical letters in the Kufic inscription on the stone mihrab of the Mosque and Pilgrimage Site of Turan Posht in Yazd. Source: Authors.

The green spaces numbered 1, the yellow spaces numbered 2, and the red spaces numbered 3 are repeated rhythmically and almost equally throughout this Kufic inscription. In addition to the presence of rhythm in the negative spaces of this Kufic inscription, other visual features such as adherence to characteristics like symmetry in some letters, equality of the circles in the eye letters, and similarity of some letters in design can be observed in this Kufic inscription. The adherence to a type of visual characteristics in this Kufic inscription is reflected in the equality of the circles of the eye letters (ه) ,(ق) ,(ف) ,(م), and (و). The repetition of these identical circles in the written text of the inscription has led the designer to achieve an overall proportion in the entire inscription, which can be seen in the design scheme of the inscription (Table 1).

Table 1. Samples of the eye circles equality in (ه), (م), (و), and (ق/ف) letters in the Kufic inscription on the stone mihrab of the Mosque and Pilgrimage Site of Turan Posht in Yazd. Source: Authors.

Sample of circle equality (ه)	Sample of circle equality (م)	Sample of circle equality (و)	Sample of circle equality (ق/ف)
			
		– –	

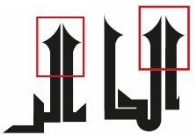
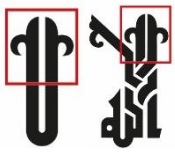
The size of the eye circles of (ه) ,(ق) ,(ف) ,(م), and (و) in the Kufic inscription of the Mosque and Pilgrimage Site of Turan Posht, Yazd, is seen in two sizes, circular and elliptical, throughout the inscription. In each letter of this inscription, if the letters follow a rectangular form, elliptical shapes are used for these eyes, and in each part of the mentioned letters, if they follow a square form, circular eyes are used. In the sample letters of the Kufic inscription of the Mosque and Pilgrimage Site of Toran Posht, Yazd, the elongation of the letters (ک) and (ط), and in some words, the letters (ن) are written at the same height as the elevated (vertical) letters like (ل), (الف), and (ط/ظ) (Table 2).

Table 2. Similarities and samples of elongated (ک), (ط), and (ن) in the Kufic inscription on the stone mihrab of the Mosque and Pilgrimage Site of Turan Posht in Yazd. Source: Authors.

Sample of elongated (ک)	Sample of elongated (ط)	Sample of elongated (ن)
		

In Kufic inscriptions, letters such as (ط/ ظ) are usually written similarly to the letter (ک) with slight differences. This similarity sometimes leads to misreading words in sentences. In the Kufic inscription of the Mosque and Pilgrimage Site of Turan Posht in Yazd, the letters (ک) and (ط) are written very similarly; however, this similarity is with a slight difference in the angle of the letter (ک) (Table 2). Additionally, in tall letters like (الف), symmetry at the ends of their extensions is repeated throughout this Kufic inscription (Table 3). «This point is noteworthy in terms of composition because it encompasses a specific and coherent rule, and we realize that attention has been paid to the details of the composition» (Jafari Jam, 2021). The details of a Kufic inscription are considered part of its overall structure, and «if any part of it is removed, a sense of incompleteness arises. This continuity and composition enhance the visual appeal of this Kufic inscription» (Salehi et al., 2020, 33). The repetition of symmetry at the ends of the letter extensions, which is part of the overall structure of this inscription, has created overall coherence in the writing space of this inscription.

Table 3. Samples of symmetry in the extensions of the Kufic inscription on the stone mihrab of the Mosque and Pilgrimage Site of Turan Posht in Yazd. Source: Authors.

A sample of symmetry in the extensions of the letters on the right and left sides of this Kufic inscription.	A sample of symmetry in the extensions of the letters at the top of this Kufic inscription.
	

The use of design schemes in the Kufic inscription of the mihrab of the Mosque and Pilgrimage Site of Turan Posht has generally resulted in unity among the letters and words of this Kufic inscription. «The connection of visual elements in the mihrab has been orderly and structurally similar to each other. This overall order also contributes to the integrity of the mihrab elements» (Afshar Mohajer, et al, 2017). The integrity of the elements used in the Kufic inscription of this mihrab, including the thicknesses of the horizontal and vertical lines of the letters, circles, and arabesque patterns, has been shaped by the artist's careful attention to the use of basic proportions, main guide lines, middle guide lines, and tabulation layouts in this Kufic inscription. Finding the design scheme in Kufic inscriptions helps in understanding how these inscriptions were designed and can also reveal the hidden dimensions of the design of the writing and its related decorations.

Conclusion

The results of this research indicate that the Kufic inscription on the stone mihrab of the Mosque and Pilgrimage Site of Turan Posht follows a plant (vegetal) system and a writing system. This Kufic inscription is designed on the right and left sides according to fundamental proportions with $\frac{1}{1}$ equal to $\frac{44}{44}$ dimensions throughout the inscription. All the letters of this inscription are designed and executed within the limits of these 44 proportional units; however, in the upper part of the Kufic inscription, 12 additional units have been added to these proportions, and these $\frac{56}{56}$ proportions have been used. It is assumed that these proportions form the basis of the design scheme of this Kufic inscription. The design scheme is a process in which the designer, considering these proportions, uses the main guide lines (base line, ascender line, and descender line), intermediate guide lines, and tabulations for the regularity and placement of letters on a level. The design scheme of the text of this inscription on the right and left sides follows 12 guide lines for designing letters and the connections of letters in words. Guideline (2) is the baseline on which all the connections of the letters in the words of this Kufic inscription are designed. The two guidelines 1 and 12 are the lines between which the letter designs in this inscription are executed, and the letter designs do not extend beyond these two lines. The other guidelines between these two guidelines 1 and 12 indicate the beginning and end of the letter designs in the design scheme of this Kufic inscription. The letter design starts on one guide line and ends on the other guide line. These twelve horizontal guide lines are placed next to each other with equal measurements, and their sizes are determined according to the fundamental proportions. The structure of the letters in all the inscription words is designed on these lines. The precise design structure of the letters on these lines indicates an overall order in the visual structure of this Kufic inscription. In the upper part of this Kufic inscription, in addition to the 12 guide lines, three other guide lines, which are also placed at equal distances from each other, are used; therefore, 15 guidelines are used in the design of the upper part of this Kufic inscription, and the decorations connected to the raised letters like (الف) are added above guideline 12. Guideline 15 indicates the beginning and end of the raised letters like (الف), (ل), (ن), (ط/ظ), (ح/خ/ج), etc. In the design of the vertical letters due to the uniform thickness of the vertical letters in this Kufic inscription, it seems that the artist used tabulations with equal sizes in the design of this Kufic inscription; this is why all the thicknesses of the horizontal letters and also the vertical raised letters are executed according to a specific and equal unit. By implementing software for this Kufic inscription and designing it using guide lines and tabulations, all horizontal and vertical letters were placed on the lines of these grids. The size of these tabulations also follows the stated basic proportions. Some of the overall visual features observed in this inscription include rhythm in the overall structure of the inscription, balance between positive and negative spaces, equal repetition of negative space in this Kufic inscription, and adherence to characteristics such as symmetry in some letters, equality of the circles of the fountain letters, and similarity in the design of some letters. The presence of elongated letters such as (الف), (ط/ظ), (ک), (د/ذ), (ن), etc., has created a negative space between the words. The artist, using a design scheme that includes fundamental proportions, main guide lines, middle guide lines, and tabulations, has managed to repeat this negative space evenly throughout the entire inscription. By designing plant (vegetal) motifs in these negative spaces with rhythm, he has reduced their volume and created a balance between positive and negative spaces. In addition to the presence of the underlying structure and the rhythmic presence of spaces in

the Kufic inscription of the stone mihrab of the Mosque and Pilgrimage Site of Turan Posht, all the diacritical letters in the text of this inscription are designed with eyes of equal size in two oval and circular shapes and are repeated throughout the inscription. The letters (ک) and (ط/ظ are written in a very similar way, making them prone to misreading. Overall, it can be said that features such as fundamental proportions, main guide lines, middle guide lines, and tabulations indicate that the artist initially executed a plot for designing the script of this Kufic inscription, and its design is based on this design scheme.

Author Contributions

This article is extracted from the doctoral dissertation in Islamic arts entitled «The Evolution of the Design of Kufic Inscriptions in the Mihrabs of Seljuk and Ilkhanid Mosques», written by Author 1 and supervised by Authors 2 to 4 at Tarbiat Modares University.

Acknowledgment

This research has no acknowledgments.

Conflict of Interest

The author (s) declare that there are no potential conflicts of interest related to this research, in writing, and publication of this article

Research Funding

The author (s) did not receive any financial support for conducting the research, writing up, and publication of this article.

Appendix

1. Refer to Ravandi, Muhammad ibn Ali ibn Sulayman. (1985). *Rahat al-Sudur wa Ayat al-Surur fi Tarikh al-Saljuq* (Muhammad Iqbal, Ed.) (with annotations by Mujtaba Minavi). Amir Kabir.
2. Of course, many works from this period have not survived, and if more works had remained, they could have been more thoroughly analyzed in terms of design diversity and a final judgment could have been made (see Blair, Sh. (2015). *The First Inscriptions in the Architecture of Islamic Iran* (M.Golchin Arefi, Trans.). Institute for Compilation and Publication of Art Works).
3. The design scheme is based on proportions, and these foundational proportions serve as a plot for creating the main guidelines, base lines, and layouts, with the letters designed and executed according to these elements.
4. Refer to Ravandi, Muhammad ibn Ali ibn Sulayman. (1985). *Rahat al-Sudur wa Ayat al-Surur fi Tarikh al-Saljuq* (Muhammad Iqbal, Ed.) (with annotations by Mujtaba Minavi). Amir Kabir.

References

- Afshar, I. (2006). *Telegraphic travelogue of the West*. Sokhan. **[In Persian]**
- Afshar Mohajer, K., Salehi, S., Ghelichkhani, H. R., & Farid, A. (2017). A visual critique of the plaster mihrab of the Malek Zozan mosque in Khaf (With an emphasis on the epigraphic system of the inscriptions). *Journal of Greater Khorasan Studies*, 8(28), 37-50.
DOI: 20.1001.1.22516131.1396.7.28.3.2 **[In Persian]**
- Asl Rusta, M. (2012). *Examination of the visual characteristics of letters in the relief inscriptions of the Seljuk period* (Master's Thesis in Visual Communication). Faculty of Visual Arts, Tehran University of Art, Tehran, Iran. **[In Persian]**
- Ayatollahi, H. (2017). *Fundamentals of visual arts.* SAMT. **[In Persian]**
- Azizpour, Sh. & Salehi Kakhki, A. (2013). *The motifs and inscriptions of the Jameh Mosques of Golpayegan, Ardestan, and Zavareh.* Goldasteh. **[In Persian]**
- Bemanyan, M. R., Okhovat, H., & Baghaei, P. (2010). *The application of geometry and proportions in architecture.* Haleh/Tahan. **[In Persian]**

- Blair, Sh. (2015). *The first inscriptions in the architecture of the Islamic period in Iran* (M. Golchin Arefi, Trans.). Institute for the Composition, Translation, and Publication of Artistic Texts. **[In Persian]**
- Danesh Yazdi, F. (2008). *Islamic inscriptions of Yazd City.* Sobhan Noor. **[In Persian]**
- Far, M. S. (2003). The impact of the religion on the painting and inscriptions of the Tîmûrid and the early Safavid periods. *Central Asiatic Journal*, 47(2), 250-293.
- Farid, A. (2021). *The coexistence of design and writing in Iranian art*. Tehran: Kalhor. **[In Persian]**
- Ghelichkhani, H. R. (2011). *Dictionary of calligraphy terms and related arts.* Rozaneh. **[In Persian]**
- Ghouchani, A. (2004). *Examination of the inscriptions of Yazd buildings.* Language and Dialect Research Institute. **[In Persian]**
- Jafari Jam, M. M. (2021). *Examination and identifying the graphic dimensions of Kufic script from Khorasan (Qaramati).* Practical Project: Designing a Font Based on Kufi Script from Khorasan (Master's in Visual Communication). Faculty of Art and Architecture, Tarbiat Modares University, Tehran, Iran. **[In Persian]**
- Makinejad, M. (2018). The structural features of decorative Kufic inscriptions (Floral and Leafy) in the Seljuk and Ilkhanid periods. *Negareh Scientific-Research Journal*, 13(46), 20-19. **[In Persian]**
- Makinejad, M., Ayatollahi, H., & Harati, M. (2009). Proportion and composition in the Mihrab inscription of the Tabriz Jameh Mosque. *Journal of Fine Arts - Visual Arts*, 1(40), 81-88. DOI: 10.22059/JFAVA.2009.68309**[In Persian]**
- Mohammadi, S., Khazaei, M., & Mohammadzadeh, M. (2023). Examining the script style and visual arrangements of the Grivar inscription in the Davazdah Imam Mausoleum of Yazd. *Paykareh*, 12(31), 1-17. DOI: 10.22055/PYK.2023.42580.1350**[In Persian]**
- Najiboghlu, G. (2000). *Geometry and ornament in Islamic architecture* (M. Qayumi Bidhendi, Trans.). Rozaneh. **[In Persian]**
- Ravandi, M. A. S. (1985). *Raha al-Sudur wa Ayat al-Surur fi Tarikh al-Saljuq* (M. Iqbal, Ed., with annotations by Mujtaba Minavi). Amir Kabir. **[In Persian]**
- Sadeghi Turan Poshti, M. & Mir Hosseini, Y. (2020). The Qadamgah of Imam Reza (AS) in Turan Posht: Newly discovered documents and inscriptions. *Journal of Heritage Mirror*, 18(66). 269-284. DOI: 20.1001.1.15619400.1399.18.1.13.8 **[In Persian]**
- Sadeghi Turan Poshti, M. (2017). *Analysis of Quranic verses used in the inscriptions of Turan Posht and their relation to religious movements* (Master's Thesis in Quranic Sciences and Hadith - Theology and Islamic Teachings), Faculty of Theology, Islamic Teachings and Guidance, Imam Sadiq University, Tehran. **[In Persian]**
- Salehi, S., Khazaei, M., & Ahmadpanah, S. A. (2020). *The Kufic inscriptions of the Jameh Mosque and Imamzadeh Abdullah in Shushtar.* Sanjesh and Danesh. **[In Persian]**
- Salehi, S., Khazaei, M., & Ahmadpanah, S. A. (2020). Analysis of the structure and visual features of the Kufic inscriptions of Imamzadeh Abdullah in Shushtar. *Jelveh Honar*, 12(4), 74-85. DOI:10.22051/jjh.2020.28997.1475 **[In Persian]**
- Shayestehfar, M. (2022). Safavid and Portuguese Christian influence on Saint Stepanos monastery in Julfa, Iran. *Baltic Journal of Art History*, *23*, 37-68. https://doi.org/10.12697/BJAH.2022.23.03
- Shahidani, Sh. (2018). Several observations on inscriptions and the necessity of applying calligraphy principles in inscriptions. *Islamic Architecture Research*, 6(18), 87-109. **[In Persian]**