

Geometrical Draft Systems in the Design of Architecture Ornaments for Churches Facades

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Abstract:

Man has always understood the connection between sculpture and architecture, as well as the connection between art weaving, architecture, and geometrical systems. The study confirmed the functional and aesthetic significance of the relationship between sculpture, fabric, and architecture. This is primarily dependent on the designer's understanding of the true role of sculpture in architectural work. Architecture has become a rostrum for the art of relief sculpture, whether on the exterior facades or in the interior of architecture. Nowadays, the ornament of architecture covers the entire architectural façade that is very different from what we are accustomed to from previous centuries. Serves as ecological regulations that enhance the overall performance of the architecture in its constructed environment. Designed to achieve comfort with aesthetics to support the entire performance requirements that motivate the built landscape. As a result, relief sculpture contributed to the enrichment of architecture with aesthetic values that combined form and content. Monumental buildings, particularly religious structures, are important indicators of the identity of the country they represent. We discover that Christian architecture aims to incorporate all of its spiritual principles into its design. The research problem is determined by a shortage in the use of the geometrical draft system in the designs of architectural ornaments for church façades. Absence of attempts for development of creative aspects in designs ornament architectural churches façades. The research aims to develop a design methodology based on the use of a decorative geometrical draft system in architectural ornament designs for church façades and confirm the relationships between building facade pattern design and building identity. The innovative designs were transformed from two-dimensional to three-dimensional sculptural designs for use on church facades. Creating of 28 designs using geometrical decorative draft systems and converted into three-dimensional sculptural design and 14 designs were applied virtually on church facades using computer-aided design programs. One of the most important findings of the study is that geometrical decorative draft systems inspire artists, interact with art, and provide tools for the generation of art. Create designs that suit all architectural formations used in architectural decorative inside and outside buildings. The study integrated the interdisciplinary disciplines of sculpture, architecture, and textile.

Keywords:

(Architectural Facades, Architectural Ornament, Ornamental Draft Systems.)

الملخص:

عرف الإنسان منذ البداية العلاقة بين فنّي النحت والعمارة، وكذلك العلاقة بين العمارة والنسيج، فانصهار المنسوجات والعمارة له تاريخ طويل رغم إهمال هذه العلاقة لفترات طويلة، وجاء البحث لتأكيد الأهمية الوظيفية والجمالية للعلاقة بين النحت والنسيج والعمارة، فنجاح العمل المعماري يعتمد على تحقيق التكامل بين العمل المعماري وما فيه من قيمة نحتية، ويعتمد بشكل أساسي على فهم المصمم للدور الحقيقي لفن النحت في العمل المعماري، وأصبحت العمارة منبراً لفن النحت البارز سواء على الواجهات الخارجية أو في الطرقات الداخلية للمباني المعمارية، ولذلك فإن فن النحت البارز ساهم في إثراء العمارة بالقيم الجمالية التي جمعت بين الشكل والمضمون، وتعد المباني الصرحية من أكبر الدلالات على هوية البلد التي تمثلها ولاسيما المباني الدينية، فنجد العمارة المسيحية تهدف إلى توظيف جميع مبادئها الروحانية في عمارتها، وتحدد مشكلة البحث في عدم وجود دراسات لتطوير تصميم الواجهات المعمارية للكنائس بالاستفادة من نظم اللقى الزخرفي الهندسي. ويهدف البحث إلى ابتكار تصميمات تستخدم في التجميل المعماري لواجهات الكنائس بالاستفادة من أنظمة اللقى الزخرفي الهندسي وقام البحث بتقديم منهجية مقترحة لإنشاء تصميم لواجهات الكنائس يتوافق مع خصائص تلك الكنائس وتم تحويل التصميمات المبتكرة من تصميمات ثنائية الأبعاد إلى تصميمات نحتية ثلاثية الأبعاد ليتسنى توظيفها على واجهات الكنائس موضوع البحث حيث تم ابتكار ١٠ تصميم باستخدام نظم اللقى الزخرفي الهندسي وتحويلهم لتصميمات نحتية ثلاثية الأبعاد وتوظيفهم افتراضياً على واجهات الكنائس باستخدام برامج الحاسب الآلي، ومن أهم نتائج البحث أنه يمكن استخدام أنظمة اللقى الزخرفي الهندسي في ابتكار تصميمات تناسب جميع التكوينات المعمارية وتستخدم في التجميل المعماري داخل وخارج المباني وحقق البحث التكامل بين التخصصات البنائية والنحت والعمارة والنسيج

الكلمات المفتاحية:

واجهات معمارية، زخرفة معمارية، أنظمة سحب زخرفية

Introduction

Throughout history, architectural buildings are strongly appreciated primarily for their aesthetic expression and emotional power on people. Also, it goes beyond the limits of the senses, it is also a branch of philosophy that has concerns with more than just aesthetic perception (Sriraman & Lee, 2021). These are the main criteria that satisfy the architect. Surprisingly, Draft systems are one of the geometrical systems that interact with art and provide tools for the generation of art, (e.g., geometrical ornament) and concepts that inspire artists, (Malkevitch, 2021).

Architecture ornament has been associated with architecture since ancient times. It was viewed as a "supplementary, appendage tacked on to the substance of the building (Picon, 2016). After the industrial revolution and the amazing growth of techniques, architecture embraced the idea of science and technology over the cultural legacy (Manvi, 2017). In the late 19th and early 20th centuries, Adolf Loos used to describe ornaments as a crime, in favor of "smooth surfaces" (Mitrache, 2012). After, modernism neglected ornament to decorate the architectural façades for nearly 80 years. In the twenty-first century, architectural design appears to be changing more quickly than its theory, parallel with the significant advancements in computer-aided design. The ornament of contemporary architecture reflects new technologies and technical thinking (Opincariu, 2011) and serves as ecological regulations that enhance the overall performance of the architecture in its constructed environment (Elrayies, 2018). Presented as a revolution in the ideology of building design, covering the entire architectural façade (Picon, 2016), which is very different from what we are accustomed to from previous centuries. The modern ornament façades are designed to achieve comfort with aesthetics to support the entire performance requirements that motivate the built landscape (Opincariu, 2011), and for the sustainability of the urban environment, to reflect the compatibility enjoyed by the designer (Pell, 20112). Regarding the guiding principles of each architectural style, the

concept of ornament as a feature with an aesthetic function has taken on various viewpoints (Moussavi & Kubo, 2006). The first rule of the building's failure or success is determined by its message of visibility. Instead of expressing linguistic beauty or hiding design problems with deceptive colors or fake ornaments, decorations must convey the 'building facade message' (Bell, 2011). Contemporary Ornament should reflect the philosophy of time. Therefore, it shouldn't be seen as merely adding ornamental elements on facades without improving the functionality of the building. Ornamented building façade is a crucial component for determining the identity and symbolism of a building and should have an aesthetic characteristic that provides visual enjoyment. As well as being significant in the sense that each building contributes to the formation of the cityscape. On the other hand, ornaments need to be planned according to the building style, because if they get overused, it might result in a chaotic appearance instead of richness in aesthetics. Building ornaments have the power to give structures a unique identity; furthermore, they distinguish the structure with unique characteristics (Moussavi & Kubo, 2006). Most geometric patterns on façades result from the repetition of a special shape or element, which can be kept unchanged along the façade's domain or altered in terms of shape, size, etc... In other cases, the allocation of these elements along the façade is the result of the discretization of the façade into two directions, which results in the repetition of the elements along both of the façade's dimensions (Caetano & Leitão, 2019). However, ornamentation of façades has also had purposes other than merely establishing beauty in the past, as a reflection on social and psychological contexts. Architectural ornaments may not be a structural feature that would affect the stability of the construction or the conveyance of the system, even though they are an element that gives the building value and personality (Balk, & Allmer 2016). James Gibbs proved that beauty in architecture can only exist on basic, unadorned surfaces since adornment distorts the proportion that determines beauty (Casey, 2019). However, it is possible to use ornaments while at the same time keeping beauty and proportion. Moreover, ornaments establish emotional and visual coherence. Repetition and rhythm are the main features for defining an attractive architectural façade. The design of the façades must be extremely flexible; therefore, it is a technical search and not an automatic process (Doğan, 2018).

The research problem :

- 1-Shortage in making use of the geometrical draft system in Designs Ornament Architectural Churches façades.
- 2-The absence of attempts to development of creative aspects in Designs Ornament Architectural Churches Facades.

Aims of the research:

- 1- Developing a design methodology based on the use of a decorative geometrical draught system in Designs Ornament Architectural Churches Facades.
- 2- Confirm the relationships between building facade pattern design and building identity.
- 3- Illuminating the decorative geometrical draught and its role in the evolution of Designs Ornament Architectural Churches Facades.

Drafting

Drafting is a set of marks or characters that used to designate the instruction in which the threads are drawn into the heddles to form the weave according to the draft system (Okpu, & Loromeke 2020). The sequence that these ends drawn through the shafts defines whether the pattern is simple (all-over effect) or more complex, using a series of different weave structures in combination with one another. The order in which these ends are passed through the heddles in the shafts in a textile machine is termed the draft (Goode & Townsend 2011).

Straight draft:

This is the simplest type of draft and from the basis of many other drafts where individual warp yarn in a repeat manner is placed in individual heald frames. The number of yarns in a straight draft is equivalent to the number of shafts in the repeat. The lifting plan is the same as the design it used in satin and twill (Wilson, 2000). One important feature of the straight draft that distinguishes it from other types of draft plans is that the peg or lifting plan is the same as the design, hence it is sufficient to indicate only the design. The straight drawing in draft forms is a basis for all others and it proceeds in one direction only. It can be used with any number of shafts (Behera, & Hari2010).

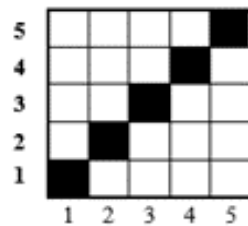


Fig. (1) illustration shows straight draft

Skip draft:

This draft is used in weaving when density of warp yarns is high. Number of heald frames maybe used twice or multiple of two than the number of warp yarn in a recurrence. This draft reduces the friction between the threads. The heald frames are divided into two groups. (Goode & Townsend 2011) All even numbered warp yarns are drawn through the one group of heald frames and all odd numbered warp threads are drawn through the two groups of head frames. (Nisbet, 1919)

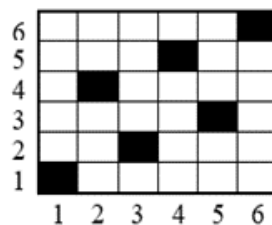


Fig. (2) illustrates skip draft

Broken draft

A broken draft almost resembles the pointed draft. It is also a combination of straight draft of different direction of construction. In broken draft a break in permanence occurs where the warp yarn revers its direction. (GROSICKI, 1975) This direction is reversed not on the last but on Prof. Ghalia El-Shenawy 'Assist.Prof. Dr. Hatem Tawfik Ahmed 'Geometrical Draft Systems in the Design of Architecture Ornaments for Churches Facades Mağallaġ Al- 'imārah wa Al-Funūn wa Al-'ulūm Al-Īnsāniyyāġ' vol9 no.46 'July2024 176

first shaft as in pointed draft. The previous gives a best interlacing of the thread broken draft which is acquired when the drawing order is straight up to half of the threads and then reserved with a break in order. (Umpleby 2017)

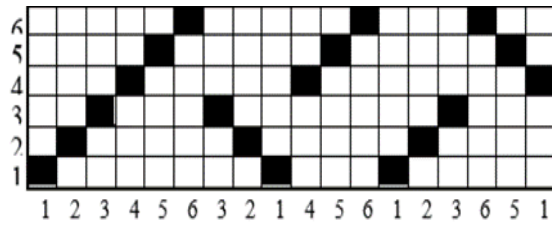


Fig. (3) illustrates broken draft.

Grouped draft:

This type of draft is used to produce cheek and stripe fabric, in which strips have different weaves or combinations,) Watson 2014). The repeat of the draft is specified by the number of stripes and the number of threads in each stripe. The number of shafts in the draft depends on the number of stripes and the warp repeat of weave of each stripe (KURTZ 1983).

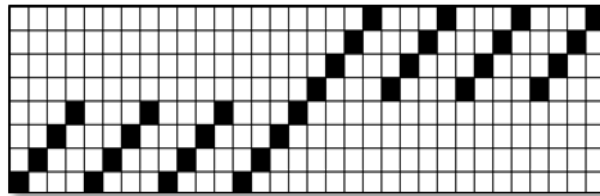


Fig. (4) illustrates grouped draft.

Pointed draft

Pointed draft is a resemble to a straight draft. The straight draft is inverted after half the repeat warp way. Point drafts are used for the weaves which are identical and symmetrical about the center,) Watson, 2014.)This draft is produced in case of rippling or diamond effects on fabric. In this system, a straight draft is returned in the counteractive direction. The number of heald shafts is usually one more than the half of the number of warp threads in warp.) Gokarneshan,2004)

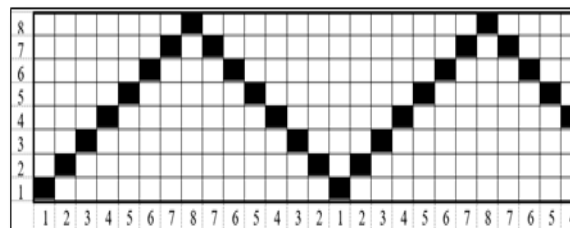


Fig. (5) illustrates pointed draft.

Curved draft:

This draft is applied to fancy weave having large warp repeat with a view to lessen the number of heald shafts. Curved drafts are irregular and actually can't be classified (GROSICKI, 1975). The minimal number of heald shaft equals the numbers of yarns in warp repeat with different order of interlacing. This draft used to produce ornamented weave with large repeat unit, all warp threads which works alike are drawn on the same heald shaft. (Alderman 2004)

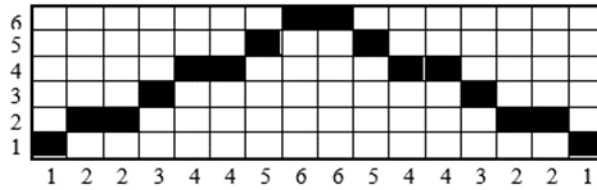


Fig. (6) illustrates curved draft.

Divided draft:

This draft is used for weaves having two series of warp yarns, in this draft the heald shafts are split into two or more groups. For every group suitable draft is selected in pile weave two or more sets of warp thread are used. (Horrocks, & Anand 2016). So, they need this type of draft, where the ground of warp, and thread of warp pile fabric are passed through the front heald shafts and pile warp threads are passed through the back heald shafts. (Umpleby 2017)

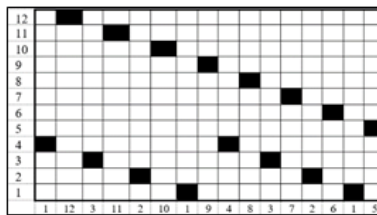


Fig. (7) illustrates divided draft.

Combined draft

Combined draft various types of drawing can be combined in one draft for producing a specific type of fabric. Two or more drafts described above can be applied simultaneously, (Gorski, 1975) for example, straight and skip or sateen, grouped and curved, and so on combined draft is the most difficult and can be chosen only if there are some technological or economic reasons.

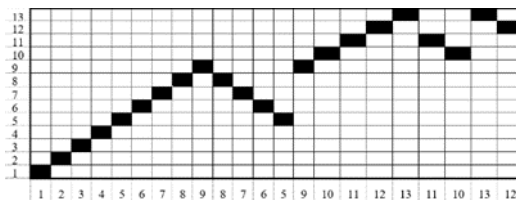


Fig. (8) illustrates combined draft.

Sateen Draft

This draft is largely used for Satin weaves; it serves the same purpose as the skip draft. In this draft the order of drawing-in is disconnected and scattered wherefore it resembles the draft for a satin weave, the sateen draft is used for weaves having repeat size of more than 4. (Okpu, & Loromeke 2020) A sateen draft enables rather finer set healds to be employed than a straight-over draft, therefore very finely set warps is sometimes used in preference to the latter. (Behera, & Hari2010)

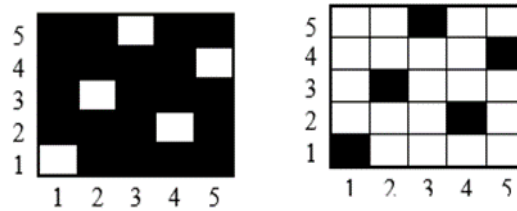


Fig. (9) illustrates twill 2 / 5, satin 5 (warp & weft), they show sateen draft

The architecture

Architecture is defined by Webster's dictionary as an art or science of building or construction, or the art and practice of designing and building structures, particularly habitable ones. There is another definition that states, architecture is the formation or construction resulting from a conscious act, (Janeites, 2020). Architecture, the art and technique of designing and building, different from the skills associated with construction. The practice of architecture is employed to fulfill both practical and expressive requirements, and thus it serves both utilitarian and aesthetic ends (Roth & Clark 2018.). Architecture is a space of opportunities and functions; all need to be present in concord with the traditional and the surrounding environs. Furthermore, it integrates all in the built environment, it is a piece of art, space and light. It is the material picture of the organization of the ambience in which we are developing spiritually and materialistic". Architecture is read as the expression of an idea relating to the art of space organization. Such organization has to meet the requirements of the users, their activities and dimensions in an appealing and aesthetic form. (Bianco, 2018)

Façades

The formation expresses the identity of the building amidst the vast number of buildings, it must be a true translation of the function of the building. The architectural formation of the facades is the picture that reaches the viewer and the entrance to the impressions it makes of the building and includes all the physical elements of the building. (Al-Kodmany & Ali 2016) "façade" generally refers to the external surface of the wall. Sometimes, the term is reserved to name only the frontal part of a building. Façade which is the outer layer of a building, originating from the Italian word *faccia*, which means face. (Mohammed, 2019) The name façade also comes from the French word for "frontage" or "face" and is generally defined as one exterior side of a building., the facade of a building is defined as the face of a building including sides and rears of buildings that can be viewed from the street. (Pell, 2012) Façades were also able to declare the power and prestige of building occupants long before other means of communication, such as writing, were invented. Throughout history, façades functions have been changed and upgraded in response to emerging materials and technologies. (Okur & Karakoç 2019) A building façade is an important element for determining the identity and symbolism of a building. The symbolism and identity of a building reflects the concept of the building design, generally, the pictures stored in the minds of people are called as an emotive picture. (Spurr, 2015) In these days when emotions play an important role on the image of building façade, the images of building façades must have an aesthetic characteristic that provides a visual enjoyment. The building façades are also important in the sense that each building constitutes as a piece in the cityscape's creation. Façades include windows, doors, balconies, walls, pillars... etc. (Dean., L. 2017). Usage of ornament on façades has not just been used for

establishing beauty in the past, also ornament was the reflection of social and psychological contexts. Architectural ornament might not be a structural element, which would affect the stability of the construction or conveyance of the system, nevertheless it is an element which gives identity and meaning to the building. (Sağlam,2013) After Modernism or since post-modernism we have been witnessing an increasing interest in - composition and, nowadays, designing a facade is playing an important role in architecture practice due to the support of digital technology. (Caetano, 2015) In general, most geometric patterns on façades result from the repetition of a special shape, which can be kept unchanged along the façade's domain or can be transformed regarding its size, shape, etc.... In some cases, the distribution of these elements along the façade results from its discretization in two directions, which results in the repetition of the components along both dimensions of the façade. (Caetano, Santos, & Leitão. 2015) In others, their distribution is derived from the façade discretization in a single direction, which means that the elements are repeated in only one of the dimensions, being therefore continuous in the other. The facades are linked to the human mind through their distinctive and unique formations. (Patsavos & Zavoleas, 2013)

The Ornament

Encyclopedia Britannica defines ornament in architecture as: Any element added to an otherwise merely structural form, commonly for purposes of embellishment or decoration (Doğan, 2018). However, in history, ornament has not just been used for decoration but also for expressing the culture and the traditions of a culture. Furthermore, ornaments also are the characteristics of an architecture which easily communicates with a wide range of people. (Gourdoukis & Moschopoulou 2109) So as a result, the ornament is the contemplation of the way society communicates, architectural ornament can also be defined as dispensable addition to functional form where ornament plays an important role in improvement the visual efficiency of buildings and their meaning that it fulfils aesthetic and social functions no less important than utilitarian ones. (Mitrache ,2012) Sometimes the usage of ornament is merely adding decorative elements on facades and not adding anything to the functionality of the building. (Fathallah, 2019) Ornament in architecture is having a dual function; On the one hand it offers support to the construction and draws attention to the means it employs, on the other hand, it brings life into a uniformly illuminated space by the interaction of shade and light. (Sağlam,2013)

Ornament in architecture has various manifestations, and it has the purpose of: -

Anchoring to the cultural phenomenon, the idea of expressivity through consistency, and not only through decorum.

The ornament isn't considered a mask anymore, in order to create a significance to have a specific meaning, the way it manifested in the postmodern time, it doesn't have the role of hiding something, the way it happened in the different historical periods prior to the modernistic period, when its existence was useless. (Criticos, 2004) Contemporary architecture produces “communication” through ornament that manifests itself in various depths of the covering layer of the façades. (Mitrache ,2012)

Interior Ornament

Interior ornament is divided into observation objects such as floors, columns, building enclosure (windows and walls, doors), ceilings, and roof constructions.

Exterior Ornament

Exterior ornaments are classified based on their placement on the facade, which can be in the facade corner, the center of the building, the bottom of the building, or crossing, in the hip rafter of the roof (Pramudito & et al ,2019).

The church

The word "church" is a translation of the Greek word "ecclesia" that means "what is called out or forth", this word was used "of any assembly, but especially of citizens, or of a selection of people. In the New Testament it is used 115 times, 3 of which it is translated as "assembly", and 112 as "church" (Menn 2021). The church is to denote a place where various religious ceremonies take place or as a component in the title of various denominations, church also implies for qualified organization that bring people together as the principle means of accomplishing its purpose. The Christian Church is the association of followers of Jesus Christ. In the New Testament the church is referred to "assembly". (McKim, 2014)

Church Ornament

Ornament usage in churches is Religious Symbolism. It is an architectural symbol or natural phenomena which is connected to a certain religion. Religious Symbolism aims to foster strong solidity among its worshippers, and to guide them to get closer to the worshipped God (Siwu, 2016). Symbolization in churches are different from one another and being dynamic because of their interaction with local cultures and the social life of the people in a certain period.

Research Methodology

The research follows the experimental and analytical method. The methodology of the research consists of two parts as follows:

The first part deals with the literature review about ornamentation in architecture façade of churches and draft systems.

The second part deals with the experimental work which creating designs with a decorative draft system.

The innovative designs

All Innovative designs were prepared on Wave maker of textile where this program is powerful, professional design software that makes sense to designers, it was converted to 3D stereoscopic imprints using Rhino software designs that were applying them to church façades using illustrator and 3D MAX programs on the facades of virtual churches.

The innovative designs

The best textures were selected to be used in innovative research designs



Fig. (10) illustrates innovative design by using ornamental draft systems, 8 healds, and it was converted to a three-dimensional design with Various textures.

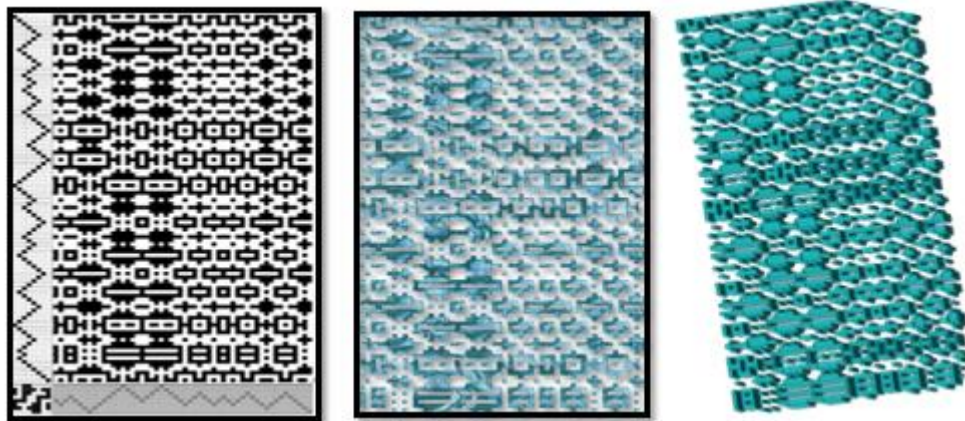


Fig. (11) illustrates innovative design by using ornamental draft systems, 10 healds, and it was converted to a three-dimensional design with two levels of surfaces.

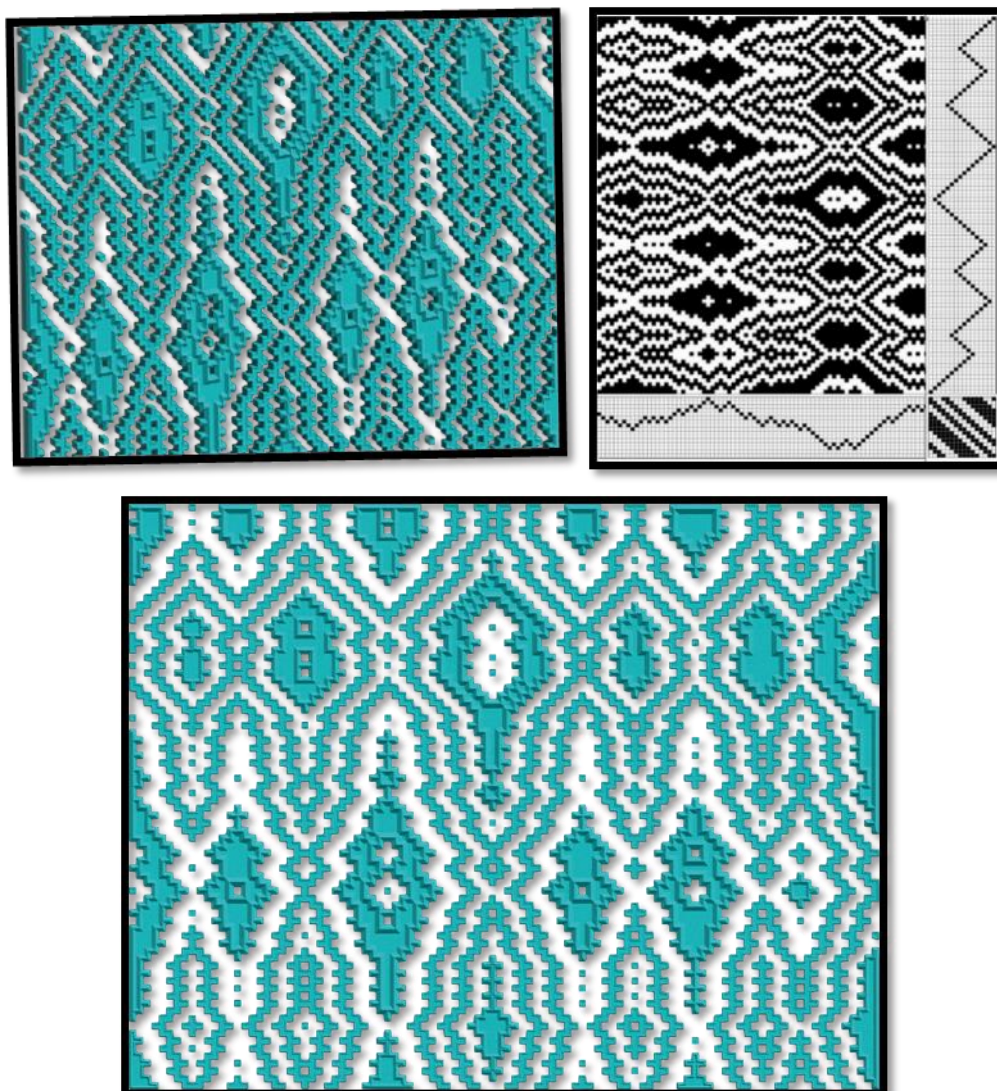


Fig. (12) illustrate innovative design by using ornamental draft systems, 16 healds, and it was converted to a three-dimensional design with two levels of surfaces.

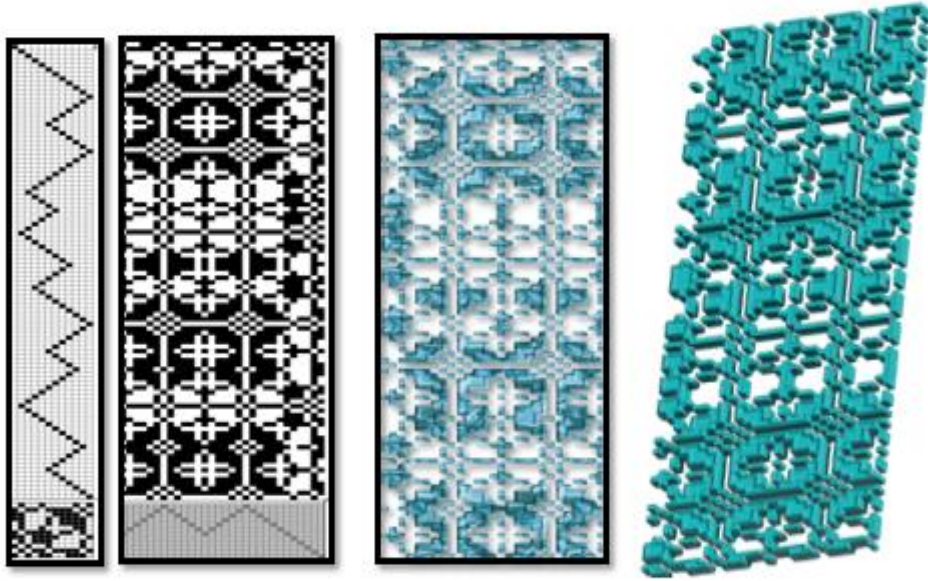


Fig. (13) illustrates innovative design by using ornamental draft systems, 16 healds, and it was converted to a three-dimensional design with two levels of surfaces.

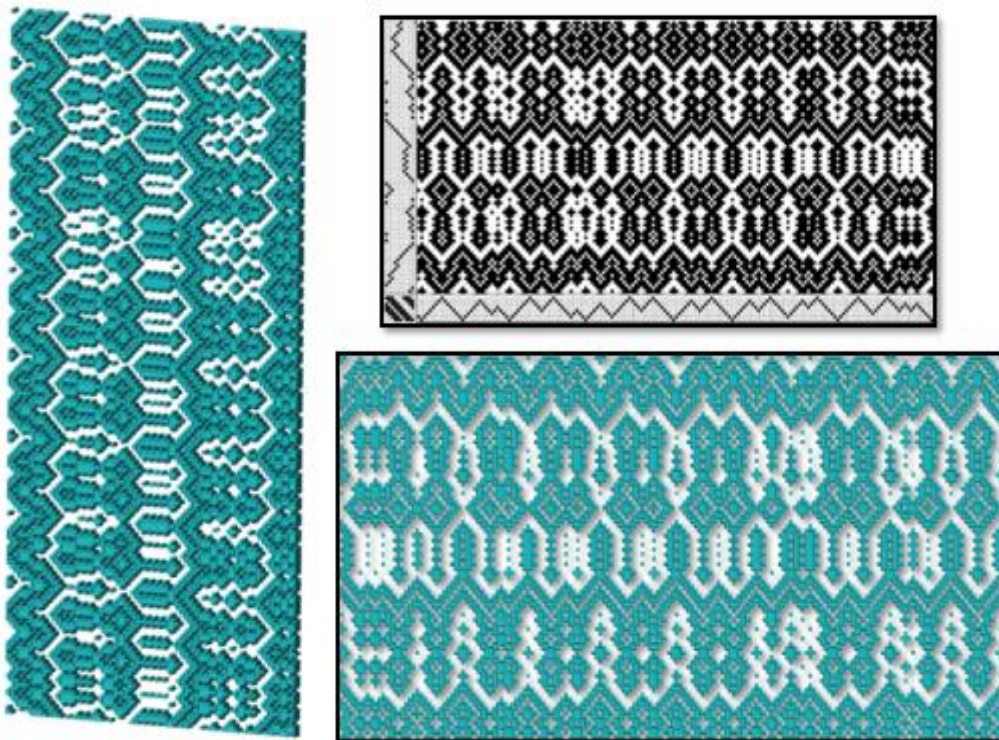


Fig. (14) illustrates innovative design by using ornamental draft systems, 10 healds, and it was converted to a three-dimensional design with two levels of surfaces.

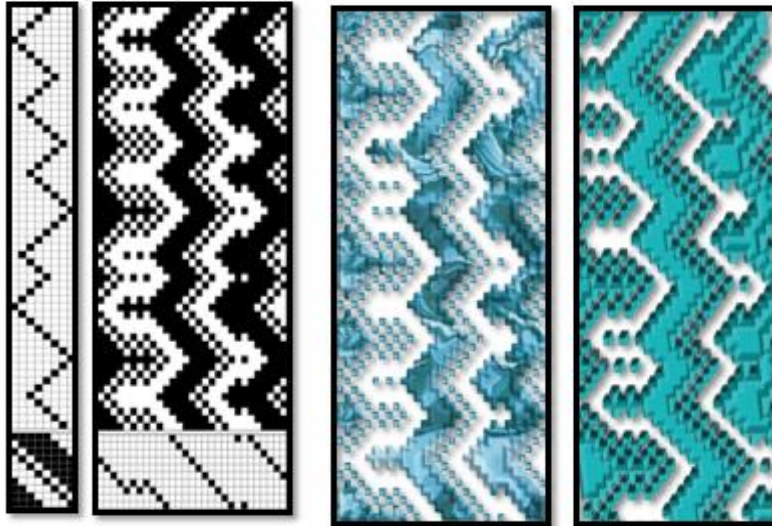


Fig. (15) illustrates innovative design by using ornamental draft systems, 10 healds, and it was converted to a three-dimensional design with two levels of surfaces.

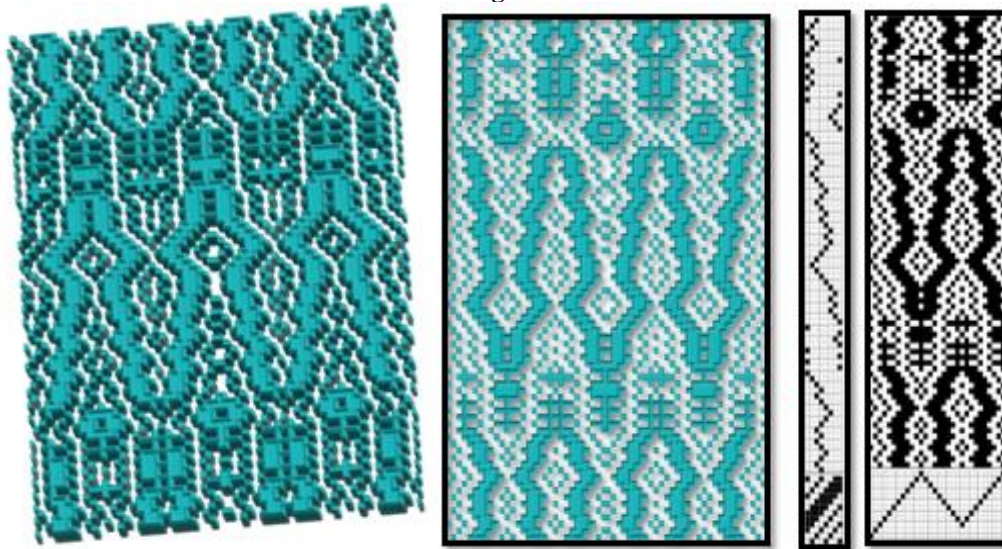


Fig. (16) illustrates innovative design by using ornamental draft systems, 12 healds, and it was converted to a three-dimensional design with two levels of surfaces.

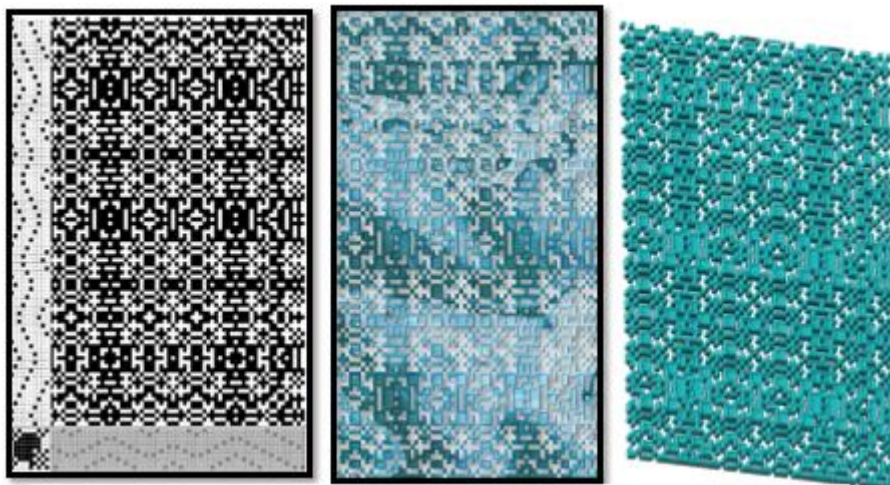


Fig. (17) illustrates innovative design by using ornamental draft systems, 10 healds, and it was converted to a three-dimensional design with two levels of surfaces.

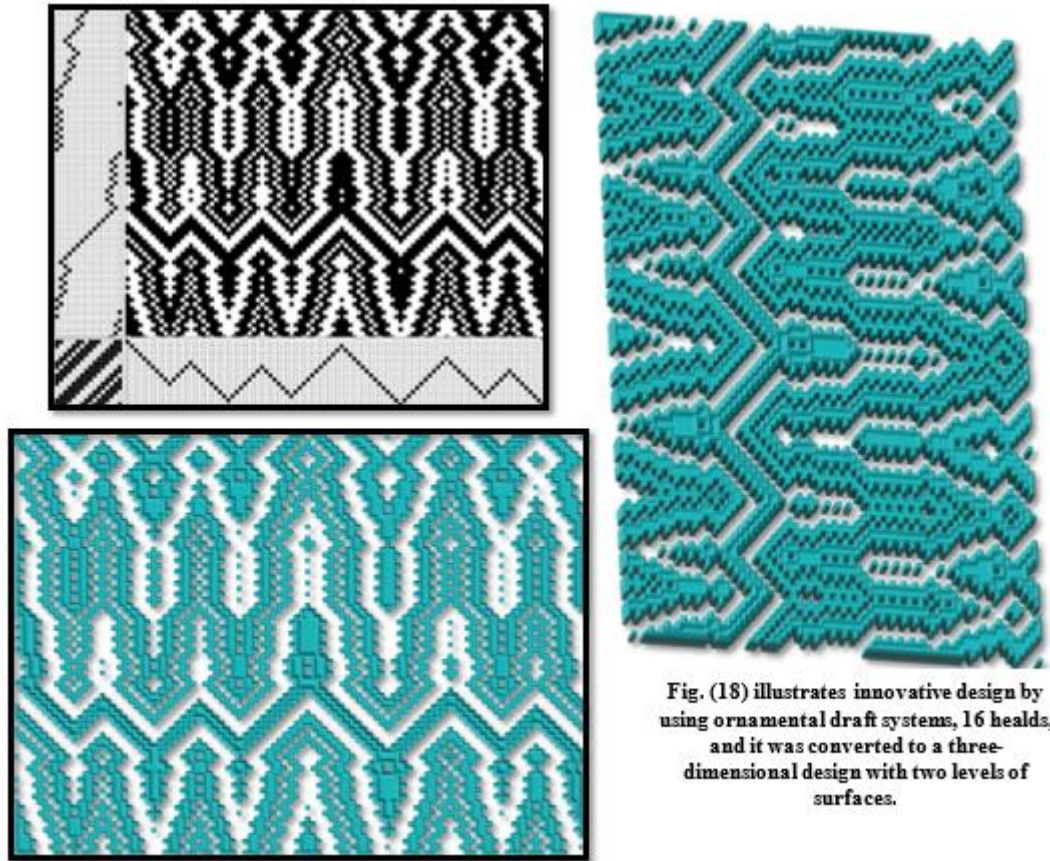


Fig. (18) illustrates innovative design by using ornamental draft systems, 16 healds, and it was converted to a three-dimensional design with two levels of surfaces.

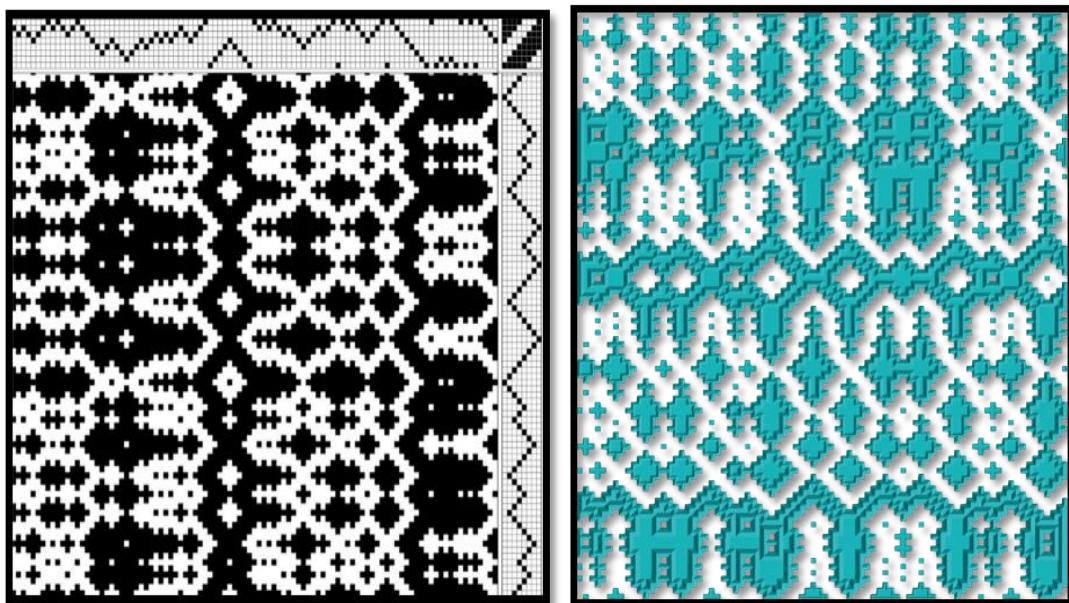


Fig. (19) illustrates innovative design by using ornamental draft systems, 8 healds, and it was converted to a three-dimensional design with two levels of surfaces.

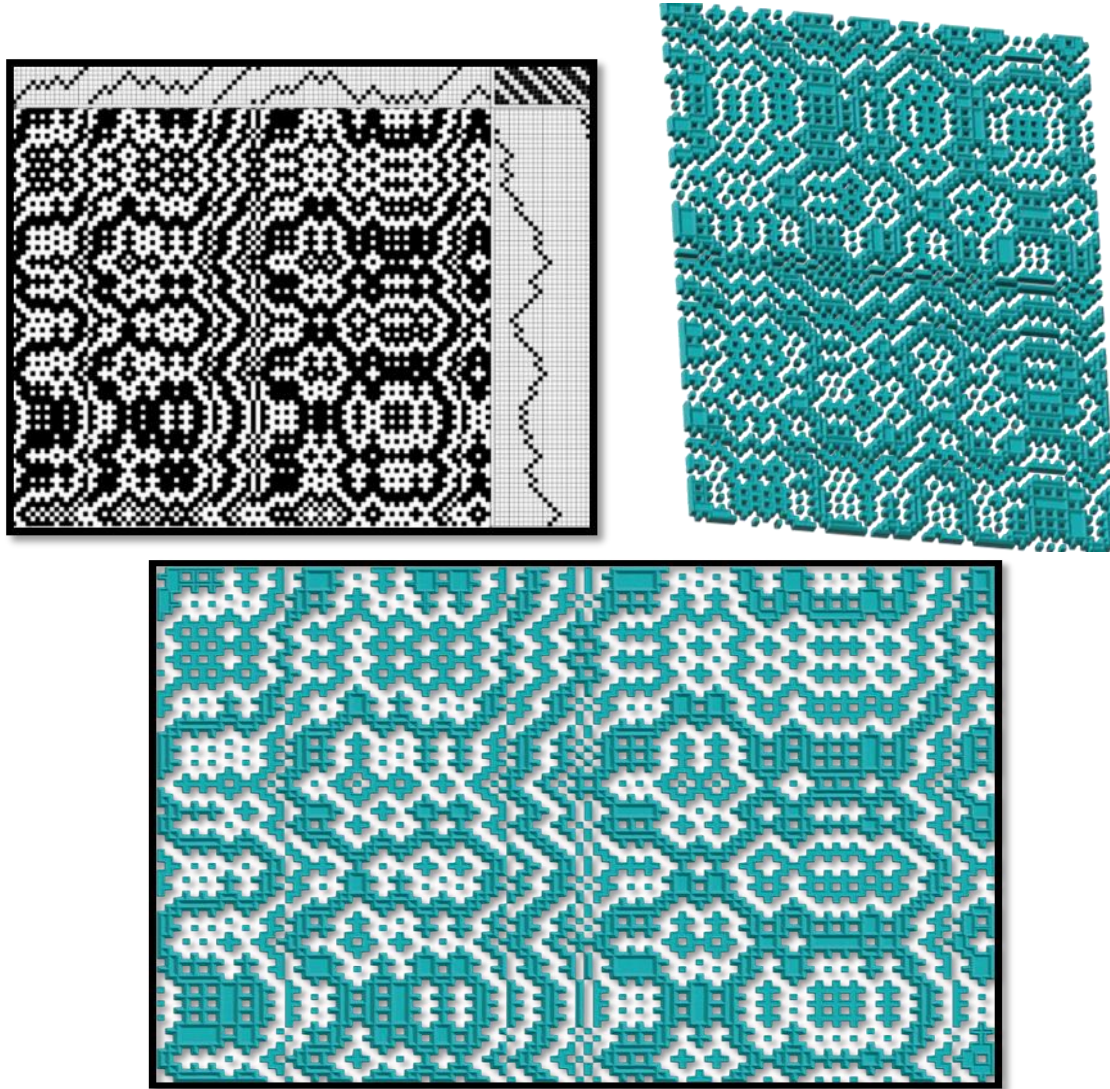


Fig. (20) illustrates innovative design by using ornamental draft systems, 8 healds, and it was converted to a three-dimensional design with two levels of surfaces.

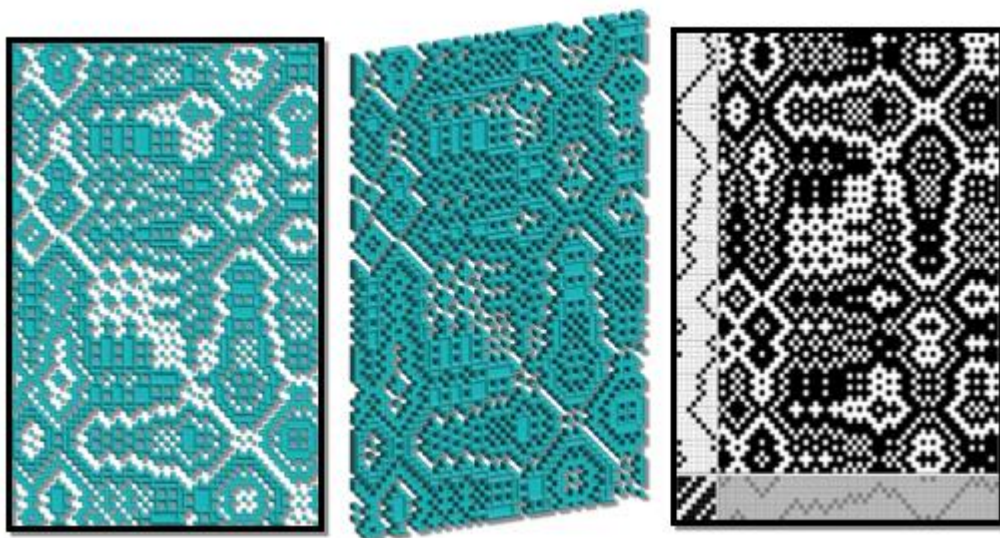


Fig. (21) illustrates innovative design by using ornamental draft systems, 8 healds, and it was converted to a three-dimensional design with two levels of surfaces.

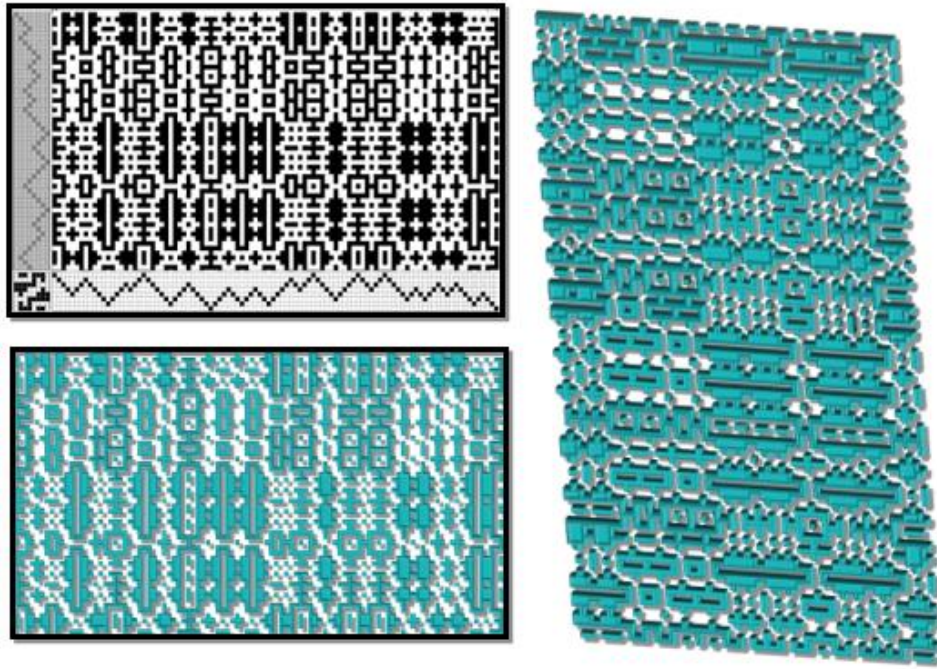


Fig. (22) illustrates innovative design by using ornamental draft systems, 8 healds, and it was converted to a three-dimensional design with two levels of surfaces.

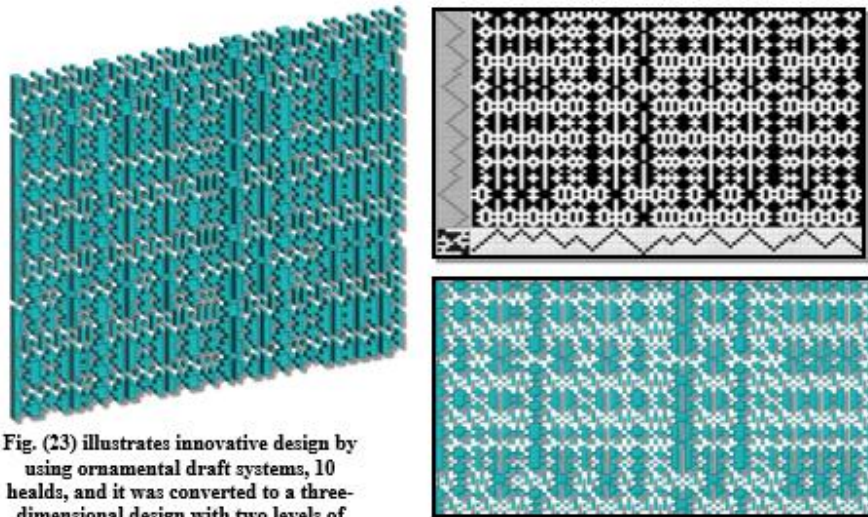


Fig. (23) illustrates innovative design by using ornamental draft systems, 10 healds, and it was converted to a three-dimensional design with two levels of surfaces.

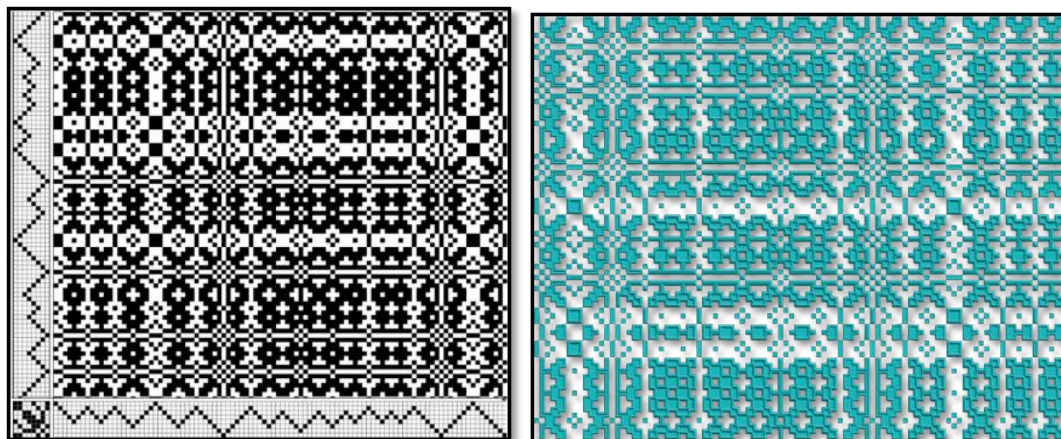


Fig. (24) illustrates innovative design by using ornamental draft systems, 10 healds, and it was converted to a three-dimensional design with two levels of surfaces.

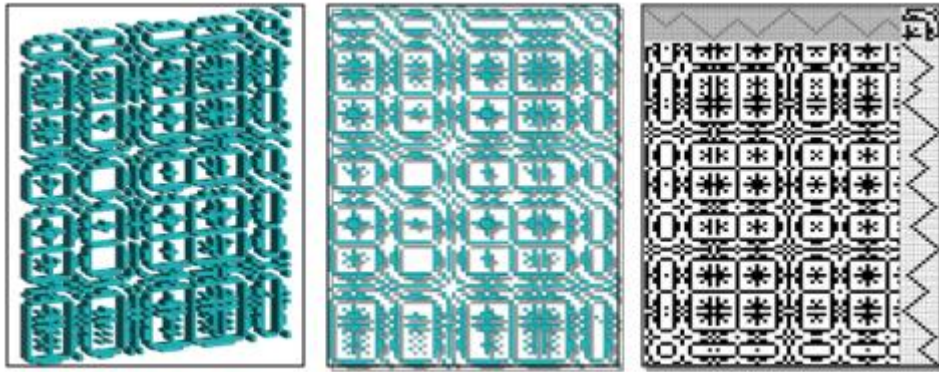


Fig. (25) illustrates innovative design by using ornamental draft systems, 10 healds, and it was converted to a three-dimensional design with two levels of surfaces.

Application of the Innovative designs on the facades of virtual churches

Application of the first innovative design

The design was done using 10 healds with the decorative draft system, the design suitable for decoration of the facades or interior walls of churches. The design appeared in the form of a cross to inspire Christian monuments and symbols and confirm the identity of the Church as Christian places of worship.

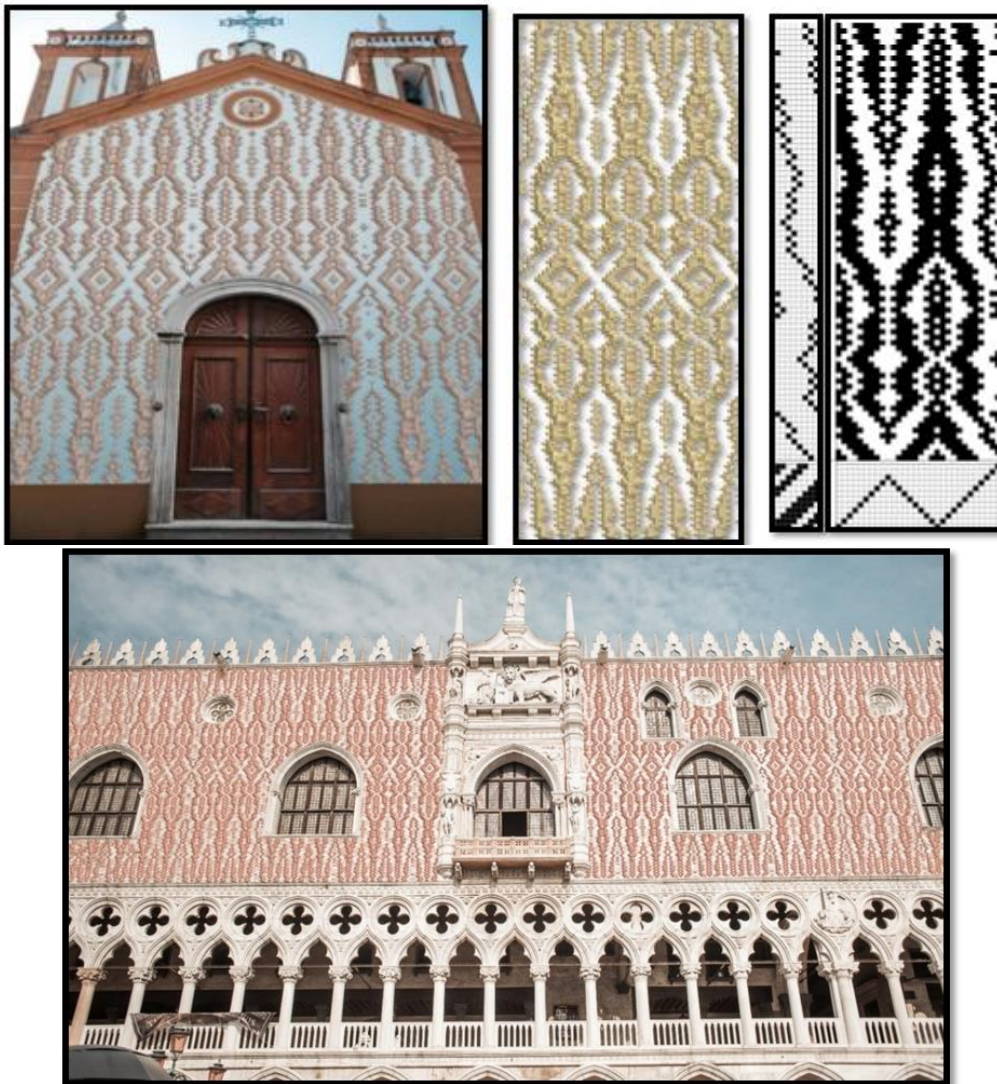


Fig. (26) application of innovative design by using ornamental draft systems, 12 healds, on the facades of virtual churches.

Application of the second innovative design on the facades of virtual church.



Fig. (27) application of innovative design by using ornamental draft systems, 8 healds, on the facades of virtual churches.

The design was done using the Wave Maker, using 8 healds with the decorative draft system and the use of a decorative weaving, design achieved the required characteristic that makes the design suitable for decoration of the facades or interior walls of churches. The design appeared in the form of a cross to inspire Christian monuments and symbols and confirm the identity of the Church as Christian places of worship.

Application of the third innovative design on the facades of virtual churches.

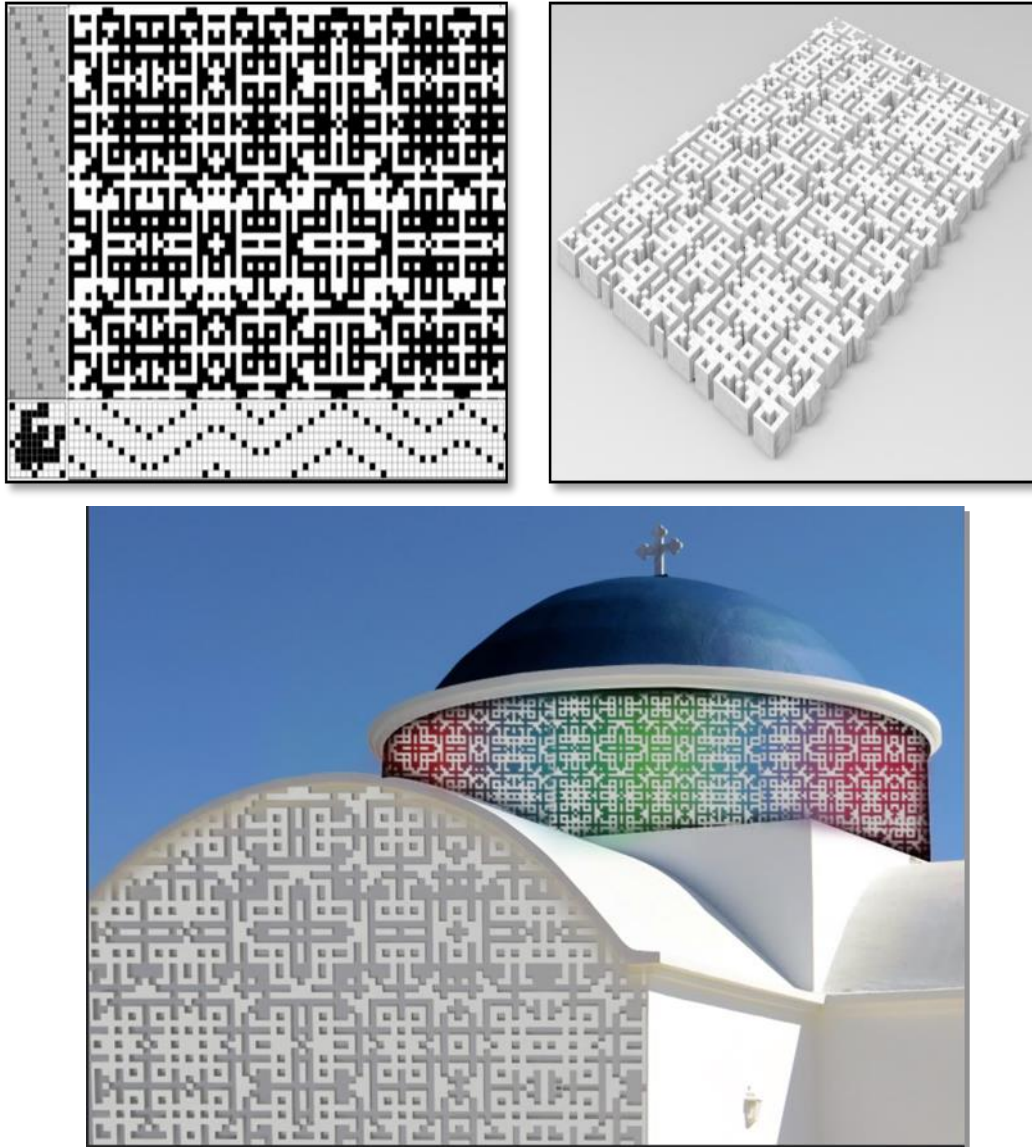


Fig. (28) application of innovative design by using ornamental draft systems, 8 healds, on the facades of virtual churches.

The design was done using the Wave Maker software on 10 variations, using 10 healds with the decorative draft system (overlapping guides) and the use of a decorative weaving composition that does not follow a specific rule that gives the required characteristic that makes the design suitable for decoration of the facades or interior walls of churches, the design appeared in the form of a cross to inspire Christian monuments and symbols and confirm the identity of the church.

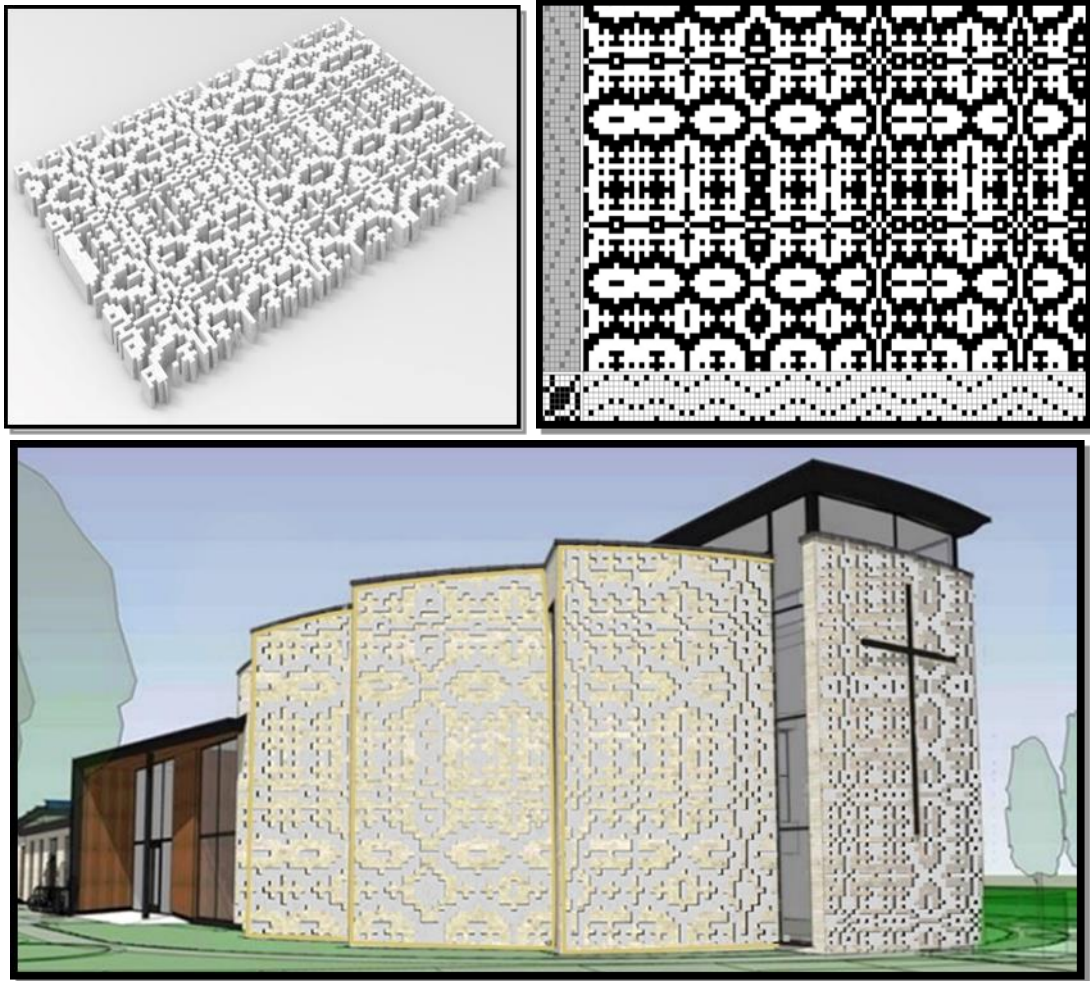


Fig. (29) application of innovative design by using ornamental draft systems, 8 healds, on the facades of virtual churches.

The design was made using the Weave Maker software on 8 variations using 8 healds with the decorative draft system (overlapping guides) and the use of a decorative weaving composition that does not subject to a specific rule gives the required characteristic that makes the design suitable for decorating the facades of churches or their interior walls. The design appeared in the form of adjacent crosses on the facade of the building to confirm its identity as a Christian house of worship.

Application of the fifth innovative design on the facades of virtual churches

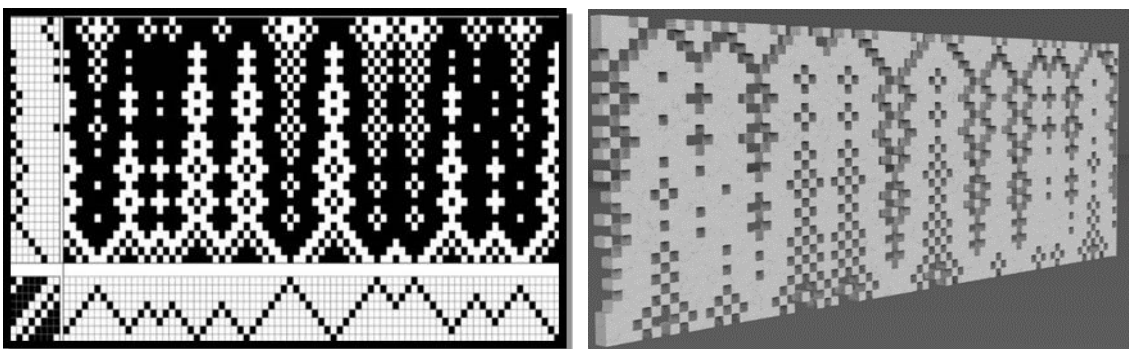




Fig. (30) application of innovative design by using ornamental draft systems, 8 healds, on the facades of virtual churches.

The design use of a decorative weaving composition that does not subject to a specific rule gives the required characteristic that makes the design suitable for decorating the facades of churches or their interior walls. The design appeared in the form of adjacent crosses on the facade of the building to confirm its identity as a Christian house of worship.

Application of the sixth innovative design on the facades of virtual churches

The design was made using weave maker software on 8 variations using 8 healds with the decorative draft system (overlapping guides) and the use of an ornamental weaving structure aimed at making the design suitable for decorating the facades of churches and their interior walls, ceilings and columns ... etc. it was placed on the façade of the virtual church to reflect the internal function of the building as the resulting design was distinguished by the distinctness of the cross over the design, which confirms the identity of the building as a church.

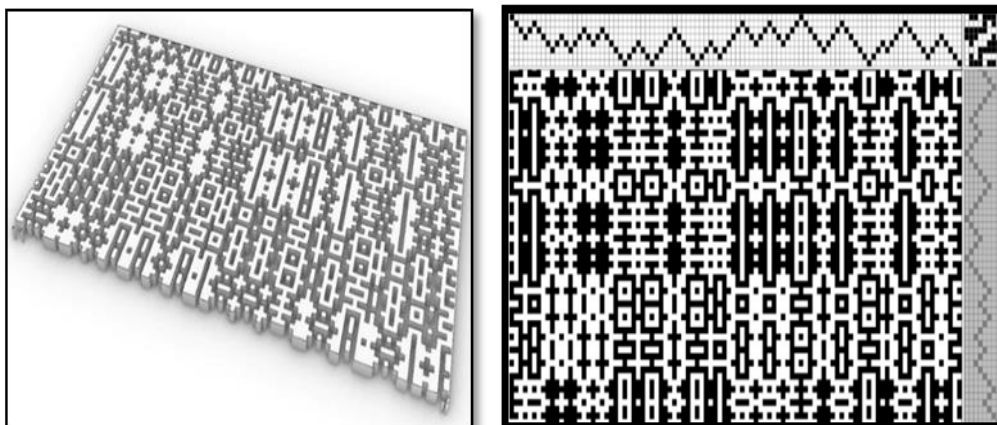




Fig. (31) application of innovative design by using ornamental draft systems, 8 healds, on the facades of virtual churches.

Application of the seventh innovative design on the facades of virtual churches

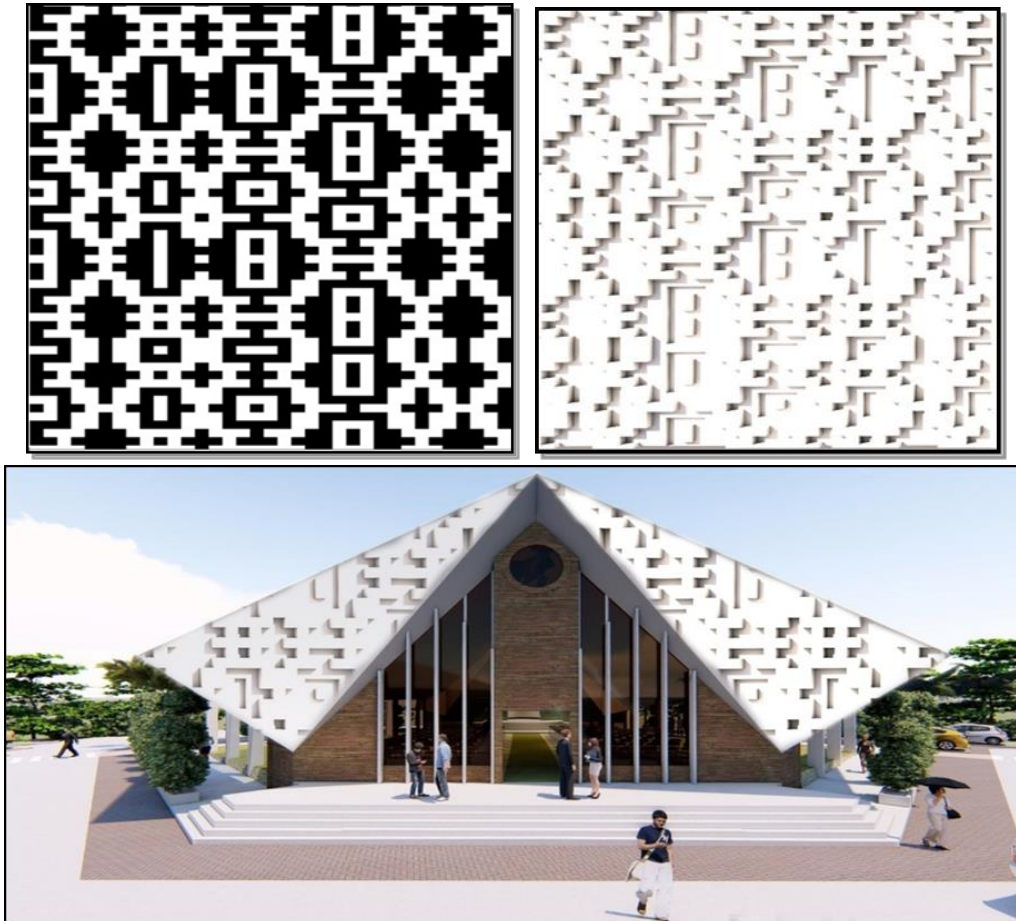


Fig. (32) application of innovative design by using ornamental draft systems, 8 healds, on the facades of virtual churches.

The design was made using weave maker software on 8 variations using 8 healds with the decorative draft system (overlapping guides) and the use of an ornamental weaving structure aimed at making the design suitable for decoration of the facades of churches and their interior walls, ceilings and columns ... etc. it was placed on the façade of the virtual church to reflect the internal function of the building as the resulting design was distinguished by the distinctness of the cross over the design.

Application of the eighth innovative design on the facades of virtual churches

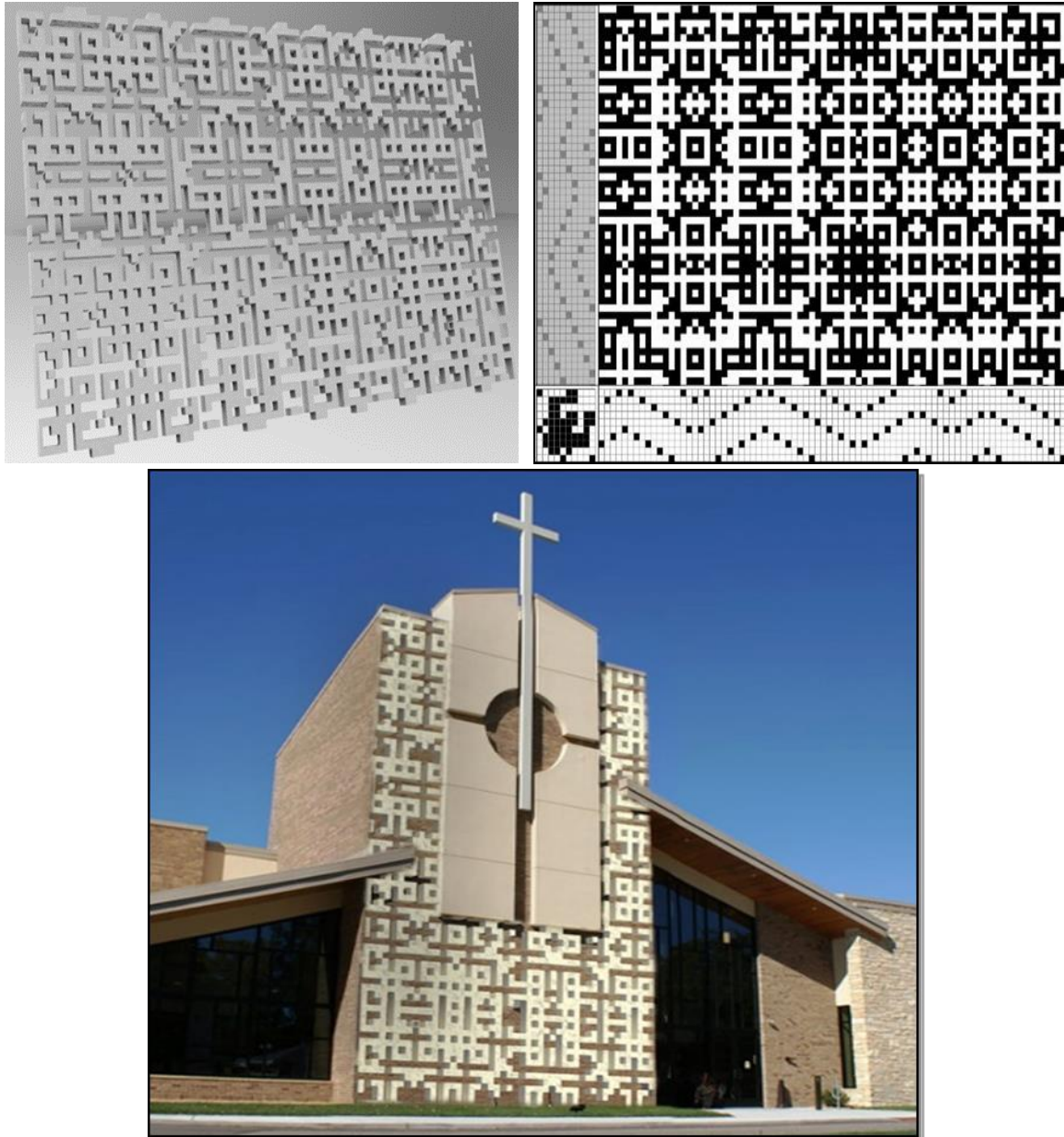


Fig. (33) application of innovative design by using ornamental draft systems, 8 healds, on the facades of virtual churches.

The design was made using weave maker software on 10 variations using 10 healds with the decorative draft system (overlapping guides) and the use of an ornamental weaving structure aimed at making the design suitable for decorating the facades of churches and their interior walls, ceilings and columns ... etc. it was placed on the façade of the virtual church to reflect the internal function of the building as a church.

Application of the ninth innovative design on the facades of virtual churches

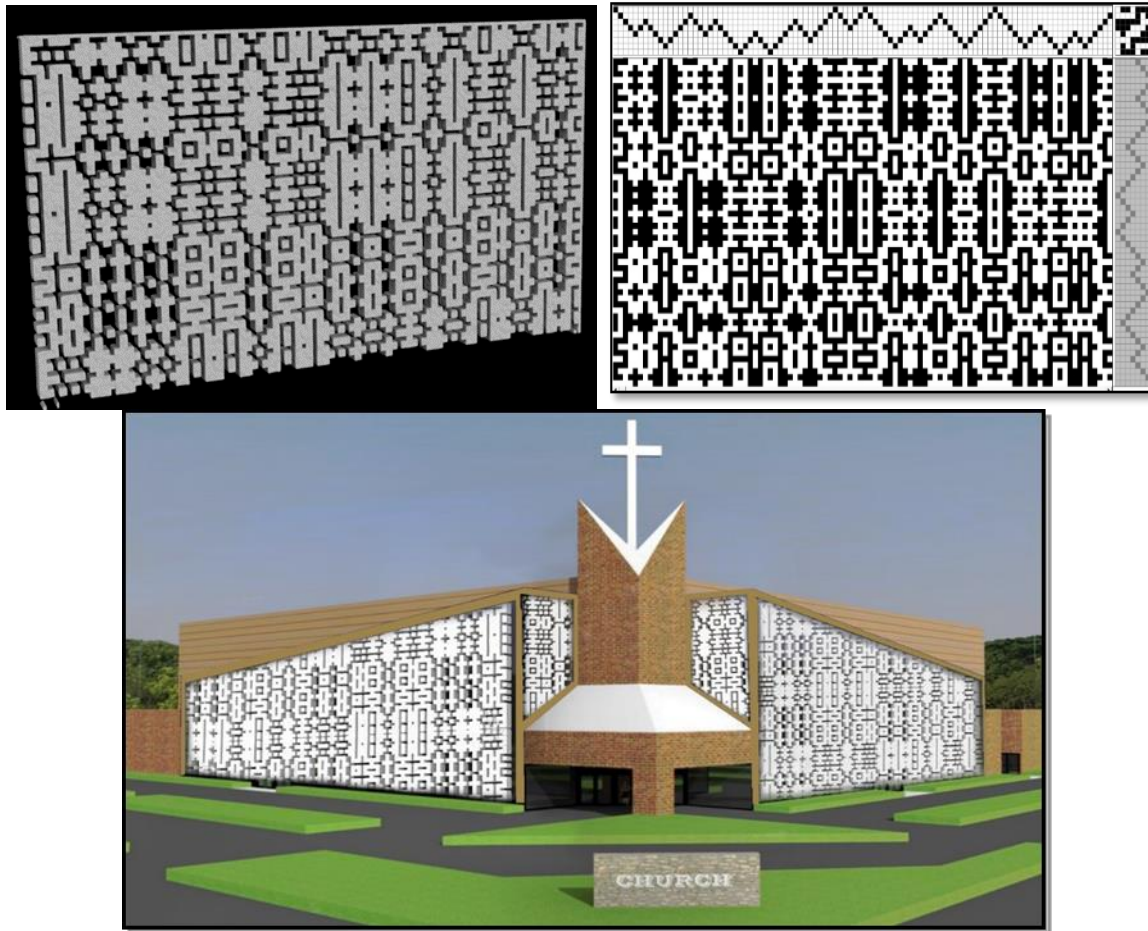


Fig. (34) application of innovative design by using ornamental draft systems, 8 healds, on the facades of virtual churches.

The design was made using weave maker software on 8 variations using 8 healds with the decorative draft system (overlapping guides) and the use of an ornamental weaving structure aimed at making the design suitable for decoration of the facades of churches and their interior walls, ceilings and columns ... etc. it was placed on the façade of the virtual church to reflect the internal function of the building as the resulting design was distinguished by the distinctness of the cross over the design, which confirms the identity of the building as a church.

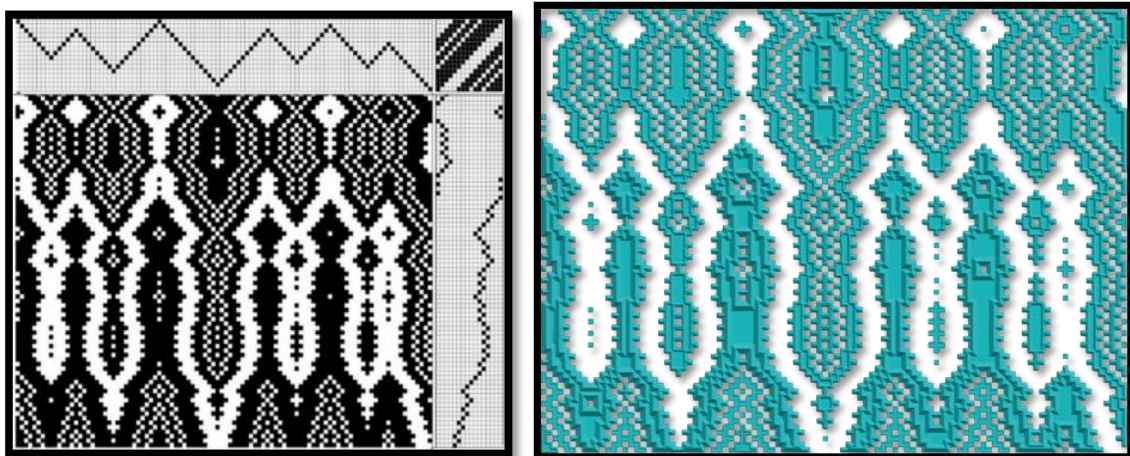




Fig. (35) application of innovative design by using ornamental draft systems, 16 healds, on the facades of virtual churches.

The design was made using weave maker software on 16 variations with the decorative draft system, it was placed on the façade of the virtual church, the cross over the design confirms the identity of the building as a church.

Application of the eleventh innovative design on the facades of virtual churches

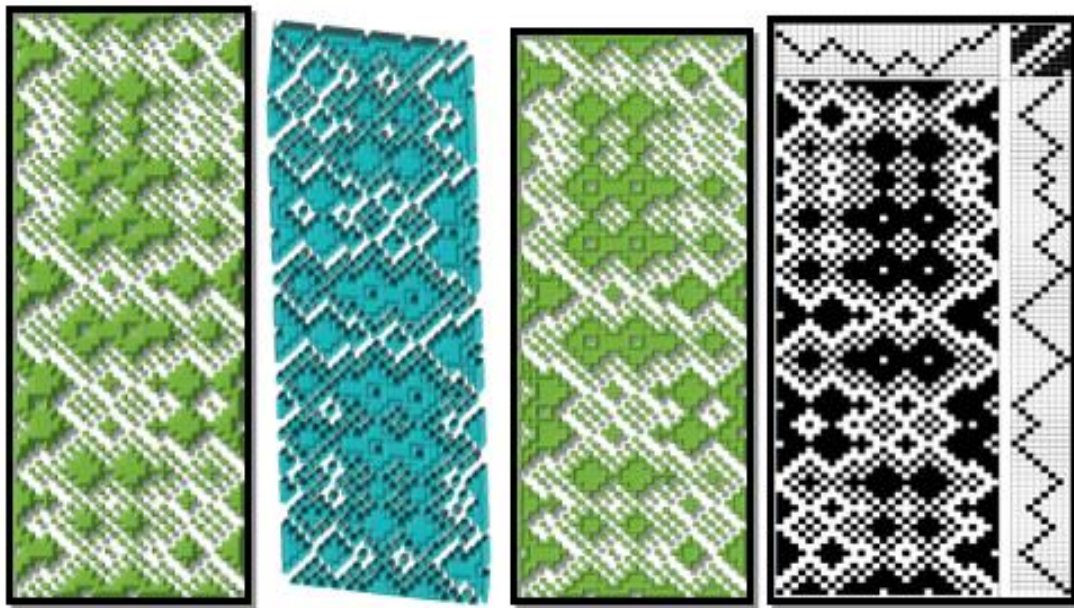




Fig. (36) application of innovative design by using ornamental draft systems, 8 healds, on the facades of virtual churches.

The design was made using weave maker software on 8 healds with the decorative draft system, the design is suitable for decoration of the facades of churches.

Application of the twelveth innovative design on the facades of virtual churches

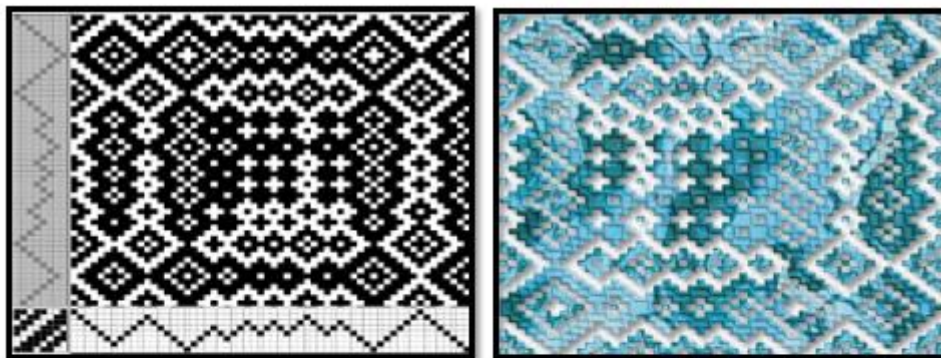


Fig. (37) application of innovative design by using ornamental draft systems, 10 healds, on the facades of virtual churches.

The design was made using weave maker software on 10 variations using 10 healds with the decorative draft system (overlapping guides) and the use of an ornamental weaving structure, the design is suitable for decoration of the facades of churches and their interior walls, ceilings and columns ... etc.

Application of the thirteenth innovative design on the facades of virtual churches

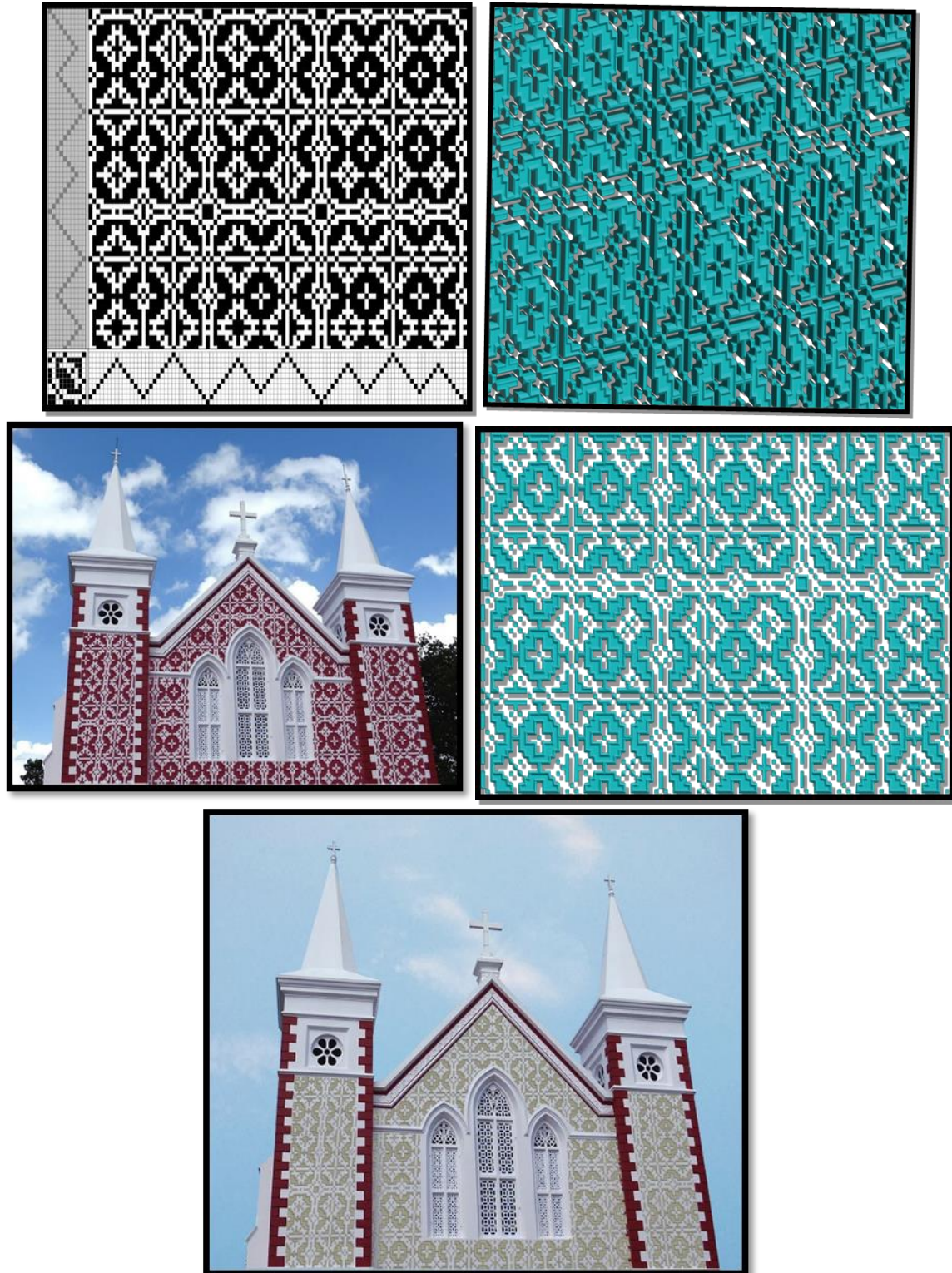


Fig. (38) application of innovative design by using ornamental draft systems, 10 healds, on the facades of virtual churches.

The design was made using 10 healds with the decorative draft system and the use of an ornamental weaving structure aimed at making the design suitable for decoration of the facades of the church to reflect the internal function of the building.

Application of the fourteenth innovative design on the facades of virtual churches

The design was made using weave maker software on 16 variations with the decorative draft system, the design is suitable for decoration of the facades of churches and their interior walls... etc.



Fig. (39) application of innovative design by using ornamental draft systems, 16 healds, on the facades of virtual churches.

Conclusion:

The façade has always been seen as more than mere protection against the weather, but nowadays, there is a growing interest in buildings envelopes presenting complex geometries and patterns. This interest is related to the use of new design tools, such as Generative Design, which promotes a greater design exploration. In this research we discuss and illustrate a structured and systematic computational framework for the facade designs. This framework includes creation of 29 Designs by using the Weave Maker software for different textiles, such as 8 ,10 and 10 healds with the decorative draft system (overlapping guides) , and Seven innovative designs were sculpted using the Rhino program and then applied to the virtual facades of churches using key sketch up and shot photoshop programs.

Results

1. The design represents the most important pillars of architectural facades where the design of architectural facades reflects the internal function of the building, especially if the building is functional and non-residential.
2. The design of facades in buildings is no less important than the internal functional solutions of architectural buildings because the facades of buildings are overlooking the outside world and give the initial reflection of the building.
3. Architectural facades allow for the extrapolation of the interior function for which the building was built because the general shape of the façade reflects the basic form of functional construction.
4. Use the appropriate architectural vocabulary in the facades of buildings to suit the internal function of the building.
5. The facades of the innovative churches were characterized by balance, rhythm, unity and emphasized the identity of the buildings, ornaments were placed on their facade as Christian houses of worship.
6. The research emphasized the aesthetics of using weave maker textile program in the design of innovative architectural facades.
7. The research stressed the need to benefit from interdisciplinary to serve scientific research.
8. Modern architectural trends need to provide aesthetic properties in order to achieve the building's compatibility with the surrounding environment by linking architecture with arts.
9. The façade of the building is the visible part of the art work and is the first factor in judging the building's success or failure.
10. The design of architectural facades requires considerable flexibility and is considered an artistic research rather than an automatic work .
11. The general appearance of the facade depends on the relationship of the spaces of its solid and hollow parts, such as wall flats, window openings and doors.
12. Architectural facades are connected spaces that show the general shape of the building and are not just an area with several windows and doors.
13. The study of light, shadows and color in the architectural facades works to highlight the facade and show its beauty and keep the sense of boredom away from the onlookers.

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