

YAZD PLATE – Traditional Design & Modern Technology “Experimental Applied Study for Making a 38 cm Ceramic Plate”

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Project Summery

Intro:

Myself as an Egyptian Graphic Designer who studied art history with a great passion for human heritage in general (Ancients Egyptian Art & Islamic Art in particular) and believed in the possibilities & potentials of civilizations dialogue, I always think of heritage as a chain of cumulative human progress throughout time & place and each of us as human beings form a part of this chain.

This believe always directed me to explore different arts & trying to understand and digest their main features, and then make my own version that carries all what I inherited and what I aspire.

So, here is this project that was carried out during my Diploma of The King School of Traditional Arts “Jameel House of Traditional Arts in Cairo” 2018-2020. An experiment for creating a ceramic plate with a traditional Persian biomorphic design using a fusion of old & modern molding techniques.

Problems:

- Lack of traditional arts experimental and applied into-depth studies.
- Time consuming & high cost of traditional arts practices that impact negatively productivity and prevent it from being a profitable art practice.
- Disregarding the modern technologies and its positive impact on traditional arts in terms of productivity & quality standards.

Significances:

- Highlighting the ability of traditional art designs to be altered according to application material & technique.
- Highlighting the positive impact of modern technology on traditional art practices.
- Exploring methods to facilitate & elevate traditional art production process while keeping authenticity and value.
- Reducing time & cost consumed & increase productivity of traditional art s practices.

Objectives:

- Bridging the gap between traditional art practice & modern application techniques.
- Facilitating and elevating individual art & craft productivity.
- Participating positively in heritage revival & creating a strong link in the chain of cumulative human progress.

Methodology:

The project adopted 2 main methodologies as follows:

Analytical Methodology:

Geometric underlying grids analysis to understand & recreate the chosen ornamental pattern.

Experimental Methodology:

Treatment of original pattern to recreate a version that is clear & readable to the laser machine, creating a separated double line channels to form barriers between different glaze colors for the embossed lines application, and also using them as dark lines in the debossed lines application.

Experiment Tools:

Creating different types and material of molds as per each application phase (Plexiglass engraved by laser, wooden concave and convex molds, 3d printed ring foot cutters, Negative Rubber Silicone Molds, Ornamental 3D printed Mold).

Results:

- Production of high-quality ceramic plates based on a traditional design with different features in terms of form, colors & decorative techniques (Embossed & Debossed Lines).
- Time efficiency and cost reduction with a well noticed quality & quantity values.
- Using laser-cut engraving & 3D print technology to produce durable molds in different materials (Plexiglass, Massive wood, Printed Acrylic & Silicone Rubber).

Keywords:

Underlying Geometric Grids

Islamic Biomorphing Patterns

Traditional Design

Modern Technology

Molds

Laser-cut engraving

3D Print

Historical Background & Inspiration (Jāmeḥ Mosque of Yazd):

It is the grand, congregational mosque (Jāmeḥ) of Yazd city, within the Yazd Province of Iran. Yazd Mosque is depicted on the obverse of the Iranian 200 rials banknoteⁱⁱ.



Figure 1 Mosque of Yazd, Yazd Province, Iran

The 12th-century mosque is still in use today. It was first built under Ala’oddoleh Garshasb of the Al-e Bouyeh dynasty. The mosque was largely rebuilt between 1324 and 1365, and is one of the outstanding 14th century buildings of Iran. According to the historians, the mosque was constructed in the site of the Sassanid fire temple and Ala’oddoleh Garshasb commenced building the mosque.



Figure 2 Mosque of Yazd iconic elements featured on banknotes

It is a fine specimen of Persian architecture. The entrance to the mosque is crowned by a pair of minarets, the highest in Iran, dating back to the Safavid era. Entrance is decorated from top to bottom in tile work. Its tall tiled Mihrab, dated 1365, is one of the finest of its kind in existence.

Yazd Mural Ceramic Motif

About 15 years ago, I found a motif in which I was fascinated by and loved it ever since. I started using it in my digital greeting cards, my PC background, my screensaver ...



Figure 2 Travelers photos were great source of information showing different perspectives & info

I didn't have much information about it, then got to know more information about while going through Instagram travelers' photos. Thanks to Google, I managed to find more details about its history, material and relatively massive size.

Later on, I was very lucky to accurately study it with its geometrical analysis during my JHTA second year lectures, and even more through an online workshop during the COVID-19 lockdown period.



Figure 3 Main motif being cut out with Photoshop

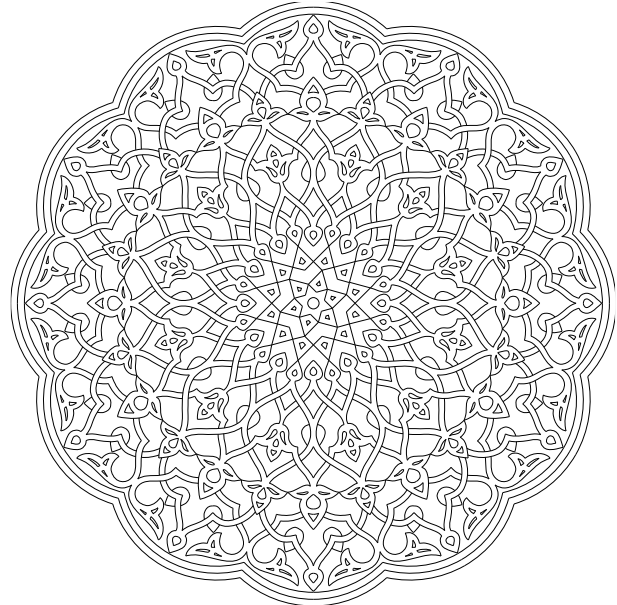


Figure 4 Main motif accurate drawing with AutoCAD

Design Hypothesis & Experimentation:

Main idea was to incorporate available facilities & current technologies as art & craft are reflections of surrounding environment, they echo it & manipulate it at the same time. Aimed for high-quality product with less efforts & cost, also to maintain ability to produce more variations with same preparations.

Using a primary mold for the decorative design and applying it on flat raw clay slabs then getting different forms according to concave to flat wooden molds.



Figure 5 Proposed different forms & functions



Figure 6 3D rendering in Rhino 5

Geometric Analysis:

Harmonic Expansion Grid is the underlying grid for the whole motif.

In a main base circle, there are main three squares that are rotated to define 12 points of a dodecagon. It’s based on 12 folds divisions to insure harmony and proportion between design elements which keep the same ratio of expanding and diminishing.

Biomorphic Design is represented in two interlaced paths, with a hexagonal star for the center.

Original Design of YAZD Wall

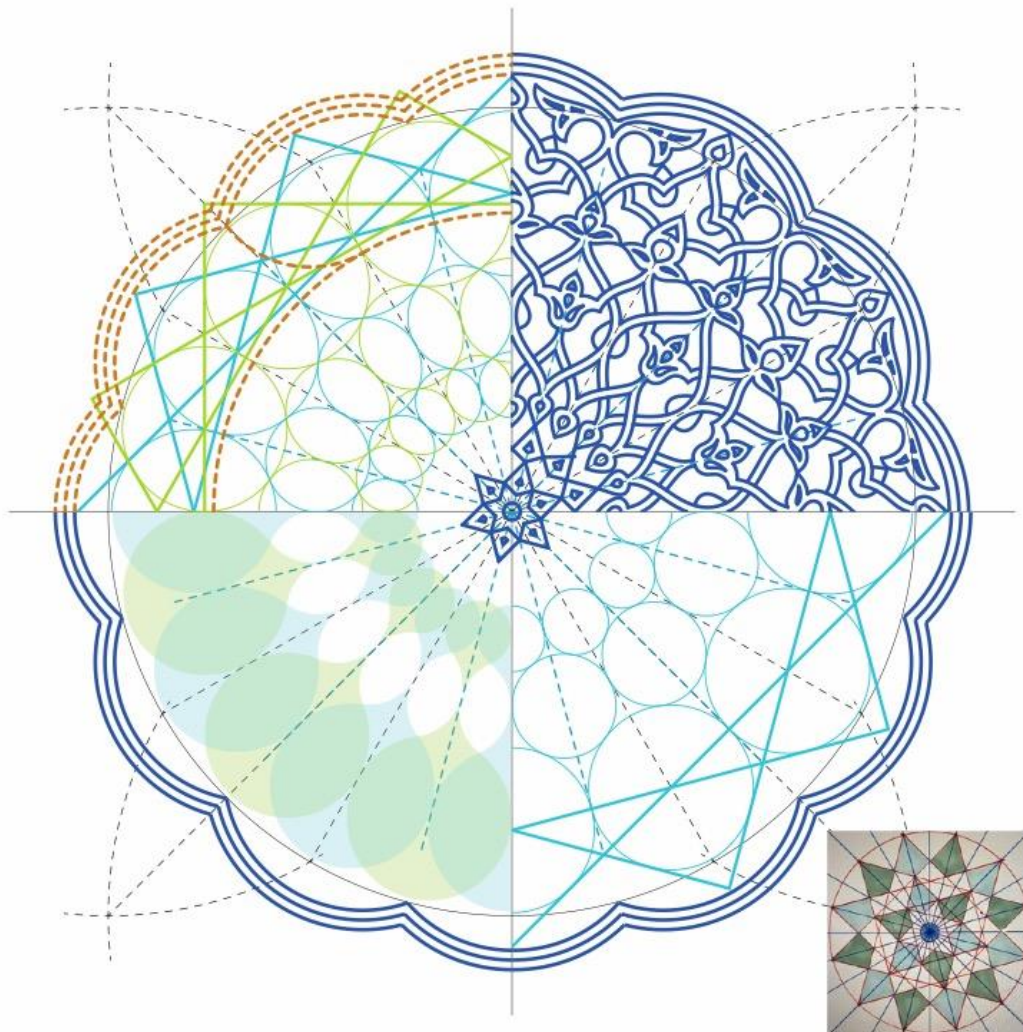


Figure 7 Geometric analysis & underlying grid that controls relations between design biomorphic elements

YAZD Plate Experiment Procedures:

Yazd Plate Project has gone through various technical steps & procedures, some of them were basically experimental.

Starting with using laser-cut technology to make a mold with engraved plexiglass based on a drawing made with AutoCAD taking into consideration required thickness of glaze barrier lines & colored areas.

Experimenting on white & red clay slabs, then making plate curvature using wooden concave molds. Also trying different colors of slips & glazes.

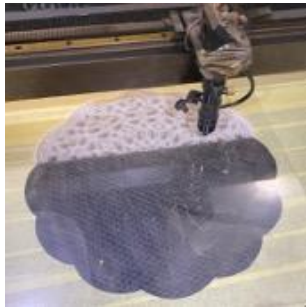


Figure 8 Laser-cut plexiglass



Figure 9 Plexiglass mold test



Figure 10 Plexiglass mold & tools



Figure 11 Red clay slab



Figure 12 White clay slab



Figure 13 Pressed slabs on curved support



Figure 14 Colored slip on bisque-fired red clay



Figure 15 Slip & glaze samples on red clay



Figure 16 Slip & glaze samples on red clay after glaze firing

Another experiment was carried out on making a negative silicone rubber mold, resulted in having the same design in a different style.

Lines were debossed instead of being embossed with the plexiglass mold, giving the plate a rhinestone edge. Trials for colored glaze were made in two different techniques, the first was applying glaze by spray, and the other was wiping colored glaze off leaving it only in debossed lines, then finishing all with a layer of transparent glaze.



Figure 17 Negative silicone rubber mold



Figure 18 Silicone rubber mold



Figure 19 Debossed lines plate

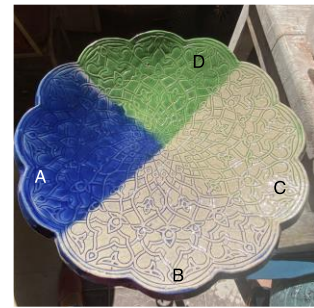


Figure 20 Debossed lines & rhinestone edge trial

For making a ring foot for the plate, at first it was applied by the traditional method on the potter’s wheel after flipping it off the wooden concave mold. Then it was done through using 3D print cutter shaped to required size.



Figure 21 White clay plate in a wooden concave mold ready to add rim



Figure 22 Ring foot on potter’s wheel



Figure 23 3D printed ring foot cutter



Figure 24 Negative & positive wooden molds

A detailed color study was made while waiting for all plates to be bisque fired with different alternatives (White clay & Red Clay - Embossed & Debossed Lines - Two different forms with different curvature). Color proposals were chosen based on two main trends, the first is using original color scheme in the same order or altered order, the second was a monochromatic earthy scheme.

This color study was applied in Procreateⁱⁱⁱ “Painting App” over a recreated digital drawing by AutoCAD after the complete geometric analysis.

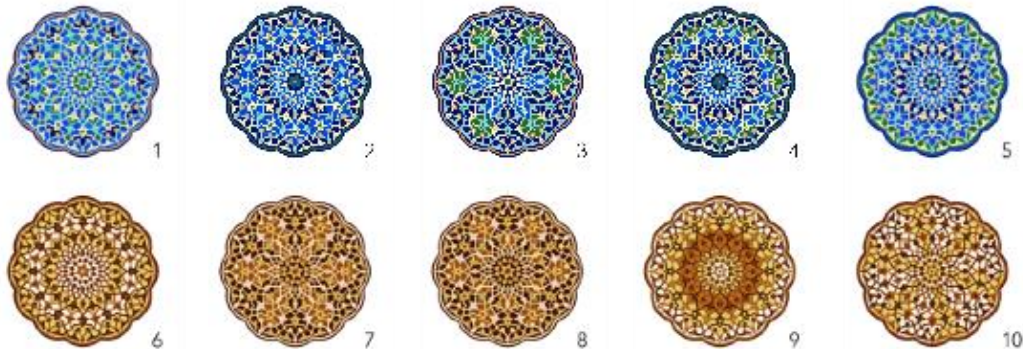


Figure 25 Color study

Glaze colors were finally chosen and sample was made as using glaze precise applicator.

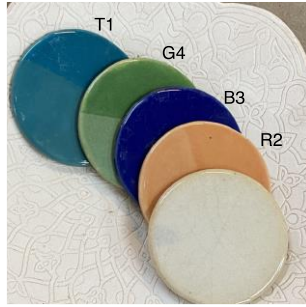


Figure 26 Chosen glazes for YAZD plate



Figure 27 Glaze precise applicator



Figure 28 Glaze coloring samples



Figure 29 Coloring samples after glaze firing

For final product, a more precise & flexible mold was made using the technology of 3D printing as per designed in AutoCAD & rendered in Rhino 5.



Figure 30 3D Printing with Rhino 5



Figure 31 3D printed mold

Three color modes for the embossed lines were applied, two of them were applied on a flat wooden mold, and the third was applied on a more wooden concave mold.



Figure 32 Color mode 1, embossed, flat



Figure 33 Monochrome, embossed, concave



Figure 34 Color mode 2, embossed, flat

Applying transparent glaze on top of colored glazes and preparing for glaze firing



Figure 35 Transparent glaze



Figure 36 Glaze kiln setting



Figure 37 Waiting to cool



Figure 38 At room temperature

YAZD Plate Finals:

Through all experimental steps & trials, the final product was not just one item, it was 6 variations made out of main original molds (Plexiglass engraved mold, rubber negative mold, wooden shape molds, 3D print ring foot cutters).



Figure 39 Color Mode 1, embossed, flat



Figure 40 One color, debossed, concave



Figure 41 One color, embossed, concave



Figure 42 One color, embossed, concave



Figure 43 Color Mode 2, embossed, flat



Figure 44 One color, debossed, flat

And proofing project assumption that heritage can be recreated using available technologies to save time & effort, hence reviving heritage and adding our contemporary contribution.

Figures Reference:

Figure No.	Reference
1:2	https://en.wikipedia.org/wiki/Jameh_Mosque_of_Yazd
3	https://www.alamy.com/iran-central-iran-yazd-jameh-mosque-tilework-and-visitors-image259651551.html
	https://mysteryofiran.multiscreensite.com/nb/photo-people-iran
4	Photo By Adam Williamson
5:45	By Research Author

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ⁱⁱ https://en.wikipedia.org/wiki/Jameh_Mosque_of_Yazd

ⁱⁱⁱ <https://procreate.com/>