A RESEARCH AND APPLICATION STUDY ON THE SUBJECT OF DEVELOPING A SUITABLE GLAZE FOR THE BODY OF HAND-MADE CERAMIC COVERING MATERIALS

LALE ANDIÇ and KEMAL TIZGÖL

Dokuz Eylül University, Faculty of Fine Arts,
Department of Ceramics, Narlıdere-Izmir/TURKEY

The development of industrial ceramics has spread across the world. Among the leading manufacturers of ceramics, the Turkish ceramics sector holds a position of world wide importance due to both its production capacity and its quality. Despite its world wide prominence and great ceramic production capacity; the Turkish ceramic industry has been influenced by the economic crisis. In particular, small manufacturers in Turkey have begun to experience the economic crisis on an extended level. As some of these smaller manufacturers began to go out of business, others tried to find a unique design range to make their production a brand name on the market. Those small businesses that rejected standardisation, industrial production and the use of automated technologies, have directed their manufacturing method towards traditional hand-made production. In the light of this, the aim of this study has been to develop a colour scale using raw glaze recipes for hand-made ceramic covering materials.

The outlines for this work have been determined through the harmony and cooperation that exists between the manufacturer and its associates, who strive for the realisation of this project. One of these companies produces hand-made roof tiles and covering materials and bases its production on traditional pottery making in order to reap the benefits. The starting point in the outline of their strategy has been to arrest the technological and sociological movements at a certain point and then to reach the more sophisticated communities by offering a privileged and qualified range of products which moved towards the development of new trends.

Once those small companies started to reject the mass cultural values, to refuse the low quality industrial production and initiate better planned investment structures, they brought higher valued products to smaller markets. Nowadays, production strategies are going down the road of 'less quantity, more income'. This concept enhances their product's artistic qualities by re-emphasising cultural values and aspirations in order to respond to more sophisticated demands. At this point, the commercial acceleration of the retail product can only be maintained when it is accepted by and is in harmony with its own country's cultural structure. In societies that feed their infrastructures with popular culture, products with extended cultural values are not easily accepted. Therefore these products do not easily find a purchaser in their own domestic markets because of their materials, workmanship, and higher costs. Consequently, the manufacturer seeks new markets abroad and therefore has to consider the purchaser's social, cultural and the economic values as important factors in the design and production process. Through these far-sighted design and production criteria the manufacturer actually steers the trends of its own society.

Today, the disappearance of geographical and industrial borders makes global competition conditions inevitable; within the ceramic industry as in all other sectors. Manufacturing diverse products to address the developing tastes of society creates a solid and distinctive position for the manufacturer amongst his competitors in the market place. At this point, the collaboration between the manufacturer and the other professional corporations becomes more important. The manufacturer's professional experiences amalgamate with reformist visions of educational institutions and enables better management. Finally, this work embraces both scientific qualities and aesthetic issues in cooperation with current trends.

During the initial stages of this study, manufacturers of hand-made ceramic covering materials have been evaluated in the context of global dynamics. The application and documentation stage has been achieved by working within the boundaries of scientific research in laboratory conditions.

1. RESEARCH STUDY AND GLAZE APPLICATIONS ON HAND-MADE CERAMIC COVERING MATERIALS

Four different glaze recipes are the core of the initial study. These recipes have been chosen out of twelve different glaze compositions. In accordance with the quality and the specifications of the manufacturer's clay, these four recipes have provided the finest results to gain the best colour variations and surface features.

The kiln: Bisque – Hoffmann
Glaze - Front loader, electric, 0.3 m³ test kiln

The bisque firing: 1060 – 1080°C / oxidation (partly reduction) - takes approximately 96 hours to fire.

The glaze firing: 1000°C / oxidation - takes approximately 5 hours to fire.

The clay body: (Chemical Analysis)	SiO_2 CaO Al_2O_3 Fe_2O_3 (LOI)	44.15 % 9.00 % 16.30 % 6.10 % 13.60 %

Seger Formulas:

Glaze A	0.85 CaO 0.09 K_2O 0.06 PbO	0.09 Al_2O_3	1.20 SiO_2 1.07 B_2O_3
Glaze B	0.65 PbO 0.09 CaO 0.13 Na_2O 0.13 ZnO	0.13 Al_2O_3	1.36 SiO_2 0.13 TiO_2 0.07 SnO_2
Glaze C	0.86 Na_2O 0.09 K_2O 0.05 ZnO	0.04 Al_2O_3	0.43 SiO_2 1.66 B_2O_3 0.03 SnO_2
Glaze D	0.68 PbO 0.16 MgO 0.16 ZnO	0.11 Al_2O_3	1.10 SiO_2

Colouring Oxides:	CuO Fe_2O_3 MnO $CoCO_3$ NiO	0.5 – 7.0 % 3.0 – 9.0 % 1.0 – 7.0 % 0.5 – 5.0 % 1.0 – 6.0 %

Glaze A-Base

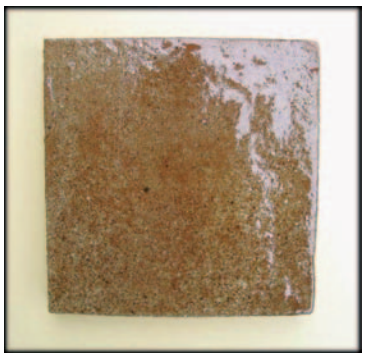
Glaze A- Coloured

Glaze B- Base

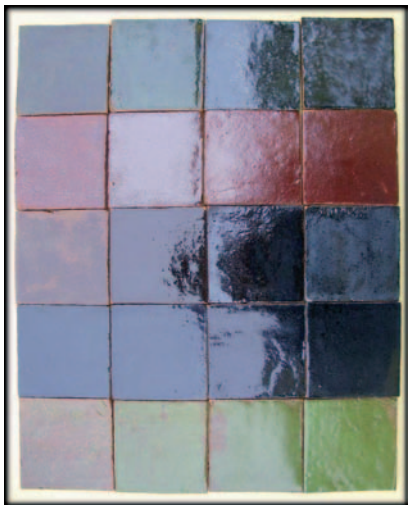
Glaze B - Coloured

Glaze-C Base

Glaze C- Coloured



Glaze-D Base



Glaze-D Coloured