

# DOKRA

**Guided by** – Ashok Mondal, Rajeev Jassal,  
Shubho Karmakar and  
Gourango Karmakar

Udita Das  
Industrial Design  
National Institute of Design, Vij



# Introduction

Raw and crude models are taken for polishing. The polishing is done through a machine by a metal brush rotating rapidly with the help of a motor. This polishing removes unwanted unevenness and projections. Thus, the colour from yellow ochre (in the crude stage) turns into into a whitish glaze yellow (in the polished stage). Sometimes the parts where the metal is found to be missing accidentally, is covered by M-seal and golden glitter. Previously, metal scrubbers were used for the process. A chemical polishing machine is also present which remains unused for the unavailability of chemicals.

TIME TAKEN - 3-6 minutes per model.







# History

The bell metal craft is the oldest form of metal casting. It has been undertaken in India for over 4000 yrs. The dancing girl of Mohenjodaro is one of the earliest known lost wax artifacts. The Ghadwas are artisans who produce the bell metal crafts. Term "ghadwa" means giving shape and creating. It is still unclear whether the community originated in the jungles of Bastar or migrated from Orissa. As their culture and traditions have strikingly similarities with the tribals of Bastar, many do believe that their traces are from Bastar. Ironically the community is given a lower status than the tribals of the region.

Some believe that in the historical period, when king built his palace, he searched some craftsmen to make the idol of Danteshwari Devi. Few of the ghadwa families were invited from Orissa and then they settled in this region. These are also called as 'Ghasis', 'Khaser', 'Mangan' & 'Vishwakarma' in different regions.

The Ghadwa craftsmen used to supply the utensils of daily use to the villagers. Slowly jewelry and forms of local deities also became part of their work. With time the figures of birds, animals, decorative objects and dance poses were added to make the craft more innovative.



**Process**



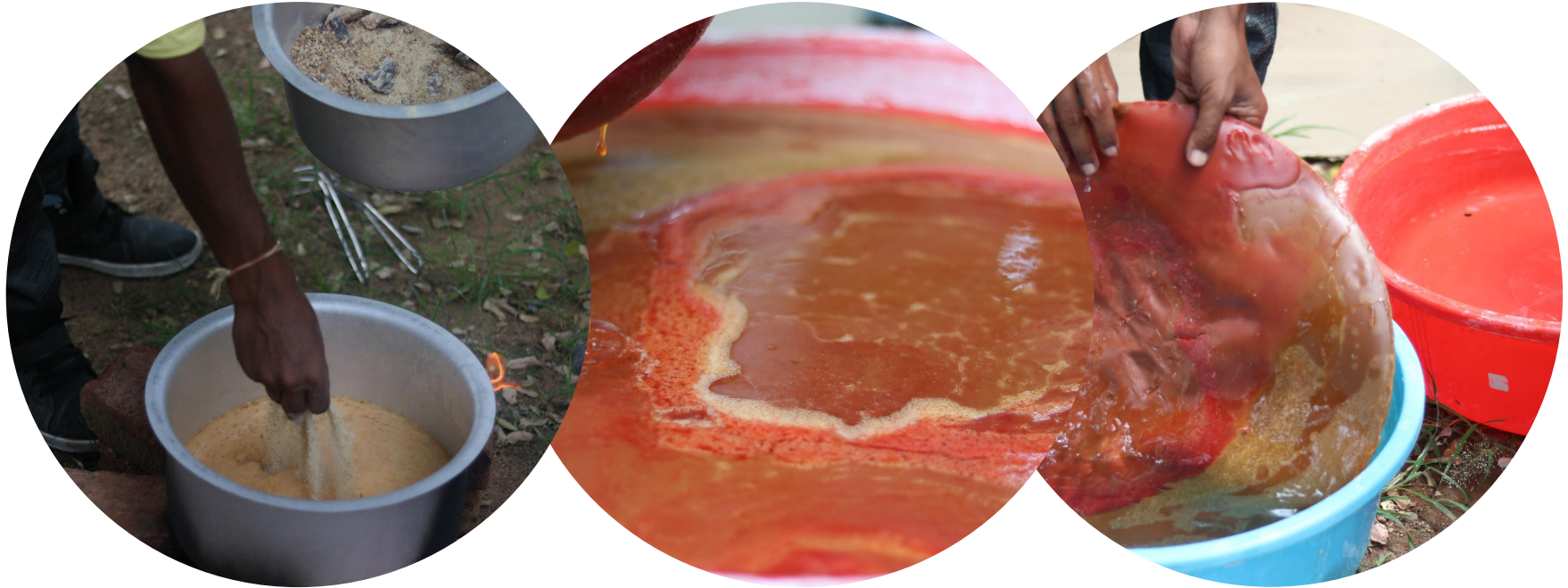
# Wood resins

A mixture is made out of beeswax (chaker mom), wood, resin gum(gacher atha) and mustard oil is made with the ratio of 5:2:3.

A basic model is prepared by using black soil mixed with rice husk in appropriate ratio. Soft pliable dough is made by adding water in it. A basic model of craft is made and dried in the sun.



# Wood resins





# Modelling the wax





Another mixture is made out of wood, resin, gum, tar and mustard oil with the ratio of 5:1:2.





In case of volumetric product, clay core is modelled in the shape of the desired product and the model is wrapped Thoroughly by a layer of wax mixture and detailed with the asphalt mixture (by heating them in chulha). The model is left to dry in the sun. On the other hand, in case of flat product, the model is directly made and detailed out of a layer of two mixtures (by similarly heating them in chulha).



# Moulding

Clay covering is done to form a mould for pouring in metal. Usually the mould is made out of four layers of clay - the first layer is of sandy soil (bele mati), whereas the successive layers contain the mixture of sticky soil (etel mati) and sand (bali) in the ratio of 1:1. Drain ducts are left for the wax, which melts away when the clay is baked. The wax is replaced by the molten metal. The liquid metal poured in, hardens between the core and the inner surface of the mould. For second layer, cleaned riverside soil is used. A powder of dung and water is added and mixed thoroughly for smooth dough. It applied all over the dry model & again left to dry in the sun. The hard & dry model is filed & shaped with metal files to achieve a proper shape. When the model is ready, it is scrubbed all over with hands to remove dust. A very thin semi liquid layer of black soil is applied over the model and is left to dry.

TIME TAKEN - mould making - 15 minute Drying takes upto 2 days









# Baking

The furnace is first prepared using bricks, ashes, kerosene oil, etc. using tools like hand fan and digging bar (shabol). Moulded product is baked and the brass is melted simultaneously with the process. The temperature should be 1000 degree celsius for the brass to melt. The temperature of the furnace reaches 1500-2000 C. The metal fills the mould and takes the same shape as the wax. The wax burns out leaving the gap for the metal to pour in. Sometimes when the metal kept inside beforehand fails to completely fill up the mould, molten metal is poured again from outside through a small hole that is present in the mould. TIME TAKEN - 1 to 2 hours.



# Breaking the mould

The object is then taken out from the furnace using a long forged tong. The moulds including the metal inside are cooled down by rubbing cold water and moist soil. This is done mainly by the female members of the family. When relatively cooled down, the mould is broken by the use of hammer, chisel and mattock. The Brass model thus is retrieved from inside the mould and taken for polishing. TIME TAKEN - 45 minutes.





# Finishing

Raw and crude models are taken for polishing. The polishing is done through a machine by a metal brush rotating rapidly with the help of a motor. This polishing removes unwanted unevenness and projections. Thus, the colour from yellow ochre (in the crude stage) turns into a whitish glaze yellow (in the polished stage). Sometimes the parts where the metal is found to be missing accidentally, is covered by M-seal and golden glitter. Previously, metal scrubbers were used for the process. A chemical polishing machine is also present which remains unused for the unavailability of chemicals. TIME TAKEN - 3-6 minutes per model.









# Raw material and tools



Brass  
Black Soil  
Rice Husk  
Riverside Soil  
Cow-Dung  
Termite Clay  
Wood

Wire  
Chisel  
Wooden Mallet  
Hammer  
Pliers  
Tongs  
Wire brushes





Thank you