

Collecting and Caring for Ceramics

The oldest man made ceramic known today is thought to be about 25 thousand years old. It is the *Venus of Dolni Vestonice* displayed in Brno, Czech Republic. The term ceramics is a general term for artefacts made from fired clay. We divide ceramics into two main groups or types. The low fired ceramics, such as terracotta, earthenware or pottery and the high fired ceramics such as porcelain and stoneware.

Terracotta, earthenware, or pottery is usually fired at temperatures of 700-1200° C. The body of terracotta is porous, softest and least compact of the fired clays. After firing of the clay, the body is not vitrified and still porous. Frequently the clay used contains tempering material such as sand, to alter the properties of the final product. The colours after firing can range widely from cream through dark red. There are various finishes of the surface such as glazes, colour pigments and lime washes.

Stoneware is an impervious type of earthenware and is fired at temperatures of 1200-1350° C. The body is hard and very compact. In comparison to terracotta the material is non-porous and seems almost granite-like in texture. The colour is usually various shades of grey. Frequently the surface is salt-glazed.

Porcelain is made from kaolin and petuntse (from 白墩子, also known as china stone), white clay formed by the weathering of aluminous minerals such as feldspar from granite sources. It was and still is an important ingredient in Chinese porcelain. Porcelain is the most high-fired of the ceramics and is fired at temperatures of 1250-1450°C. The body and surface is very hard, compact and vitreous. The colours range from white to bluish-white. Due to the vitreous nature of porcelain artefacts are easily chipped.

Handling

Ceramics be it terracotta or porcelain should not be handled with bare hands. The oily hand secretions are readily absorbed specially by porous surfaces such as terracotta.

Very frequently glazes on deteriorated or damaged porcelain, can contain crazing this will also absorb

these oils causing a darkening of the crizzled areas. The dirt can even creep between the glaze and the body of the ceramic.

It is also pertinent to remove jewellery such as rings and watches, since the hardness of the metal can chip or crack the brittle surface.

As tempting as it is do not handle cups, pots and vases at protruding parts such as spouts, handles or rims. These areas are very vulnerable and should there be a previous restoration, the likelihood of a weak joint failing and opening is high. In case of inappropriate handling small faults such as hairline cracks can enlarge and fail. Always use both hands, only hand carry pieces short distances, place them in padded boxes and try to use trolleys whenever possible.

Display

Ceramic seems to be a resilient material, however there is a limit to it. Terracotta if not glazed has a porous surface and body. Frequently terracotta is painted with mineral pigments that do not adhere well to the surface. Vigorous dusting will remove these pigments or rub the dust into the pores. Therefore if the surface of a ceramic is not glazed, the object should not be on open display. Pieces with glazed surfaces can be displayed, as long as the air-conditioning filters out solids such as soot and major dust particles. Since fine particulates such as cigarette smoke can deposit within flaws of a glaze.

When displaying fine arts such as ceramics, it is always prudent to show the piece as intended. Hanging plates on walls always increases the risk of accidents. If a plate has to be propped up, it's best to use a purposely-made stand in a material such as acrylic or wood. The wood needs to be painted with an inert paint and the contact surface covered with polyethylene foam or another form of suitable cushioning.

Figurines are generally displayed by placing the piece on thin polyethylene foam. However, it is vital to ensure that the center of gravity of the object is low enough to prevent the piece of falling over.

Materials such as blue-tag are not suitable for securing art pieces, most tagging materials on the market will loosen due to temperature fluctuations and can stain the surface.

Wherever possible, it is best to display ceramics in showcases or vitrines of one kind or another. This minimizes the risk of damage due to accidents and environmental damage such as soot, dust and

humidity fluctuations.

It is important to check ceramics for old repairs, restorations and in case of archaeological material, soluble salts before displaying them in an environment that is not air-conditioned or light controlled.

Maintenance

Dusting of ceramics seems to be straightforward; one way is to carefully dust the surface with a longhaired brush. It has to be ensured that the metal bracket around the stem of the brush is protected with a masking tape, so to not scratch the surface of the ceramic. Hair of synthetic brushes can be rather sharp, due to the cutting and trimming of the tip of the brush. The edges of the hair can scratch a fragile terracotta surface.

It has been also recommended to use compressed air from an aerosol-can, however like the brushing, this has to be done with caution, since it can dislodge loose fragments and pigments or drive the dirt and dust further into pores, crevices and cracks.

Dusting with a cloth is usually only done on undamaged porcelain. The cloth can interlock with parts of damaged glaze or chips and further harm the surface. In case of terracotta it will rub the dirt into the pores or remove surface decoration.

Washing of plates should be left to an experienced conservator, since small cracks can absorb moisture and soap and water can drive dirt and dust between glaze and body or even further into the body of the ceramic. It is a well known fact that porcelain can take weeks to dry, which can result in corrosion stains, should there be iron particles or pins in the porcelain. Terracotta should never be washed if not absolutely unavoidable, such as in case of desalination of soluble salts.

Packing and Storage

Packaging for transit or storage is best done by a professional art-handler. The materials need to be inert to prevent damage due to off-gassing of harmful substances such as acids. Or caking of deteriorated foams onto the body of the artwork.

Ceramics are first condition checked, to ensure safe transport. Then acid-free paper is wrapped around

the body. No kind of tape is to be used in the first layer of wrapping. Then a double layer of bubble wrap is to be wrapped around the body. The bubbles have to face each other, to minimize the pressure points. The piece is then placed into a crate best made of inert plastic. The crate is to be padded with shock absorbent polyethylene foam.

Ceramics can be stored in a range of humidity best ; as long as the ceramic does not contain soluble salts, as can be found in pieces recovered from maritime recoveries such as shipwrecks. It is also pertinent to check for old restorations, since these are often susceptible to fluctuations in heat and humidity. Should the ceramic contain old restoration it is best to keep the relative humidity around 55% and the temperature should not exceed 20-23C°.

Conservation/Restoration

Most museums all over the world practice conservation of terracotta, porcelain and other materials instead of restoration. This is based on the principle idea of minimal intervention with the artwork which means leaving as much of the original material intact and undisturbed for future generations of scholars to do their research. Many restoration techniques will remove or manipulate Porcelain or cover it.

Conservation work is almost completely reversible and does the least amount of alterations to the ceramic ware. But it has to be noted that there is no such thing as a 100% reversible conservation technique. Once original dirt or deposits are removed they cannot be added and adhesives (glues) are rarely completely removable, especially for the case of high-fired ceramics since they contain fine pores that can trap the adhesive and fillers applied during conservation of an artefact.

Nowadays conservators usually use epoxy resins to join and replace missing pieces. A good conservator will be able to match the colours very closely to the original. The draw back of this technique is, its too time consuming. Epoxy is relatively hard and the application of epoxy is also not easily reversible. If not carefully executed, the adjacent ceramic might be scratched, and there is also a possibility that the fill colour is not well matched or the fill changes colour due to light and heat.

During restoration the broken or cracked ceramic is glued together and missing areas filled in most

cases with unsuitable materials, and then the fills and cracks are covered with paint. In case of porcelain the new restorations and the adjacent porcelain are airbrushed with a solvent-based paint; this paint needs to be perfectly colour matched to the porcelain. Most restorations are done for the art market, private collectors and commercial art galleries. If a restoration is done well, it will be very difficult for a layperson to detect the cracks and missing parts.

In the past these restorations discoloured in a short time span, especially in a climate with high temperature and light intensity. This is due to accelerated aging of the infills, paint and lacquer. Today there are synthetic paints in the market that will age and discolour much slower, and when the ceramic is not exposed to extreme environmental conditions, it can last for a long time.

The advantage of conservation is the minimal interference with the actual body and surface of the ceramic in question. However, unsuitable materials like epoxy resins tend to be hard and difficult to remove. The colour matching of some synthetic resins is rarely satisfactory in the long run. Either the fill is off colour from the start or most resins in the market will change colour due to light and high temperatures.

The conservation and restoration of terracotta is fairly straight forward, since the body of the pieces is porous and will absorb adhesives and glues much more readily, therefore the bonds are stable and strong. The missing pieces are usually filled with wall fillers of one kind or another. The fills are then colour matched using reversible paint medias. Today low-fired ceramics such as terracotta are mostly conserved rather than restored.

Conservation techniques are desirable, since in principal they are the least harmful to an art piece. But it is rare that the conservation work on porcelain and high-fired ceramics is visually or esthetically pleasing, since it can be easily spotted when handling porcelain. In good conservation work, the fill will blend in well when the ceramic is viewed from a distance or through a display case. Should the colour matching or filling be poor, the ceramic will look cracked or broken, and this distracts from the original décor and the original craftsmanship. A conservator will always educate the owner of a damaged piece that it is of academic and ethical interest to not alter the porcelain and keep as much of the original as possible.

When restoring a porcelain, it is often done by a person relying on the fact that some of the glaze is

covered by airbrushing the paint. In case of a quick fix or an irresponsible restorer, scratching of the glaze when smoothing the fills is considered irrelevant, since it is covered by paint and therefore not visible. In my experience most high-fired ceramics that went through restoration work of this kind, were heavily damaged by scratching of the glaze underneath the overpainted areas. This damage cannot be undone, and has to be colour matched with paint in future, since it will distract from the original décor.

A good restoration will combine the idea of minimal intervention as practiced in conservation, with the inherent aesthetically pleasing nature of restoration. However it is important that the restoration is always visible to an expert, and that the restoration is entirely reversible. Therefore Restorers need to adopt the practice of reversible materials and materials that do not age rapidly.

Simple ways of how to spot restored high-fired ceramics and porcelain:

- Shining light through the porcelain will show up fills and cracks
- Ultraviolet light can expose most lacquers, paints or added pigments.
- A magnifying glass of about 10-30x will also show in many cases the pattern of an airbrush.
- Acetone or thinner will remove most paints used to restore the porcelain.