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INDEGINOUS PROCESSING

TOPIC: THE TRADITIONAL EXPLORATION OF BEADMAKING

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ABSTRACT

Beadmaking is a centuries-old time-honored craft that has been producing exquisite beads for jewelry production . This report provides an in-depth analysis of the art of beadmaking , evaluating its significance, traditional techniques, contemporary practices, and working tools. The report delves into the creative and artistic aspects of beadmaking , highlighting the craftsmanship involved in designing and crafting unique and personalized beads. It also sheds light on the challenges and advantages in the beadmaking industry, including the cost of materials, time-intensive production processes, specialized equipment requirements.

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CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND

Beads have been used by cultures, religions and subcultures for personal adornment, communication and trade across the world. Today, we see beads used in artworks, jewellery making, embroidery, costume design and much, much more. We have recently started stocking an incredible range of beads and stones by Rico, so to celebrate the humble bead we take a quick look at its fascinating history, which spans thousands of years.
In 2006 archaeologists discovered what is said to be the oldest surviving beads; small sea snail shells perforated with holes dated between 90,000 and 100,000 years old. Located in Isreal and Algeria, the discovery of the beads so far from the sea, told researchers that they must have been either used for trade or collected by humans indicating that symbolic behaviour in humans dated back further than previously thought.
Throughout the ages, beads have been used to convey symbolic, religious or even personal messages. The Zulu people of Southern Africa have used beads as a way of conveying their marital status and their emotions; the colours and pattern design of the beadwork conveying symbolic and personal messages, such as whether a woman is single. In Zulu beadwork a triangle is used to represent female (pointing upwards) and male (pointing down).
With each corner of the triangle being symbolic, the way it is represented within the beadwork can convey whether they are single or married. Colour is also hugely significant in Zulu beadwork and is used to convey positive and negative messages depending on the colour combinations.

A bead is a small, coloured, often round piece of plastic, wood, glass, etc. with a holethrough it. It is usually put on a string with a lot of others to make jewellery. Beadmaking is the art or craft of making beads from glass, woods, plastics etc. A beadmaker is a person who makes beads.

Fig 1.1. 12mm bead grab bags.

CHAPTER TWO

2.1 MATERIALS NEEDED IN BEADMAKING

Modern mass-produced beads are generally shaped by carving or casting, depending on the material and desired effect. In some cases, more specialized metalworking or glassworking techniques may be employed, or a combination of multiple techniques and materials may be used. The following are some materials and tools used in bead carving or casting:

- Granite Stone

The granite stone is used to grind or break glasses into smaller pieces

- Metal Pestle

The pestle is used to pound the broken glasses into fine powder inside a mortar.

- Mortar

The medium within which broken glasses are pounded.

- Clay Moulds

The hollow cavity of desired shapes within which pounded glasses or bead materials are heated to form intricate bead shapes.

- Cassava Leaf Stalks

They are inserted into cavities of the mould.

- Sieves

Sieves are used to separate glass powder from glass pieces after pounding.

- Bamboo or Metal for Spatula (Both Long & Short)

The spatula is used to hold the mould

- Metal Spindles

Spindles are used to hold the mould from the kiln after heating

- Firewood Kiln

The firewood kiln fires the mould and heats it.

- Stone Platform
- Glass Bottles (for glass beads)
- Ceramic dye

Ceramic dyes are added to glass powder for coloring.

Fig 2.1. Bead mold with powdered glass been heated in a firewood kiln.

CHAPTER THREE

3.1 PROCESSES INVOLVED IN BEADMAKING

Beadmaking involves different processes depending on the bead material used and the desired bead to be produced. Wood used as bead material is carved with tools into desired shapes. The following are some processes in beadmaking when glass is used as the bead material :

3.1.1 MAKING CLEAR/TRANSLUCENT BEADS

1. Glass is broken into small pieces by using a granite stone.
2. The glass pieces are then sieved in order to remove any remaining glass powder from the pieces.
3. Pieces are then scooped and poured over the moulds, filling the holes.
4. The kiln is heated at a high temperature.
5. Using a long, metal spatula, the molds are placed into the kiln.
6. The moulds are then left in the kiln for 30-45 minutes for the glass to melt into molten mass.
7. After firing, the moulds are removed one at a time from the kiln.
8. Two small metal spindles are used to hold down the mould.
9. Another metal spindle is used to pierce the center of the bead.
10. The bead is then moved around in the mould to shape the bottom of the bead.
11. After all the beads have been shaped, they are left for an hour to cool.
12. Sand and water are added onto a sandstone with the beads.
13. They are then rubbed until the beads are polished to a smooth finish.
14. The sand is washed off the beads and dried.

Fig 3.1. Different bead types.

3.1.2 MAKING POWDERED BEADS

1. Glass bottles are broken into smaller pieces by hitting them against a granite stone and then transferred into a mortar where they will be pounded into a fine powder by a pestle.
2. Ceramic dye is then added to the glass powder for coloring and then transferred into the moulds.
3. A piece of cassava leaf stalk is inserted into each hole of the mould and the surface is smoothed out with a spatula.
4. Colored powdered is layered in the moulds to achieve different designs and then fired in the kiln at a low temperature for 5-10 minutes.
5. At the end of the firing, cassava leaf stalks will be burnt away, leaving a hole in the center of the bead which will be used for shaping.
6. Using two metal spindles, one holds down the mould and the other is inserted in the bead hole to shape the ends of the hot beads.
7. The beads are left to cool and then polished.

3.1.3 MAKING PAINTED GLASS BEADS

1. The beginning process is the same as that of the powder and clear glass beads.
2. Once the beads have been made and let to cool down they are ready to be glazed and painted.
3. A mixture of plain glass powder and ceramic dye are mixed together to create a glaze.
4. This glaze/paste allows the bead maker to make designs using the colored paste they've created.
5. A small pin or needle is then used to draw designs on each bead.
6. After the designs have been painted on they are left to dry for approx. 15 minutes.
7. Certain moulds that have been coated with kaolin (white clay) are used to hold the designed beads.
8. The moulds are placed in the kiln at a low temperature and left until the design is able to melt and stick effectively to the bead.
9. The moulds are taken out of the kiln, left to cool for an hour, then the bead maker removes the painted beads and polishes them to a smooth finish.

3.1.4 MAKING SEED BEADS

1. First, glass is broken into smaller pieces until they produce a distinct, glass powder.
2. The main difference in making the seed beads is the size of the moulds being used. The moulds used for seed beads have very small depressions. Much smaller than the rest of the moulds. This allows the beads to come out in a nice, tiny shape.
3. Glass powder is poured into the tiny holes of the mould and inserted into the kiln.
4. After about 45 minutes, the powder is melted into the shape of the seed bead.
5. Each bead is then shaped by using a metal spindle to create a hole in the center of the bead, allowing the bead maker to move the bead around to even the shape all around.
6. The beads cool down and then are polished.

CHAPTER FOUR

4.1 SCIENTIFIC CONCEPTS INVOLVED IN BEADMAKING

Beadmaking involves several scientific concepts that are crucial for creating beautiful and intricate beads. Here are some key scientific principles involved in beadmaking:

1. Materials Chemistry: Beadmaking materials like glass is made from a mixture of silica (sand), soda ash, and limestone, along with various metal oxides to impart color. Understanding the chemical composition of these materials and how different elements interact during the melting and cooling process is essential for achieving desired colors, transparency, and durability in beads.

2. Heat Transfer: Beads are made by heating materials like glass rods or sheets until they become molten and then shaping them using molds. Knowledge of heat transfer principles is important for controlling the temperature of the these materials to prevent cracking, ensure even heating, and achieve the desired shape and texture in the finished bead.

3. Thermal Expansion: Glass, woods, plastics or beadmaking materials have a unique property of expanding when heated and contracting when cooled. Understanding the thermal expansion characteristics of the materials is crucial for preventing stress fractures or breakage during the heating and cooling process in bead making.

4. Annealing: Annealing is a process of slowly cooling glass beads to relieve internal stresses and increase their strength and durability. Scientific principles related to annealing, such as controlling cooling rates and temperatures, are essential for producing high-quality beads that are less likely to break or shatter.

5. Viscosity: The viscosity of molten materials affects how it flows and shapes during bead making. Understanding the relationship between temperature, composition, and viscosity of these materials is important for controlling the flow of the molten form, creating intricate designs, and achieving desired textures in beads.

6. Surface Tension: Surface tension plays a role in shaping and forming beads, as it influences how the molten form behaves when manipulated with tools or molds. Understanding surface tension principles can help in creating smooth surfaces, intricate patterns, and uniform shapes in beads.

CHAPTER FIVE

ADVANTAGES AND LIMITATIONS IN BEADMAKING

5.1. ADVANTAGES

- Beadmaking is an artwork that provides skill to the society.
- It also provides a simple process to produce jewelry parts.
- Most bead makers work with local recycling companies to help reduce waste. An example is the use of broken glasses or failed plastics as raw materials in beadmaking from companies.
- Also, most bead makers use less power consumption than other manufacturing options.

5.2. LIMITATIONS

- Health risks
  Exposure to metals and chemicals can pose serious health risks to bead makers.
- Environmental impact
  The use of old ways or machines like the firewood kiln pose a threat to the ecosystem like the emission of carbon monoxide to deplete the ozone layer.
- Time-Intensive
  Beadmaking can be time-consuming, particularly for intricate designs or custom pieces, which may result in longer production times.

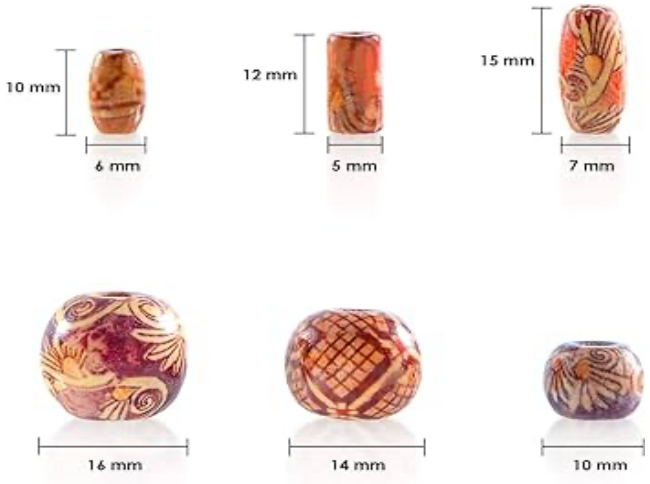

Fig. 5.1. Some sizes of wooden beads.

CHAPTER SIX

IMPROVEMENT METHODS

Beadmaking can be improved in several ways, including:

1. Skill development: Beadmakers can improve their craft by continuously developing their skills through practice and learning new techniques. This can involve attending workshops, classes, or seeking mentorship from experienced goldsmiths.

2. Use of technology: Incorporating modern tools and technology into beadmaking can improve efficiency and precision.

3. Quality of materials: Using high-quality raw materials with specific properties can improve the overall quality and durability of the finished products.

4. Design innovation: Bead makers can improve their craft by staying updated with current trends and developing innovative designs that appeal to contemporary tastes.

5. Sustainability: Implementing sustainable practices in beadmaking, such as using recycled glasses, can improve the environmental impact of the industry.

6. Customer feedback: Listening to customer feedback and incorporating their suggestions can help beadmakers improve their products and services to better meet the needs of their customers.

Fig. 6.1. Wooden beads under carving.

CHAPTER SEVEN

CONCLUSION

In conclusion, beadmaking is an ancient craftwork that continue to thrive in the modern world. The art of working with bead materials like wood , glass etc requires skill, creativity, and a deep understanding of materials and techniques. As with any craft, there are always opportunities for improvement and innovation. By focusing on skill development, incorporating modern technology, using high-quality materials, embracing design innovation, promoting sustainability, and listening to customer feedback, bead makers can continue to elevate their craft and meet the evolving demands of the market. With dedication to these principles, the art of beadmaking will continue to flourish for generations to come.

REFERENCES

1. https://globalmamas.org/handcrafting/beads/beadmakingtools/
2. https://globalmamas.org/handcrafting/beads/beadproduction/
3. https://www.fredaldous.co.uk/blogs/news/a-short-history-of-beads
4. https://www.wikihow.com/Make-Wooden-Beads
5. https://en.m.wikipedia.org/wiki/Bead