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'PAA GRANT' OUTDOOR CONCRETE SCULPTURE AS CONSERVATION OF CULTURAL HERITAGE: A SCULPTOR-CONSERVATOR-RESTORER APPROACH

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Abstract

The study explores the deteriorating condition of 'Paa Grant' outdoor concrete sculpture and provides a sculptor-conservator-restorer approach in handling the artwork by justifying the need for restoring the defects that have been ignored endlessly since its production. In this study, descriptive and studio-based methods constituted the form of mixed methods research design used. The unstructured interview and direct observation were the instrumentations used for the data collection. Data was analysed using descriptive and document review analysis tools. It was revealed that the 'Paa Grant' outdoor concrete sculpture had defects such as cracks and broken offs that caused spalling, delamination, corrosion of metals due to the prevalence of exposure to weathering conditions. The enhancement of restoration methods further boosted the concrete sculpture from further deteriorating. The maintenance culture of conservation and restoration practices on public sculptures in Ghana and beyond should be encouraged to establish any fault and forestall further deterioration.

Keywords*: Conservation; Defects; Outdoor concrete sculpture; Paa Grant; Restoration; Studio practice*

Introduction

Outdoor sculpture is an important part of the landscape setting that becomes the public culture of peace and interaction. Since the highlight of the inner-city landscape setting, outdoor sculptures have multiple functional values. As divided into spiritual and practical functions, the sculptures may symbolise the national culture, enhance the urban cultural and inventive style and beautify the setting with their leisure and recreation functions. Outdoor sculptures are part of cultural heritage that require to be preserved and improved [1]. The belief that conservation of cultural heritage is thought to be a defined field of study that was developed in Germany in 1888 by Friedrich Rathgen, who became the principal chemist at 'Koniglichen Museen', Berlin (Royal Museums of Berlin). Rathgen developed a scientific approach to the caring of the artworks within the museums. The scientific approach was further developed into a handbook of conservation in the year 1898 [2].

The Renaissance contributed to the enjoyment of beauty as a special quality resulting in the notion of work of art and to the new appreciation of aesthetic qualities in objects or buildings [3]. From this perspective, there was a rise of interest in ancient monuments or sites for historical and aesthetic values. This interest led to orders by authorities, rulers, like the

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Antiquities Ordinance by the King of Sweden in 1666 and step by step increased to the trendy legal protection and state administration within the nineteenth and early twentieth century [4].

Reacting to these assertions, the majority of these outdoor sculptures were produced from concrete. Equally, Ghana has outdoor concrete sculptures that are part of the integral landscape setting. An example is Takoradi. Outdoor concrete sculptures in Takoradi can be traced far back to 1954, before the independence of Ghana in 1957 (B.S. Keelson, Personal communication, June 11, 2019). In this regard, there are many outdoor concrete sculptures in Takoradi, such as the three-bust of Kwame Nkrumah at the Airport Roundabout, Lion Dens at Zenith hotel, the Unknown Soldier at Harbour View, 'Paa Grant' sculpture near Monkey Hill-New Takoradi Roundabout and other institutional outdoor concrete sculptures at vantage points within the Metropolis. The production of these outdoor sculptures was concerned with the designing, modelling, casting, painting and decoration of the finished works. The majority of contemporary artworks were created between the periods of 1954 to 2017. In heritage context, artworks that hold the key to Ghana's struggle for independence are the 'Paa Grant' outdoor sculpture and the three-bust of Kwame Nkrumah in Takoradi, Ghana.

The historical significance of 'Paa Grant' outdoor concrete sculpture reflects the environmental prettification and boosts the cultural heritage among the people of New Takoradi, Ghana. The outdoor concrete sculpture was produced in 2017 as a tribute to Paa Grant. He was a political activist, a founder and the first President of the United Gold Coast Convention (UGCC) in 1947. The outdoor concrete sculpture, significantly, is a life-sized and monumental sacred sculpture that immortalizes the philosophical resonance of George Alfred Grant (1878-1956), popularly known as 'Paa Grant' as a merchant and politician in the then Gold Coast in 1947, now Ghana. Paa Grant, who hailed from Takoradi, emerged as a formidable public figure in Ghana's political landscape. Grant's exposure and his influence as a bankroller for the struggle for independence in Ghana had gained recognition. The Sekondi-Takoradi Metropolis Assembly (STMA) recognized his efforts through the National and Regional developments. The Assembly granted a contract to the Director of Centre for National Culture, Sekondi. As in accordance to creating an outdoor concrete sculpture of Paa Grant to be placed at New Takoradi Roundabout, Western region of Ghana. After the construction, the artwork was mounted near the coastal settings of New Takoradi. Notwithstanding this fact, environmental conditions play a role in the conservation of outdoor sculptures.

After its inception, the sculpture has not been maintained since it has deteriorated in dry and saline weathering conditions. This situation calls for much attention to the restoration prerequisites of conserving the outdoor concrete sculpture for posterity. The outdoor sculptures displayed or exhibited in exterior environments are exposed to numerous threats resulting in their ultimate deterioration [5]. Artworks, of such nature, should be preserved a minimum of each two years particularly those among salty settings. Due to the long-absent conservation methods for preserving Paa Grant sculpture, it has deteriorated gradually to the prevalence of weather conditions.

Some scholarly research in Ghana have reviewed concrete and cement sculptures such as concrete murals and their surface for a chromatic painting [6]. Also, cement in artistic medium [7], whilst there has been a write up on sculpture in concrete techniques and processes [8]. The study, however, argues that these scholarly investigations were silent on conservation and restoration methods on outdoor concrete sculptures. These research, however, celebrate the creation of cement sculptures without attention being paid to the conservation and restoration methods of these artworks. Regarding this statement, the academic views on concrete and cement sculptures are very important in cultural heritage value and protective for future generations. However, none of these scholarly contributions made an impact on the conservation and restoration of outdoor cement or concrete sculptures. Therefore, the study explores the deteriorating condition of 'Paa Grant' outdoor concrete sculpture and provides a

sculptor-conservator-restorer approach in handling the artwork by justifying the need for restoring the defects that have been ignored endlessly since its production.

Theoretical framework

The study adopted Brandi's (1977) Theory of Restoration. The theory was founded by Italian theorist and renovator Cesare Brandi within the year 1977. In this study, Brandi's Theory of Restoration is useful in emphasizing two key philosophies by what is seen as the backbone of the theory. Firstly, the material form of the work of art is to be preserved. Therefore, the theory indicates that the physicality of works must not be compromised. Secondly, conservation and restoration should be applied to modify the potential unity of the art pieces. The foundation of this theory is authenticity/integrity. Brandi's Theory of Restoration ensures the honesty of the inner and unity of preserved objects. It guards the structural quality of the conservation, quality of information supply and documentary proof, establishing useful integrity to avoid decrease, dodging of replication to boost the visual quality of the preserved object, social context and living tradition.

Using the theory of restoration best matches the sculptor-conservator-restorer approach to Paa Grant outdoor concrete sculpture. This theory was vital in the study's direction towards assessing and restoring the structure of Paa Grant outdoor concrete sculpture at New Takoradi-Roundabout. In an actual sense, the artwork is object-based that relies on Brandi's theory in artistic and scientific positivism. It serves as conveyors of truth that must not be falsified. The theory is the reversibility of restoration associated with respect for the history of artwork is incredibly vital. In this case, the professional experience and initial principle of restoration prerequisites formed the theoretical basis for the study.

Experimental part

Materials and Tools

In achieving the objectives of this study, materials and tools were comprised of spatulas made of metal, cutlery of spoons and knives, plier, scraper, sieve mesh, sand, cement, iron rods, wire brush, chicken mesh, abrasive paper, enamel paint and brushes.

Techniques

The study employed cleaning, reinforcing and direct modelling of restoration to suit the outdoor concrete sculpture of Paa Grant. The technique of cleaning was employed to cleanse the surface of the artwork from dirt. The technique of direct modelling was employed to fill the cracks and the broken-off portions of the sculpture. Reflecting on the outdoor concrete sculpture points to the fact that concrete as adaptable material can be used for an artwork in the context of utilitarian, ornamental, and monumental structures [9]. The composition of outdoor concrete sculpture was composed of sand, gravel, and cement. These components underwent a reaction and hardened once the water was added. Also, the technique of reinforcement was chosen to add endurance to the structural concrete components [10]. The employment of reinforcing the artwork contributed considerably to the size of the work structure created with concrete [11].

Procedures

Data collected informed the sculptors to use the studio-based method in a systematic approach to conserving the restoration prerequisites of the sculpture. The study was informed by the inconsistent maintenance culture of Paa Grant outdoor concrete sculpture. Regular maintenance does not require an extensive investment of time. But it is a great benefit for the Paa Grant outdoor sculpture to be restored. Conservation done at least annually can mitigate the dangers of outdoor concrete sculpture on display and help detect damage in its early stages. This assertion supports the annual assessment of outdoor sculpture that allows for early action

to be taken to prevent catastrophic deterioration and the need for extensive and expensive conservation treatment [12].

Methods

The study used mixed methods, research design preponderantly under the qualitative research approach [13-17]. The mixed-method research designs were used for the study where descriptive and studio-based methods were employed. Descriptive research assisted in discussing the deteriorating conditions of Paa Grant outdoor concrete sculpture with appropriate characteristics, trends and categories of conservation methods [18]. In addition, the studio-based methods focused on the artistic techniques and procedures of restoring the outdoor concrete sculpture [19-21].

The unstructured interview and direct observation were the instrumentations used for the data collection. Data was solicited from respondents on the conditions of the Paa Grant outdoor concrete sculpture located at New Takoradi, with the direct interview using a face-to-face approach [14, 22-24]. This data instrument helped to achieve an in-depth condition assessment regarding conservation problems and the extent of deterioration of the sculpture at the location [25]. The ethical consideration was considered regarding the moral and reproduction rights before embarking on the studio processes. This consent was sought from the Sekondi Takoradi Municipal Assembly for the restoration processes. Direct observation was made on the sculpture as site-specificity concerning the environment. Studio-based methods on techniques and procedures for restoring the outdoor concrete sculpture of Paa Grant were done at the site.

Data was analysed using descriptive and document analysis tools. The state of the sculpture and restoration processes were described through the undertaken of the sculptor-conservator-restorer approach. This approach was a key factor in the restoration processes. Documents analysis included official records, newspapers, reports, and letters of published and unpublished documents. Documents used were data containing the artist who produced the work, the kind of artwork produced, materials from which the artwork was made, the year it had been created [17, 22, 23]. With document analysis, it was used to review the archival data on the artwork. These analysis tools helped to identify, describe and document all the data needed on the conservation and preservation practices on outdoor concrete sculpture [26].

Results and discussion

Environmental and Physical condition assessments on the 'Paa Grant' outdoor concrete sculpture

From Table 1, the assessment of environmental and physical conditions was done through the visual survey and inspection openings. The sculpture was assessed through the condition of effects of saline weathering causing deterioration. Determining the causes of deterioration, developing conservation is also central to the repair plans on heritage [27, 28]. In effect, the significance of this concrete structure includes its architectural or engineering design, materials and construction techniques, which both guided the decision making on restoration for conserving the sculpture [29].

The outdoor concrete sculpture is located at the New Takoradi roundabout around the Monkey Hill Sanctuary. The surrounding conditions of the outdoor concrete sculpture have been challenged due to the saline weathering condition of the sea. It is a three-minute drive and 1.4 kilometres from the roundabout where the sculpture is located to the sea. Unlike many works of cultural heritage, outdoor artworks are not exhibited in a controlled environment, where temperature and relative humidity are closely monitored. Though works may be more easily preserved in a controlled environment, they are installed outside to preserve the artist's intent and avoid decontextualization [30].

It was witnessed that outdoor concrete sculpture had been exposed to many and various environmental factors depending upon its geographic or site location and its configuration due

to the sea [31]. Other environmental threats found were acid rain and fluctuations in temperature and relative humidity. The excessive rain and moisture caused the mould growth and dirt on the sculpture.

Table 1. Environmental and Physical condition assessments on 'Paa Grant' outdoor concrete sculpture

Name of Sculpture: Paa Grant Location: New Takoradi Roundabout: Takoradi–Western Region, Ghana. Areas assessed: 1. Materials; 2. Methods; 3. Human activities; 4. Environment; 5. Animal; 6. Benefits			Checklist No: Type of Sculpture: Outdoor Concrete Sculpture Date inspected by Sculptors/Practitioners: 26th March 2019
S/No.	***Areas***	***Description***	***Observations of defects***
1.	Material used	Cement, Sand, Stones, Water (H2O), Iron rods, Wire mesh	- Broken off of concrete portions. - Corrosion of reinforcing steel in concrete resulting in expansion that creates tensile stresses in the concrete sculpture, which eventually cause cracking, delamination, and spalling. - Concrete scaling causing fading, flaking and peeling of paint on the Sculpture. - Wasp's nest on the sculpture.
2.	Method of Production	Modelling and Casting	
3.	Human activities	Vandalism of sculpture by posting of posters on the sculpture for advertisement	
4.	Environment	Humidity, Acid Rain, Dust, Salt	
5.	Animals	Bird's dropping, Cattle grazing	
6.	Benefits of the Sculpture	Beautification, Preservation of heritage, Socio-economic, Political, Cultural significance	

There was no proper documentation by the original artist on the production process before the sculpture was mounted at the site. Reviewing some technical assessments on the outdoor concrete sculpture were challenged. As a result, a vital assessment of the composition of concrete and its formation was a problem. It was difficult to know the mixture of aggregate by the artist and locate the reinforcing metals in the sculpture. In that effect, the physical condition of the artwork has to be examined through a close-up investigation of modes of deterioration shown in Figures 1-4.

Again, the study revealed that the sculpture has defects of broken off of concrete portions; corrosion of reinforcing steel in concrete resulting in an expansion that creates tensile stresses in the concrete sculpture. This situation eventually causes cracks, delamination and spalling, concrete scaling causes fading, flaking and peeling of paint on the sculpture. The wasp holes or nests on the sculpture cause defects to the surface by destroying the paint finish of the work. It was observed that these defects on the sculpture were signs of flaws where iron rods for the reinforcement of the artwork were exposed to an exceedingly saline setting of New Takoradi. This observation points to the fact that concrete works with metal reinforcement near saline areas tend to deteriorate. It was believed that the size of metals or wire mesh for an outdoor concrete sculpture to be half-inch that may bond effectively with mortar [26]. This observation is contrary to the Paa Grant sculpture at New Takoradi. In the assessment, the artist had used a one-inch wire mesh for the artwork. This material has big holes in it and could not bond with mortar properly at the tip of the sculpture's jacket. The metal used at the tip of the jacket was one inch, which was bigger for such an area. This situation affirms the preservation ethics of poor craftsmanship. The exposed metals have led to spalling of the outdoor concrete sculpture [32, 33].

It was revealed that the severe concrete scaling with cracking of the sculpture was a lack of correct maintenance on the sculpture that had contributed to the water-related deterioration of the outdoor concrete work. The scaling was detected with the result of silt content analysis testing. It was found out that, the sculpture has been saturated with water and so exposed to

harsh climatic conditions of the study area. Since the water within the concrete had frozen, it had expanded and exerted forces on the seam lines on the concrete sculpture. Continual freezing and thawing have resulted in the concrete sculpture cracking and delaminating. Immediately, the faults on the concrete structures were treated to avert complete deterioration that can erode the gains of the cultural heritage of the people of Sekondi-Takoradi. In the case of voids, the concrete sculpture was poorly consolidated throughout its cement casting process [34, 35].

Fig. 1. Fading and pealing of paint on the sculpture

Fig. 2. Wasp holes on the sculpture

Fig. 3. Breakages on the fingers of the sculpture

Fig. 4. Break offs on the pedestal of the sculpture

Non-destructive test method

A review was done on non-destructive testing methods such as silt content analysis testing as shown in Table 2 and Figure 5.

The testing was done to categorize the deterioration as ascertained within the concrete sculpture of Paa Grant because of saline weathering conditions. The weathering such as wind, rain, sun, frost for atmospheric condition, pollution within the atmosphere reacting with the type of sand used for the sculpture constituted the major factors inflicting the decay and the deterioration. This had resulted from a characteristic sign of failure within the concrete sculpture of Paa Grant included cracking, spalling, staining and deflection. This statement confirms the issue where every heritage must have regular check-ups just as human beings go

for medical check-ups [36]. This development has daunting effects on the aesthetics and health of the sculpture. This development is of significant concern to the lifespan of the sculpture since it is a cultural heritage [37, 38]. This testing led to identifying areas with severe delamination. This approach was in line with the fact that any conservation carried out on a heritage must at all costs have condition assessment done to identify the real cause of the problem [36].

Table 2. Results from the Silt Content Analysis Test

Pit Sand	River sand	Quarry Sand	Sea Sand
Total = 195	Total = 170	Total = 245	Totaal = 165
Sand = 150	Sand = 160	Sand = 215	Sand = 160
Silt = 45	Silt = 10	Silt = 30	Silt = 5
23.1%	**5.9%**	**12.3%**	**3.0%**

The calculation of the Pit Sand
45 divided by 195 multiply by 100% = 23.1%
The calculation of the Rriver sand
10 divided by 170 multiply by 100% = 5.9%
The calculation of the Quarry sand
30 divided by 245 multiply by 100% = 12.3%
The calculation of the Sea Sand
5 divided by 165 multiply by 100% = 3.0%

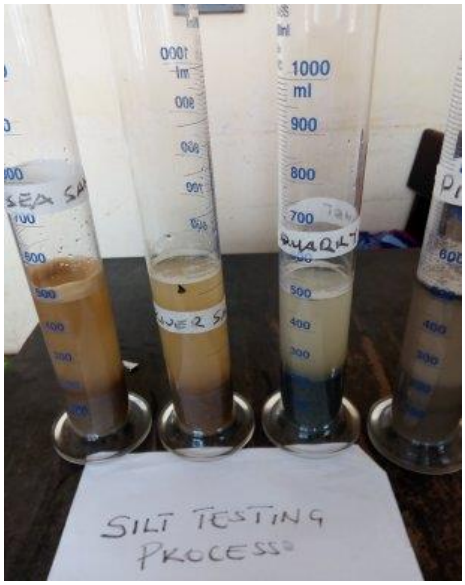

Fig. 5. Silt content test

Surface preparation of the sculpture

It was witnessed from the study that materials and craftsmanship employed in constructing the Paa Grant outdoor sculpture were also a problem. For example, the aggregate consisted of clinker from burned coal or crushed brick. This concrete has tended to be weak and porous because these aggregates have absorbed water during the conservation testing. These aggregates were very vulnerable to deterioration because the sculpture was exposed to wetness as well as cyclic freezing and thawing. The 'Paa Grant' outdoor concrete sculpture had been compromised by the inclusion of breeze and beach sand that was found at the coastal belt.

Sodium chloride found in the breeze and beach sand contributed to the rate of corrosion of the reinforced metals in the outdoor concrete sculpture. This statement gives credence to an understanding of the original construction techniques used by the artist. This practice helps to cement characteristics and mixtures used in the previous repair work. This assessment of the concrete was important in determining the causes of existing deterioration and the susceptibility of the structure to potential other types of deterioration [1].

In a careful selection of materials for restoring the sculpture, a comparison of the old and new concrete materials in terms of size, colour and texture was done to ensure proper conservation. The aggregate of cement was considered in the repair of the concrete sculpture. The properties of concrete materials in terms of durability and resistance to deterioration were considered. In this case, a mixture of cement was used relative to the old concrete surface of the work.

In undertaking the surface preparation for the outdoor concrete sculpture (Paa Grant), was taken care to provide an appropriate substrate for the repair. The practice was done to ensure the enhancement and fine details of the sculpture. Surface preparation began with cleaning the dirt from the surface and removing broken- portions of concrete with a hammer, plier and wire brush. Paint peels off was removed by scraper and sandpaper to establish the degree of the repair. It was then followed by cutting the border of the broken-off areas. The affected area was extended beyond to provide a better bonding and solidifying with the existing concrete. The outdoor concrete sculpture (Paa Grant) was cleansed to get rid of powder substances and dirt. However, it is believed that the implementation of a maintenance strategy for the sculpture is the most effective way to help shield the artwork from deteriorating. Again, the defects such as cracking and delamination of metal caused by corrosion were removed for proper restoration. The nylon bristle brush was used to remove the excessive and expose cement paste. A half-inch wire mesh was used to create a variable surface to match the original concrete as shown in Figure 6.

Fig. 6. Retouching the broken-off portions on the sculpture

Finishing the outdoor concrete sculpture with cement mixture (penetrating sealants) and enamel paint

It was clear from the sculptor-conservator-restorer approach that the studio-based method could revive the old outdoor concrete sculpture with either written or no written records on the artwork left deteriorating in the environment. In the case of Paa Grant outdoor concrete sculpture, the artwork was symbolic of the Sekondi-Takoradi's cultural heritage of the past, the present generation and the posterity to come. However, the old sculpture had no written

document for scholarly discussion concerning its conservation and restoration. The study did not find any documentation regarding the material ratio used in the production and surface coating with its intended appearance. In the preparation stage of physical condition assessment, the formation of new materials was used as adequate ageing of mock-ups for matching to the original concrete. This situation attests to the principles on conservation of cultural heritage that there must be a written record relating to its related documentation [39-41]. With conservation principles, three primary approaches were considered for the outdoor concrete structure. These approaches comprised of maintenance, repair and replacement [9]. However, the sculpture was severely deteriorated and had inherent problems with the material leading to cracks and delamination [42]. In the context of restoring Paa Grant outdoor concrete sculpture, the sculptor-conservator-restorer with maintenance, repair and replacement approaches were applied because the sculpture needed maximum interventions.

Figure 7 illustrates how the active cracks were filled with cement mixture as penetrating sealants. The detailing of work with sealants required considerable attention. Protection systems such as the application of resin were applied onto the sculpture before the introduction of the patina to protect it. This practice is believed to increase the length of the lifespan of the concrete sculpture.

Fig. 7. Practitioners restoring the sculpture of Paa Grant with cement mixture (penetrating sealants) and enamel paint

Fig. 8. The restored and finished sculpture of Paa Grant

The finishing was done to retain the original form of the restored sculpture with bronze enamel paint, as shown in Figure 8.

Conclusions

Cement and concrete have become prevalent construction materials for construction. They have gained greater recognition as durable materials in Takoradi since the city is very known for cement production called 'GHACEM', meaning Ghana cement. It was a fact that the sculptor-conservator-restorer approach to the 'Paa Grant' outdoor concrete sculpture required a systematic review of restoration methods for solving the deteriorated outdoor concrete sculpture, as well as its material replacement. As evident in the restoring processes of the sculpture, the study considered the Paa Grant outdoor concrete sculpture as a conservation of cultural heritage where measures were taken to extend the lifespan of the sculpture in strengthening the transmission of its significant heritage messages and values the artwork carries. As a signifier to the domain of cultural property in Ghana, the study aimed to maintain the physical and cultural characteristics of the outdoor concrete sculpture to ensure that its value will not be diminished, but it will outlive the limited period. As such, this progression was demonstrated through the restoration techniques with materials employed to extend the lifespan of the outdoor concrete sculpture and regain its conservation for posterity.

Outdoor concrete sculptures in Takoradi and around the coastal belt are prone to fast deterioration due to environmental pressures such as the humidity temperature of the atmosphere and the saline nature of the sea. Therefore, it is recommended that conservation and restoration practices on public sculptures should be encouraged annually to establish any fault and forestall further deterioration. In addition, the approach of Sculptor-Conservator-Restorer should be deployed by artists for conserving and restoring all public outdoor concrete sculptures. This practice should be done frequently to check deteriorated concrete sculptures using the restoration and studio-based methods. The practice of conservation and restoration is one of the key principles of preserving the National Cultural heritage. Conservation of public sculptures saves the cultural heritage and maintains the history by informing the generations about their past and present.

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