

Establishment of Conservation Management System and Application of Cultural Contents for Stone Sculptures in Gyeongbokgung Palace, Korea

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Abstract

The Conservation Management System (CMS) for stone sculptures in Gyeongbokgung Palace (hereafter referred to as the Palace) was developed after three years of surveying and researching on the works, compiling and classifying the research results and creating a database for managing the sculptures effectively and systematically. In addition, the system was constructed considering the prospect of linking with and expanding into other palaces. Along with this, development plans were presented for education and promotion contents that utilize the humanistic study archives. As part of this study, characters were designed by adopting as the subject matter the symbols and meanings of the statues of the 'Seosu' (Auspicious Beasts image) in platform of 'Geunjeongjeon Hall' in the Palace and the draft plans were also produced for the story telling animation that reflects study contents together with the audio tour guide contents that developed the story telling visit to the stone sculptures across the Palace.

Keywords: Conservation, Contents, Stone Sculptures, Storytelling

1. Introduction

The Palace (Gyeongbokgung) is the top-hierarchical royal palace among those from Joseon Dynasty (AD 1392 to 1910) in Korea. And The Palace is symbolically significant, and offers many clues for understanding and analyzing the royal palaces of the country¹. In this study, utilize the cultural contents were presented and the Conservation Management System (hereafter referred to as the CMS) was constructed after three years of humanistic and conservation scientific previous studies all the stone sculptures of the Palace²⁻⁴ (Korea Institute of Cultural Heritage Conservation, 2011; 2012; 2013).

In previous study, a list of 888 stone sculptures was secured through a survey of all the stone sculptures of the Palace. All this, as well as and the creation time and symbolic meaning of various stone sculptures, including the statue of the 'Haechi' were defined. Also, the diverse literary documents concerning the Palace were compiled,

thereby leading to securing diverse basic research data in this regard. In addition, the research outputs were digitalized through broadband 3D scanning by category, the precise measurement and 3D scanning of important stone sculptures, and the measurement of other stone sculptures. The conservation science based survey and research defined the petrologic characteristics of the stone sculptures, evaluated their weathering status and defined the causes of such, and analyzed the production areas of the stones used.

2. Previous Studies

2.1 Literature Studies

A total of 888 stone works were identified in the Palace through the complete enumeration survey. In addition, through the photos taken with the photosensitive plates, the transmission process, locations and weathering

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aspects were determined. In the literature research, the construction techniques were examined with the books of the Palace and the Diary of the construction of the Palace as direct data and all the articles about the Palace and major terminologies regarding the stone works in the Palace were extracted and organized with reference to the government compiling works over 'The True Record of the Joseon Dynasty', 'Ilseongnok', 'Seungjeongwon-ilgi' (Diaries of the Royal Secretariat) and 'Uigwe' (Royal Protocols of the Joseon Dynasty) and 'Deungrock' (Records of the Precedents), 'Jiriji' (books on geographic features) and 'Youseo' (compilation of various books).

Through this, the contents of the stone collection, the 'Bueolganyeok' (temporary government office on a special occasion) and stone mason were confirmed. In addition, a further study was made on the inclination of the 'Bueolganyeok' through this literature research. Furthermore, this study provided data to help understand the construction of the Palace through the survey of 'Sansai Zue', China's representative 'Youseo' and the data concerning the Four Gods and 28 Beast carried by the 25

authentic history books were further studied and their relationship was identified (Figure 1).

Representative stone sculptures showing (A) Haechi of Gwanghwamun, (B) Seosu of Yeongjegyo, (C) Dapdo and Seosu of Geunjeongmun, (D) Hayeopdongjaseok in platform of Geunjeongjeon, (E, F, G, H, I, J) Seosu in platform of 'Geunjeongjeon, (K, L) Seosu of Jibokjae and (M) Pumgyeseok for the study in the Gyeongbokgung Palace.

2.2 Art History and Architectural Studies

In the study on the fine arts history, an estimation was made of the construction time of the stone works and the basic standards for the style chronology were presented with a comparative analysis on the Buddhist sculptures that provide the information on the construction time of the scholar-officials' tombs as well as the sculptures in the royal tombs (Figure 2). In addition, this study made an attempt to review the complex aspects of the representative patterns of the Palace (i.e., patterns of



Figure 1. Representative stone sculptures showing (A) Haechi of Gwanghwamun, (B) Seosu of Yeongjegyo, (C) Dapdo and Seosu of Geunjeongmun, (D) Hayeopdongjaseok in platform of Geunjeongjeon, (E, F, G, H, I, J) Seosu in platform of 'Geunjeongjeon, (K, L) Seosu of Jibokjae and (M) Pumgyeseok for the study in the Gyeongbokgung Palace.

dragon, phoenix, and 'Taegeuk' (Great Ultimate). Along with this, the construction background and the symbolic meaning of the statue of the 'Haechi' (imaginary animal that tells god from evil) in front of 'Gwanghwamun Gate' were determined through a further study and a minute analysis was made in comparison with the stone works in the Chinese royal tombs.

Furthermore, the origin and characteristics of the ballasts were partially determined through the comparison with the relief sculptures from China's Han Dynasty. The chronology of the construction of the Palace was organized, an on-site comparison was made of variety of the reports published since 1955; the hierarchical expression; the chronological characteristics of the stone sculptures in the architectures were classified; and a study was performed to compare the stylobates of Korean and Chinese structures. Through this, the characteristics of the stylobates of the structures in the Palace were clarified while the common denominators and differences with the stone sculptures were also identified at the same time (Figure 2).

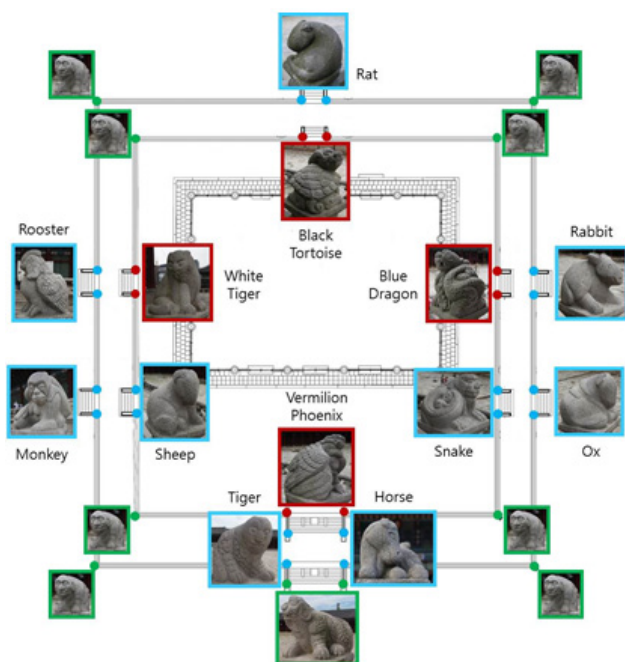


Figure 2. The statues of the Four God (red border), Twelve Zodiac Animal Deities (blue border) and the Auspicious Beasts (green border), in platform of 'Geunjeongjeon' in the Palace.

In addition, a comparison was made of the stylistic characteristics between the stylobate of 'Jeongjeon' (main hall) and that of 'Jibokjae' (Chinese style house), and a review was performed on the area-based arrangement phenomenon and principle of the stone sculptures in the structures in the Palace. These humanistic studies made it possible to carry out an in-depth comparative study on the stone sculptures in the Palace with Ming Dynasty Tombs, Zun hua qing dong ling, Yi xian qing xi ling, and Forbidden City in China through the on-site investigation in terms of literature history, fine arts history, and architecture history.

2.3 Conservation Studies

To perform an actual survey, a broadband 3D scanning was performed by dividing the entire area of the Palace into three parts to write the accurate location of the stone sculptures (Figure 3). As regards the stone works, a total of 58 pieces including 24 pieces of 'Pumgyeseok' (indicating rank government posts) and 20 pieces of 'Daewooseok' in platform of 'Geunjeongjeon' were precisely surveyed and a precise actual survey drawing a total of 159 pieces was drawn up after another 101 pieces of the stone works including of 12 pieces made of the statues of the Four God of a three-dimensional and complex type, the Twelve Zodiac Animal Deities and the statues of the Auspicious Beasts were given a precise 3D scanning. A simple survey was made on the measurement of all the 624 pieces of 'Hayeopdongjaseok' of 'Geunjeongjeon', 'Gyeonhoeru' and 'Jangchoseok' (Figure 3).

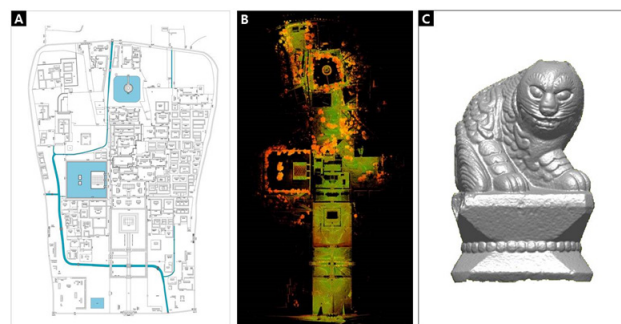


Figure 3. (A) Layout drawing of the Palace, (B) broad 3D scanning and (C) example of precise 3D scanning image of the Tiger statues of the Four God in platform of Geunjeongjeon.

In conservation scientific studies, the site environment of the Palace, the material analysis of the stone works and the distribution of the kinds of the component stone were determined and the production site was interpreted through the material analysis of the rock in terms of the mineralogical and geochemical factors⁵ (Kim et al. 2013). A physical, chemical and biological damage map was completed on the basis of the drawings drawn up through the actual survey (Figure 4). In addition, factors in their weathering were analyzed and a precise diagnosis was made on the 'Pumgyeseok' and the entire area of 'Geunjeongjeon' on which physical damage is concentrated.

3. Result and Discussion

3.1 Cultural Contents Utilization

Through these humanistic and conservation scientific

studies, the status of all the stone works in the Palace were determined and listed and a comprehensive artifact card was created which carries the literature data related to the photos, the locations on GPS, the actual survey data, the characteristics in terms of the history of fine arts and styles, the kinds of the rocks, the preservation status, the weathering grades and the estimated production sites.

The documentation, the database of the management information on the stone works of the Palace was accumulated and the basis for a utilization of the contents and a comprehensive management system was established. As a humanistic study of these stone sculptures, the production of publications, online websites, the utilization of digital contents and the production of broadcast programs were surveyed. Measures for developing educational contents were prepared by making the most of the humanistic research archives.

First, the production of mobile web catalogues (App Book) was presented. The major technologies for the App

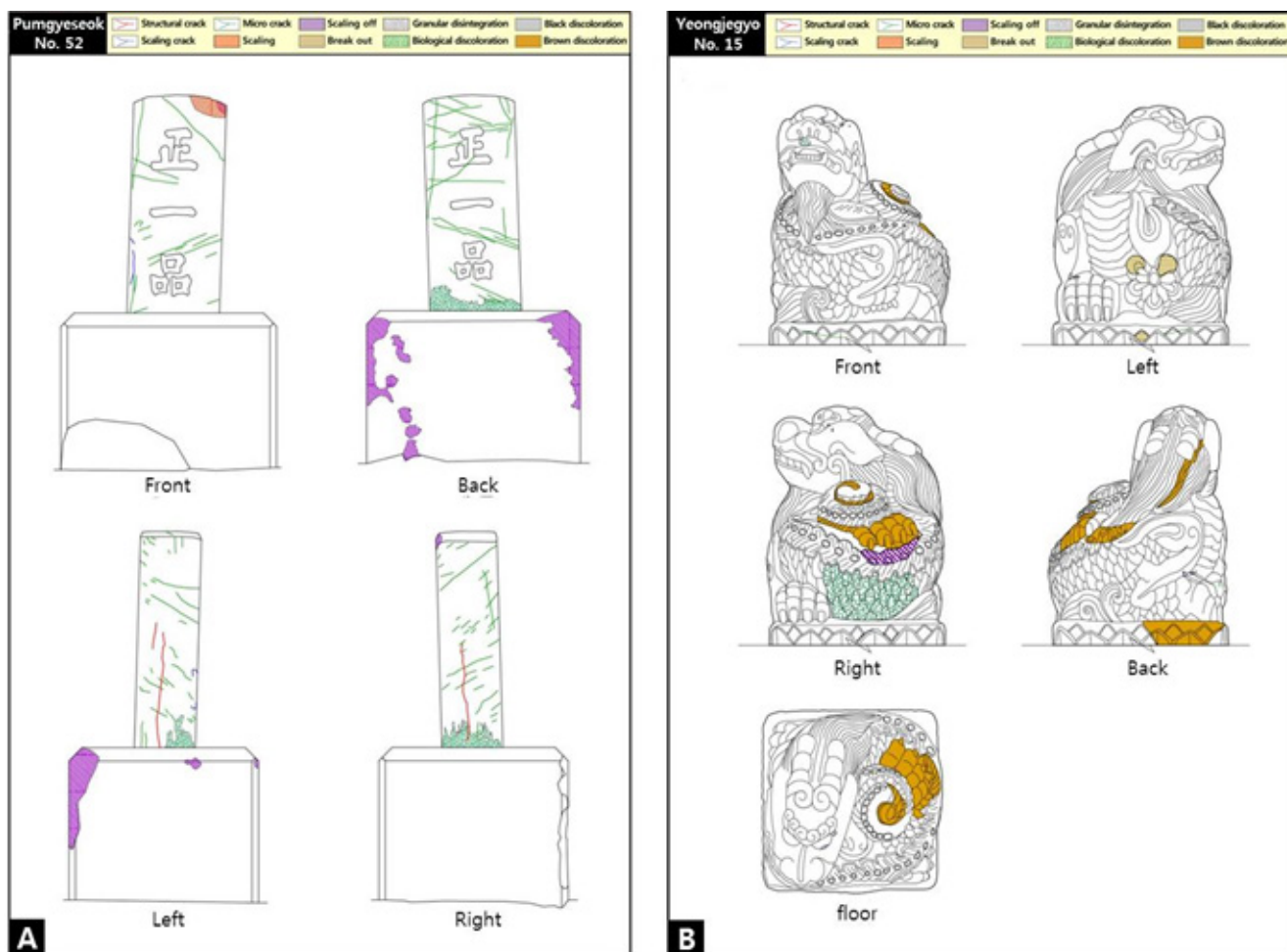


Figure 4. Representative example of weathering damage map of (A) Pumgyeseok, (B) Yeongjegyo stone sculptures in the Palace.

Book included the mobile e-book application technology, the key UI technology, the event animation and sound technology, the key game technology, the gravity sensor, the orientation sensor and the augmented-reality technology.

Second, measures for producing educational websites, targeting PCs and mobile Web, were prepared. This website was crafted to enable the general public and viewers to receive services such as gaining access to the basic information on the Palace stone sculptures, their theme information, storytelling, animation, professional information, shape data and other specialized spatial information. Other than this, this study suggested an educational experience program on the stone works in the Palace.

Third, measures for developing multimedia contents on the Palace's stone sculptures were planned and as part of such initiative, a test storytelling animation was produced. The 3-minute-long test flash animation featured characters based on the symbol and meaning of stone sculptures carved on the platform of 'Geunjeongjeon' in the Palace – on which the humanistic research was focused – along with storytelling based on the research result (Figure 5).



Figure 5. Example showing storytelling animation continuities for stone sculptures in the Palace.

In addition, storytelling courses for the Palace's stone sculptures were developed and their test audio tour guide promotion contents were produced. This test audio tour guide featured a traditional mason's voice providing guidance on the stone sculptures and user-friendly storytelling based on research information (Figure 6). The two types of storytelling products mentioned above were produced and gradual cultural-content development measures were prepared through the study on measures for utilizing cultural contents. Furthermore, task content plans and task order plans for pushing ahead with the

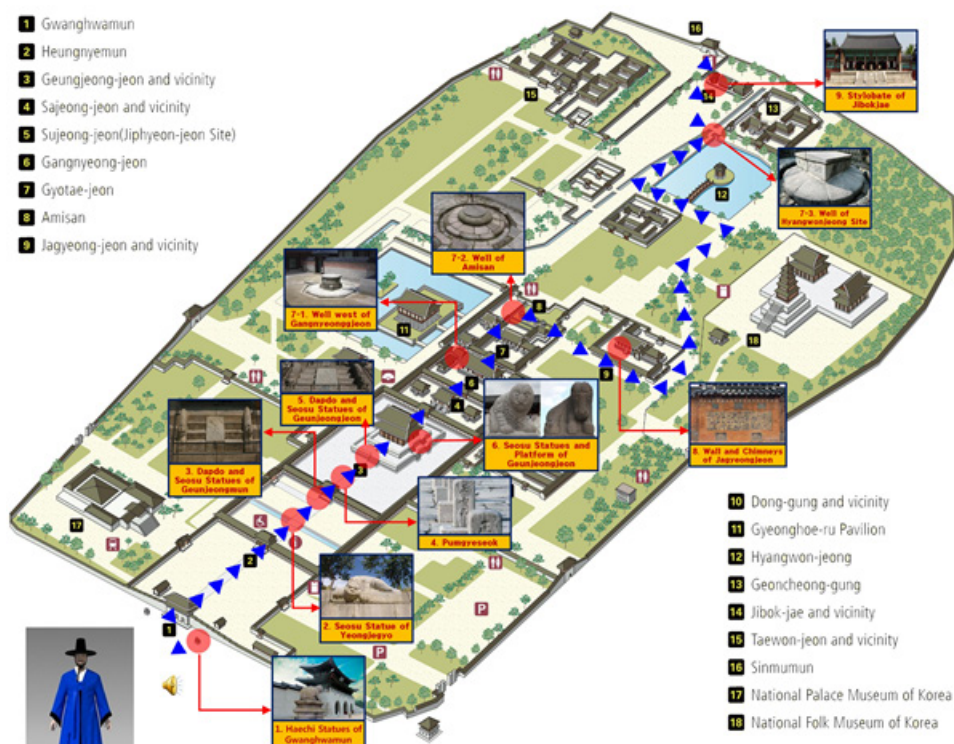


Figure 6. Representative storytelling audio guide on the tour for stone sculptures in the Palace.

project were drawn up by seeking the methods to speed up education, promotion and tourism content development.

3.2 Conservation Management System (CMS)

Within the period of three years, humanistic and conservation scientific research results were complied, classified and documented to construct a database. Based on such information, a conservation management guideline for the systematic management of the Palace's stone sculptures for the working staff was prepared and a Web-based CMS was developed (Figure 7).

The CMS was constructed after preparing content conversion measures to make the contents fit the system format of the management agency, gathering experts' opinions and constructing the system prototype, UI and UX to enable the survey, search and utilization of the database. The program classified all the relics within the Palace, including the stone sculptures, into certain groups and created the code management function designed to integrate the management of the whole place and to consider expanding into other palaces.

In addition, diverse data such as the stone sculptures name, location, characteristics, photos, drawings, 3D images, relevant research papers and conservation activities were put into a database to enable the search and printing thereof. The system was constructed in such a way that it would be possible to check the conservation status and to manage the stone sculptures by period in a bid to ensure the conservation management of the works. Furthermore, the system was developed in such a way

that relevant video and audio files could be uploaded and downloaded, information-updating contents (along with their reasons) could be inputted and managed and operators could be classified by class and could be granted access rights accordingly. All the operation details were specified in the CMS manual.

4. Conclusion

This CMS and the Cultural-content utilization measures can be applied to relics of other shapes and materials and will be instrumental in expanding into other palaces, such as those palace of the Changdeokgung, Changgyeonggung, Gyeonghuigung and Deoksugung. These results are meaningful because they were produced on the basis of the actual survey and conservation scientific studies along with literature research and studies on the fine arts history and architecture history. In addition, this study can be seen as a good case in which accurate information is delivered with the professionalism and systematic implementation process through a vigorous historical investigation. The significance of this study can be found in the fact that it helped the general public understand the cultural heritage of the Palace by using the friendly contents.

The establishment of the conservation management system was made by the person in charge. He documented the proper names, management serial numbers, locations on GPS, actual survey measurements, characteristics in terms of fine arts history, rock types, preservation status, weathering grades, weathering damage maps, relevant



Figure 7. Example of page for the CMS website for stone sculptures in the Palace.

photos and literature data and 3D precise scanning images. In addition, a step-by-step conservation management guideline was provided to make sure that conservation planning and conserving treatment were systematically carried out. It is hoped that this kind of study will provide a valuable opportunity for the specialists in each field to perform a joint research and have a close exchange among them. This may reinvigorate multidisciplinary studies on cultural heritages.

5. Acknowledgement

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