

Are the Processes of Mold Making and Casting

Important to Model Sculpture?

Chaichan Jantasri⁺ (Thailand)

Abstract

The purpose of this research is to study whether the process of mold making and casting are important to model sculpture or not. The results will be used to improve and develop the curricula in Sculpture of Poh-Chang Academy of Arts, Rajamangala Rattanakosin Technology University as well as be disseminated to institutes where Sculpture is taught. The instrument used in data gathering is a questionnaire which comes in two parts; the first part is the interview of sculptural experts for their personal data and the second part asks for opinions of 35 experts in sculpture and sculptural teaching and 35 artists, sculptors, and modelers who do independent jobs in sculptural art. It is found from the research that 77.4 percent of the answerers strongly agree that a good sculptor or modeler should be able to make mold and cast of a sculpture. All agree that the processes of mold making and casting enable the sculptors to control their performances giving their works exquisiteness as well as matching in detail their prototype. If sculptors can mold and cast themselves, they will be able to save time and cost in hiring mold maker and caster to do the jobs for them. Moreover, sculptors are the ones who know well their own works including casting, parts assembling, and texture finishing. Similarly, 70 per cent of the respondents agree that the processes of mold making and casting are most important to sculptural work. The good processes of molding and casting produce sculptural works that match the prototypes, helping to save time and cost, and reduce problems and errors in the completed works. 82.26 per cent also agrees to the highest level that students majoring in Sculpture should be taught and trained in the processes of mold making and casting, all with the similar reason that the knowledge is very useful for their future works.

Keywords: *Mold Making, Casting, Model Sculpture.*

⁺ Chaichan Jantasri, Assistant Professor, Poh-Chang Academy of Arts, Rajamangala University of Technology, Rattankosin, Thailand.

Introduction

In the past, after sculptors had finished their sculpting, they made molds and did the casting of their works themselves. In other words, at that time, sculptor, mold maker, and caster were the same person and his works came out as perfect as they could be with no or few faults. On the contrary, sculptors nowadays concentrate only on their sculpting skill and hardly have the ability of mold making and casting which they disregard as of less importance. Requiring their completed works to be made of stronger and more durable materials such as resin, fiberglass, plaster, cement etc., they would rather hire mold maker and caster to do the jobs for them. As a result, the finished sculptural works can be of poor quality, different from their prototypes, and lacking the exquisite details of their sculptors' efforts. Beside the costs of hiring, errors can also occur to the sculptures with mold makers' and casters' lack of skills in the mold dividing, joints joining and parts assembling, texture decorating, posture positioning etc. The deficient ability of the sculptors nowadays originates from Art academic institutes' curricula which fail to emphasize the study of mold making and casting as tools to complete artworks and as important sculptural art technique. Accordingly, it is necessary in sculpture studies to be corrected and make improvement. Sculptors need to be able to make mold and cast, important processes relating to sculptural work. If sculptors can do the processes of mold making and casting themselves as artists in the past, their completed sculptural works will be as beautiful and faultless as their sculpting prototypes, satisfying the sculptors' wishes. Sculptors can also save the cost on hiring mold maker and caster as well as reduce problems and errors. Realizing the problems concerning sculptures, this research intends to study whether the processes of mold making and casting are important to model sculpture. The results of the research will be used to improve and develop the curricula for major study in sculpture and publicize for further academic study.

Objectives of the Research

- To study whether the processes of mold making and casting are important to model sculpture.
- To examine whether the results of the processes of mold making and casting are important to model sculpture.
- To apply the results of the research to the development of the curricula for major study in Sculpture, Department of Sculpture, Poh-Chang Academy of Arts, Rajamangala Rattanakosin Technology University.
- To publicize the results of the research in academic seminars and journals.

Research Methods

Population and Samples

Concerning the interview process, the interviewee population consisted of 20 sculptural experts with bachelor or higher degrees in sculpture who have worked on sculptures or done sculptural jobs continuously for more than 20 years, well-known or widely accepted in the domestic society of sculptural art. They are, for example, national artists, independent artists, sculptors, sculptural scholars, teachers, lecturers, and retired government officers.

Concerning the questionnaire, respondents were 70 persons divided into 2 groups of 35 persons each. The first group consisted of 35 scholars, teachers, lecturers who have performed sculptural works along with teaching sculptural art in schools, colleges, and universities all over the country with more than 10 years experience and well-recognized in the society of sculptural art.

The second group consisted of 35 independent modelers, sculptors, and artists with bachelor or higher degrees in Art who have performed independent sculptural jobs continuously for more than 10 years.

Instruments Used in the Research

The instrument used in data gathering was a questionnaire with two parts. The first part asked sculptural experts about their personal data: Name, address, education, career, position, name of institution worked, experiences, and past works. The second part asked for opinions both from experts, teachers and from independent artists who do sculptural jobs.

Data Gathering

In this research, the researcher gathered the data from experts, scholars, teachers, lecturers, sculptors, artists, and independent modelers. The 70 answers of the questionnaire were divided into 2 groups of 35 persons. The first group consisted of scholars, teachers, and lecturers working on sculpture along with teachers of sculpture in schools, colleges, and universities all over the country recognized in the sculptural art society and with more than 10 years experience. The second group consisted of 35 independent modelers, sculptors, and independent artists with bachelors or a higher degree who have continuously done sculptural jobs for more than 10 years. Methods used in data gatherings were planned according to the following procedures:

- Contact 70 sculptural experts from all over the country who have qualifications as specified.
- Apply for letters from Poh-Chang Academy of Arts, Rajamangala University Rattanakosin and send them to the expected population and samples to ask for their cooperation in the data gatherings.
- Contact the executives of each institute to ask for their permission to send out the questionnaire to or interview their staffs to gather the data (only in the case that samples are experts, scholars, teachers, and lecturers in government institutes).
- Send out the questionnaire by mail, hire a company to do the turnkey job of data gathering. In some cases the researcher does the data gathering himself.
- The researcher collects all 70 questionnaires. The data were then categorized, analyzed.
- A Summary of the research results was composed.

Data Analysis

Data from the returned questionnaires was analyzed as follows: data categorizing, reporting the results of each question using descriptive writing, and summarizing answers of each sample.

Summary of the Results

It was found that all the 70 experts, scholars, teachers, lecturers, sculptors, artists, and independent modelers had given similar answers to the questionnaire. The researcher then summarized and reported the answers related to each of the following five questions.

Question 1: Do you agree that the good sculptor or modeler should be able to mold and cast the sculpture?

From the group of experts, scholars, teachers, lecturers, sculptors, artists, and independent modelers 77.14 percent strongly agree to the question since sculptural work is closely related to mold making and casting which are the processes that need high techniques, skill, and experiences. Mold making and casting are needed to be learned and understood to avoid in every step obstacles in the process of sculpture creation. Sculptors with ability to mold and cast can complete their works by themselves and can accurately control their plan, time, materials, tools, and costs of their works as well. They can properly plan the time of sculpting, mold making, and casting. Their complete works will answer perfectly to the prototypes as required since every step of the production has been done through the scrutinizing eyes of sculptors themselves who know best where to take special care during the mold making process in order to distinguish the exquisite details of the sculptures' texture including other details of the prototypes. Allocating the entire process to one person can save time and costs involved in finding and hiring a mold maker and caster, allowing sculptors to correct any problem on their works, and produce satisfactory sculptural works that answers perfectly to their prototypes since sculptors can best understand the nature of their works including casting, parts assembling, and texture finishing. Moreover, sculptors can correctly and confidently explain the mold making and casting steps of their works to customers or hirers. They can also use their skills in mold making and casting to earn their living.

Opinion	Disagree	Slightly Agree	Moderately Agree	Strongly Agree
Amount (s)	-	1	15	54
Percentage	-	1.43	21.43	77.14

Figure 1. Shows the numbers and level of agreement by percentage of expert opinions to question 1.

Question 2: Do you think that the processes of mold making and casting are important to model sculpture?

For this second question 70 per cent of them agreed with the highest level that the processes of mold making and casting are important to model sculpture. They feel that after casting, the good sculptural works should precisely match their prototypes. If the sculpting is excellent but the mold making and casting fail, the completed sculptural work may come out defective. Moreover, in sculpting the prototypes, soft materials are normally used, but when it comes to production, the materials are often changed to more durable ones using the processes of mold

making and casting. Therefore, sculptors need to have ability, skills and techniques in mold making and casting to be able to solve problems in the processes from the beginning. Understanding the shapes and structures of their works, sculptors can choose the proper way of mold making which can also reduce time and costs. Since sculpting, mold making, and casting are co-related, sculptors and modelers should learn the processes carefully to help reduce problems and errors during mold making and casting. Left to do the processes themselves, sculptors can take care of every details and produce exquisite works perfectly representing their prototypes.

Opinion	Disagree	Slightly Agree	Moderately Agree	Strongly Agree
Amount (s)	-	3	18	49
Percentage	-	4.29	25.71	70

Figure 2. Shows the numbers and level of agreement by percentage of expert opinions to question 2.

Question 3: Do you think students with sculpture as their major should be taught mold making and casting skills?

In this third question 82.86 per cent of experts, scholars, teachers, lecturers, sculptors, artists, and independent modeler strongly agree to this idea. They think that students majoring in sculpture need to learn skills and techniques of mold making and casting, It is very useful knowledge which they can apply to their works. Understanding the processes of mold making and casting allows students to change the soft materials of their prototypes to those stronger, more durable, and more valuable using the processes and ending up with perfect first-class works. It is suggested that apart from in-class study, the students should be trained to perform the processes of mold making and casting in real factories or foundries, business where personnel with such knowledge and skills are in need and hard to find one nowadays.

Opinion	Disagree	Slightly Agree	Moderately Agree	Strongly Agree
Amount (s)	-	3	18	49
Percentage	-	4.29	25.71	70

Figure 3. Shows the numbers and level of agreement by percentage of expert opinions to question 3.

Question 4: What do you think are the advantages of sculptors with ability to mold and cast?

Opinions on the advantages of sculptors with the ability to mold and cast are as follows:

- Saving costs in hiring mold maker and caster
- Allowing sculptors to precisely calculate time, fees, and costs of materials so that they can submit their appropriate turnkey price to customers
- Allowing sculptors to plan and set their schedules in advance and finish their works on the assigned date; their complete works perfectly beautiful as required

- Allowing sculptors or modelers to select the appropriate materials for their sculptures
- Bringing the sculptures' proportions to accurate correctness or with few errors
- Allowing every step of the performance to be carefully and conveniently checked, redressed, and improved
- With sculptors' understanding of cast removal, allowing the better dividing of molds into proper sections for casting in order to emphasize the sculptures' dominant points and conceal their joint lines, and to assemble the cast models back to positions as identical to their prototypes as can be
- Allowing sculptors on their own to confidently and skillfully explain to and negotiate with customers, creating trust to them.

Question 5: What do you think are the disadvantages of sculptors without ability to mold and cast?

Opinions on the disadvantages of sculptors without the ability to mold and cast are as follows:

- Increasing costs on hiring mold maker and caster
- Possible occurrence of mistakes and inaccuracy compared to their prototypes, and loss or deviations of the sculptures' fineness relating to their proportions, postures, positioning, and shapes of sculptures caused by errors in joint connection
- Sculptors' lack of ability to control and modify the works of mold maker and caster
- Delay performance, damage, or poor quality of sculptures, not as artistically beautiful and durable as sculptors' wishes and as a result, sculptors may find limitation in their creation
- Sculptors cannot thoroughly plan their schedules, estimate and negotiate the proper price in hiring mold maker and caster, control and calculate the cost of materials and tools in mold making and casting, all of which lead to the inability to deliver at the agreed work price
- Sculptors may feel undignified and have no confidence to correctly explain steps in sculptural creation to customers

Results and Discussion

1. It was found from the study "Are the processes of mold making and casting are important to model sculpture?" that 77.14 per cent strongly shared the opinion that a competent sculptor or modeler should have a good command of mold making and casting since the processes are very important to sculpture. The view complies with the academic document of Sanchai Ratananopat (1978:6) which said that an artist who has all abilities of drawing, sculpting, carving, and casting is the luckiest one. Most artists in the past were really capable in these abilities and were referred to as "Sa-ra-phat Chang" (expert of all kinds). Requiring skills, techniques, and experiences, mold making and casting are needed to be learned with complete understanding before one can plan the conforming schedule for sculpting and mold making, and casting and can accurately control the timeline, materials and tools, costs and expenses.

To have abilities to make mold and cast can help reduce mistakes caused by mold maker and caster and lacking of such abilities can be a big disadvantage to the creation of sculptural work and to the sculptors themselves. Similarly, in his interview, Ariya Kitticharoenwiwat (31 January 2013 Interview) said that sculptors without any knowledge, experience and understanding in mold making and casting can cause mistakes or damage their works. Prasert Wannarat (22 January 2013 Interview) explained that casting is a method to conserve sculptural works made with soft perishable and deformable materials. The cast sculptural works can perfectly match their prototypes satisfying their sculptors' wishes only when every steps of the mold making and casting is in the hands and care of their sculptors. Since sculptural works need delicate skill, mold maker and caster should be the same person as the sculptor himself so that he can understand where to take special care in mold making in order to achieve a sculpture that resembles its prototype in every details and he needs not to waste time in finding and hiring mold maker and caster to do the jobs. Moreover, the sculptor is the one who best understands the nature of his work including casting, parts assembling, and texture finishing. To do the processes himself results in a perfect sculpture with satisfying resemblance to the prototype. Komsan Kamsingha (25 April 2013 Interview) talked about the mold making and casting of sculptural works and other figure designs that the processes include pouring a liquid material into a mold which contains a hollow cavity of the desired shape and allows to solidify. Breaking the mold out, a cast sculpture is obtained as desired.

2. It is found from the study "Are the processes of mold making and casting important to model sculpture?" that 70 per cent in the survey think that the processes are most important to model sculpture. They agree that the cast sculptural work can accurately match its prototype only when sculptors have good control of mold making and casting. No matter how well the prototype is sculpted, if its mold making and casting fail, the finished sculpture can then be defect. Prasert Wannarat (22 January 2013 Interview) said that casting is a method to conserve sculptural works that are normally made with soft nondurable and deformable materials. Accordingly, sculptors need to have knowledge, ability, techniques and skills in mold making and casting to achieve the sculptural conservation and to be able to manage any problem concerning the processes which can be prevented from the early steps of designing and structural making. The sculptor is the one who most understand and familiar with his own work, he then knows best what type of mold is most suitable to the shape and structure of his work. Sopit Bhudharak (1 February 2013 Interview) explained that in most of the sculpting, soft and nondurable materials such as clay, plasticine, resin, wax etc. are used. In order to conserve the work or to duplicate it, the nondurable materials are needed to be replaced with strong ones such as plaster, fiberglass, metal, using the processes of mold making and casting. As sculpting is closely related to mold making and casting, sculptors needs to understand and able to do the processes themselves so as to avoid problems and mistakes. The scrupulous attention of sculptors' performances will result in exquisitely subtle works as perfect as their prototypes. Pradub Temdee (21 March 2013. Interview.) also mentioned that a method to con-

serve the prototype sculpture is to change its material into the permanent one. Ariya Kitticharoenwiwat (31 January 2013. Interview.) stated that to work without understanding can err and damage the work.

3. It is found from the study that 82.86 per cent strongly agreed that students majoring in sculpture should be taught the knowledge of sculpture's mold making and casting. All agree that the knowledge is necessary and greatly useful to the students. Enhanced with the knowledge of mold making and casting including its techniques, skills, and experiences, students can effectively perform their sculptural works and can also earn their living through their competence. Students can conserve their sculptural works, altering by their own hands their soft nondurable materials into stronger, more durable, and more valuable ones. Capable to complete all the processes on their own, students can produce good quality and perfect sculptural works. It is suggested that apart from in-class study, the students should be trained to perform the processes of mold making and casting in real factories. Without the study in mold making and casting, experts in the field, needed in great number in factories and foundries, may well be lacking in the future.

4. It is found from the study that the advantages of sculptors or modelers capable of making mold and cast their sculptural works themselves are as follows:

- Saving cost and expense in hiring mold maker and caster
- Allowing sculptors to select materials most suitable to their works
- Reducing errors in the works and casting performance
- Ability to check every steps of the casting performance and allowing convenient correction and improvement of the works
- Allowing sculptors to plan their schedules in advance enabling the sculptural works to be finished on the assigned date and time
- Allowing perfect completion of sculptural works as required
- Allowing the sculptors to accurately calculate costs of tools and materials and fees in order to submit their appropriate turnkey price to customers
- Allowing sculptors on their own to confidently discuss every step of their works with customers, creating trust and assurance

5. It is found from the study that the disadvantages of sculptors or modelers who cannot make mold and cast their sculptural works themselves are as follows:

- Increasing cost and expense in hiring mold maker and caster
- Possible occurrence of mistakes and inaccuracy compared to their prototypes, and loss of details and fineness relating to their texture, proportions, postures, and shapes of sculptures
- Decreases in quality concerning artistic beauty and durability (not conforming to customer's requirements)
- Sculptors' lack of ability to correctly explain steps of sculptural work creation to customer, limiting sculptors' creative ability, preventing them from laying a good work plan and estimating or negotiating their appropriate price since they cannot do all the processes themselves.

Suggestions

1. Suggestions obtained from the study:
 - Courses in mold making and casting should be taught to students majoring in sculpture to enhance their ability, experiences, techniques, skills, and ideas in performances all of which they can widely use.
 - Sculptors, modelers, and students are required to understand and be able to make mold and cast since a good sculptor need to be capable of doing the processes himself so he can control and solve any occurring problem
2. Suggestions for further research:
 - Mold making and casting of local people in various areas should be studied to acquire their unique knowledge, methods, and techniques.
 - Thai original processes of mold making and casting should be studied to rediscover and gather the knowledge, methods, and techniques and conserve them as basic data for further research

Acknowledgements

The researcher would also like to thank with great appreciation towards the supports of the National Research Council of Thailand (NRCT) and the Rajamangala Technology University Rattanakosin who granted the research fund.

References

- Art gallery NSW. n.d. Giacometti : Sculptures, Prints & Drawings from the Moeght Foundation.
- Chaiphrom, Wallop. *Plaster: Art and Invention*. Bangkok: United Books, 1990.
- Chaiphrom, Wallop. *The Creation of Molds for Casting*. Bangkok: Wadsilp, 2007.
- Chanaphan, Kongket. Senior Professional Sculptor. Unpublished Interview by the author. February 19, 2013.
- Currier, Anne. *Sculpture Skulpturen*, 2006.
- Curtis, Penelope. *Sculpture 1900-1945: After Rodin*. Oxford university press, 1999.
- De Vecchi, Pierluigi. *Michelangelo*. Barrie & Jenkins Ltd., 1992.
- Huanmanop, Potsilp. *The Basic Casting Tools*. (Bound academic documents). Bangkok: Poh-Chang Academy of Art, 1978.
- Jantanapalin, Nonthiwat. National Artist in Visual Arts (Sculpture). Unpublished Interview by the author. February 9, 2013.
- Jantasri, Chaichan. 2009. *Sculpture*. Bangkok: Wadsilp, 2009.
- Kamsingha, Komsan. Highly Skilled Professor Assistant. Unpublished Interview by the author. April 25, 2013.

- Ketdara, Jamrat. *Casting Handicraft*. Bound academic documents. Bangkok: Poh-Chang Academy of Art, 1987.
- Kitticharoenwiwat, Ariya. Senior Associate Professor. Unpublished Interview by the author. January 31, 2013.
- Kongsuk, Kemrat. National Artist in Visual Arts (Sculpture). Unpublished Interview by the author. March 4, 2013.
- Nilkamhaeng, Songsan et al. *The Annals of the Principle Buddha Image Creation at Buddha Mantala*. n.p., 1982.
- Ontrakul, Somkuan. Senior Professional Sculptor. Unpublished Interview by the author. March 21, 2013.
- Prasong, Chin. Senior Expert Sculptor. Unpublished Interview by the author. February 8, 2013.
- Ratana-opart, Sanchai. *The Decorative Plaster Works*. (Bound academic documents). Bangkok: Phra Nakorn Teachers' College, 1978.
- Somprasong, Jeeraphan. *The Creation of Sculpture with Plaster*. Bangkok: OS Printing House, 1990.
- Utthayotha, Samphan et al. *The Sculpting and Casting and the Traditional Thai Technique of Clay Mixing*. Bangkok: Roongsin Printing, 2008.
- Wannarat, Prasert. Highly Skilled Professor Assistant. Unpublished Interview by the author. January 22, 2013.
- Wichai Sitthirat. Senior Associate Professor. Unpublished Interview by the author. February 18, 2013.
- Wichienket, Chamruang. National Artist in Visual Arts (Sculpture). Unpublished Interview by the author. March 31, 2013.
- Witthayajak, Suwit. *The Creation of Casting Works*. Bangkok: Wadsilp, 2012.
- Wongloy, Sathian. *Casting Techniques*. Bangkok: Poh-Chang Art Academy, n.d..
- Wongsingthong, Pornsanong. *The Decorative Crafts and Bronze Sculpture Casting Art with New Techniques of Lost Wax*. Bangkok: Viscom Center Ltd., 2006.