Outline of Mold for Compression Molding

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1. Introduction

Celluloid House Yokohama Museum carry out various investigation and research on celluloid. As a part of the process, many molds used for molding are stored. Since organizing the mold is completed [(1)], we will report the outline (form, figure, features, etc.) of the mold for compression molding [(2)]. Also the mold manufacturing method and the actual condition of the molding work by this mold is interesting. We are continuing to investigate these issues and will report them as soon as they are finalized.

2. Mold overview

(1) Mold type

Most of the mold is single piece type, but as shown in Figure 1 and 2 there are type with two or more pieces. In taking many pieces, the same cavity as in this example is often sculpted multiply the same piece, but there is also different type, so-called family type (Figure 3). In this case, there is a type of a cavity having a similar shape, but there is a type of a completely different design. All cavities are carved directly into the cannon block. No mold release mechanism and cooling mechanism are attached.

Figure 1: Example of taking two pieces

Figure 2: Example of taking many pieces

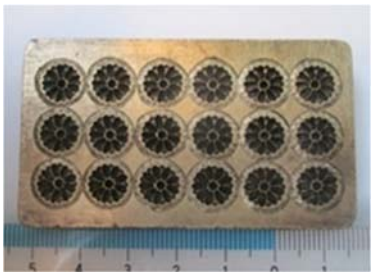
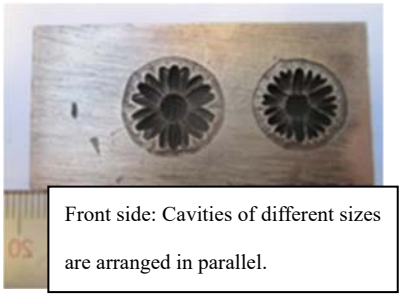


Figure 3: Examples of multiple families and the use of both sides



Front side: Cavities of different sizes are arranged in parallel.

Back side: Cavities engraving a different shape of another size.

Multiple type mold is often engraved on a single mold plate (e.g., Figure 1 and 2), but some are single piece type mold that are connected each other by wax and formed as multiple type (Figure. 4). It seems to have been carried out in order to raise production efficiency by molding with highly used mold at the same time. Since the mold thickness is not standardized as described later, it is presumed that the thicker mold was scraped to form the thicker mold for joining.

On the contrary, there is also an example in which it seems that the number was reduced by cutting the multi-piece into individual mold (see Figure 5). It is presumed that the number of defective cavities was reduced in response to disposal or demand reduction.

The mold of Figure 3 has a cavity engraved on the front and back. It seems to have been done for emergency treatment.

Figure 4: Example of 2 molds connected by wax

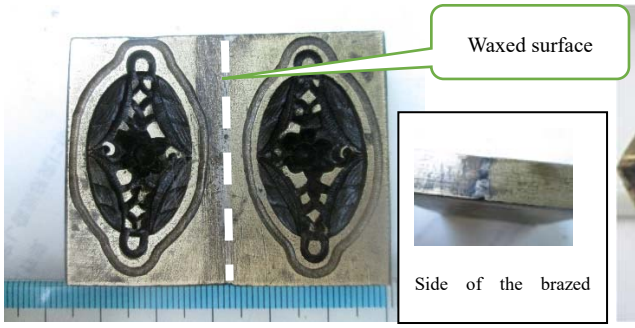
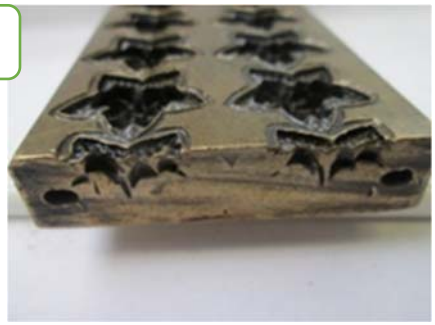


Figure 5: Mold cutted



Although it is few, there are double types as shown in Figure 6 and 7. In this case, two or more positioning pins are provided. The two molds can produce a product with a design on the entire surface of the molded product.

Figure 6: Example of a two-sheet mold

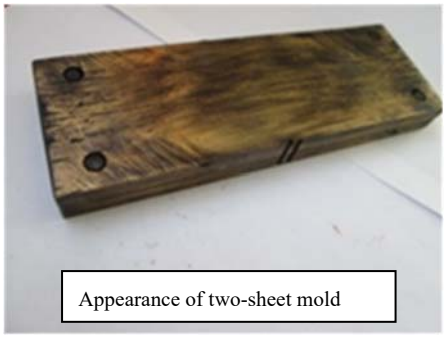
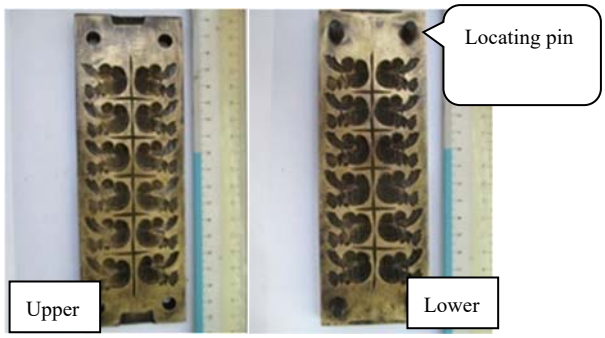


Figure 7: Two-sheet mold is opened.



In the case of the two-sheet mold, there is an example in which a molded article with undercut is molded using a placing core. Mold is configured as shown in Figure 8. The core is taken out together with the molded product after the mold is opened, and then separated from the molded product. Figure 9 shows an example of a core. This is incorporated into the mother mold as shown in Figure 10. In this mold, animal legs are carved on the core, and each of the four legs can be made into different designs.

Figure 8: Two-sheet configuration with a leaving core.

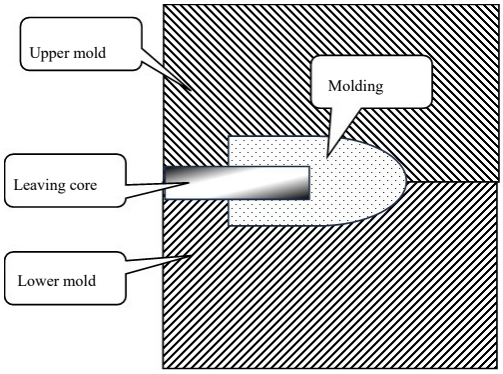
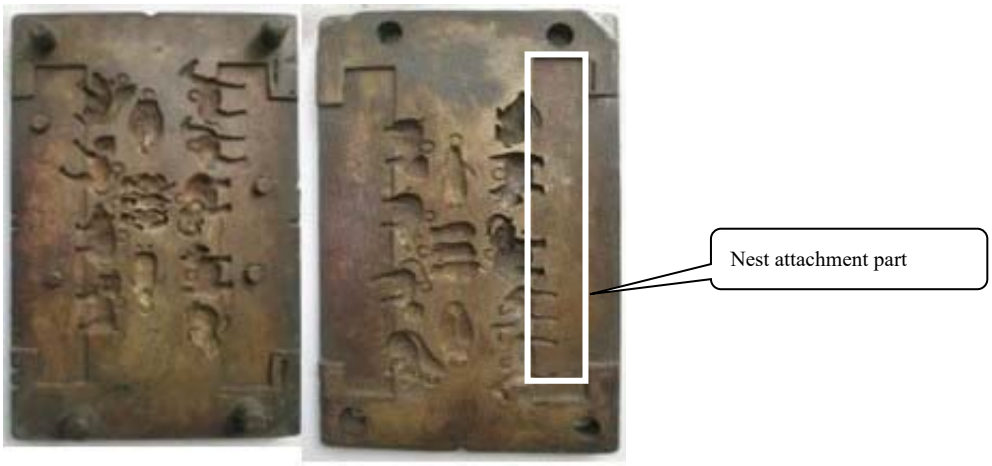


Figure 9: Leaving core of an animal leg

Figure 10: Example of a mother mold type of leaving core



(2) Outer form, dimension [3]

There are many cubic types of 15 mm thick and few cm square size, and some like bracelets are close to 40 cm long. Dimensions vary and there is no evidence that the dimensions are standardized.

The shape is not always a cube. Since it is formed by a press machine, it is a thick plate with high parallelism of the front and back sides, but it is not always a square shape, and it is very diverse in triangular shape, hexagonal shape, octagonal shape, etc. An example is shown in Figure 11.

It seems to be carried out in accordance with the cavity shape to deform the mold shape. It is estimated that this reduces the mold weight, reduces the mold material, and improves the workability. Further, the molding time can be shortened because the thermal inertia is reduced.

Figure 11: Molds of various shapes

When the thickness distribution was examined, it became as shown in the following table, and the 13mm unit occupied the majority. Though the mold thickness distribution was examined by attaching it to the mold of the base of 13mm, the tendency was not found especially. From this, it is estimated that a standardized plank is not used.

Distribution of plate thickness

Mold thickness (mm)	<6	6~	7~	8~	9~	10~	11~	12~	13~	14~	15~
%	0.3	0.2	1.3	0.8	1.3	7.4	8.5	18.9	50.9	8.7	1.6

(2) Letter information [4] left in the mold

Approximately 20% of the molds are carved with numbers, letters, symbols, and others. Many of them are numbers. It is documented because it may provide a clue to the type history, history of utilization, and others. Examples of information are shown in Figure 12 to 14. Incidentally, an example in which the same number is numbered in the mold of the same design has been found considerably. However, the same number may be used for different designs. It can be presumed that the figure was functioning as a product number in a certain period (which may be limited to a specific field).

Figure 12: Numeric example

Figure 13: Kanji example

Figure 14: Mark example

3. Summary

The compression mold stored in the celluloid house has the following features.

① There are many single-sheet types. Although the number is small, there are several dozens of small items.

② Cavities are usually provided by hand carving with a gunmetal of several cm square.

③ Though many molds are rectangular, some molds are deformed according to the cavity shape. Thickness is 13mm but variable, with no standardized evidence.

④ Some are written with various information such as numbers.

These characteristics seem to be related to the fact that the application is more in the accessory relation. In the future, we would like to continue the examination by expanding the field of view to die manufacturing method, molding method, etc.

4. References

(1) Isao Sato, Celluloid House Pressure Molding Mold Survey Report No.67

Kenkyu67.pdf (celluloidhouse.com) (Link)

(2) Compression molded celluloid mold, Isao Sato,

Edited by Museum of Local History and Astronomy of Katsushika City, Celluloid Town Katsushika

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(3) Compression molds, Isao Sato, and the first technical Vol.33, No.1, P78 (2018 of Mold Archaeology)

(4) Outer form of Compression mold, Isao Sato, Sixth Technical Vol.33, No.7, P82 (2018 of Mold Archaeology)

(5) Information left in the compression molds, Isao Sato, No. 10 of Mold Archaeology

Type Technical Vol.33, No.11, P90 (2018)