CHAPTER 6
MANUAL INSTRUCTION

This manual instruction explains the list of specifications and the operating procedure of spin casting machine.


1. Handle
2. Top Enclosure
3. Funnel
4. Upper Frame
5. Cover
6. Switch
7. Support Frame
8. Middle Frame
9. Post Frame
10. Electric Motor
11. Base Frame

Figure 6.1 Machine Specification
Table 6.1 Specification

<table>
<thead>
<tr>
<th>SPECIFICATION</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Dimension</td>
<td>520mm x 440mm x 710mm</td>
</tr>
<tr>
<td>Weight</td>
<td>55 kg</td>
</tr>
<tr>
<td>Maximum speed</td>
<td>1400 RPM</td>
</tr>
<tr>
<td>Operating speed</td>
<td>460 RPM</td>
</tr>
<tr>
<td>Maximum dimension of silicone rubber mold</td>
<td>140mm x 600mm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POWER SUPPLY</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Input voltage</td>
<td>220V AC, 50/60Hz</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>187.5 Watt</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PRICE</th>
<th></th>
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<tbody>
<tr>
<td>Master Model Machine</td>
<td>IDR 4,500,000.00</td>
</tr>
</tbody>
</table>

6.2. The Operating Procedure

STEP 1: Prepare Tools and Material
1. Molten metal
2. Silicone Rubber Mold
3. Ladle

STEP 2: Open Top Enclosure

Figure 6.2 Open Top Enclosure
STEP 3: Load silicone rubber mold into plate

Figure 6.3 Load silicone rubber

STEP 4: Put and fasten the mold frame gripper to plate

Figure 6.4 Fasten the mold frame

STEP 5: Close Top Enclosure

Figure 6.5 Close top Enclosure
STEP 6: Connect Machine to Regulator

Figure 6.6 Connect machine to regulator

STEP 7: Plug Regulator’s Electrical Plug to the Jack

Figure 6.7 Plug the electrical plug

STEP 8: Activate the machine

Figure 6.8 Turn the switch on
Figure 6.9 Set the regulator at maximum voltage to activate electric motor

Figure 6.10 Set the regulator at 125 volt to get constant speed

STEP 8: Pour the molten metal to the Funnel Presser and wait for spinning process about 1 minute

Figure 6.11 Pour the molten metal
STEP 9: Turn off the regulator

Figure 6.12 Set the regulator at 0 volt

Figure 6.13 Pull the plug out

Figure 6.14 Turn the switch off
STEP 10: Open top enclosure

Figure 6.15 Open top enclosure

STEP 11: Remove mold frame to unload silicone rubber mold

Figure 6.16 Remove mold frame

STEP 12: Open silicone rubber mold to obtain casting result

Figure 6.17 Open silicone rubber mold
CHAPTER 7

CONCLUSION

7.1 Conclusion

From the research, conclusion obtained

1. The best technique in master model is using horizontal long sprue mold that spun using machine that the spin rate is controlled by regulator and the heating time of tin is no more than 4 minutes.

Table 7.1 Comparison Result

<table>
<thead>
<tr>
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<th>Master</th>
<th>Making Master Model</th>
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</thead>
<tbody>
<tr>
<td>Front Side</td>
<td><img src="image1.jpg" alt="Image" /></td>
<td><img src="image2.jpg" alt="Image" /></td>
</tr>
<tr>
<td>Back Side</td>
<td><img src="image3.jpg" alt="Image" /></td>
<td><img src="image4.jpg" alt="Image" /></td>
</tr>
</tbody>
</table>
2. a. Making master model production time:
   One product will take 4.2025 hours or half working day.
   Low quantity order, 250 products take 7 working days.
   b. Master machine cost is IDR 1,650,00

7.2 Suggestion
For the future research, it is suggested to conduct a design mold frame which has different size to gain others different master model size.
REFERENCES


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Nayatani, Y., Eiga, T., Futami, R., Miyagawa, H., 1984, The Seven New QC Tools Practical Applications of Managers, Japan: 3A Corporation

Wibisono, Sigit., 2007, Perencanaan dan Pembuatan Cetakan Symbolic Shorthand Souvenir Menggunakan Silicone Rubber, Skripsi Program Studi Teknik Industri Fakultas Teknik Industri Universitas Atma Jaya Yogyakarta


APPENDIX
PROCESS DECISION PROGRAM CHART (PDPC)

- **Preparing the Silicone Rubber:**
  - Using Roland MDX 40
  - By Carving

- **Preparing the Master Model:**
  - Using HTV silicone rubber
  - Using RTV silicone rubber

- **Vulcanizing the Mold Frame:**
  - Vulcanized

- **Open the Mold:**

- **Mold Finished:**

- **Using Bench Vise:**

- **Spin Method:**
  - Using master model machine with regulator

- **Pouring the Tin:**

- **Obtain the Product:**

- **Electropated the Resin Product:**

- **Vulcanized Product:**

- **Blow Defects on Result:**

- **Bad Result (Unaccomplished pattern):**

- **Too Expensive because the machine utilizing per hour is expensive:**

- **The master model is too complicated, hand carving do not get the detail and also long time consuming:**

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**PROCESS DECISION PROGRAM CHART (PDPC):**

- **Mold Master Model:**
  - By Carving
  - By Casting

- **Preparing the Silicone Rubber:**
  - Using HTV silicone rubber
  - Using RTV silicone rubber

- **Positioning the Master Model:**

- **Vulcanizing the Mold Frame:**

- **Open the Mold:**

- **Mold Finished:**

- **Using Bench Vise:**

- **Spin Method:**
  - Using master model machine with regulator

- **Pouring the Tin:**

- **Obtain the Product:**

- **Electropated the Resin Product:**

- **Vulcanized Product:**

- **Blow Defects on Result:**

- **Bad Result (Unaccomplished pattern):**

- **Too Expensive because the machine utilizing per hour is expensive:**

- **The master model is too complicated, hand carving do not get the detail and also long time consuming:**