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# Automation Establishment Mold Set Image Database Mouldbase By Utilizing Standard

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ABSTRACT

*Research related to the design process is increasingly gaining attention so extensive and intensive research community. It is based on the fact that the increasing challenges that arise from the consumer is a trigger among practitioners in the manufacturing world meet their diverse needs. The proper integration of all activities of the design using a computer (Computer Aided Design) and all manufacturing activities paced computer (Computer Aided Manufacture) is a key factor in creating a manufacturing environment that is totally integrated with the computer as a tool primarily, particularly manufacturing activities mold (Computer Mold Integrated Manufacturing), this research has been done. The overall aim is to achieve global optimization of an enterprise by integrating the use of computers in all areas of production, especially in producing mold as a component that will produce a variety of products that will be used directly by the end-user. This study specifically sought to develop an interface or software that is able to assist a designer in designing a mold (mold). Especially in preparing various types of standard molds to automate the process of selecting and describing the various sets the desired mold. The resulting standard mold to be formed in accordance with a predetermined design shape and satisfy consumer desires. This research has been done, also an integral part of various other studies were conducted at the Laboratory of Production Systems Department of Industrial Engineering ITB. Implementation of the test results have shown that the software has been developed from the model in this study could be implemented and integrated with some software that has been developed previously.*



## 1. Introduction

In an effort to improve the efficiency and productivity of manufacturing activities, in particular to address challenges demand increasingly fast-changing consumers with a wide variety of products is high, then the efforts to shorten the stages of the production process becomes important. One very important stage and determines the design stage, both stages of the design of the product itself as well as the design stage its production tool mold or mold. Therefore, it is necessary to do businesses that are able to shorten the mold design process.

## 2. Literature review

An integrated mold factory model by utilizing the computer (Computer Integrated Manufacturing Mold, CIMM) needs to be built to demonstrate the effectiveness of the application of the CIM. Gradual integration effort has been carried out at the factory in accordance with a model of unification of various



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functional requirements and information are handled at each job cetakan.Suatu manufacture factory model organized into a set of integrated subsystems such as a mid-level subsystem design, production planning subsystem, and subsystem manufacturing the flow of such data can beis shown in Figure 1.

A subsystem design associated with product modeling, secondary geometry synthesis, simulation of the injection molding process, and rapid design mold components. Production planning subsystem transform the design into production information that includes the operation, machining conditions, and various numerical control or NC programs for various types of equipment that can be programmed. A production subsystem performs the function of managing information related to job preparation, and coordination and monitoring job. A wide variety of equipment production subsystem consists of machine tools, industrial robots, coordinate measuring machine (Coordinate Measuring Machine, CNM), and an Automatic Guided Vehicle, AGV) (Kang et al., 1990).

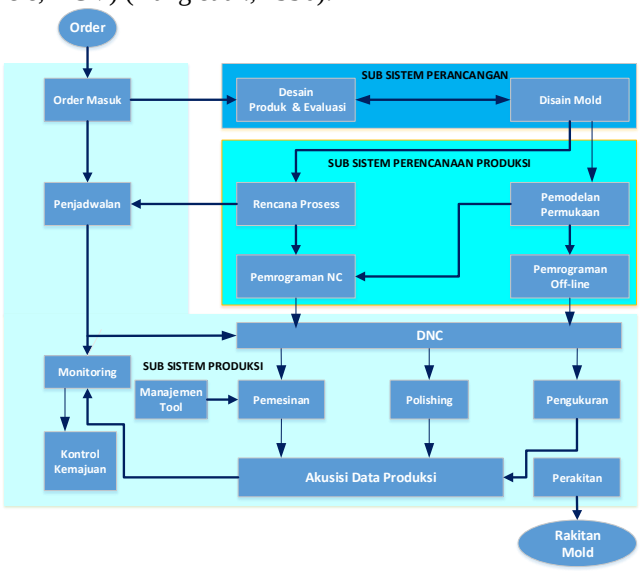


**Fig 1.** Data flow between the subsystems In the Factory Model CIM (Kang et. Al, 1992, redrawn)

## 3. Results and Discussion

Testing program carried out by using the cases considered representative represents permasalahan.Kasus setting standards for the construction mouldbase drawing mold and mold assembly case in the form of exploded view it is a stage of preparation for the disaindengan use design by feature approach or conventional design. well done,testing with real cases.

In the first test case, the test is done by giving commands to the computer to draw the four existing standards are standard A, standard B, standard C and D standards for a broad measure of the same cavity. Furthermore, try to give the appearance decomposed form (explode-view) and form mampatnya. In the second test cases, testing is done to give commands to the computer to be able to show the images to the same standard but the size of the cavity different. While in the third test cases in the form of implementation and program models that have been developed with a real case, in this case by trying to integrate it with other models and programs developed ever before.

The test results on the ground show that the programs that have been developed in this study can be implemented and integrated. Implementation and integration testing performed by utilizing some of the programs that have been developed previously include: 1. Introduction Program Form Image Recognition Plan or Feature 2. Programs Feature-Based Process Planning, 3. Program CAPP model with alternative processes, and 4. Generating Software NC program.

### 3.1. *Loading and Execution Program*

Programs that have been made and then run an interactive command mode so that it appears as follows below.

Command:



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A =
B =
C =
Parting Line 2?
Need to pin point gate?
need support plate?
need stripper plate?
Cavity size =
Explode? (Y / n)
Explode range =

***a. I Test Case***

Furthermore, the value of the parameters A, B and C is filled in accordance with Test Cases table below:

**Table 1.**
Test Case I For 2525 Cavity Size

| *No. Test case* | *parameter A* | *parameter B* | *parameter C* | *Explode? y / n* |
|---|---|---|---|---|
| *1.1* | *30* | *30* | *70* | *No.* |
| *1.2* | *30* | *25* | *70* | *No.* |
| *1.3* | *35* | *40* | *80* | *No.* |
| *1.4* | *25* | *25* | *70* | *Yes. Explode Range = 40* |

After each parameter is loaded, it will display each image corresponding to the parameter values, for example, are shown sepertiGambar2dan Gambar3.

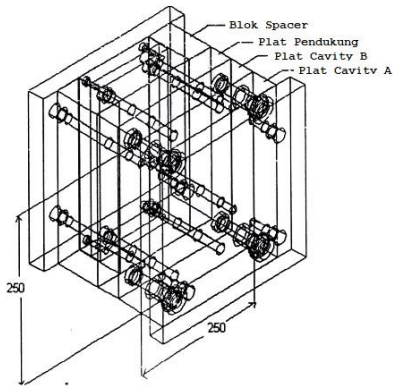


**Fig 2.**Mold Standard A 2525 Size

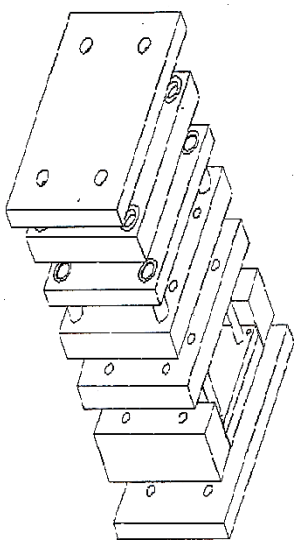

**Fig 3.**Views Exploded View for Standard B2525

Against the Test Case 1.1 through 1.4 Test Cases also be measured while running the program to generate a standard mouldbase images A, B standard, the standard C and D were compared with the


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standard measurement results mouldbase imaging process standards by a qualified expert drafterdengan. The measurement results for the second time this way could be seen in this Tabel2berikut.

**Table 2.**
Mouldbase Drawing Speed Comparison Between Human and Program Standards Developed

| Drafter | standard A | standard B | standard C | standard D |
|---|---|---|---|---|
| Human | 8 -10 hours | 8 -10 hours | 8 -10 hours | 8 -10 hours |
| Program | 25-30 seconds | 25-30 seconds | 25-30 seconds | 25-30 seconds |

From Table 2 above, it can be seen that there is a time difference is a very significant process between man and drafter drafter program. Thus, the efficiency gained significant time using the program in the imaging process mouldbase desired standards. Even more so when considering that very many mouldbase standards which must be made of the drawing. It is thus a program that has been developed is able to make a major contribution in helping the design process.

***b. Test Case II***

Test Case 2 is the standard setting mouldbase the same standard but with different sizes. In this case been one of the standard that is the standard A to the cavity size in 2020, 2525 and 3030. The results of program execution can be seen in Figure 2, Figure 4And Figure 5. In Figure 2, as described in the first Test Case, the size of the cavity used is 250x250mm2 , While in Figure 4And Figure 5 of its cavity size, respectively 200x200mm2 and 300x300mm2.

To prove that the size of the cavity in Figure 2, Figure 4And Figure 5tersebut row is 2525 or equal to 250x250 mm2, 200x200mm2, and 300x300mm2, done by giving a dim command at the command prompt in AutoCAD. Then further define the end point (end point) first and second end point for each cavity on the size of a way so that finally obtained the dimension between the two ends.

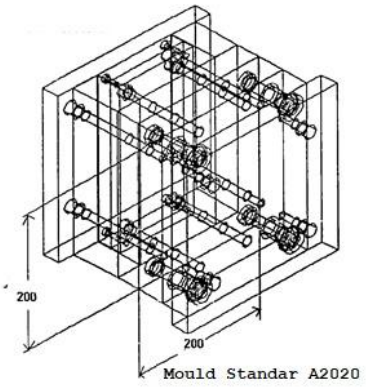


**Fig 4.** Mold Standard A 2020 Size

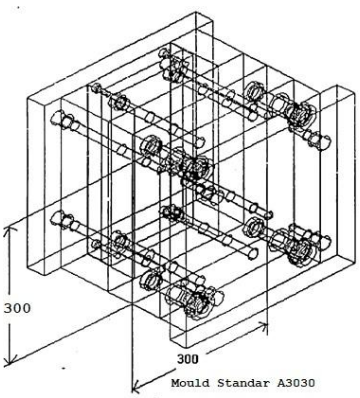


**Fig 5.** Mold Standard A 3030 size

***c. Test Case III***

Of the two test cases that have been done, it can be proved that the program can be run properly. Furthermore, to prove that the program of models that have been developed can also be used, especially in efforts to create a computer-based mold manufacturing integration (Computer Integrated Manufacturing Mold, CIMM), then the implementation of the tests have been conducted. Here is an implementation test measures the body works is the manufacture of plastic molds for the cap deodorizer used in the room or in a vehicle. First, TAMOULD.EXP program called, then based on the information known to mold the product obtained dipilihatau standards raised pictures are standard mold A. Second, after a standard mold the image appears on the screen AutoCAD, The next step is to give shape to the cavity and other components in accordance with the form of products to be produced. The process of



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granting or depictions of conventional form is done by using the principles of Boolean operations (union, Substraction, and intersection operation).

*Third*, After the process of granting or depiction of finished, proceed with the introduction of form or feature. Feature recognition process performed using software previously developed so recognizable shapes or any basic features contained on each plate or components that have given shape.

*Fourth*, After the recognizable features or basic form what is on each of the components, the next step is to do the planning process or CAPP by utilizing software previously developed. The results of the use of this software is in the form of a plan that contains the order execution process starts from the raw material up into the final shape of the workpiece. The output of this process plan is a plan of a detailed process that can used for the manufacture of components manually or by a program NC (Numerical Control).

*Fifth*, Is the manufacture of the NC program. Output plan process that has been generated in the fourth step further made its NC program. In making this NC program utilized a previously developed software that gives the freedom to choose the direction and determination of the track chisel cut.

*Sixth*, Workmanship workpiece. Output fifth step further transferred to the machine Dyna CNC (Computer Numerical Control) Vertical Milling (or other CNC machines). The end result of this step is a component of the shape as desired.

With regard Test Cases Test Cases I through III, can be perceived how much time and energy must be spent if it had to draw it manually every standard required by the number of components to as many as 15 pieces. While variations of cavity size very much. So with this program that has been developed primarily perceived benefits in terms of efficient use of time and effort must be spent in doing the design process.

With the reduction in time and effort that must be made available to the design activity, the availability of time and energy can be used for anything else. Some things that can be done include the opening of more possibilities to innovate and make modifications quickly and easily. Thus not only the cost of the design to be reduced, but also design activities will be more productive and flexible.

In the process of integration with other programs can also be shown that the program has been developed which is very helpful. Especially in the design activity is at the upstream part of the overall manufacturing activity based printing computer (Computer Integrated Manufacturing Mold, CIMM).

## 4. Conclusion

From the research that has been done, it can be proven that the automated process of image formation of mold set by utilizing standard database is very helpful mouldbase a mold designer at his job is to help choose the standard form mouldbase also help the process of depiction quickly and easily. The trial results were able to provide the ease of doing mold design so that the design process is faster and easier when compared to manual processing. The software developed is also able to integrate with some software that has been developed previously.

## 5. Reference

[1] Zeid, I, CAD/CAM Theory and Practice, Mc. Graw-Hill Inc., 1991.
[2] Elias, Hans-Georg, An Introduction To Plastics 1st Ed..Weinheim ; New York; Basel; Cambridge; Tokyo; VCH, 1993.
[3] Menges, G., Paul Mohren, How to Make Injection Molds 2nd Ed., Hanser Publisher. Munich, Vienna, New York, Barcelona, 1993.
[4] Bradburry, J.A.A, Product Inovation: Idea to Exploitation, John Willey & Sons Ltd, 1989.
[5] Dieter, George E., *Engineering Design 2nd*, McGraw-Hill. Inc., 1991.
[6] Beckert, B.A., Linking Design & Manufacturing, Computer Aided Engineering, October 1994, p. 46-55.
[7] Chang. Tien-Chien. Richard A Whysk and Hsu-Pin Wang. Computer Aided Manufacturing. Prentice Hall, Inc., Nexi . 1991.
[8] Kang, Mujin, Sehyung Park and Yell-Sun Hong, *Computer Integrated Mould Manufacturing*, International Journal Computer Integrated Manufacturing. Vol. 5 No. 4 & 5, 1992.
[9] Zhang, H.C. and Leo Alting, Computerized Manufacturing Process Planning System, Chapman & Hall, Great Britain, 1994.
[10] Pessen, David W.. Industrial Automation, John Wiley & Sons. Inc., Singapore, 1990.



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Jurnal Mantik
Volume 3 Number 4, February 2020, pp. 129-134 E-ISSN 2685-4236
https://iocscience.org/ejournal/index.php/mantik/index

[11] Asai, K., S. Takashima and P.R. Edwards, Manufacturing Automation Systems and CIM Factories, Chapman & Hall, 1994.
[12] Allcock, H.R. and Lampe F.W., Contemporary Polymer Chemistery2nd., Prentice-Hall. Inc..New Jersey, USA.
[13] Biles. W.F . R. Walker and T.J. Gornet, "Concurent Engineering of New Plastic Products". Procedding of the International Conference on Computer Integrated Manufacturing ICCIM '91, Singapore 2-4 October 1991. World Scientific. Singapore, 1991. pp. 191-194.
[15] Lim. E. and B. Barnes, "Case in Integrating CAE Tools in Injection Molding Design Procedding of the International Conference on Computer Integrated Manufacturing ICCIM '91, Singapore 2-4 October 1991, World Scientific, Singapore, 1991. pp. 235-240.
[16] Dirhamsyah. M.. Isa SetiasvahToha, "Model CAAP Dengan Alternatif Proses". Proceeding Seminar CAD CAM '95, Bandung.