

TECHNOLOGICAL STEPS IN THE MANUFACTURING OF THE BRACKET TYPE AUTOMOTIVE PARTS WITH THE HIGH PRESSURE DIE CASTING TECHNOLOGY

Ferencz Peti¹, Lucian Grama², Ioan Solovăstru³

¹SC CIEMATRICON SA, Târgu-Mureş, ²University of "Petru Maior" Târgu-Mureş,
Technological and Managerial Engineering Department,

³SC CIE R&D ROM SRL, Târgu-Mureş

petiferencz82@yahoo.com; lgrama@engineering.upm.ro; isolovastru@ciematronic.ro

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Abstract: The paper presents the main technological steps in the manufacturing of the "bracket type" automotive parts with the high pressure diecasting technology and the elements of the manufacturing process.

The manufacturing process definition has as main steps the definition of the process flow chart and the definition of the manufacturing process layout.

1. Introduction

From early design stage of the automotive bracket type of parts is necessary to analyze and to think on the main technological operations that will add value to the part. Most of OEM's are requiring to their suppliers, manufacturers of these type of parts to define clearly even in technical study for quotation phase the manufacturing flowcharts and industrial layouts for the technological operations. The technological steps are defined in the flowchart and layout.

2. Flowchart definition

A flowchart is a type of diagram that represents an algorithm or process, showing the steps as boxes of various kinds, and their order by connecting these with arrows. This diagrammatic representation can give a step-by-step solution to a given problem. Process operations are represented in these boxes, and arrows connecting them represent flow of control. Data flows are not typically represented in a flowchart, in contrast with data flow diagrams; rather, they are implied by the sequencing of operations. Flowcharts are used in analyzing, designing, documenting or managing a process or program in various fields

The main technological operations and the order of the industrial steps which have to be followed for the producing in serial condition of the bracket type automotive parts with the high pressure diecasting technology are presented in the figure 2.1.

The main industrial equipments from the casting cell are: Melting furnace, maintenance furnace, the high pressure diecasting machine, washing system, tool tempering system robot for parts extraction from the mould, quenching tank, trimming press, shotblasting machine.

The main tools to equip these machineries are: the mould, trimming tool, robot specific clamping arms, support for the part in order to be possible that the robot clamps the biscuit on the runner from different positions, trimming tool, hook for the shotblasting machine.

In the figure 2.2. is presented a detailed flowchart of the casting process for a bracket type of part.

The main industrial equipments from the machining cell are: CNC machine – basically a CNC milling machine in 3 or 4 axis; washing machine for the cleaning of the parts from chips, Assembly machine, to assemble the machined-diecasted part with other components; packaging equipment.

The main tools to equip these machineries are: clamping device for the CNC machine and cutting tools, special support for the parts in the washing machine, clamping device for the parts in the assembly equipment. Part of the material handling is the specific packaging material.

In the figure 2.3. is presented a detailed flowchart of the machining process for a bracket type of part.

In the tools section in the both category of processes we have to mention the specific gauges to check the quality of the parts.

In the detailed process flowchart also the tools have to be specified as well as the type and frequency of process controls.

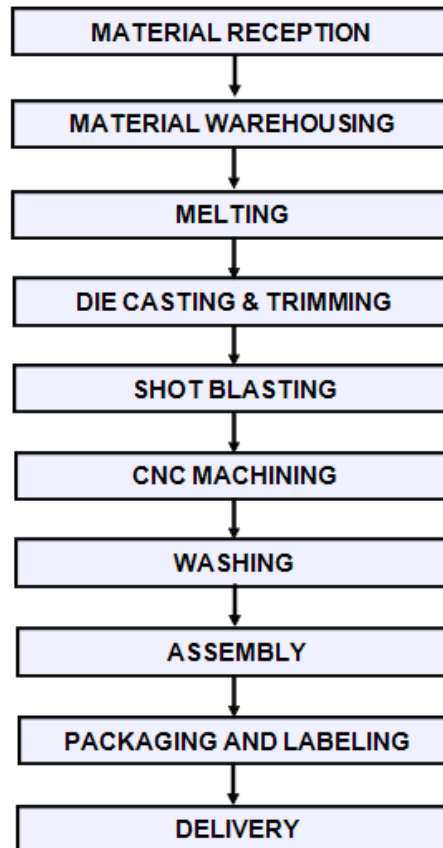


Figure. 2.1. Order of the industrial manufacturing steps of the bracket type automotive parts with the high pressure diecasting technology

3. Production cell layout definition

In industrial engineering, process layout is the floor plan of a plant, which is installed by industrial engineers to improve the efficiency by arranging equipment according to their functions. In this layout, the main idea is to arrange or gather machines or equipments of the same function into one group or department.

It is known that a Process Layout is effective when are fulfilled the following:

1. Minimize material handling costs
2. Utilize space efficiently
3. Utilize labor efficiently
4. Eliminate bottlenecks
5. Facilitate communication and interaction between workers, workers and supervisors
6. Eliminate waste or redundant material
7. Promote product and service and quality

8. Provide a visual control of activities

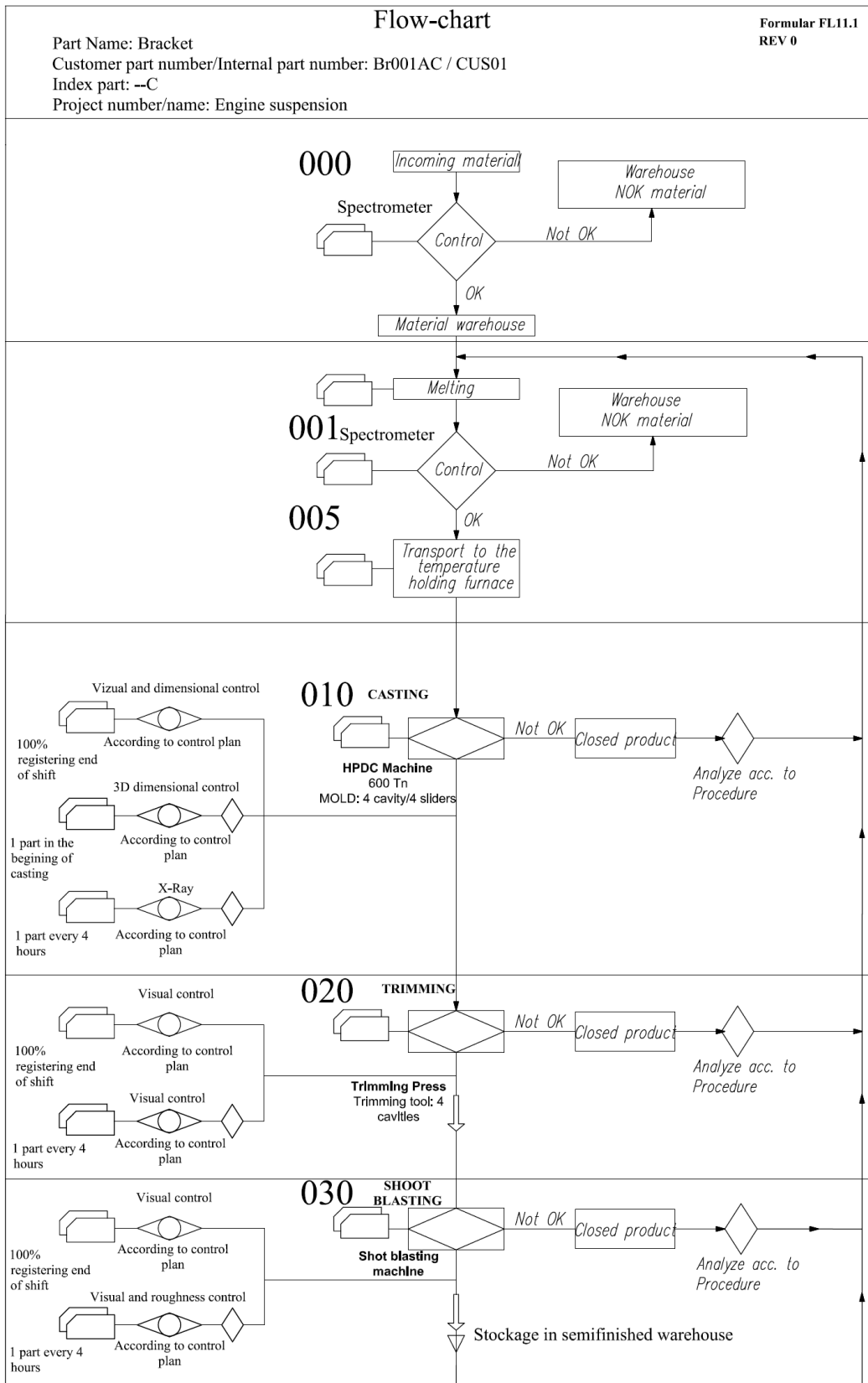


Figure. 2.2. Flowchart of the casting process for a bracket type of part.

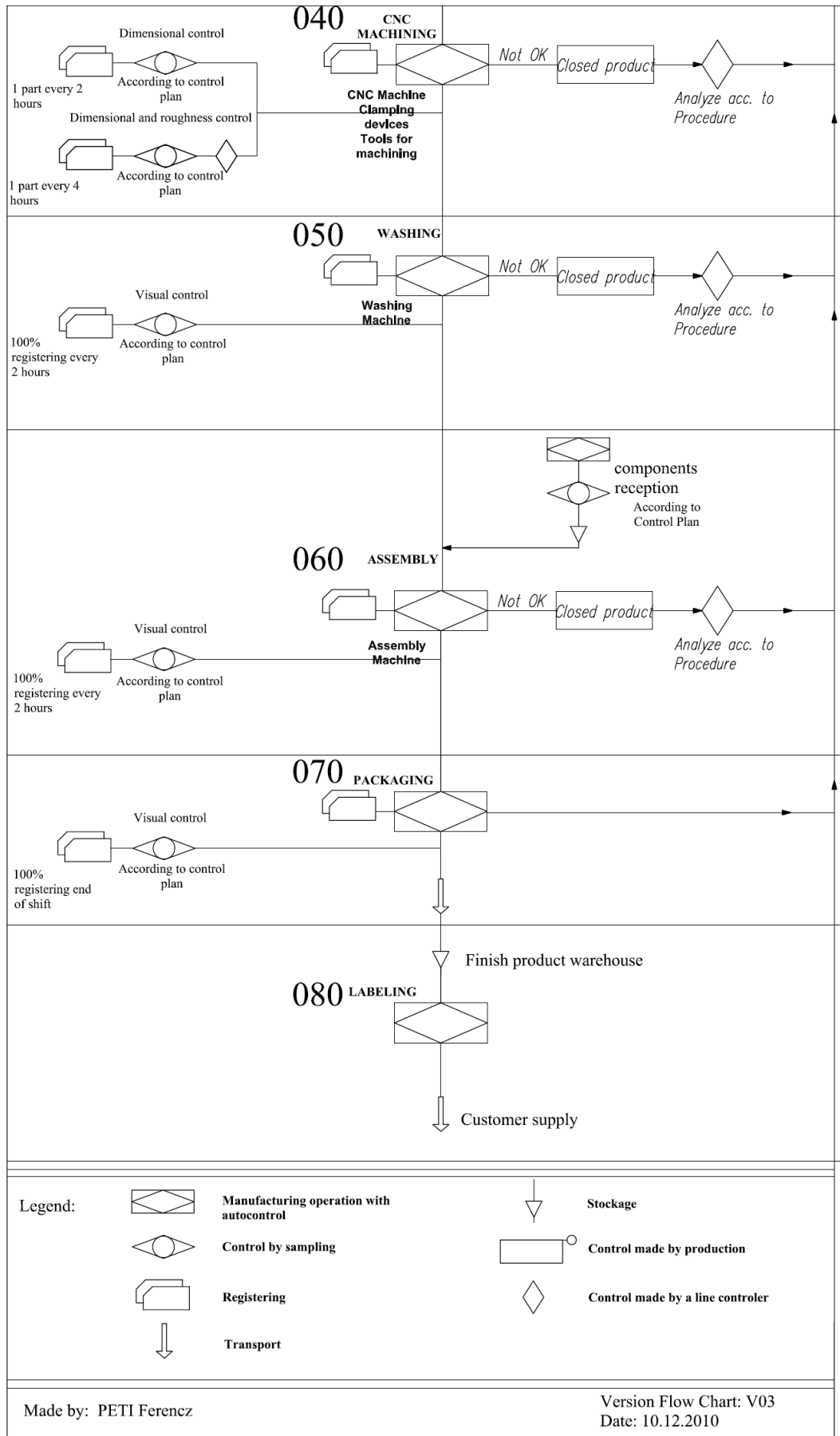


Figure. 2.3. Flowchart of the machining process for a bracket type of part

In the figures 3.1. and 3.2. are presented the manufacturing cells layouts for the high pressure diecasting and the CNC machining processes for a bracket type of part.

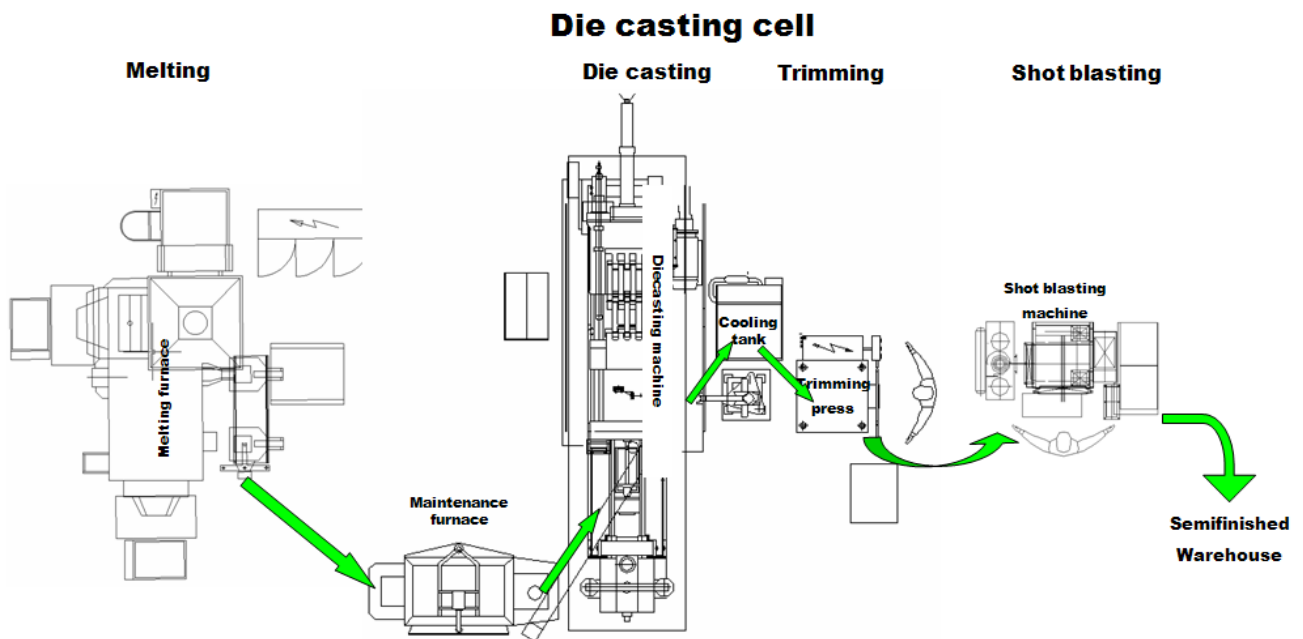


Figure. 3.1. Manufacturing cell layout for high pressure diecasting process

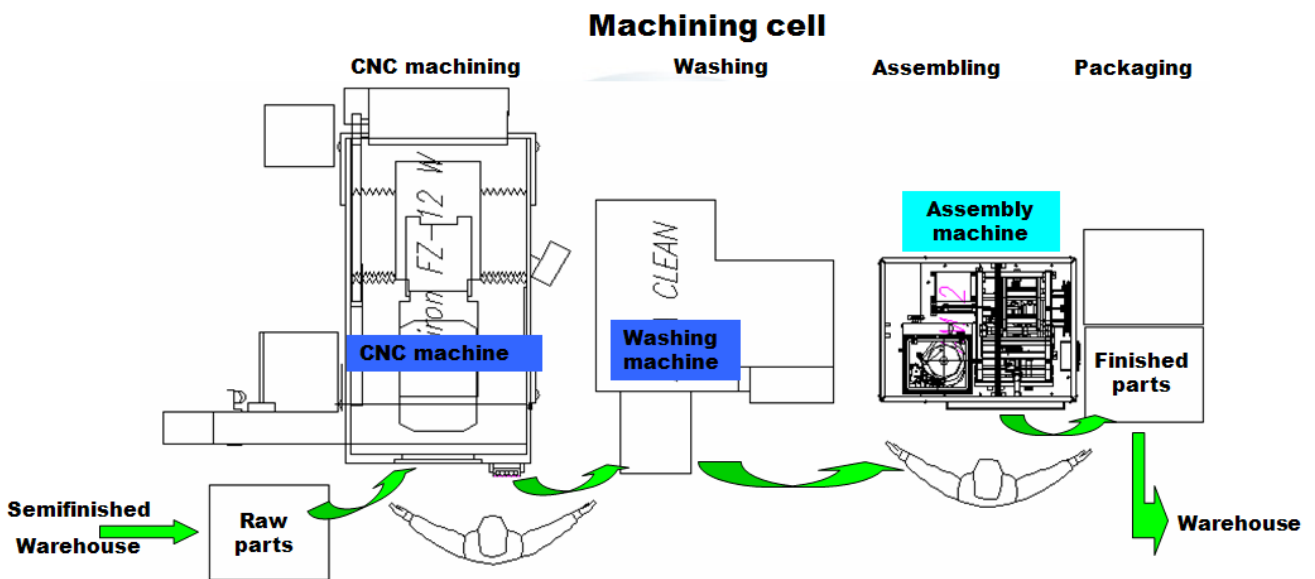


Figure. 3.2. Manufacturing cell layout for machining process

4. Conclusions

By defining the process flow chart and the manufacturing process layout a clear picture about the manufacturing process of the bracket type of parts is given.

This is beneficial for all the departments of the organization as well as for the relation with the customer.

Once they exist, the process flow chart and the manufacturing process layout can be and usually are optimized in order to eliminate waste and to reduce or to optimize the manufacturing costs.

5. References

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