Retraction

Retraction: Design and Analysis of Chips Block Making Machine (IOP Conf. Ser.: Mater. Sci. Eng. 1145 012059)

Published 23 February 2022

This article (and all articles in the proceedings volume relating to the same conference) has been retracted by IOP Publishing following an extensive investigation in line with the COPE guidelines. This investigation has uncovered evidence of systematic manipulation of the publication process and considerable citation manipulation.

IOP Publishing respectfully requests that readers consider all work within this volume potentially unreliable, as the volume has not been through a credible peer review process.

IOP Publishing regrets that our usual quality checks did not identify these issues before publication, and have since put additional measures in place to try to prevent these issues from reoccurring. IOP Publishing wishes to credit anonymous whistleblowers and the Problematic Paper Screener [1] for bringing some of the above issues to our attention, prompting us to investigate further.

[1] Cabanac G, Labbé C and Magazinov A 2021 arXiv:2107.06751v1

Retraction published: 23 February 2022
Design and Analysis of Chips Block Making Machine

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Abstract. Machinery in industries is used to change the size and shape of the raw material to obtain the required work piece. During this process, metal chips of different types and size are obtained. These metal chips are collected manually and are transported to local scrap yards, where recycling processes takes place. During transportation, most of these metal chips are lost or not recycled due to its size. Chips Block Making Machine can convert the collection of loose metal chips to a whole block. These blocks can be transported to scrap yards more efficiently. This process is carried out by using the principle of Thermal compression. Flow simulation in Solid Works is used as a tool to analyse the exposed environmental temperature from inner body of the machine. As a result, the efficiency of transporting these metal chips is increased and recycling process can be done more comfortably.

Keywords: Flow Simulation Metal Chips, Temperature, Solid temperature, Liquid temperature.

1. Introduction
Chips Block Making Machine works on the principle of thermal compression process, where the thermal heat is transferred to the loose metal chips and is compressed along with heat energy. This machine can be used in industries where processes like cutting, milling, grinding, planning, shaping etc. takes place. Generally, the metal chips are collected by hand and is transported either in closed carrier or opened carrier. In most of the cases, opened carrier is used and it is observed that the metal chips of smaller size and grains are exposed to air, causing loss in quantity of metal chips and health issues to the public.

We have studied that almost 40% of the metals available in market is recycled and only 30% of the waste metals received from industries are recycled. Chips Block Making Machine can change this situation. Initially, the collected loose chips are deposited at the core of the machine called inner body. The base plate is already placed at the inner body which helps to remove the block at the end. The Ni-chrome coils, which is fixed at the inner part of the outer body, heats to respective saturation temperature such that the inner body transfers the heat energy to the metal chips.

When the temperature attains the saturation point of the chip material, the molecules of the material tend to expand, a pressure plate, made of tungsten which is attached to a rack and pinion mechanism to lift and drop, is used to compress vertically such that the chips fusion with other chips. After this process, the pressure plate is lifted manually using the gear and the block which is formed is removed by lifting the base plate and separating the block from the base plate. This block now has the strength and stability to withstand the shocks from the transportation vehicle, which will reduce the normal loss...
of metal and lower the chances of inhaling the metal grains and many health hazards. This metal block can also be recycled more efficiently with low maintenance.

[1] have submitted a paper on the analysis of chip formation, where the formation of a segmented chip in the case of hard turning is studied. [2] have provided a research about the insulating firebricks and the analysis of chemical, mechanical and thermal properties. [3] have discussed about the thermal stability of aluminium alloys, results show the tensile strength against different temperatures. [4] have submitted a paper on thermal conductivity of cast iron, it results in the thermal conductivities of different types of cast irons on different temperatures. [5] submitted a paper on the mechanical properties of copper-brass alloy and the microstructure study of copper-brass alloy obtained during annealing and hardening on different temperatures. [6] have studied mainly about temperature and wear resistance of the titanium alloy and the thermal properties. [7] gave a study about the structures of stainless steel by sintering and the mechanical properties. [8] submitted a research paper on the properties and the types of zirconium, it describes about the mechanical characteristics of zirconium. [9] have studied the boron white cast iron, the result shows that the boron white cast iron has high toughness and hardness than the conventional white cast iron, also microstructure and mechanical properties were studied. [10] have made a study on the properties of beryllium and observed the hardness and tensile strength.

2. Design of Chips Block Making Machine
Outer body, inner body, Ni-Chrome coils, base plate, pressure plate, rack & pinion, support fix, gear stand 1 & 2 and the pin are the components of Chips Block Making Machine. The total height of the machine is 1050 mm and the width is 3000 mm for the assembly as shown in figure 1, figure 2 shows the assembly of the inner body.

![Figure 1](image1.png) ![Figure 2](image2.png)

**Figure 1.** Assembly of Chips Block Making Machine  **Figure 2.** Assembly of Inner body

2.1. *Outer Body*
The outer body shown in Figure 3 is of height 585 mm (23 in), length and width of 3000 mm (118 in). This body has a hollow cube and extensions extruded at the center as shown in Figure 4 to fix the Ni-Chrome coils and the Inner body. It is made of the material Aluminium-clay fire brick. The main objective of this body is to insulate the heat created, inside the inner body, from the environment. Aluminium-clay fire brick is selected because it is a good thermal insulator and can withstand up to 2300 °C.

![Figure 3](image3.png) ![Figure 4](image4.png)

**Figure 3.** Outer body  **Figure 4.** Extrude cut in outer body
3. Analysis of Chips Block Making Machine

For the analysis process, Flow simulation is used in Solidworks to study the heat transfer from the core of the machine to the environment. The ambient or the environmental temperature is considered to be 25 °C. For the second heat transfer process – radiation, radiative surface is selected. Inner body outer faces and inner faces of the outer body are selected. Black body wall type is selected for this radiative analysis.

For the final conduction process, in the outer body, the outer most faces are selected in the boundary condition option. Real wall type is selected and the Heat transfer coefficient is changed to 12 W/m²/k (Heat transfer coefficient of Al-Clay refractory brick). Average temperature surface goals are selected for the selected faces. This selection will automatically display the average temperature generated in the outer atmosphere and the outer surface. Initial global is changed to 3 and uniform type mesh is selected. The Table 1 shows the melting point and the saturation temperature of the most commonly used metals in industries.

| Material       | Melting point (°C) | Saturation point (°C) |
|----------------|-------------------|-----------------------|
| Titanium       | 1800              | 1000                  |
| Zirconium      | 1800              | 1000                  |
| Stainless Steel| 1500              | 800                   |
| Carbon Steel   | 1500              | 800                   |
| Beryllium      | 1280              | 800                   |
| Cast iron      | 1200              | 800                   |
| Brass          | 950               | 600                   |
| Copper         | 1000              | 600                   |
| Aluminium      | 660               | 400                   |
| Lead           | 350               | 150                   |

4. Results and discussions

The surface and environmental temperature is observed from the analysis for different material, which has undergone heating and compression process. Figure. 5,6,7,8 shows the Flow simulation solid temperature and flow simulation fluid temperature for materials like titanium and zirconium, which is heated to 1000 °C.

Figure 5. Flow simulation solid for front face (1000 °C)

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Figure 6. Flow simulation fluid for front face (1000 °C)

Figure 7. Flow simulation solid for side face (1000 °C)

Figure 8. Flow simulation fluid for side face (1000 °C)

Figure 9. Flow simulation solid for front face (800 °C)

Figure 9, 10, 11, 12 shows the Flow simulation solid temperature (body temperature) and flow simulation fluid temperature (air temperature) for materials like stainless steel, carbon steel, beryllium and cast iron, which is heated to 800 °C.
Figure 10. Flow simulation fluid for front face (800 °C).

Figure 11. Flow simulation solid for side face (800 °C).

Figure 12. Flow simulation fluid for side face (800 °C).

Figure 13, 14, 15, 16 shows the flow simulation solid temperature (body temperature) and flow simulation fluid temperature (air temperature) for materials like brass and copper, which is heated to 600 °C.

Figure 13. Flow simulation solid for front face (600 °C).
Figure 14. Flow simulation fluid for front face (600°C)

Figure 15. Flow simulation solid for side face (600°C)

Figure 16. Flow simulation fluid for side face (600°C)

Figure 17. Flow simulation solid for front face (400°C)

Figure 17, 18, 19, 20 shows the Flow simulation solid temperature (body temperature) and flow simulation fluid temperature (air temperature) for materials like aluminium, which is heated to 400°C.
Figure 18. Flow simulation fluid for front face (400 °C)

Figure 19. Flow simulation solid for side face (400 °C)

Figure 20. Flow simulation fluid for side face (400 °C)

Figure 21, 22, 23, 24 shows the Flow simulation solid temperature (body temperature) and flow simulation fluid temperature (air temperature) for materials like lead, which is heated to 150 °C.

Figure 21. Flow simulation solid for front face (150 °C)
5. Conclusion
An effort has been made to study and display the outer body temperature and surrounding environment temperature produced during the thermal compression process in the machine. The displayed figures 25, 26, 27, 28, 29 and 30 concludes with our study that the environmental temperature is safe for work and no excess temperature is generated from the machine other than from conduction and radiation heat.
Figure 27. Average temperature in faces (600 \degree C)

Figure 28. Average temperature in faces (400 \degree C)

Figure 29. Average temperature in faces (150 \degree C)

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