

ABSTRACT

Coffee plants have many uses, starting from being processed into drinks, beauty, deodorizing to being used as animal feed. How to make animal feed through raw coffee husks is usually done in the traditional way and using processing machine tools such as the Hammer Mill. Processing using processing machine tools is becoming popular nowadays because it can save labor and time. Each process requires cycle time which affects the final cost of production. One of these processing processes is the process of transferring coffee skin from one process to another that passes through a container or hopper. The object of this research is to simulate the transfer of coffee husks from the reservoir to the grinder through the hopper, using an optimal hopper design so that raw materials flow smoothly to reduce cycle time. The software used is Autodesk Inventor and Altair EDEM. Redesign the hopper using Autodesk Inventor while for simulation analysis using Altair EDEM. Simulation results from Altair EDEM show that there is blocking in the existing hopper and a comparison is made with the latest hopper design to eliminate stagnant or blocking areas. Analysis from Altair EDEM also showed a 26% increase in incoming particles and a 150% increase in particle residence time compared to the existing hopper. The results obtained show that the slope of the hopper angle greatly affects the flow rate of raw materials, and in this study the most optimal angle in the distribution process of raw materials through the hopper is 50°. After that, the selected hopper design will be proven by a visual simulation of the movement of the raw material flow, prototyping and direct testing. With this design, the cycle time and residence time are decreased and the rate of the coffee rind smoothly descends into the hammermill.

Keywords: hopper, reverse engineering, hammer mill, particles, residence time