Design Of An Automatic Soy Milk Bottle Filling And Capping Machine Using Autodesk Inventor Software

Supervised by Nuzula Afianah S.Kom, M.Cs

Muhammad Yahya Tri Budiyanto
Mechatronics Engineering Technology Study Program
Engineering Departement

ABSTRACT

The increasing public awareness of the importance of milk consumption has encouraged people to consume soy milk as a means of maintaining health and fulfilling the body's nutritional needs. Along with the growing demand and the recognized health benefits of soy milk, many Micro, Small, and Medium Enterprises (MSMEs) have entered the soy milk production industry. However, a significant number of these enterprises still utilize manual labor in the bottle filling and capping processes, which results in inefficiencies and limited production capacity. This study aims to design and develop an automatic soy milk bottle filling and capping machine to enhance production efficiency for MSMEs. The research methodology includes observation, literature review, machine design, and design testing, which involves stress analysis and design feasibility assessment. The stress analysis simulation conducted using Autodesk Inventor software indicated that the frame structure experienced Von Mises stress values ranging from 0.05 MPa to 17.97 MPa, with a minimum safety factor of 8.36 and a maximum of 15. The tray component exhibited Von Mises stress values between 0 MPa and 19.13 MPa, with corresponding safety factors ranging from 5.23 to 15. Furthermore, a design feasibility evaluation was carried out through questionnaires distributed to five expert respondents and assessed using a Likert scale. The results revealed a score of 85.2%, classifying the design within the "very good" category and indicating that the proposed machine is feasible for further development and application in MSME-scale soy milk production.

Keywords: *soy milk MSMEs, design, automatic filling, automatic capping*.