ABSTRACT

Increasing in market competition has pushed Indonesia as an agricultural country to increase the competitiveness of agricultural products. To be able to increase product competitiveness in an industry, technology research and development are needed that can meet specified production indicators such as accuracy, speed, and precision. One of the technologies that can be researched and further developed is robotic technology, such as farmbot, an agricultural robot that is expected to meet production indicators. However, in order to be used properly to be used for research purpose, a systematic approach is needed in order to produce a good design concept base and motion mechanism system. By using the Pahl and Beitz product design method, a base concept design and farmbot x-axis motion system which was selected is safe to use for research purpose. By simulating using ANSYS Workbench in the form of structural static, and deformation. Von equivalent stress mises produced on the y-axis frame are 1.2589 MPa, and the x-axis frame is 0.65808 MPa. Whereas the deformation generated on the x-axis frame is 0.003 mm, and the y-axis frame is 0.0008 mm. The allowable stress set in this study is the ultimate tensile strength of the selected material at 310 MPa, while the allowable deformation is 2.5 mm. Thus, by using Pahl and Beitz method it is found that the base and x and y motion system designs are safe, because the von-mises equivalent stress and maximum deformation that occur are still within the safe limits.

Keywords *: research, farmbot, pahl and beitz method, finite element method*