

Design of Leek Cutting Machine and Finite Element Analysis of its Chassis

Chen Fang¹, Changxu Meng¹ and Jian Wang^{1,2,*}

¹School of Mechanical Engineering, Dalian University of Science and Technology, Dalian, Liaoning, 116052, China

²Key Laboratory of Digital Design and Intelligent Manufacturing of Lightweight Castings for New Energy Vehicles of Liaoning Province, Dalian University of Science and Technology, Dalian, Liaoning, 116052, China

*Corresponding author's e-mail: wangjian191@sohu.com

Abstract. In this article, we designed and conceptualized many parts of a leek-cutting machine. We deconstructed various existing mechanisms, selected the most suitable movement mode for the product, and incorporated a wireless function module for remote control. A cutting mechanism was added for cutting the leeks, and a pulley system was included to transmit the cut leeks. Additionally, we designed a power module and a vision module to support the movement of the mechanism. The motion form of the leek-cutting machine was carefully selected. The related parts were modeled. Furthermore, the chassis was analyzed based on existing conditions.

Keywords: leek cutting machine, walking mechanism, vision module, motion simulation, three-dimensional modeling

1 Introduction

With the rapid development of modern agriculture, people's living standards are constantly improving. However, the development of China's agricultural technology has not kept pace with these rising standards. This is particularly evident in the case of leeks, which hold a very important position in agriculture. Leeks are leafy vegetables. In today's era of agricultural globalization, they are distinctive Chinese vegetables with strong competitiveness in the global market.

Currently, leek production and harvesting largely rely on hand-pushed harvesting methods or manual labor, which are labor-intensive and inefficient. Therefore, a leek cutting machine must be designed to address these challenges.