

ABSTRACT

This research aims to develop an automated hand tractor with a remote control system to enhance agricultural productivity. The identification of challenges faced by farmers, including physical factors and obstacles during the rainy season, serves as the basis for developing solutions. The main objective is to design a remote control system for the hand tractor using the AFHDS Protocol-based control system. A remote control, based on Arduino Nano, is utilized to operate the power window motor for engaging the clutch brake on the hand tractor. The implementation of the AFHDS Protocol control system enables farmers to operate the tractor efficiently from a remote distance, overcoming environmental and weather-related obstacles. The test results indicate that the controller device functions according to user instructions through the remote control system. Distance communication tests show good performance, with the ability to transmit signals up to 110 meters in the field. Despite signal disruptions at certain points, such as tall buildings and trees, command data can still be transmitted. Data analysis under various weather conditions reveals that rainy and thunderstorm weather affects communication range and signal strength. In these conditions, there is a reduction in communication range, and radio signals may be disrupted. The data analysis in Table 4.5 shows a comparison of communication methods. The AFHDS Protocol is recommended for large fields with a range of 110 meters, while wireless communication is suitable for limited areas with a range of 30 meters, and Bluetooth communication is ideal for short distances.

Keywords: AFHDS Protocol, Remote Control, Hand Tractor, Control System.