

Automatic Boom Height Control and Design Parameters for Hydraulic Drives on Potato Harvesters

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Abstract: *The greatest source of loss to potato growers has been found to be mechanical damage to tubers. The harvester is a major source of the potato damage. A considerable reduction in mechanical damage to potatoes can be achieved by coordinating various conveyor speeds on the harvester with the forward speed and potato yield. Speed adjustment of the conveyors can be achieved using a variable speed/hydraulic drive system. In this paper, an electrohydraulic automatic boom height control was designed and fabricated. The system was mounted on a Lockwood Mark 76 potato harvester and was tested for correct function of the automatic height control operating both independently from and simultaneously with manual control of the boom height. Design data for a variable speed hydraulic drive system on the harvester were collected while running the boom elevator and side elevator at different speeds for several simulated yields of potatoes. The maximum input power required for running a conveyor at a speed of 3 km/h under a potato yield of 37 t/ha was 2.43 kw. The required running torque was 108 Nm with a starting torque of 203 N.m. The corresponding hydraulic oil pressures were 3.04 MPa for running and 5.78 MPa for starting. Maximum oil flow for each motor was 36 L/min.*

Keywords: *Boom height control, design parameters, hydraulic drives, potato harvesters*