

Optimum Design of Combine Threshing Cylinder for Soybean Harvest

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Abstract : This study was carried out to develop a soybean combine thresher that enables to reduce the damage rate of soybean threshing and the rate of unthreshing. The combine threshing cylinder was developed with 6 circular axis at each end and fixed with disc plates. It was attached to the prototype combine thresher. A combine thresher that has a cylinder with circular rod type threshing pegs was used for a comparative test. A series of comparative tests were conducted using dae-won soybean. The test of the soybean thresher was performed at the cylinder speeds of 210, 240, 270 and 300 rpm, and with the concave clearance of 10, 13 and 16 mm. The separating positions of soybean after threshing were researched on a separate box with 4 sections. The soybean positions of front, center, rear and rear outside, of 59.5%, 30.6%, 7.8% and 2.2% respectively, were obtained. At the cylinder speeds from 210 rpm to 300 rpm, the damage rate of soybean was increased from 0.1% to 4.2% correspondingly to speeds. The unthreshed rate of soybean under the same condition was increased from 0.9% to 4.1% correspondingly to speeds. 0.7% of the damage rate and 1.5% of the unthreshed rate was achieved at the cylinder speed of 240 rpm and with the concave clearance of 10 mm. For Daewon soybean, an optimum cylinder speed of 240 rpm and the concave clearance of 10 mm were identified. These results will be useful for the design, construction, and operation of soybean threshing harvesters.

Keywords : soybean harvest, combine threshing, threshing cylinder, optimum design

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