The Modelling, Development and Evaluation of a Rotary Harrow

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Abstract: The objective of this study involves the development of a soil-working implement in the area. For seedbed preparing, a rotary harrow was modelled to disintegrate clods and loosen soil by the rigid tines. The cutting tools, 2 double-ended narrow blades which manipulated by the soil-implement interaction, were fabricated on the two shafts to shape an offset rotary harrow with the gang angle of 15 degrees. The blade design factors are the depth/width ratio of 3.1 and rotary speed of 60 rpm. The rotary harrow performance was compared with an offset disk harrow regarding to tillage depth and mean weight diameter (MWD) of clod fragments in a sandy loam soil. The degree of clod disintegration, expressed by the MWD, was not significantly different in the disk and the rotary harrows. But the working depth in rotary harrow was 0.19 m which was 0.11 m more than that of disk harrow. The blade width of 0.032 m produces 1.44 m total width for the mounted implement. This produces the machine field capacity of 0.6 ha/h in forward speed of 6 km/h.

Key words: Disk harrow, mean weight diameter (MWD), narrow blades, tillage, seedbed