

Krongrat Rakthiangtam 2013: Design and Development of Subsoiler's Automatic Reset Shank by Using Leaf Spring. Master of Engineering (Agricultural Engineering), Major Field: Agricultural Engineering. Department of Agricultural Engineering. Thesis Advisor: Associate Professor Prathuang Usaborisut, Ph.D. 117 pages.

Soil compaction can be alleviate by subsoiler. However one of disadvantage of using subsoiler is damage when tilled in soil with a big rock or a huge stump. This research is to design and study on mechanism of an automatic reset subsoiler's shank by using leaf spring. The 18 millimeters thick leaf spring subjected to vertical load as using in car had spring constant 3084.26 N/mm and when it was under horizontal load, it had spring constant 1535.27 N/mm. The computer simulation showed similar value of spring constant with one getting from the test. Vertical displacement of the subsoiler's shank was 41.73 millimeters under 16 kN and 103.1 millimeters before being broken by stress of 345 MPa.

Test results showed that subsoiler type 3 with 45 degree leaf spring was best suitable to work under obstruction in soil more than type 1 with 0 degree leaf spring and type 2 with 15 degree leaf spring. Because there was no damage appear in subsoiler type 3.

Specific power to soil disturbance of subsoiler type 3 with 2 plates of leaf spring was the lowest when tilled through soil with 4 x 4 inch and 50 centimeters long cement block burrying in soil at 40 centimeters depth. The subsoiler with 2 plates overlap leaf spring required 14.5 kW and the one with 3 plates overlap leaf spring required 23.14 kW maximum of average drawbar power.

The results of a shank's lift displacement showed that the 2 plates overlap leaf spring was lift 79.34 millimeters maximum and the 3 plates overlap leaf spring was lift 58.14 millimeters.

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Thesis Advisor's signature

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