A RESEARCH ON METAL AND METALLURGICAL PROPERTIES OF CHISEL TILLAGE MACHINE TINES

Serkan ÖZDEMİR[1*], Zeliha Bereket BARUT[1]

[1] Cukurova University Faculty of Agriculture, Agricultural Machinery and Technologies Engineering

*Correspondence Author: zbbarut@cu.edu.tr

ABSTRACT

Reduced tillage forms a subgroup of conservation tillage. In this system, chisel or disc tools are generally used for primary soil tillage, and milling machines, disc tools or cultivators are used for secondary soil tillage and seedbed preparation. The entire area is tillaged so that the plant residues are on the soil surface and prone to the surface. It provides significant fuel and energy savings compared to conventional tillage due to less machine traffic. In order to ensure sustainability, conservation tillage (using a chisel instead of the plow that works by turning the soil) as an alternative to conventional tillage and the development of agricultural tools and machines used for this purpose have gained great importance. Chisel is a soil cultivation tool widely used in stubble destruction and conservation tillage system. It is known that the chisel provides significant savings in terms of fuel consumption compared to the plow. For a chisel construction that can operate at an optimal level, the basic requirement is to have optimal material quality, optimal weight and optimal cost. In this research, the physical and chemical processes of chisel tines produced as cast steel were examined. It is of primary importance that it provides minimum fuel consumption with its optimal chemical content, easy mounting to the chassis, unbreakable model structure and angles. A casting and agricultural machinery company that helped with the study was visited and the GS-52 steel casting process, which is widely used for chisel tines in our country, was examined and tensile, yield and rupture tests were performed. As a result, it has been observed that a better construction can be created by changing the chemical content of GS-52 steel. Different trials to be carried out as the continuation of the research will help determine the optimal structure of the chisel tines.

Keywords: Reduce tillage, Chisel tines construction, Material quality