

Van den Akker, J.J.H., 1998. Prevention of subsoil compaction by defining a maximum wheel load bearing capacity. *Advances in Sugar Beet Research*, IIRB, Vol. 1, pp. 43-54.

Abstract

Subsoil compaction is very persistent and the effect of natural and artificial loosening is disappointing. Our objective is to solve this problem by developing a systematic way to prevent subsoil compaction by limiting the stresses exerted on the subsoil by a wheel load to the bearing capacity of that subsoil. This is the maximum wheel load exerted by a specific tyre type and tyre inflation pressure which does not exceed the strength of the subsoil. The analytical Soil Compaction Model (SOCOMO) was developed to calculate soil stresses under wheel loads, which are compared with the soil strength measured in lab tests. Field tests on trailer tyres (inflation pressure 80 and 240 kPa, wheel load 32 kN) performed to investigate the effectiveness of low pressure tyres to prevent (sub-)soil compaction and to verify SOCOMO. Compactions, deformations and stresses were measured. Compactions and deformations under the low pressure tyre were limited to the topsoil, the bearing capacity was sufficient. The bearing capacity of the subsoil was exceeded under the normal pressure tyre and compactions and deformations reached into the subsoil. The results of the model simulations agreed with the field measurements. Low tyre inflation pressures proved to be very effective in preventing subsoil compaction. A provisional map was constructed presenting the maximum wheel load bearing capacities of Dutch soils during harvesting using trailer tyres 50 cm wide with an inflation pressure of 80 kPa