MODELING OF SOIL FLOW FOR TILLAGE TOOLS, SEEDERS AND PLANTERS

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ABSTRACT Few virtual soil bins were developed at CNH to model the soil flow around the tools for tillage, planters and seeders. These soil bins were created using the Discrete-Element Method (DEM) that can also be linked with computational fluid dynamic (CFD) if necessary to include air flow. Soil properties (sand, loam, clay and mixed soil e.g. clay-loam), stubble conditions (roughness, stubble thickness, roots, stones, clusters,...) and tool geometries were imported in the software to recreate realistic desired conditions. Models are validated with field and lab tests. Different soil bins were developed, in particular for wear test, draft test, deep tillage, stone impact on tool, soil fracture, seed and fertiliser placement.

Keywords: Soil flow modeling, virtual soil bin, discrete-element method, soil fracture, draft, seed placement