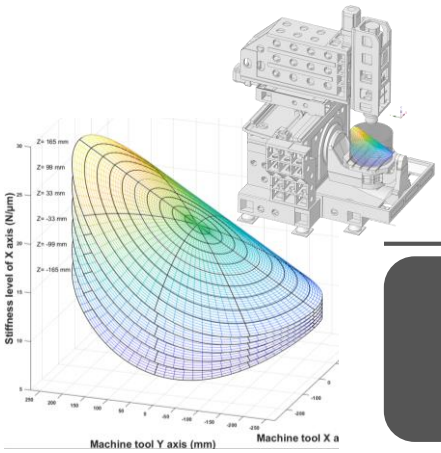
CENTRO DE COMPETÊNCIA EM MANUFATURA



ROMI

Performance Assessment of Machine Tools Based on Structural Stiffness

Motivation

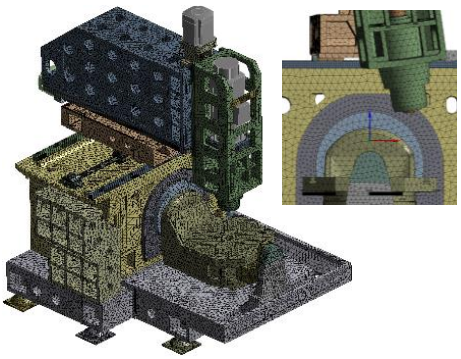
The machine's structural stiffness is recognized as a relevant factor for its accuracy level. However, for in almost cases the structural stiffness is different for each machine's axes and it varies during the cutting process. Bearing this in mind these is fundamental considers how the machine's accuracy is affected by the different axes.

Objective

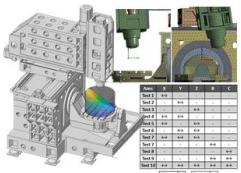
Map the machine' structural behavior and its influence on the geometrical accuracy of a machined part.

Approach

Two investigations were proposed. In the first investigation each translational machine axis' structural stiffness was mapped, in its entire work volume. This first investigation applied a finite element model to map the directional stiffness of the axes. In the second investigation, the stiffness map was correlated with machined parts. To achieve this correlation, experimental tests were performed by machining parts in different points of the machine's work volume.

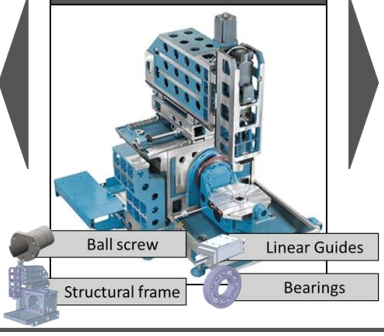


Machine's characteristics

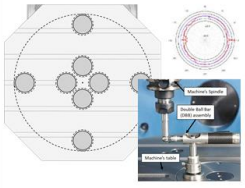


Stiffness of machine's axes; Influence of maximum acceleration

Structural behavior



Experimental tests



Correlation of stiffness and accuracy performance

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