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THE VEINING STRUCTURE METHOD, THE FINITE ELEMENT METHOD IN THERMAL DEFORMATION DETERMINATION FOR THE MAIN SPINDLE AT NUMERICAL CONTROL LATHES

ABSTRACT

In the determination of the process accuracy on CNC lathe it is very important to know the thermal deformations. This article presents a new solution to obtain the thermal deformations at the principal arbor (the most important part of a principal actuation for a CNC lathe) by using the element finite method. The first part of the theoretical aspect presents the steps of this method used especially for the principal arbor. The experimental part presents how this method was used to measure and process the signals. The experimental tests were applied in two different situations: (a) when material was catch only in principal arbor, and (b) when material was catch in principal arbor and chuck. The NASTRAN MSC program was used, high as the possibility to determine the temperature values in the whole mass of the principal arbor and later the deformation temperature of every point of the ensemble was obtained. In order to analyze the thermal strain influence on the main spindle, the finite element method, the veining structure of a body was used. This is a method through which the "mother" (complex) structure was split in composing parts considered as independent, (substructures). The link between different substructures in which the complex structure was split, is made on the common contour of substructures. The substructure becomes this way an independent structure with edge condition, constraint by assembly continuity of initial structure.

KEYWORDS

[finite element](#), [thermal deformation](#), [main spindle](#)

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