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Article Abstract

Title: **Characterisation of dynamic behaviour of vertical machining centre components: experimental and simulation approaches**

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Abstract: The paper presents a systematic procedure and details of the use of experimental and analytical modal analysis technique for structural dynamic evaluation processes of a vertical machining centre. The main results deal with assessment of the mode shape of the different components of the vertical machining centre. The simplified experimental modal analysis of different components of milling machine was carried out. This model of the different machine tool's structure is made by design software and analysed by finite element simulation using ABAQUS software to extract the different theoretical mode shape of the components. The model is evaluated and corrected with experimental results by modal testing of the machine components in which the natural frequencies and the shape of vibration modes are analysed. The analysis resulted in determination of the direction of the maximal compliance of a particular machine component.

Keywords: experimental modal analysis; EMA; vibration; vertical machining centres; VMC components; mode shape; structural dynamics; milling machines; finite element method; FEM; modelling; simulation.

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