EXPERIMENTAL RESEARCH ON THE THERMAL BEHAVIOUR OF FEED AND POSITIONING KINEMATIC CHAIN

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Rezumat. *Cele mai importante direcţii de dezvoltare ale maşinilor-unelte CNC sunt: precizie înaltă, fiabilitate, calitate, productivitate şi costuri de producţie reduse. O contribuţie remarcabilă în îndeplinirea acestor obiective o are lanţul cinematic de avans / poziţionare* (*LCA / P*) *şi şurubul cu bile. Căldura generată de frecare produce erori ale mecanismelor din structura LCA/ P ce influenţează precizia de poziţionare pe axele comandate numeric. Ca urmare, se impune studiul comportării termice pentru reducerea şi compensarea deformaţiilor termice ale cuplei şurub-piuliţă cu bile, în scopul de a îmbunătăţi precizia tehnologică a maşinii-unealtă*.

Abstract. *The most important directions in CNC development can be considered high precision, liability, quality improvement, the increase of productivity and reduction of the production cost. An outstanding contribution in fulfilling these conditions was brought by attaching at CNC structures a ball screw driving feed drive system. The friction heat generates errors on position accuracy on machine axis. The main purpose is to reduce the thermal deformation of ball screw for bringing accuracy in machine activity*.

Keywords: thermal behaviour, CNC machine, ball screw system, structural and thermal behaviour, advance and positioning kinematic chains

1. Introduction

In the whole industry the most important need is the high quality of finishing processing. Those CNC machine tools use high-speed ball screw. Also to have such a high performance we need to reduce the errors due to thermal moving elements, balls of bearings and support bearings, motors and ball screw nut has internal heat sources [1].

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