UNIVERSITATEA POLITEHNICA BUCUREŞTI
FACULTATEA DE INGINERIE INDUSTRIALĂ ŞI ROBOTICĂ

TEZĂ DE DOCTORAT

CERCETĂRI ȘI PERSPECTIVE DE DEZVOLTARE A CALITĂȚII PRODUSELOR METALICE REALIZATE PE MAȘINI CU C.N.C.

Conducător de doctorat: Prof. univ. emerit dr. ing. Iosif TEMPEA

Autor: ing. ec. Neta Pușcaș (Popescu)

BUCUREŞTI
2020

Abstract

The global market must offer products that adapt to customer needs, which involves large investments and long-term employments. The diversity and multiplicity of economic products on the globalized world market has led to a change in buyers' behavior.

Consumers' thinking is anticipated by producers. Product quality has become an important economic indicator that makes a difference.

The thesis presents studies and research in the field of bent metal parts, with thicknesses of: 1 mm, 1.5 mm, 2 mm, 2.5 mm and 3 mm, made of OL 37.

Studies and researches have provided numerous answers to the problems facing companies. Product quality is the main attribute.

Researches and studies in the field of metal parts on CNC machines were carried out in two stages, respectively in two companies with different equipment and MUCN. The objective of the thesis was to determine the optimal bending coefficient Kî with which to calculate the unfolding of bent parts.

During the research it was found that in addition to the parameters necessary to perform bending, namely: material type, chemical composition, material thickness, number of bends, type of tools used (die / punch pair), bending part limitations, bending speeds (at bending and punch lifting stroke), other variables appeared that adversely affected this operation.

During the bending operation, variables appeared that adversely affected the quality and accuracy of the parts made.

The quality and precision of the parts bent by non-quantifiable variables were affected, respectively: machine vibrations during the execution of parts, wear of tools used, roughness and unevenness of the material, ambient temperature, tolerance between the surface of the bending tools, high tool speeds during stamping operation, hardness of material used, etc.

The bending coefficients that have been determined for the parts of the specified material thicknesses and bends at angles of 90^0, can be used in the calculation of the unfoldings of the parts, as a compensating factor for the multitude of variables. The bending coefficients Kî were obtained by simulations, tests, verifications and experimental measurements.