

USING OF DESIGN OF EXPERIMENTS FOR DESCRIBING OF IMPACT OF COLD DRAWING PROCESS PARAMETERS ON PLASTIC PROPERTIES OF WIRE FOR STEEL ROPES

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Abstract

Shear deformation of subsurface layers in wire drawing leads to marked non-uniformity of strain across the wire cross section. In wires intended for products operating under dynamic loads, such as ropes and springs, the variance in work hardening level across the cross section may cause fatigue fractures. In this paper we used physical modelling in an attempt to show how the non-uniformity of strain in drawing can be reduced by changing key process parameters. For this purpose, a full factorial experiment involving three factors was undertaken. (The factors included the approach angle 2α , single pass strain Qd or the number of passes n and type of scales removing (pickling or 2 axis bending + brushing.) The simulation involved drawing of 2.5 mm C78DP steel wire from 5.5 mm thick rolled rod. Single wire drawing block Koch with rotating die holder was used for the modelling. In this paper we evaluate the influence of factors on final plastic properties of the wire (number of torsion to fracture). The test was conducted in accordance with the ČSN ISO 7800 standard Metallic Materials - Wire - Torsion test.

Keywords: Wire drawing, wire for steel ropes, strain, approach angle, simple torsion test

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