

RESEARCH ABOUT ROUGHNESS AFTER TURNING WITH SMALL CUTTING FEEDS

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An assembly shaft-bore, the shaft being mounted by running fit into bore, has been designed. On both parts of fit, made by OL 37, has been executed 8 steps, each step being machined by cylindrical turning, with same cutting feed for each step (for shaft and bore) but different cutting feeds for the 8 different steps. For high values of cutting feeds, plastic deformations are large but it is maintained parallelism of ribs on the processed surface. Non-uniform flutes and ribs with uneven thickness can be observed. Also, more elements of chips on ribs and interruptions of some ribs can be detected.

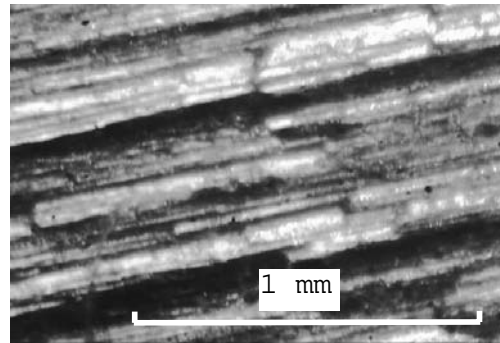


Fig.1. Surface roughness after turning with high feed

In range of very small cutting feeds, the plastic deformations have a much higher influence on roughness than for normal or great values of cutting feeds. In range of small cutting feeds, some disturbances ratio geometrical roughness appear because of phenomena from plastic deformation in cutting area. Also, appear elements of chips that make uneven into geometrical flutes generated by cutting tool and, thus, the measured value of roughness is non-uniform. Viewing under microscope of micro-asperities of surfaces allowed finding explanations about measured values of roughness parameters. It has been measured the roughness after turning with small cutting feeds for shaft and bore (table1) and these have been correlated with plastic deformation phenomena.

Table 1. Values of roughness parameters obtained after turning on small cutting feeds

Sample	Cutting feed	Shaft			Bore		
		Ra	Rz	Rq	Ra	Rz	Rq
1	0,053	4,85	28,53	6,01	2,19	14,56	2,73
2	0,059	4,58	27,94	5,65	2,21	13,28	2,71
3	0,075	4,72	29,15	5,86	2,49	14,16	2,97
4	0,083	4,84	32,29	6,10	2,68	15,49	3,20
5	0,088	5,43	35,86	6,76	2,48	13,80	2,98
6	0,096	6,18	36,16	7,75	2,88	17,80	3,53

They are presented microscopic images of surfaces, tables with final results and diagrams of roughness depending on cutting feed values for small cutting feeds range. Conclusions denote the advantages and disadvantages of using small cutting feeds.

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