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Study of surface state after annealing of a steel 42CrMo4 part machined by turning with a ceramic tool and a carbide tool

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This article exposed the results of an experimental study on the machining of steel annealing 42CRMO4 with Brinell hardness HB 174, with two cutters: white zirconia ceramic (Al_2O_3 and ZrO_2) and the carbide (made of tungsten carbide WC). The test series is devoted to the study of the influence of cutting conditions on the main criteria of the roughness of the machined surfaces (R_a , R_z and R_t), to do this we have made plain factorial trials and based on multifactorial the method of experimental design, the variable parameters: cutting speed, feed per revolution and the depth of cut. Modeling results helped lead to mathematical models like Gilbert (Taylor model generalized). When machining of the steel pure ceramic gave very good surface states with high cutting speeds.