



Comparative Analysis between machining forces at different cutting parameters & study of overall performance of uncoated & CNT Coated tools

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Introduction : The cutting performances of tools depend on cutting force and thrust force. These have a lot of bearing on the chip appearance and the resulting surface finish. A reduced cutting force is beneficial, primarily because it demands less motor power of the cutting machine while a reduced thrust force helps by lowering the demands for machine stability. Many authors have shown that a TiN-coated tool yields lower forces than the conventional uncoated HSS tool. A number of papers have also reported an improved surface finish of the chips . However, this is of minor importance for the cutting performance, but is an indication of changed in the contact conditions between chip and tool. While TiC and Al₂O₃ appear to provide the most chemically stable screening layer between chip and tool, TiN appears to offer the lowest tool friction. This has been attributed to a lower chip surface strengthening action of nitrogen than carbon when the coating materials is decomposed in the presence of the austenitic surface of the chip. TiN and TiC coated tools give good surface finish on the work piece because the contact conditions between the tool and work piece cause smaller or fewer built-up edge (BUE) fragments which could be deposited on the cut surface, and also partly by the fact that the lower forces obtained do reduce tool vibrations, which lead to deterioration in the surface finish in the case of using conventional tools.



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