Investigation on hole manufacture in 42CrMo4 steel using 3-flute carbide drills and 6-flute cermet reamers

An investigation on cutting forces and hole quality using carbide 3-flute self-centering drills and 6-flute cermet reamers was performed on 42CrMo4 alloy steel. Different depths of cuts were analyzed with respect to cutting thrust and cutting torque, hole diameter, form and surface integrity. Good reproducibility in cutting forces was obtained for all drilled holes with coefficients of variation less than 6% for thrust and 8% for torque respectively. Good reproducibility for all depths of cuts was obtained in reaming, reaching coefficient of variation in the range 7-13% for thrust and 9-23% for torque. It was found that drilled holes were generally reproducible with low form error, recording roundness less than 10 μm and cylindricity less than 30 μm as well as low roughness (Ra).