

Study of the Roughness of Carbon Fiber-Reinforced Composite Plates in Peripheral Cryogenic Milling

Rosario Domingo^{a)}, Marta M. Marin^{b)} and Beatriz de Agustina^{c)}

Department of Construction and Manufacturing Engineering, Universidad Nacional de Educación a Distancia (UNED); C/Juan del Rosal 12, Madrid E-28040, Spain

^{a)}Corresponding author: rdomingo@ind.uned.es

^{b)}mmarin@ind.uned.es

^{c)}bdeagustina@ind.uned.es

Abstract. In recent years, the cryogenic machining is being studied with interest due to its potential as an environmentally friendly process and to its possible efficiency. This machining has achieved some improvements respect to the conventional machining, as can be the surface quality in some alloys. This paper presents a study focused on the cryogenic peripheral milling of composites reinforced with carbon fiber, in particular in the roughness, which is compared with results obtained in a conventional peripheral milling. The methodology used combines experimentalism and statistics. The tests were carried out in a machining center at different cutting conditions; the cryogenic fluid, nitrogen, impacted directly on the tool, and it did not affect to composite plates. The experimental outcomes, measured by a profilometer, were statistically analyzed and the most influential parameters and variables were identified, confirming the good performance of cryogenic machining and contributing to a greater knowledge of this process.