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Cooling system using LN₂ and compressed air mixture: An experimental study on machining of Nickel based super alloy

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Abstract: A major problem in machining industry during machining process is increased temperature which affect quality and production cost. Increase in cutting temperature causes not only affects surface integrity, nucleate sub-surface micro cracks but accelerates rapid oxidation and corrosion. It also reduces the life of a cutting tool. To control the temperature at the cutting edge, machining industries use many fluids and lubricating oils, but usage of these conventional coolants are not effective in reducing temperature and tool wear. Further it has limitations in terms pollution and increase in handling and disposal cost. In this context, cryogenic machining has become one of the alternative methods to control the cutting temperature and tool wear. This research paper tried its best to use LN₂ as coolant during machining of Inconel 718 Nickel based superalloy material and comparative study on influence of lead level (H₁ and H₂) of cryogen in cryocan on cut edge temperature by varying cutting speed and depth of cut is done.

Keywords: cryogen, cryocan, surface integrity, rapid oxidation, corrosion, Inconel 718, cut edge temperature.

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