

## Application of the Experimental Planning Design to the Notched Pre-cracked Tensile Fracture of Composite

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**Abstract :** Composite materials have important assets compared to traditional materials. They bring many functional advantages: lightness, mechanical resistance and chemical, etc. In the present study we examine the effect of a circular central notch and a precrack on the tensile fracture of two woven composite materials. The tensile tests were applied to a standardized specimen, notched and a precracked (orientation of the crack  $0^\circ$ ,  $45^\circ$ , and  $90^\circ$ ). These tensile tests were elaborated according to an experimental planning design of the type 23.31 requiring 24 experiments with three repetitions. By the analysis of regression, we obtained a mathematical model describing the maximum load according to the influential parameters (hole diameter, precrack length, angle of a precrack orientation). The specimens precracked at  $90^\circ$  have a better behavior than those having a precrack at  $45^\circ$  and still better than those having of the precracks oriented at  $0^\circ$ . In addition the maximum load is inversely proportional to the notch size.

**Keywords :** polymer matrix, glasses, fracture, precracks

**Conference Title :** ICSRD 2020 : International Conference on Scientific Research and Development

**Conference Location :** Chicago, United States

**Conference Dates :** December 12-13, 2020