

MICHAEL NATSUTI, Dept of Computer Sciences, Mathematics, and Engineering, Shepherd University, Shepherdstown, WV, 25443, and LEVI JUNKINS, Dept of Computer Sciences, Mathematics, and Engineering, Shepherd University, Shepherdstown, WV, 25443, and JASON MILLER, Dept of Computer Sciences, Mathematics, and Engineering, Shepherd University, Shepherdstown, WV, 25443. Carbon Fiber Resin Composite Strength Relative to Orientation.

Carbon fiber resin polymer (CFRP) is a laminate of multiple sheets of carbon fiber woven cloth infused with epoxy resin. The combination is hard, strong, and lightweight, making it ideal for aerospace applications. CFRP is not as well characterized as other construction materials such as metal, wood, and plastic, for which datasheets are easy to find in the public domain. To promote the wider use of CFRP, we used a universal testing machine to measure CFRP sample coupons obtained from manufacturers of experimental aerospace vehicles. The tensile strength and elongation of the CFRP coupons were measured with the weave oriented at an angle of 0, 45, and 90 degrees. Results show that CFRP sheets with a weave orientation of 45 degrees is 1.5 times stronger than the weave of 0 degrees, and 1.1 times stronger than the weave of 90 degrees. These results imply that the strongest part of CFRP sheets is diagonal relative to the weave. For future work, we propose to use larger sample sizes, incorporate different thicknesses of sample, and compare CFRP samples to metal samples of similar sizes.