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Question 3

The mechanical behavior of composites differs from the mechanical behavior of conventional isotropic metals is that composites are anisotropic meaning it is dependent on the direction of the applied load. Composites offer high strength to weight ratio with high durability, stiffness, damping, flexural strength, resistance to corrosion, high impact and fire which could lead for uses in automobile, aerospace, biomedical and other manufacturing needs. Conventional isotropic metals responses are independent from the way of loading meaning its mechanical behavior is the same in different directions and is constant in young’s modulus, shear modulus and poison’s ratio compared to composites.

This influences how engineers must design with composites materials because they do not do well under heavy compression force such as pillars, which is where conventional metals would work better. Composites would be used due to their lightness in weight while still being durable, smooth in texture, high tensile strength, and rust resistance. More specifically, factors that influence the stiffness of composites are the nature and properties of materials, the properties of the individual materials used to make the composite significantly affects its stiffness. Volume fraction of the composite material is another factor with each proportion of each material affect on stiffness and increasing the fraction can lead to higher overall stiffness. The arrangement of material of how its distributed impacts its stiffness. Manufacturing process can be done to influence stiffness with processes that align fibers along various directions of forces.