The strength of materials is a branch of engineering concerned with the resistance and durability of materials, with their ability to resist forces from within and from without. The ability to design structures, bridges or aircrafts using this information is a key factor in engineering projects. In this article we discuss the importance of strength-of-materials in engineering studies and how you can find out about it better. Strength comes from two different sources: its tensile strength, which is how much force it takes for a material to break or deform, and its compressive strength or pressure that a material is able to withstand before breaking or deforming. It is important to note that any material, including concrete or wood, can have tensile strength only when the materials are strong enough to resist breaking under tensile stress. The compressive strength of a material mainly depends on how many atoms are bonded together to form the material. These tensile and compressive strengths are different for each material. Wood, for one example, has a lower tensile strength than concrete or steel; conversely it has greater compression strength than steel or concrete (about 45 MPa (Mega Pascals) compared with 20 MPa for concrete and 30-35 MPa for mild steel). A material's compressive and tensile strengths also depend on the materials' hardness, the modulus of elasticity and the density. The most important factors affecting strength of materials are: Strength of materials is one important and crucial aspect in many aspects of engineering that we use in our daily lives. A common example would be using a structural integrity analysis tool to design bridges or any other construction. One application would be to make sure the project was safe before initiating it (making sure no one is trapped within). Another application would be if there was an earthquake, for example; it could help engineers know the type of support the structure needs before designing it (e.g. change of level, support beams, etc.). Another application of strength of materials would be to design aircraft, cars, or any type of transportation. This would help engineers predict how their cars or other vehicles will last in harsh conditions. Lastly, it is used to design structures that are strong enough to hold up under great loads. This process should start with finding out about the features the material has that must be taken into account while designing something. The important features that are related to strength of materials are: 1) The tensile and compressive strengths (how much force it takes for a material to break; the number of atoms comprising the material; if there are not enough atoms for stability). 2) The modulus of elasticity (how many times the material can be stretched before it becomes flexible). 3) The density. 4) The hardness of the material.

In this table, “E” represents the energy needed to break a sample of a certain component, and “N” represents the number of particles needed to make up one gram. In other words, "N" = "E" / "m". In this table we have data for steel and carbon fiber. Steel has lower tensile strength compared to carbon fiber, but higher compressive strength compared to carbon fiber.

588eeb4e9f3280