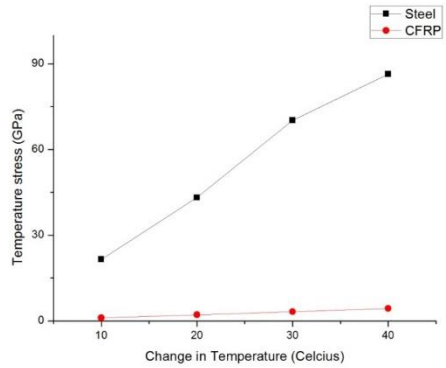

Figure 6. Comparison of temperature dependency on stress

As temperature increases the stress behavior of steel changes which gradually reduces its stiffness and strength, whereas for carbon fibre reinforced polymer the effect of thermal stress on the cable is negligible**.**

4.4 Influence on endurance time

Materials subjected to constant load over a period of time can suddenly fail. Assuming the heat convection of air is 20W/(m2.K), it would take 184sec for temperature to generate in carbon fibre reinforced polymer cable but about 481sec for steel cable. The results show that the endurance time of carbon fibre reinforced polymer is lower than steel as compared. However, carbon fibre reinforced polymer cable is generally not affect by environmental conditions.

5. CONCLUSIONS

In this paper a carbon fibre reinforced polymer cable is analyzed based on thermal effect and compared with the thermal behaviour steel cable to investigate the influence of temperature variation on the mechanical behaviour of both cables. Several analyses have been discussed, highlighting the influence of temperature on cables used in cable structures. It can be drawn out that

1. The mechanical properties of carbon fibre reinforced polymer cable do not drastically decrease with increase in environmental temperature as steel cable.
2. The displacement value due to temperature change for carbon fibre reinforced polymer cable is lower than that of steel
3. The stress relationship for carbon fibre reinforced polymer cable was low as compared with steel.

For realistic temperature variation, significant effect in the cables has been experienced numerically. The temperature effect on steel is much more evident with higher values as compared with carbon fibre reinforced polymer. Hence, carbon fibre reinforced polymer cable tends to have more favorable properties when it comes to temperature variation. Carbon fibre reinforced polymer cable offers a greater thermal efficiency than steel cable. Thus, this lightweight material could significantly reduce the overall cost associated with thermal control in cable structures.

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