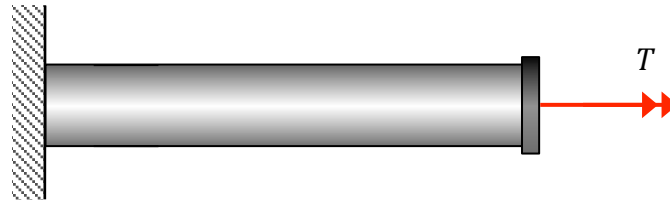


## Q: Does the length of a shaft change under a torque loading?

F.O. Falope, L. Lanzoni and A.M. Tarantino, "Finite Torsion of Compressible Circular Cylinders: An Approximate Solution," *Journal of Elasticity*,  
<https://doi.org/10.1007/s10659-022-09928-x>



A: For small deformations (linear theory, as in this course), NO.  
For large deformations, YES.

Shown below are results from large deformation analysis of shaft. The results show both elongation and a decrease in cross-sectional area.  $\alpha_0$  is the angle of twist of shaft in radians.

