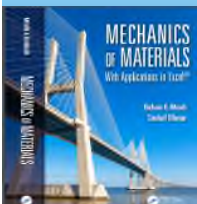


MECHANICS OF MATERIALS: WITH APPLICATIONS IN EXCEL CHAPTER 2: TORSIONAL LOADS

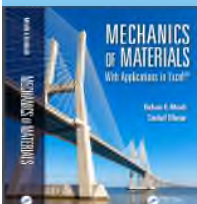
LECTURE 9

2.4 STATICALLY INDETERMINATE SHAFTS



Lecture Outline

- Definition
- Solution Procedure
- Examples

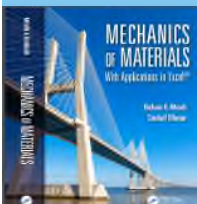
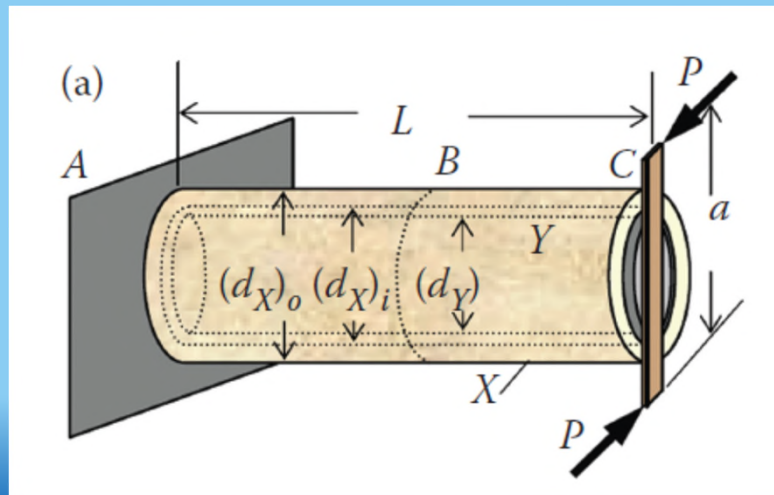


Lecture 9

Chapter 2. Torsional Loads

Definition

- statically indeterminate shaft is one in which the number of unknown quantities exceeds the number of available equilibrium equations.
- Situation may happen when more than one material are involved or there are too many torsional reactions.

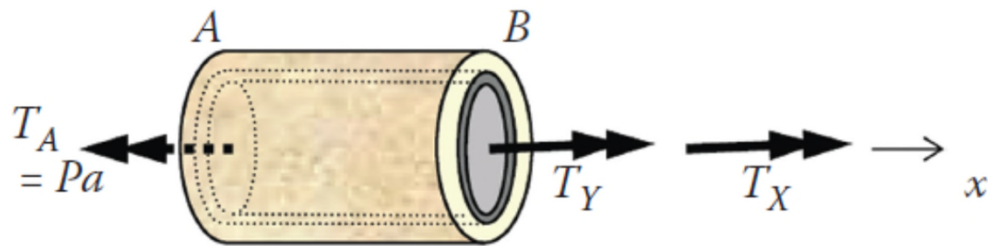


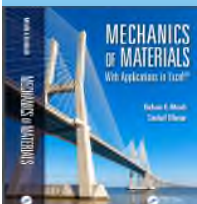
Lecture 9

Chapter 2. Torsional Loads

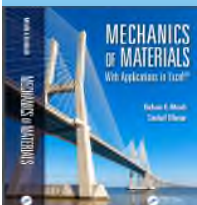
Solution Procedure

- Supplement the conditions of equilibrium with relations arising from the deformation characteristics of the shaft under consideration

<p>(b)</p> 	$\sum T_x = 0 \Rightarrow T_X + T_Y - Pa = 0$ $\theta_X = \theta_Y \Rightarrow \left(\frac{TL}{JG} \right)_X = \left(\frac{TL}{JG} \right)_Y$
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Examples



Lecture 9

Chapter 2. Torsional Loads