Solving an Eng. Problem

1. Known
2. Find
3. Schematic
4. Decision
5. Assumption
6. Analysis
7. Comments

What do we need:

- **Force**: \( F = m a \)  
  \( [\text{kgm/s}^2 = \text{Newton}] \)

- **Work ↔ Energy**: \( W = F x s = T x \theta = \Delta E \)  
  \( [\text{Nm} = \text{Joule}] \)

- **Power**: \( \dot{W} = F \times (ds/\ dt) \)  
  \( \dot{W} = F \times V = T \times \omega \)  
  \( [\text{Nm/s} = \text{J/s} = \text{Watt}] \)

- **Conservation of Energy**: \( \Delta E = \Delta E_{\text{kin}} + \Delta E_{\text{pot}} + \Delta U = Q + W \)

- **Equilibrium of Forces**: \( \sum F = m a \)  
  \( [\text{N}] \)

  \( \sum M = I \times \alpha \)  
  \( [\text{Nm}] \)

  \( I...\text{moment of inertia} \)

- **Shape, Material, Size, ...**
- **Simplifications, Model, ...**

\( a \times b = C \)  
\( 1.2 \text{ m} \times 0.5 \text{ m} = 0.6 \text{ m}^2 \)

- Use SI units for calculation
- Number x Unit = Quantity

- Limits of the results