Housekeeping

- **Tuesday**
  - Q 5 start day
- **Wednesday**
  - PL 18
- **Thursday**
  - ME 19
- **Friday**
  - Oct 28: last class day TAM 210 (review?)
  - Oct 30,31: TAM 210 office hours 5-7pm 112 Transp Building
- **Sunday**
  - WA 10 (last 210 WA)
- **Next week**
  - TAM 211 usual stuff
  - TAM 210 FINAL (Nov 1 – Nov 5) – sign up on CBTF

The tunnel ends!! (for some)
Draw the shear and moment diagrams for the simply supported beam.
Draw the shear and moment diagrams for the beam.
Wherever there is an external concentrated force, or a concentrated moment, there will be a change (jump) in shear or moment respectively.
Friction

Friction is a force that resists the movement of two contacting surfaces that slide relative to one another. This force acts tangent to the surface at the points of contact and is directed so as to oppose the possible or existing motion between the surfaces.

Dry Friction (or Coulomb friction) occurs between the contacting surfaces of bodies when there is no lubricating fluid.
Dry friction

- Consider the effects of pulling horizontally (force $P$) a block of weight $W$ which is resting on a rough surface.

- The floor exerts an uneven distribution of normal forces $\Delta N_n$ and frictional forces $\Delta F_n$ along the contacting surface.

- These distributed loads can be represented by their equivalent resultant normal forces $N$ and frictional forces $F$.
Dry friction

Table 8–1 Typical Values for $\mu_s$

<table>
<thead>
<tr>
<th>Contact Materials</th>
<th>Coefficient of Static Friction ($\mu_s$)</th>
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</thead>
<tbody>
<tr>
<td>Metal on ice</td>
<td>0.03–0.05</td>
</tr>
<tr>
<td>Wood on wood</td>
<td>0.30–0.70</td>
</tr>
<tr>
<td>Leather on wood</td>
<td>0.20–0.50</td>
</tr>
<tr>
<td>Leather on metal</td>
<td>0.30–0.60</td>
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<tr>
<td>Aluminum on aluminum</td>
<td>1.10–1.70</td>
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</table>
Given:  Crate weight = 250 lb and \( \mu_s = 0.4 \)

Find:  The maximum force \( P \) that can be applied without causing movement of the crate.