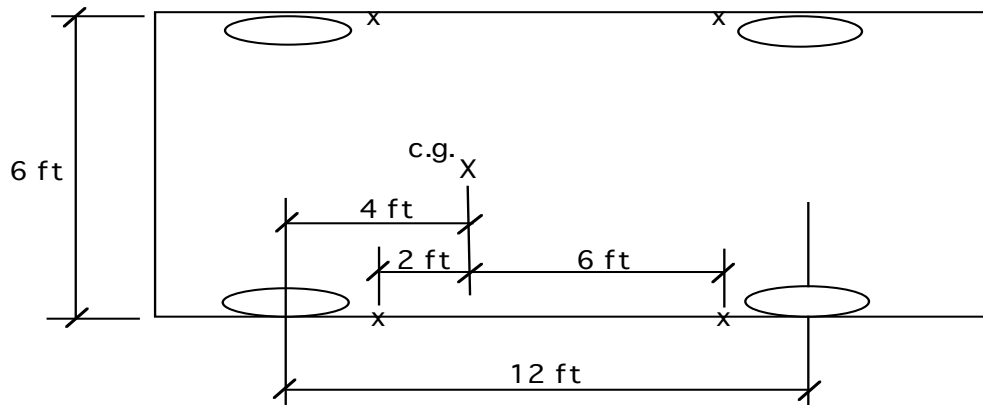


Design a screw-driven jack to be used with an ATM service vehicle weighing 6000 lb. A top view of the vehicle is given below showing the center of gravity and possible jack locations X:



Your design must:

- be able to resist static strength failure modes with a factor of safety of $n = 2.0$, using standard mechanical design methods for components. Use the Shigley text, not AISC.
- be able to carry the maximum load for changing a tire assuming level ground.
- be a screw-driven pin-bar scissor jack or similar mechanism—no hydraulics.
- be self-standing.
- be able to be set up and operated manually by one person.
- have a minimum raising distance of 12 inches vertically, of which at least 8 inches will be under load. Note: These distances may be increased as you wish to accommodate your design.
- include a removable, easy-to-use crank handle.
- be able to be built from your final report and drawings.

Note: Neglect the effects of the suspension system. Assume rigid-body contact.

Schedule: Submit copies of two progress reports (not returned) and the original final report.

1. **November 11. List of Team Members and Jack Design Load:** List of team members (three or four members) and a one-page summary of analysis of the maximum load the jack must support.
2. **November 18 or 20. Force Analysis and Preliminary Design:** Sketch of design concept with approximate dimensions; member forces at contact height and full height; preliminary calculations and design of main members: power screw, compression members, tension members, crank handle.
3. **December 9. Final Written Report:** A well-organized, stand-alone report that must include a typewritten and illustrated presentation of your design, a summary of the design goals and how your design accomplishes them, professional-quality drawings for all components, and appendices containing mechanical design calculations for main components. The result must be a report that effectively communicates a design that is technically sound and can be implemented.

Basis of Project Grade: Effective communication of the final report, quality of the drawings, soundness and completeness of mechanical design, and accomplishment of the project goals. Missing or unsatisfactory progress reports will result in points deducted up to 10%. will be discussed in class.

Further Guidelines: See the separate document "GE 410 Project Report Guidelines."