

# ME 119: Product Design II

PROJECT

First Draft

19 November 2008

The goal of this project is to design and package the gearbox considered in Case Studies 7-A, 7-B, and 7-C (see the first figure below). The torque demanded by the compressor is as given in the second figure. Hence, the maximum value of the torque is 800 lb-in and the minimum value -250 lb-in. Angular velocities of the engine and the compressor are 4000 rpm and 1600 rpm, respectively. Only the dimensions of the shafts and the gears will be determined analytically, following similar steps as the Case Studies 7-A, 7-B, and 7-C. You can make similar assumptions made in these case studies. After the shafts are sized, the final safety factors for them will be determined using CosmosExpress. Drawing for the final design of the gearbox will be carried out in SolidWorks.

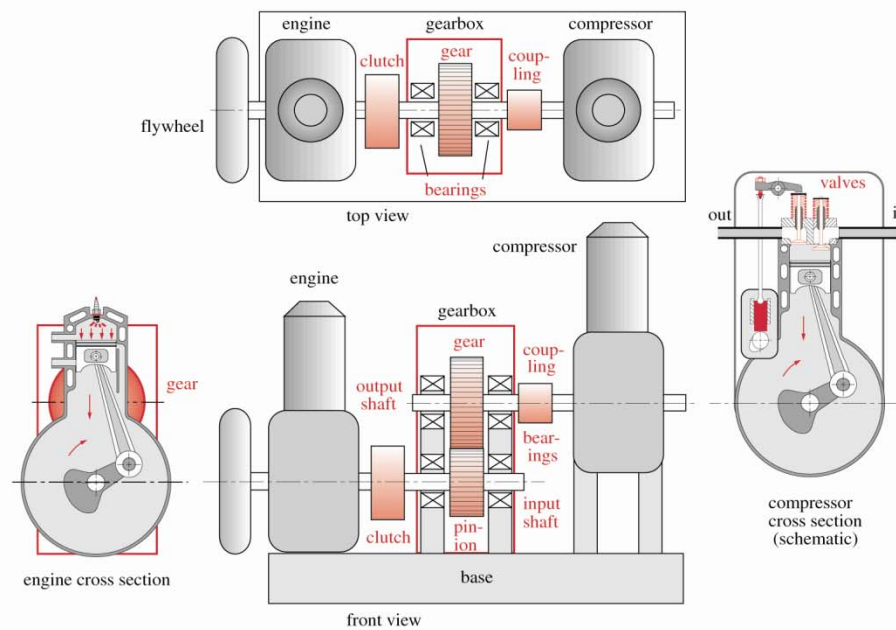


Figure 8-1

Preliminary Design Schematic of Gasoline-Engine-Powered Portable Air Compressor, Gearbox, Couplings, Shafts, and Bearings.

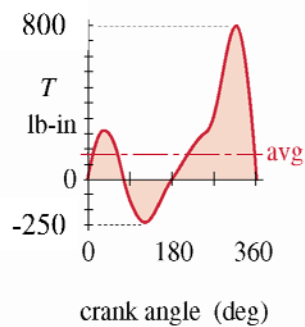


Figure 8-3

Total Torque-Time Function at Crankshaft with Constant  $\omega$ .

### **ADDITIONAL NOTES**

- The project can be completed in teams of at most three persons.
- Each team will submit a single completed project report.
- The report should be typed and include all the design steps and the final drawing in Solidworks.
- You are encouraged to exchange ideas and information with other teams, but the final project must be entirely your own work.
- The completed project is due by 8:00 am on December 10. Late projects will lose 15% of the grade.
- Projects will be evaluated on the basis of neatness, clarity, quality of drawings, supporting information, and extra material submitted.