

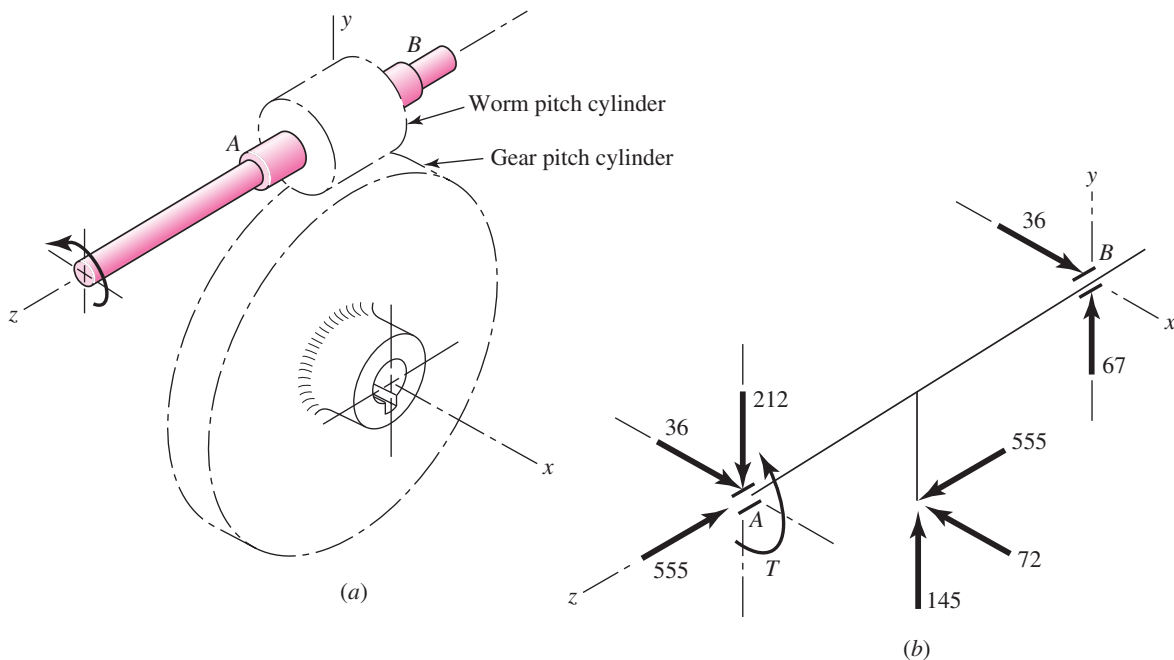
# Assignment/Tutorial 10 (Rolling Contact Bearings) ME-30602, 2017-18 Spring Semester

April 05, 2018

1. Problems 11.1, 11.2, 11.3, 11.5, 11-6, 11-7, 11-12, 11-16, 11-17, 11-19, 11-20, 11-21, 11-24, 11-25, 11-27

From Chapter 11 of Shigley's Mechanical Engineering Design book. (On Rolling Contact Bearings).

**Problem:** The worm shaft shown in the figure (a) below transmits 1000W at 600rpm. A static force analysis (assuming the bearing at A takes thrust load) is shown in figure (b). The loads are in kN. The desired life is 25kh and the application factor is 1.3.



- (a) For the above case select a 02-series angular-contact bearing at A and a 02-series straight roller bearing at B. Combined reliability is 0.99. Since the axial thrust is significantly larger than the radial loads and bearing at A is taking the thrust. The chance of failure of bearing B is much less. Thus choose a reliability of 0.99 for bearing at A and reliability of 1 for bearing B. The Weibull parameters for the ball bearings are  $x_0 = 0.02$ ,  $\theta - x_0 = 4.139$ ,  $b = 1.483$ .