Subject: Solid Mechanics Simulation

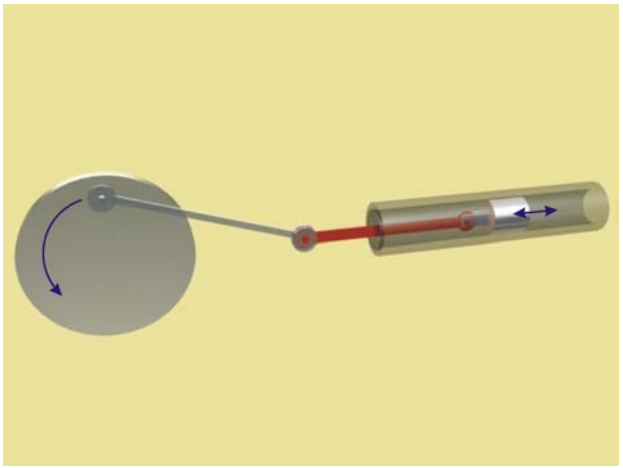

Fig. 1

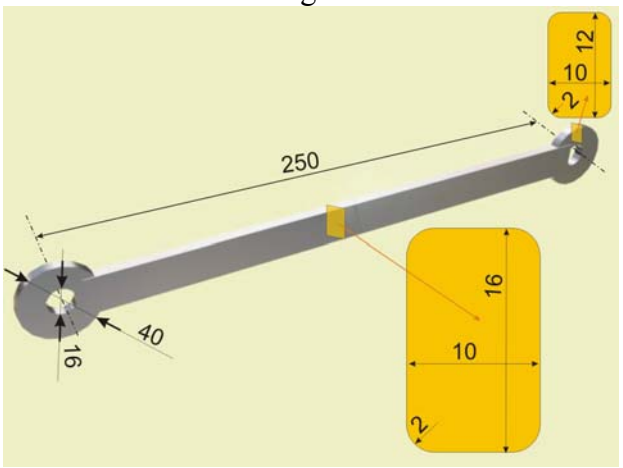

Fig.2

Assignment: A grinded gray cast iron rod works as a part of a piston-pump (fig.1, щракни тук за подробности).

The shape and dimensions of the rod are shown on fig.2. The rod is subjected to an alternating load, corresponding to the next three operation modes:

- Fully reversed force of 1000 N (fig.3)
- Zero-based tension force of 2000 N (fig. 4)
- Zero-based compression force of 2000 N (fig. 5)

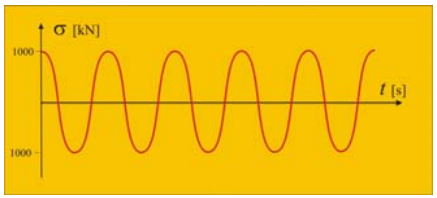

Fig. 3

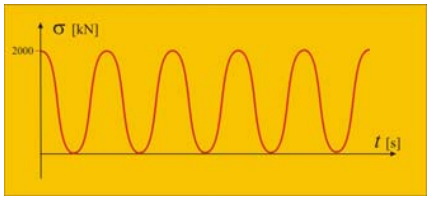

Fig. 4

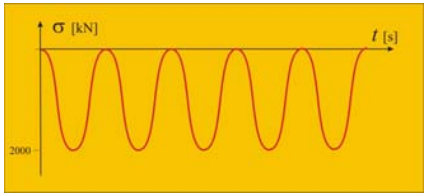

Fig. 5

Submit:

1. Geometrical model, including the mesh and the boundary conditions.
2. The stress life in seconds.
3. The safety factor for design life of 10^9 cycles.
4. Animate the process.
5. Comparison of results for zero-based tension force, obtained by different mean stress theories (Goodman, Soderberg or Gerber).

Answer the next questions:

1. What is the mechanical property peculiarity of the solid parts, subjected to an alternating stress?
2. What solution type was used?
3. What was the reason for the choice of the fatigue strength factor value?
4. How many nodes and elements were created?