*Perform a convergence study for each problem with maximum number of elements not to exceed 2500.*

1) Figure shows simplified schematic of a compound wrench. A load of 60 *N* is applied to a portion of the handle (approximately 30 mm in length) as shown. Two different boundary condition sets, simulating two separate fastener grips, are to be considered as shown in red and blue highlighted regions. Uniform thickness of the wrench is *4* mm. Assume material to be steel with E = 210 *GPa* and $v = 0.29$.

Perform a 4-mesh convergence study and determine the critical location and magnitude of maximum von Mises stress for the outer(red) BC. Use the last mesh of the model with the inner (blue) BC and compare the results with the corresponding outer BC model.
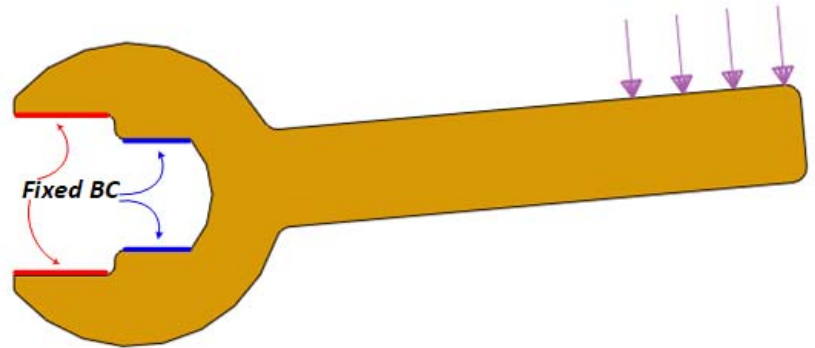
2) Idealization of a dovetail machine part is shown in the figure. Loading is uniform pressure of 3.5 *MPa* applied to the top surface, while the bottom two surfaces are assumed to be fully restrained. Material is aluminum alloy with properties of *E* = 79 *GPa* and $v = 0.33$.   Determine magnitude of maximum deflection and von Mises stress and their locations. Also compare the convergence behavior of deflection and stress.

100.

20.

10.

45.°

Dimensions in *mm*

20.