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| --- | --- |
| 6-11) Two steels are being considered for manufacture of as-forged connecting rods subjected to bending loads. One is **AISI 4340 Cr-Mo-Ni steel capable** of being heat-treated to a tensile strength of **260 kpsi**. The other is a **plain carbon steel** **AISI 1040** with an attainable **Sut of 113 kpsi**. Each rod is to have a size giving an equivalent diameter **de of 0.75 in**.  Determine the endurance limit for each material.  Is there any advantage to using the alloy steel for this fatigue application? | -**11.1**  What is the value of k\_a for AISI 4340 steel?  0.1578    **6-11.2**  What is the value of k\_b for AISI 4340 steel?  0.9065  **6-11.3**  What is the value of k\_c for AISI 4340 steel?  1  **6-11.4**  What is the value of k\_d for AISI 4340 steel?  1  **6-11.5**  What is the value of k\_e for AISI 4340 steel?  1  **6-11.6**  What is the value of k\_f for AISI 4340 steel?  1  **6-11.7**  What is the endurance limit for AISI 4340 steel? (express in ksi)  **6-11.8**  What is the value of k\_a for AISI 1040 steel?  **6-11.9**  What is the value of k\_b for AISI 1040 steel?  **6-11.10**  What is the endurance limit for the AISI 1040 steel? (express in ksi) |

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| 6-13) A solid square rod is cantilevered at one end. The rod is 0.6 m long and supports a completely reversing transverse load at the other end of 62 kN. The material is AISI 1080 hot-rolled steel. If the rod must support this load for 104 cycles with a design factor of 1.5, what dimension should the square cross section have? Neglect any stress concentrations at the support end. |  |

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| 6-14) A rectangular bar is cut from an AISI 1020 cold-drawn steel flat. The bar is 2.5 in wide by 3 in 8  thick and has a 0.5-in-dia. hole drilled through the center as depicted in Table A–15–1. The bar is concentrically loaded in push-pull fatigue by axial forces *Fa*, uniformly distributed across the width. Using a design factor of *nd* 5 2, estimate the largest force *Fa* that can be applied ignoring column action. |  |

110

6-13.1

What is k\_a?

120

6-13.2

What is k\_b?

130

6-13.3

What is k\_c?

140

6-13.4

What is k\_d?

150

6-13.5

What is k\_e?

160

6-13.6

What is k\_f?

170.5 pts

6-13.7

What is the effective diameter? (express in mm)

181 pts

6-13.8

What is the value of b, the side length of the square? (express in mm)

191 pts

6-14.1

What is LaTeX: S'\_eS e ′? (express in ksi)

201 pts

6-14.2

What is LaTeX: S\_eS e? (express in ksi)

211 pts

6-14.3

What is the notch sensitivity factor, q?

221 pts

What is the maximum force allowed for infinite life? (express in lbf)