# RAK-33060 Fracture mechanics and fatigue

10. Exercise, fatigue

1. A plate structure having thickness 5 mm is loaded with a pulsating load ($R = 0$) such that $F_{max} = 20$ kN. Calculate the life-time by using the strain-life method and draw the stress-strain curve for the most stressed point. Material parameters in the Basquin-Coffin-Manson equation are: $c = 0.6, b = 0.085, \sigma'_f = 1100\text{MPa}, \varepsilon'_f = 0.5$. The Ramberg-Osgood material model parameters are $E = 205\text{GPa}, \bar{n} = 0.142, \bar{K} = 1200\text{MPa}$. All roundings have the same radius $r = 1$ mm.
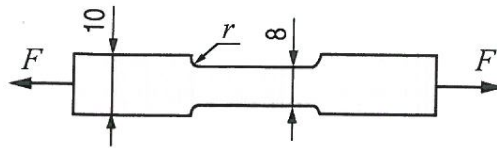
2. From the bottom of a notch the following strain spectrum has been measured. Distinguish the individual cycles from the spectrum and determine the strain amplitude for them. Use both the rainflow and water reservoir cycle counting methods.