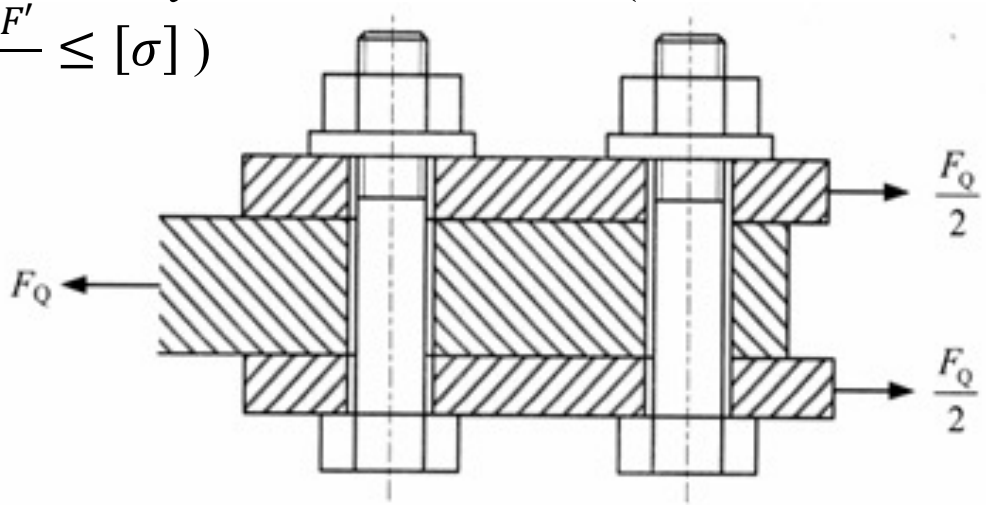
# HW05
# 第05章 连接及连接件
# 作业

所有作业要求手写

Autumn 2024

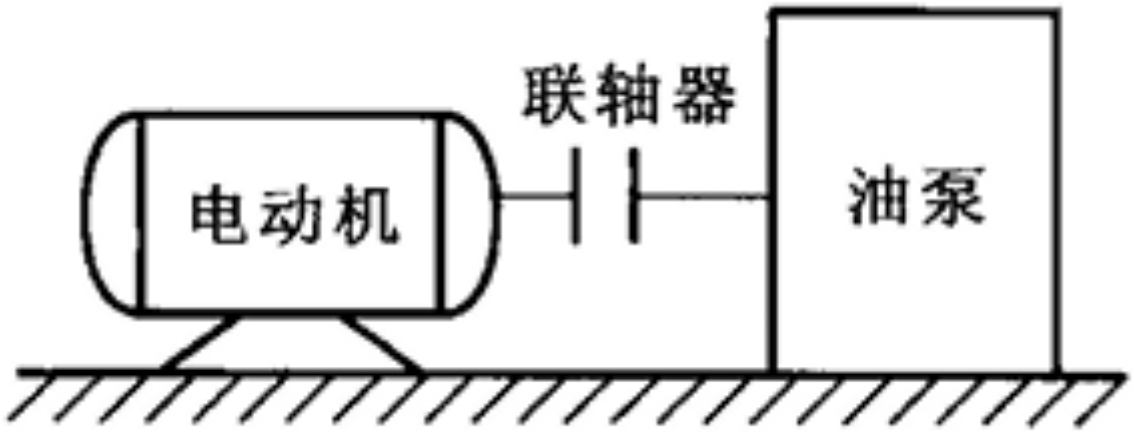
# HW 05.1

- 图示螺栓连接中采用2个M20（$d_1 = 17.3\text{mm}$）的螺栓，其许用拉应力为[σ]=160MPa, 被连接件接合面间的摩擦系数 $\mu = 0.2$，若考虑摩擦传力的可靠系数 $K_f = 1.2$，试计算该连接允许传递的静载荷$R$。
  （普通螺栓拉伸强度条件$\sigma_{ca} = \frac{4\times1.3F'}{\pi d_1^2} \leq [\sigma]$ ）
- The bolted connection shown in the figure is made with 2 bolts of M20 ($d_1 = 17.3mm$) with an allowable tensile stress of [σ]=160MPa, and the coefficient of friction between the joint surfaces of the connected parts μ=0.2. If the reliability coefficient of friction transmission $K_f = 1.2$ is taken into account, try to calculate the permissible static load to be transferred by this connection. $R$. (Common bolt tensile strength condition $\sigma_{ca} = \frac{4\times1.3F'}{\pi d_1^2} \leq [\sigma]$ )



# HW 05.2

- 如图所示，在电动机与增压油泵间用联轴器相连。已知电动机功率$P=7.5$ kW，转速$n=960$ r/min，电动机伸出轴端的直径$d_1=38$mm，油泵轴的直径$d_2=42$ mm，取$K_A=1.7$。试确定选用的联轴器是否满足需求：某型弹性圈柱销联轴器的技术参数：许用扭矩：250 N·$m$，许用转速：$n_{\max}=3300$ r/min（联轴器材料为铁），$n_{\max}=3$ 800 r/min（联轴器材料为钢），轴孔直径：$d_{\min}=32$ mm, $d_{\max}=42$ mm
- As shown in the figure, a coupling is used to connect the motor and the boost oil pump. It is known that the motor power $P$= 7.5 kW, the speed $n$=960 r/min, the diameter of the motor shaft end $d_1$=38mm, and the diameter of the oil pump shaft $d_2$=42 mm. Try to determine whether the selected coupling meets the requirements: Technical parameters of a certain type of elastic ring pin coupling: allowable torque: 250N·$m$, allowable speed: $n_{\max}$ =3300 r/min (coupling material is iron) $n_{\max}$ =3 800 r/min (coupling material is steel), shaft hole diameter: $d_{\min}$ =32mm, $d_{\max}$ =42mm

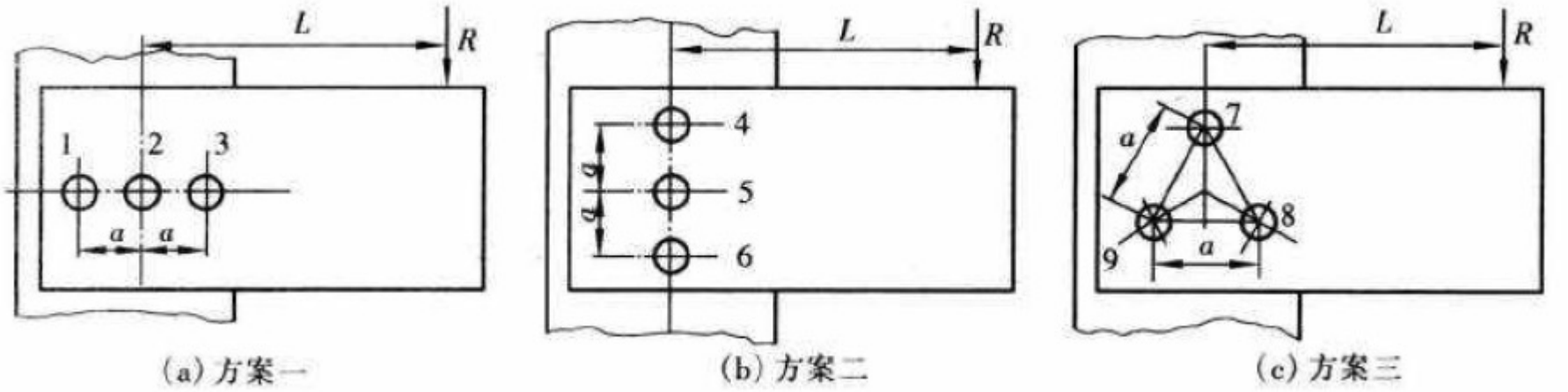


# HW 05.3

- 两个半联轴器用四个普通螺栓连接,传递转矩 T ＝1000 N.m，螺栓分布圆直径为 D＝300mm，接合面摩擦系数μ＝0.15，求螺纹小径（装配时控制预紧力，选螺栓材料为Q235）。
- Two half-coupling with four ordinary bolt connection, transfer torque T = 1000N.m, bolt distribution circle diameter D = 300mm, joint surface friction coefficient μ = 0.15, find the thread diameter (assembly control preload, selected bolt material for Q235).

# HW 05.4

- 图所示为一螺栓组连接的3种方案，其外载荷 R,尺寸 a、L 均相同，a=60mm，L=300mm。试分别计算各方案中受力最大螺栓所受横向载荷 $F_s$，并分析比较哪个方案好。
- The figure shows three schemes for a bolt group connection, whose external load R, dimensions a and L are the same, a=60 mm, L=300 mm. Try to calculate the transverse load $F_s$ of bolts with maximum force respectively in each scheme, and analyze and compare which scheme is better?



# Thank you~

所有作业要求手写

Autumn 2024