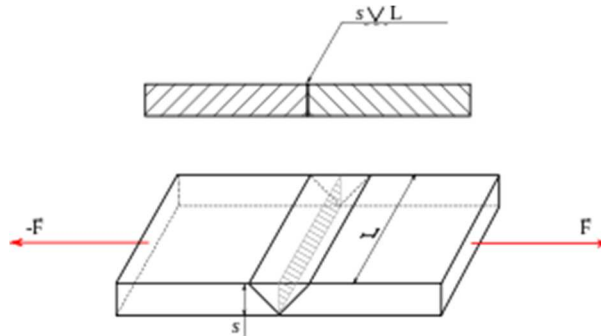


TD N°2

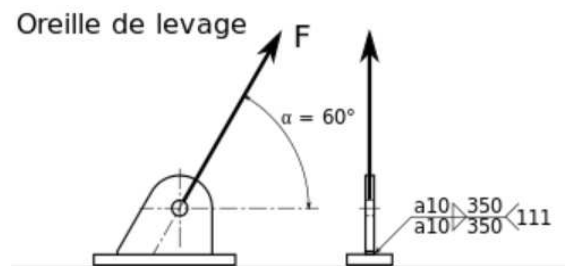
Exercise N°1:

For metal sheets of S235 steel with a yield strength (limite d'élasticité) R_e of 235 MPa with a thickness of 5 mm, a load of 5 000 N and a safety factor of 2, calculate the required length of the weld seam.



Exercise 2:

Check the strength (résistance) of the welded connection of the lifting ear (l'oreille de levage) shown in the figure. The angle formed by the cable is $\alpha = 60^\circ$ from the horizontal. The load to be lifted is equivalent to $P = 200$ kN, representing a pull (traction) of 116 kN.



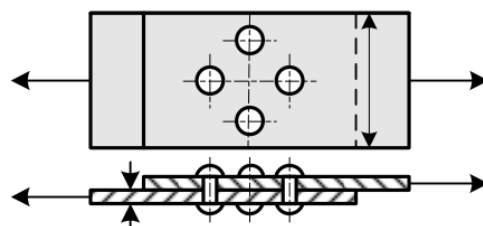
For this weld seam, the yield strength is $R_e = 295$ MPa, with a safety factor $k = 2$.

Exercise 3:

Determine the diameter of the rivets required to join two 10 mm thick plates. With a shear force (force de cisaillement) of 15,000 N and a breaking strength (résistance à la rupture) of 80 MPa, determine the number of rivets.

Exercise N°4:

Two steel plates, held together by four rivets, are subjected to opposing tensile forces (forces opposées de traction) $F = 80$ kN. The plates have a width $b = 80$ mm and a thickness $e = 10$ mm, while the rivets have a diameter $d = 16$ mm. Check the strength of the rivets taking into account the permissible normal stress (la contrainte normale admissible) which is equal to 300 MPa and the permissible shear stress which is equal to 100 MPa.



Exercice N°5 :

Check the tensile strength capacity (résistance à la traction) of the shank of a screw (la tige d'une vis) type M12x1.25, made from a material with a yield strength (limite d'élasticité) $R_e = 240$ MPa and subjected to a force of 1800 N. The screw is screwed into a material with a resistance $R_{pg} = 40$ MPa. Find the minimum screw insertion depth (layout) with a safety factor $S = 2$.

Exercice N°6 :

Determine the tightening and loosening torque (le couple de serrage et de desserrage) of a connecting screw M 10 × 1.5 assuming that all contact surfaces are steel-steel ($\mu = 0.14$).