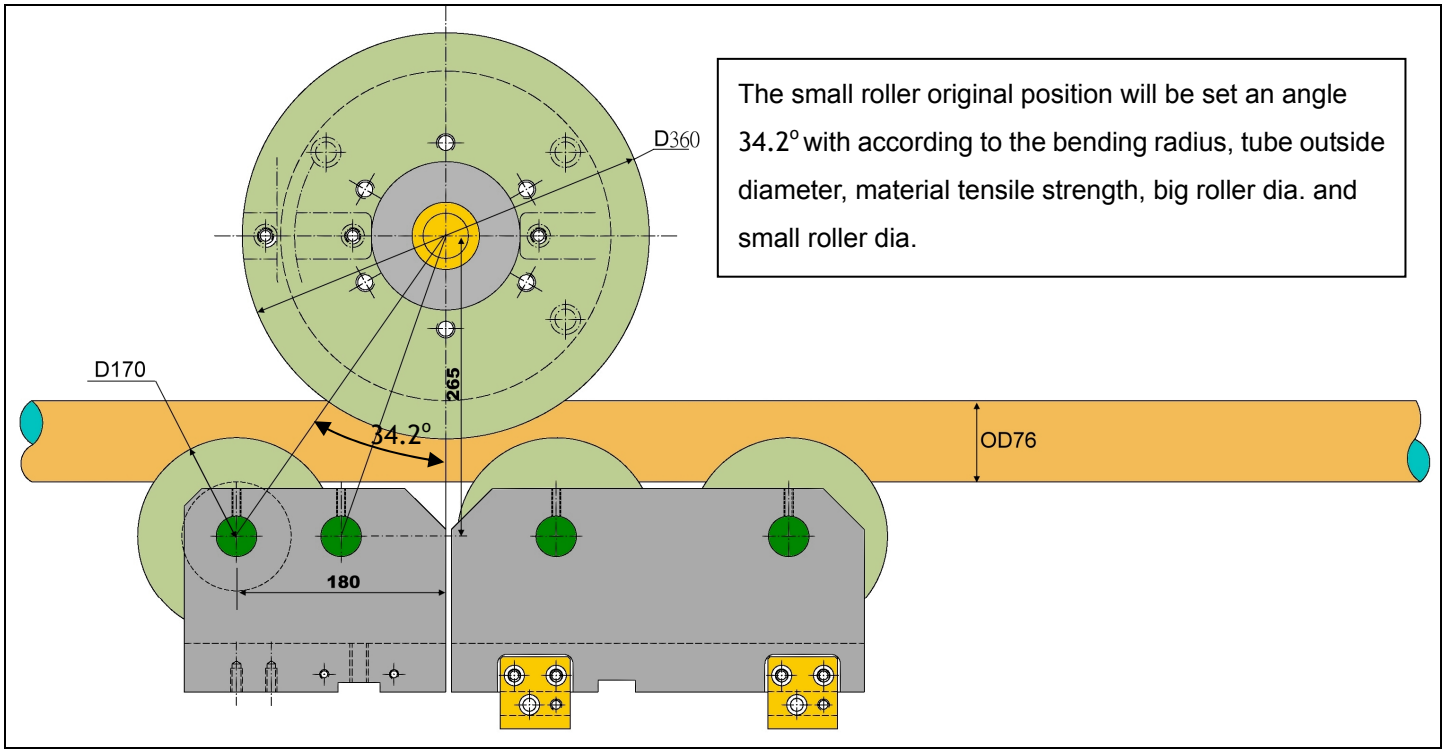
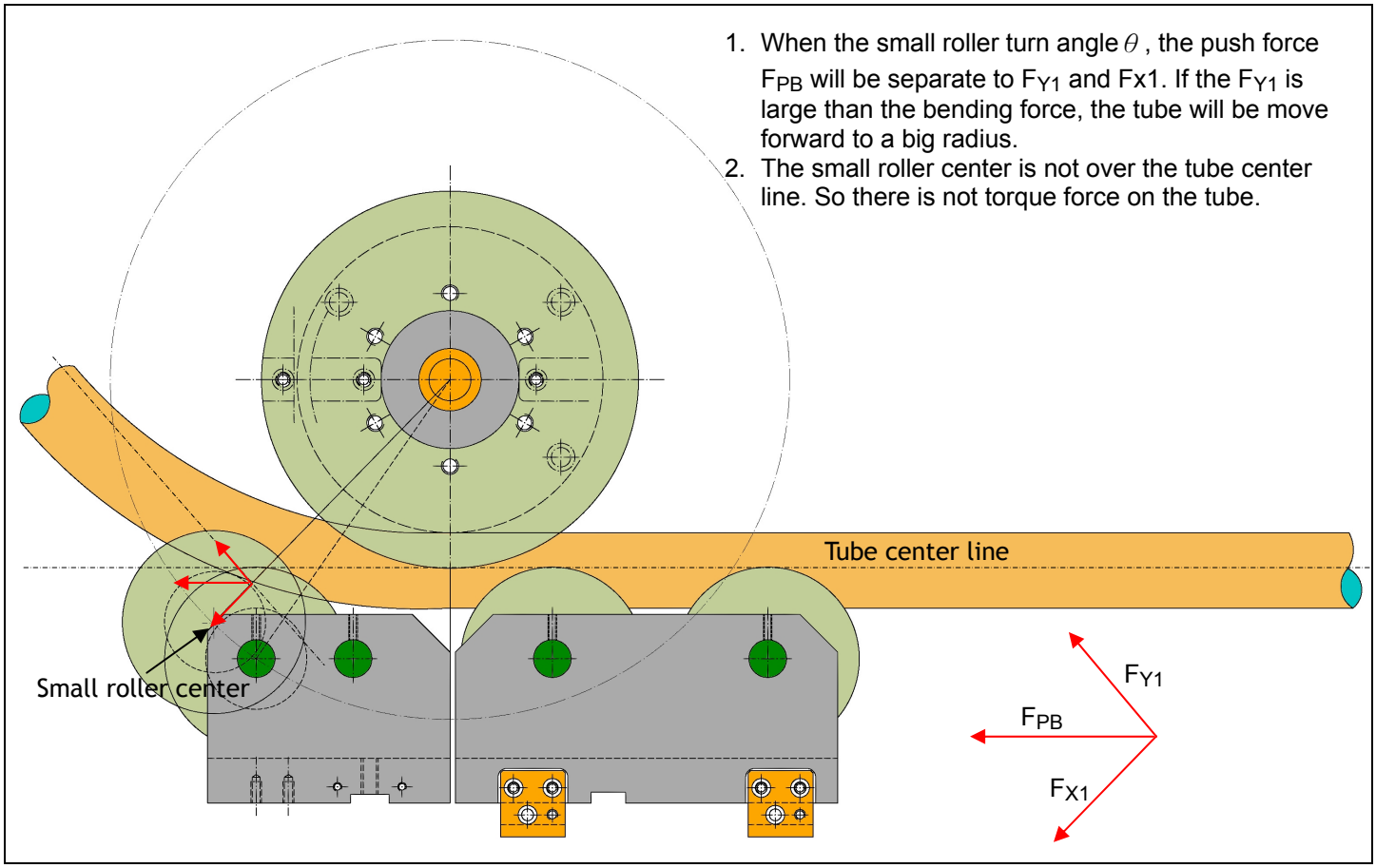
Roll bending principle

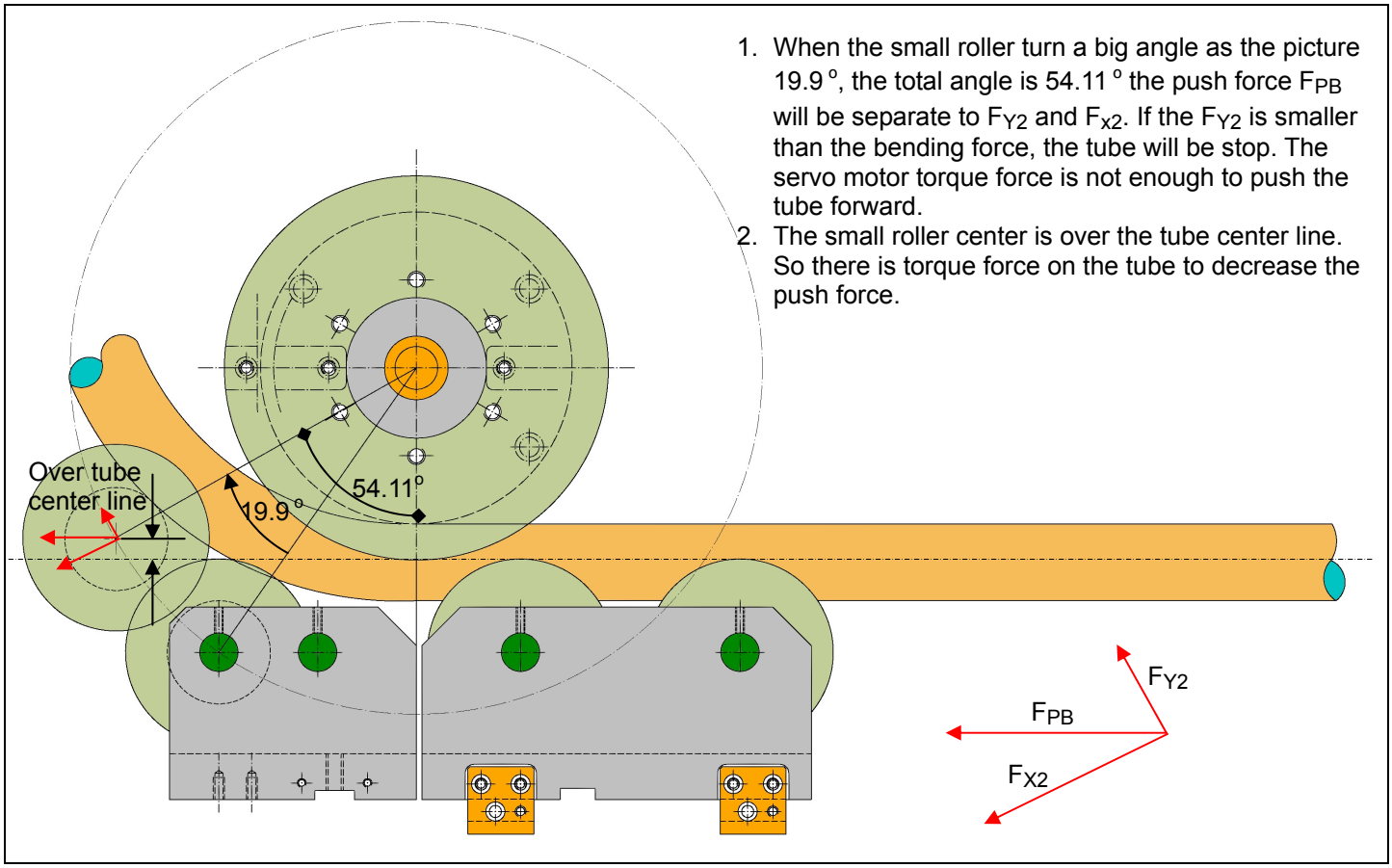
Example: OD76 in CNC130 with roll bending function application



The small roller original position will be set an angle 34.2° with according to the bending radius, tube outside diameter, material tensile strength, big roller dia. and small roller dia.



1. When the small roller turn angle θ, the push force F_{PB} will be separate to F_{Y1} and Fx1. If the F_{Y1} is large than the bending force, the tube will be move forward to a big radius.
2. The small roller center is not over the tube center line. So there is not torque force on the tube.



1. When the small roller turn a big angle as the picture 19.9°, the total angle is 54.11° the push force F_{PB} will be separate to F_{Y2} and F_{x2}. If the F_{Y2} is smaller than the bending force, the tube will be stop. The servo motor torque force is not enough to push the tube forward.
2. The small roller center is over the tube center line. So there is torque force on the tube to decrease the push force.

Formula for calculate the tube total length in push bending function application

Lt = Lf + S + Lr

S = θ / 360° x $2\pi R$

Lf = 2xOD

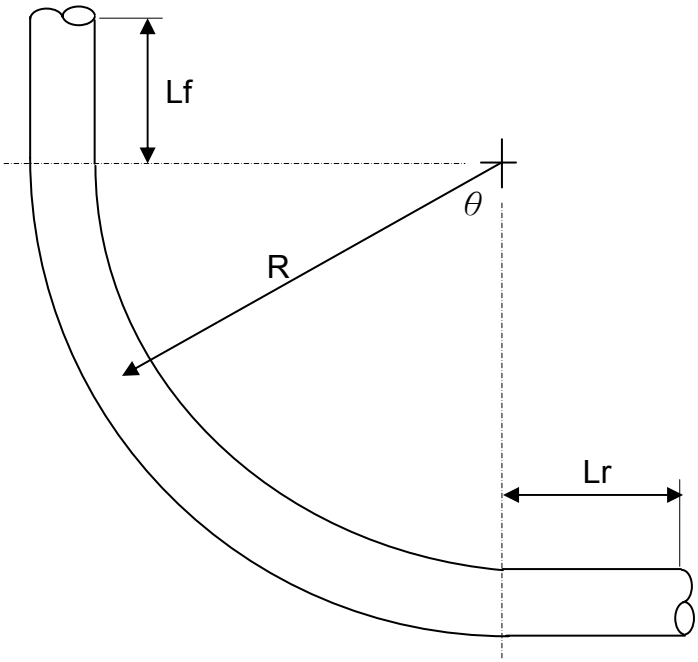
Lt: tube total length

Lf: the length from the front tube end

S: the arc length of center line

Lr: the length from the rear tube end

θ : Bending angle



Example:

Tube OD=65 mm

R = 500 mm

θ = 90°

Lr = 200 mm (inner jaw)

Lr = 265 mm (external jaw)

Lt=135 + 785.4 + 200 = 1120.4 (with inner jaw)

Lt=135 + 785.4 + 265 = 1185.4 (with outer jaw)