Material cost minimization in the design of a end-constrained beam

A end-constrained beam and subjected to a vertical load at the other end should be designed while minimizing its mass. The beam has an I-profile and must be sufficiently rigid in bending and shear. Its deflection should not exceed a certain limit value.

So, in this structural problem, it is intended to design a beam of length L, horizontally recessed at one end and subjected to a downward vertical load of intensity F at the other end, with as little weight as possible. The beam has an I-profile and must be sufficiently rigid in bending and shear. Additionally, a maximum allowable deflection is imposed.

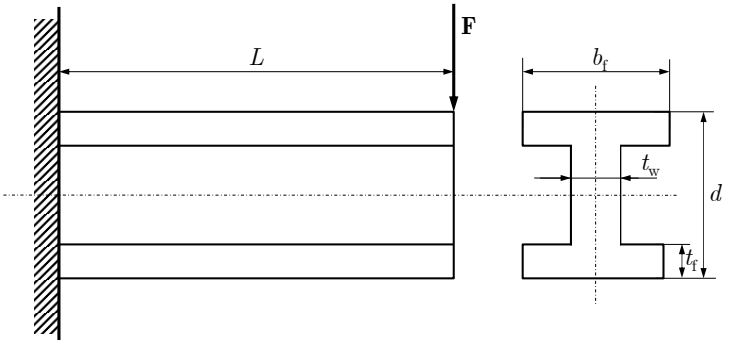

Figura 1 End-constrained beam and its cross section profile.