Program for Design of Springs, Problem 5 .

Problem Statement: A helical tension lspring is used in the spring balance to measure the weights. One end of the sprinh is attached to the rigid support while the other end, which is frem carries the weights to be measured. The maximum weight attached to the spring balance is 1500 N and the length of the scale should be approximately 100 mm. The spring index can be taken as 6. The spring is made of oil hardened and tempered steel wire with ultimate tensile strength of 1360 N/mm2 and modulus of rigidty of 81,370 N/mm^2. The permissible shear stress in the spring wire should be taken as 50% of te ultimate tensile strength. Desing the spring and calculate:

i) Wire diameter

ii) Mean coil diameter

iii) Number of active coils

iv) Required spring rate

v) Actual pring rate.

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clc;

clear all;

Intializing the given values:

F = 1500

C = 6

S\_u = 1360

G = 81370

y = 100;

Finding the wire diameter:

tau=0.5\*S\_u

[K]=Eqn11\_2a(C)

[d]=Eqn11\_1d\_d(F,C,K,tau)

d=ceil(d)

Finding the coil diameter:

D = C\*d

Finding the number of active coils:

[N]=Eqn11\_5a\_i(F,D,G,d,y);

N=ceil(N)

Finding the spring rate:

k = F/y

Finding the actual spring rate:

k\_act = ((G\*d^4)/(8\*(D^3)\*N))