Program for Design of Springs, Problem 1 .

Problem Statement: It is required to design a helical spring subjected to a max force of 1250 N. The deflection of the spring corresponding to the ma force should be approximately 30mm. The spring index can be taken as 6. The spring is made of patented and cold-draw steel wire. The ultimate tensile strength and modulus of rigidity of the spring material are 1090 and 81370 N/mm^2 respectively. The permissible shear stress of the spring material shoud be taken as 50% of the ultimate tensile strength. Design the spring and calculate:

i) Wire diameter

ii) Mean Coil diameter

iii) Number of active coils

iv) Total number of coils

v) Free length of the spring

vi) Pitch of the coil

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clc;

clear all;

Intializing the known values:

F = 1250

y = 30

S\_u = 1090

C = 6

G = 81370

Finding the wire diameter:

tau=0.5\*S\_u

[K] = Eqn11\_2\_a(C)

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

d=ceil(d)

Finding the mean 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 toal number of coils:

[Nt,f] = Table\_11\_4(N)

Free length of the spring:

[y\_act]=Eqn11\_5\_a(F,D,G,d,N)

S\_L=Nt\*D

gap=1

T\_ag=(Nt-1)\*gap

F\_L=ceil(S\_L+T\_ag+y\_act)

Finding the pitch of the coil:

p = F\_L/(Nt-1)