Program for Design of Bevel Gear, Problem 15.

Problem Statement: A pair of straight bevel gears is to transmit 15 kW at 1500 rpm input speed. The number of teeth on pinion is 20 and the speed ratio is 5. Design the gears assuming 14.5 degrees full depth form

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Name: Avva Sai Pranav

USN: PES1201800861

clc;

clear all;

Intializing the given data:

alpha = 14.5

theta = 90

ii = 5

z1 = 20

P = 15

N1 = 1500

Cv = 0.5

Finding the number of teeth on gear and rpm of the gear respectively:

z2 = z1\*ii

N2 = N1/ii

Finding the delta values for pinion and gear using equation 12.32(a) and 12.32 (b):

del\_p = Eqn\_12\_32\_a(ii)

del\_g = Eqn\_12\_32\_b(ii)

Finding the lewis form factor:

ze = Eqn\_12\_25\_d(z1,del\_p);

zep = ze

ze = Eqn\_12\_25\_d(z2,del\_g);

zeg = ze

[y1]=Lewis(zep)

[y2]=Lewis(zeg)

Finding the design stress using table 12.7:

[S\_d] = Table\_12\_7()

S\_d1 = S\_d;

[S\_d] = Table\_12\_7()

S\_d2 = S\_d;

Find the strength factor, find the weaker part and deciding what the design is based on:

if S\_d1\*y1<S\_d2\*y2

disp("Design is based on pinion")

S\_d=S\_d1;

Y=pi\*y1;

z=z1;

else

disp("Design is based on gear")

S\_d=S\_d2;

Y=pi\*y2;

z=z2;

end

Finding the torque:

Mt = ((9.55\*10^6\*P)/(N2))

Finding the module:

m = module(Mt,S\_d,Cv,Y,z1,z2,z);

m = Table\_12\_24(m)

Finding the pitch diameter of pinion and gear using Equation 12.1(e) respectively :

d1 = m\*z1

d2 = ii\*d1

Finding the core distance(L):

L = (1/2)\*sqrt(d1^2+d2^2)

Finding the face width using equation 12.36(b):

b = L/3

Finding the velocity and the

v = (pi\*d2\*N2)/(60)

Cv = ((6.1)/(6.1+v))

FInding the tangential force using Equation 12.38(b):

Ft = ((1000\*P)/(v))

Finding the design stress induced and if it lies between the permissible values:

S\_di = (Ft/(m\*Cv\*b\*Y))\*(L/(L-b))

if S\_di < S\_d

disp("The calculated values lie between the permissible values");

else

disp("The calculated values lies outside the permissible values");

end

hence the diameter for the gear pair of pinion and gear respectively:

d1

d2