Program for Design of Chain Drive, Problem 2.

Problem Statement: A 900 rpm, 30 kW squirrel cage induction motor is to drive a recuoricatubg oyno at 225 rpm. The pump is to run at full load for 24 hours a day. Select a suitable roller chain drive, if the center distance is as short as possible

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clc;

clear all;

Intializing the given values:

P = 30

N1 = 900

N2 = 225

Finding the velocity ratio. Finding the number of teeth using the Table.14.36a

i = N1/N2

[z2,z1] = Table\_14\_36\_a(i)

Finding the pitch and using the table Equation 14.22 b:

[p] = Eqn14\_22\_b(N1)

[p1,W,Fu] = Table\_14\_39\_b(p)

PCD of the sprockets:

D1 = p1/(sind(180/z1));

D2 = p1/(sind(180/z2));

C1 = D1+D2;

Velocity of chain and the tangential Force:

[v] = Eqn14\_22a(p1,z1,N1)

F = (1000\*P)/v

[Ks] = Table\_14\_35()

From table 14.37 and interpolation:

FS = 11.7

[Fw] = Eqn14\_22e(Fu,FS,Ks)

Fw = Fw\*1000

Finding the number of strand sand the actual factor of safety:

j = ceil(F/Fw)

Fc = (W\*(v^2))/9.81

Finding the horizontal drive:

K2 = 6;

Fs = K2\*W\*(C1/1000);

FS\_actual = j\*(Fu/(F+Fc+Fs))\*1000;

fprintf('Fs\_actual:%f \n',FS\_actual);

if FS\_actual>FS

disp('Chain is Safe');

else

disp("Chain is unsafe");

end

Finding the chain length in pitches:

Cp = C1/p;

alpha = asind((D2-D1)/(2\*C1))

[Lp] = Eq14\_22\_k(z1,z2,Cp,alpha)

Finding the chain length from its pitch:

L = p\*Lp

Finding the exact center distance:

[Ce] = Eqn14\_22\_kCe(Lp,z1,z2,alpha,p);

Ce = Ce/2