Program for Design of Chain Drive, Problem 3.

Problem Statement: A 15kW, 1100 rpm motor drives a line shaft at 200 rpm. The shaft center distance is approximately 600 mm, The motor shaft has a diameter of 50 mm. The starting torque on motor is times the running torque. The load is applied with moderate shocks. Select a suitable roller chain drive.

Date: 26/09/2020

Name: Avva Sai Pranav

USN: PES1201800861

clc;

clear all;

Intializing the given values:

P = 15

N1 = 900

N2 = 225

C1 = 600

d1 = 50

Finding the velocity ration and the number of teeth:

i = N1/N2;

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

Finding the pitch:

[p] = Eqn14\_22b(N1);

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

Finding the PCD of sprockets

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

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

Finding the velocity of the chain and the tangential force:

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

Mt = (P\*60)/(2\*pi\*N1)

Mtmax = 2\*Mt\*10^3

F = (2\*Mtmax\*1000)/d1

Finding the allowable lworking load per strand:

[Ks] = Table\_14\_35()

FS = 13.45

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

Finding the number of strands and then finding 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