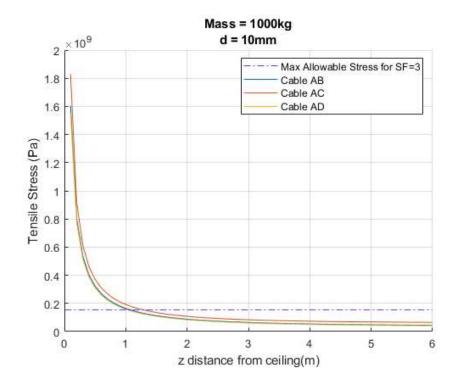
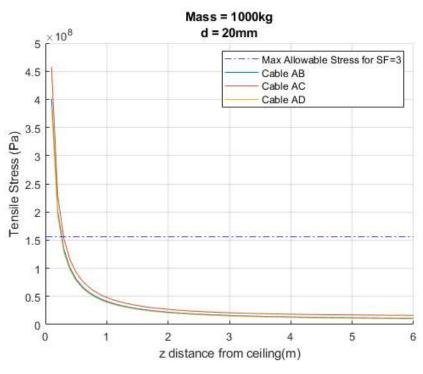
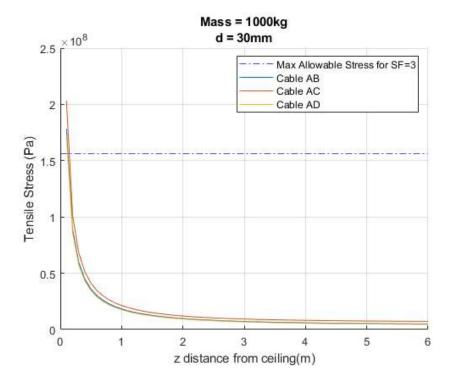
```
% This code produces plots of distance from ceiling vs stress in cables
% AB, AC, and AD
%variable declaring
sAB=1;
sAC=1;
sAD=1;
% for loop counter variable
a=1;
% Gravity (m/s^2)
g= 9.81;
% Masses (kg)
m=[1000 2000];
% Known Dimensions (m)
x1= 3.2;
x2=2.7;
y1= 4.0;
y2=3.6;
z= linspace(0.1,6,60); % +.1 increment
% Diameter (mm)
d= linspace(10,30,3); %10,20,30
% Saftey Factor (=UTS/Tensile Stress)
SF= 3;
% Ultimate Tensile Strength (Al 2024) (Pa)
UTS= 469000000;
% Max Allowable Stress (sAB, sAC, sAD need to be less than this)
s= UTS/SF;
for n=1:length(m) %loop for each Masses
    m1=m(n);
    for k=1:length(d) %loop for diameters 10,20,30
        d1=d(k);
        %cross-sectional area
        Ac= (pi.*(d1.^2))./4;
        Acm= Ac./(1000^2);
                                % (m^2)
        for i=1:length(z) %loop for plotting z v. d
            %cable lengths
            LAC= sqrt((x1^2)+(z(i).^2));
            LAB= sqrt((x2^2)+(y2^2)+(z(i).^2));
            LAD= sqrt((x2^2)+(y1^2)+(z(i).^2));
            %tensions
            A = [(-x2)./LAB \ x1./LAC \ (-x2)./LAD; \ (-y2)./LAB \ 0 \ y1./LAD; \ (-z(i))./LAB \ (-z(i))./LAC \ (-z(i))./LAD];
            B= [0; 0; -m1*g];
            T= A\backslash B;
            TAB= T(1,1);
            TAC= T(2,1);
            TAD = T(3,1);
            %stresses
            sAB(i)=TAB./Acm;
            sAC(i)=TAC./Acm;
            sAD(i)=TAD./Acm;
            %safety factor
            SF1(i)= UTS./sAC(i);
```

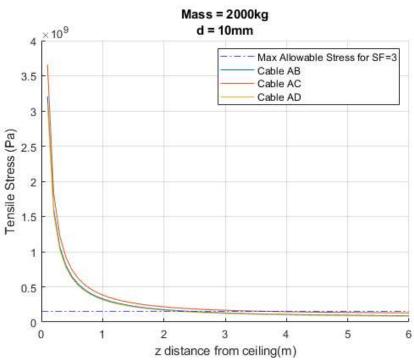
```
end
       % plot z v. stress
       figure(a);
       grid on
       title("Mass = " + m1 + "kg" + newline + "d = " + d1 + "mm")
       hold on
       yline(s,'-.b');
       pAB=plot(z,sAB);
       pAC=plot(z,sAC);
       pAD=plot(z,sAD);
       xlabel('z distance from ceiling(m)');
       ylabel('Tensile Stress (Pa)');
       legend('Max Allowable Stress for SF=3','Cable AB','Cable AC','Cable AD');
       hold off
       \% plot z v. SF
       figure(7);
       grid on
       hold on
       pSF=plot(z,SF1);
       title("z vs SF")
       xlabel('z distance from ceiling(m)');
       ylabel('Safety Factor') ;
       hold off
       legend('m=1000kg d=10mm', 'm=1000kg d=20mm', 'm=1000kg d=30mm', 'm=2000kg d=10mm', 'm=2000kg d=20mm', 'm=2000kg d=30mm');
       a=a+1;
   end
end
```

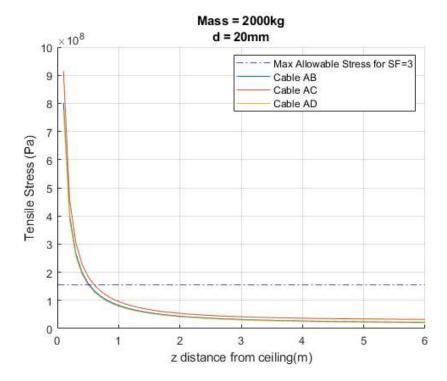
```
Warning: Ignoring extra legend entries. Warning: Ignoring extra legend entries.
```

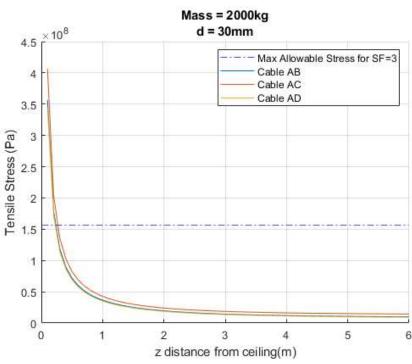


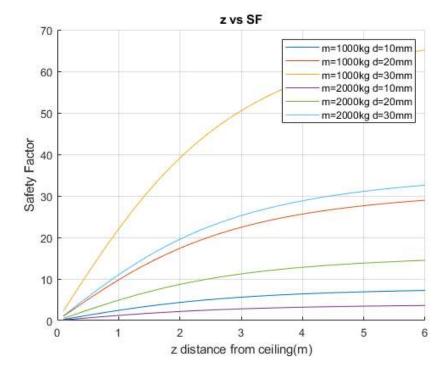












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