```
D = 2100 ; d = 1500;
fck = 40 ; fy = 500;
%Inputting T Matrix which consists of no. of layers of steel in 1st column,
% its respective depth from top in 2nd column and Area in 3rd column
T = readmatrix('myfile.csv');
P = []; M = [];Phi = [];Xu =[];Emax = [];P=[];
% loop for fetching a phi value
for phi = 0:0.0000001:0.00003
    %iterating through strain values to obtain point which satisies our
    %condition
    for ecmax = 0.00005:0.0000001:0.0035
        pct = 0 ;mct =0;pst=0;mst=0;
        % computing xu for strain and curvature combinations
        xu = ecmax/phi;
        if(xu>=2100)
            t = 42 ;
        else
            t = xu/50;
        end
        if(t~=0)
            for i = 1:50
                eci = phi*(xu-(2*i-1)*(t/2));
                if(eci<0.002)
                    sigmaci = 18*(eci/0.002)*(2-(eci/0.002));
                else
                    sigmaci = 18;
                end
                pci = sigmaci * strip_area(i,t);
                mci = pci*(1050-(2*i-1)*(t/2));
                pct = pct + pci;
                mct = mct + mci;
            end
        else
            pct = 0;
            mct = 0;
        end
        for j =1 :21
        % esi and sigmasi are strain and stress in given steel layer
        esi = phi* (xu -T(j,2));
        sigmasi = mysteel_stress(esi);
        % psi and msi are force and moment in given steel layer
        psi = sigmasi * T(j,3);
        msi = psi*(1050-T(j,2));
        pst = pst+psi;
        mst = mst+msi;
        end
        pt = (pst+pct)/1000;
        mt = (mst+mct)/10^6;
        if(abs(pt)<50)
        Phi(end+1) = phi ;
        M (end+1) = mt;
        Xu(end+1) = xu;
        Emax(end+1) = ecmax;
        P(end+1) = pt;
        break
        end
    end
end
title("M-Phi Curve")
xlabel("Phi(rad/mm)")
ylabel("M(KNm)")
hold on
plot(Phi,M,"LineStyle","-","LineWidth",1,'Color','b','Marker','o','MarkerEdgeColor','r','MarkerFaceColor','y','MarkerSize',5,'MarkerIndices',[3 29 101])
ax = gca;
ax.XAxisLocation = 'origin';
ax.YAxisLocation = 'origin';
grid on
display(Phi)
display(M)
display(Xu)
display(Emax)
display(P)
```

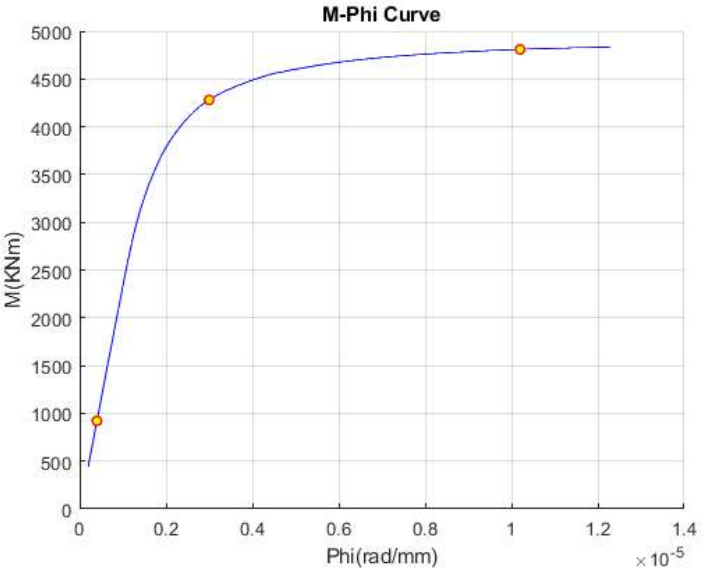
```
Phi =

   1.0e-04 *

  Columns 1 through 7

    0.0020    0.0030    0.0040    0.0050    0.0060    0.0070    0.0080

  Columns 8 through 14

    0.0090    0.0100    0.0110    0.0120    0.0130    0.0140    0.0150

  Columns 15 through 21

    0.0160    0.0170    0.0180    0.0190    0.0200    0.0210    0.0220

  Columns 22 through 28
```

```
    0.0230    0.0240    0.0250    0.0260    0.0270    0.0280    0.0290

  Columns 29 through 35

    0.0300    0.0310    0.0320    0.0330    0.0340    0.0350    0.0360

  Columns 36 through 42

    0.0370    0.0380    0.0390    0.0400    0.0410    0.0420    0.0430

  Columns 43 through 49

    0.0440    0.0450    0.0460    0.0470    0.0480    0.0490    0.0500

  Columns 50 through 56

    0.0510    0.0520    0.0530    0.0540    0.0550    0.0560    0.0570

  Columns 57 through 63

    0.0580    0.0590    0.0600    0.0610    0.0620    0.0630    0.0640

  Columns 64 through 70

    0.0650    0.0660    0.0670    0.0680    0.0690    0.0700    0.0710

  Columns 71 through 77

    0.0720    0.0730    0.0740    0.0750    0.0760    0.0770    0.0780

  Columns 78 through 84

    0.0790    0.0800    0.0810    0.0820    0.0830    0.0840    0.0850

  Columns 85 through 91

    0.0860    0.0870    0.0880    0.0890    0.0900    0.0910    0.0920

  Columns 92 through 98

    0.0930    0.0940    0.0950    0.0960    0.0970    0.0980    0.0990

  Columns 99 through 105

    0.1000    0.1010    0.1020    0.1030    0.1040    0.1050    0.1060

  Columns 106 through 112

    0.1070    0.1080    0.1090    0.1100    0.1110    0.1120    0.1130

  Columns 113 through 119

    0.1140    0.1150    0.1160    0.1170    0.1180    0.1190    0.1200

  Columns 120 through 122

    0.1210    0.1220    0.1230

M =

   1.0e+03 *

  Columns 1 through 7

    0.4464    0.6842    0.9209    1.1576    1.3935    1.6287    1.8631

  Columns 8 through 14

    2.0966    2.3298    2.5607    2.7725    2.9587    3.1247    3.2650

  Columns 15 through 21

    3.3936    3.5031    3.6075    3.7026    3.7860    3.8581    3.9247

  Columns 22 through 28

    3.9832    4.0396    4.0917    4.1396    4.1805    4.2175    4.2512

  Columns 29 through 35

    4.2807    4.3078    4.3343    4.3584    4.3795    4.3987    4.4181

  Columns 36 through 42

    4.4361    4.4540    4.4721    4.4882    4.5037    4.5184    4.5324

  Columns 43 through 49

    4.5459    4.5563    4.5657    4.5751    4.5842    4.5931    4.6015

  Columns 50 through 56
```

```
    4.6093    4.6173    4.6252    4.6330    4.6408    4.6478    4.6550

  Columns 57 through 63

    4.6620    4.6682    4.6740    4.6799    4.6857    4.6916    4.6973

  Columns 64 through 70

    4.7030    4.7080    4.7129    4.7170    4.7209    4.7250    4.7292

  Columns 71 through 77

    4.7330    4.7365    4.7402    4.7432    4.7467    4.7498    4.7530

  Columns 78 through 84

    4.7562    4.7590    4.7621    4.7650    4.7679    4.7707    4.7734

  Columns 85 through 91

    4.7758    4.7783    4.7808    4.7832    4.7857    4.7880    4.7903

  Columns 92 through 98

    4.7926    4.7946    4.7966    4.7987    4.8006    4.8027    4.8046

  Columns 99 through 105

    4.8061    4.8077    4.8092    4.8107    4.8123    4.8137    4.8152

  Columns 106 through 112

    4.8166    4.8179    4.8195    4.8205    4.8218    4.8228    4.8240

  Columns 113 through 119

    4.8251    4.8262    4.8272    4.8283    4.8292    4.8304    4.8315

  Columns 120 through 122

    4.8323    4.8334    4.8345

Xu =

  Columns 1 through 7

  409.0000  418.3333  423.2500  426.8000  429.5000  431.7143  433.6250

  Columns 8 through 14

  435.3333  437.0000  438.4545  438.8333  437.9231  436.2143  433.4667

  Columns 15 through 21

  430.5625  427.0588  423.7778  420.4211  416.8500  413.0952  409.4545

  Columns 22 through 28

  405.8261  402.4167  399.1200  395.9231  392.5926  389.2857  386.0690

  Columns 29 through 35

  382.9000  379.8065  376.9062  374.0909  371.2941  368.5714  366.0278

  Columns 36 through 42

  363.5676  361.2368  359.0513  356.8500  354.7073  352.6429  350.6512

  Columns 43 through 49

  348.7273  346.6889  344.6957  342.7872  340.9583  339.1837  337.4400

  Columns 50 through 56

  335.7451  334.1346  332.5849  331.0926  329.6545  328.2321  326.8772

  Columns 57 through 63

  325.5690  324.2712  323.0000  321.7869  320.6129  319.4921  318.4063

  Columns 64 through 70

  317.3538  316.3030  315.2836  314.2353  313.2319  312.2714  311.3521

  Columns 71 through 77

  310.4444  309.5479  308.6757  307.8000  306.9737  306.1558  305.3718

  Columns 78 through 84

  304.6076  303.8625  303.1481  302.4512  301.7711  301.0952  300.4353

  Columns 85 through 91
```

```
  299.7791  299.1494  298.5341  297.9326  297.3556  296.7802  296.2391

  Columns 92 through 98

  295.7312  295.2234  294.7263  294.2500  293.7835  293.3367  292.8889

  Columns 99 through 105

  292.4300  291.9604  291.5000  291.0485  290.6154  290.1810  289.7642

  Columns 106 through 112

  289.3551  288.9630  288.5872  288.1818  287.7928  287.4018  287.0265

  Columns 113 through 119

  286.6579  286.2957  285.9397  285.5897  285.2458  284.9160  284.5917

  Columns 120 through 122

  284.2645  283.9508  283.6504

Emax =

  Columns 1 through 7

    0.0001    0.0001    0.0002    0.0002    0.0003    0.0003    0.0003

  Columns 8 through 14

    0.0004    0.0004    0.0005    0.0005    0.0006    0.0006    0.0007

  Columns 15 through 21

    0.0007    0.0007    0.0008    0.0008    0.0008    0.0009    0.0009

  Columns 22 through 28

    0.0009    0.0010    0.0010    0.0010    0.0011    0.0011    0.0011

  Columns 29 through 35

    0.0011    0.0012    0.0012    0.0012    0.0013    0.0013    0.0013

  Columns 36 through 42

    0.0013    0.0014    0.0014    0.0014    0.0015    0.0015    0.0015

  Columns 43 through 49

    0.0015    0.0016    0.0016    0.0016    0.0016    0.0017    0.0017

  Columns 50 through 56

    0.0017    0.0017    0.0018    0.0018    0.0018    0.0018    0.0019

  Columns 57 through 63

    0.0019    0.0019    0.0019    0.0020    0.0020    0.0020    0.0020

  Columns 64 through 70

    0.0021    0.0021    0.0021    0.0021    0.0022    0.0022    0.0022

  Columns 71 through 77

    0.0022    0.0023    0.0023    0.0023    0.0023    0.0024    0.0024

  Columns 78 through 84

    0.0024    0.0024    0.0025    0.0025    0.0025    0.0025    0.0026

  Columns 85 through 91

    0.0026    0.0026    0.0026    0.0027    0.0027    0.0027    0.0027

  Columns 92 through 98

    0.0028    0.0028    0.0028    0.0028    0.0028    0.0029    0.0029

  Columns 99 through 105

    0.0029    0.0029    0.0030    0.0030    0.0030    0.0030    0.0031

  Columns 106 through 112

    0.0031    0.0031    0.0031    0.0032    0.0032    0.0032    0.0032

  Columns 113 through 119

    0.0033    0.0033    0.0033    0.0033    0.0034    0.0034    0.0034
```

```
  Columns 120 through 122

    0.0034    0.0035    0.0035

P =

  Columns 1 through 7

  -49.7000  -49.3619  -49.9093  -49.5095  -49.1849  -49.0183  -49.0939

  Columns 8 through 14

  -49.4493  -49.1643  -49.4375  -49.7843  -49.8070  -49.5656  -49.6848

  Columns 15 through 21

  -49.4365  -49.6618  -49.5625  -49.5029  -49.8170  -49.8337  -49.9706

  Columns 22 through 28

  -49.7128  -49.7905  -49.7268  -49.2869  -49.9950  -49.3269  -49.7355

  Columns 29 through 35

  -49.3950  -49.7221  -49.4399  -49.4971  -49.8232  -49.9493  -49.7318

  Columns 36 through 42

  -49.7532  -49.8167  -49.4192  -49.9608  -49.4840  -49.4787  -49.6152

  Columns 43 through 49

  -49.7557  -49.6494  -49.6529  -49.6966  -49.8711  -49.8703  -49.5984

  Columns 50 through 56

  -49.8732  -49.7472  -49.7422  -49.7605  -49.5987  -49.9218  -49.9056

  Columns 57 through 63

  -49.8894  -49.7057  -49.9656  -49.8948  -49.9660  -49.7676  -49.7372

  Columns 64 through 70

  -49.5829  -49.6080  -49.6085  -49.7113  -49.9586  -49.9505  -49.6510

  Columns 71 through 77

  -49.8598  -49.9491  -49.6569  -49.9816  -49.6468  -49.8050  -49.6957

  Columns 78 through 84

  -49.6722  -49.9144  -49.8989  -49.9755  -49.9938  -49.9992  -49.7525

  Columns 85 through 91

  -49.9327  -49.8491  -49.8341  -49.8872  -49.6798  -49.8701  -49.9095

  Columns 92 through 98

  -49.8037  -49.9347  -49.9751  -49.8521  -49.8996  -49.7170  -49.7481

  Columns 99 through 105

  -49.9620  -49.9088  -49.9085  -49.9620  -49.7778  -49.9277  -49.8471

  Columns 106 through 112

  -49.9468  -49.9869  -49.7715  -49.9563  -49.7852  -49.9165  -49.8229

  Columns 113 through 119

  -49.7715  -49.7624  -49.7891  -49.8522  -49.9533  -49.8422  -49.7698

  Columns 120 through 122

  -49.9815  -49.9795  -49.7897
```



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