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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=[];
for phi = 0:0.0000001:0.00003
    for ecmax = 0.00005:0.000001:0.0035
        pct = 0 ; mct = 0; pst=0; mst=0;
        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 = 26.8*(eci/0.002)*(2-(eci/0.002));
                else
                    sigmaci = 26.8;
                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 = unfactored_steel_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
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',[4 24 86])
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

Columns 36 through 42

Columns 43 through 49

Columns 50 through 56

Columns 57 through 63

Columns 64 through 70

Columns 71 through 77

Columns 78 through 84

Columns 85 through 91

Columns 92 through 98

Columns 99 through 105

Columns 106 through 11

Columns 113 through 1:

Columns 120 through 131

Columns 127 through 131

Columns 134 through 14

0.1350 0.1360 0.1370 0.1380 0.1390 0.1400 0.1410

$$M =$$

1.0e+03 *

Columns 1 through 7

0.4749 0.7278 0.9808 1.2336 1.4847 1.7364 1.9870

Columns 8 through 14

2.2374 2.4867 2.7356 2.9841 3.2168 3.4316 3.6202

Columns 15 through 21

3.7854 3.9334 4.0626 4.1823 4.2934 4.3931 4.4796

Columns 22 through 28

4.5578 4.6275 4.6922 4.7538 4.8095 4.8603 4.9063

Columns 29 through 35

4.9466 4.9822 5.0151 5.0463 5.0751 5.1027 5.1250

Columns 36 through 42

5.1471 5.1683 5.1885 5.2086 5.2291 5.2474 5.2649

Columns 43 through 49

5.2814	5.2977	5.3134	5.3251	5.3363	5.3469	5.3580
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Columns 50 through 56

5.3687	5.3782	5.3876	5.3970	5.4063	5.4155	5.4244
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Columns 57 through 63

5.4328	5.4416	5.4493	5.4561	5.4632	5.4703	5.4772
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Columns 64 through 70

5.4840	5.4907	5.4970	5.5028	5.5082	5.5133	5.5188
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Columns 71 through 77

5.5237	5.5289	5.5336	5.5377	5.5422	5.5462	5.5505
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Columns 78 through 84

5.5543	5.5583	5.5623	5.5665	5.5701	5.5740	5.5774
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Columns 85 through 91

5.5805	5.5838	5.5871	5.5902	5.5932	5.5965	5.5997
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Columns 92 through 98

5.6024	5.6058	5.6084	5.6110	5.6139	5.6168	5.6189
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Columns 99 through 105

5.6210	5.6233	5.6252	5.6274	5.6295	5.6316	5.6339
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Columns 106 through 112

5.6359	5.6377	5.6394	5.6411	5.6427	5.6445	5.6462
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Columns 113 through 119

5.6478	5.6494	5.6509	5.6526	5.6540	5.6557	5.6570
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Columns 120 through 126

5.6586	5.6599	5.6614	5.6626	5.6640	5.6653	5.6667
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Columns 127 through 133

5.6682	5.6695	5.6707	5.6722	5.6735	5.6747	5.6761
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Columns 134 through 140

5.6772	5.6785	5.6797	5.6806	5.6816	5.6827	5.6835
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Xu =

Columns 1 through 7						
357.5000	364.6667	368.7500	371.6000	373.5000	375.2857	376.7500

Columns 8 through 14

378.1111	379.3000	380.4545	381.5833	382.0769	381.9286	380.9333
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Columns 15 through 21

379.2500	377.2353	374.7778	372.3158	369.8500	367.2381	364.4545
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Columns 22 through 28

361.6087	358.7917	356.0400	353.4231	350.8148	348.2857	345.7241
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Columns 29 through 35

343.1333	340.5806	338.0937	335.6970	333.3824	331.1714	328.8889
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Columns 36 through 42

326.7297	324.6579	322.6667	320.7750	319.0000	317.2143	315.4651
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Columns 43 through 49

313.7727	312.1556	310.5870	308.9149	307.2917	305.7143	304.2200
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Columns 50 through 56

302.7647	301.3077	299.9057	298.5556	297.2545	296.0000	294.7719
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Columns 57 through 63

293.5690	292.4237	291.2833	290.1475	289.0645	288.0159	287.0000
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Columns 64 through 70

286.0154 285.0606 284.1194 283.1912 282.2609 281.3429 280.4648

Columns 71 through 77

279.5972 278.7671 277.9459 277.1200 276.3289 275.5455 274.7949

Columns 78 through 84

274.0506 273.3375 272.6420 271.9756 271.3133 270.6667 270.0235

Columns 85 through 91

269.3837 268.7701 268.1705 267.5843 267.0111 266.4615 265.9239

Columns 92 through 98

265.3871 264.8830 264.3684 263.8646 263.3814 262.9184 262.4242

Columns 99 through 105

261.9400 261.4752 261.0098 260.5631 260.1250 259.6952 259.2830

Columns 106 through 112

258.8692 258.4537 258.0367 257.6273 257.2252 256.8393 256.4602

Columns 113 through 119

256.0877 255.7217 255.3621 255.0171 254.6695 254.3361 253.9917

Columns 120 through 126

253.6612 253.3279 253.0081 252.6855 252.3760 252.0714 251.7717

Columns 127 through 133

251.4844 251.1938 250.9077 250.6336 250.3636 250.0977 249.8433

Columns 134 through 140

249.5852 249.3382 249.0730 248.8043 248.5396 248.2786 248.0142

Emax =

Columns 1 through 7

0.0001 0.0001 0.0001 0.0002 0.0002 0.0003 0.0003

Columns 8 through 14

0.0003 0.0004 0.0004 0.0005 0.0005 0.0005 0.0006

Columns 15 through 21

0.0006 0.0006 0.0007 0.0007 0.0007 0.0008 0.0008

Columns 22 through 28

0.0008 0.0009 0.0009 0.0009 0.0009 0.0010 0.0010

Columns 29 through 35

0.0010 0.0011 0.0011 0.0011 0.0011 0.0012 0.0012

Columns 36 through 42

0.0012 0.0012 0.0013 0.0013 0.0013 0.0013 0.0014

Columns 43 through 49

0.0014 0.0014 0.0014 0.0015 0.0015 0.0015 0.0015

Columns 50 through 56

0.0015 0.0016 0.0016 0.0016 0.0016 0.0017 0.0017

Columns 57 through 63

0.0017 0.0017 0.0017 0.0018 0.0018 0.0018 0.0018

Columns 64 through 70

0.0019 0.0019 0.0019 0.0019 0.0019 0.0020 0.0020

Columns 71 through 77

0.0020 0.0020 0.0021 0.0021 0.0021 0.0021 0.0021

Columns 78 through 84

0.0022	0.0022	0.0022	0.0022	0.0023	0.0023	0.0023
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Columns 85 through 91

0.0023	0.0023	0.0024	0.0024	0.0024	0.0024	0.0024
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Columns 92 through 98

0.0025	0.0025	0.0025	0.0025	0.0026	0.0026	0.0026
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Columns 99 through 105

0.0026	0.0026	0.0027	0.0027	0.0027	0.0027	0.0027
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Columns 106 through 112

0.0028	0.0028	0.0028	0.0028	0.0029	0.0029	0.0029
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Columns 113 through 119

0.0029	0.0029	0.0030	0.0030	0.0030	0.0030	0.0030
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Columns 120 through 126

0.0031	0.0031	0.0031	0.0031	0.0032	0.0032	0.0032
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Columns 127 through 133

0.0032	0.0032	0.0033	0.0033	0.0033	0.0033	0.0033
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Columns 134 through 140

0.0034	0.0034	0.0034	0.0034	0.0035	0.0035	0.0035
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P =

Columns 1 through 7

-49.2008	-49.7762	-49.5723	-48.7665	-49.8818	-49.2491	-49.3667
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Columns 8 through 14

-49.0979	-49.6892	-49.9627	-49.9657	-49.8305	-49.9374	-49.4163
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Columns 15 through 21

-49.8913	-49.0720	-49.9970	-49.6809	-49.5477	-49.4651	-49.2940
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Columns 22 through 28

-49.9808	-49.3231	-49.7600	-49.2567	-49.9866	-49.7110	-49.8712
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Columns 29 through 35

-49.4563	-49.9742	-49.7671	-49.7582	-49.6911	-49.2286	-49.9052
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Columns 36 through 42

-49.5149	-49.4699	-49.6327	-49.8032	-49.3088	-49.9138	-49.8323
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Columns 43 through 49

-49.8412	-49.7547	-49.3596	-49.5992	-49.4552	-49.9911	-49.8113
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Columns 50 through 56

-49.5282	-49.6193	-49.6766	-49.7217	-49.7413	-49.7546	-49.8038
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Columns 57 through 63

-49.9547	-49.5184	-49.5059	-49.8803	-49.6944	-49.5582	-49.4839
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Columns 64 through 70

-49.4831	-49.5667	-49.5503	-49.7234	-49.9654	-49.9912	-49.5685
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Columns 71 through 77

-49.7632	-49.5356	-49.5656	-49.9997	-49.5788	-49.7474	-49.5153
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Columns 78 through 84

-49.8665	-49.8274	-49.8895	-49.5788	-49.8432	-49.6195	-49.7018
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Columns 85 through 91

-49.9392	-49.8079	-49.7664	-49.8093	-49.9377	-49.7202	-49.5902
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Columns 92 through 98

-49.9762	-49.5994	-49.7617	-49.9944	-49.8920	-49.6209	-49.7433
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Columns 99 through 105

-49.8837 -49.6913 -49.9531 -49.8900 -49.8866 -49.9454 -49.6920

Columns 106 through 112

-49.7469 -49.8329 -49.8216 -49.8504 -49.9215 -49.7525 -49.7246

Columns 113 through 119

-49.7451 -49.8098 -49.9210 -49.7363 -49.9437 -49.8520 -49.9379

Columns 120 through 126

-49.7252 -49.8880 -49.7553 -49.9886 -49.9334 -49.9204 -49.9452

Columns 127 through 133

-49.6855 -49.7833 -49.9189 -49.7798 -49.7777 -49.8815 -49.7149

Columns 134 through 140

-49.8952 -49.8110 -49.7405 -49.9072 -49.8411 -49.7233 -49.8193

