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Housekeeping

```
clc; clear; close all;
```

Constants

```
t = 10e-3; % m
E = 200e9; % N/m^2
yield = 300e6; % N/m^2
```

```
L = 1:7; % m
d = [60, 80, 100, 150, 200, 225, 250]*10^-3; % m
```

```
long = 0;
short = 0;
```

Analysis

```
I = (pi/4)*((d/2).^4 - (d/2 - t).^4);
A = pi*((d/2).^2 - (d/2 - t).^2);
```

```
P_cr = (pi^2)*(E*I)./(L.^2);
P_y = yield*A;
```

```
for k = 1:length(L)
    if P_cr(k) < P_y(k)
        fprintf("Column #%.0f is a long column, P_cr = %.3d N, P_y = %.3d N\n", k, P_cr(k), P_y(k))
        long = long + 1;
    else
        fprintf("Column #%.0f is a short column, P_cr = %.3d N, P_y = %.3d N\n", k, P_cr(k), P_y(k))
        short = short + 1;
    end
end
```

```
fprintf("In total, there are %.0f long columns and %.0f short columns.\n",
    long, short)
```

```
Column #1 is a short column, P_cr = 1.008e+06 N, P_y = 4.712e+05 N
Column #2 is a short column, P_cr = 6.783e+05 N, P_y = 6.597e+05 N
Column #3 is a long column, P_cr = 6.356e+05 N, P_y = 8.482e+05 N
Column #4 is a short column, P_cr = 1.336e+06 N, P_y = 1.319e+06 N
```

Column #5 is a short column, $P_{cr} = 2.133e+06$ N, $P_y = 1.791e+06$ N
Column #6 is a short column, $P_{cr} = 2.145e+06$ N, $P_y = 2.026e+06$ N
Column #7 is a long column, $P_{cr} = 2.191e+06$ N, $P_y = 2.262e+06$ N
In total, there are 2 long columns and 5 short columns.

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