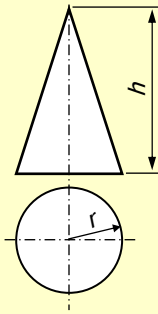


1-1. naloga: volumen stožca

$$V_{\text{stožca}} = \frac{\pi r^2 h}{3}$$



a)  $r = 2.9$  cm  
 $h = 5.8$  cm

b)  $r = 2.9$  cm  
 $h = 1.5, 1.9, 2.2, 3.5, 5.8$  [cm]

c)  $r = 2.9, 4.5, 8.8, 9.3, 12.4$  [cm]  
 $h = 5.8$  cm

d)  $r = 2.9, 4.5, 8.8, 9.3, 12.4$  [cm]  
 $h = 1.5, 1.9, 2.2, 3.5, 5.8$  [cm]

NM: V-I/1

1-1. naloga: volumen stožca

```

MATLAB
File Edit Text Go Cell Tools Debug Desktop Window Help
C:\Temp\MATLAB\NM_1_vaja.m

Workspace
Name Value Class
Va 51.0802 double
Vb [13.2104 16.7332 19.3752 30.8243 51.0802] double
Vc [51.0802 122.9934 470.3509 525.3183 933.8992] double
Vd1 [13.2104 40.2909 178.4090 317.0024 933.8992] double
Vd2 <5x5 double> double
h [1.5 1.9 2.2 3.5 5.8] double
r [2.9 4.5 8.8 9.3 12.4] double

Editor: C:\Temp\MATLAB\NM_1_vaja.m
1 - clc;
2 - clear all;
3 - format compact;
4 - %a)
5 - r = 2.9; %[cm]
6 - h = 5.8; %[cm]
7 - Va = pi*r^2*h/3 %[cm^3]
8 - %b)
9 - r = 2.9; %[cm]
10 - h = [1.5 1.9 2.2 3.5 5.8]; %[cm]
11 - Vb = pi * r^2 * h / 3 %[cm^3]
12 - %c)
13 - r = [2.9 4.5 8.8 9.3 12.4]; %[cm]
14 - h = 5.8; %[cm]
15 - Vc = pi * r.^2 * h / 3 %[cm^3]
16 - %d1)
17 - r = [2.9 4.5 8.8 9.3 12.4]; %[cm]
18 - h = [1.5 1.9 2.2 3.5 5.8]; %[cm]
19 - Vd1 = pi * r.^2 .* h / 3 %[cm^3]
20 - %d2)
21 - Vd2 = pi * (r.^2) * h / 3 %[cm^3]

Command Window
Va =
51.0802
Vb =
13.2104 16.7332 19.3752 30.8243 51.0802
Vc =
51.0802 122.9934 470.3509 525.3183 933.8992
Vd1 =
13.2104 40.2909 178.4090 317.0024 933.8992
Vd2 =
13.2104 16.7332 19.3752 30.8243 51.0802
31.8086 40.2909 46.6527 74.2201 122.9934
121.6425 154.0805 178.4090 283.8324 470.3509
135.8582 172.0870 199.2587 317.0024 525.3183
241.5256 305.9325 354.2376 563.5598 933.8992
>>
    
```

NM: V-I/2

1-2. naloga: masa plošče z izvrtino

$\rho = 7800 \text{ kg/m}^3$

$m = V \cdot \rho$

$V_{\text{kvader}} = a \cdot b \cdot c$

$V_{\text{valj}} = \pi \cdot r^2 \cdot h$

$V_{\text{pr\_stožec}} = \frac{\pi \cdot h}{3} (R^2 + r^2 + R \cdot r)$

NM: V-I/3

1-2. naloga: masa plošče z izvrtino

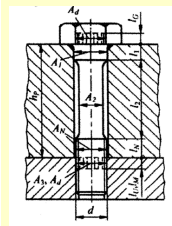
```

MATLAB
File Edit Text Go Cell Tools Debug Desktop Window Help
'Documents and Settings\niko\AA-Home\Biro\AA-Fak
Shortcuts How to Add What's New
Workspace
Name Value
R 20
V 347957.2282
Vkvader 360000
Vstozec 7330.3829
Vvalj 4712.389
a 120
c 25
h 10
hvalj 15
m 2.7141
r 10
ro 0
Editor - C:\Documents and Settings\niko\AA-Home\Biro\AA-...
1 - c1c;
2 - clear all;
3 - ro = 7800.e-9; % [kg/mm3]
4 % Izračun volumna kvadra
5 - a = 120; % [mm]
6 - c = 25; % [mm]
7 - Vkvader = a*c*c; % [mm3]
8 % Izračun volumna valja
9 - r = 10; % [mm]
10 - h = 10; % [mm]
11 - hvalj = c-h; % [mm]
12 - Vvalj = pi*r^2*hvalj; % [mm3]
13 % Izračun volumna presekanega stožca
14 - R = 20; % [mm]
15 - Vstozec = pi*h/3*(R^2+r^2+R*r); % [mm3]
16 % Izračun volumna in mase plošče z izvrtino
17 - V = Vkvader-Vvalj-Vstozec; % [mm3]
18 - m = V*ro;
19 - fprintf('Masa plošče je %5.3f kg \n\n',m);
Command Window
Masa plošče je 2.714 kg
script Ln 16 Col 27 OVR

```

NM: V-I/4

1-3. naloga: izračun momenta za dosego sile prednapetja



$$F = 12 \text{ kN}$$

$$d_v = 15 \text{ mm}$$

$$d_m = 23 \text{ mm}$$

$$\beta = 30^\circ$$

$$h = 2 \text{ mm}$$

$$\mu_v = 0.1$$

$$\mu_p = 0.2$$

$$\alpha = \arctan\left(\frac{h}{\pi d_v}\right)$$

$$\rho = \arctan\left(\frac{\mu_v}{\cos(\beta)}\right)$$

$$M = F \left\{ \tan(\alpha + \rho) \frac{d_v}{2} + \mu_p \frac{d_m}{2} \right\}$$

NM: V-I/5

1-3. naloga: izračun momenta za dosego sile prednapetja

```

1 - clear;
2 - clear all;
3 - F=input('Sila prednapetja vijaka \n F [N] = ');
4 - dv=0.015; % [m]
5 - dm=0.023; % [m]
6 - kotbeta=30; % [stopinje]
7 - h=0.002; % [m]
8 - miv=0.1; % [/]
9 - mip=0.2; % [/]
10 - alfa=atan(h/(pi*dv)); % [stopinje]
11 - ro=atan(miv/cos(kotbeta)); % [stopinje]
12 - M=F*(tan(alfa+ro)*dv/2+mip*dm/2); % [Nm]
13 - fprintf('\n Moment je %+6.2f Nm \n\n', M);

```

Workspace:

Name	Value	Class
F	12000	double
M	41.882	double
alfa	2.4302	double
dm	0.023	double
dv	0.015	double
h	0.002	double
kotbeta	30	double
mip	0.2	double
miv	0.1	double
ro	6.5868	double

Command Window:

```

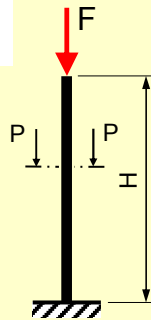
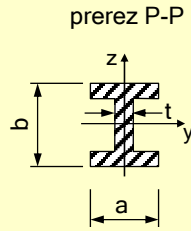
Sila prednapetja vijaka
F [N] = 12000

Moment je +41.88 Nm

```

NM: V-I/6

1-4. naloga: uklon nosilca



$F = 100 \text{ kN}$   
 $H = 2,2 \text{ m}$   
 $E = 200000 \text{ MPa}$   
 $\beta = 2$   
 $a = 80 \text{ mm}$   
 $b = 120 \text{ mm}$   
 $t = 12 \text{ mm}$

$$A = 2at + (b - 2t)t$$

$$I_y = \frac{ab^3}{12} - \frac{(a-t)(b-2t)^3}{12}, \quad I_z = \frac{2ta^3}{12} + \frac{(b-2t)t^3}{12}$$

$$I_{\min} = \min(I_y, I_z), \quad i_{\min} = \sqrt{\frac{I_{\min}}{A}}, \quad \lambda = \frac{\beta H}{i_{\min}}$$

$$F_{kr} = \frac{\pi^2 EA}{\lambda^2}, \quad 105 < \lambda < 250$$

$F < F_{kr}$

NM: V-17

1-4. naloga: uklon nosilca

```

1 - clc;
2 - clear all;
3 - F=100000; % [N] sila
4 - H=2200; % [mm] dolzina
5 - E=200000; % [MPa] elastični modul
6 - beta=2; % [-] koeficient, ki popisuje način vpetja nosilca
7 - a=80; % [mm] dimenzija prereza
8 - b=120; % [mm] dimenzija prereza
9 - t=12; % [mm] dimenzija prereza
10 - A=2*a*t+(b-2*t)*t;
11 - Iy=a*b^3/12-(a-t)*(b-2*t)^3/12;
12 - Iz=2*t*a^3/12+(b-2*t)*t^3/12;
13 - Imin=min(Iy, Iz);
14 - imin=(Imin/k)^^(1/2);
15 - lambda=beta*H/imin;
16 - Fkr=pi^2*E*A/lambda^2;
17 - fprintf('\n Vitkost nosilca = %3.0f ', lambda);
18 - fprintf('\n Kriticna sila = %3.1f kN \n\n', Fkr/1000);

```

Command Window

```

Vitkost nosilca = 239
Kriticna sila = 105.8 kN

```

NM: V-18