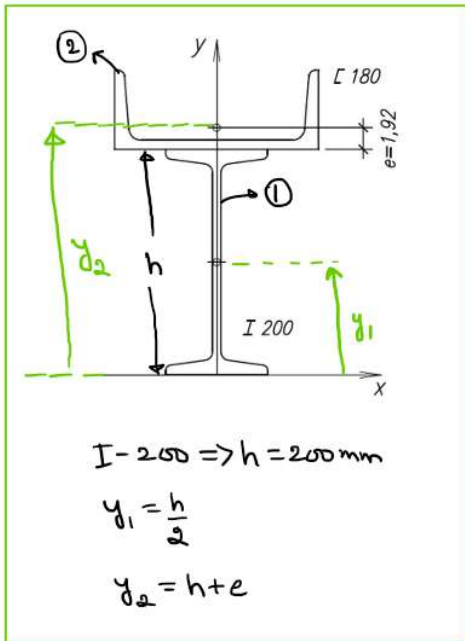
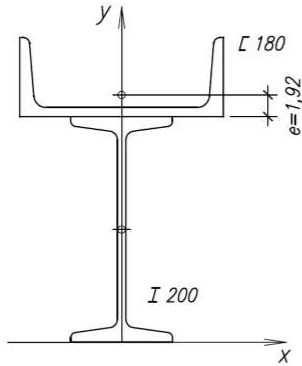


Center of Gravity of a composite section made of Eurocode C-180 and Eurocode I-200

Please find the coordinates: x_0 , y_0 of the center of gravity of the composite figure below:



Symmetry about y axis $\Rightarrow x_0$ lies at y-axis.

$$y_0 = \frac{A_1 y_1 + A_2 y_2}{A_1 + A_2}$$

$\rightarrow A_1 = \text{Area of I-200 cross-section}$
 $= 33.4 \text{ cm}^2$ [From Table below]

$= 33.4 \times (10 \text{ mm})^2 = 33.4 \times 10^2 \text{ mm}^2$

$\rightarrow y_1 = \frac{h}{2} = \frac{200 \text{ mm}}{2} = 100 \text{ mm}$

$\rightarrow A_2 = \text{Area of C-180 cross-section}$
 $= 20 \text{ cm}^2$ [From table below]

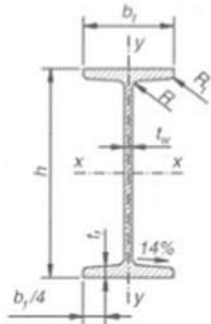
$= 20 \times 10^2 \text{ mm}^2$

$\rightarrow y_2 = h + e = 200 \text{ mm} + 1.92 \text{ cm}$ [From Table - C-180]

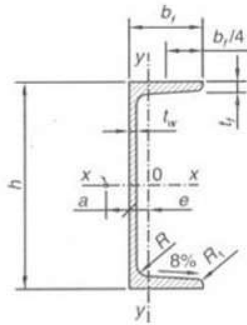
$= 200 \text{ mm} + 19.2 \text{ mm} = 219.2 \text{ mm}$

Plugging values, we get $y_0 = 154.36 \text{ mm}$

Tables in the *Manual of Steel Construction*:



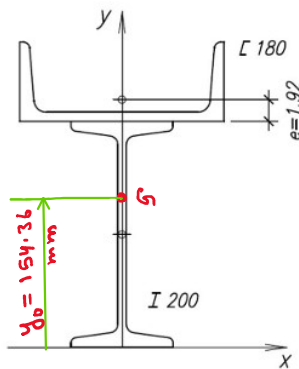
I-section, double-tee bar



channel section

I			Area	Moments of inertia		Section modulus	
	h	b _f	A	I _x	I _y	W _x	W _y
	cm ²			cm ⁴		cm ³	
80	80	42	7,57	77,8	6,29	19,5	3,00
100	100	50	10,6	171	12,2	34,2	4,88
120	120	58	14,2	328	21,5	54,7	7,41
140	140	66	18,2	573	35,2	81,9	10,7
160	160	74	22,8	935	54,7	117	14,8
180	180	82	27,9	1450	81,3	161	19,8
200	200	90	33,4	2140	117	214	26,0
220	220	98	39,5	3060	162	278	33,1
240	240	106	46,1	4250	221	354	41,7
260	260	113	53,3	5740	288	442	51,0
300	300	125	69,0	9800	451	653	72,2
340	340	137	86,7	15700	674	923	98,4
360	360	143	97,0	19610	818	1090	114
400	400	155	118	29210	1160	1460	149
450	450	170	147	45850	1730	2040	203
500	500	185	179	68740	2480	2750	268
550	550	200	212	99180	3490	3610	349
600	600	215	254	139000	4670	4630	434

C			Area		Moments of inertia		Section modulus	
	h	b _f	A	e	I _x	I _y	W _x	W _y
	cm ²			cm	cm ⁴		cm ³	
40	40	20	3,51	0,65	7,26	1,06	3,63	0,78
50	50	38	7,12	1,37	26,4	9,12	10,6	3,75
65	65	42	9,03	1,42	57,5	14,1	17,7	5,07
80	80	45	11,0	1,45	106	19,4	26,5	6,36
100	100	50	13,5	1,55	206	29,3	41,2	8,49
120	120	55	17,0	1,60	364	43,2	60,7	11,1
140	140	60	20,4	1,75	605	62,7	86,4	14,8
160	160	65	24,0	1,84	925	85,3	116	18,3
180	180	70	28,0	1,92	1350	114	150	22,4
200	200	75	32,2	2,01	1910	148	191	27,0
220	220	80	37,4	2,14	2690	197	245	33,6
240	240	85	42,3	2,23	3600	248	300	39,6
260	260	90	48,3	2,36	4820	317	371	47,7
280	280	95	53,3	2,53	6280	399	448	57,2
300	300	100	58,8	2,70	8030	495	535	67,8
320	320	100	75,8	2,60	10870	597	679	80,6
350	350	100	77,3	2,40	12840	570	734	75,0
380	380	102	80,4	2,38	15760	615	829	78,7
400	400	110	91,5	2,65	20350	846	1020	102,0



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