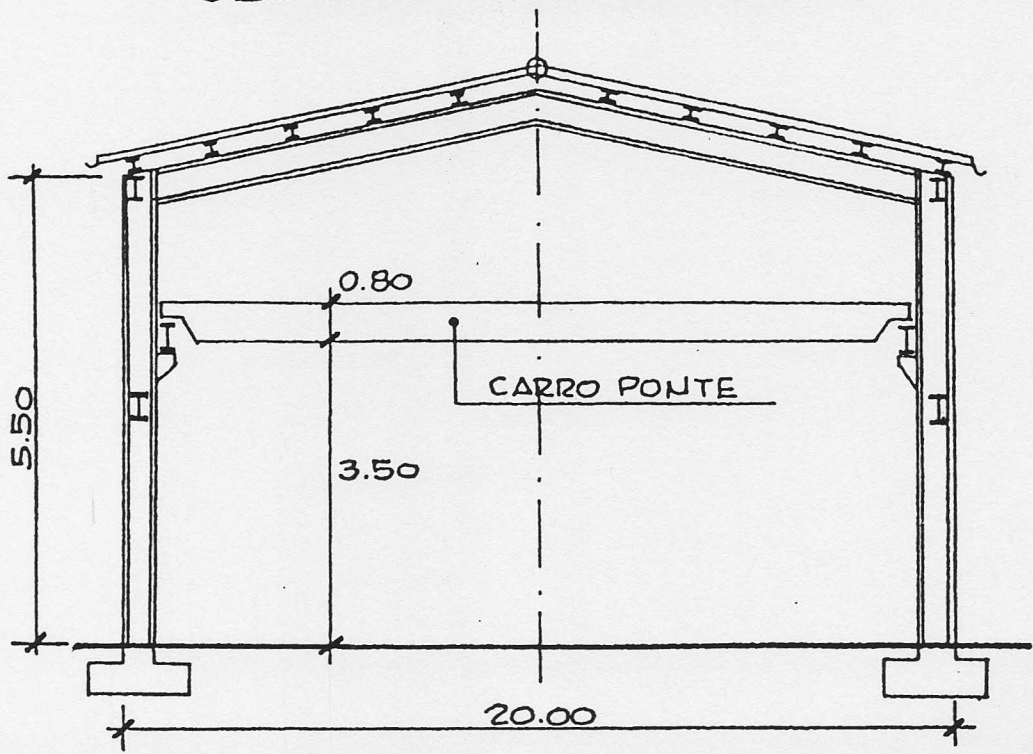
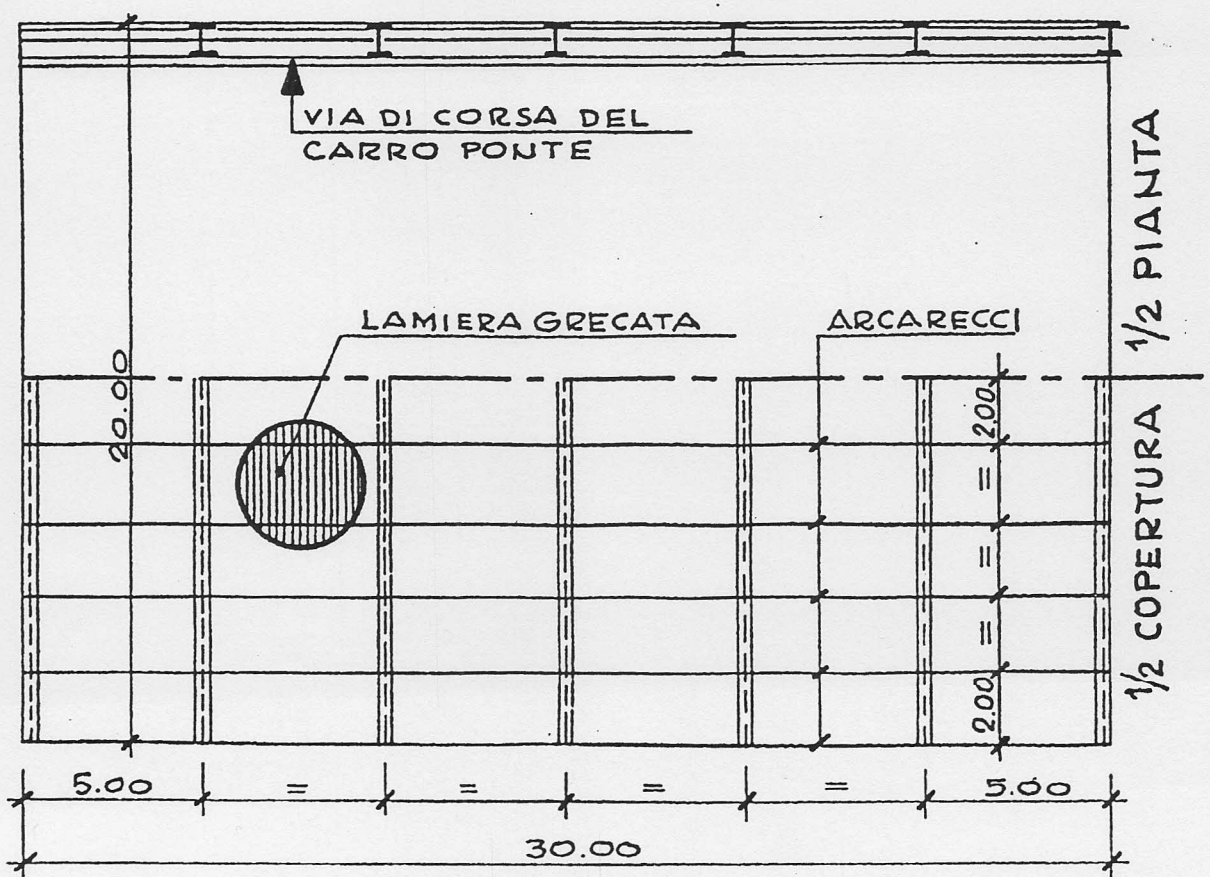
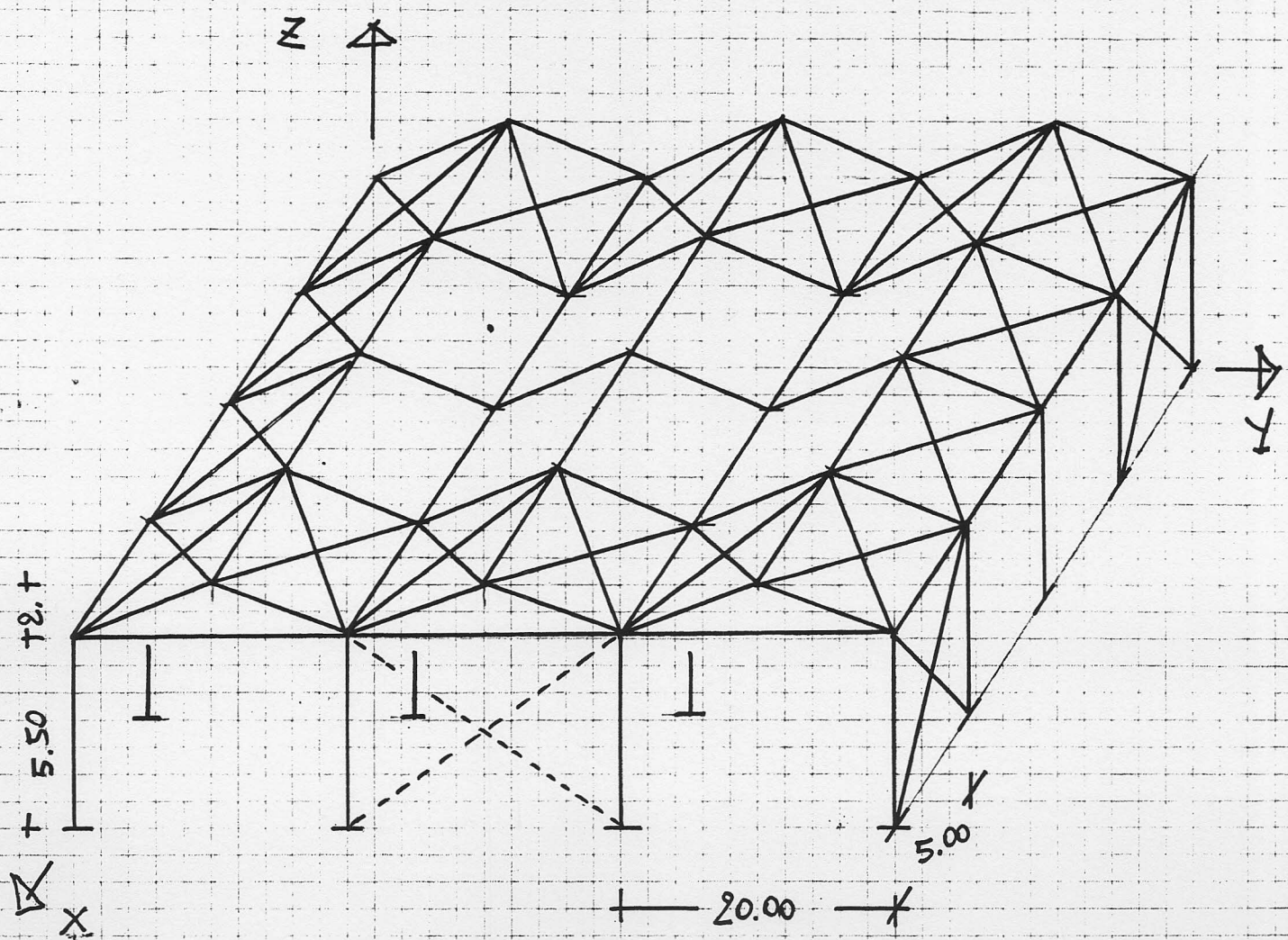


# SEZIONE TRASVERSALE

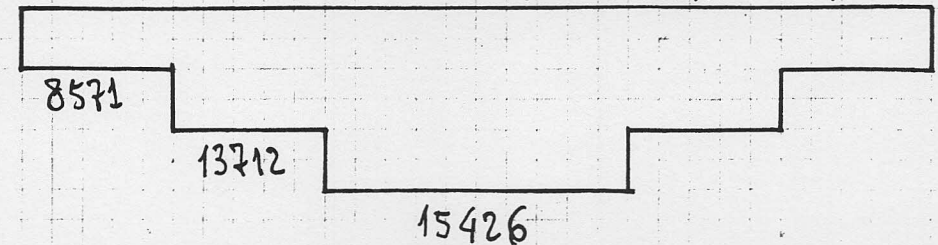
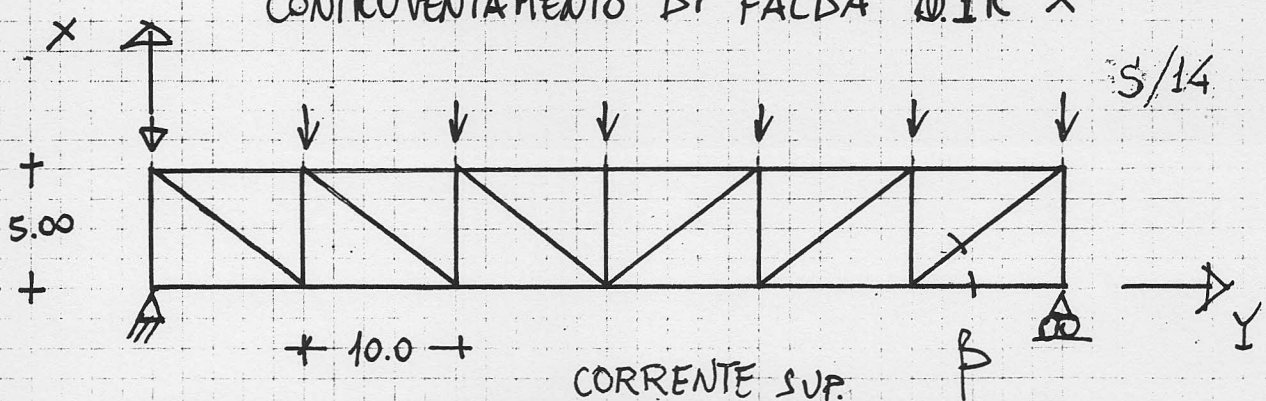


# CAPANNONE INDUSTRIALE IN CARPENTERIA METALLICA

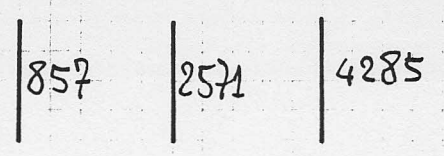
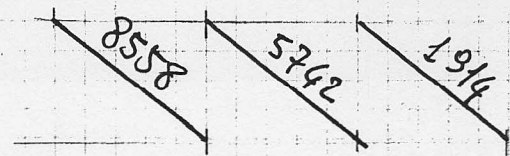




CONTROVENTAMENTO DI FALDA DIR X



$\beta = 26.6^\circ$



A. PARETE DIAG.

A. PARETE MONTANTI

# ANALISI DEI CARICHI

LAM. GRECATA + IMP. + COIB.

SOV. ACC. (NEVE)

$$p = \frac{50 \text{ Kg/m}^2}{150} = 0.33 \text{ Kg/m}$$

## ARCARECCI

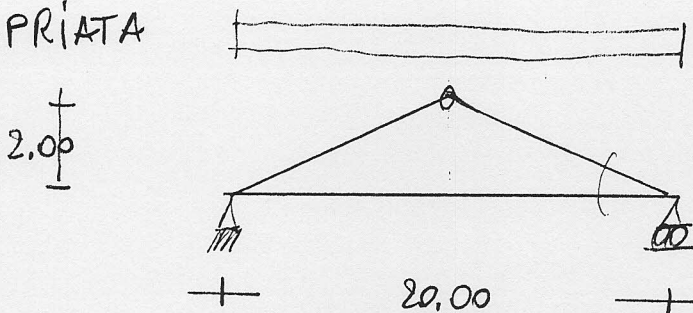
$$q = 150 \times 2.00 = 300 \text{ Kg/m}$$

$$M = 300 \times 5^2 / 8 = 937 \text{ Kg/m}$$

$$W = M / \sigma = 93700 / 2400 = 39 \text{ cm}^3$$

IPE 120

## CAPRIATA



$$d = 11.30$$

$$q = 150 \times 5 = 750 \text{ Kg/m}$$

$$R = q l / 2 = 7500 \text{ Kg}$$

$$T = R / \cos d = 37.500 \text{ Kg}$$

$$C = R / \sin d = 38.242 \text{ Kg}$$

$$M = q \left(\frac{l}{2}\right)^2 \frac{1}{8} = 9375 \text{ Kg/m}$$

$$\text{Tirante } A = T / \sigma_A = 15.6 \text{ cm}^2$$

2L 70 x 7

$$\text{Puntone IPE 360 ; } A = 72.7 ; I_{MAX} = 16270 ; W = 904 \text{ cm}^3$$

$$i_{MAX} = 15.0 \text{ cm}$$

$$N_E = EI \pi^2 / l^2 = 337.215 \text{ Kgf}$$

$$C = 1 / (1 - N/N_E) = 1.128$$

$$\lambda = l_0 / i_{MAX} = 66.7 \quad \omega(\lambda) = 1.65$$

$$\sigma = \omega \frac{N}{A} + \frac{M}{W} C = 1.65 \frac{38242}{72.7} + \frac{937500}{904} \cdot 1.13$$

$$= 868 + 1172 = 2040 \text{ Kgf/cm}^2$$

$$2 \text{ UPN 280} \quad A = 106.7 \quad I = 12552 \quad W = 896$$

$$i = 10.8$$

$$N_E = EI \pi^2 / l^2 = 260.155 \text{ Kgf}$$

$$C = 1 / (1 - N/N_E) = 1.17$$

$$\lambda = l_0 / i_{MAX} = 92.6 \quad \omega(\lambda) = 1.82$$

$$\sigma = \omega \frac{N}{A} + \frac{M}{W} C = 652 + 1224 = 1876$$

# AZIONE SISMICA

$$W = 60 \times 20 \times 200 = 240000 \text{ Kg}$$

$$F_x = 0.1 W = 24000 \text{ Kg}$$

## CONTROVENTI DI FALDA

C: azioni sui correnti

P: azioni sulle estremità di parete

$$C_1 = F_x \left( \frac{1}{4} - \frac{1}{14} \right) \times \frac{10}{5} = 8571 \quad 235 \times 4$$

$$P_1 = F_x \left( \frac{1}{4} - \frac{1}{14} \right) \frac{1}{\sin \beta} = 8558$$

$$C_2 = F_x \left[ \left( \frac{1}{4} - \frac{1}{14} \right) \times 20 - \frac{1}{14} \times 10 \right] \frac{1}{5} = 13712$$

$$P_2 = \frac{(4285 - 1714)}{\sin \beta} = 5742$$

$$C_3 = F_x \left[ \left( \frac{1}{4} - \frac{1}{14} \right) \times 30 - \frac{1}{14} \times 20 - \frac{1}{14} \times 10 \right] \frac{1}{5} = 15426$$

$$P_3 = \frac{(4285 - 1714 \times 2)}{\sin \beta} = 1914$$

Correnti 2 UPN 160

$$\lambda = 1000 / 6.21 = 161 \quad \omega = 4.23$$

$$\sigma = 15426 / (2 \times 48) = 679$$

PILASTRO

Opature  $20 \times 5 \times 200$  20.000 kg  
Carrifante 20.000 kg

HE 220 B

$$\lambda = 550 / 9.43 = 58.3 \quad \omega = 1.25$$

$$\sigma = \omega \frac{N}{A} = 549 \text{ kg/cm}^2$$

BINARIO CARRO PONTE

Carro ponte 2000/2

Gancio

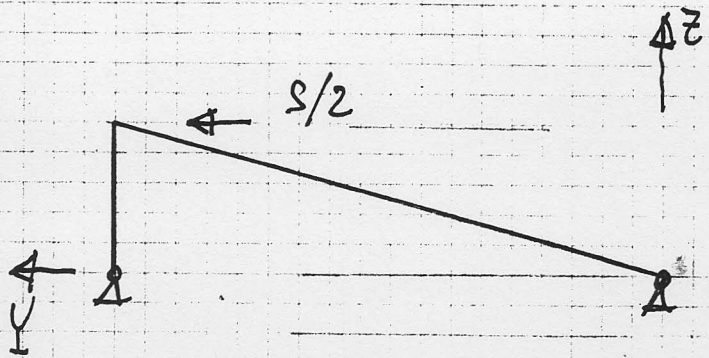
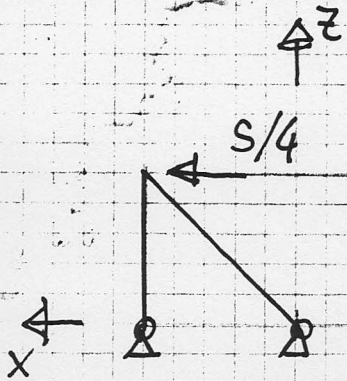
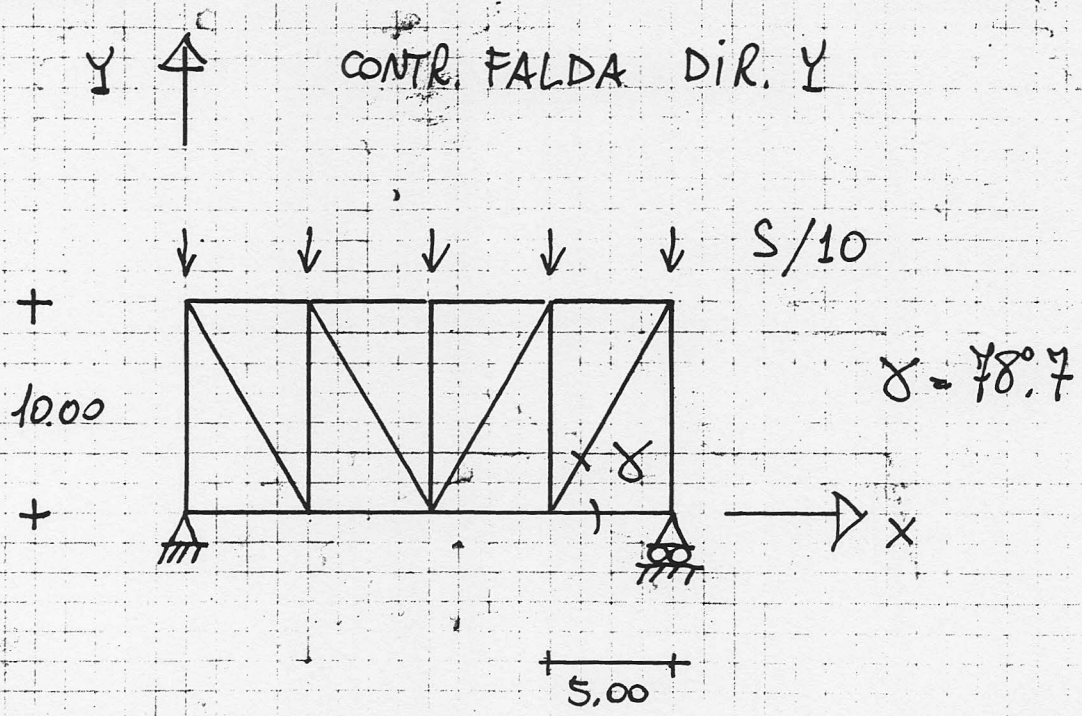
$$\begin{array}{r} 1000 \text{ kg} \\ 10000 \text{ u} \\ \hline 11000 \end{array}$$

appoggiate  $M = P l / 4 = 13.75 \text{ tm}$

incastate  $M = \frac{1}{8} P l$

$$W \leq \frac{M}{\sigma_A} = 528 \text{ cm}^3$$

IPE 300



CONTR. PARETE DIR. X

CONTR. PARETE DIR. Y

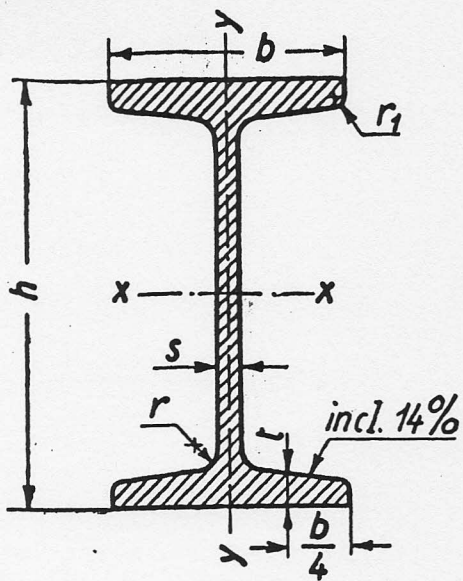


Fig. 1.

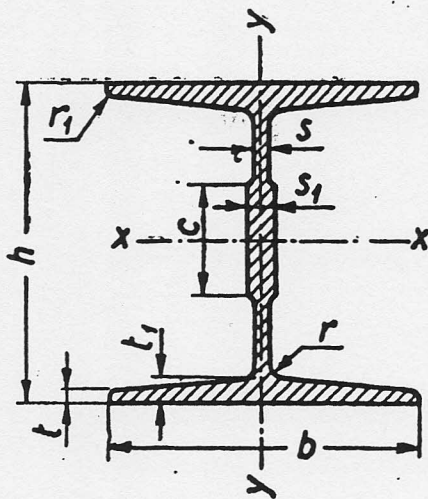


Fig. 2.

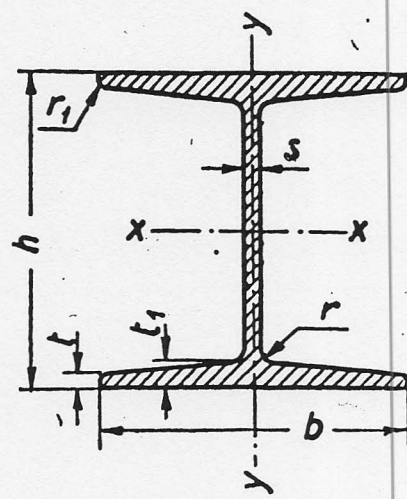


Fig. 3.

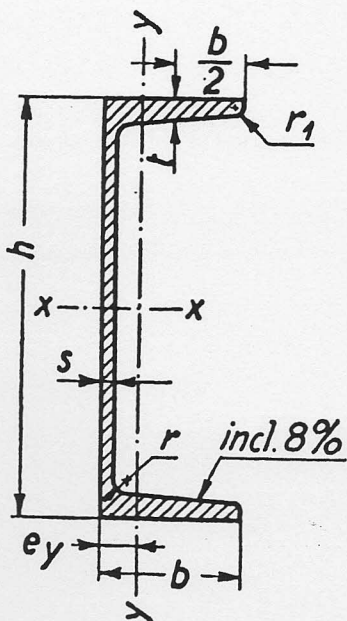


Fig. 4.

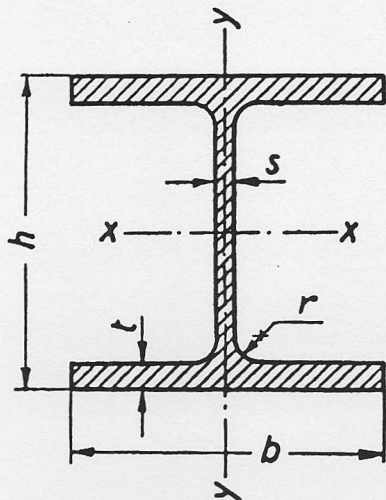


Fig. 5.

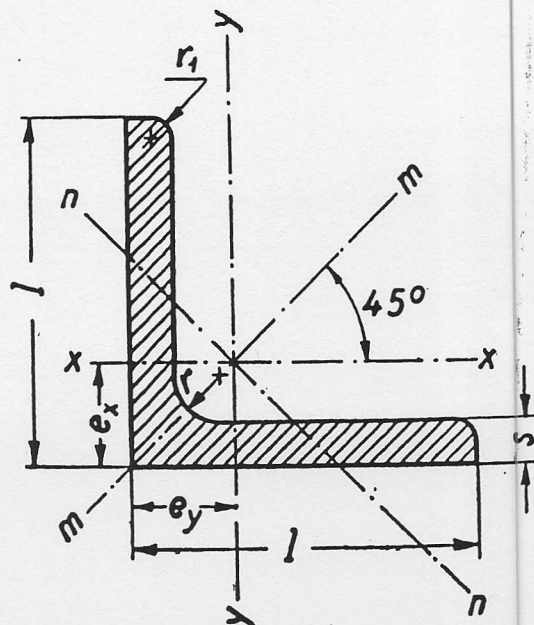


Fig. 6.

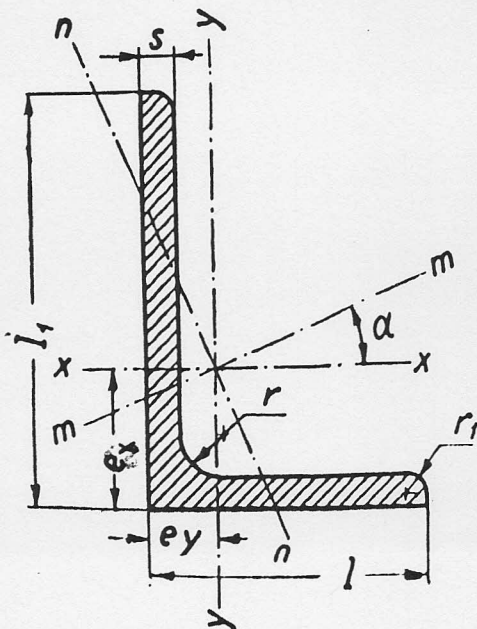


Fig. 7.

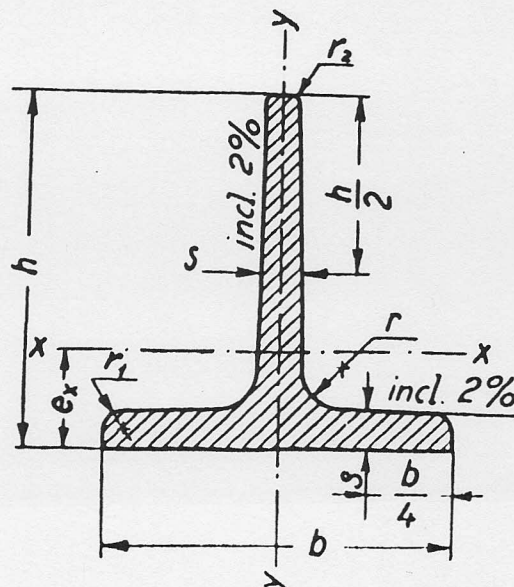
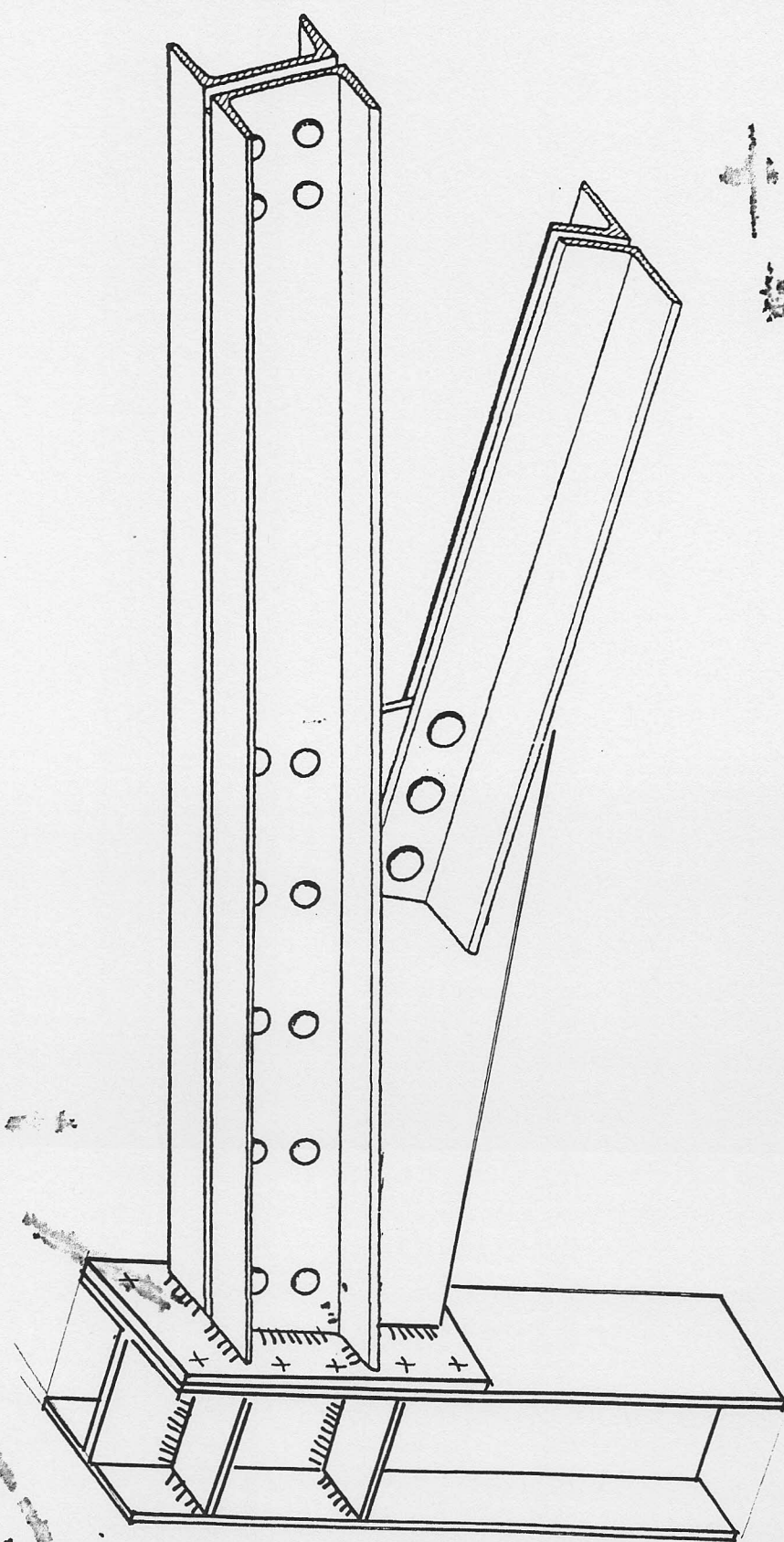
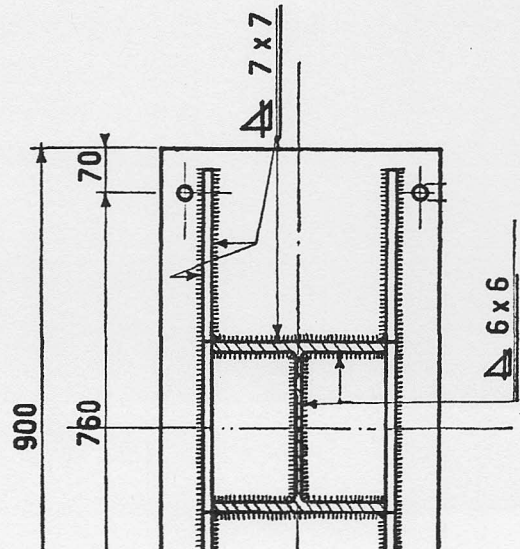
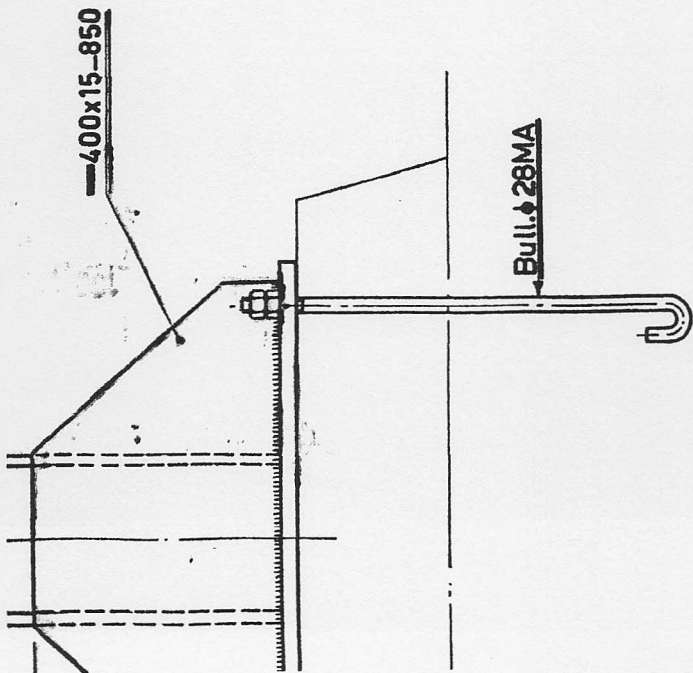
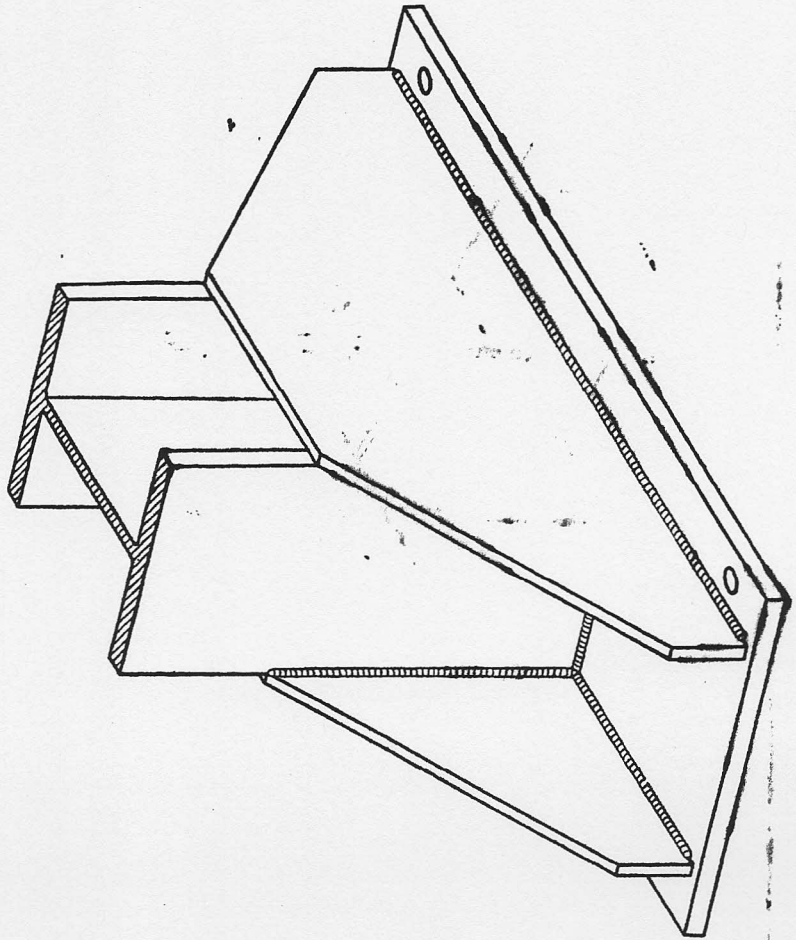
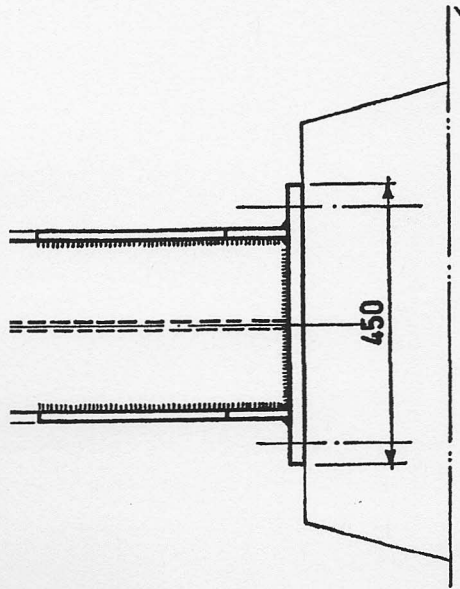
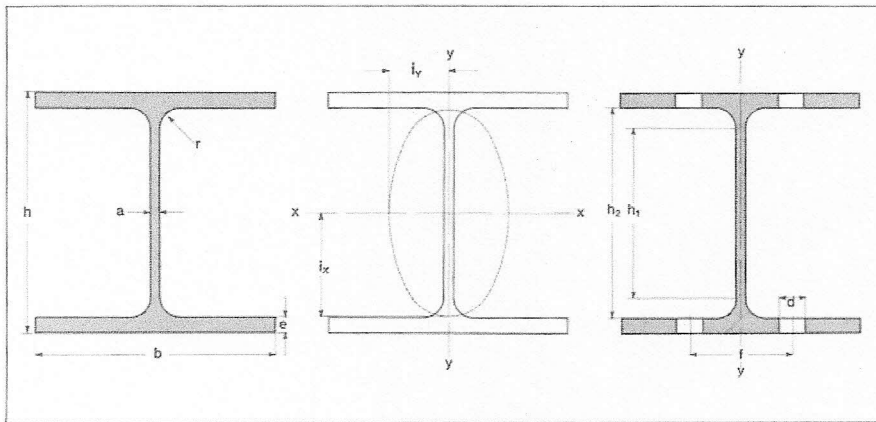


Fig. 8.





**TRAVI HE**  
ad ali larghe parallele  
UNI 5397-64



desi- gnazione profilo (*)	dimensioni							A cm <sup>2</sup>	p kg/m	U m <sup>2</sup> /m	
	h mm	b mm	a mm	e mm	r mm	h <sub>1</sub> mm	h <sub>2</sub> mm				
HE 100	A	96	100	5	8	12	56	80	21,2	16,7	0,561
	B	100	100	6	10	12	56	80	26,0	20,4	0,567
	M	120	106	12	20	12	56	80	53,2	41,8	0,619
HE 120	A	114	120	5	8	12	74	98	25,3	19,9	0,677
	B	120	120	6,5	11	12	74	98	34,0	26,7	0,686
	M	140	126	12,5	21	12	74	98	66,4	52,1	0,738
HE 140	A	133	140	5,5	8,5	12	92	116	31,4	24,7	0,794
	B	140	140	7	12	12	92	116	43,0	33,7	0,805
	M	160	146	13	22	12	92	116	80,6	63,2	0,857
HE 160	A	152	160	6	9	15	104	134	38,8	30,4	0,906
	B	160	160	8	13	15	104	134	54,3	42,6	0,918
	M	180	166	14	23	15	104	134	97,1	76,2	0,970
HE 180	A	171	180	6	9,5	15	122	152	45,3	35,5	1,02
	B	180	180	8,5	14	15	122	152	65,3	51,2	1,04
	M	200	186	14,5	24	15	122	152	113	88,9	1,09
HE 200	A	190	200	6,5	10	18	134	170	53,8	42,3	1,14
	B	200	200	9	15	18	134	170	78,1	61,3	1,15
	M	220	206	15	25	18	134	170	131	103	1,20
HE 220	A	210	220	7	11	18	152	188	64,3	50,5	1,25
	B	220	220	9,5	16	18	152	188	91,0	71,5	1,27
	M	240	226	15,5	26	18	152	188	149	117	1,32
HE 240	A	230	240	7,5	12	21	164	206	76,8	60,3	1,37
	B	240	240	10	17	21	164	206	106	83,2	1,38
	M	270	248	18	32	21	164	206	200	157	1,46
HE 260	A	250	260	7,5	12,5	24	177	225	86,8	68,2	1,48
	B	260	260	10	17,5	24	177	225	118	93,0	1,50
	M	290	268	18	32,5	24	177	225	220	172	1,57
HE 280	A	270	280	8	13	24	196	244	97,3	76,4	1,60
	B	280	280	10,5	18	24	196	244	131	103	1,62
	M	310	288	18,5	33	24	196	244	240	189	1,69

(\*) A = serie leggera      B = serie normale      M = serie rinforzata

- A** = sezione del profilo (A', A'' = sezione depurata dei fori)  
**p** = peso di un metro di barra  
**U** = superficie del contorno per un metro di barra  
**J** = momento d'inerzia  
**W** = modulo di resistenza (W', W'' per sezione depurata dei fori)  
**i** =  $\sqrt{J/A}$  = raggio d'inerzia  
**S<sub>x</sub>** = momento statico di mezza sezione  
**s<sub>x</sub>** =  $\frac{J_x}{S_x}$  = distanza tra i centri di trazione e di compressione

valori statici relativi agli assi xx-yy								(*) foratura sulle ali						desi- gnazione profilo (*)
J <sub>x</sub> cm <sup>4</sup>	W <sub>x</sub> cm <sup>3</sup>	i <sub>x</sub> cm	J <sub>y</sub> cm <sup>4</sup>	W <sub>y</sub> cm <sup>3</sup>	i <sub>y</sub> cm	S <sub>x</sub> cm <sup>3</sup>	s <sub>x</sub> cm	d mm	f mm	su 1 ala		su 2 ali		
										A' cm <sup>2</sup>	W' <sub>x</sub> cm <sup>3</sup>	A'' cm <sup>2</sup>	W'' <sub>x</sub> cm <sup>3</sup>	
349	73	4,06	134	27	2,51	41,5	8,41	13	55	19,1	57,6	17,0	72,7	HE 100 A B M
450	90	4,16	167	33	2,53	52,1	8,64	13	55	23,4	71,1	20,8	68,8	
1143	190	4,63	399	75	2,74	118	9,69	13	65	48,0	152	42,8	147	
606	106	4,89	231	38	3,02	59,7	10,2	17	65	22,6	82,1	19,9	79,5	HE 120 A B M
864	144	5,04	318	53	3,06	82,6	10,5	17	65	30,3	111	26,5	107	
2018	288	5,51	703	112	3,25	175	11,5	17	70	66,3	228	52,1	215	
1033	155	5,73	389	56	3,52	86,7	11,9	21	75	27,8	118	24,2	114	HE 140 A B M
1509	216	5,93	550	79	3,58	123	12,3	21	75	37,9	162	32,9	156	
3291	411	6,39	1144	157	3,77	247	13,3	21	80	71,4	314	62,1	300	
1673	220	6,57	616	77	3,98	123	13,6	23	85	34,7	170	30,5	164	HE 160 A B M
2492	311	6,78	889	111	4,05	177	14,1	23	85	48,3	239	42,3	230	
5098	566	7,25	1759	212	4,26	337	15,1	23	90	86,5	438	75,9	420	
2510	294	7,45	925	103	4,52	162	15,5	28	95	40,0	220	34,7	212	HE 180 A B M
3831	426	7,66	1363	151	4,57	241	15,9	28	95	57,5	317	49,6	305	
7483	748	8,13	2580	277	4,77	442	16,9	28	100	99,9	563	86,4	539	
3692	389	8,28	1336	134	4,98	215	17,2	31	105	47,6	293	41,4	283	HE 200 A B M
5696	570	8,54	2003	200	5,07	321	17,7	31	105	68,8	426	59,5	410	
10642	967	9,00	3651	354	5,27	567	18,7	31	115	116	728	100	698	
5410	515	9,17	1955	178	5,51	284	19,0	31	110	57,5	398	50,7	386	HE 220 A B M
8091	736	9,43	2843	258	5,59	414	19,6	31	110	81,1	566	71,1	547	
14605	1220	9,89	5012	444	5,79	710	20,6	31	115	133	942	117	908	
7763	675	10,1	2769	231	6,00	372	20,9	31	115	69,4	535	61,9	521	HE 240 A B M
11259	938	10,3	3923	327	6,08	527	21,4	31	115	95,5	741	84,9	719	
24289	1800	11,0	8153	657	6,39	1058	22,9	31	125	180	1428	160	1380	
10455	836	11,0	3668	282	6,50	460	22,7	31	120	79,0	677	71,3	661	HE 260 A B M
14919	1150	11,2	5135	395	6,58	641	23,3	31	120	107	925	96,7	902	
31307	2160	11,9	10449	780	6,90	1262	24,8	31	130	199	1747	179	1696	
13673	1010	11,9	4763	340	7,00	556	24,6	31	120	89,2	834	81,2	815	HE 280 A B M
19270	1380	12,1	6595	471	7,09	767	25,1	31	120	120	1128	109	1102	
39547	2550	12,8	13163	914	7,40	1483	26,7	31	130	220	2099	199	2042	

(\*) I valori indicati (d, f) si riferiscono ai diametri ed alle posizioni normali dei fori