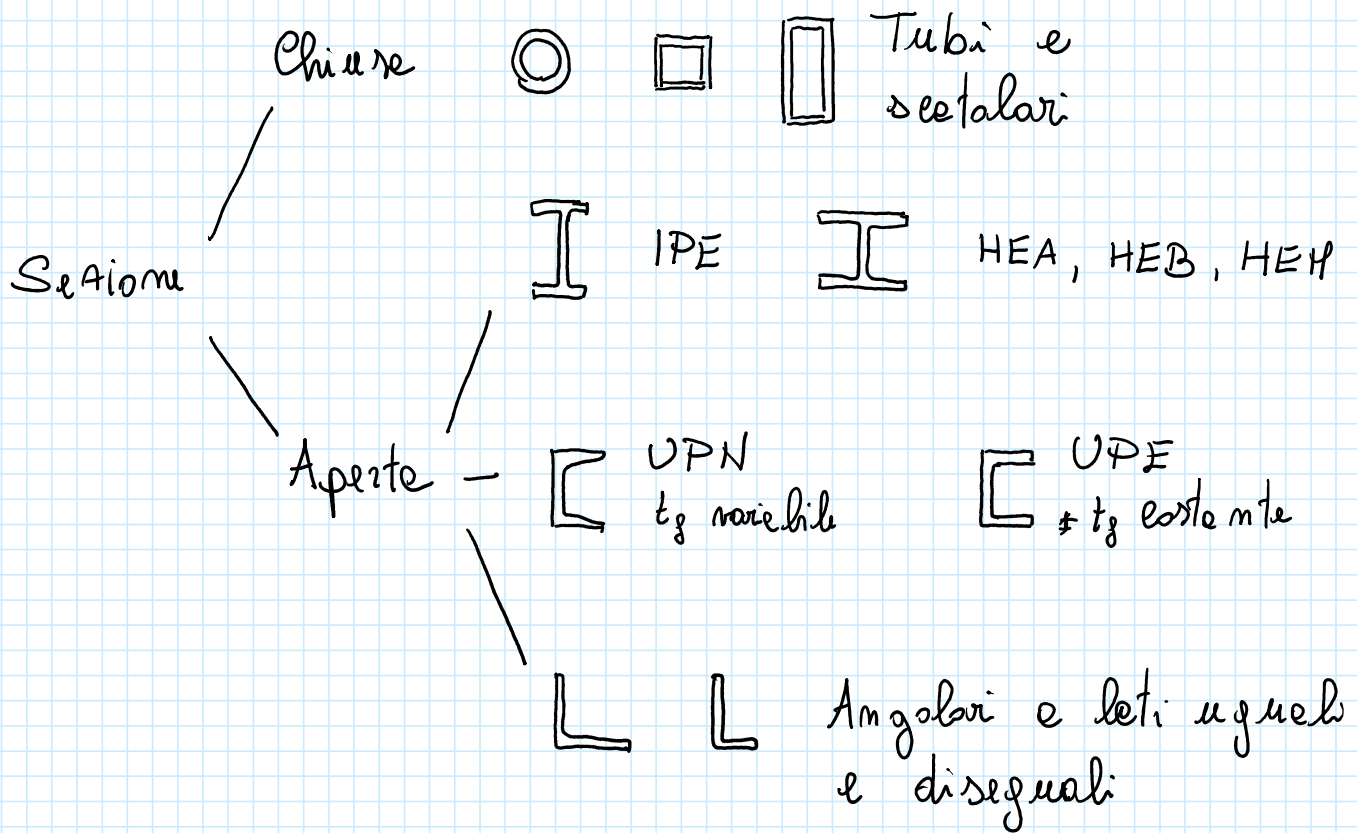


# Profiliati

Si usano per realizzare travi, colonne e aste di travi reticolari.



# Segomario

## Poutrelles européennes à larges ailes

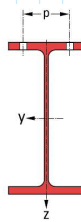
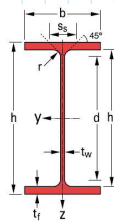
HE A, HE B et HE M 100 - 1000 conformes à l'Euronorme 53-62; HE AA 100 - 1000; HL 920 - 1100

## European wide flange beams

HE A, HE B and HE M 100 - 1000 in accordance with Euronorm 53-62; HE AA 100 - 1000; HL 920 - 1100

## Europäische Breitflanschträger

HE A, HE B und HE M 100 - 1000 gemäß Euronorm 53-62; HE AA 100 - 1000; HL HL 920 - 1100

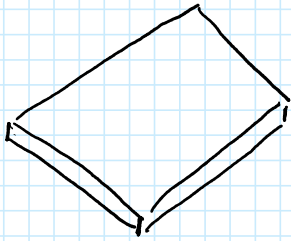


Contiene tutte le  
caratteristiche geometriche  
dei profili

Désignation Designation Bezeichnung	Dimensions Abmessungen					Dimensions de construction Dimensions for detailing Konstruktionsmaße					Valeurs statiques / Section propriétés / Statische Kennwerte															Classification ENV 1993-1-1				HISTAR			
											axe fort y-y strong axis y-y starke Achse y-y							axe faible z-z weak axis z-z schwache Achse z-z								pure bending y-y		pure compression					
	G kg/m	h mm	b mm	t <sub>w</sub> mm	t <sub>f</sub> mm	r mm	A cm <sup>2</sup>	h <sub>i</sub> mm	d mm	Ø	P <sub>min</sub> mm	P <sub>max</sub> mm	I <sub>y</sub> cm <sup>4</sup>	W <sub>el,y</sub> cm <sup>3</sup>	W <sub>pl,y</sub> † cm <sup>3</sup>	I <sub>y</sub> cm	A <sub>vz</sub> cm <sup>2</sup>	I <sub>z</sub> cm <sup>4</sup>	W <sub>el,z</sub> cm <sup>3</sup>	W <sub>pl,z</sub> † cm <sup>3</sup>	I <sub>z</sub> cm	S <sub>y</sub> mm	I <sub>t</sub> cm <sup>4</sup>	I <sub>w</sub> × 10 <sup>3</sup> cm <sup>6</sup>	S <sub>235</sub>	S <sub>355</sub>	S <sub>460</sub>	S <sub>235</sub>	S <sub>355</sub>		S <sub>460</sub>		
HE 100 AA+	12.2	91	100	4.2	5.5	12	15.60	80	56	M10	54	58	236.5	51.98	58.36	3.89	6.15	92.06	18.41	28.44	2.43	29.26	2.51	1.68	1	3	-	1	3	-			
HE 100 A	16.7	96	100	5	8	12	21.24	80	56	M10	54	58	349.2	72.76	83.01	4.06	7.56	133.8	26.76	41.14	2.51	35.06	5.24	2.58	1	1	-	1	1	-			
HE 100 B	20.4	100	100	6	10	12	26.04	80	56	M10	56	58	449.5	89.91	104.2	4.16	9.04	167.3	33.45	51.42	2.53	40.06	9.25	3.38	1	1	-	1	1	-			
HE 100 M	41.8	120	106	12	20	12	53.24	80	56	M10	62	64	1143	190.4	235.8	4.63	18.04	399.2	75.31	116.3	2.74	66.06	68.21	9.93	1	1	-	1	1	-			
HE 120 AA+	14.6	109	120	4.2	5.5	12	18.55	98	74	M12	58	68	413.4	75.85	84.12	4.72	6.90	158.8	26.47	40.62	2.93	29.26	2.78	4.24	2	3	-	2	3	-			
HE 120 A	19.9	114	120	5	8	12	25.34	98	74	M12	58	68	606.2	106.3	119.5	4.89	8.46	230.9	38.48	58.85	3.02	35.06	5.99	6.47	1	1	-	1	1	-			
HE 120 B	26.7	120	120	6.5	11	12	34.01	98	74	M12	60	68	864.4	144.1	165.2	5.04	10.96	317.5	52.92	80.97	3.06	42.56	13.84	9.41	1	1	-	1	1	-			
HE 120 M	52.1	140	126	12.5	21	12	66.41	98	74	M12	66	74	2018	288.2	350.6	5.51	21.15	702.8	111.6	171.6	3.25	68.56	91.66	24.79	1	1	-	1	1	-			
HE 140 AA+	18.1	128	140	4.3	6	12	23.02	116	92	M16	64	76	719.5	112.4	123.8	5.59	7.92	274.8	39.26	59.93	3.45	30.36	3.54	10.21	3	3	-	3	3	-			
HE 140 A	24.7	133	140	5.5	8.5	12	31.42	116	92	M16	64	76	1033	155.4	173.5	5.73	10.12	389.3	55.62	84.85	3.52	36.56	8.13	15.06	1	2	-	1	2	-			
HE 140 B	33.7	140	140	7	12	12	42.96	116	92	M16	66	76	1509	215.6	245.4	5.93	13.08	549.7	78.52	119.8	3.58	45.06	20.06	22.48	1	1	-	1	1	-			
HE 140 M	63.2	160	146	13	22	12	80.56	116	92	M16	72	82	3291	411.4	493.8	6.39	24.46	1144	156.8	240.5	3.77	71.06	120	54.33	1	1	-	1	1	-			
HE 160 AA+	23.8	148	160	4.5	7	15	30.36	134	104	M20	76	84	1283	173.4	190.4	6.50	10.38	478.7	59.84	91.36	3.97	36.07	6.33	23.75	3	3	-	3	3	-			
HE 160 A	30.4	152	160	6	9	15	38.77	134	104	M20	78	84	1673	220.1	245.1	6.57	13.21	615.6	76.95	117.6	3.98	41.57	12.19	31.41	1	2	-	1	2	-			
HE 160 B	42.6	160	160	8	13	15	54.25	134	104	M20	80	84	2492	311.5	354.0	6.78	17.59	889.2	111.2	170.0	4.05	51.57	31.24	47.94	1	1	-	1	1	-			
HE 160 M	76.2	180	166	14	23	15	97.05	134	104	M20	86	90	5098	566.5	674.6	7.25	30.81	1759	211.9	325.5	4.26	77.57	162.4	108.1	1	1	-	1	1	-			

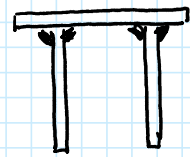
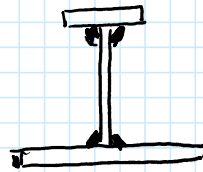
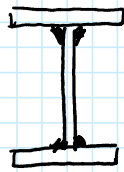
# lamiere

Due dimensioni sono prevalenti rispetto alla terza (spessore)

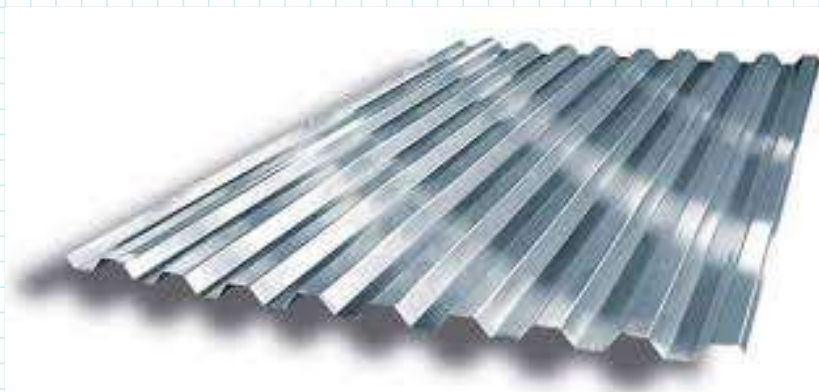


Si realizzano

- foglietti e piastre per collegamenti
- Travi e colonne con forme diverse saltando più lamiere

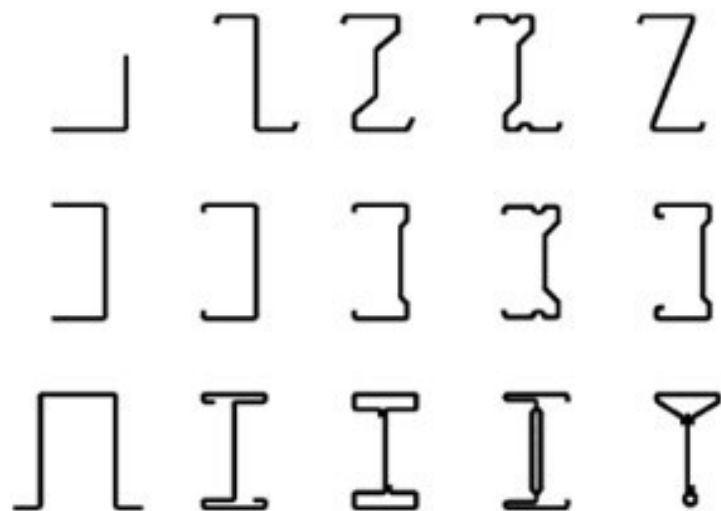


# Prodotti e pareti sottili



de misura queste per  
solai, copertura o  
temporanea

Aste con sezione trasversale  
e pareti sottili di diverse  
forme e dimensioni



# Normative italiane

Legge 1086/71: è una legge quadro, le prescrizioni tecniche vengono fornite attraverso D.M. e circolari



D.M. 17/01/2018 NTC18

Circolare n. 7 del 21/01/2019

# Normativa europea: Eurocodici

EN 1990

EN 1991 Eurocodice 1 Axiomi sulle strutture

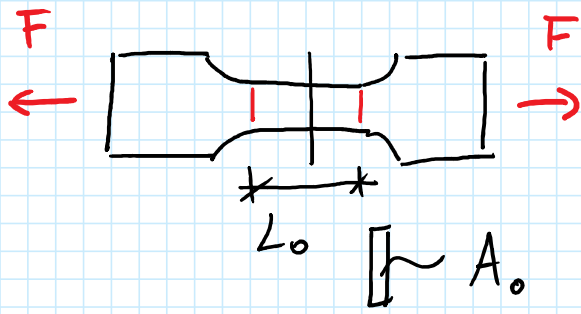
EN 1992 Eurocodice 2 Strutture in c.a.

EN 1993 Eurocodice 3 Strutture in acciaio

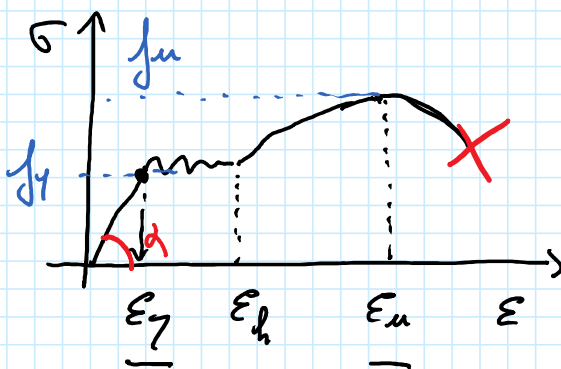
⋮

Appendici nazionali (per l'applicazioni degli Eurocodici in Italia)

# Prove di trazione



$$L_0 = 5,65 \sqrt{A_0}$$



$$\sigma = \frac{F}{A_0}$$

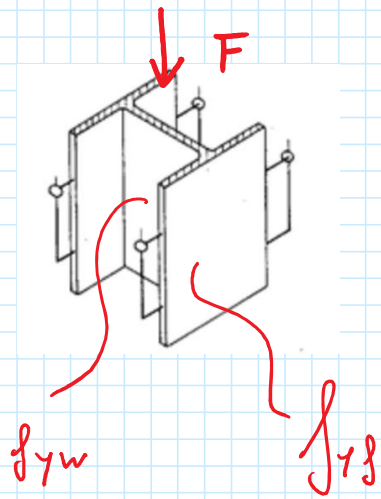
$$\epsilon = \frac{L - L_0}{L_0}$$

$$E_s = \frac{\sigma_y}{\epsilon_y} = 240.000 \text{ MPa}$$

$$\epsilon_y = \frac{\sigma_y}{E_s}$$

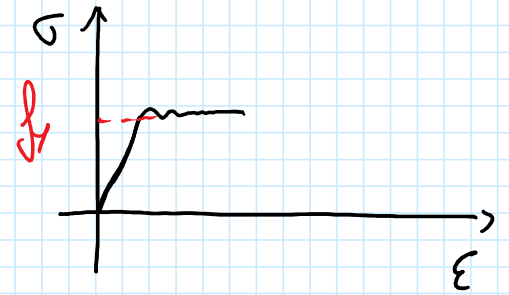
$$\mu = \frac{\epsilon_u}{\epsilon_y}$$

# Prove di compressione globali (Stub column test)



$$\sigma = \frac{F}{A}$$

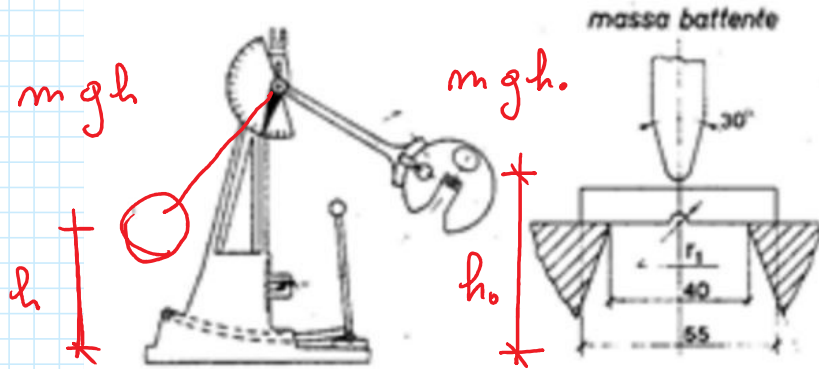
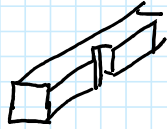
$$\varepsilon = \frac{L_0 - L}{L_0}$$



$$f_{yw} > f_{ys}$$



# Prove di resilienza

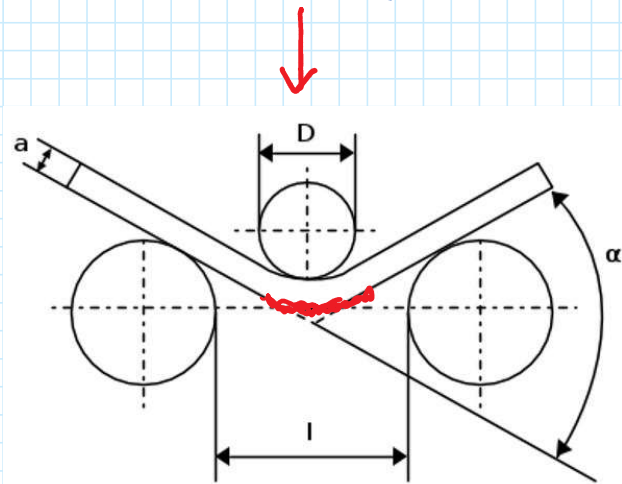


Pendolo di Charpy

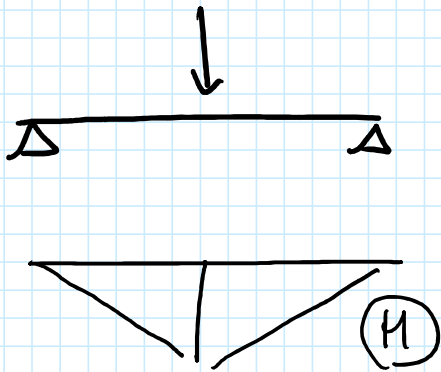
$$Resilienza = m g (h_0 - h)$$

J

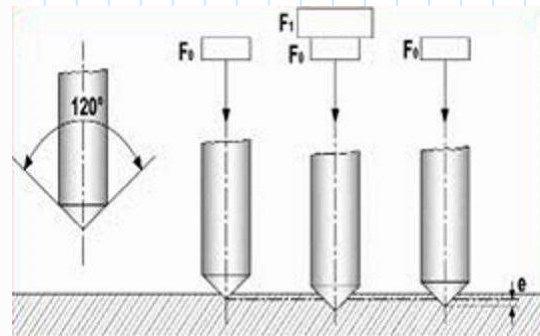
# Prove di piegamento



Se ci sono crepe l'acciaio non è duttile



# Prove di durezza



**Tab. 4.2.I** – *Laminati a caldo con profili a sezione aperta piani e lunghi*

Norme e qualità degli acciai	Spessore nominale "t" dell'elemento			
	t ≤ 40 mm		40 mm < t ≤ 80 mm	
	f <sub>yk</sub> [N/mm <sup>2</sup> ]	f <sub>tk</sub> [N/mm <sup>2</sup> ]	f <sub>yk</sub> [N/mm <sup>2</sup> ]	f <sub>tk</sub> [N/mm <sup>2</sup> ]
UNI EN 10025-2				
S 235	235	360	215	360
S 275	275	430	255	410
S 355	355	510	335	470
S 450	440	550	420	550
UNI EN 10025-3				
S 275 N/NL	275	390	255	370
S 355 N/NL	355	490	335	470
S 420 N/NL	420	520	390	520
S 460 N/NL	460	540	430	540
UNI EN 10025-4				
S 275 M/ML	275	370	255	360
S 355 M/ML	355	470	335	450
S 420 M/ML	420	520	390	500
S 460 M/ML	460	540	430	530
S460 Q/QL/QL1	460	570	440	580
UNI EN 10025-5				
S 235 W	235	360	215	340
S 355 W	355	510	335	490

## Criteri di verifica

1. Metodo delle funzioni ammissibili
  2. Metodo del calcolo a rotture
  3. Metodo probabilistico
  4. Metodo semi-probabilistico
- } Metodi deterministici