

LEGAME
COSTITUTIVO

A horizontal bar representing a tensile specimen is shown with arrows at both ends indicating an applied force F . Below the bar, the stress is defined as $\sigma = \frac{F}{A}$.

Y: YIELDING

SNERVAMENTO

H: HARDENING

INCRODIMENTO

U: ULTIMATE

ULTIMO

tension σ f_y

$$P_a = \text{N/m}^2$$

$$\begin{aligned} MP_a &= 10^6 \text{ N/m}^2 : \\ &= \text{N/mm}^2 \end{aligned}$$

valore medio

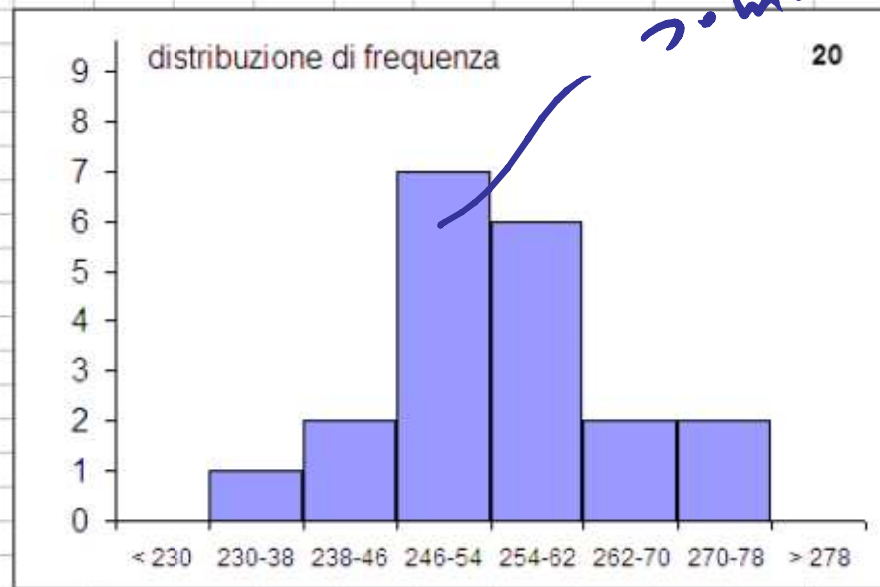
$N_1 \ N_2 \ \dots \ N_i \ \dots \ N_{n_{T,i}}$

$$\mu = \frac{\sum_{i=1}^{n_{T,i}} N_i}{n_{T,i}}$$

VALORE MEDIO

DISTRIBUZIONE DEI VALORI

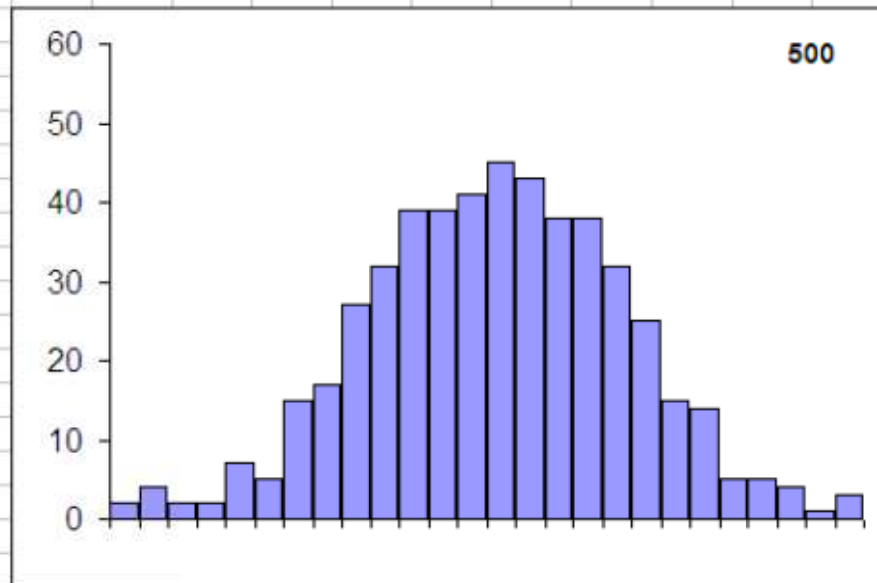
classi:

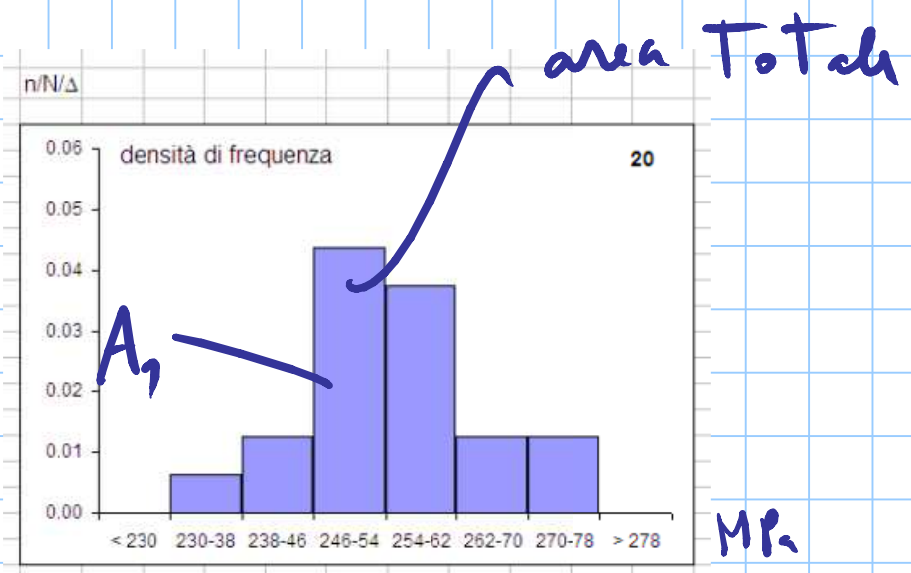
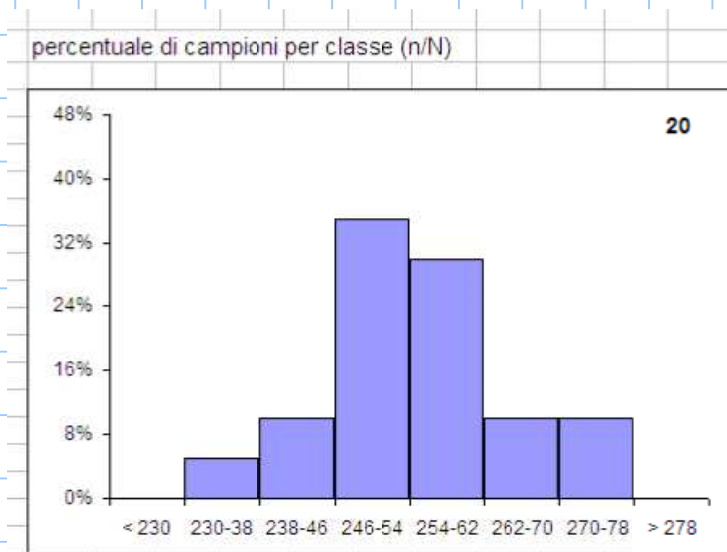


→ somma delle alture = n. campioni

distribuzione
di frequenza

MP₂





20 valori

246 - 254 7

ampiezza

$$254 - 246 = 8$$

perc.

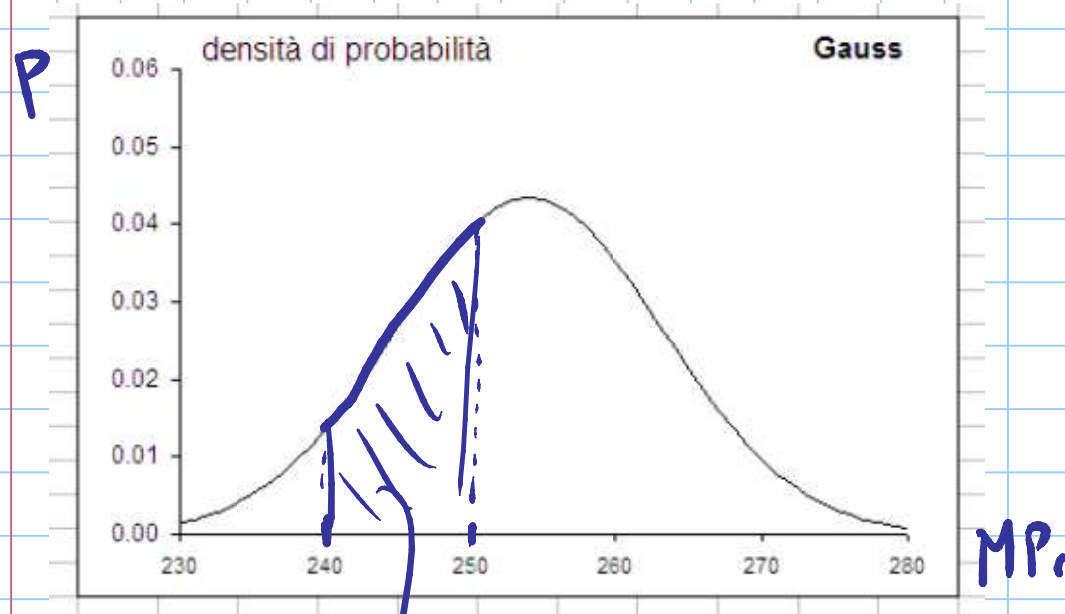
$$\frac{7}{20} = 35\%$$

dens. frequ.

$$\frac{7}{20 \times 8} = 0.0438$$

$$A_1 = 0.0438 \times 8 = 0.35 (35\%)$$

$$\sum A = 1$$



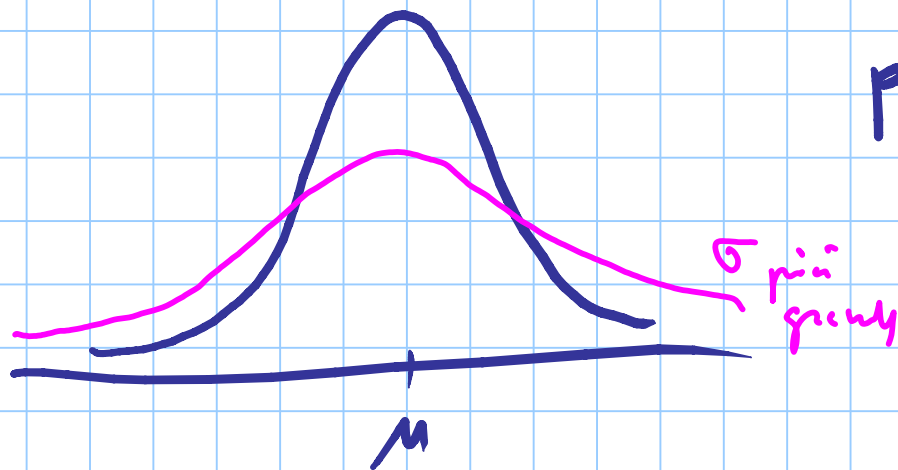
$p(x)$
Densità di
probabilità

% di campioni con $240 \leq f_y \leq 250 \text{ MPa}$

$$\sigma = \sqrt{\frac{\sum_{i=1}^{n-1} (N_i - \mu)^2}{n-1}}$$

SCARTO
QUADRATICO
MEDIO

distribuzione Gaussiana



$$p(x) = \frac{e^{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2}}{\sqrt{2\pi} \sigma}$$

$$\int_0^{\infty} p(x) = 1$$

267.82

260.11

233.38

273.34

251.81

266.98

261.18

244.87

247.54

239.73

271.44

248.43

258.12

257.26

253.59

251.74

261.16

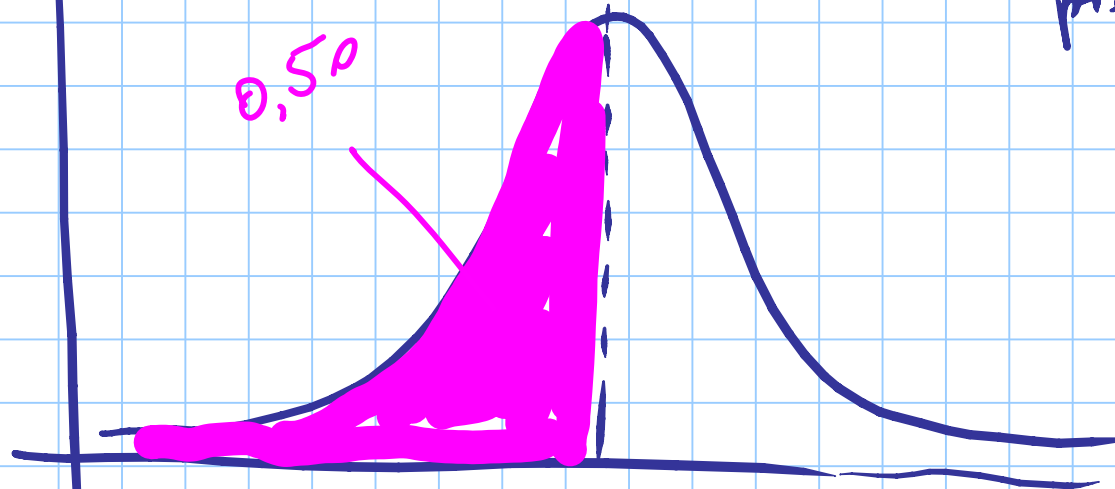
250.83

250.35

257.08

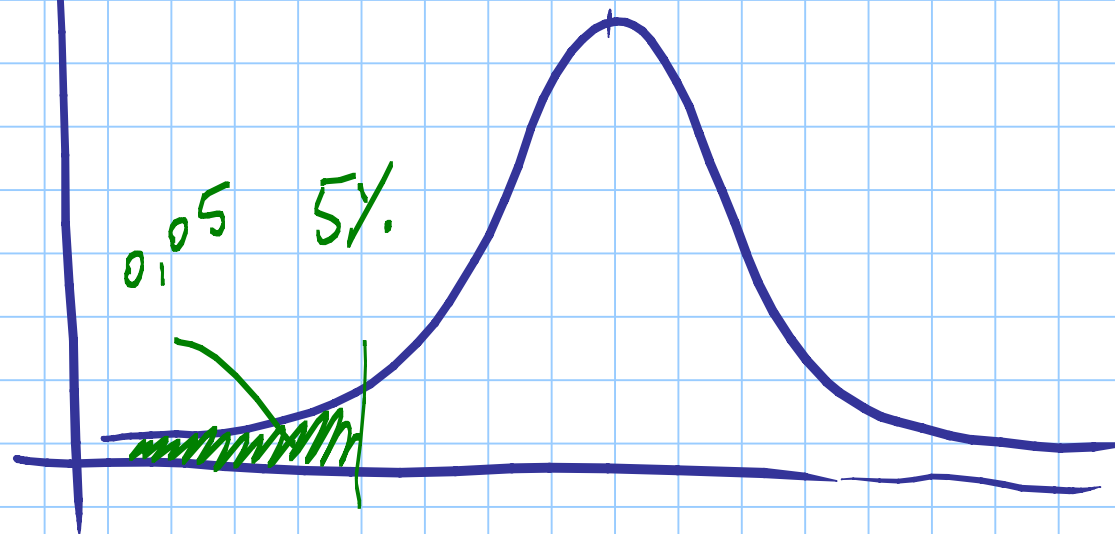
quale valore usare
come riferimento?

densità di
probabilità.



FRATILE

$n\%$



$0,05$ 5%

fratile 5%

S 235

$f_y < 235 \text{ MPa}$ solo nel 5% dei
casi

VALORE DI RIFERIMENTO (resistente)

frattile 5%.

VALORE CARATTERISTICO

pedice K

f_{yk}

CARICHI

g - PERMANENTI

pes. proprio

altri elementi (quasi) sempre presenti:

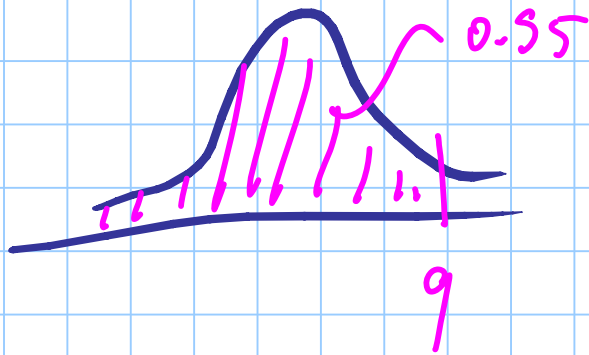
q - VARIABILI

variano nel Tempo

[valori massimi in tutte le vite
distribuzione nel Tempo

carichi variabili

- valore massimo in tutte le vite di riferimento



probabilità 95%

valore caratteristico

q_k

carichi variabili:

q_k

caratteristico (perm.)

- valore frequente

$\psi_1 q_k$

- valore quasi permanente

$\psi_2 q_k$

fattile 95%
nel temp.

media (fattile 5%)
nel temp.

$$1 > \psi_1 > \psi_2 > 0$$