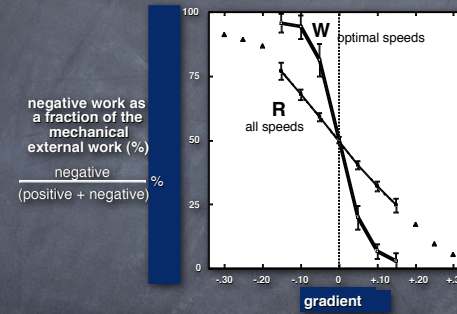


Biomeccanica II

Lez. BM12

Venerdì 8 Maggio 2009 10:30÷12

Luca P. Ardigò



Minetti et al. 1993, 1994

transforming MECHANICAL WORK into ENERGETIC COST in GRADIENT LOCOMOTION

TE increases = positive mechanical work: raise and accelerating the body centre of mass

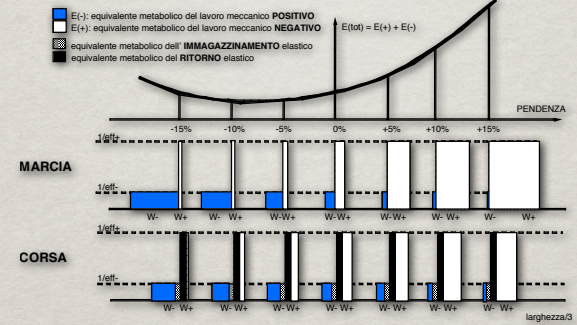
TE decreases = negative mechanical work: lowering and decelerating the body centre of mass

$$W_{tot} = W_{ext}^+ + W_{ext}^- + W_{int}$$

efficiency = $\frac{\text{Mechanical Work}}{\text{Energetic Cost}}$ $E = \frac{W_{tot}}{eff}$ $eff = 3-5 \times eff^+$

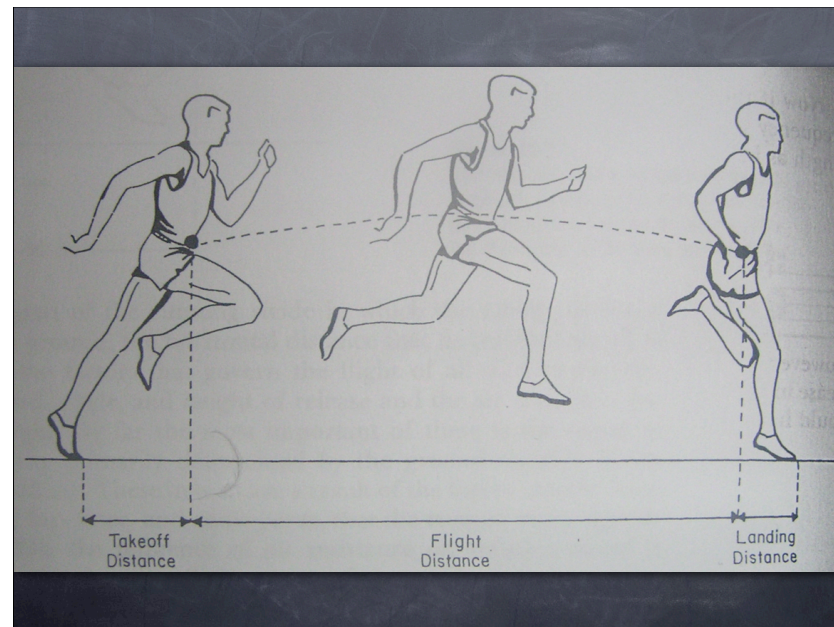
$$E_{tot} = E^+ + E^- = \frac{W_{ext}^+}{eff^+} + \frac{W_{ext}^-}{eff^-}$$

MARCIA A VELOCITA' OTTIMALE. CORSA A QUALSIASI VELOCITA'



Definizioni

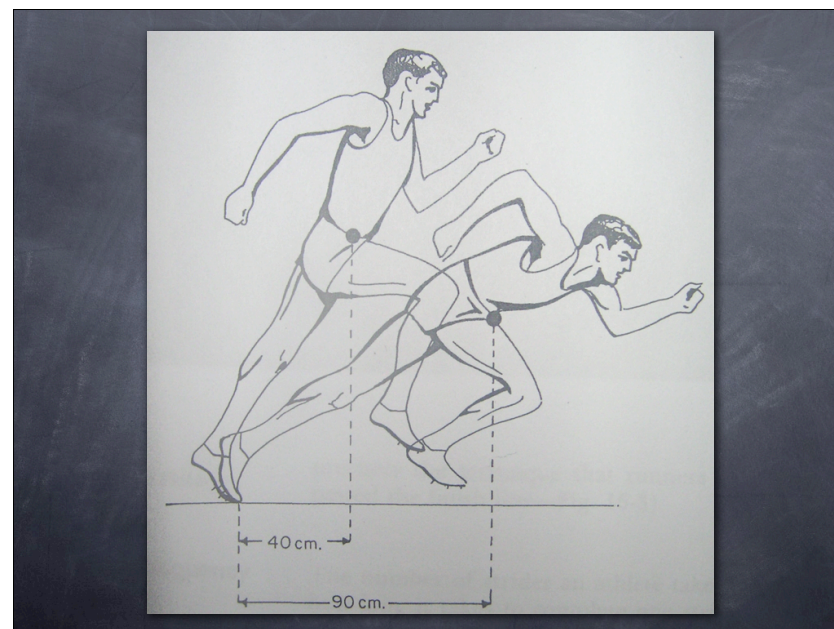
$$v = SL \times \nu \text{ (cicli min}^{-1}\text{)}$$



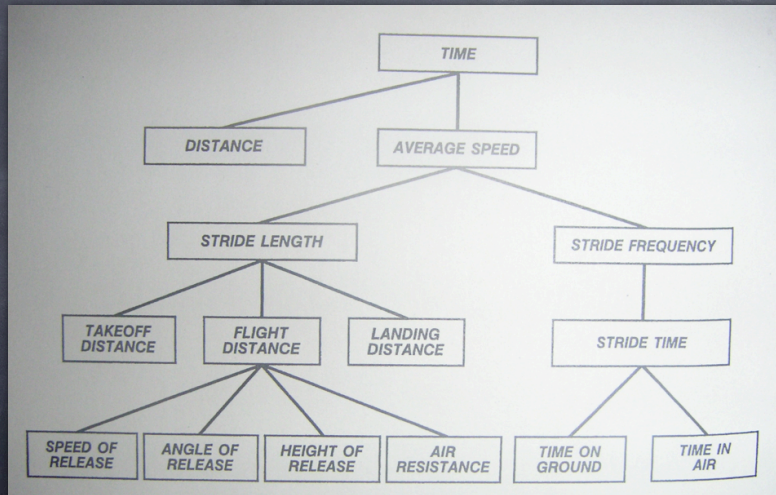
Definizioni/2

$$v = SL \times \nu \text{ (cicli min}^{-1}\text{)}$$

- Distanza 'di decollo' 22 [% GC] 26 30 [min] [media] [Max];
- distanza 'di volo' 50 57 64;
- distanza 'di atterraggio' 12 17 20.



'Ingredienti' della corsa



Partenza della corsa



'ai vostri posti'

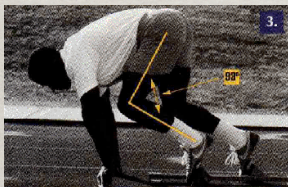
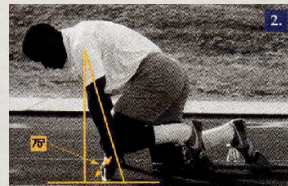
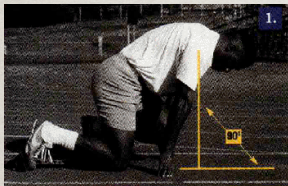


'pronti'

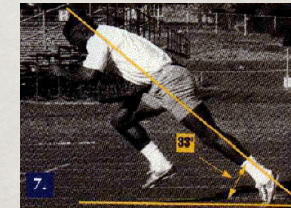


'via'

Partenza della corsa/2



Partenza della corsa/3



Partenza della corsa = corsa in salita

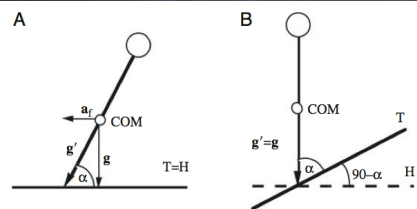


Fig. 1. Simplified view of the forces acting on a runner. The subject is accelerating forward while running on flat terrain (A) or running uphill at constant speed (B). The subject's body mass is assumed to be located at the centre of mass (COM); a_f =forward acceleration; g =acceleration of gravity; $g'=(a_f^2+g^2)^{0.5}$ is the acceleration resulting from the vectorial sum of a_f plus g ; T =terrain; H =horizontal; α ($=\arctan g/a_f$) is the angle between runner's body and T ; the angle between T and H is $\alpha=90-\alpha$. (Modified from di Prampero et al., 2002.)

di Prampero et al., 2005

Corsa di velocità (sprint)

Arti inferiori

- Fase di supporto ('atterraggio'÷sorpasso BCOM-piede);
- fase di spinta (sorpasso BCOM-piede÷'decollo'); &
- fase di recupero ('volo').

Sprint/2

Angoli di estensione di anca e ginocchio al 'decollo'

Anca 167°;

Ginocchio 157°.

Carl Lewis (U. S. A.), 200 m .

Corsa e salti: ostacoli alti (110m)

[13.72/1.067/9.14/14.02]/100m [bassi {13/.84/8.5/10.5}]

