



Seminario  
Sovraccarico Biomeccanico Lavorativo:  
esperienze a confronto e nuove prospettive  
IMOLA 7-11-2018

**L'aggiornamento dello standard ISO 11228-1  
sul sollevamento e trasporto manuale di carichi**

ENRICO OCCHIPINTI 



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**NORME TECNICHE ISO DI RILIEVO PER LA PREVENZIONE DEI WMSDs**


NORME ISO

**ISO 11228- 1:** Ergonomics — Manual handling — Lifting and carrying

**ISO 11228- 2:** Ergonomics — Manual handling — Pushing and pulling

**ISO 11228- 3:** Ergonomics — Manual handling — Handling of low loads at high frequency

**ISO 11226 :** Ergonomics — Evaluation of static working postures



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**ISO 11228- 1 IN REVISIONE**

La norma ISO 11228- 1:  
Ergonomics — Manual handling — Lifting and carrying  
è in revisione  
da parte del WG 4 (Biomeccanica) del TC 159 (Ergonomia) di ISO.

La revisione è stata proposta da ANSI (U.S.A.) e da AFNOR (Francia) ed accettata dalla maggior parte dei Paesi attivamente partecipanti a ISO TC 159

Le altre norme della serie ISO 11228 sono confermate per i prossimi anni fino al 2022



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**ISO 11228-1 IN REVISIONE**

In questa presentazione saranno schematicamente presentati i principali punti della revisione

Essi derivano in gran parte dai contenuti del TR 12295 (quick assessment e annex A)

Va sottolineato che si tratta ancora di proposte del gruppo di lavoro che dovranno essere poi convalidate da inchiesta pubblica

La revisione definitiva potrebbe impiegare ancora 1 anno o 1 anno e mezzo per la pubblicazione




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**ISO 11228-1 IN REVISIONE**

ISO 11228-1:2018 (E)  
ISO TC 159/SC 3/WG 4  
Secretariat: NEN

Ergonomics — Manual handling — Part 1: Lifting, lowering and carrying




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**MASSE DI RIFERIMENTO**  
(massimi pesi sollevabili in condizioni ideali)

Considering the contents of Table B.1, if it is needed to specifically consider age and gender aspects in the general healthy working population, the following reference masses (Table B.2) could be adopted as a function of age and gender.

Working population by gender and age	Reference mass ( $m_{ref}$ )
Females (20-45 years)	20 kg
Females (<20-45> years)	15 kg
Males (20 or 45 years)	25 kg
Males (<20 or >45 years)	20 kg




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**INTRODUZIONE DEL CONCETTO DEL LIFTING INDEX**

SI INTRODUCE IL CONCETTO DEL LIFTING INDEX (LI) COME RAPPORTO TRA

$$\frac{\text{MASSA SOLLEVATA}}{\text{MASSA RACCOMANDATA}}$$

- SE LA MASSA SOLLEVATA E' ≤ A QUELLA RACCOMANDATA O IL LIFTING INDEX E' ≤ 1 **LA CONDIZIONE E' ACCETTABILE**
- SE LA MASSA SOLLEVATA E' SUPERIORE A QUELLA RACCOMANDATA O IL LIFTING INDEX E' > 1 **LA CONDIZIONE NON E' RACCOMANDABILE**




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**INTRODUZIONE DEL CONCETTO DEL LIFTING INDEX**

The LI should be used as an indicator of the level of exposure to overall physical demands for repetitive lifting activities. Table D.1 provides information on exposure levels related to different LI values, as well as their interpretation (based on current scientific literature) and some possible recommended actions

Lifting Index Value	Exposure level/Risk Implication	Recommended Actions
LI ≤ 1,0	Very low	None in general for the healthy working population.
1,0 < LI ≤ 1,5	Low	Pay particular attention to low frequency/high load conditions and to extreme or static postures and redesign tasks or workstations. If necessary use additional analysis methods.
1,5 < LI ≤ 2,0	Moderate	Redesign tasks and workplaces according to priorities to reduce the LI, followed by analysis of results to confirm effectiveness.
2,0 < LI ≤ 3,0	High	Changes to the task to reduce the LI should be a high priority.
LI > 3,0	Very high	Changes to the task to reduce the LI should be made immediately.
For Any level of Risk/Exposure	Identify any workers who may have special needs or vulnerabilities. In lifting tasks and assign or design the work accordingly. Training workers on safe manual handling methods and recognizing material handling hazards is beneficial. Limiting the weight to be lifted, to less than the Reference Mass may also be considered.	




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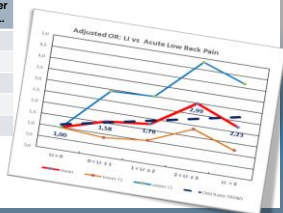
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**Annex I (informative)  
Exposure and Risk: The Basis for Table D.1**

**I.2- Summary of Research on the Relationship between LI and Low Back Pain (LBP) Risk**

- I.2.1 Studies on Generic LBP (from USA)
- I.2.2 2016 Italian Study on CLW/LI and Acute Low Back Pain (LBP) Outcomes
- I.2.3 Summary of German Studies on Spinal Loading and Lumbar Disc-Related Injury

LI class	Mean OR	OR Lower 95% C.L.	OR Upper 95% C.L.
LI = 0	1	=	=
0 < LI ≤ 1	1,58	0,848	2,932
1 < LI ≤ 2	1,76	1,031	3,006
2 < LI ≤ 3	2,99	1,846	4,842
LI > 3	2,23	1,192	4,169




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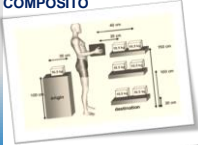
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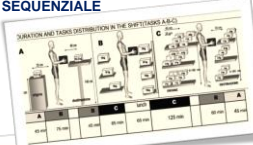
**INTRODUZIONE DELL' ANALISI  
PER COMPITI DI SOLLEVAMENTO COMPLESSI**

**VENGONO INTRODOTTE LE DEFINIZIONI E LE MODALITA' DI ANALISI PER  
COMPITI DI SOLLEVAMENTO COMPLESSI: COMPOSITI, VARIABILI E  
SEQUENZIALI**


**COMPOSITO**




**SEQUENZIALE**



**VARIABILE**





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**INTRODUZIONE DELL' ANALISI  
PER COMPITI DI SOLLEVAMENTO COMPLESSI**

**VIENE DEFINITO QUANDO USARE I DIVERSI APPROCCI DERIVATI DALLA RNLE PER  
COMPITI SEMPLICI, COMPOSITI, VARIABILI E SEQUENZIALI**



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**ALTRI PUNTI DI RILIEVO**

- NEL TESTO PRINCIPALE SI FA RIFERIMENTO ALLA UTILITA' DELLA SORVEGLIANZA SANITARIA E SE NE DEFINISCONO GLI SCOPI
- VENGONO FORNITI NUOVI ESEMPI DI APPLICAZIONE E DI CALCOLO PER COMPITI DI SOLLEVAMENTO SEMPLICI E VARIABILI E PER IL TRASPORTO (QUELLI NELL'ATTUALE STANDARD SONO SBAGLIATI)
- SONO FORNITI CRITERI PER IL REINSERIMENTO IN ATTIVITA' DI MOVIMENTAZIONE MANUALE DI SOGGETTI PORTATORI DI PATOLOGIE DEL RACHIDE LOMBARRE (SIMILI A QUELLI DELLE LLGG ITALIANE DELLE REGIONI)
- IL DRAFT DEFINITIVO E' STATO LICENZIATO DAL GRUPPO IN OCCASIONE DI UN MEETING ISO DURANTE IEA 2018 A FIRENZE E SARA' CIRCOLATO PER LA INCHIESTA PRESSO I P-MEMBERS DI ISO ENTRO LA FINE DELL' ANNO



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# GRAZIE DELLA ATTENZIONE

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