Rischi Fisici nei luoghi di lavoro

Noise and Vibration technical standards – Surfing the wave

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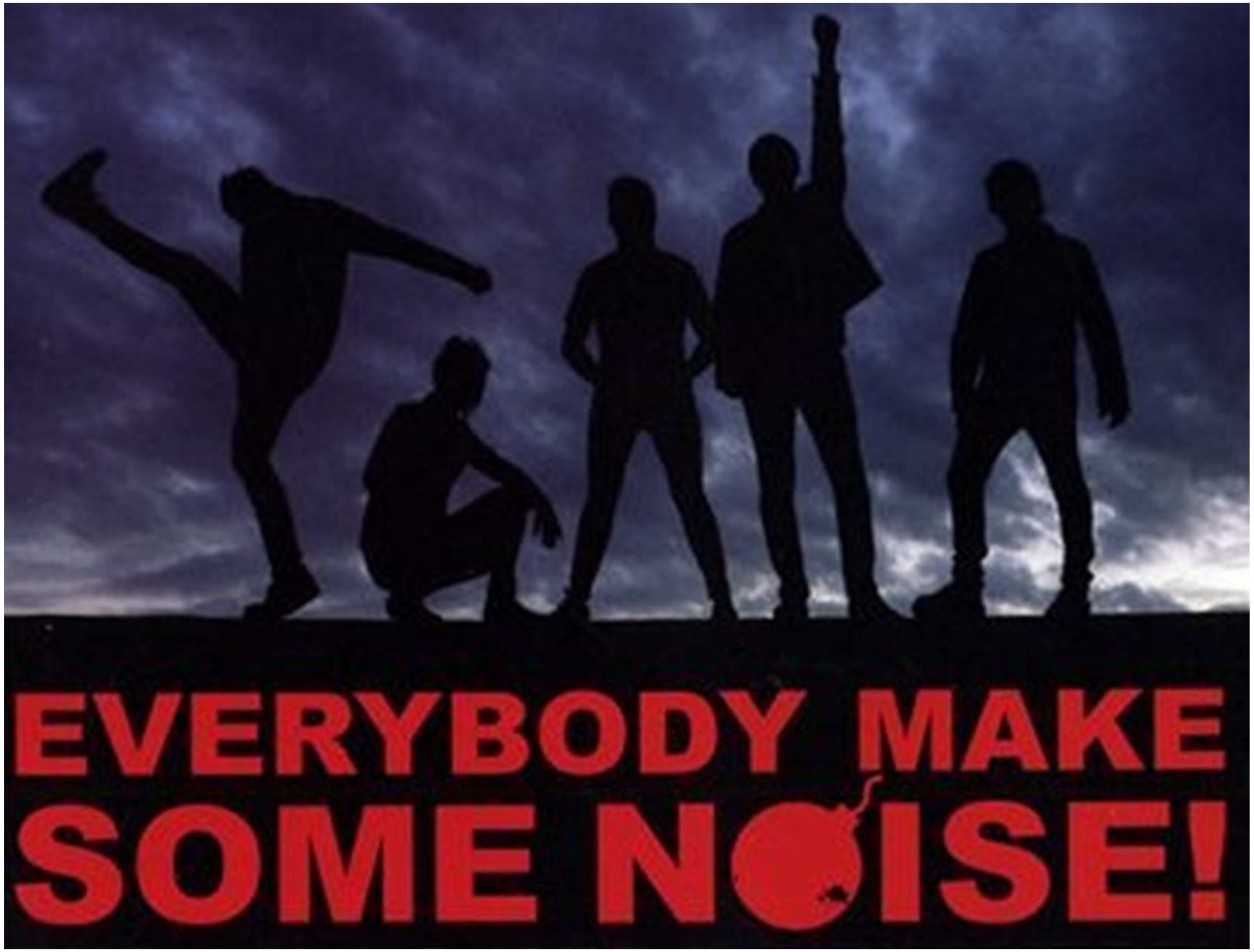

EVERYBODY MAKE
SOME NOISE!

ISO 1999

Stima della perdita uditiva

ISO 4869-7

Attenuazione dei dispositivi di protezione in presenza di rumori impulsivi

ISO 5114-1

ISO 9612

DRAFT INTERNATIONAL STANDARD
ISO/DIS 9612

ISO/TC **43**/SC **1** Secretariat: **DIN**

Voting begins on:
2023-01-17

Voting terminates on:
2023-04-11

e

Acoustics — Determination of occupational noise exposure — Methodology

INAIL

ISO 9612

Note 2 to entry: If the average or normalized exposure over a number of days is expired, Formula (3) can be used

$$\overline{L}_{EX,8h} = 10 \ \lg\left[\frac{1}{x}\sum_{x=1}^{X} 10^{0,1 \cdot L_{EX,8h,x}}\right] \text{dB} \quad (3)$$

where $L_{EX,8h,x}$ is the daily noise exposure level for day *x*.

The value of *X* is chosen according to the purpose of the averaging process. For example, *X* = 5 leads to a daily noise exposure level normalized to a nominal week of five 8 h working days.

ISO 1999

Note 1 to entry: The quantity "noise exposure level normalized to a nominal 8 h working day" may also be called "daily noise exposure level".

Note 2 to entry: If the exposure averaged over *n* days is desired, for example if noise exposure levels normalized to a nominal 8 h working day for weekly exposures are considered, the average value of $L_{EX,8h}$, in decibels, over the whole period may be determined from the values of $(L_{EX,8h})_i$ for each day using the following formula:

$$L_{EX,8h} = 10 \ lg\left[\frac{1}{c}\sum_{i=1}^{n} 10^{0,1(L_{EX,8h})_i}\right] dB$$

The value of *c* is chosen according to the purpose of the averaging process: it will be equal to *n* if an average value is desired; it will be a conventional fixed number if the exposure is to be normalized to a nominal number of days (for example, when *n* = 7, *c* = 5 will lead to a daily noise exposure level normalized to a nominal week of 5 eight-hour working days). For consideration of irregular exposures over an extended time period, see ISO 9612.

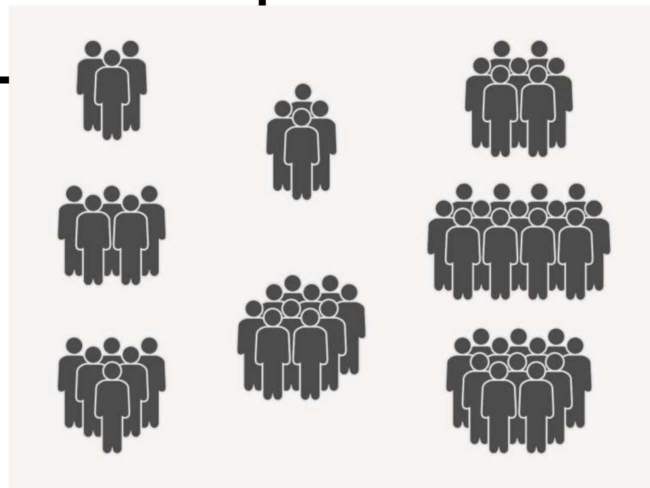
9.3.2 Number of measurements

To cover as much of the actual variation in noise levels as possible, it is recommended to measure on different workers within a group.

In this case at least 5 measurements shall be made. Otherwise, at least 3 measurements shall be made for each task, if just one worker is sampled. A recommendation of the number of workers on which the tasks measurements can be performed in function of the HEG size is given below:

Table 1 — Minimum recommended number of workers (n_{min}) on which measurements can be taken as a function of the size of the HEG (n_G)

n_G	1 to 2	3 to 5	6 to 11	12 to 15	16 to 20	Above 21
n_{min}	1	2	3	4	5	6



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If the results of the three measurements of a task differ by 3 dB or more:

a) perform three or more additional measurements of the task; or

b) subdivide the task into further tasks, and repeat 9.2 and 9.3; or

c) repeat this subclause with a longer duration of each measurement.

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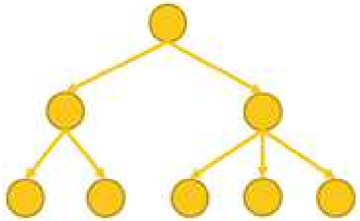
:
ts until the

Rephrase option a) as follows:
subdivide the task into two tasks, and carry out for both tasks new measurements with the above indicated minimum numbers. Proceed iteratively until the appropriate max-min range limit is complied with for each sub-task



Rephrase option b) as follows:
repeat this subclause with a longer duration of each measurement. If the appropriate max-min range limit is complied with, then proceed by discarding the previous set of measurements and retaining only the latter set. If on the opposite the appropriate max-min range is not complied with, then switch to option a)

e) results and conclusions:

1) A-weighted equivalent continuous sound pressure level $L_{p,\mathrm{A,eq}T}$ and, optionally, C-weighted peak sound pressure level $L_{p,\mathrm{Cpeak}}$ for each task/job,

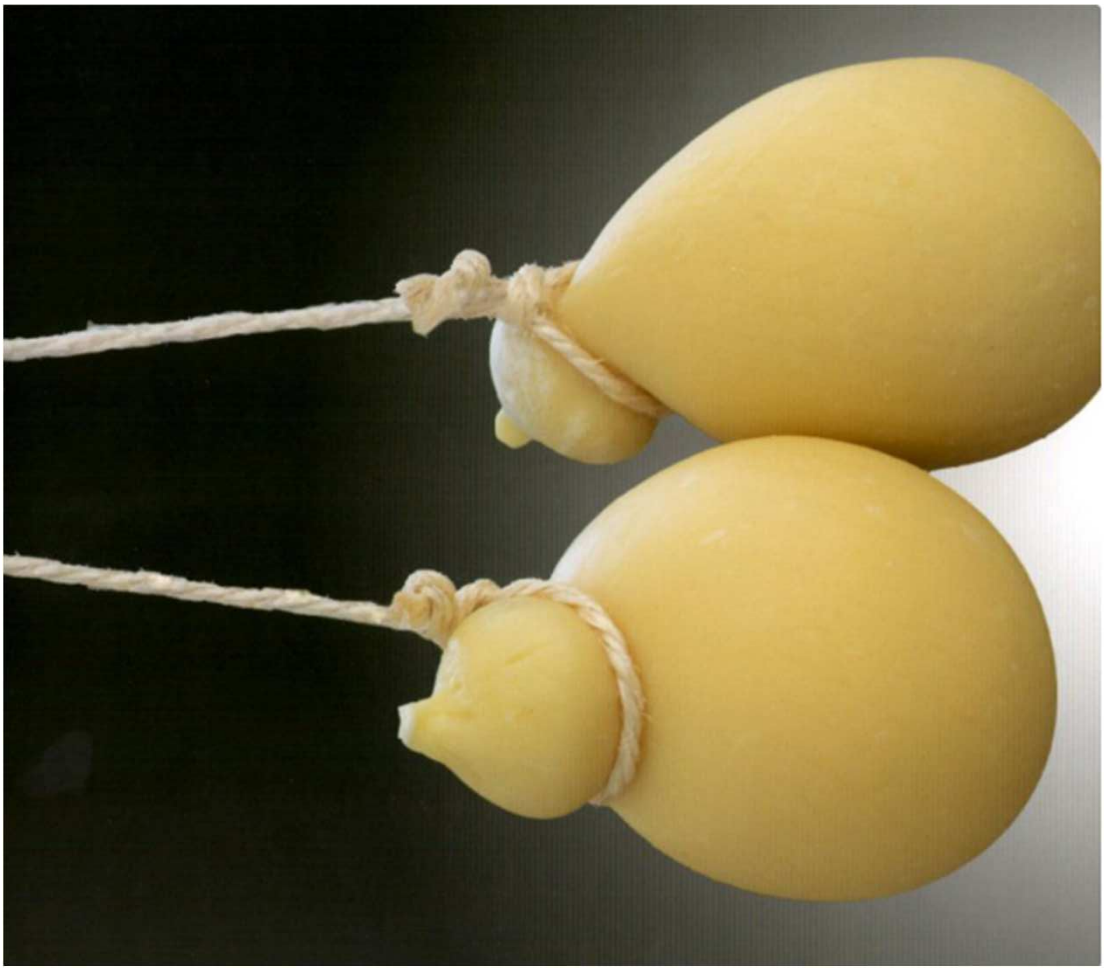
2) The number of peak events exceeding the regional regulation for $L_{p,\mathrm{Cpeak}}$, and the description of these specific noise events,

3) when using the task-based measurement, the values of $L_{\mathrm{EX,8h},m}$ for each task, if relevant,

4) A-weighted noise exposure level $L_{\mathrm{EX,8h}}$ for the nominal day(s), and the highest C-weighted peak sound pressure level $L_{p,\mathrm{Cpeak}}$ if measured during all tasks, rounded to one decimal place,

5) uncertainty associated with $L_{\mathrm{EX,8h}}$ and $L_{p,\mathrm{Cpeak}}$, if available, for the nominal day(s), rounded to one decimal place (noise exposure and the measurement uncertainty shall be reported as separate values),

6) Final $L_{\mathrm{EX,8h,95\,\%}}$ which is the sum of the A-weighted noise exposure level $L_{\mathrm{EX,8h}}$ or (as appropriated) and its associated uncertainty. This value can be compared to the national action or limit values.



Come produrre una stima ragionevolmente accurata di L_{Cpeak} con metodi sufficientemente semplici?

$$L_{Cpeak} \approx L_{Cpeak\text{-}medio\text{-}osservato} + k \times \sigma(L_{Cpeak\text{-}osservati})$$

…… che fra l'altro consente anche una stima piuttosto semplice dell'incertezza $u(L_{Cpeak})$

Come tener conto dell'eventuale impulsività del rumore?

$$L'_{EX,8h} = L_{EX,8h} + 6,5 \log(\beta_n/\beta_g)$$

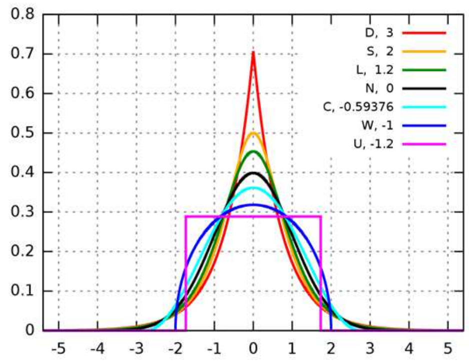
ISO 1999

$$L'_{Aeq} = L_{Aeq} + 6,5 \log(\beta_n/\beta_g)$$

…… dove β_n è la kurtosi della distribuzione della pressione sonora e β_g è la kurtosi di una distribuzione normale $\beta_g = 3$

$$\beta_j = \frac{\frac{1}{n}\sum_{i=1}^{n}(x_i - \overline{x})^4}{\left(\frac{1}{n}\sum_{i=1}^{n}(x_i - \overline{x})^2\right)^2}$$

Quantifica la «tailedness» della distribuzione



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Per stare nella revisione dello standard ISO 9612 deve prima stare nella revisione dello standard ISO 1999

Nella revisione dello standard ISO 1999, l'uso della kurtosi come quantificatore di impulsività è stato dirottato su un binario morto

INAIL


AL MIO
SEGNALE
VIBRAZIONI
PI TUTTI !

ISO 22704

Incertezza sulla esposizione a vibrazioni

ISO 15230-1

Forza di accoppiamento uomo-attrezzo vibrante (HAV)

ISO 15230-2

Forza di accoppiamento uomo-attrezzo vibrante (HAV)

INAIL

INTERNATIONAL STANDARD **ISO/FDIS 15230-1**

Mechanical vibration and shock — Coupling forces at the man-machine interface for hand-transmitted vibration —

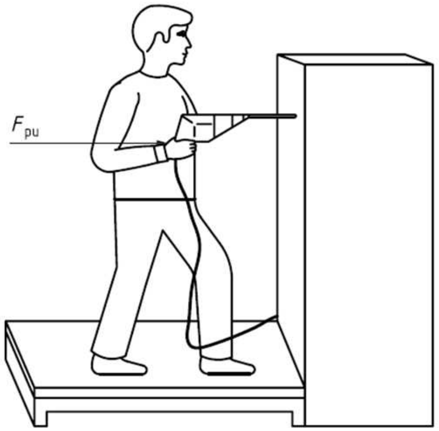
Part 1:
Measurement and evaluation

TECHNICAL SPECIFICATION **ISO/DTS 15230-2**

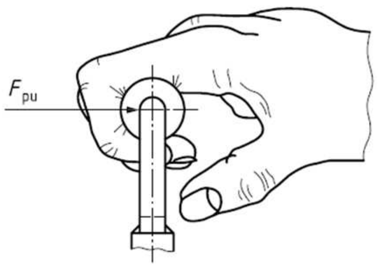
Mechanical vibration and shock — Coupling forces at the man-machine interface for hand-transmitted vibration —

Part 2:
Evaluation of coupling forces

INAIL



a) Push force



b) Pull force

B.2 Push/pull force

The push or pull force, F_{pu}, is calculated using Formula (B.1) (see Figure B.1):

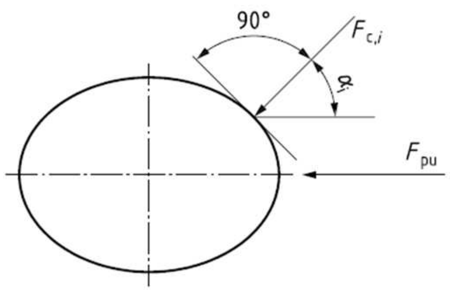
$$F_{pu} = \sum_i F_{pu,i} = \sum_i F_{c,i} \cos\alpha_i = \sum_i p_i \cdot S_i \cos\alpha_i \quad \text{(B.1)}$$

When the feed force is not in the direction of the push or pull force, it can be useful to calculate also the resultant forces in this direction. In this case, the following definition of real push force, $\vec{F}_{RP}$ should be used:

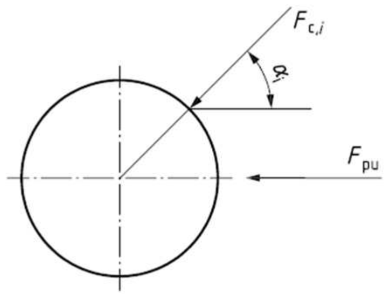
$$\vec{F}_{RP} = \sum_i p_i \cdot S_i \left(\hat{i}\ \cos\alpha_i + \hat{j}\ \sin\alpha_i\right)$$

where $\hat{i}$ and $\hat{j}$ are the coordinate axis definitions for the vector.

NOTE $\vec{F}_{RP}$ is a vector quantity which can be measured in the plane orthogonal to the handle axis and would provide information on the posture of the operator during the test. Its direction can be time-dependent.



a) Elliptic handle



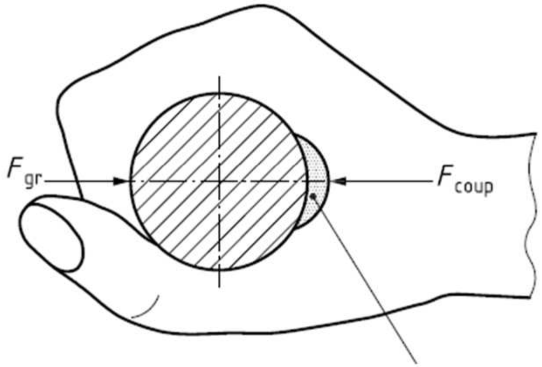
b) Circular handle

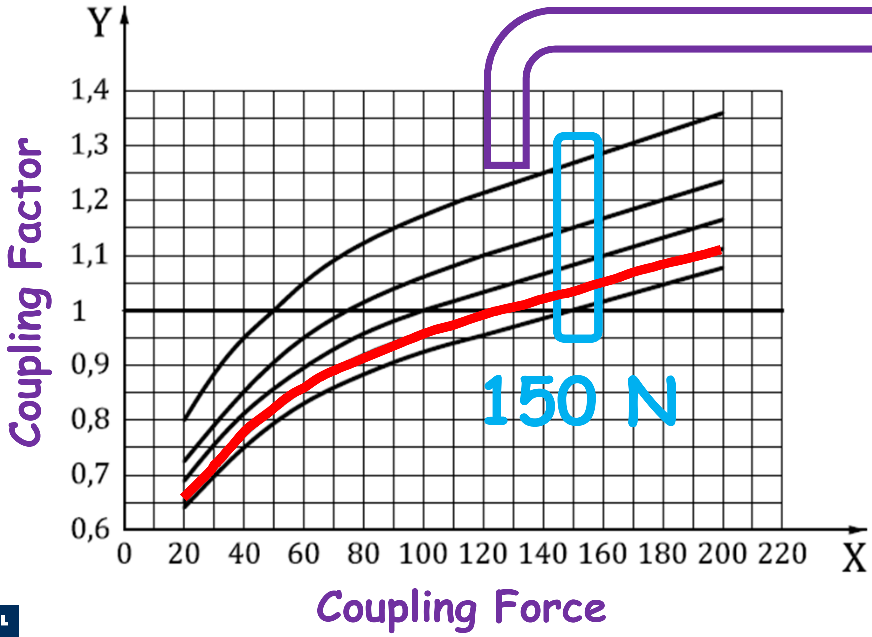
Figure B.1 — Angle between local normal force and push/pull force axes

The coupling force, F_{coup}, is calculated as follows (see Figure B.3):

$$F_{coup} = F_{pu} + F_{gr} = \frac{1}{2}\left(F_{c,pu} + F_{pu}\right) = \frac{1}{2}\sum_i p_i \cdot S_i \cdot \left(\left|\cos\alpha_i\right| + \cos\alpha_i\right)$$

A possible scheme for measurement of the coupling force is shown in Figure B.3.





$$a_{hwF} = a_{hw} \cdot c_{cp}$$

Mola

Coupling force di riferimento 125 N

$c_{cp} = 1.05$

ISO 2631-1

Esposizione a WBV

ISO 3153

Effetto della postura nelle esposizioni a WBV

ISO 3153:2023(E)

ISO TC 108/SC 4/WG 14

Date: 2023-06-07

ISO 22270

Guida al monitoraggio e alle misurazioni di HAV

Mechanical vibration — Posture in whole-body vibration environments

WD – NP stage

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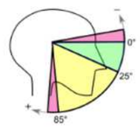
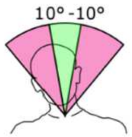
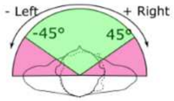
Category	Head flexion/extension sagittal	Head flexion lateral	Neck torsion
			
Neutral	0° to 25° <0° Full head support	-10° to 10°	-45° to 45°
Moderate	25° - 85°		
Awkward	< 0° no head support or > 85°	< -10° or > 10°	<-45° or >45°

Table 1. Assessment categories for the head and neck (ISO/TR10687, Table B.1)

Table 3. Assessment categories for the back ((ISO/TR10687, Table B.3)

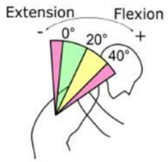
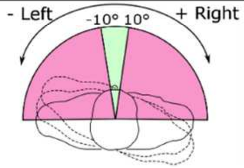
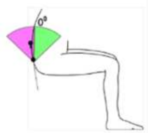
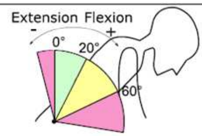
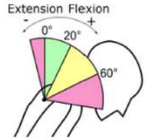
Category	Back flexion/extension sagittal	Back torsion	Lordosis/ Kyphosis	Back inclination
				
Neutral	0° to 20°	-10° to 10°	> 0°	< 0° with back support 0° to 20°
Moderate	20° to 40°			20° to 60°
Awkward	< 0° or > 40°	<-10 or > 10°	< 0°	< 0° no back support or > 60°

Table 2. Assessment categories for the thoracic spine (ISO/TR10687, Table B.2)

Category	Thoracic flexion/extension (sagittal)	Thoracic flexion (lateral)
		
Neutral	0° to 20°, <0° Full back support	0° to 10°
Moderate	20° - 60°	
Awkward	< 0° no back support, or > 60°	<-10° or > 10°

$$RS_i \begin{array}{ll} = 0 & \text{for neutral} \\ = 0.5 & \text{for moderate,} \\ = 1.0 & \text{for awkward,} \end{array}$$

$$R_i = RS_i + RS_i \times (t\%) = RS_i(1 + t\%)$$

$t\,\%$ is the percentage of expected daily exposure duration

$$R_{index} = 1 + \frac{\sum_{i=1}^{p} R_i}{2N}$$

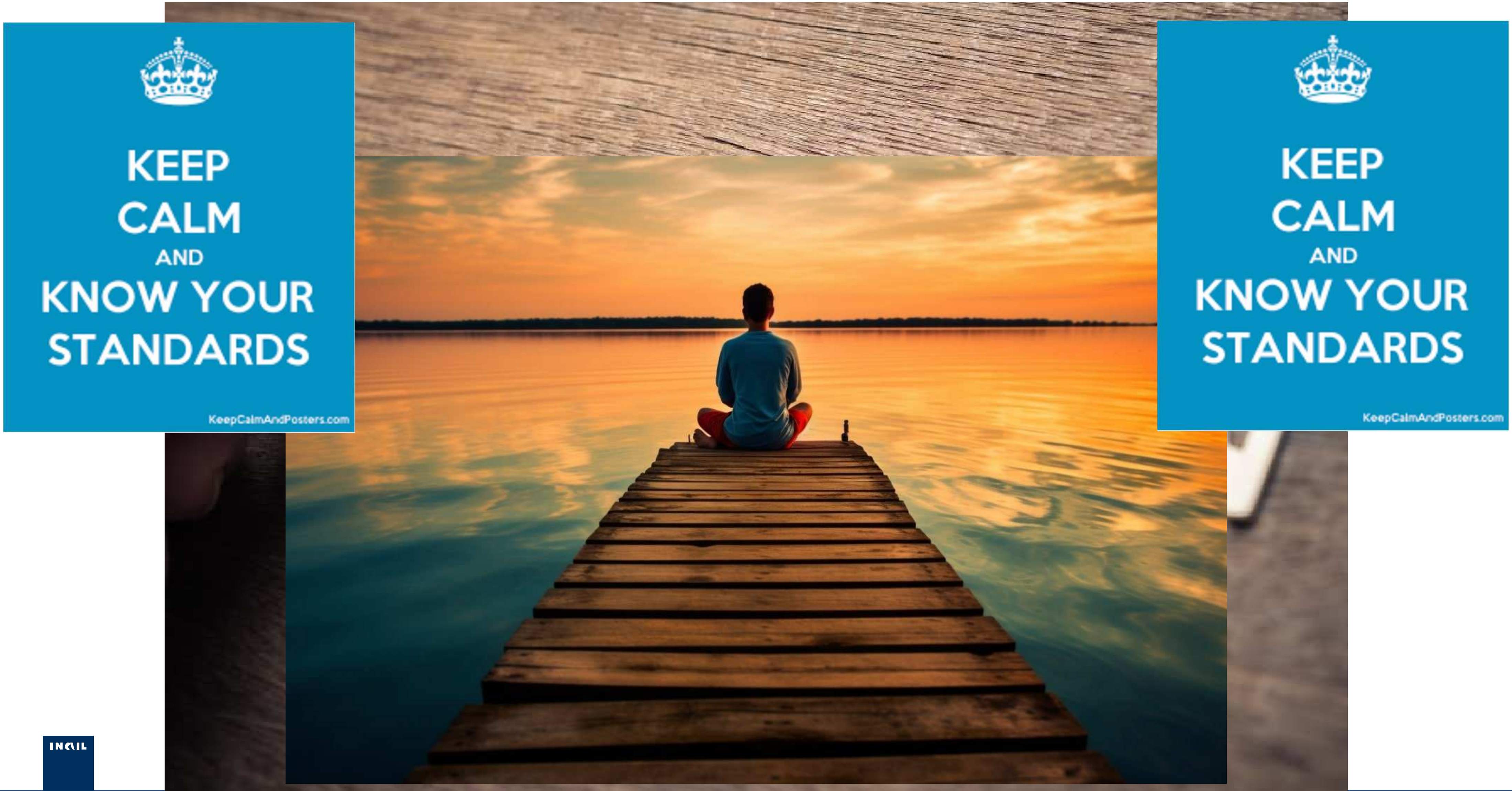
where

R_i is the posture index for each DOF or angle i,

N is the total number of spine and head angles defined in Tables 1 – 3; N=9.

P is the number of DOFs or angles measured in the field; $P \leq N$.

$$A^*(8) = A(8) \times R_{index}$$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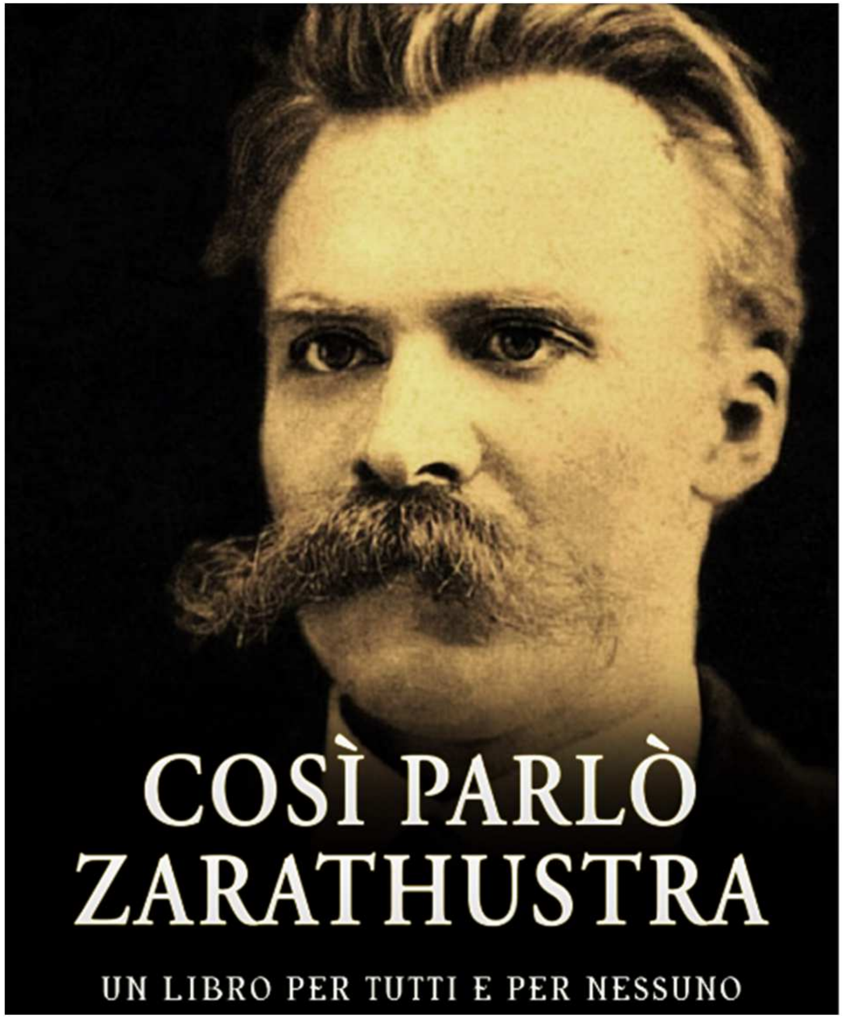

o Zarathustra, è vero: tu scagliasti la pietra lontano, ma essa ricadrà su di te!