

Slide 1

## Job Strain Index (JSI)

Moore, J.S. and Garg, A. (1995) American Industrial Hygiene Journal 56:443-58.

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## JSI Ratings

1. Intensity of Exertion
2. Duration of Exertion
3. Efforts per Minute
4. Hand/Wrist Posture
5. Speed of Work
6. Duration of Task per Day

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### 1. Intensity of Exertion

An estimate of the strength required to perform the task one time. Guidelines for assigning a rating criterion are presented in the following table.

Rating Criterion	% MPA*	Body Strain†	Perceived Effort
Light	<10%	+0	barely noticeable or relaxed effort
Somewhat Hard	10%-20%	3	noticeable or definite effort
Hard	30%-40%	4-6	obvious effort; unchanged facial expression
Very Hard	50%-70%	6-7	substantial effort; changes facial expression
Near Maximal	>80%	7†	uses shoulder or trunk to generate force

\*Percentage of maximal strength  
†Compared to the Borg CR-10 scale††

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**2. Duration of Exertion**

Duration of Exertion is calculated by measuring the duration of all exertions during an observation period, then dividing the measured duration of exertion by the total observation time and multiplying by 100.

% Duration of Exertion =  $\frac{100 \times \text{duration of all exertions (sec)}}{\text{total observation time (sec)}}$

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**3. Efforts per Minute**

Efforts per Minute are measured by counting the number of exertions that occur during an observation period, then dividing the number of exertions by the duration of the observation period, measured in minutes.

Efforts per Minute =  $\frac{\text{number of exertions}}{\text{total observation time (min)}}$

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**4. Hand/Wrist Posture**

Hand/Wrist Posture is an estimate of the position of the hand or wrist relative to neutral position. Guidelines for assigning a rating criterion are presented in the following table.

Rating Criterion	Wrist Extension <sup>A</sup>	Wrist Flexion <sup>A</sup>	Ulnar Deviation <sup>A</sup>	Perceived Posture
Very Good	0°-10°	0°-5°	0°-10°	perfectly neutral
Good	11°-25°	6°-15°	11°-15°	near neutral
Fair	26°-40°	16°-30°	16°-20°	nonneutral
Bad	41°-55°	31°-50°	21°-25°	marked deviation
Very Bad	>60°	>50°	>25°	near extreme

<sup>A</sup> From derived from data.  
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**Job Strain Index Worksheet**

	Intensity of Exertion (IE)	Duration of Exertion (DE)	Efforts/Minute (EM)	Hand/Wrist Posture (HWP)	Speed of Work (SW)	Duration per Day (DD)
Exposure data						
Ratings						
Multipliers						
SI Scores						

**JSI = IE x DE x EM x HWP x SW x DD**

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**Job Strain Index Worksheet Example**

	Intensity of Exertion (IE)	Duration of Exertion (DE)	Efforts/Minute (EM)	Hand/Wrist Posture (HWP)	Speed of Work (SW)	Duration per Day (DD)
Exposure data	Somewhat hard	60%	12	fair	fair	4-8
Ratings	2	4	3	3	3	4
Multipliers	3.0	2.0	1.5	1.5	1.0	1.0

**JSI = IE x DE x EM x HWP x SW x DD**

**JSI = 3.0 x 2.0 x 1.5 x 1.5 x 1.0 x 1.0**

**JSI = 13.5**

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**Job Strain Index**

- Preliminary testing has revealed that jobs associated with distal upper extremity disorders had SI Scores greater than 5.
- SI Scores less than or equal to 3 are probably safe.
- SI Scores greater than or equal to 7 are probably hazardous.
- The Strain Index does not consider stresses related to localized mechanical compression. This risk factor should be considered separately.

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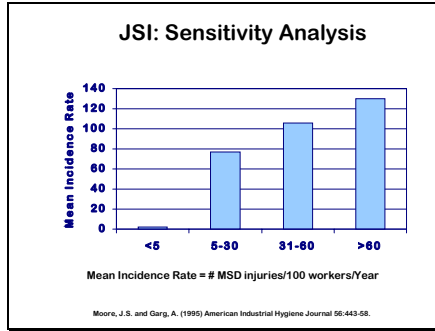
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Slide 13



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