

Ergonomics in workstation design:

a case study from the biomedical sector

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Overview:

1. Key ergo risk factors
2. Risk quantification method
3. Case study details
4. ErgoTable development
5. Risk score changes
6. Operator feedback
7. Summary & cost

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Reminder of key ergonomic risk factors:

- Force

- Frequency

- Posture

- Contact stress

- Vibration

} This case study

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Approaches to ergonomics

- Ideal World :

- Get it right first time...by DESIGN

- Mature Approach – proactive / preventative

- Real World:

- Get it right second time...by RETROFIT

- Initial Approach – reactive



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First step: quantify risk...what method?

'START' system helps quantify risk levels and employee discomfort

System To Assign Risk Thresholds

The START system assessment form is a grid-based tool for quantifying risk levels and employee discomfort. It is organized into sections for different body parts: Hand & Wrist, Elbows, Shoulders, Back, Neck, and Legs. Each section contains a list of risk factors with corresponding icons and a scale from 1 to 4. For example, under 'Hand & Wrist', factors include Posture (Frequency, Force, Vibration, Repetition, Frequency) and Force (Static, Dynamic). Each factor has a scale from 1 to 4, and a 'TOTAL, each out of 10' box at the bottom of each section.

The START system assessment form includes a human figure diagram with a red dot indicating a risk level of 5 on the elbow. The diagram is labeled 'Front' and 'Back'. A vertical scale on the right side of the diagram indicates the risk level, ranging from 0 to 10. The scale is as follows:

- 0 No discomfort at all
- 1 Extremely small discomfort
- 2
- 3 Very small discomfort
- 4
- 5 Moderate discomfort
- 6
- 7 Very large discomfort
- 8
- 9 Extreme discomfort
- 10 Maximum discomfort

Please Mark any specific areas of discomfort

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Case Study:

- Large production area running 24 / 6 (Medical Device Company)
- Production lines designed & laid out with minimal focus on Ergonomics
- Growing incidence of 'slow-burn' ergonomic injuries (WRULDS) *Wrists, Elbows, Shoulders, Neck.*
- Obtained senior management support to address the ergo issues
- Assigned and trained assessment team
- Drew up action plan & assessed workstations (START) – 3 job steps
- Came up with concept of "Ergo Table" (semicircular cut-out worktop)
- Implementation

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Work Station **Before** ergo assessment:



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ErgoTable Development:

Updated START assessment scales
 Made hook portable out of aeroboard

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ErgoTable START scores

BEFORE

Work Step	Hand & Wrist		Elbows		Shoulders		Back	Neck	Legs	Eyes
	Left	Right	Left	Right	Left	Right				
Pre Weigh	2	7	6	6	7	0	5	5	3	0
Post Weigh	1	5	3	6	4	7	5	5	3	0
Final Inspect	5	5	5	5	7	7	5	6	2	1



AFTER

Work Step	Hand & Wrist		Elbows		Shoulders		Back	Neck	Legs	Eyes
	Left	Right	Left	Right	Left	Right				
Pre Weigh	0	0	0	0	0	0	0	0	0	0
Post Weigh	0	0	0	0	0	0	0	0	0	0
Final Inspect	0	0	0	0	0	0	0	0	0	1

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Operator feedback:

- *“Everything is located very close and there is no need to stretch for anything”*
- *“There is plenty of space to do paperwork without having to get out of the chair”*
- *“I can now sit properly into post weigh”*

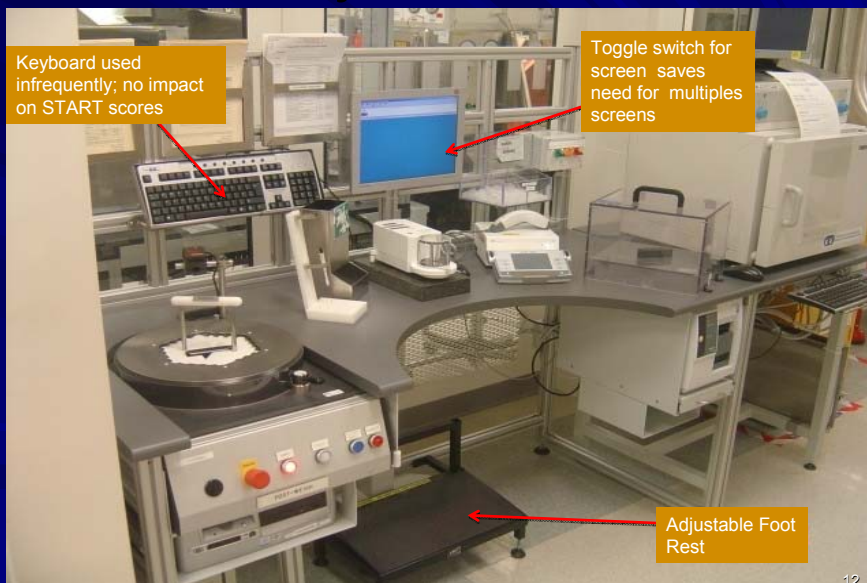
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Work Station **Before** ergo assessment:



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New Layout (Pre / Post weigh):



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ErgoTable (Final Inspect):



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Summary...

PROCESS:

- Obtained Management support
- Used quantitative methodology (START)
- Cross functional team input to include users
- Aeroboard mock-ups (great flexibility)

COST: ~ \$90k (<\$2k / table;~ \$15k / lines)

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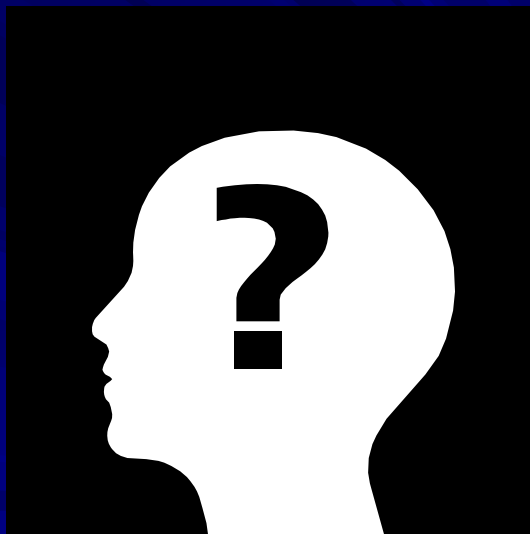
...Summary.

BENEFITS:

- Very positive feedback from operators
- Very significant ergonomic risk reduction
- No EHS complaints from new station layouts
- Improved product flow on line
- Work step space reduction:
 - 12% for *Pre-weigh* step
 - 40% for *Post-weigh* step
 - 15% for *Inspect* step

Supports 'Lean'

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Appendix

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Skeleton ErgoTable



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Adjustable Foot Rest:

