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Myths & Truths About Ergonomics

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Agenda

- 2 Truths & a Lie for 5 core subject areas related to Ergonomics
  - » Each section will begin with a poll
  - » Identify which statement is the lie
  - » Discussion will follow on each subject area
- Q&A

Tactical Ergonomics

Which is the lie?

Poll

1. The risk assessment method should fit the style of work being assessed.
2. A high-quality root cause analysis is critical to selecting improvements that address the presence of risk within a job.
3. Completing a perfect Ergonomics Risk Assessment is the top priority.

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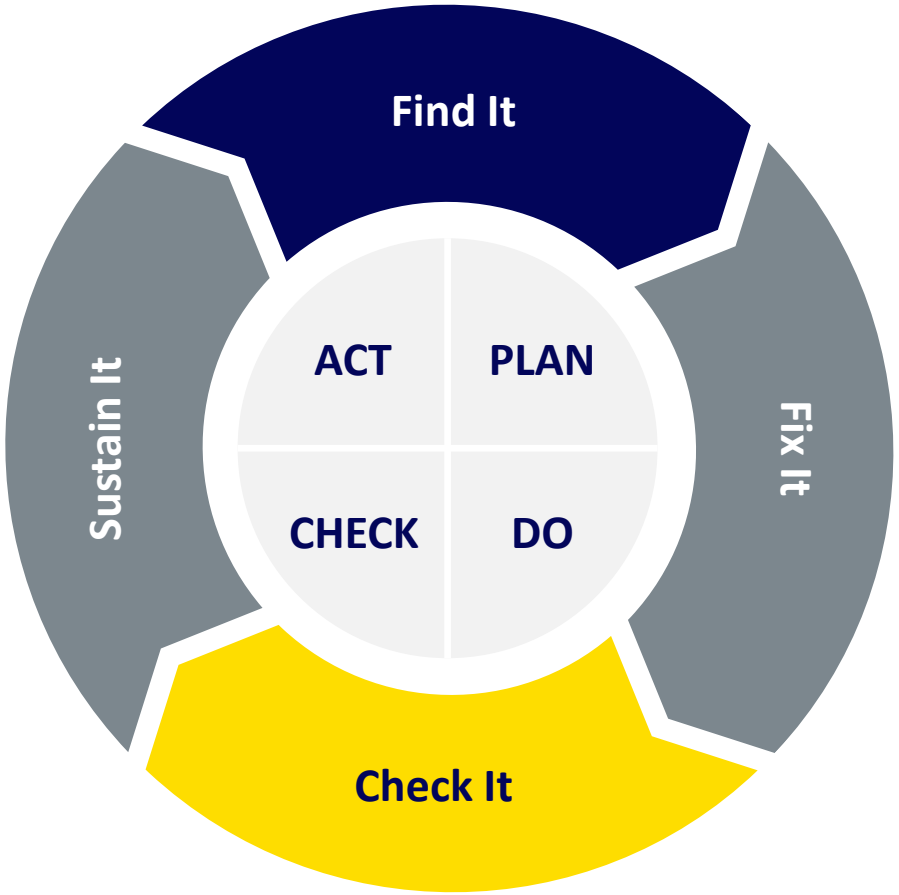
Objective of Ergonomics

Ergonomics is…

- a process, not a program.
- about solutions, not assessments.

- ¼ of your time should be spent on assessment.
- ¾ of your time should be spent on solutions (or fixes.)



Applied Reality of MSD Risk Assessment

- Detail needed for accurate assessment
  - » Cost for data collection equipment
  - » Training for assessors
  - » Time to complete assessments
- Simplicity needed for widespread use
- Value of participatory ergonomics
- Need for expert ergonomists

If a majority of jobs come out high risk on REBA/RULA, how do you know where to start?

Benefits of Technology for MSD Risk Assessment

- Allows users with less EHS expertise to achieve accurate assessment results
- Improved consistency of results between users
- Potentially less work disruption to complete an assessment

Value of Root Cause Analysis

Simplify Solutions

- A good Direct Cause statement is the opposite of its related solution
  - i.e., Object too far away >> Move it closer
  - i.e., Assembly force too high >> Reduce force on operator
  - i.e., Visual access to work is obstructed >> Expand line of sight

Implicit Bias

- What is your core responsibility?
- How does that related to identified risk factors?
- Can you dig deeper?

By Greg L - originally posted to Flickr as Plane crash into Hudson River, CC BY 2.0, https://commons.wikimedia.org/w/index.php?curid=5723340

Poll

Machine Learning

Which is the lie?

1. Bias in AI is the result of human decisions about how an application is designed, tested, and deployed.
2. AI can replace all Subject Matter Experts.
3. Machine learning is the science of developing algorithms and statistical models that computer systems use to perform complex tasks without explicit instructions.

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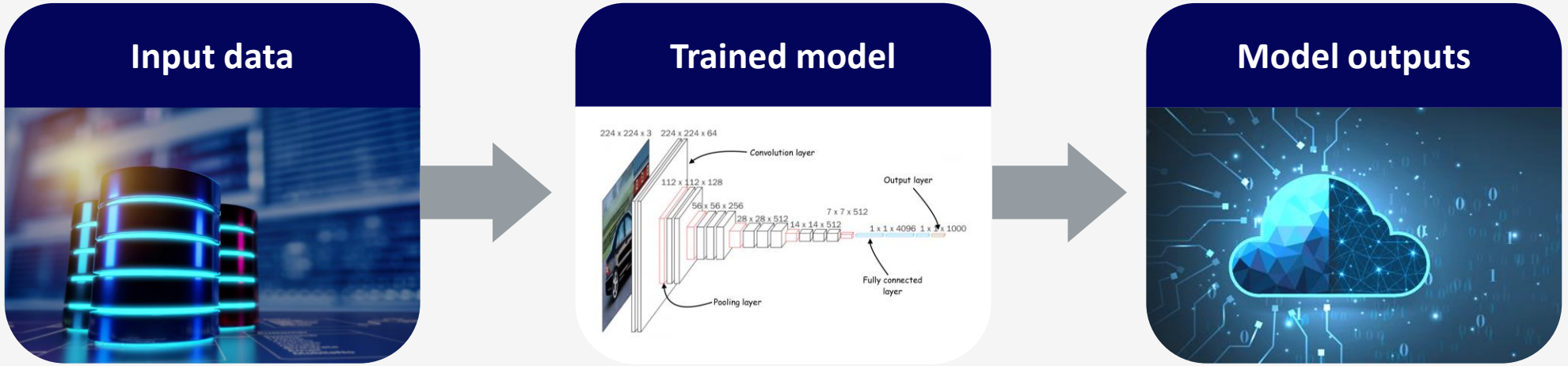
Machine Learning vs Experts

- Some human beings will always be required in the work force because AI has limits.
- Currently, AI systems excel at narrow tasks, while occupations consist of many interrelated tasks.
- AI systems lack true agency or creativity and cannot currently think like sentient beings.
  - » One of the roles of Subject Matter Experts is to help bridge the creativity gap.

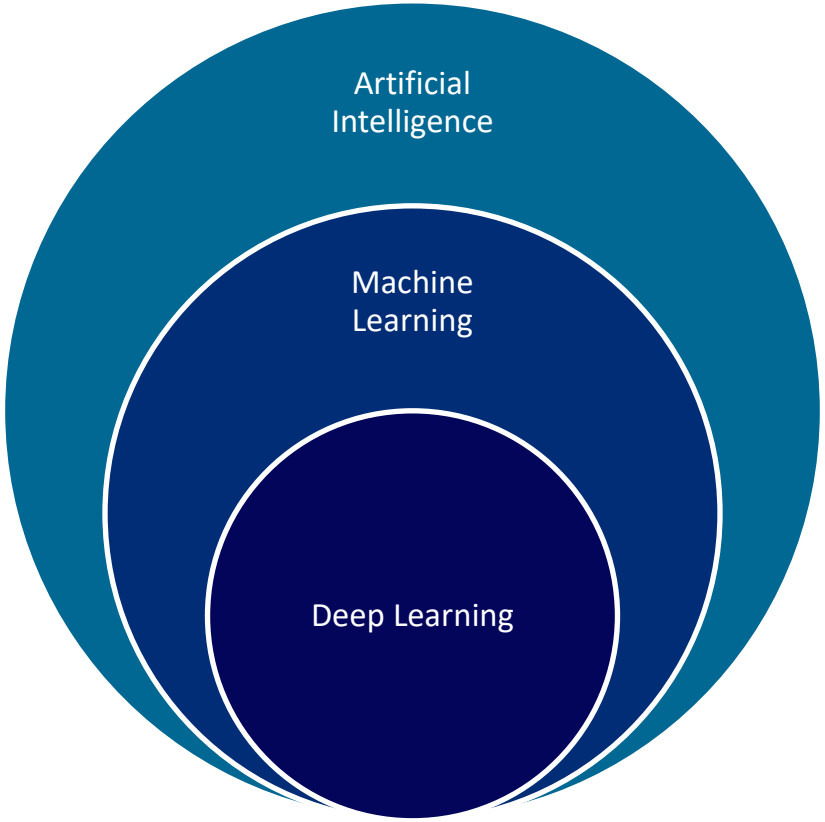
Machine Learning Model Development

- The trained model receives input and applies many basic operations such as addition, multiplication, maximum, and averaging to produce the output.
- Well-designed, thoroughly vetted AI systems can limit unfair bias, and may even help us to identify and combat bias in human decision-making.



Machine Learning vs Artificial Intelligence

- Machine Learning is a subsection of Artificial Intelligence.
  - » All ML is AI, but not all AI is ML.
- Deep learning is particularly popular Machine learning technique based on neural network technology.
  - » An algorithm whose architecture is inspired by the human brain and can learn to recognize complex patterns, such as what “hugs” are or what a “party” looks like.



Poll

Strategic Ergonomics

Which is the lie?

1. A sustainable ergonomics process relies on the involvement and support of multiple departments.
2. Self-assessments can be a great tool to use between larger audits to identify key areas of focus for process improvements.
3. Launching a new company process is simple once you have a detailed launch plan.

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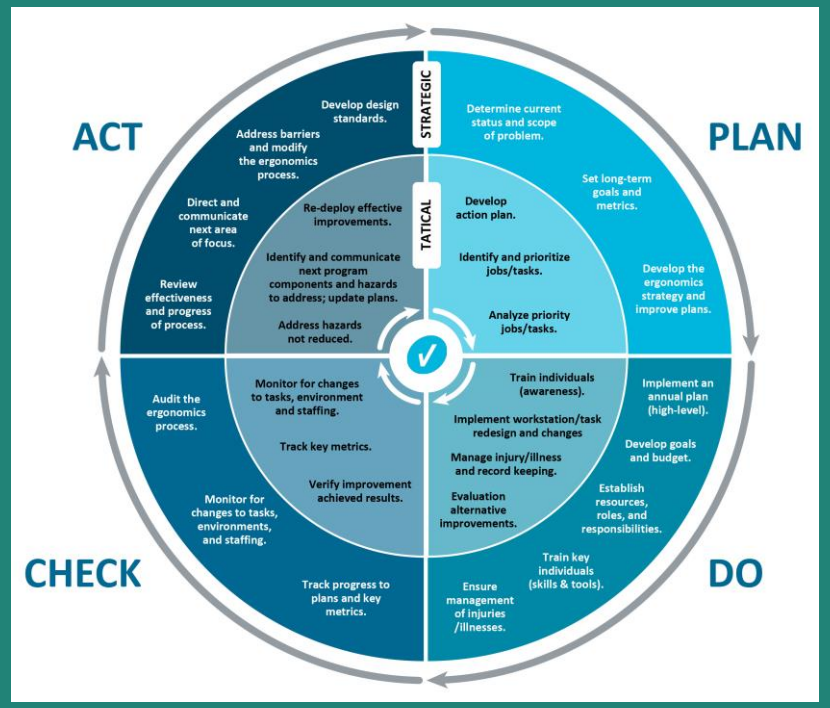
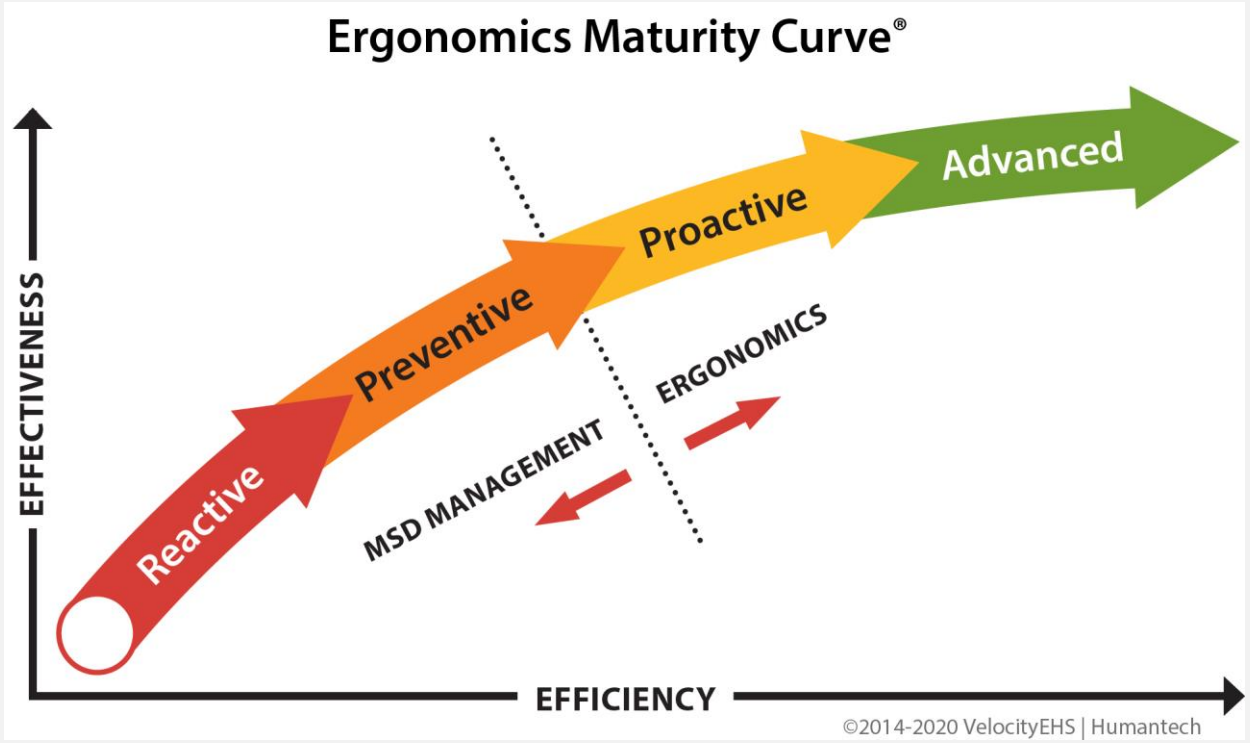
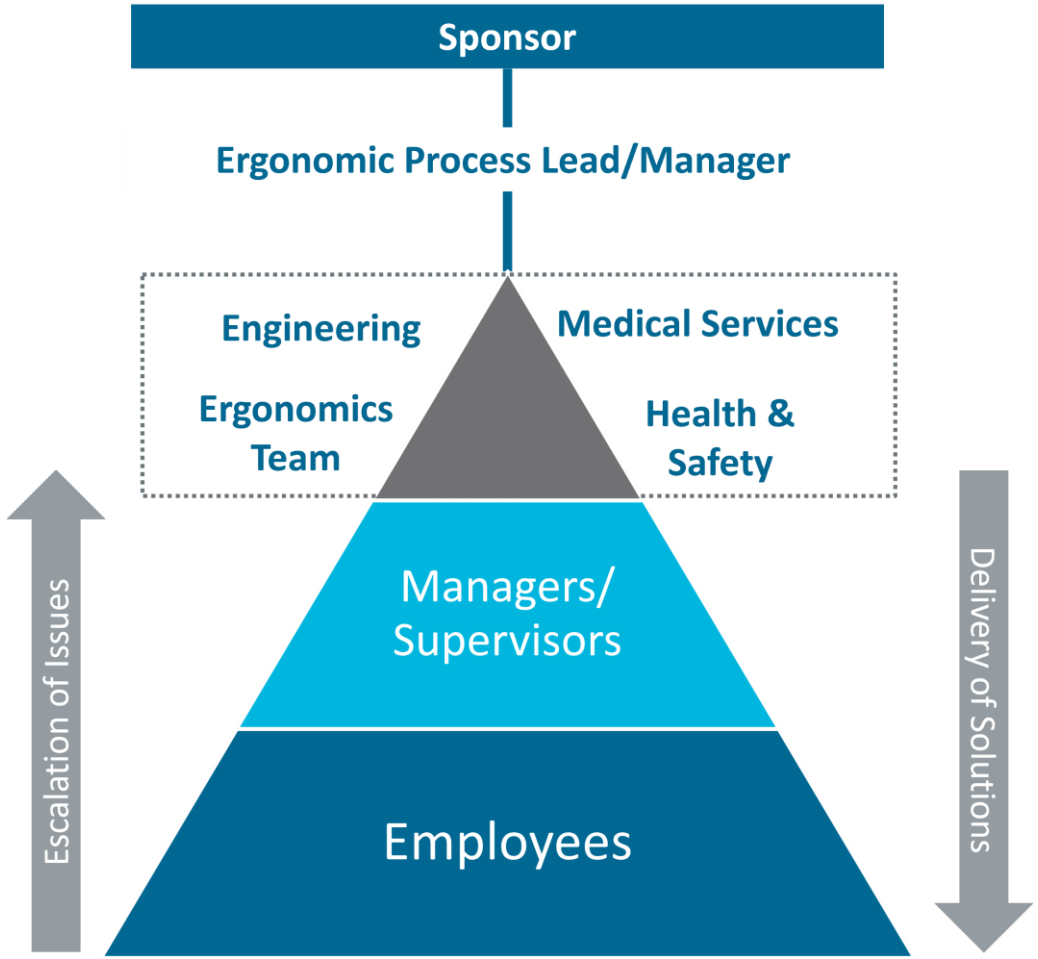
Ergonomics Process Launch





Benefits of Cross-Functional Involvement

- Multiple perspectives lead to more effective solutions
- Improved delegation of work tasks
- Reduction in information silos
  - » More likely to maximize the benefits of each individual improvement



What is a Plan Self-Assessment?

- Different from an audit
  - » No independent auditor
  - » Identifying opportunities is more important than providing evidence
  - » No comparative standard
- Evaluation level
  - » What's in the ergonomics plan?
  - » Does the process follow what's in the plan?
  - » System used to update the plan?
- Gap Analysis

Interactive Ergonomics Program Self-Assessment

Scan the QR code to quickly assess your current program. You'll get **easy-to-read results** & **customized recommendations** for improvement.

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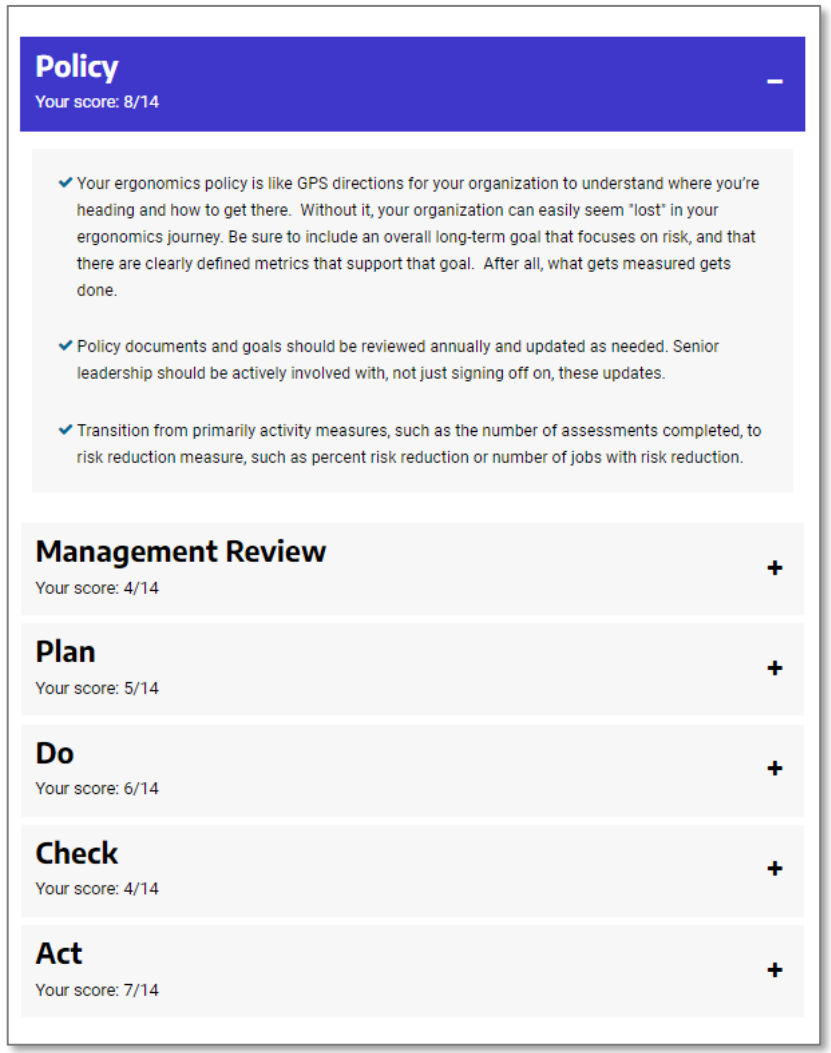
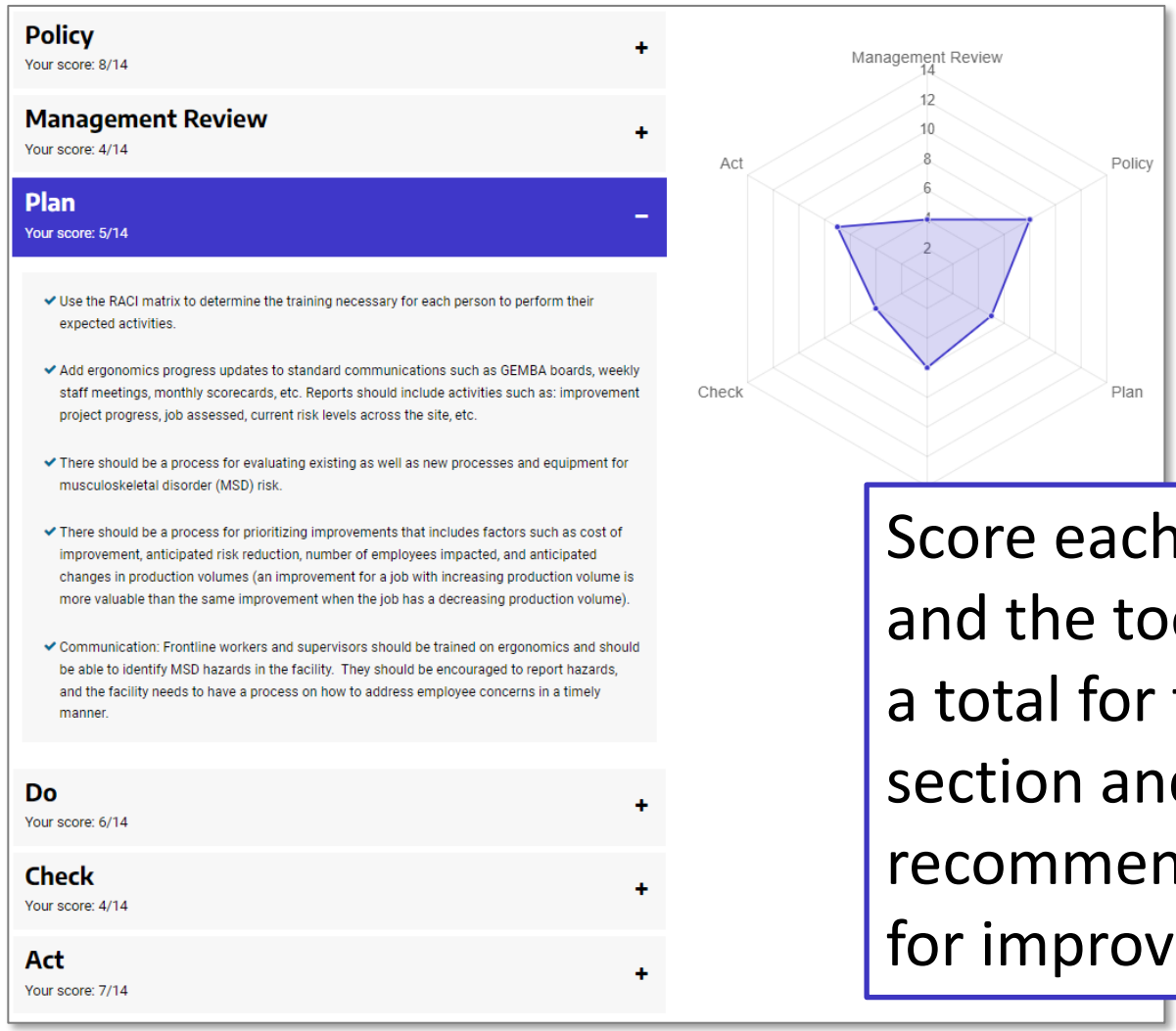
Ergonomics Program Self-Assessment





Score each question and the tool will get a total for the section and provide recommendations for improving.

Environment of Ergonomics

Which is the lie?

Poll

1. Office ergonomics and Industrial ergonomics require the same approach, just in different settings.
2. All ergonomics risk assessments tools focus on identifying high forces, awkward postures, long durations, and high frequency activities.
3. Total Worker Health is a holistic approach to worker well-being that combines ergonomics, safety, and psychosocial risk factors.

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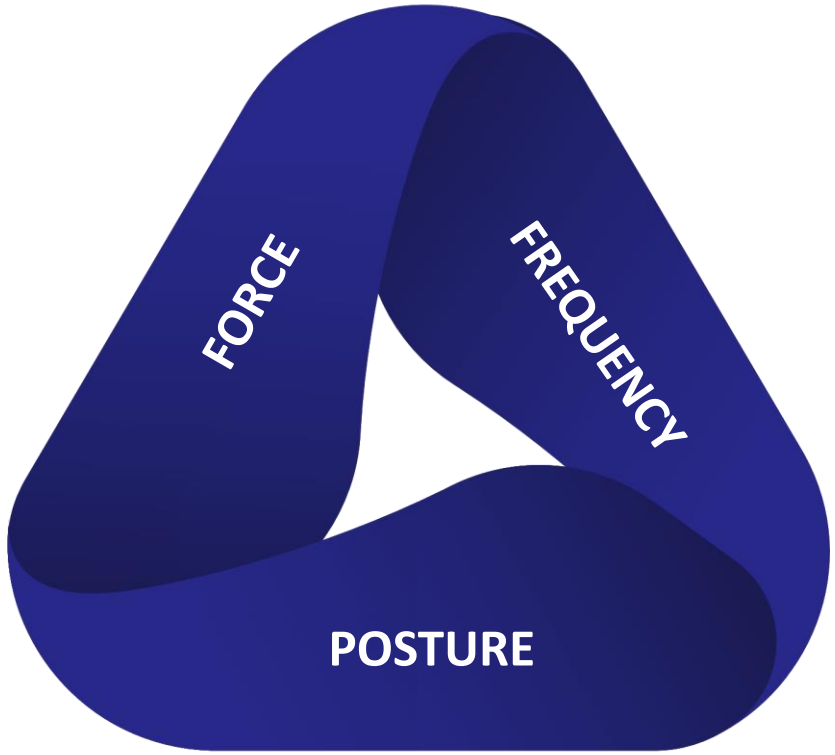
Office vs Industrial Ergonomics

- Individual's level of control over work environment
- Based on style of work, there are different top priority risk factors
  - » Office Ergonomics = Static awkward postures
  - » Industrial Ergonomics = high forces

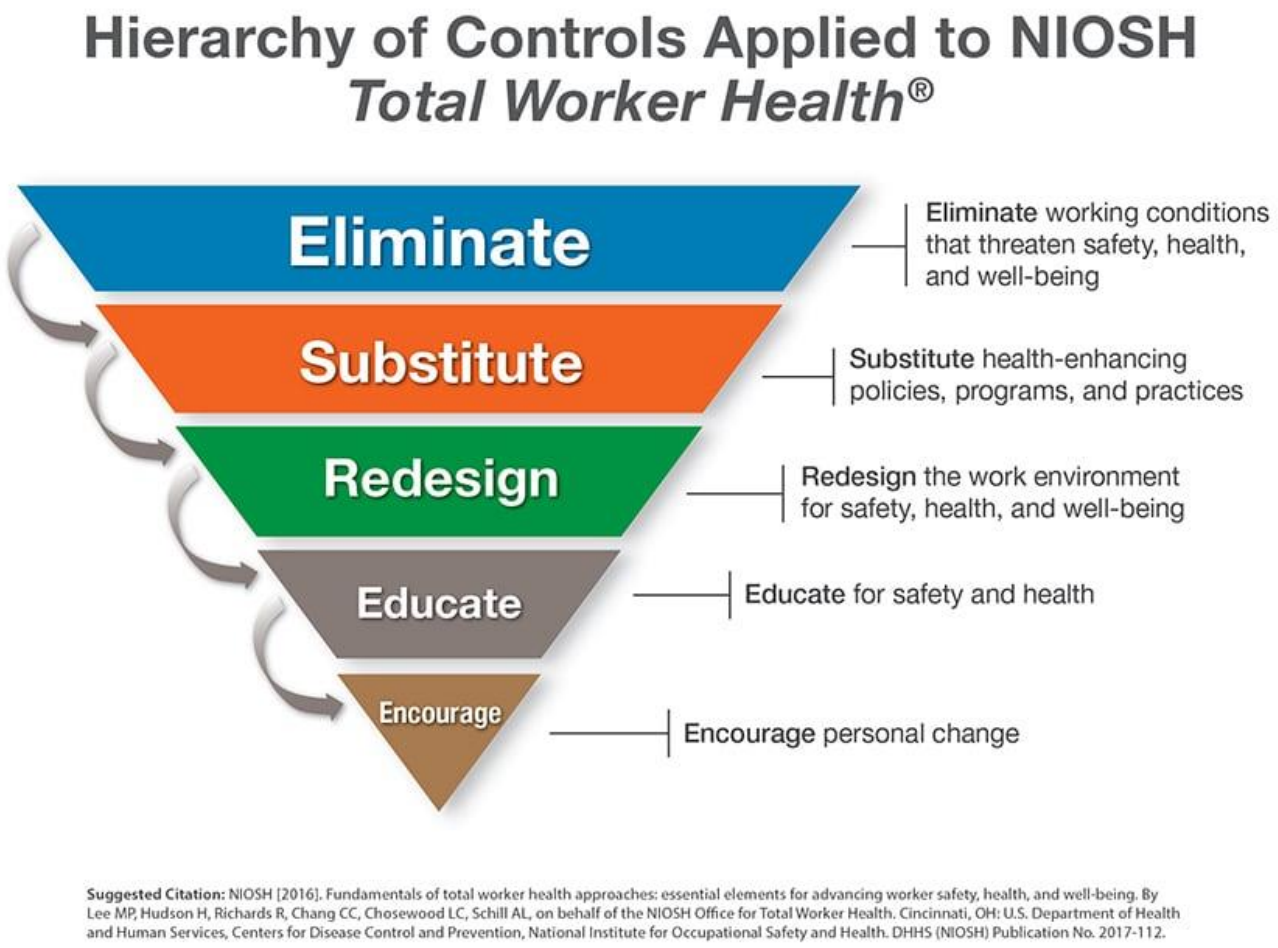
MSD Risk Factors

The primary physical risk factors that lead to the development of a musculoskeletal disorder are…

- Forceful exertions
- Awkward postures
- Long durations
- High frequencies/repetitions
- Vibrations exposures



Total Worker Health



Business Impacts of Ergonomics

Which is the lie?

Poll

1. Key Stakeholders for a good ergonomics process can be found at all levels of a corporation from the lowest operator actively producing products to the C-Suite.
2. The primary driver of good ergonomics is a reduction in Safety incidences.
3. Ergonomics is an engineering discipline that can be directly correlated to quality and productivity.

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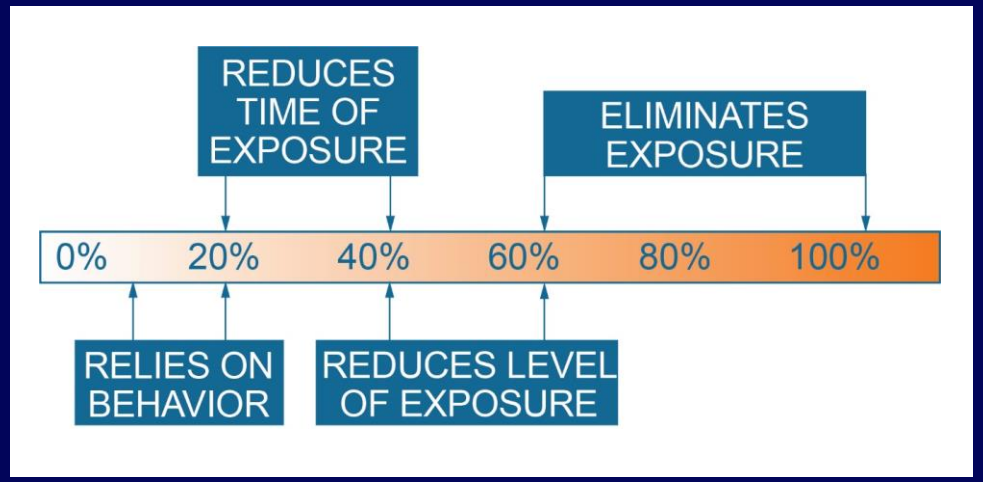
Benefactors & Benefits

Dul J, Bruder R, Buckle P, Carayon P, Falzon P, Marras WS, Wilson JR, van der Doelen B. (2012). A strategy for human factors/ergonomics: developing the discipline and profession. Ergonomics. 2012;55(4):377-95.

Improved Employee Well-being

- Musculoskeletal disorders
- Incidence rates
- Lost workdays
- Restricted workdays
- Workers' compensation costs
- Turnover
- Absenteeism



- productivity
- quality

Goggins RW, Spielholz P, Nothstein GL. (2008). Estimating the effectiveness of ergonomics interventions through case studies: implications for predictive cost-benefit analysis. J Safety Res. 2008;39(3):339-44.

Improved Manufacturing Performance

Participatory ergonomic intervention shows statistically significant improvements in performance outcomes:

1% Increase first-time quality production

5% Increase productivity efficiency

Tompa E, Dolinschi R, Natale J. (2013). Economic evaluation of a participatory ergonomics intervention in a textile plant. Appl Ergon. 2013 May;44(3):480-7.

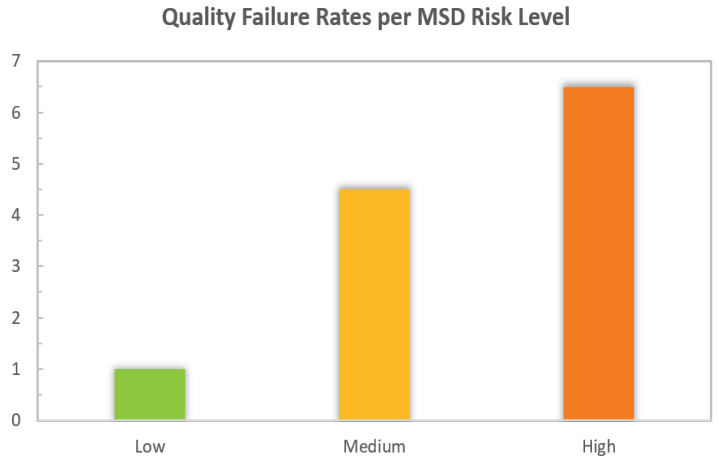
risk level

=

quality failure rates

=

cost to correct errors



Ann-Christine Falck, Roland Örtengren and Dan Högberg. (2010). The impact of poor assembly ergonomics on product quality: A cost–benefit analysis in car manufacturing. Human Factors and Ergonomics in Manufacturing & Service Industries, Volume 20, Issue 1, pages 24–41, January/February 2010.

Ann-Christine Falck, Roland Örtengren, Mikael Rosenqvist. (2014). Assembly failures and action cost in relation to complexity level and assembly ergonomics in manual assembly (part 2). International Journal of Industrial Ergonomics 44 (2014) 455-459.

Questions?

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eBook: Deploying a Large-Scale Ergonomics Process

Scan the QR code to download the eBook for a year-by-year guide to successfully deployment.

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