THE TOP FIVE MYTHS & TRUTHS OF ERGONOMICS

By Ryan Cowart, CPE, Senior Consultant and Ergonomics Engineer, Humantech

Throughout my nine years as a professional ergonomist, I've been fortunate to collaborate and engage with many organizations to create meaningful workplace change. From foundational awareness trainings to advanced work cell and vibration-exposure analysis to senior leadership summits, my time spent with mid- to large-size companies has been as broad as it has been deep. However, the greatest percentage of the time I allocate to working with organizations is demystifying the field of ergonomics; where the applications of this engineering discipline begin and end.

It would be incorrect to say that the ergonomics profession needs only to address a few questions to be effective. In fact, listing out as many topics as I can think of wouldn't do this field justice, as the principles of workplace design are dictated by the specificity of the job, the employees, the culture that exists on-site and the equipment workers are provided to get that job done right.

Following is a list of common myths, and their corresponding truths, to begin understanding the implications of occupational ergonomics. While not exhaustive, this is an illumination of the perceptions, strategy, implementation and management of an ergonomics process. As one of my colleagues once cleverly stated, "I will likely gain more and more enemies the further down you read!" Nevertheless, here are the top five myths I argue are the most applicable in our current business climate.

The Value of Ergonomics

It only improves employee well-being.

It's surprising to me that business units and divisional leaders within organizations aren't better informed of the values of ergonomics. Leading research in the field of psychology suggests that people tend to connect things they are unfamiliar with to things that they are familiar with. This is called confirmation bias—the tendency to gather evidence that confirms preexisting expectations—and it happens to be one of the strongest types of feeling or inclination humans possess. It is in large part because of these inclinations that many believe the myth that ergonomics is all and only about employee well-being; injury/illness rates, lost workdays, and the like.

Contrastingly, ergonomics design impacts the physical and psychological elements of a worker. It's logical that an employee who doesn't experience pain and discomfort when working will experience greater enjoyment, or at least less dread, as opposed to those who do have such symptoms. Furthermore, we find that employees show significantly more engagement in their work culture when their organizational leaders are actively involved in the improvement process.

Enhanced employee engagement leads to word-of-mouth conversations about positivity, which in turn begins the snowball effect of reduced job turnover, reduced absenteeism and increased work performance, to name a few. The list of benefits is in no particular order; the outcomes are most certainly associated with an effective process. Ergonomics is no longer just about the health and safety benefits.

The Societal Cost of Poor Workplace Design

It's just for work, it won't follow you home.

If we "zoomed out" of a specific production facility and took more of a global view of things, we'd find that very few people evade the negative impacts of poor workplace design. Whether you are assembling a fighter jet wing, typing up a document at a computer workstation, cleaning dishes after Thanksgiving dinner or delivering parcels to a customer, awkward postures, excessive forces and/or repetition of activity is likely involved. The myth people seem to tell themselves is that ergonomics is just about work and not something to consider after hours.

A 20-year study recently published reported that low-back pain was the sixth highest cause of the global burden of disease, just after HIV/AIDS and before Malaria (Lancet. 2012). One out of eight Americans will experience back pain during

57%

of those who die from opioid-related deaths had at least one prior workplace musculoskeletal disorder.

The truth is that a high-frequency task will increase the MSD risk of just about any job, but increasing the force required to complete the same task comparatively increases the risk far greater.

his or her working life. What's more, 2012 research suggested that 57 percent of those who die from opioid-related deaths had at least one prior workplace musculoskeletal disorder (Cheng et. al. 2012). Of that employee pool, the top three most affected occupations were that of construction workers, farmers and material handlers. The truth is that poor workplace design, while obviously present in the work environment, can and does follow you home.

The Primary Biomechanical Risk Factor of MSDs *Frequency kills.*

Research in the field of biomechanics and other applied sciences has stated the myth that frequency is the greatest culprit in predicting MSD risk of a given job. Even if we begin reverting to our confirmation bias of what we were taught when we originally learned about ergonomics, we too would be firm in our belief that frequency kills. But that's not who we are; as professionals in the field of environmental, health and/or safety sciences we're actively seeking what is true.

The truth is that a high-frequency task will increase the MSD risk of just about any job, but increasing the force required to complete the same task comparatively increases the risk far greater. The 2019 Liberty Mutual Workplace Safety Index reveals that overexertion (e.g., lifting, lowering, pushing, pulling and carrying) is the #1 cause of non-fatal workplace injuries in the US, accounting for 23 percent of all non-fatal workplace injuries and $13.11 billion in direct costs per year. This is approximately $250 million per week directly related to high force exertions. I challenge readers to not only consider the traditional means of applying forces with the body, but to also think about those created by the hands, like pinching, pressing and grabbing various objects, increasing MSD risk as well.

Industrial Exoskeletons & Employee Use *They will solve all of your problems today.*

You've seen them in pop culture references, films and perhaps even during a work site demonstration. Exoskeletons are here and they will likely get better in the future, but what about right now? How effective are current industrial exoskeletons at reducing MSDs? The myth that manufacturers and stakeholders would have you assume is that the devices undoubtably increase worker productivity, while also enhancing employee well-being.

The reality on exoskeletons is that this messaging does not align with the findings from research experts. A 2019 study of exoskeletons on worker benefits and limitations in preventing MSDs suggests that, while loads on primary joints are reduced, the neighboring joints increase in magnitude, quality errors increase and energy expenditure increases with the use of certain models. Clearly, the data is stratified and inconclusive regarding the application of these devices to the current work environment. What we continue to see is that industrial exoskeletons, while able to make a substantial impact in specific operational jobs, have not yet reached a point where they should be considered for uniform introduction to the employee workforce.

Job Rotation *It magically reduces MSD risk.*

In a non-office work environment, the topic of job rotation is the most common inquiry we receive, since many still believe that the application of job rotation reduces the risk of MSDs in the workplace. From a psychological perspective, the effectiveness of job enlargement (the expansion of one's role to include additional responsibilities that were previously not associated with a given task) could invoke a range of emotions; from intrigue in acquiring new skills to outright frustration in having to do more with less. Nonetheless, simply transitioning team members from one role to the next within a given 8- to 12-hour shift does not dilute the job-specific risk introduced to the rotated worker.

The truth about job rotation is that there is weak evidence supporting such an effort as a strategy for the prevention and control of MSDs. Results of a 2017 study suggest that attempting to "balance" high-risk, medium-risk and low-risk tasks ends up creating three jobs that are all high risk (Gallagher et. al. 2017). Therefore, job rotation should no longer be considered an option for reducing MSD risk.

To conclude, I hope that the explanation of the top five myths and truths helped shed light on the perceptions, strategy, implementation and management you choose to undertake when working your plan. Smart people design things they tend to understand. For the elements they don't, a person is usually tasked with doing it manually. My hope is that you find the passion needed to understand ergonomics and *do it right.*

To learn more about how Humantech can help you use the science of ergonomics to improve workplace performance, visit ***www.Humantech.com***.

Ryan Cowart, CPE, Senior Consultant and Ergonomics Engineer, facilitates the deployment of Humantech ergonomics software solutions and conducts on-site workshops across global companies. He performs musculoskeletal disorder risk assessments and redesigns workspaces.

Prior to joining VelocityEHS' Humantech, Ryan completed an internship as an ergonomics engineer at Intel Corporation, where he led projects throughout the manufacturing site to reduce workplace risks and collaborated with area managers to implement appropriate mechanical assists and new tool designs. He also evaluated job rotation schedules and workflow design to increase production output and safety.

Ryan received both a Bachelor of Science and a Master of Science degree in Kinesiology from Indiana University, in Bloomington, Indiana. He has achieved recognition as a Certified Professional Ergonomist (CPE).

SOURCES

2019 Liberty Mutual Workplace Safety Index

Alabdulkarim S, Nussbaum MA, Rashedi E, Kim S, Agnew M, Gardner R. (2016). Impact of task design on task performance and injury risk: case study of a simulated drilling task. Ergonomics. 2016 Aug 31:1-16. [Epub ahead of print]

Cheng M, Sauer B, Johnson E, Porucznik C, Hegmann K. Comparison of opioid-related deaths by work-related injury. Am J Ind Med. 2012;56(3):308–316

Gallagher S, & Schall MC Jr. (2017). Musculoskeletal disorders as a fatigue failure process: evidence, implications and research needs. Ergonomics. 2017 Feb;60(2):255-269

Gallagher S, Schall MC, Sesek RF, and Huangfu R. (2017). Job Rotation as a technique for the control of MSDs: A fatigue failure perspective. Proceedings of the Human Factors and Ergonomics Society of the 61st International Annual Meeting. Austin, TX.

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.

Hawkins, Roelofs, Laing, & Davis (2019). Opioid-related overdose deaths by industry and occupation—Massachusetts, 2011–2015. American Journal of Industrial Medicine. Volume62, Issue10. October 2019. Pages 815-825. https://doi.org/10.1002/ajim.23029.

McGowan, B. (2018). Industrial Exoskeletons: What You're Not Hearing. Occupational Health & Safety Magazine. October 2018.

Padula RS, Comper MLC, Sparer EH, and Dennerlein JT. (2017). Job rotation designed to prevent musculoskeletal disorders and control risk in manufacturing industries: A systematic review. Appl Ergon. Jan;58:386-397.

Theurel, J. & Desbrosses, K. (2019). Occupational Exoskeletons: Overview of Their Benefits and Limitations in Preventing Work-Related Musculoskeletal Disorders, IISE Transactions on Occupational Ergonomics and Human Factors, 7:3-4, 264-280.

Years lived with disability (YLDs) for 1160 sequelae of 289 diseases and injuries 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet. 2012 Dec 15;380(9859):2163-96. doi: 10.1016/S0140-6736(12)61729-2.