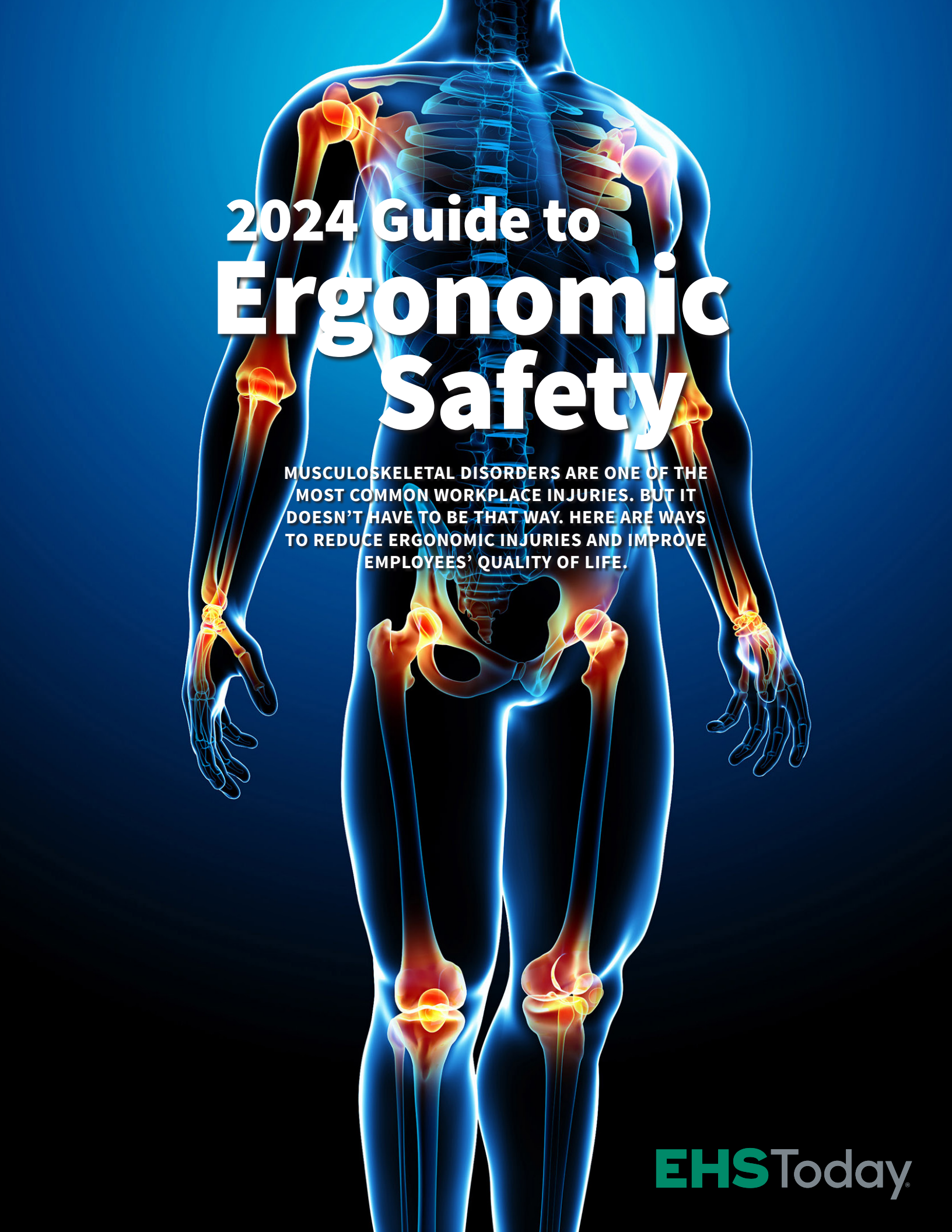
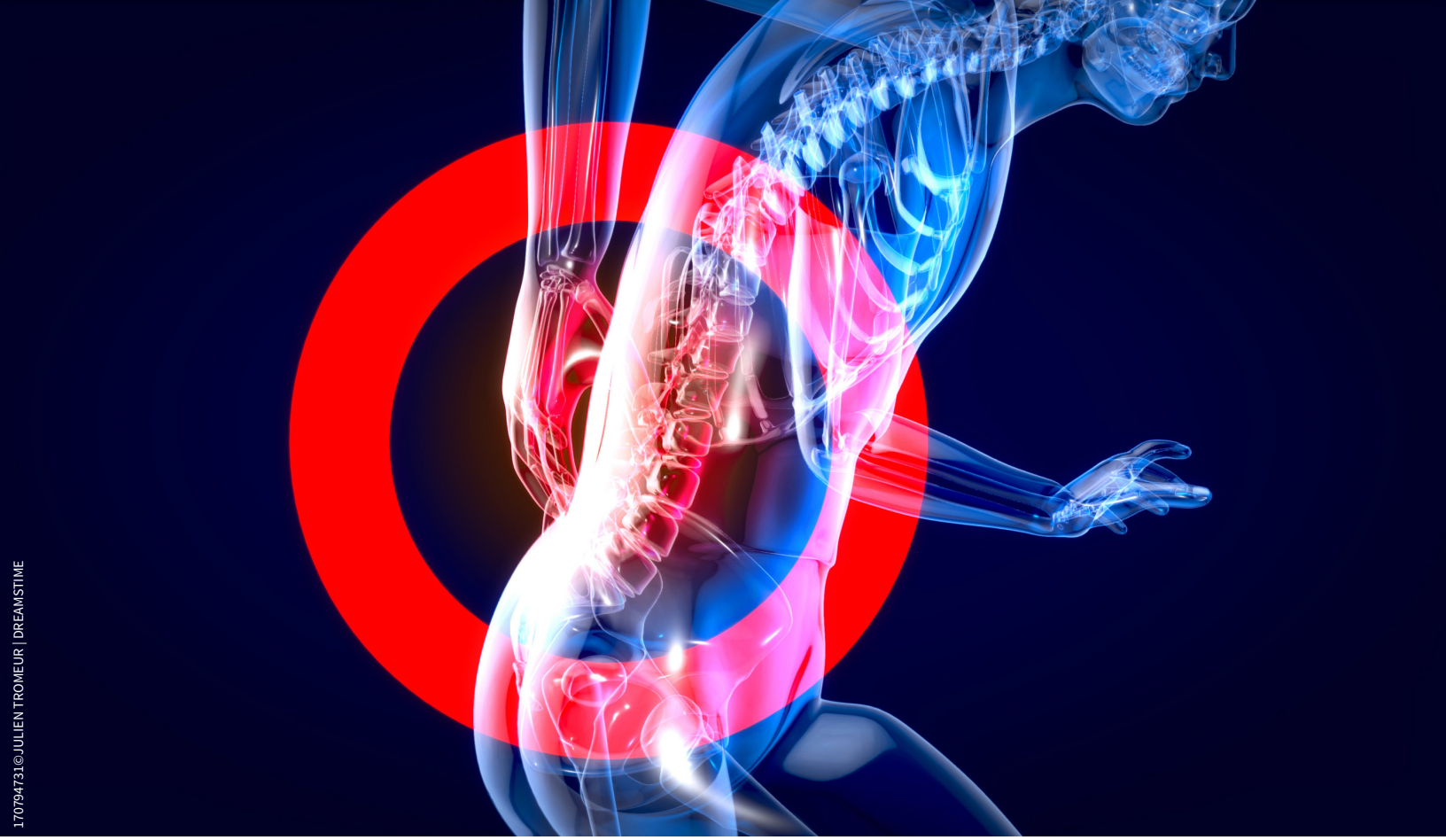


2024 Guide to Ergonomic Safety

MUSCULOSKELETAL DISORDERS ARE ONE OF THE MOST COMMON WORKPLACE INJURIES. BUT IT DOESN'T HAVE TO BE THAT WAY. HERE ARE WAYS TO REDUCE ERGONOMIC INJURIES AND IMPROVE EMPLOYEES' QUALITY OF LIFE.

EHSToday



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Introduction

When one part of you hurts, your entire body hurts. We all know that you can experience stiffness from sleeping wrong or sharp pains from awkwardly stepping on an uneven surface. But when the pain becomes persistent, safety professionals must act.

Recently, I've seen a growing number of workplaces disregard the source of the pain and focus instead on helping workers heal. Some workplaces have on-site clinics, footwear programs, and visiting massage and occupational therapists. These workplaces recognize that whether the reason is an old sports injury flare-up or improper bending, the result for employees is still the same: pain.

We know that pain can seep into other parts of our lives. It can make us irritable, uncomfortable and frustrated that we can no long do the things that matter to us, such as holding a child, walking the dog or working in the garden. The same is true for your work colleagues.

In many instances, the workplace is not designed for the needs of individual workers or any specifications considerations they may require. That's where ergonomics programs come into play, to bridge the gap between getting the job done and being comfortable while doing it. There are countless ways to improve workplace ergonomics, from adjusting a work surface to employing cobots to using artificial intelligence (AI) to redesigning a line.

Musculoskeletal disorders (MSDs) are often the first sign of a deeper problem. They're also often overlooked and dismissed, both by workers and by employers. It's up to safety professionals to identify the root cause, then collaborate with other departments (e.g., operations) to develop a solution that workers say improves their physical, mental and emotional well-being.

There's nothing more important than when a worker is able to do their job, go home at the end of their shift and get on with their life.

To that end, *EHS Today* has compiled several articles that can help you better assist your workforce. Whether you have employees working on the shop floor, in a warehouse, hybrid office setting or completely remote, we have plenty of ideas for how to make the act of work less painful.

***Nicole Stempak** is managing editor of* EHS Today *and conference content manager of the Safety Leadership Conference.*

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Identifying Metrics That Drive a Company's Ergonomics Process

Similar to the components of a song, a single metric on its own is not as effective as the combination of metrics working together.

By Christy Lotz

Metrics are a vital part of a successful ergonomics process. Typically, the need to implement an ergonomics process comes from the desire to reduce injuries and costs, which are lagging metrics. Whether an ergonomics process is in early stages of implementation or further along, when identifying metrics for your organization, consider two questions:

1. What do we want to achieve?
2. How are we going to do it?

The answer to these questions can differ from company to company and from year to year, so staying loyal to one or two metrics is not going to ensure success. In fact, the key to success is understanding how different metrics combined will benefit your organization.

Leaning on a variety of metrics at different times or levels of maturity will keep your organization on the path toward success. Similar to the components of a song (e.g., melody, rhythm, bass and harmony), a single metric on its own is not as effective to an organization (a.k.a. the audience) as the combination of metrics working together.

Let's dive deeper into the topic of metrics to help you understand what will work best for you. There are three categories of metrics to consider when implementing an ergonomics process:

» Leading metrics (melody),
» Activity metrics (rhythm) and
» Lagging metrics (bass).

LEADING METRICS

Leading metrics predict the likelihood that an event might occur. Among the three types of metrics, they are the most effective, as we're trying to predict what kinds of events might occur and how we can prevent musculoskeletal disorders (MSDs). Leading metrics should all be tied to risk and the reduction of risk. Systematically managing risk with a few leading metrics will satisfy leadership and keep the team results oriented. Examples include:

» percentage of workstations/jobs at low risk,
» percentage reduction of MSD risk score and
» percentage of new workstations at low/no risk upon installation.

Leading metrics are the melody of your ergonomics process. Just as having more notes doesn't make the melody any better (only sound different), having too many leading metrics may

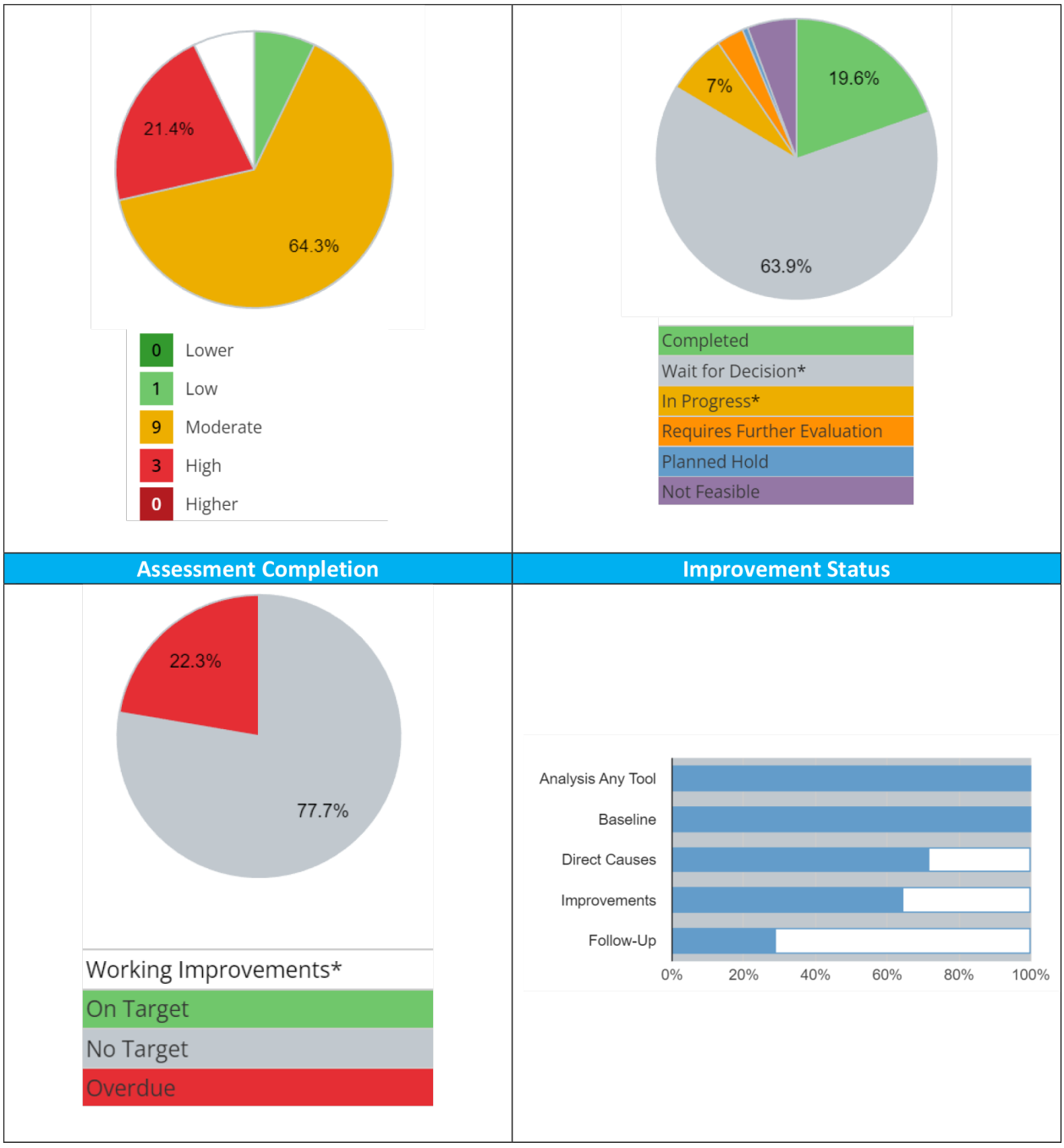

Figure 1

make the process too chaotic. Therefore, select the appropriate one or two leading metrics to be the main metrics that guide your process.

ACTIVITY METRICS

You could have the best melody in the world, but if you don't have a strong rhythm, or the appropriate cadence, you can quickly move off track. Activity metrics are the rhythm of the song, or the drumbeat; they reflect actions taken or tasks completed. They don't measure how well something is performed or the impact on risk but rather specific activities the team is taking monthly, quarterly and annually to make sure they stay on track and consistent with their goals. Examples include:

- » percentage of employees who have received training,
- » number of jobs/processes assessed,
- » number of workstation improvements identified,
- » number of workstation improvements implemented and
- » percentage of assessed jobs with a follow-up assessment completed.

Unlike the melody, more activity in the rhythm section can elevate a song to the next level. The outcomes of risk

assessment and improvement activities provide measures of risk level and risk reduction.

Select targets that will be easy for the team to complete—and will drive them through the job improvement process. For example, task the team with completing two assessments per month and also two improvements implemented on previously assessed jobs. This will ensure that improvements are being made and that the focus isn't solely on assessing jobs.

Consider which metrics will drive the desired behavior. For example, consider the image in *Figure 1*. A lot of assessments have been completed and improvements are being identified. However, too few improvements are completed, nothing is prioritized appropriately, no decisions are being made to move improvements forward with improvements and we are not completing the job improvement process. Adjusting the activity metrics will be effective because the team will focus less on the number of assessments and more on the number of improvements completed.

LAGGING METRICS

Lagging metrics are typically initial program measures. They are the reason why an organization may implement an ergonomics process in the first place. Frequent injuries and high costs are what set the majority of ergonomics processes in motion. There is no fault in lagging metrics being a driver for the process. However, reducing injuries and costs is more of an end goal to an effective process and less of a metric to monitor success throughout the process.

One of the main reasons lagging metrics are not a good measure of success is that the results require specific activities and actions, and this can take time to yield results. More steps are required along the way to know if you are on the right track. If, at the end of a year of your ergonomics process, you have not achieved the reduction in injuries or costs that you were aiming for, it does not mean you need to change your process. Rather, it means you just aren't seeing the results yet.

Injury and illness rate, days since the last injury, lost workdays and injury costs are all consequence data happening after the fact. They are still important measures to track, but they don't help us understand if we are moving in the right direction to achieve risk reduction goals.

Lagging metrics are like the bass of a song, which moves in contrast to the rhythm and melody. The bass is important—even vital—to a song's success, but it is not as effective on its own.

COMMUNICATING PROGRESS

Lean on all of the aforementioned measures based on where you are in your process, the culture of your organization and assessment of what is working or not working. For example, consider easy activity metrics when initially implementing the process. As you move into sustaining the process, challenge your organization to move toward more leading key performance indicators (KPIs) that require the team to focus on risk reduction and implementing actions to improve the workplace.

Give metrics time to determine if they'll work for your teams, but don't be afraid to adjust. Often, making adjustments reinvigorates the process and will ultimately make it more successful.

Initial Program Measures
# of workstation improvements implemented
% of targeted employees completing appropriate level of training
% of targeted workstations/jobs assessed for risk
MSD incident rate

Key Performance Indicators
% of new workstations/jobs at high risk
% workstations/jobs at high risk
# workstations/jobs with ≥ 10% risk score reduction
% reduction of MSD risk score

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Figure 2

Common Metrics				
Timing	**Site**		**Division or Corporate**	
Launch/ Year 1 Metrics	S1	% of People Completing Assigned Training	C1	% of Sites with Hierarchy Built Out for The Humantech System
	S2	% Targeted Job or # of Assessments Completed	C2	% of Sites with an Implementation Plan Completed
	S3	# of Improvements Implemented	C3	% of Sites with an Ergonomics Team
	S4	# of Engineering Improvements Implemented	C4	% of Ergonomics Teams with ≥ 4 Job Functions Represented on Team
Ongoing Metrics	S5	Improvement (*Points, %, or Just Documented Improvement*) in Annual Process Review Score	**C5**	% of Sites with Process Review Completed
	S6	% of New Workstations/Jobs that are High Risk upon Installation	**C6**	Overall Organization *<define percentage>* Reduction in Risk Score
	S7	% of New Workstations that were Evaluated with Ergo Design Guidelines Prior to Arrival/Installation at Site		*Any site level ongoing metric can also be appropriate to track at Division of Corporate level*
	S8	% or # of Jobs that are High Risk for the Whole-Body Assessment		
	S9	% or # of Jobs that have High MMH Risk		
	S10	% or # of Jobs that are High Risk at Least 1 Body Area		
	S11	% or # of Jobs with a <define value> Reduction		
Metrics Addressing Specific Issues	S12	% of Ergonomics Team Attending Meetings		
	S13	% of Job Assessments with Direct Causes Completed		
	S14	% of Improvements with a Targeted Date Assigned		
	S15	% of Improvements with a Responsible Person Assigned		
	S16	% of Improvements more than *<define time frame>* Overdue		
	S17	% of Improvements in "Waiting for Decision" Longer Than *<define time frame>*		
	S18	% of Improvements with a Decision Made within *<define time frame>*		

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Figure 3

Remember that metrics are not set in stone. Feel free to adjust to what isn't working for your executive team, ergonomics team and rest of the workforce. Switching metrics midyear is not a sign of failure; in fact, it helps highlight that you are engaged and flexible. Give metrics time to determine if they'll work for your teams, but don't be afraid to adjust. Often, making adjustments reinvigorates the process and will ultimately make it more successful. The worst thing to do when going down the wrong path is to not turn around.

Just as important as identifying the metrics is the way progress is communicated: How often? To whom? And how? Communication is the harmony of the song, an assist to make everything sound better. Good communication will bring everything together, improve popularity and ensure longevity.

Depending on the audience, you'll want to present information in different ways. Limit visual tracking to the key measures you want to highlight. For activity metrics specific to an ergonomics team, consider a simple color-coded scorecard (*see Figure 2*). They'll refer to this often to quickly understand if they're on track.

What about your leadership team? They won't want to get into the weeds of how a song is made, but they know a good song when they hear it. It's therefore important to present your leadership team with evidence of progress toward broader goals (*see Figure 3*).

Look for ways to present information based on the types of questions they'll ask: How much will this cost? When do we expect to see a return on investment (ROI)? How successful have we been to date? Do you need anything from me?

To be most efficient and impactful, metrics should be accurate, understandable, meaningful, scalable, actionable and in real time. Although leading measures provide an early warning system and are the most effective way to track the success of an ergonomics process, the best processes don't focus on a single metric.

Just as a song is much better as the sum of its individual parts, the same applies to ergonomics metrics: Use each to make the whole better. **EHS**

Christy Lotz, CPE, is director of ergonomics and senior global enterprise account executive with VelocityEHS, a provider of EHS software solutions.

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MSD Injuries are Affected by DE&I Culture

A recent report from the National Safety Council shows the relationship between an inclusive workplace and injuries.

By EHS Staff

Analyzing data on workplace injuries, the National Safety Council (NSC) found that workers of color face more work-related injuries and illnesses. The most common workplace injuries are musculoskeletal disorders (MSDs), so the group released on a new report entitled "The Intersection of DEI and MSDs: Ensuring Equitable Outcomes."

"At the National Safety Council, we believe fostering diversity, equity and inclusion is not only a moral imperative but also essential for creating safer and healthier work environments for all," said Lorraine Martin, NSC president and CEO, in a statement.

The research paper identifies workplace factors that can lead to inequitable MSD outcomes and provides solutions for mitigation. Key findings center on:

Work organization

Shift work, long hours and part-time employee status can impact the prevalence of MSDs among workers. Demanding work schedules can increase the risk of MSDs due to less time for adequate sleep and recovery from work, longer exposure to hazards and demands at work, and less time to attend to non-work responsibilities.

Other workplace factors highly associated with MSD risk and prevalence are the type of job and the pace at which work is done.

Workplace and equipment design

An employee who uses a wheelchair or an employee smaller than a fifth percentile female may have difficulty accessing the full range of their workstation depending on its design.

PPE has also traditionally been designed to fit the average white male and, as a result, females in the workforce are often not provided with properly fitting gear. One survey found that only 19% of women, non-binary and transgender construction workers received appropriately sized gloves and safety gear.

Safety culture

Creating a strong safety culture is an important factor in making sure workplaces are inclusive and safe from MSD risks. Workplaces that do not offer benefits, such as paid sick

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leave and long-term disability, may create an unsafe culture in which employees feel insecure about taking necessary time off when they have suffered a workplace injury.

Clear and accessible policies and procedures are vital to ensuring organizations are equitably protecting all workers from safety risks.

Psychological safety

Employee well-being at work is significantly influenced by a sense of belonging to the organization or team, with managers showing appreciation for their employees and involving them in decision-making.

Voice suppression can prove particularly harmful to employees of color, as they may already perceive their voices and opinions as less valued than the majority group. As a result of this disparity, Black and Hispanic workers report the most unease about reporting unsafe work conditions when compared to other racial and ethnic groups.

Psychosocial risk factors

Common psychosocial risk factors are job stress; lack of job control or autonomy; job dissatisfaction; time pressure; and poor organizational, supervisor, or co-worker support.

Occupational stress has shown to increase MSDs, with role conflict and lack of job control leading to wrist, hand, shoulder and lower back issues.

Further, these psychosocial risks are more pervasive in jobs and industries that commonly employ workers of color and female workers.

The NSC report also outlines potential solutions to address inequities and risks based on the hierarchy of controls, including:

- **Elimination:** Be mindful of jobs that demand high exertions, awkward or sustained postures and a fast pace. Eliminate them when able.
- **Substitution:** Adapt workplace design to those with different sizes and abilities. Provide ergonomic accommodations for employees with medical conditions or disabilities.
- **Engineering:** Provide adjustable assistive devices and technology (e.g., lifts, ramps, hoists, cobots, carts, counterbalances, turntables and conveyors) to minimize strain and repetitive motions. Incorporate designs respecting different cultural norms and practices.
- **Administrative:** Utilize policies and procedures to ensure accessibility for all workers, an open and anonymous reporting system. Promote diverse representation in safety leadership and training materials. Furthermore, seek and include feedback on job tasks and risk factors from a diverse group of employees to source solutions that are helpful for everyone.
- **PPE:** Routinely check in with employees to confirm PPE needs are being appropriately met, including those with different body types, abilities and religious or cultural preferences. EHS

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The Wild, Wonderful World of **Manufacturing Ergonomics**

Here are postures and movements to watch out for—and how to redesign work processes for fewer injuries and greater worker comfort.

By Scott Mullett

Ergonomics, at its core, is central to all that is performed in the workplace. It's much more than fitting the workplace to the worker. Ergonomics is the combination of engineering, biomechanics, psychology, sociology, design, complex problem solving and anthropometry.

Ergonomics encompasses the whole workforce of a company, and a focus on ergonomics is essential to reducing injury rates, creating a safe working environment and decreasing costs—all while increasing production.

When looking at manufacturing ergonomics, it's important to know that it is possible to improve the workplace. Much of the time, the work setting and processes do not change often. However, if an ergonomic risk factor occurs, engineering controls can be implemented and workflow processes can change to benefit workers and reduce discomfort.

Here are five awkward postures for workers to avoid and seven steps to help you initiate a successful ergonomics program.

AWKWARD POSTURES TO AVOID IN MANUFACTURING

Part of the challenge with manufacturing ergonomics is that work may involve repetition, forceful exertion or sustained body positioning, all of which pose a risk to proper body alignment.

Therefore, safety professionals should watch for these four postures. If found, they should consult with workers, engineers, operations, ergonomists and other key stakeholders to implement corrective actions. This may involve engineering changes or additional safety trainings, which could include a comprehensive stretch and flex program.

Arms above the head

Working with arms above the head could create several health issues, including muscle spasms, shoulder strains and shoulder inflammation—just to name a few. Positioning conveyors or other frequent tasks that take employees out of their power zone, the area between the mid-thigh and mid-chest height, is where injuries and accidents can happen. The power zone is where an individual can lift the most with the least amount of effort; elbows are at 90 degrees and close to the body.

Corrective actions include engineering solutions to lower tasks or equipment to accommodate working in the power zone.

Twisting back

The back allows for a maximum 35 degrees of rotation. Extreme twisting motions can result in muscle strains, disc herniations or bone spurs. It's important to educate workers about repetitive or extreme twisting motions when handling materials.

Corrective actions include redesigning an area to best accommodate the task or instructing employees to "dance" with the material to avoid twisting. This requires workers to handle the material in such a way that they are turning their whole body instead of their upper torso. For example, when placing an item on an adjacent shelf, one should move their feet and turn their entire body in one fluid motion.

Forward bending

The seemingly simplest of tasks can have the most devastating consequences, such as bending down to pick up something. Distribution of weight causes a tremendous amount of pressure and stress on the lumbar spine and back musculature.

Corrective actions may include lowering workstations, utilizing equipment (e.g., lift-assist devices and carts) or changing/redesigning tools if repeated forward bending is required to perform a task.

Non-neutral wrists

Here's a test: Grab something with a straight, neutral wrist and pick it up. Now perform the same task with a bent wrist. Notice the difference? Performing tasks that require workers to bend their wrists not only decreases grip strength but could lead to issues such as carpel tunnel syndrome. However, redesigning a workstation is not always needed.

Corrective actions may include education and additional training for workers. If it does come down to redesign, make sure that neutral wrists are accounted for. Grip strength is everything in manufacturing. Flexed or extended wrists will either shorten or lengthen the wrist tendons. Once this occurs, grip strength will be hindered. The key is to keep wrists straight, or like the position one assumes when shaking hands.

Frequent kneeling and squatting

Occasional kneeling and squatting throughout the day are normal occurrences. However, when kneeling and squatting become frequent, it can cause problems. As our bodies age, fluids that help lubricate our joints begin to dry up. A combination of frequent squatting to perform tasks and the natural process of aging could lead to osteoarthritis developing in the knees. What's more, frequent kneeling on hard surfaces could result in bursitis, a massive amount of swelling on the knee.

Corrective actions may include identifying job tasks that pose a risk to frequent kneeling and squatting, redesigning an area to raise it up (if possible) to prevent or counteract these movements, and fitting employees with knee pads if they need to perform a kneeling task.

PROBLEM SOLVING

Oftentimes, a safety or ergonomic issue arises, but companies are too late to address the concern. We live in a reactive world with little emphasis on being proactive, though, to be fair, forecasting is difficult. We cannot tell the future, and many companies do not want to spend the money to implement a control with unforeseeable risks.

As safety professionals and company leaders, we know that it is in everyone's best interest to identify these issues. This point is front and center with ergonomics concerns. They are generally considered lower priority items, yet they are some of the most expensive injuries encountered in the workplace. A proactive approach is core to accomplishing your ergonomic goals. Here are some tips to bring this all together.

Survey

Start with a simple survey. Ask workers a series of questions related to improvement of controls. Specifically, ask what they see as a benefit to improve a task, process or piece of equipment. Company-wide surveys are an essential part of applying ergonomic controls. Keep it anonymous for honest feedback. Focus on questions centered around the difficulties of certain tasks performed and discomfort experienced while at work. Use this information to perform a factory audit.

Factory audit

Once the data is collected, investigate employee concerns. In addition, review past data, including OSHA's Injury & Illness Recordkeeping Forms (Forms 300A, 300 and 301). Observe employee body positioning and mechanics. Ask yourself if engineering controls are required or additional education is needed. Utilize online ergonomic forms from OSHA to conduct a general assessment or an evaluation of the area to help identify ergonomic and safety concerns.

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Education and collaboration
From the factory audit, what have you discovered? Does the equipment need to be redesigned? Are employee body mechanics an issue? A quick overview of stretching or implementing a pre-work stretching session could be helpful for workers. If an engineering concern is present, collaborate with the engineering and maintenance departments about what can be done to correct this issue. Involve employees in the design and decision-making process, especially if engineering controls are needed.

Cost justification
When exploring possible solutions, it's important to consider the potential costs. Utilization of the OSHA safety pays estimator is a beneficial tool when comparing an ergonomic injury in relation to the expense of the control. The tool is geared toward manufacturing and offers a feature that incorporates the sales of that product to make up for the cost of an injury.

Consider the human factor
There's no question about it. Everyone's body is unique in many ways: height, weight, age, gender, health profile, etc. When looking to apply engineering controls to your setup, involve employees as much as possible. After all, they are the ones doing the work. Though often overlooked, employee involvement is center to successful implementation of controls.

Case studies
After implementation of controls, follow-up with workers. Ask them about what has changed and if those recommendations and/or controls are working. Before and after pictures are always helpful visuals to show progress. Present your findings to company leadership, and be sure to celebrate the success with the ergonomic control.

Continuous improvement
While not the most exciting of topics, implementing an ergonomic solution to a manufacturing floor can be a thrill. Take that momentum to the next level, and express your excitement to the rest of the employee base by presenting your findings and overall successes. Remember, ergonomics is an ongoing effort and does not stop even after a solution has been implemented. Continue observing tasks that employees perform, and conduct employee interviews frequently.

CONCLUSION

The whole process of identifying and implementing an ergonomic control can be a wild ride. However, with the right plan in place, successful implementation of ergonomic controls will reduce injuries, improve morale and keep safety your number one priority. **EHS**

Scott Mullett, M.A., AT, CEFE, is a board certified and state licensed athletic trainer and an employee at Ergonomic Consultants Incorporated. He has been an occupational athletic trainer for over 6 years, performing injury prevention and ergonomic services for several manufacturing companies in Ohio and Indiana. Previously, he practiced for six years as an athletic trainer within the secondary school setting.

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NIOSH Issues Ergonomic Recommendations

The agency offers suggestions on how to reduce musculoskeletal disorders at distribution centers.

By EHS Today Staff

The National Institute for Occupational Safety and Health (NIOSH) issued a report this summer on its findings with regards to ergonomic and musculoskeletal evaluation of a logistic facility. The agency made recommendations for that facility in Georgia, but they can be used as a blueprint for any facility.

The agency reviewed employees tasks, including picking, packing, processing, storing, loading and unloading.

During the visit to the Georgia facility, which employs 492, NIOSH completed the following activities:

» Observed work processes, practices and workplace conditions.

» Measured workstation heights and took pictures of workstations.

» Interviewed 43 employees about their work and their health. These included distribution process workers, material examiners, material identifiers and work leaders. Interview topics included job tenure, job tasks, relevant medical history, and musculoskeletal health symptoms and concerns.

NIOSH recommends providing workstations that adjust for sitting and standing based on employees' job demands. Other recommendations to reduce risks for musculoskeletal disorders include the following:

Ensure hand working heights on conveyors range from 38 to 49 inches. Also, consider where the employee handles the load (i.e., at the top, middle or bottom of the item.)

» Reach distances should range from 11 to 22 inches.

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» Provide tools, such as hooks, for employees to bring items closer to them without reaching or overextending.

Standing workstations are recommended if the job includes heavy lifting, long reaches or frequent walking. Adjust these as follows:

» Standing hand working heights should have an adjustability range between 38 and 47 inches or fixed at 42 inches. The display viewing height (i.e., the top of screen) should have an adjustability range between 58 and 71 inches or fixed at 66 inches. Viewing distance should have an adjustability range between 18 and 30 inches or fixed at 23 inches.

» Parts bins used during standing work should be placed in front of the employee. The reaching distance to the bins should be less than 16 inches. The bins' vertical height should be between 24 and 70 inches.

Seated workstations are recommended if the job is visually demanding. Adjust these as follows:

» Seated hand working heights should have an adjustability range between 27 and 36 inches or fixed at 36 inches. The display viewing height (i.e., the top of screen) should have an adjustability range between 35 and 46 inches or fixed at 46 inches.

» Seated workstation clearance should be greater than 18 inches for knee depth and greater than 30 inches for knee width.

» Parts bins used during work should be placed in front of the employee. Reaching distance to the bins should be less than 16 inches. The bins' vertical height should be less than 46 inches.

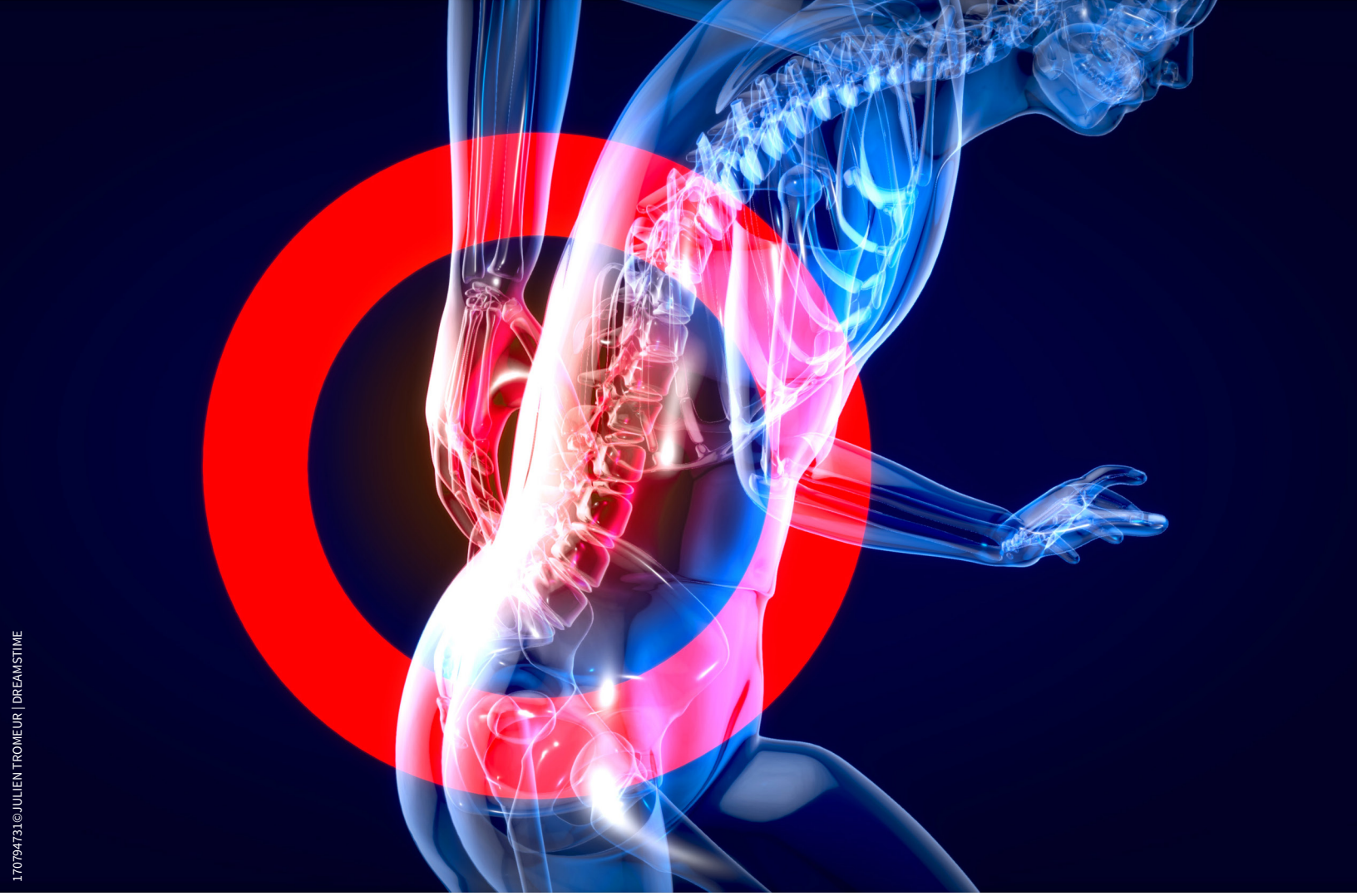
» A height adjustable chair with footrest can be provided, if needed.

Reorganize stock and place all large items on pallets to make it easier for employees using material handling equipment. Heavy items should be placed on lower racks to make it easier for two-person lifts.

Provide antifatigue mats for employees who usually stand as part of their job.

» Mats should be at least 0.5 inches thick. They should have an optimal compressibility (firmness) of 3%–4% and beveled edges so they are not tripping hazards. They should be at least 8 inches under a workstation to keep standing surfaces even.

» Mats should cover the entire area that employees move while performing their job tasks. They should be replaced when they appear worn out or are damaged. **EHS**



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Using AI to Take a Systems Thinking Approach to Ergonomic Risk Assessments

The next frontier of workplace safety requires taking a holistic view, especially in ergonomics, a process made possible by the advancements in artificial intelligence safety technology applications.

By Toni-Louise Gianatti

Humans are somewhat limited in the vast maze of workplace interactions. We don't possess computational brains, can't be omnipresent, and—while we think in patterns—tracking them in real-time is a challenge. These limitations underscore the pressing need for a more holistic approach to workplace safety, particularly in the realm of ergonomics.

To truly manage Occupational Health and Safety (OHS), we must embrace a systems thinking approach, which means observing the whole environment and the connections between its parts; it isn't just about isolated incidents, it's a dynamic interplay of countless factors, each influencing the other within the workplace.

While academic safety research has championed this comprehensive perspective, its real-world application often falls short. The human brain, though remarkable, has its boundaries. Remembering every detail, anticipating every risk and discerning every trend that could impact worker safety is beyond our singular capacity. We can't be everywhere at once, track every pattern as it unfolds or recall every detail.

But artificial intelligence (AI) can.

AI digests the plethora of data our senses encounter, then promptly compartmentalizes, categorizes and processes it all. Afterwards, AI presents us with a lucid road map of our organization's safety landscape while also highlighting areas needing attention, intervention or enhancement.

A new chapter in the Australian publication "*OHS Body of Knowledge*" provides an overview of the systems thinking approach to OHS, its theoretical underpinnings and core safety models, which emphasize its vital role in risk assessments.

Risk assessment, with its forward-thinking approach, complements systems thinking by diving deeper into understanding and mitigating potential threats to worker welfare. While systems thinking provides a holistic perspective, risk assessment zeroes in on the details, allowing for the identification of specific hazards.

When paired, these two methodologies can create a comprehensive safety framework, ensuring no detail is overlooked. Unlike accident analysis, risk assessment centers around the proactive identification of hazards and associated risks, estimating the probability of their occurrence.

With the integration of ergonomic AI technologies, safety programs have the potential to transform, as AI provides predictive insights and data-driven strategies. Combining a systems thinking strategy with advanced AI technologies refines the process of identifying, comprehending and managing ergonomic risks.

SYSTEMS THINKING IN THE CONTEXT OF RISK ASSESSMENT

Traditional risk assessments tend to offer a fragmentary view, centering on individual behaviors and identifying errors and faults arising from poor judgment or flawed beliefs. However, according to a recent paper by Read, et al., this isolated perspective is increasingly recognized as inadequate for truly improving safety and optimizing overall system and organizational performance. Instead, what is required is a shift toward systems thinking risk assessment, focusing on the intricate interplay of various human and non-human factors across all levels of a system.

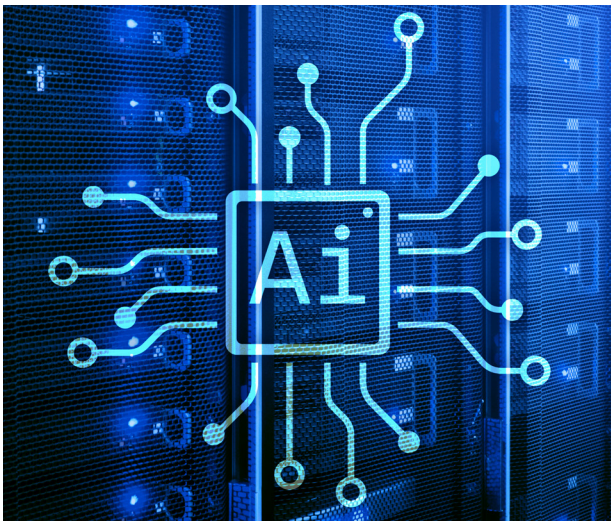
The core principles of systems thinking risk assessment involve holism, complexity and multi-scale factor interactions encompassing numerous interconnected components, such as workers, work processes, equipment, environment, organizational culture and management strategies. It acknowledges that anticipating potential loss events necessitates an appreciation of the whole workplace system as more than just the sum of its parts.

THE ROLE OF AI TECHNOLOGY ADDRESSING ERGONOMIC RISKS

Utilizing AI in OHS risk assessments significantly enhances the application of systems thinking. These technologies are adept at quickly capturing and evaluating work tasks, providing an in-depth insight into the entire work system. Through sophisticated algorithms, AI can immediately identify ergonomic risks, enabling prompt risk control actions.

The integration of AI with systems thinking shifts the perspective from individual error attribution to the recognition of systemic factors contributing to safety challenges. By efficiently processing complex datasets from work systems, AI offers invaluable assistance, turning the lens toward the intricate connections and broader patterns.

For example, by scrutinizing task sequences, AI may pinpoint that the location of a particular tool is a source of strain for workers. This goes beyond individual ergonomic risks and delves into how tasks, tools and employees are interconnected, potentially prompting changes, such as tool repositioning to optimize the workflow. Its keen observation can differentiate ergonomic threats across various employee groups. Such distinctions are crucial, as they reveal feedback loops and underscore the importance of tailoring training



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modules to address specific needs, ensuring uniform safety standards throughout the organization.

The depth of analysis also translates into understanding the subtler nuances of workplace dynamics. Noteworthy shifts in ergonomic issues or changes in organizational culture can be indicators of underlying systemic challenges, possibly pointing to lapses in addressing safety concerns or shifts in safety priorities. Similarly, when AI identifies patterns of resistant behaviors, it's sounding an alarm that the overarching system might be veering off the path of safety objectives.

It's important, however, to acknowledge the concerns of safety professionals about automation. Some fear that the rise of AI might render their roles redundant or distance them from the personal connections they maintain with workers. The truth is far from it.

AI is not here to replace but to augment and enhance the roles of safety professionals. Instead, they can be "virtually present" across multiple locations, ensuring safety standards are maintained everywhere without spreading their resources too thin. AI provides safety professionals with a broader and deeper perspective, equipping them with insights that might be difficult to glean with the human eye alone.

AI also allows for a more participatory approach where workers and safety professionals can collaboratively review

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real-time data, creating a shared responsibility. This helps workers to understand their environments better, while safety professionals can harness AI's insights to devise more effective interventions. By automating certain measurements and assessments, safety professionals can then focus on more complex tasks and strategic initiatives.

A crucial aspect of this development will be the collaboration among AI specialists, technology providers and safety professionals. This partnership will ensure the meaningful application of AI tools, grounded in a comprehensive understanding of work systems and their inherent complexities.

While the use of AI is still evolving, the synergistic application of combining these approaches will inevitably shape the future of OHS. At its core, AI gives safety professionals an opportunity to delve deeper into systems than ever before, unearthing intricate patterns and risks that might otherwise remain elusive.

We should not choose to remain entrenched in old methodologies when the safety of our employees hangs in the balance. As with other industries, the field of workplace safety should be agile, adapting and evolving at pace—if not faster. The stakes here are not mere numbers or profit margins, but the very livelihoods of individuals.

Embracing a holistic approach through systems thinking, and supercharging it with AI, isn't just a step forward for a company. It's a leap toward a commitment to the highest standards of welfare. It's more than a wise business move. It's a moral imperative. **EHS**

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How to Develop an **Ergonomics Program for Remote Workers**

It's important for employees to have a well-designed workspace to prevent musculoskeletal disorders, sprains and other ergonomics-related injuries. And, for a growing number of workers, that includes their home office setup.

By Ron Goodman

As COVID-19 spiked around the world in early 2020, companies shifted en masse toward remote work. Many organizations were telling themselves a story that things would revert to normal once the COVID-19 threat waned, but four-plus years later, it is clear the pandemic marked a turning point—not a brief pause in how we do business.

Data show the pandemic has changed the way employers and employees view the future of the office environment. Some organizations continue to seek hybrid options, while others see fully remote options as talent retention and recruitment tools. In fact, according to a 2022 study from Stanford University's Institute for Economic Policy Research, hybrid work options reduced attrition rates by 35% for a large technology firm.

For those whose jobs can be performed from home, over half of employees report a preference to work fewer than three days a week in the office.

Despite these benefits, many work-from-home environments are fraught with health and safety risks. To protect employees from injury and guard against skyrocketing workers' compensation costs, employers must prioritize the safety and well-being of their at-home workforce. This starts by addressing a primary risk posed by remote work: poor ergonomics.

It's common to hear about home-based employees slumped over a laptop while sitting on a couch or awkwardly situated at the kitchen counter or table. Often, remote workers lack access to adjustable office equipment or knowledge of how

to optimize their home environment to achieve an ideal ergonomic setup.

To make matters worse, workers may find themselves logging more hours at home in these uncomfortable body positions. In environments with unmanaged ergonomic risks, rates of occupational injury will climb. We typically associate wrist and hand injuries with computer work, but the risk is actually also common for the lower back, shoulders, neck, eyes, elbows and forearms.

"It's a growing problem," says Katherine Mendoza, EHS director with the National Safety Council. "This is an opportunity for companies to start thinking about it."

Experts argue that ergonomic injuries normally take six to 12 months to develop, making early detection and proactive interventions important. Indeed, as early as mid-2020, 41% of all workers were already reporting new or increased pain in their shoulders, back or wrists.

Increased pain, discomfort and injuries negatively impact employee morale, well-being and productivity. Beyond the individual harm, ergonomics issues can also contribute to high direct and indirect costs that affect company operations and financial performance.

"Adopting a culture of prevention is critical in this new environment since it enables companies to detect early warning signs of problems, such as pain and discomfort, and to take action before injuries can develop," says Kevin Costello, ergonomist and president of New York-based U.S. Ergonomics.

The collection of accurate, real-time data on employee work behaviors and risk exposure was key for managing office ergonomic risks before the pandemic. But when employees are effectively invisible working remotely, gathering accurate real-time risk data becomes even more necessary.

In order for a company to be effective at managing ergonomic risk, it must have visibility into what is happening within the workplace, even if that workplace now extends into employees' homes. When an organization lacks this visibility to risk, it becomes increasingly challenging to detect poor employee workstation setups or at-risk behaviors as well as provide recommendations to address these concerns.

Digital solutions that engage employees in the regular assessment of risk and empower them to address these issues early can be the difference between controlling injuries or being controlled by them. When determining what software solution can help you manage ergonomic risks among your remote workforce, here are four ideas to keep in mind.

1.INVITE EMPLOYEES TO PLAY A ROLE IN MANAGING RISK.

Many employees are unaware that specific behaviors or even the design of their workstations can increase the risk of a

soft-tissue injury. Often, the first step in managing ergonomic hazards is being educated on where hazards exist in the working environment.

When considering a software solution, it's crucial to select one that offers tools to help increase employee awareness of ergonomic risk while also enabling employees to assess their own level of risk exposure by considering their personal working behaviors and workstation designs. Moreover, these tools need to help guide employees on corrective actions. Platforms that help highlight critical concerns and focus attention on issues relevant to the individual worker are immensely useful in getting—and keeping—employees involved in occupational health and safety programs.

2. PROMOTE SELF-AWARENESS AND BEHAVIOR CHANGE.

Simply designing more ergonomically-sound workstations will not guarantee an injury-free workplace. People can still adopt poor postures and unsafe working behaviors in an ideal working environment.

Therefore, employers need to consistently engage employees and encourage them to continuously assess how they are working, how it might impact their risk exposure and suggest changes to ensure hazards are being actively managed. Encourage employees to drive this level of self-awareness and behavioral self-reflection to empower them to take corrective actions.

Software solutions that monitor working patterns and encourage regular breaks with movement can be effective at promoting increased circulation and reduced muscle fatigue. In addition, tools that increase body awareness, such as noticing seated postures or wrist position on a keyboard, can help reduce static positing that can lead to stiffness.

It is important to note that these solutions will only be effective if they are sophisticated enough to work with employees rather than creating resistance. For example, activity-based reminders are better-received than time-based ones. Ensuring that employees can continuously assess their ergonomic risk exposure and make small adjustments in how they work helps to create a culture of continuous improvement.

Resolutions may be individualized, but a formal ergonomics system introduces an underlying culture of acceptance and awareness. When employees experience company-provided prompts for body awareness and mental health breaks, they may feel less stigma around raising an ergonomic-related issue with a supervisor or colleague.

3. FOCUS ON THE INDIVIDUAL.

Managing ergonomic risks sustainably requires employee ownership, as your ergonomic experts can't be everywhere at once. Leveraging technology to personalize your ergonomics program ensures that solutions and data are relevant to every employee. A personalize approach gives every employee agency to not only find problems but to fix them, too. After all, employees who are actually exposed to the hazard have the most to gain by improving their office ergonomics.

Any ergonomics software solution under consideration should include features that help guide and empower employees to resolve identified risks, including the ability to create individual action plans that offer research-based recommendations on how employees can easily and cost-effectively address risks by themselves. Ideally, when the software detects an issue, employees will have a way to take immediate actions, such as contacting someone at their organization or an external safety expert.

And while ergonomics recommendations need to be personalized, aggregating data from across the system is powerful, too. If you can show all employees how ergonomic risks are identified, assessed and resolved, it will help gain buy-in and ensure future successes.

4. PROVIDE EMPLOYEES WITH FEEDBACK LOOPS.

Finally, a good solution will include ways for employees to close the loop by indicating when and how an ergonomics issue has been resolved or is being addressed.

Ongoing reminders allow employees to reflect on their progress, receive refreshers on the importance of certain ergonomic adjustments, and prioritize their mental and physical health in more bite-sized ways. Over time, microlearning enables greater awareness of ergonomics concerns to reduce injuries and keep those instances low. Employees can also report back with ways they have addressed and managed potential risks, helping to strengthen an ergonomics program over the long term.

FINAL THOUGHTS

"The solution doesn't have to be a new desk or chair," says Mendoza of the NSC. "There are a lot of fantastic solutions out there to decrease the risk and make the employee more comfortable. It's hugely important to engage employees as part of the solution."

The success that many of our clients have had at reducing ergonomic risks across their workforce is because they focused on employee engagement. They designed their ergonomics program to be easy-to-use, relevant and appealing. Their program also prioritized employees' needs and interests.

High-performing organizations that deploy a workforce-driven ergonomics program and successfully engage employees will not only be positioned to overcome the challenges of keeping remote employees safe; they will also be better equipped to adapt to whatever workplace changes lie ahead. **EHS**

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Ergonomic Considerations for **Hybrid Workers**

The workplace is changing. Here's what you need to know to keep workers safe, comfortable and in proper alignment when they come to the office.

By Anand S. Iyer, Brandy F. Miller and Jeffrey E. Fernandez

COVID-19 has significantly disrupted office work. The implementation of telework during the pandemic allowed employees to remain productive while mitigating risks related to COVID-19.

During the pandemic, companies reacted swiftly and with great conviction to adapt the culture of work to keep up with changing guidance. However, frequent lockdowns, waves of infections and several COVID-19 mutations have forever changed the nature of work—along with how companies react to a variety of risks.

The widespread usage of telework has provided a way for workers to be effective and efficient whether at the office, home or any other remote location. Companies have realized that not all employees have to be present at the same office location, at the same time, to conduct business operations. Rather, teams can get many work tasks efficiently completed from a remote location and on an asynchronous schedule. As a result, some companies have even gone from working entirely in the office to 100% home-based operations with little or no effect on their business operations.

As companies continue to make changes to their business model and prepare for the future, they need to consider which culture changes to continue and which will return to the pre-pandemic model.

Because of the success of telework, many organizations are continuing with a hybrid schedule. To accommodate hybrid work, safety and facilities personnel are assessing a new set of scenarios related to having fewer employees on-site at any given time. This allows for the possibility of using less real estate so that employees who are needed on-site at any given time are provide the required office space along with employees who are still inclined to work from the office. To that extent, many businesses have already reduced their footprint by liquidating excess office space.

The challenge of this new arrangement is determining how best to optimize productivity for both the physical and telework workspace while making sure employees are operating in a comfortable setting.

Ergonomics is the science that fits the task to the worker. Too often, employees perform tasks in hazardous postures or environments that may cause them injury, either immediately or over time. The main work-related health problems affecting office employees are pain, discomfort, stress, visual fatigue and even injury. These can be the result of sedentary work, highly repetitive tasks and working in awkward positions due to an incorrect workstation set up.

Improving ergonomics at the workplace can address many of these issues while positively impacting your bottom line. Effective ergonomics programs benefit both employers and employees through improved health and safety, higher productivity, and lower costs.

If your organization is considering or has a hybrid work model, here are three questions to ask yourself as you weigh how best to keep employees safe.

1. WHERE CAN TASKS BE MOST EFFECTIVELY COMPLETED?

With a hybrid model, managers should consider which tasks should be performed in each location (on-site versus telework). Understanding each environment and their unique characteristics can help improve the efficiency of each location.

In the telework environment, employees can focus on tasks that require minimal interaction. Work that is solitary or work with people at different locations may lend itself to being completed primarily during telework times. Solitary work can also be performed on-site as needed but does not take advantage of the opportunity to work with others that is inherent to the office.

Conversely, on-site work allows for collaboration, planning and face-to-face interaction. Therefore, tasks that require collaboration may be most appropriately scheduled on days when key employees are in the office.

When hybrid schedules are slightly flexible, employees can coordinate their on-site days so that they can schedule their work together. It should be noted that some tasks, such as internal or external customer facing tasks, may require some employees to be on-site every day.

2. HOW CAN WE OPTIMIZE SPACE WITH ON-SITE WORKSTATIONS?

Understanding the primary tasks performed during on-site days is critical to make the best use of office space. Planners, ergonomists and safety professionals should use this information to ensure that employees can perform work tasks safely and efficiently.

The hybrid workplace requires that both the telework location and the on-site work location accommodate employees' needs.

When setting up any workspace, the goal of ergonomics should be kept in mind: to fit the tasks performed to the capabilities of the human. One way this can be done is to adhere to the design acronym N-E-W (neutral posture – elbow/eye height – work area) to guide workstation setup.

When employees work a reduced number of days on-site, it may allow for more efficient use of space through shared workstations. There are a number of ways that organizations can address this shared workplace environment, including:

- » assigning the shared desk locations to individuals based on need;
- » making them available for reservation based on workstation characteristics; or
- » having them be on a first come, first served basis.

3. HOW CAN EMPLOYEES AND MANAGERS BE ERGONOMICALLY AWARE OF WHERE THEY WORK?

No matter which method is used, it is important to ensure the workstations accommodate the range of employees who could use potentially them. This can be done by either ensuring the workstations include built-in workstation adjustability or through an A-B-C type approach.

Built-in Workstation Adjustability

Fully adjustable workstations have built-in adjustability to accommodate the majority of employees who may use a workstation. This may include:

- » dual monitors with mounted "arms" that can be adjusted for optimal height and viewing distance;
- » a workstation that can adjust from seated postures to standing postures; and
- » a chair that allows for key adjustments, such as seat pan depth, lumbar support, seat height, armrest width and seat pan height.

Furthermore, each workstation should have ergonomic friendly peripherals that includes (but is not limited to):

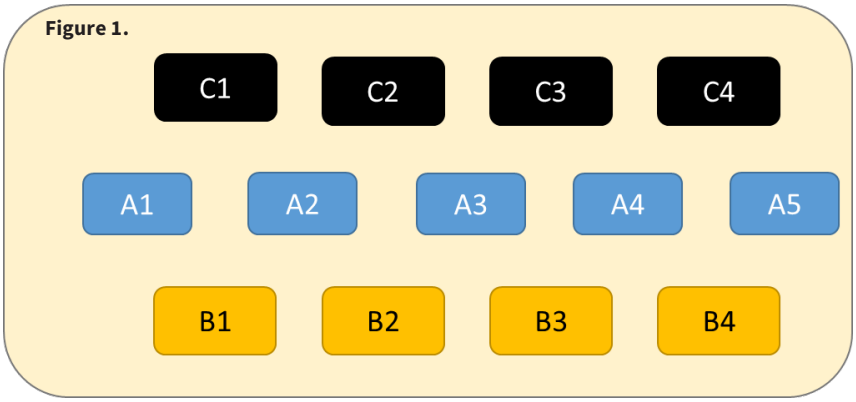
- » a docking station that is compatible with employer-provided technology,
- » power outlets that are available on the top of the workstation (to eliminate the need for people to regularly plug in items under the workstation), and
- » an external keyboard and mouse.

Organizations can reuse existing furniture for these workstations, but they must incorporate as much adjustability as possible so that employees can arrive at the workstation, quickly make the necessary modifications and begin working.

Along with any built-in adjustability, employees should be trained on the proper adjustment and alignment of the equipment. Employees should work with their monitors positioned so their neck is neutral (straight), their keyboard and mouse are positioned close (primary work area) and at elbow height, and their feet are on the floor or a footrest.

For employees who need additional accommodations, it is the company's responsibility to provide the necessary workstation modifications so that employees are in line with the N-E-W principle. For example, the company may need to purchase additional chair models for employees of a certain height and/or weight who are not served by a standard chair.

Figure 1.



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Sample spatial arrangement of workspace by A-B-C categories

A-B-C Workspaces

When built-in workstation adjustability cannot accommodate the range of employees who need to use a workstation, employers should develop an A-B-C approach. This approach divides the available workstations into sets that are adjusted to fit employees of all sizes.

Employees are measured and then instructed to use those select workstations that match their measurements. In practice, this means that a single work area would include workstations of each predetermined size to accommodate all workers. For this concept to be successful, two activities should be conducted:

- A map of the entire work area needs to be cataloged with the dimensions, features, and adjustability for the workstations, seats, and peripherals.
- Employees must have pertinent anthropometric measurements (e.g., sitting/standing elbow height for work surface height, popliteal height, etc.) taken so they can be categorized and educated as to which workstation cluster is most appropriate for them.

For example, one organization implemented such a strategy and arranged desks so that the work surfaces were 25 inches, 27 inches and 29 inches (*see Figure 1 for a sample layout*). The seated elbow height for all employees within the organization was then measured, and they were coached as to which workstation height group would be most appropriate for their use.

IT considerations for external monitors, keyboard/mouse, docking stations and power on the desktop should also be included at each workstation. Additionally, the implementation of footrests may be needed for individuals whose feet do not reach the ground to allow them to work in a neutral ergonomic position at some workstations. As with the adjustable workstations, additional considerations are needed to ensure that individuals who do not fit into those sets are provided appropriate ergonomic workstation modifications.

ACKNOWLEDGE AN ENVIRONMENT OF CHANGE

As organizations navigate a changing environment, it is important to remember that the way each employee works is also changing significantly.

For some, teleworking has introduced flexibility and additional short work breaks into their schedules, so coming to the office may mean being tied their desks for a longer duration. For others, teleworking has required them to be tied to their workstations for almost continuous virtual meetings, so coming to the office may provide additional breaks as they move between conference rooms or in-person meetings.

As employees adjust to a hybrid schedule, it is important to ensure that everyone follows proper ergonomic principles. Furthermore, companies need to guarantee that necessary workplace modifications are available and provided to individuals with special needs. These accommodations must remain compliant with all the federal and state regulations. It is important for individuals who have a history of related injuries, such as musculoskeletal disorders and other disorders, to seek the assistance of a certified professional ergonomist (CPE).

With careful planning, consideration and training, employees can continue to work productively and safely in a hybrid work environment. **EHS**

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