9 Essential Questions To Ask Before Buying an Anti-fatigue Mat

By Allan Shelley, SATECH, Inc.

Good ergonomics is good business. According to a recent productivity study in the Journal of the American Medical Association (JAMA), November 12, 2003 – Volume 290, No. 18: "Lost productive time from common pain conditions among active workers costs an estimated $61.2 billion per year [in the U.S.]…while at work and not work absence." The use of ergonomic / anti-fatigue / stress-reducing mats is considered a critical means to alleviate the pain associated with standing work and, as a result, reduce the exposure to L& I claims and increase productivity.

How should you go about evaluating anti-fatigue matting and implement a working surface that offers the best health and safety benefits as well as the best value? Here are 9 essential questions to consider before buying anti-fatigue matting that apply to any product, regardless of the manufacturer. These questions are based on a broad analysis of research data* relating to the effectiveness of standing/working surfaces and their impact on reducing fatigue and injury as well as their ability to increase productivity. Recent research has spawned a new generation of work surfaces and indicates the optimal surface is based on a combination of critical elements working in concert and not softness alone.

Question 1
Has the mat been optimized for Softness and Hardness?
The elastic modulus (compressibility) of a material is a global measure of mat firmness and is one of the most important test results in evaluating product performance. It is measured in Mega Pascals (MPa) a measurement of pressure, with the optimal range of firmness to reduce fatigue between .6 and .9 MPa.

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A standing surface that is too soft can increase fatigue (example: standing on a mattress); a surface that is too hard or bottoms out easily may be only slightly better than standing on nothing. Overly soft surfaces also tend to wear out more quickly.

There are many so-called ergonomic/anti-fatigue mats that appear to have as their primary feature a claim of being the "softest" or "plushest" in the market. These mats fall well outside the optimal parameters for reducing fatigue, and in fact may increase fatigue and the likelihood of injury due to surface instability that causes excessive body sway or lower extremity shifting over time. Usually, thicker softer matting material creates a greater trip hazard and wears out more quickly. Softer isn't necessarily better when it comes to reducing fatigue and injury.

SmartCells mats, runners, platforms and cushioned floors are engineered to very specific parameters that reflect the latest research on optimal compressibility.

Question 2
Does the mat provide an adequate balance between instability and stability?

There needs to be enough instability to encourage small postural changes that facilitate increased blood flow to and from working muscles, but not so much that it requires excessive muscular activity that might accelerate fatigue. Extreme levels of instability, caused by overly soft mats, increases the risk of loss-of-balance as well as affects overall body posture. Too much instability can increase subtle additional muscular activity as the body works to retain balance, accelerating fatigue levels. Fatigue-induced deterioration in postural stability (balance) may lead to an increased risk of slips, falls and workplace accidents when workers are tired or experiencing discomfort.

Additionally, too much instability can cause or worsen musculo-skeletal conditions in the back, hips, knees, ankles and feet, and make painful conditions like plantar fasciitis even more debilitating.

Extreme levels of stability, on the other hand, are often found in too-hard mats. Overly soft mats that bottom out, or unusually hard mats, do not encourage subtle muscular activity and increased blood flow to keep the muscles optimally serviced with nutrients and waste removal. The lack of circulation causes the pooling of blood and painful swelling in the lower extremities, which can lead to or exacerbate debilitating physical maladies like varicose veins. Swelling can restrict blood flow to the muscles, further reducing their supply of nutrients and oxygen and causing them to fatigue more rapidly. Extremely stable mats also create pressure points causing discomfort and over-fatigue of certain muscles. The optimal balance of instability and stability is critical and works in concert with optimal compressibility.

SmartCells mats provide a stable surface supported by unstable cells that 'soften' as needed in response to surface activity.

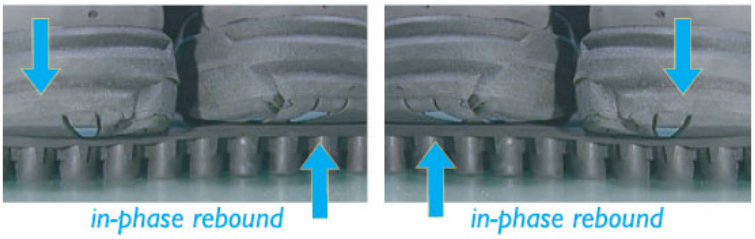
Question 3
Does the mat resist bottoming out without being too soft?
Although a surface may have adequate compressibility, it must also be appropriately thick. A mat that is too soft and easily bottoms out begins to act like a mat that is too hard because the cushioning material becomes fully compressed.

Current data suggests that mats should have a bottoming out depth greater than 5 mm and a thickness greater than 10 mm. This is called the "densification strain" (bottoming out point as a percentage of thickness) and must exceed 50% to produce the best results, unless the mat is too soft. In other words, a mat may have an appropriate ratio: thickness/bottoming-out depth, but if it is too soft this value becomes unimportant due to the overriding problems associated with mats that are too soft. Optimal bottoming-out depth works in concert with an optimal balance of stability and instability, and optimal compressibility.

SmartCells mats have been optimized to resist bottoming out without being too soft.

Question 4
Does the mat adequately respond to worker movements?
A responsive mat should rapidly return to its original shape as weight is shifted. If a mat has a delayed "rebound" it will likely already be partially compressed as a load is repeatedly placed on it, reducing its ability to provide the most effective benefit of its elastic modulus. A surface that is slow to respond is prone to bottoming out.

If the return is actually "in-phase" with the movement, less energy may be used as the mat "helps" with movement, much as a spring would assist. Adequate responsiveness works in concert with optimal bottoming-out depth, optimal balance of stability and instability, and optimal compressibility.



SmartCells rebound instantly as weight is shifted

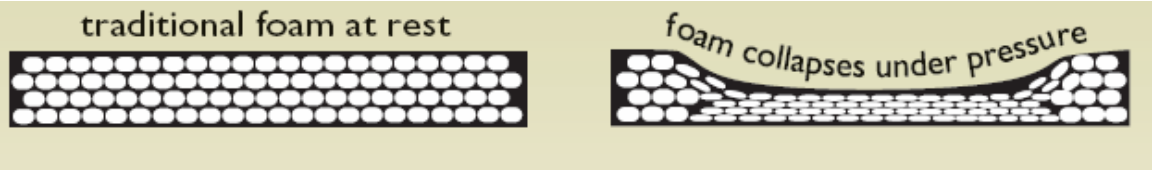
The SmartCells technology has been designed to be "in-phase" with the movements of the body, providing a remarkable anti-fatigue characteristic that actually "helps" every subtle and overt movement involved in standing

Question 5
Does the mat balance shock attenuation (absorb energy) and resilience (return energy)?

The ability to attenuate or absorb shock without bottoming out ensures that the impact of falls and sudden movements on the mat are cushioned adequately without causing injury. Too much absorption however may create the same sensation as standing in sand, which may absorb shock but is very uncomfortable as a working surface. When balanced with the right amount of elasticity (resilience), a mat can result in less discomfort.

SmartCells mats provide an optimum balance between shock attenuation and resilience.

Question 6
Does the mat get softer as it is compressed?
There appears to be a popular yet faulty logic that reasons if a hard surface is bad to stand on, then a soft surface is good. In response to this erroneous assumption, many mat surfaces are constructed from foam materials. Regardless of the variations in construction, from domed foam geometries to draped top-covers with various surface textures, there is one challenge shared by all foam-based mats: foam gets harder as it is compressed.



So, if the objective is [merely] to provide a softer surface, why do it with a material that gets harder as it is walked on or stood on? On the other hand, some mats are made of difficult to compress materials and lack the advantage of compressibility provided by foam.

SmartCells get softer as they are compressed, without bottoming out.

Question 7
Does the mat resist movement under use?
A clean, dry floor is one of the best deterrents to a sliding mat, but not always a likely reality. The material from which a mat is made can also contribute to a mat that moves easily across the floor. Some foam formulations break down readily, creating a slippery layer of fine "dust" between the mat and the floor. If these mats are draped with a hard finish, the user may be unaware of the degradation of the material, as the top surface may still look good. Also, many mats are so light-weight that they shift easily and become a trip hazard as items roll over them or as they are kicked or bumped.

SmartCells mats are significantly sturdier than light-weight mats, and resist movement, yet are easily removed for cleaning.

Question 8
Is the mat easy to clean?
Foam based mats, mats with rough, domed or uneven surfaces, or mats with through-holes may be difficult to clean, absorb moisture or trap foreign matter, which leads to unsanitary and unsightly conditions. In food preparation areas, especially where heavy wear-and-tear occurs, foam mats that are sliced, cut or torn can easily trap food

particles and bacteria in their ruptured foam cells that are almost impossible to thoroughly clean. Health Inspectors may react harshly to this unsanitary situation. Mats made of material other than closed-cell foam tend to be easier to clean if sliced, cut or torn.

The SmartCells mat surface can easily be swept or vacuumed. Pressure washing with soap and water is also easy and does not damage the mat.

Question 9

Is the mat durable? The real value of an anti-fatigue solution may be more apparent when analyzing the number of replacement cycles that result over a specified time period. Many mats are replaced after only a few months or a few years due to damage. Although it may not be visible to the naked eye, the thin cell walls of foam mats can rupture and lose their elasticity with use, leading to an overly soft condition and a mat that easily bottoms out.

Foam can break down, become raged and generate particulates over time. Also, many mats today are prone to edge damage because of thin edges or the softness of their material.

Draped top-covers can curl and tear as they become brittle. Mats with damaged edges create a trip hazard and should be replaced. The edge system of a mat should be designed to be durable so it is not easily damaged.

The SmartCells anti-fatigue mat has been designed to last for many years; to resist edge damage, tearing and premature failure of its elastic properties.

SmartCells mats come with an 8-year limited warranty.

So, there you have it: 9 essential questions to ask before buying an anti-fatigue mat. Research has enabled us to create a new generation of technology that not only saves us money but can also truly reduce fatigue and injuries, and increase productivity, which is where the real value resides.

Summary of optimized mat qualities:

1. Optimized for just the right softness
2. Encourages appropriate blood flow in the lower legs
3. Resists bottoming-out
4. Provides energizing response to worker movements
5. Balances shock absorption and resilience
6. Gets softer as compressed
7. Resists warping, bunching and creeping
8. Easy to clean surface
9. Durable structure and edges

For more information about the SmartCells technology and to arrange for a **free trial**, please contact:

SATECH, Inc.
PO Box 1264
1769 Bishop Road
Chehalis, Washington 98532
phone: (360) 748-8711
fax: (360) 709-9704
email: info@satechinc.com

*The published research of the following scientists was considered in establishing the criteria for the 9 Essential Questions as well as the backbone of the SmartCells technology:

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