

New technology needs new rules

The changing face of the office and the new challenges posed by how we work



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Introduction



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Life as a DSE administrator used to be much more straightforward. It wasn't so long ago that our employees used a fixed computer on a fixed desk with the only exceptions being laptop users and homeworkers.

How things have changed. The speed of technological development is quickening and, while this new technology can help improve productivity, there seems little regard for how our workers are responding to this technology in terms of comfort.

The equipment we use at work is getting smaller, lighter and increasingly portable. Computers have given way to laptops, in turn tablets are becoming the tool of choice and who knows how we will embrace smart watches? Each time our technology evolves it seems to place us in increasingly poor positions and engage us so much that we spend more time than we expect using them.

It isn't just technology that is changing; our place of work is changing too. Most of us will have queued in a coffee shop while checking our devices for emails; hotel lobbies seem filled with business travellers working sitting in apparently comfortable chairs that were never meant for business use.

So, with the parameters of our roles changing so quickly, it is comforting to know that researchers are able to keep us up-to-speed with best practice use, right? Wrong.

While research has been undertaken, it is somewhat limited in its workplace application. In terms of tablet use, there doesn't appear to be a safe way to use them, just a less risky way.

Cardinus is fortunate to work with academics around the world, with regulators, equipment suppliers and workplace practitioners. As a result, we are able to bring together the best guidance and advice to help in your workplace. This white paper provides you with the latest news, with tips and tricks you can apply and more. I hope you find it useful.

Jon Abbott
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Background

New smaller and more portable devices such as laptops, tablets and smartphones are supposed to make work easier, more accessible and therefore make us more productive. However, because it is harder to find a good posture to use these devices, the risk to the user of discomfort, fatigue and therefore reduced productivity is increased and needs to be managed.

It's a fact of life – technology will always be ahead of good practice advice and legislation. Legislation and guidance is often slow to be published as we all wait to see how popular new technology will be, the impact it will have on the way we work and the risk it therefore poses from a discomfort and health perspective.

This poses a challenge for managing the risk. We can't see the future but we are able to help with good practice advice on emerging technology and business practices. Some of this advice is strategic for you to consider when planning for the risks each modern technology poses, while other advice is common sense information that should be passed to users.

The changes we see in the workplace can be divided into two distinct categories: changes driven by the gadgets themselves – the technological changes; and the behavioural changes – the changes to our patterns of work and lifestyles.



Work-related upper limb disorders

In our previous whitepaper entitled *Managing Work-Related Upper Limb Disorders* we included a very useful definition of this term along with some detail on some of the most commonly occurring conditions that fall under this category of injury. I repeat this below as a guide for consideration when we look at the potential risks some of the new technology and work trends could pose.

There is no rigid definition of Work-Related Upper Limb Disorders (WRULDs) but the term encompasses conditions that have certain characteristics. The term is normally used to describe such conditions as:

- Disorders of muscles, nerves, tendons, ligaments, joints, cartilage or the spinal column
- Conditions that are not caused by a single, instantaneous or acute incident but are the result of longer-term or chronic exposure to a causal event
- Disorders which can range in severity from mild or occasional discomfort to severe, continuous and potentially disabling conditions
- Conditions which may display several distinct features such as carpal tunnel syndrome which manifests as discomfort throughout the hand, arm and shoulder
- Conditions that are defined by a specific body location such as lower back pain

Common examples of WRULDs include the following specific conditions:

- De Quervain Syndrome
- Carpal tunnel syndrome
- Tenosynovitis
- Tendonitis
- Epicondylitis
- Vibration white finger
- Bursitis
- Lower back pain

De Quervain Syndrome

Commonly known as BlackBerry thumb, this is a form of repetitive strain injury (RSI) caused by the frequent use of the thumbs to press buttons on PDAs, smartphones, or other mobile devices. The medical name for the condition is De Quervain Syndrome and is associated with the tendons connected to the thumb through the wrist.

Causes for the condition extend beyond smartphones and game consoles to include activities like golf, racket sports, and lifting.

Symptoms of BlackBerry thumb include aching and throbbing pain in the thumb and wrist. In severe cases, it can lead to temporary disability of the affected hand, particularly when gripping objects.

Carpal tunnel syndrome

This results from repeated hand or finger movements when the wrist is bent. The tendons that transmit motion from the fingers through the wrist to the arms pass through the carpal ligament or 'tunnel', along with the median nerve.

If the wrist is flexed while repeated hand or finger movements are made, friction at the carpal tunnel will lead to inflammation and pain.

You will see later that carpal tunnel syndrome can be caused when using a touch screen device angled up on a flat surface such as desk



Work-related upper limb disorders

Tenosynovitis

This is inflammation of the fluid filled sheath (synovium) which surrounds the tendons and can result from friction between the tendon and the sheath. This can be caused by repetitive motion when the joint is flexed. In the hand, this can cause the finger to stick in a flexed position; this is known as stenosing tenosynovitis or "trigger finger".

Tenosynovitis can be treated by use of cortisone injections followed by a course of painkillers. Surgery can be carried out to increase the diameter of the sheath and lessen the risk of friction. This will require splinting of the hand for at least a week.

Tendonitis

This is inflammation of the tendon itself caused by overuse or injury. It can affect tendons in the shoulder, elbow, wrist, finger, knee or heel and causes severe pain in the affected areas. In the case of those tendons that are enclosed in a synovium, both tendonitis and tenosynovitis can occur at the same time.

Tendonitis is not confined to work-related causes but can result from other activities such as sport. Treatment is mainly palliative and includes application of ice packs supported by rest or nonsteroidal anti-inflammatory drugs such as ibuprofen.



Epicondylitis

This condition, more commonly known as 'tennis elbow', 'golfers elbow' and more recently 'iPad elbow', is caused by overuse of the muscles in the lower arm which are attached to the elbow. These muscles, the wrist extensors, allow the hand to be pulled backward. Symptoms include the outer part of the elbow being painful and tender to the touch and lifting movements being painful.

Treatment is similar to that for tendonitis.

Vibration white finger

Also more correctly known as Hand-arm Vibration Syndrome or Raynaud's disease, this condition results from excessive use of vibrating hand-held machinery. This affects the blood vessels, nerves, muscles and joints of the hand and wrist, producing blanching and numbness in the fingers. In mild cases this affects only the finger tips but in more severe cases the whole finger down to the knuckles can become white with associated loss of feeling. This can result in loss of manual dexterity, particularly in colder weather, and in extreme cases can require the loss of a finger.



Work-related upper limb disorders

Bursitis

This condition arises when bursae (sacs of synovial fluid which provide lubrication at points in the body where muscles or tendons pass over bone such as elbows and knees) become inflamed. This results in pain and difficulty in moving the joints where the bursa is inflamed. The most common causes are repetitive motion and excessive pressure, mainly in the elbow or knee, hence 'housemaid's knee'.

Normally the treatment is palliative and includes ice compresses and anti-inflammatory drugs.

Lower back pain

This is experienced as pain between the bottom of the rib cage and the top of the legs.

Lower back pain results from damage to the vertebrae, nerves, muscles, ligaments and discs in the L1 – L5 lumbar region of the spine which supports the whole weight of the upper body and any additional load which you may be carrying. It is, therefore, under constant pressure but additional stress will be created through actions such as bending, twisting or lifting. Activities which can result in lower back pain include:

- Bending awkwardly
- Manual handling of loads
- Poor posture when seated
- Over stretching
- Poor driving posture
- Driving with insufficient breaks

The pain will normally last from a few days to a few weeks but will then heal itself, given suitable exercise. For normal acute cases treatment would consist of painkillers such as paracetamol or an NSAID (Non-Steroidal Anti-Inflammatory Drug) such as ibuprofen. In very severe acute cases a muscle relaxant such as diazepam may help. However this can have unwanted side-effects. Chronic cases of lower back pain can be treated in similar ways but physiotherapy may be recommended and surgery may be appropriate in specific cases, e.g. fusion to treat a prolapsed disc.

A common feature of all these work-related upper limb disorders is that they can be caused by the need to carry out a task involving movement of loads and/or repetitive actions. As a result the people most commonly affected fall into two groups:

- Manual workers whose work involves repetitive actions
- Workers operating at computer workstations



Technology trends

The constant introduction of new technology that is smaller, more powerful and more versatile is probably the biggest driver of change. Let's look at the big tech shifts at work and how we should be dealing with them.

Laptops replacing desktop PCs

Laptops aren't new technology but as companies adopt a more flexible way for their employees to work, the old desktop PC is being replaced with the more portable laptop.

Laptops were not originally designed to be an employee's main computer, used for long periods. The integrated screen, keyboard and touch pad make it impossible for the user to find a good posture. The hunched posture we naturally adopt when using a laptop in its integrated form encourage the following unhealthy trends amongst users:

- Flexion in the neck as we look down to see the screen
- A rounding of the back
- Bending of the wrists to use the keyboard and touchpad
- Resting the wrists on the edge of the laptop

The now mass usage of laptops in the workplace increases the risk of injury for employees not using this device correctly. Laptops require additional equipment so that employees can work comfortably with them for long periods.

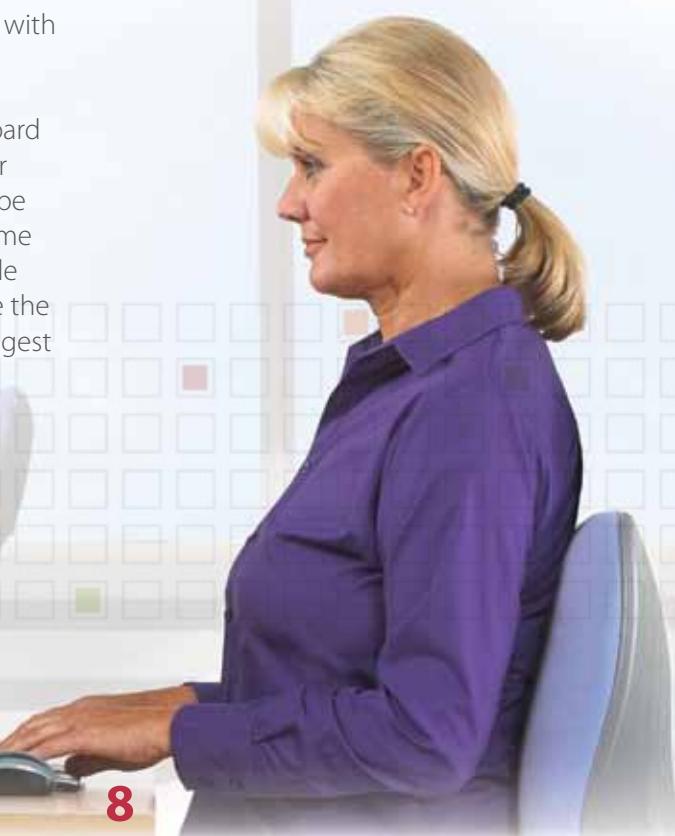
All users should have a separate keyboard and mouse with either a laptop riser or separate monitor. These items should be available to users for as much of the time they spend using the laptop as possible and in particular in the places they use the laptop most frequently and for the longest durations.

Choice of peripherals is important. Monitors aren't portable so they'll only be of benefit where they're situated. Consider investing in laptop risers instead so that the laptop can be set up correctly in more of the locations it might be used.

Users shouldn't work for long periods with their laptop:

- On their lap
- In comfy furniture such as a sofa
- In bed
- Just before they go to sleep

To reduce the risk of manual handling injury, make sure employees who travel a lot with their laptops are provided with appropriate bags to carry them in. The bags need to house any peripheral equipment and other items they need to perform their role. Users should also be advised to minimise how much they carry with them. Staff should only be carrying the items essential for work but the items they pack should definitely include their peripheral equipment if they are going to be using the laptops for long periods wherever they're going.



Technology trends

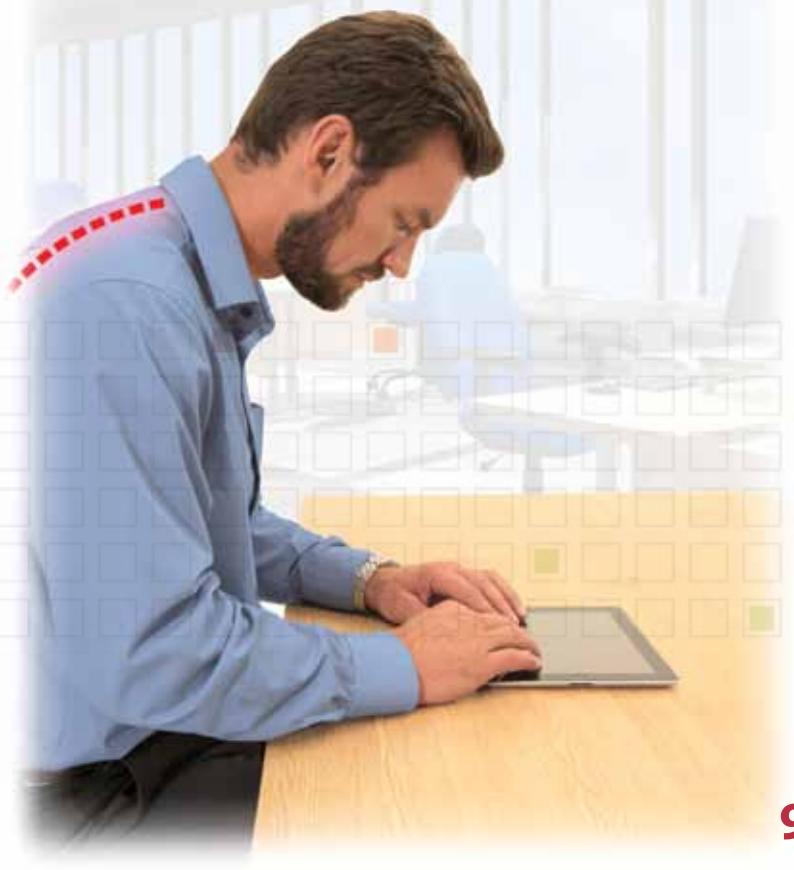
Tablets

No matter how much we love to use them, tablets are not suitable as a main device for long periods of DSE work. They are best used as supplementary devices for travelling or specific tasks such as browsing, emails and note-taking. A tablet can also be an occasional use dual-screen device, complementing a main computer monitor.

Tablets are very difficult to set up to work comfortably and the screen is too small to be used as a main computer. Tablets are often held closer to the face than usually recommended and therefore can cause visual fatigue. Many users use their tablets just before bed to check emails and browse the internet. This practice can have a negative effect on sleep as using the tablet stimulates the brain.

Because a tablet's data input is via a touch screen this makes finding a good posture difficult. These images illustrate the challenges involved in terms of your staff finding a comfortable posture.

Using a tablet flat on the desk encourages the user to adopt a curved spine and flex the neck down to see the screen.



Using a case/riser to angle the tablet for a better viewing position tends to make the user bend the wrist when inputting. This is another unhealthy posture that potentially puts the user at risk of developing a WRULD (Work-Related Upper Limb Disorder).



Peripheral devices to make tablets safer to use are already appearing on the market. Some tablet designs are starting to resemble laptops. Recreating the laptop is better for typing tasks but this isn't enough. As we have already seen, laptops need further peripheral equipment for comfortable working.

Tablets are extremely useful for employees who work away from a desk or who need to input information standing up. Research has shown that when using the tablet standing up, the supporting arm becomes fatigued when inputting data. In fact, some tablet users have experienced pain in the elbow and forearm after just 30 minutes of continuous use.

When using a tablet away from a desk and where no peripheral equipment is available the user should:

- Vary the hand they hold the tablet in
- Vary the position of the hand on the tablet and the way the device is held
- Not use the device for too long at any one time

Technology trends

Of the range of peripheral equipment that can help make using a tablet device more comfortable, different peripherals have different types of use: at a desk, standing, as a second screen, etc.

Peripherals should be selected in consultation with the employees, taking into account what they use the tablet for, how long they will be using it and where they will be using it. Peripherals should be task-and person-specific. There is little point buying a stand for someone who will predominantly use the tablet away from their desk.

Smartphones

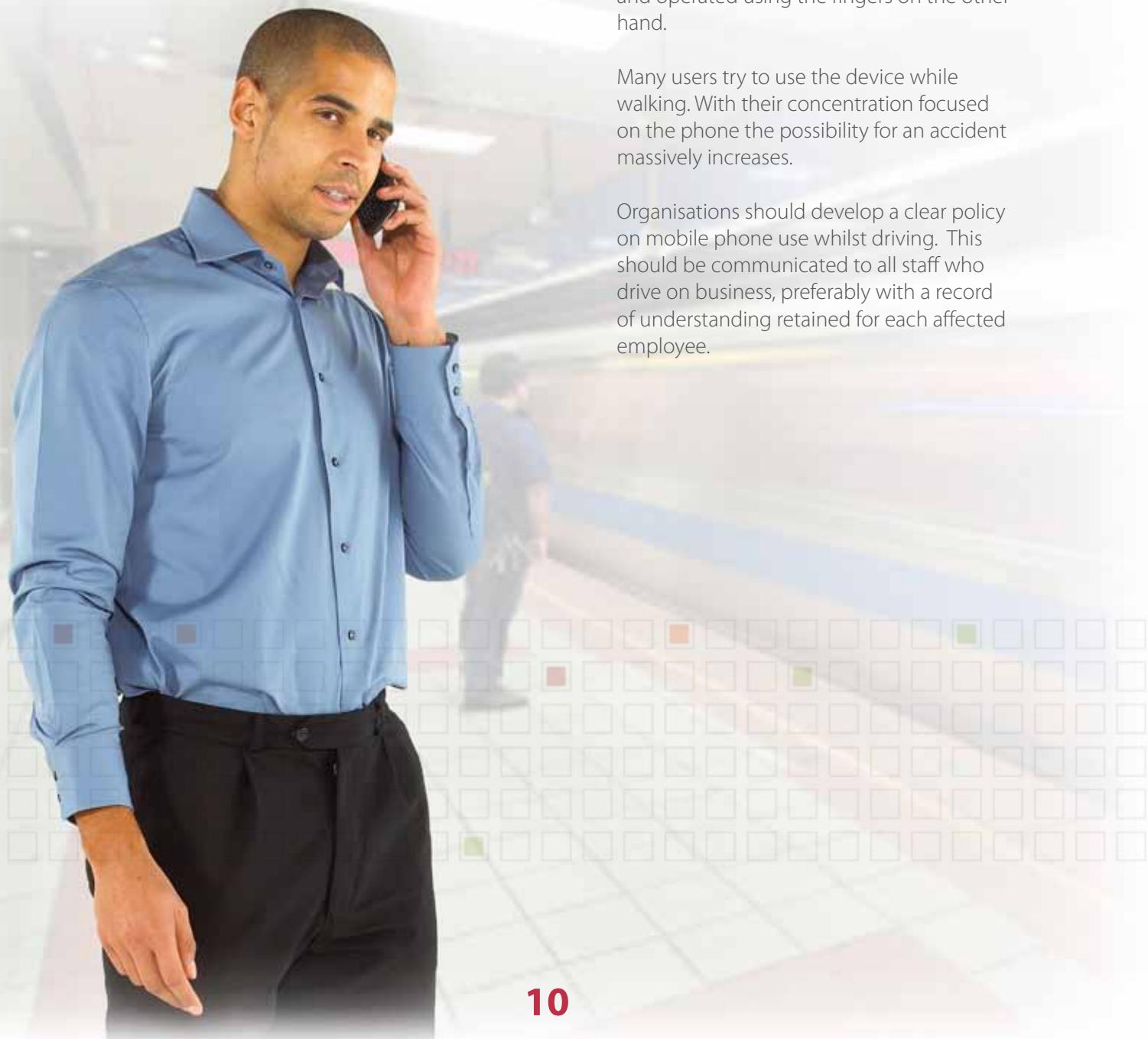
Portability makes smartphones an extremely high-use device but their size and method of operation don't lend themselves to long-term comfortable working.

Unfortunately, their many and varied functions encourage prolonged usage among smartphone enthusiasts.

Smartphones are responsible for very intensive stress on small tendons and muscles. Users try to use these devices in one hand, putting a large workload on their thumbs. Good practice advice states that a smartphone should be held in one hand and operated using the fingers on the other hand.

Many users try to use the device while walking. With their concentration focused on the phone the possibility for an accident massively increases.

Organisations should develop a clear policy on mobile phone use whilst driving. This should be communicated to all staff who drive on business, preferably with a record of understanding retained for each affected employee.



Behavioural trends

Although most of the changes are driven by the gadgets themselves, adopting them often allows us to change the way we work. Access to business networks over the internet allows us to work pretty much anywhere, so many of us do. Flexible working is just one behavioural change that we now have to manage. There are several.

Bring your own equipment

The trend most loved by your friendly IT team. Somebody gets a sexy new Android device for Christmas and of course they want to use it for work. Well, in addition to the obvious compatibility and security issues this poses, additional comfort-related issues need to be considered for health and safety management.

As there is no standardisation of the devices staff are using, the employer is often unable to purchase the appropriate ergonomic equipment to aid their safe use. This creates a very difficult situation to manage. Where employees are using their own devices the employer needs to consider providing the following:

- General advice on safe device use
- Advice on suitable equipment such as: mouse, keyboard, stand, bag, case, etc
- An employee allowance to buy suitable ergonomic equipment to support the devices they use
- A clear 'Home Device Use Policy' to protect both employee and employer

When using all modern technology, whether it's the employee's own equipment or the organisation's, the need for regular breaks or changes of activity is increased because a good working posture is harder to find. Some people set a timer and alert sound on the device itself to remind them how long they have been using it. This can be the signal to move or take a break.

Similarly, for portable devices, all aspects of personal security should be considered, from the risks of being seen using an expensive, desirable device, to the lack of awareness of your surroundings when you are immersed in its use. Devices that store sensitive business information could pose a risk to the company if they are lost or stolen.

An alternative to employees using their own equipment is to encourage the use of cloud-based storage. Documents can be opened and updated across multiple machines wherever the employee chooses. This also reduces manual handling issues in terms of carrying devices around. An employee can use a home PC to start a document, save it to the cloud, travel to work, use a work PC to access the document in the cloud, update it and then print or send it to colleagues. Cloud-based storage is also beneficial for collaborative work.

Sit/stand furniture

Alternating between sitting and standing while you work stimulates the body and mind, increases blood circulation, improving overall health and reducing mental and physical fatigue. Sit/stand desks enable employees to periodically swap from a seated to a standing working position.

In the UK this equipment is predominantly used for remedial purposes, by employees with existing conditions. However, a growing number of organisations are starting to adopt sit/stand desks across a larger percentage of their office-based employee population. Despite the relatively high cost compared with a standard desk this does make sense. Sit/stand furniture is beneficial to all from a comfort and productivity perspective. When used correctly, studies show that productivity increases by around 23 minutes per employee per day.

Unfortunately, in many cases sit/stand furniture is not used correctly. Standing periods that are too long cause discomfort; not standing frequently enough means the benefit of this equipment isn't fully realised.

Behavioural trends

One set of advice doesn't fit all people – sitting and standing periods may change depending on a person's capabilities. This needs to be taken into consideration when this equipment is issued and user training provided.

Some other tips and things to consider when using sit/stand furniture:

- Think about what will be done with the chair when the user stands. Will they be a tripping hazard, or block escape routes during standing periods?
- Staff using sit/stand furniture must wear appropriate footwear – high heels are not good for long periods of standing
- Users should be encouraged to move when standing to realise the full benefit of this equipment. Swapping one static posture for another has a limited benefit
- With users alternating between sitting and standing positions, other equipment needs to be adjustable. Watch out for short cables that prevent re-positioning of equipment on desk

Smart working, flexible working, home working and other trends

Smart working is a results-focused method of working. The focus is on the purpose of your role rather than being in an office, at a certain time and working for a set amount of hours with a scheduled break. It means people can work early or late, in the office or at home – whatever is best for the role they perform, the task they are currently working on, achieving the end result, plus their own quality of life inside and outside of work.

Smart working potentially brings everything we have covered in this whitepaper so far in to scope along with home and remote working issues such as fire, electrical, slips, trips and falls and personal safety.

Managing the health and safety element with all these variables can be a challenge so it's important that it plays an active role in preparing for this change in working methods.



Summary

Key to all of the above is getting the appropriate training and advice to your employees. A particular challenge when considering the extent of the possible training requirements Smart Working brings.

How do you effectively and efficiently provide this key guidance to staff when that workforce is so much more mobile? How, when and where should training be provided to staff?

It is worth considering running workshops providing advice on how to safely use the new technology that employees are relying on to do their work. Perhaps providing training material and tip sheets on how to use each device safely. These could be distributed by email, made available on your company intranet or posters on notice boards.

Given the logistical challenges of providing training for employees at different sites, mobile employees and home workers, the obvious and more practical solution is e-learning and an online risk assessment solution for the safe, ergonomic use of display screen equipment. The fact that this type of training can be carried out on the actual devices it deals with is not an ironic contradiction. A well-designed training course will take advantage of this situation.

Online training for all the other areas of health and safety you want to address with your employees, such as general fire safety, manual handling, induction, etc. is available and can be accessed on mobile devices. Just make sure everyone is using them safely before they start.

How Cardinus can help

Workstation Safety Plus, written in partnership with the Health and Safety Laboratory, includes specific variants for the different ergonomic equipment and the modern employee's many ways of working. Users choose the equipment and working practices relevant to them at the start and a tailored learning experience follows.

Workstation Safety Plus also includes a dynamic online risk assessment, focusing on the issues relevant to the individual. For any issues raised, Workstation Safety Plus provides the employee with standardised, tailorable advice on how they can resolve the issues for themselves, meaning the majority of risk issues are dealt with at source.

The small number of remaining issues can be viewed, prioritised and resolved via a central online management module called PACE. PACE, which is unique to Cardinus e-learning and risk management software, is the best way to manage all the differing equipment with workers who may or may not be at a desk in the office at any given time of the day.

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