



IMPROVE ANY SPACE BY STARTING WITH THE FLOOR

How the design of the workplace
influences well-being and productivity?



Allura Stone LVT

PRODUCTIVITY AT WORK IS INFLUENCED BY VARIOUS FACTORS

A suitable look and feel contributes to happiness at work

A poorly designed working environment can negatively influence our productivity, health and sense of well-being.

While there is overwhelming evidence for this, we are not always fully aware of its importance as a society. This white paper therefore looks at the role played by the office building – and particularly the floor – in our physical and mental well-being. How do we feel about a space? What makes it a nice place to work, in which you put your best foot forward? What are the main problems in terms of design and the choice of a floor? This report takes a look at the facts.



ABSENTEEISM THE FACTS

Absenteeism cost the UK £18 billion in 2017

In the UK, 137.3 million work days were lost due to sick leave in 2016 (Office for National Statistics¹). In 2017, the cost of absence through lost productivity was £18 billion in the UK alone. With mental health issues having risen by 71.9% since 2011, the UK can expect to pay up to £8.4 billion for mental-health related absences per year (Personnel Today²).



The cost of absence in the UK is due to increase to £21bn by 2020 and £26bn by 2030.

Personnel costs including salaries and benefit payments account for approximately 90% of operational costs of an office, which explains why many companies work hard to ensure a healthy and happy workplace. This is part of policy for the majority of employers, as well other reasons such as philanthropy or idealism. According to the research outlined in this whitepaper, relatively minor measures can have a major effect on this absenteeism.

Let's have a look at what influences users in and around the office. Where possible, we shall take a closer look at flooring in the working environment.



Flotex Planks Concrete

AIR QUALITY WORKING ENVIRONMENT

Productivity is boosted in rooms with healthy air

One of the main problems in any working environment is the poor air quality. While polluted air is rarely visible to the naked eye, air quality does greatly influence the well-being and productivity of office staff. Poor air quality can even result in respiratory illnesses and other diseases. It is especially caused by poor ventilation and the evaporation of volatile organic compounds (VOC emissions) from furniture and floors, cleaning detergents and building materials, for example.

A 2016 YouGov survey reported that 70% of UK office workers complain about poor air quality, with 68% of respondents noting that they experience lapses in concentration and 67% reporting that they suffer from fatigue

on a regular basis (BESA³). It is noted that we must do more than just open windows to combat these issues. In fact, opening windows can actually expose office workers to more outdoor toxins. BESA (Building Engineering Services Association) reports that we spend 212 days at work on average and has called on the industry to ensure all offices are well ventilated.

70%
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LOW VOC
MATERIALS
CAN INCREASE
PRODUCTIVITY
BY UP TO
11%

A recent report by the UK Green Building Council⁴ determined that using low VOC materials and optimising ventilation can increase productivity by as much as 11%.



Tessera Alignment & Diffusion carpet tiles

SOLUTION AIR QUALITY

Good ventilation can help increase productivity

Many experts are of the opinion that the combination of a climate control system and natural ventilation is the best solution, as it provides an optimum balance between energy consumption and quality of the climate and air quality. The ceiling height in offices also plays a role: the higher the ceiling, the more room there is for so-called air stratification (various temperature layers). This results in effective natural air displacement and allows more opportunity for air intake.

Extensive analysis by the Carnegie Mellon University showed that natural ventilation or a multi-modal system can reduce healthcare costs by 0.8% to 1.3% and increase productivity by 3% to 18% simultaneously,

achieving a 47% to 79% saving in the climate control system at an ROI of at least 120%⁵.

An effective method of solving another part of this problem is to tackle it at source, as in the case of printers and copiers, while also precluding materials that have high VOC (volatile organic compounds) emissions. Having an office with plants and flowing water is a great way to reduce air pollutants, as these two features help to remove carbon monoxide and other toxins or impurities.

Using low VOC floor coverings, wall panneling, paints and soft furnishings can also help to optimise indoor air quality.



PARTICULATE POLLUTION AND THE OFFICE FLOOR

Clean air keeps
employees healthy

So how does that translate into flooring in the office? Marmoleum is produced from natural raw materials, is naturally CO₂ neutral* and does not contain any phthalate softening agents. Marmoleum also offers natural protection against bacteria, which makes it the ideal floor for a hygienic working environment. Forbo Flooring vinyl & flocked floors are free from phthalates and therefore from any associated emissions. As far as carpet is concerned, the fibres can trap particulate pollution, the degree to which they do so depends on the density, structure and thickness of the fibres. Trapped particulate pollution can be safely removed by daily vacuuming, using an upright machine with a rotating brush.

A subject of discussion in the flooring world is whether there is a relationship between the volume of indoor particulate pollution and the type of flooring. Scientific journalist Dr. Anton Duisterwinkel has researched this issue in depth. The exposure to particulate pollution in the air is a complex subject, and is only partially solved by ventilating offices, due to the intake air not always being equally clean. The research studied whether the type of flooring chosen in an office can play a role

*2.5MM MARMOLEUM SHEET IS CO₂ NEUTRAL IN PRODUCTION.

in reducing the volume of particulate pollution indoors. Does textile flooring retain particulate pollution more effectively than a smooth floor? And does it matter how and how often the floor is cleaned?

Anton Duisterwinkel is a scientific journalist specialising in hygiene matters, who has undertaken much research into the relationship between cleaning and particulate pollution, on behalf of the VSR Association for Cleaning Research. The volume of particulate pollution in the air changes continuously. Duisterwinkel: 'If you measure the particulate concentration in an empty office, you will find only minor pollution in the air. This concentration increases once the office staff arrive. The more mobile the users are, the higher the concentration due to it floating upwards.'

Anton Duisterwinkel has also studied the health and effective cleaning of floors. 'Any floor can be equally good or bad for the air quality, depending on maintenance aspects. Resilient flooring can be more easily and effectively cleaned than textile flooring, but you do need to do so correctly. Resilient flooring should not be vacuumed, as this will cause more dust to float than you are actually removing. The best way to remove dust and particulate pollution from resilient floors is to use a wiper and dust-binding cloths. Textile flooring can only be vacuumed, on the other hand'.

Something else to consider on the topic of indoor air quality is airborne allergens. The UK is one of the top three countries with the

highest instances of allergy, with over 21 million UK adults suffering from some kind of allergic reaction⁶.

21 MILLION ADULTS IN THE UK SUFFER FROM ALLERGIC REACTIONS

Forbo Flooring's Flotex flocked flooring and Marmoleum linoleum flooring are both Allergy UK approved. They don't harbour dust mites or allergens, contributing to better indoor office environments.



[Click to read more about Marmoleum & Flotex's Allergy UK Seal of Approval™](#)

POOR ACOUSTICS IN A WORKING ENVIRONMENT REDUCES PRODUCTIVITY

Pleasant acoustics mean happier employees

Studies have shown poor acoustics to be the main annoyance factor in an office environment, impacting on employees' ability to retain vital information and causing feelings of stress and fatigue. A typical UK office generates sound levels of 54 A-weighted decibels or more, above the recommended 45dB(A) (British Gypsum⁷). Ideally speaking, the acoustic design of an office environment should be in keeping with the activities of its users. It is worth paying attention to sustainable acoustic design solutions as they can safeguard the productivity and health of employees. In the longer term, this can prevent the high costs of absenteeism of employees or productivity losses.

The floor plays an important role in office acoustics. At Forbo's request, the Peutz research agency tested the acoustic quality of various hard and soft floors. Attention was paid not only to the sound absorption of the floor finishing, but also the improvement of contact sound insulation, focused on walking noise. The study showed the use of Granit needlefelt, budget carpet, Flotex flocked flooring and Tessera carpet tiles to contribute

Zebra Technologies worked with Oktra on their new London office to create a vibrant, customer centric working space. Tessera carpet tiles were installed for a burst of colour as well as their great acoustic properties.



considerably to total sound absorption. The use of Flotex and Forbo carpet tiles reduced walking noise in a neighbouring room by up to two classes (10 dB). Resilient floors scored less impressive results of course, though Marmoleum was more effective than wood and stone, for example.

Innovation has led to a number of backings with enhanced acoustic performance. Forbo supplies textile softbac floors which can absorb up to 30dB of impact noise.

ZEBRA TECHNOLOGIES

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80% of UK employees complain about temperature at work, resulting in 2% of office hours wasted at a cost of £13 billion per year, [Facilities Management Journal]



Tessera Seagrass planks & Allura Flex LVT

OFFICE TEMPERATURE

An agreeable temperature
improves concentration

Besides air quality, floor coverings and acoustics, temperature also plays a critical role in productivity at work. The Facilities Management Journal notes that temperature can greatly impact on workplace comfort and productivity, with 80% of UK employees complaining about temperature at work, further resulting in 2% of wasted office hours at a cost of £13 billion per year (FMJ, 2014⁸).

The way in which people perceive their thermal internal climate is not only dependent

on the air and radiation temperature, but also on their expectations and ability to control this. Our perception of thermal comfort directly influences our productivity. Success has been achieved with sunscreens, a cooling system, and measures to promote individual controllability. Think in terms of windows which can be opened and/or have adjustable ventilation grills, the installation of thermostatic controls (in each room) or the introduction of a relatively liberal dresscode in the office.



Well lit spaces with large windows enable a connection with nature and the great outdoors, enhancing productivity and employees' overall mood.

Tessera Cloudscape carpet tiles

DAYLIGHT AND LIGHTING IN THE OFFICE

Eyes are more relaxed in sufficient daylight

It will come as no surprise that daylight and lighting are also factors that influence productivity in the workplace. Whilst it is simple to determine the light concentration in a workspace, there is an initially weak relationship between light concentration and productivity. Loss of productivity does not occur until lighting levels drop significantly below 300 lux. As far as floor coverings are concerned, their LRVs (light reflection values) are extremely important. Most manufacturers like Forbo supply such information along with their floor coverings. By choosing wisely, you are ensuring sufficient light as well as saving on the energy costs of lighting.

Problems with lighting are subjective but above a certain limit will lead to drastic loss of productivity with direct financial consequences. Annoying reflections on a computer screen or the contrasts around a viewed task can result in losses of tens of percent. Nowadays, there are cameras with special analysis software that can quantify the severity of lighting problems.

Choosing floor coverings with high LRVs enhances alertness and productivity, whilst reducing energy consumption. For dementia inclusive environments, LRV ratings should be within 8 steps of each other for tonal continuity.

HOLISTIC

A comfortable workplace is an effective workplace.

Studies also show that the interior of a working environment can influence employees' concentration, cooperation, privacy and creativity, which directly affects health, mental well-being and cognitive performance. With this in mind, it is important to design buildings from a holistic point of view, which means that the total picture of the office makes sense; it is not only about working. Measures should be taken to reach a complete state of physical, mental and social well-being, rather than simply preventing illness or disorders.

Involving employees in designing healthy and productive workspaces gives employees ownership, i.e. allow them to exercise their own influence on their working environment. Flexible furniture, a variety of working spaces, control of the interior climate at work and personalisation of their working environment – a rug under the desk and working with shoes kicked off can give employees a sense of empowerment and autonomy. There are strong scientific indications that ownership has a positive influence on productivity, motivation, group cohesion and satisfaction at work.

Creating a flexible workplace that encourages both productivity and relaxation is important. An environment which facilitates both personal conversations and team activities makes people feel more

Student Accommodation company, Urbanest installed Flotex Concrete Planks in their new London head office for a contemporary and forward-thinking space that encourages flexibility and collaborative working.



Urbanest, London

understood and valued. Informal breakout areas, where employees can relax, socialise and spontaneously exchange ideas, result in extra relaxation and more productivity back at the desk.

URBANEST

[CLICK TO READ MORE ABOUT THIS PROJECT](#)

For their new Birmingham office, Energy Systems Catapult opted for Marmoleum Modular due to its excellent green credentials and high end aesthetics. The project won the 2017 BCO regional award in the Fit Out of Workspace category.



Energy Systems Catapult, Birmingham

OFFICE IMAGE

Employees who are proud of their workplace are more productive

The look and feel of an office can have a positive influence, contributing to our sense of well-being, comfort and effectiveness in a working environment. The UK Green Building Council notes that the look and feel of an office with a layout that encourages movement is key to productivity⁹.

Basic colour theory demonstrates that red is associated with energy, green is calming and reduces fatigue, blue signifies clarity and increases productivity whilst yellow encourages creativity and white can make spaces feel bigger. We also tend to choose round and soft shapes rather than sharp and hard shapes, due to the sense of danger suggested by the latter.

The biophilia trend continues to boom in the UK office segment. As we typically spend 8 hours per day indoors, association with the outdoors is key. Plants and a visible connection to nature are said to increase productivity by up to 15% (Forbes, 2017¹⁰).



PLANTS CAN INCREASE PRODUCTIVITY BY UP TO 15%
[FORBES]

These topics are of course subjective, but there is no doubt that the look and feel of an office influences its users and visitors.

ENERGY SYSTEMS CATAPULT
[CLICK TO READ MORE ABOUT THIS PROJECT](#)

Providing opportunities for employees to be more active not only improves their physical health & wellbeing, but their emotional health & wellbeing, too. A gym in the workplace gives people a sense of motivation, reducing overall absenteeism.



EXERCISE AT WORK

At least 30 minutes' exercise per day helps keep people healthy

Exercise has a positive effect on cognitive capacity, general health and mood. Certain features can spontaneously 'tempt' employees to become more mobile in the office, such as standing tables, walking routes, a garden, table football or visually attractive staircases. Walking routes to printers, coffee machines and pigeon-holes can be combined with stimulating experiences, which make employees inquisitive and motivate them to move around more often. A gym, changing rooms, showers and bike sheds can also meet employee needs and encourage them to be more active.

According to research by professor in spine biomechanics, Jack P. Callaghan, we should sit for 1 minute and stand for 3 minutes as a ratio¹¹. In light of this, workplaces should provide flexible working spaces with standing desks and a variety of seating options for employees.



Leading HR consulting firm, UBF, note that facilitating fitness in the workplace through organised activities and providing places to exercise can better employees' moods and energy levels whilst encouraging teamwork and increased productivity¹².

ROMAN HOUSE

[CLICK TO READ MORE ABOUT THIS PROJECT](#)

Time Inc. created a spacious breakout area in their London based office that provides a flexible space for employees to work, eat or meet.



Time Inc., London

RELAXATION AT THE OFFICE

Views of greenery promote relaxed working.

Although relaxation between working tasks has been demonstrated to have positive effects on the psychological well-being, physical health, cognition and productivity, it has been paid little attention in the workplace so far. For example, a relaxing interior can be achieved by creating room for yoga and meditation or private reflection spots such as secluded corners or an open hearth. Moreover, power naps have extremely positive effects on the performance and health of employees.

Forbes notes that diet is directly linked to productivity¹³. Healthy nutrition not only stimulates learning capacity but also reduces the risk of obesity and increases life expectancy. Supplying healthy food choices will make your workforce more effective.

The large majority of people believe in the relaxing effect of nature, and the same applies to natural and varying views. This approach is supported by results of a growing number of scientific studies, with hard proof. Healthcare is paying more and more attention to surrounding views and greenery, as well as more natural elements, thanks to the insight gained with healing environments. Studies in healthcare centres built on that basis have confirmed the positive effects on the physical and psychological well-being of patients and staff alike. This can be directly translated into a reduction in healthcare costs due to quicker healing and less absenteeism among staff.



CREATE THE PERFECT FLOOR PLAN WITH OUR DESIGN TEAM

Forbo Flooring advocates all aspects in this report and is committed to creating better environments in which to live, work and play.

How can a Forbo floor contribute even more to people's health and wellbeing in the urban environment now and in the future? An important factor is the influence exercised by a floor on the interior environment in the broadest sense of the word.

Our in-house team of experienced designers on hand to help you with tailormade floor plans so you can create the perfect commercial office environment.

To find out more about how you can take advantage of this service, contact your local Business Area Manager.

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Forbo Flooring Systems is part of the Forbo Group, a global leader in flooring and movement systems, and offers a full range of flooring products for commercial and affordable housing and new build markets. High quality linoleum, vinyl, textile, flocked and entrance flooring products combine functionality, colour and design, offering total flooring solutions for any environment.

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