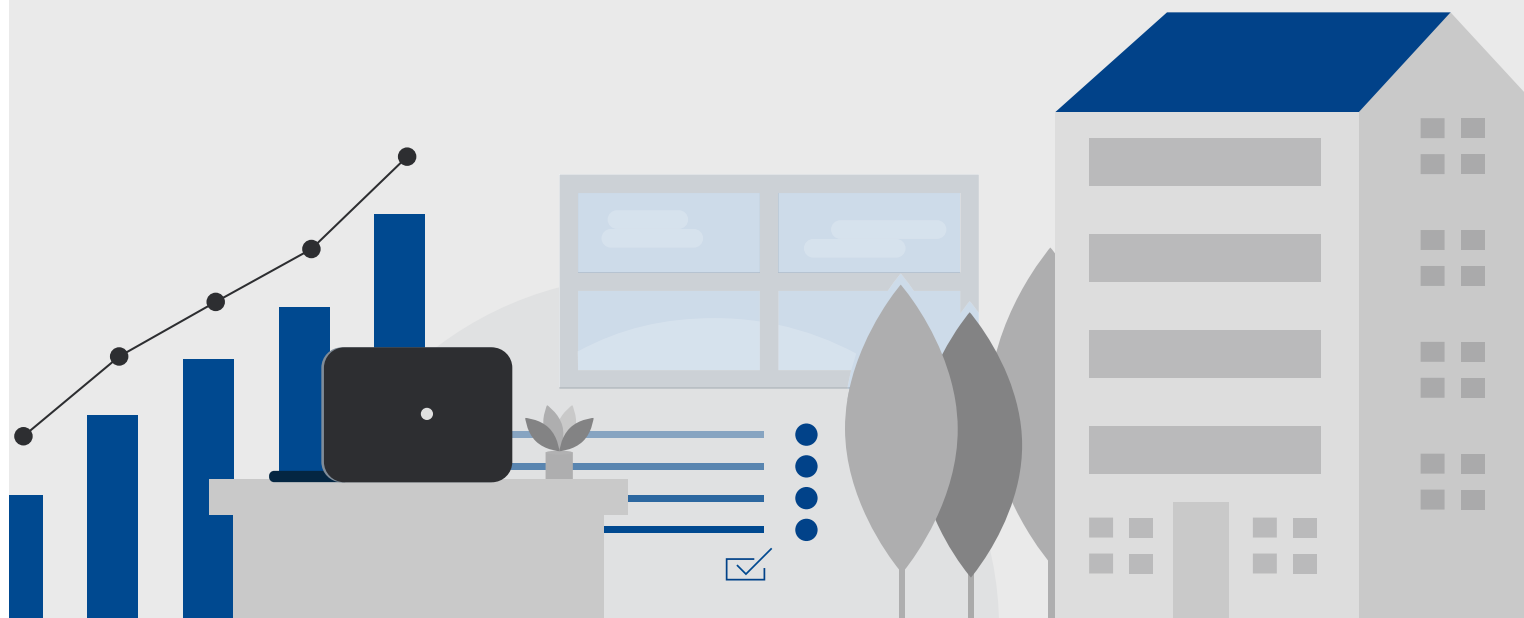# Designing for Happiness in the Workplace: A Kingspan Light + Air Report

How can our work environments positively impact employee well-being and the business bottom line?

Kingspan
Light + Air

Introduction

In recent decades, workplace conditions have improved dramatically for many people around the world, with health and safety considerations now being recognised as a basic human right enshrined in law. Whilst this may address issues such as working hours and having the right equipment and training, it does not necessarily factor in the impact that building design can have on our health and happiness at work. We are only now beginning to understand the positive influence designing for occupant well-being can have on productivity, quality of output, employee satisfaction and, ultimately, the business bottom line.

This report explores what is meant by happiness, the hidden commercial and social benefits it can bring, and how carefully considered building design can help to produce a healthy and happy working environment.

Contents

01

What is happiness?
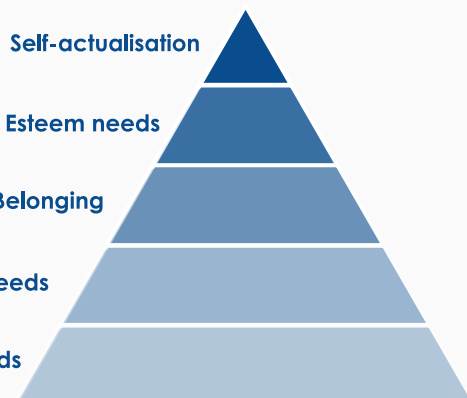

Maslow's Hierarchy of Needs
Figure 1

> ## "Happiness (noun); a state of well-being and contentment."
> - Merriam Webster[1]

'Happiness' is a word often used interchangeably with 'pleasure' or 'joy'. However, rather than a fleeting moment of intense positive emotion, true happiness is a much deeper, more innate concept. Following the principles of Maslow's Hierarchy of Needs[2] (figure 1), it is based on a feeling of satisfaction, security and comfort. It is when all your basic requirements are being met and you can turn your attention to pursuing a sense of belonging, self-esteem and self-actualisation; ideas that most people would equate to happiness.

This holistic thinking is also echoed by the evolution in our understanding of what it means to be healthy. Rather than being solely focused on our physical condition, we now recognise it as a much more rounded concept; as the World Health Organisation (WHO) defines, health is "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity"[3].

Put simply, good health and well-being lead to happiness. This is where our built environment can play a vital role.

02

What impact can the built environment have on our happiness?

"One of the great causes of both happiness and misery is the quality of our environment."
- Alain de Botton, The Architecture of Happiness[4]

Studies show that we spend approximately 90% of our lives indoors.

We spend an estimated 90% of our lives indoors[5][6]. Therefore, it is only logical that buildings have a significant impact on our bodies and minds. Whilst we don't need science to see the truth in this, the evidence for the physical and psychological effects our indoor lifestyle is having on our well-being is startling. For example, WHO reports that indoor air pollution from biological agents related to damp and mould increases the risk of respiratory disease in children and adults by 50%[7]. Meanwhile, research conducted by The Journal of the American Osteopathic Association has shown that nearly 15% of the global population are vitamin D deficient or insufficient[8] due to lack of sunlight, contributing to feelings of fatigue and poor mood.

However, it is not enough to create spaces that limit these negative conditions. We need to go one step further. In recent years, the drive to construct 'healthy buildings' has gained momentum, with a particular focus on how our internal environments can positively influence the way in which we feel and behave. Buildings do not become a source of happiness on their own – there are various social, economic and other, often uncontrollable, factors at play. However, our environments can provide a robust foundation for people to develop a stronger sense of well-being.

03

Why design for happiness in the workplace?

"A quality workspace design leads to a less stressful and more productive atmosphere. It's essential that employers take the physical work environment of their employees into consideration. Employees need to feel comfortable and calm in their physical work settings to produce their best work."

- Alan Kohll, Forbes[9]

The majority of the world's population spends almost one third of their adult lives at work, "contributing actively to the well-being of [themselves], their families and society"[10]. Whether it is an office, warehouse, shop or a public building, ensuring that every workplace supports the health and happiness of its workers can have a positive impact on a number of personal, societal and economic levels.

Despite growing evidence to support this, the Design Council's 2018 report into 'Healthy Placemaking' revealed that healthy design interventions are often excluded from proposals due to the perceived cost of implementing them, with many clients considering them a

"luxury" rather than a necessity[11]. Therefore, the challenge for building designers and developers lies not only in finding the best ways to create healthy, happy buildings, but also in how to present the business case for doing so. To do this effectively, it is vital to understand the benefits that basic environmental factors, such as light and air, have on people's well-being and performance, and how these elements contribute to a holistic, sustainable and cost-effective building concept which will increase asset value and support ongoing business success in the long term.

58% of the world's population spends almost one third of their adult lives at work. - WHO
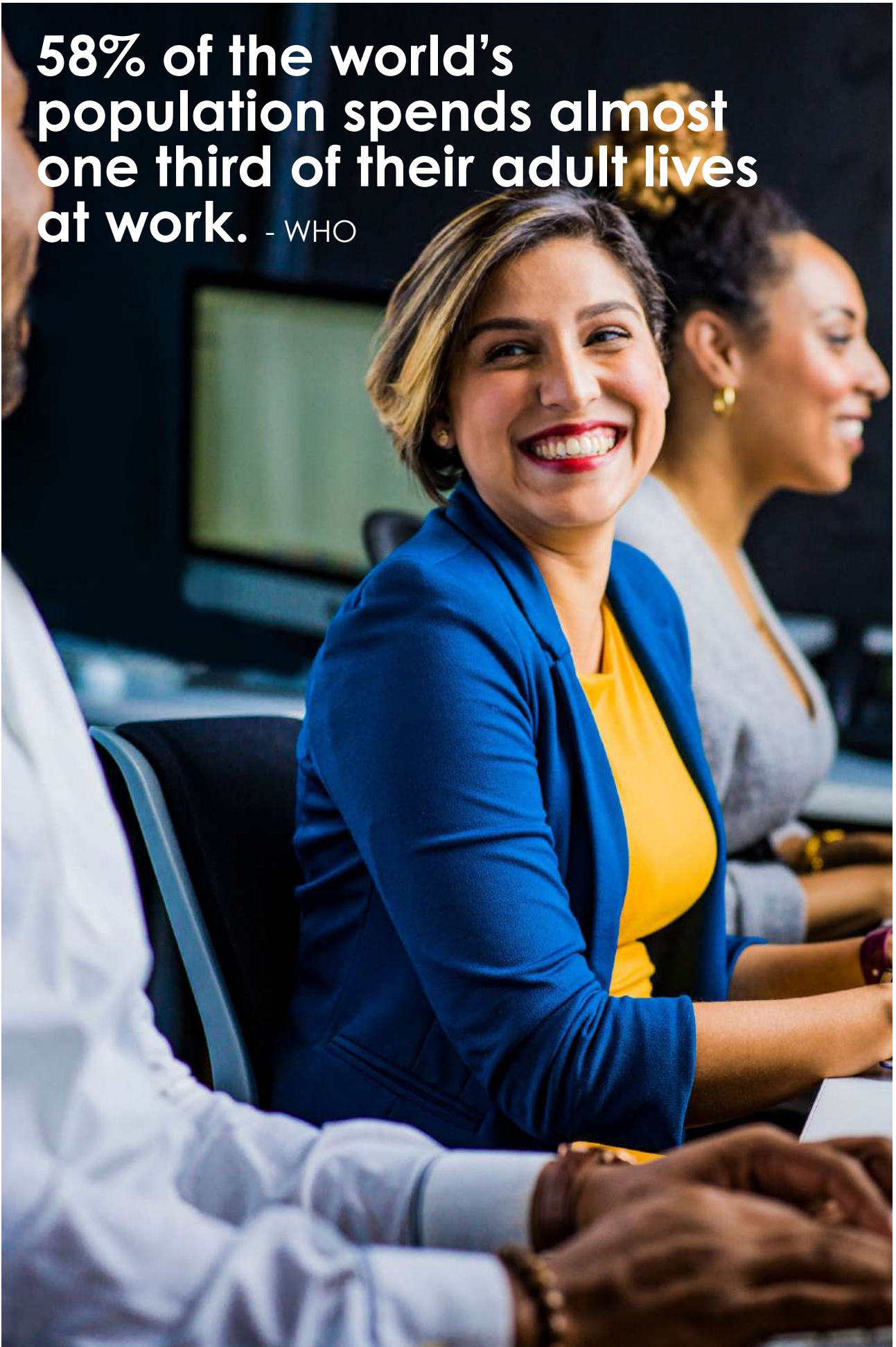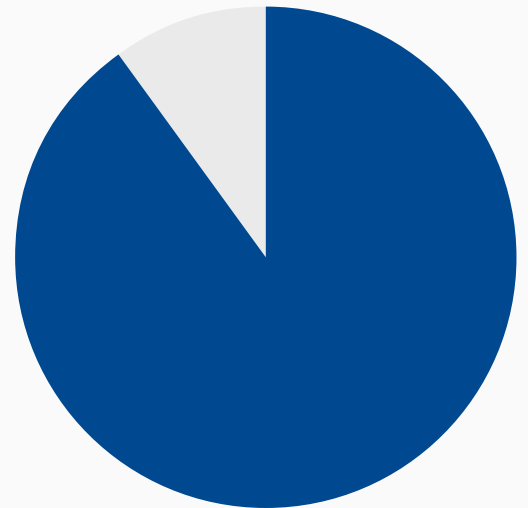
Happy people are successful people

Increased productivity and comfort

'Positive Psychology' is an increasingly common concept in the business world, working on the principle that people who feel happier in work will go on to engage more effectively with their tasks, set higher goals and deliver greater results[13]. This has led to many companies investing in all manner of wellness schemes and perks. Yet, research suggests "such interventions yield unimpressive results"[14]. What employees want and need is for the basics to be right first.
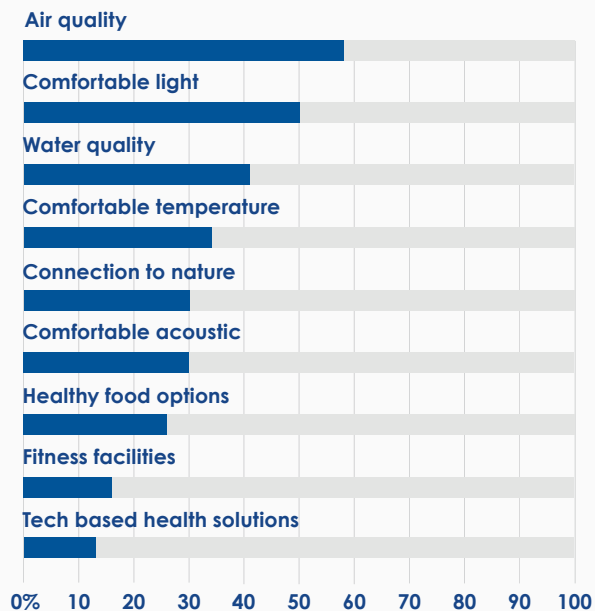
A survey conducted by Future Workplace and View in 2019 asked 1,600 workers across North America which wellness perks mattered to them most and how they felt these impacted their productivity. It found that environmental factors had the biggest impact on comfort and performance— while fitness facilities and technology-based health tools were considered the most trivial[15].

Fresh, allergen-free air was identified as a key factor for the majority of respondents, with half saying that poor air quality makes them feel lethargic during the day and more than a third reporting up to an hour in lost productivity as a result. The next highest rated aspect was comfortable lighting, with one in three respondents stating they considered that having

On average, people account for 90% of operating costs for a business[12]. Therefore, investing in their health and happiness is not only a company's responsibility, it also makes good business sense.

Which wellness perks matter the most to employees?

Air quality

Comfortable light

Water quality

Comfortable temperature

Connection to nature

Comfortable acoustic

Healthy food options

Fitness facilities

Tech based health solutions

0% 10 20 30 40 50 60 70 80 90 100

https://futureworkplace.com/

the appropriate intensity and colour of light is important for their daily health. Additionally, almost 40% thought their companies should provide views to the outdoors, enabling a vital and calming connection to the outside world.

These results are supported by research from numerous medical and scientific bodies, such as by the Harvard T.H. Chan School of Public Health which found a 101% increase in cognitive scores for workers in green, well-ventilated offices[16].

Unscheduled sick leave costs businesses approximately €3284 ($3600) per year for each hourly paid worker.
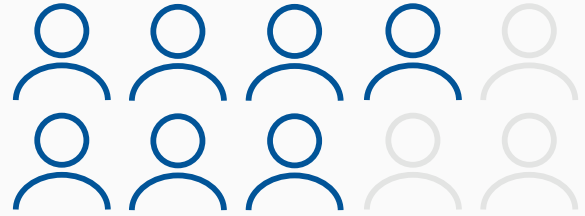
- Circadian[17]

Reduced sickness

Working in a healthy building has been proven to reduce illness, and lost hours and productivity. This can have a significant financial impact, as highlighted in a study from the World Green Building Council (WGBC). In one example, Cundall's new UK office found that, after focusing on improving indoor air quality, absenteeism dropped by more than four days per person per year - a 58% reduction - and staff turnover reduced by 27%. The combined impact of these two outcomes delivered savings of almost €225,000 ($246,070) per year[18].

7 out of 10 workers thought that a workplace focused on their health and well-being would make them more likely to accept a new job. - Future Workplace Wellness Study[23]

Increased attraction and retention

An occupant-focused workplace can also be a powerful recruitment tool. A survey released by the U.S. Green Building Council (USGBC) shows that the majority of office workers want to work for a value-orientated company that has a reputation for showing commitment to both environmental and human sustainability[19].

Prioritising employee well-being and happiness enhances corporate reputation, which research has indicated has a significant impact on jobseekers' decision to accept or decline an offer of employment. One study found that 75% of Americans would prefer to stay unemployed rather than work for a company with a bad reputation, and that 87% of currently employed workers would consider leaving their job to take on a role with a company that has an excellent reputation[20].

It is a similar story for retention. Workers regularly cite unhappiness with their physical workspace when planning to leave their current employment[21]. Meanwhile, employees satisfied with their workplace are 18% more likely to stay at their current company[22].

True sustainability

The human element of sustainability is strongly recognised in the UN Sustainable Development Goals, with targets which address inequality and prioritise good health and well-being for all sitting alongside those which are designed to protect the environment[24]. The interconnectedness of our planet and its people is undeniable and it follows that a healthier, happier population is key to creating a healthier, happier world.

Many of the building systems and design strategies which produce the kind of bright, fresh workspaces people need to thrive capitalise on natural resources such as sunlight and wind. These also reduce the demand on artificial systems and help to lower energy usage. With increasing pressure on businesses to reduce their carbon footprint, and utility bills making up anywhere between 3% and 32% or more of a company's total annual expenditure[25], this presents a clear opportunity to save on both emissions and operational costs, in addition to demonstrating corporate and social responsibility.

Case Study

Lycee Lucie Aubrac High School

Location: Paris area, France

Architect: Epicuria Architectes

Products: Optima Louvred Ventilator and Ecovision PN Facade Windows

Designed to be environmentally friendly with a Net Zero Energy objective, the new Lycee Lucie Aubrac High School building is organised around a long inner 'street', covered by a monumental glass rooflight. This allows a high level of daylighting, which plays an important role, both in energy-saving building management and in improving user well-being. The use of natural ventilation through facade air inlets and louvred windows integrated into the rooflight provides a healthy and productive indoor work environment for staff and students.

Higher asset value

Investing in a healthy, happy workplace can have an impact on the market value and desirability of a building. The WGBC found that building owners consider healthy buildings to be worth 7% more than standard buildings, whilst 46% said they were easier to lease, and 28% said they commanded premium rents[26].

Achieving voluntary building standards which address health and well-being can help to provide a recognisable, reliable and regionally-appropriate indicator of a building's performance to owners and occupiers looking to invest in sustainable and healthy buildings, increasing asset value and justifying higher rates. There are a number of building standards for which health and well-being are a key component – from those dedicated completely to the user experience, to sustainability standards which recognise how designing for improved environmental performance often goes hand in hand with the drive to create healthy, nourishing internal spaces.

79% of office workers say they would choose a job in a LEED-certified building over a non-LEED building[27].

04

Voluntary building standards - an overview of three global standards:

WELL

Administered by the International WELL Building Institute (IWBI), WELL is defined as "the leading global rating system and the first to be focused exclusively on the ways that buildings, and everything in them, can improve our comfort, drive better choices, and generally enhance (rather than compromise) our health and wellness". Since its introduction in 2013, it has been increasingly embraced by architectural firms and construction bodies across the world.

Developed from seven years of research into the effects of the built environment on human health and well-being in partnership with scientists, doctors and architects, the standard places all aspects of wellness at the centre of design decisions with several key concepts which must be addressed. These include concepts that support occupant happiness and must be considered during the initial design stage, such as Light, Air, Thermal Comfort, Sound and Materials.

For more information, visit https://www.wellcertified.com/

BREEAM

Created in the 1990s, the Building Research Establishment's Environmental Assessment Method (BREEAM) was the world's first sustainability rating system for the built environment. It measures sustainable value in a series of key categories, awarding points which contribute to the overall BREEAM rating. Applicable under both new construction and refurbishment schemes, the health and well-being category aims to enhance quality of life by recognising the key design aspects that must come together to create a healthy and safe internal

environment for occupants. These include addressing issues such as Visual Comfort (Hea 01) and Indoor Air Quality (Hea 02).

In 2016, it was announced that the BRE and the IWBI were working together to align BREEAM and the WELL Standard to simplify the process for project teams who are pursuing accreditation under both[28], expressing the coherence between health and wellness and sustainability. This work has included comparing performance requirements, harmonising evidence and identifying opportunities to streamline the process of achieving dual certification. The BREEAM Briefing Paper 'Assessing Health and Wellbeing in Buildings: Alignment between BREEAM and the WELL Building Standard™'[29] was released in 2017, and it is due to be updated towards the end of 2019.

For more information, visit: https://www.breeam.com

LEED

The Leadership in Energy and Environmental Design (LEED) certification system has been through a similar development. Launched in 2000 by USGBC, it provides a framework to create healthy, highly efficient and cost-saving green buildings. Like BREEAM, projects pursuing LEED certification earn points across several categories.

The latest version of the LEED standard offers a number of credits for buildings that "enhance individual human health and well-being" under the indoor environmental quality (EQ) credit category. It rewards designs that have carefully considered aspects such as Enhanced Indoor Air Quality Strategies, Thermal Comfort, Interior Lighting and Daylighting, and Quality Views — all of which have been holistically employed to protect the health and well-being of occupants.

For more information, visit: https://new.usgbc.org/leed

05

## What design elements
need to be considered?
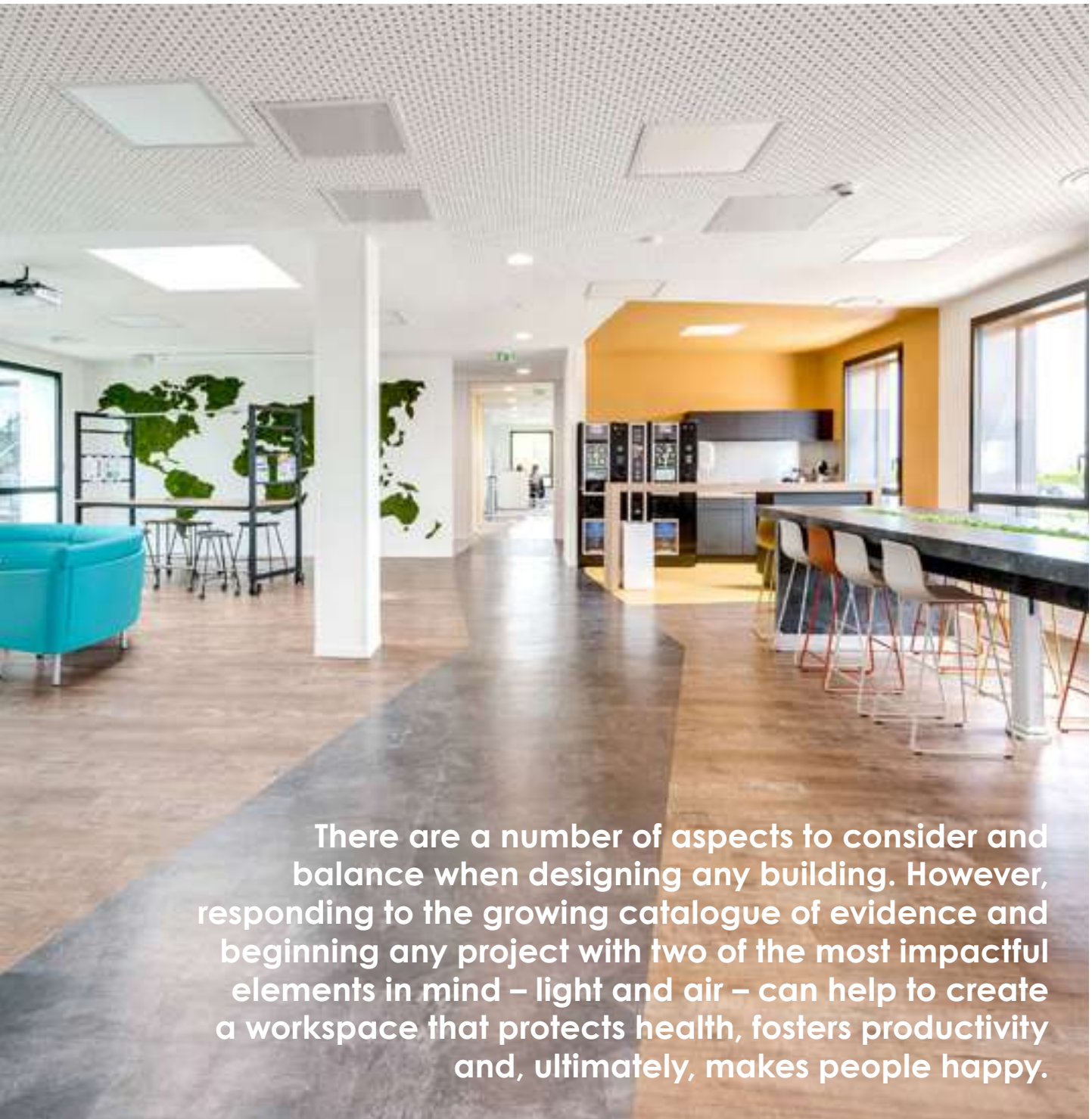
There are a number of aspects to consider and balance when designing any building. However, responding to the growing catalogue of evidence and beginning any project with two of the most impactful elements in mind – light and air – can help to create a workspace that protects health, fosters productivity and, ultimately, makes people happy.
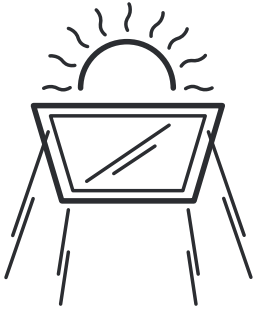
Light

Access to daylight is an essential human need. It not only improves our visual acuity—providing more even illumination of objects and better colour rendition than artificial lighting—but it also plays a vital role in reinforcing our circadian rhythm. This biological clock programmes us to be more active and alert during daylight hours, tire as it becomes darker and consequently sleep better at night. Even the slightest change in this pattern can have a substantial impact on our mood, productivity and overall well-being.

For example, staff in offices with no natural daylight have been shown to sleep on average 46 minutes less than their light-receiving counterparts[30]. They also reported lower scores on quality of life measures related to physical problems and vitality, and had worse overall sleep quality, sleep efficiency, sleep disturbances and daytime dysfunction[31]. This can result in an increased likelihood of missing work or making errors. Additionally, lack of sleep is linked to many psychological conditions such as depression and anxiety[32]. The impact light can have on our mood is further evidenced by a research poll of 1,614 North American employees in which 43% reported feeling gloomy because of the lack of light[33].

Building form

Orientation, form and layout are all important factors affecting how much natural light a space will receive at any given time of the day. Therefore, daylight should be considered from the outset of a design proposal. Design tools such as Climate Based Daylight Modelling (CBDM) are invaluable for effective daylighting strategies. This method predicts the quality and quantity of daylight a proposed construction will receive in its exact geographical location, using realistic sun and sky conditions drawn from standardised climate data.

Glazing types

Side glazing is the most common point of entry for natural light to enter a space. However, this is unlikely to provide a uniform distribution of light in deeper workspaces such as warehouses or large offices, which may also have objects such as machinery or shelves breaking up the space. Rather than meeting the demand with artificial light, rooflights can be used as an effective alternative for bringing natural light into single storey or top floor spaces. In areas with limited opportunities for traditional windows, rooflights can also provide views of the sky, enabling occupants to retain a visual connection to the world outside.

Glare and heat gain

If unmanaged, direct sunlight can cause disruptive or disabling glare, or a build-up of heat in the space below. As well as being uncomfortable for occupants, these issues can cause health problems such as eye strain and exhaustion. Both can be difficult and costly to rectify retrospectively; therefore, the type of products used to introduce daylight into a space, how they are positioned, and how the light is transmitted and diffused, all play a part in how effective a daylighting strategy is. Climate-controlled glazing which can filter out ultraviolet (UV) and infra-red (IR) rays, or uses nano-prismatic technology to diffuse light beams and create a soft, even light can provide simple solutions to these issues.

Product longevity

The translucency of some older rooflight materials can degrade over time, either preventing optimal light transmission or causing a yellowing effect which blocks out blue light waves. This can have a negative effect on the way that colours are perceived and how people feel in a space. There are more blue light waves in the morning, making us feel active, alert and ready for the day, tiring as it becomes darker and the light moves towards the yellow and red end of the spectrum. It is therefore important not to filter out the blue light in places of work, as this can disrupt the circadian rhythm and reduce productivity.

External views

Offering views of nature - whether of water, a park or even just a tree - restores attention capacity, can help to lower blood pressure after attention-demanding tasks and leads to higher efficiency[34]. This is becoming increasingly recognised in legislation, such as the new European daylighting standard, EN 17037[35]. In spaces where privacy is required, provision can be made through the use of translucent materials or rooflights which still allow reference to the outside world.

Supplementary artificial lighting

No matter the performance of a daylighting system, artificial light is also an important consideration for darker days or night workers. Glare-free lighting that evenly illuminates the working plane with no noticeable flicker is ideal. Where possible, these systems should be dynamically controlled, dimming and brightening in reaction to the natural light levels for a consistent visual environment.

Aesthetic effect

French writer Stendhal once wrote that "beauty is the promise of happiness". Natural light, particularly from above, can be used to create all kinds of striking, architectural impressions throughout a workspace, from a dramatic entrance to a restorative breakout zone.
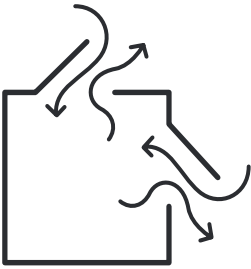
Air

Access to good quality air is fundamental to health and wellness. Spending too much time in a space with poor air quality can result in respiratory problems and what is known as 'Sick Building Syndrome', manifesting in symptoms such as headaches, irritated eyes, nose and skin, and difficulty concentrating[36].

Replacing stale, polluted indoor air with fresh air through natural ventilation systems can not only prevent these issues, but lead to dramatic improvements in cognitive performance. For example, a study showed employees in environments with optimised ventilation scoring 31% better in crisis-response questions, 299% better on information usage, and 288% higher in strategy[37].

Fresh air is also important for our emotional well-being. Opening a window or activating a natural ventilation system gives us a direct connection to the outside world, helping us to feel refreshed. Meanwhile, the sensation of a breeze against our skin can have a calming effect[38].

Employees in environments with optimised ventilation score: 31% better in crisis-response questions, 299% better on information usage, 288% higher in strategy.

Case Study

Eneco Head Office

Location: Rotterdam, The Netherlands

Architect: Cees Dam & Partners

Products: Bespoke toughened solar glass roof and Kingspan Ventria Opening Rooflights

Forming a key feature in the building's unusual triangular design, the central atrium provides daylight, ventilation and views of the sky no matter where you are in the building. To minimise the impact of material expansion or contraction depending on the outdoor temperature, the roof was fitted with a flexible edging system, allowing it to shift in any direction by approximately two centimetres whilst remaining watertight.

Air flow

Natural ventilation systems, such as wall and roof vents or opening rooflights, use the natural driving forces of wind and thermal 'buoyancy' to extract stale air and replace it with fresh air from outside. This oxygenates the room, dilutes and disperses pollutants, reduces odours and humidity, and can help to regulate internal temperatures.

Natural air can be provided through cross or stack ventilation, and both should be integrated where possible. This means designing buildings to be dual aspect, or to have a connection with the sky. There are various airflow modelling software platforms available which can help to determine the best ventilation types or products for a particular project— this modelling can often be conducted by a system manufacturer's technical design team.

Building form and layout

The shape, size and location of rooms are key to how successfully they can be ventilated. In principle, narrower rooms are easier to ventilate (and introduce daylight to) and they often have more external aspects to bring in fresh air. Higher ceilings can also help to improve air quality as there is more space for air particles to circulate, in addition to being linked to a greater sense of psychological freedom[39].

Outdoor air quality

The effectiveness of natural ventilation systems is reliant on the outdoor air quality being higher than the indoor air. If the outdoor air pollution levels exceed local guidance, mechanical solutions with air filtration will need to be employed to reduce the concentration of particulate matter in indoor air. Undertaking an assessment of the potential external and internal sources of pollution at the design stage can help to determine what method is appropriate.

Thermal comfort

Staff performance can fall by 6% when workspaces are too hot and 4% if too cold, so it is important to maintain a comfortable and stable ambient temperature[40]. Once the average optimum temperature has been calculated, it can be kept as close to this level as possible with effective air circulation and night purge strategies, where air is introduced through windows and vents during the night to cool the internal spaces.

Automation and operation

Window and rooflight systems can often be automated to open when triggered by rising internal temperatures or air pollution levels. This should have an adaptive approach, responding to daily external temperatures to ensure the optimum indoor temperature. However, the perception of control is closely linked to our sense of well-being, with more employees wanting the option to adjust their personal workspace conditions (42%) than wishing for an unlimited vacation policy (28%)[41]. It is therefore important that occupants can override these systems when they desire, with the ability to manually open a window or louvre, or access the monitoring systems.

Supplementary mechanical systems

Not all buildings will be suitable for designs incorporating purely natural ventilation; for example, those with particularly deep or high internal spaces. In these cases, energy efficient mechanical ventilation can provide an additional way of supplying fresh air.

Integrated safety systems

Ventilation strategies can also play an important role in fire risk management. In most building fires, the biggest threat to life usually comes, not from the fire itself, but from the smoke generated by burning contents. Integrating a natural smoke management system with the ventilation plan maximises value from a single system, helping to protect people from the effects of smoke inhalation, provide precious escape time, and can even minimise damage to property.

Case Study

# IKO Polymeric
Manufacturing Facility

Location: Derbyshire, UK

Products: Kingspan Day-Lite Barrel Vault Rooflights

Warehouses were once amongst the worst offenders for poor natural light levels. IKO Polymeric's new, highly energy efficient manufacturing facility shows how things are changing, using a combination of daylighting and smart lighting.

"The Kingspan Light + Air rooflights and smart lighting ensures that the working plane is well lit and safe for our staff, whilst minimising the lighting costs."

Dave Coldham MIoR, Divisional Manager IKO Polymeric
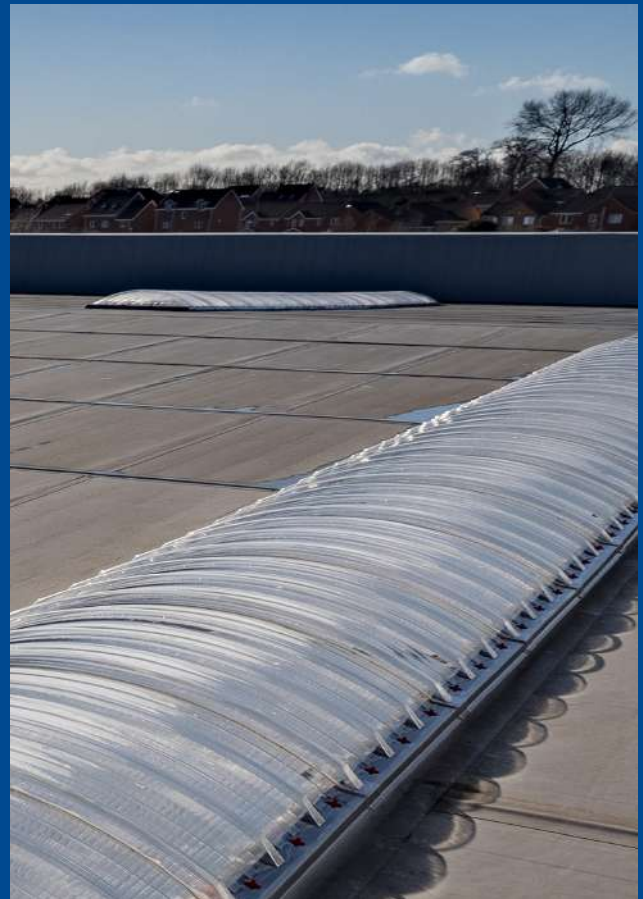
Other design elements to consider

→ **Create quiet spaces to retreat**
It's estimated that between 33% and 50% of people are introverts[42], preferring environments that are not over-stimulating and relying on quiet time to re-energise.

→ **Offer capacity for people to personalise workspaces**
Employees who are allowed to personalise their space are up to 32% more productive[43].

→ **Provide some outdoor space**
Creating a small green oasis, outside or even on the roof of a workspace, can be a valuable resource for worker well-being.

→ **Inspire people to move**
Exercise is great for our physical and mental health. Encourage this with open and accessible stairways, bike storage facilities and showers.

→ **Manage acoustics**
Staff productivity can fall as much as 66% as a result of distracting noise[44].

→ **Make room for kitchen space**
Providing a kitchen in a workplace offers people greater control over what they eat and drink.

→ **Bring more plant life inside**
Studies have shown indoor plants can help to reduce stress, increase productivity and creativity, and even clean the air of pollutants[45].

→ **Don't overlook storage**
Cluttered environments trigger the production of cortisol, a stress hormone[46].

→ **Make it look the part**
Working in a space that meets our aesthetic expectations is important to creating a harmonious atmosphere.

06

Conclusions

"Happiness is an incredibly important but often overlooked aspect of our lives. It can result in improved productivity in the workplace and better learning in students; most importantly, it can drastically improve people's quality of life and physical and mental health." - Ben Channon, Happy by Design[47]

From creating open spaces designed to inspire interaction and collaboration, to capitalising on the enriching power of natural light and air, architects have a central part to play in fostering a positive relationship between a building and its occupants. By making employee well-being a fundamental consideration from the earliest design stages, we can ensure that our future workspaces have a positive impact that can be seen at individual, business and environmental levels – happiness all round.

07

How can Kingspan Light + Air help?

Kingspan Light + Air was formed to contribute towards Kingspan Group's vision of creating healthy and energy-efficient buildings that enhance the well-being of their occupants. Designing and manufacturing a broad range of natural light, ventilation and smoke safety solutions, and supported by expertise from all over the world, we can help architects to produce bespoke, integrated systems that deliver real value to their designs—all backed up with first rate technical design and installation services and maintenance packages.

For more information, please visit:

Kingspan Light + Air UK & Ireland
Kingspan Light + Air North America
Kingspan Light + Air Netherlands
Kingspan Light + Air France
Kingspan Light + Air Germany
Kingspan Light + Air Belgium

08

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