

The logo for XCCO2 features the letters 'X', 'C', 'C', and '2' in a bold, white, sans-serif font. The letter 'O' is replaced by a circular icon consisting of three concentric rings with arrows pointing clockwise, symbolizing a cycle or simulation process.

XCCO₂

WELL Inspired Design & The Role of Simulation

Lindsey Malcolm



WELL Inspired Design & The Role of Simulation

- Background to Health, Wellbeing & Productivity
- The WELL Standard Process
- Design Stage Considerations
- Role of Simulation
- Project Examples

Context

Health & Wellbeing

Air Quality

Recruitment/retention

London Mayor calls for immediate action on air pollution

22.06.2016
NEWS
LEWIS DEAKIN

Mayor of London, Sadiq Khan, has called for people to be warned if air pollution levels are at dangerous levels in the city.

Mr Khan was speaking after King's College London said air pollution should have been issued on more than 100 occasions since he took office in 2016.

The Saharan Dust episode two-and-a-half-years ago saw London hit with moderate or higher levels 49 times.

the guardian

home > money > careers property savings pensions borrowing UK world all

Guardian sustainable business

Office buildings are key to workers' health, wellbeing and productivity

... show poor air quality and lighting increase sick days and can affect sleep but the evidence is not influencing most design and leasing decisions

Best Practice in Promoting Employee Health and Wellbeing in the City of London

RESEARCH REPORT CITY OF LONDON CORPORATION

Research report

Health and well-being at work: a survey of employers

by Viv Young and Claire Bhaumik

DWP Department for Work and Pensions

Sustainable health
27 May 2016
Reducing...
on the en...
about the

Women toll workers

Icons include: a plus sign, a heart, a checkmark, a magnifying glass, a gear, a person, a bicycle, a speech bubble, and a bar chart.

The Built Environment

September 2014

UK-GBC publish report on 'Health, Wellbeing and Productivity in Offices'



Health, Wellbeing & Productivity in Offices
The next chapter for green building

JLL | Lend Lease | SKANSKA



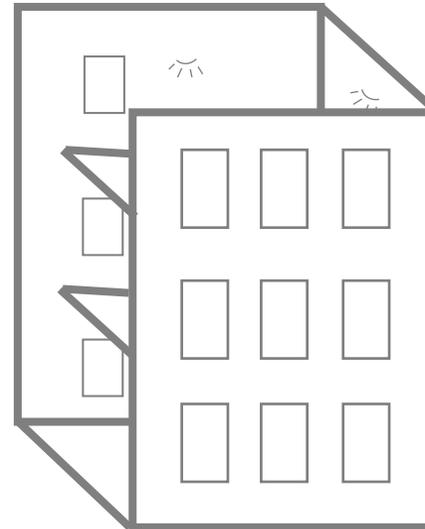
February 2015

WELL Certification introduced to UK

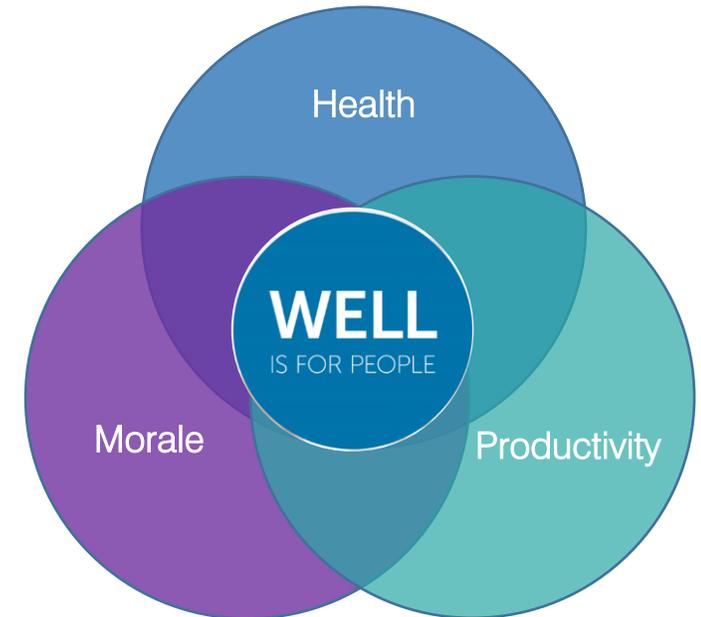


Present Day

Moving beyond existing building assessment schemes...

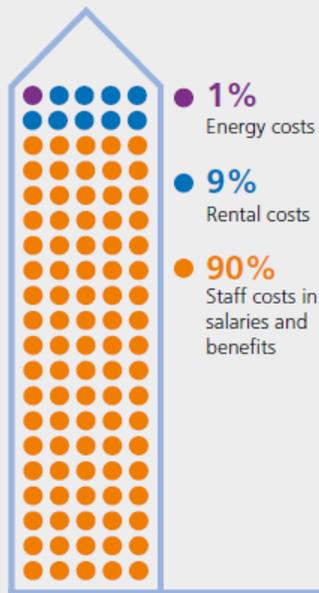


... by focusing on the **users**, rather than the building



The Value of Staff

Typical business operating costs¹



10% Variation

A 10% variation applied equally to each cost has a far from equal impact

+/- 0.1%

Energy costs

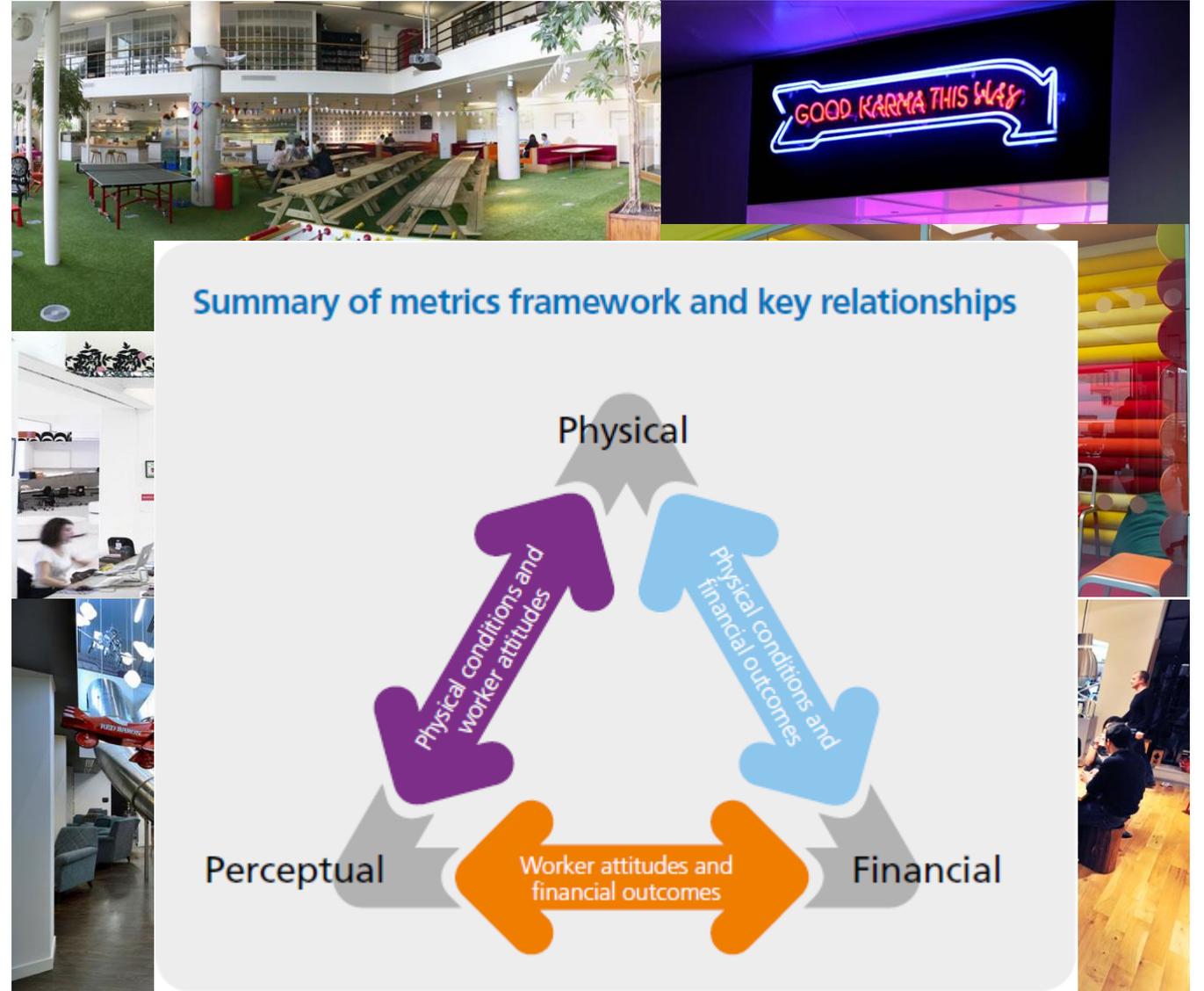
+/- 0.9%

Rental costs

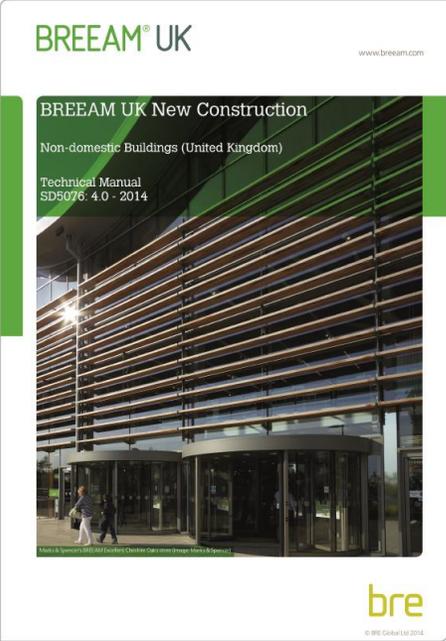
+/- 9.0%

Staff costs

Health, Wellbeing & Productivity in Offices, World-GBC Report



The Response



Issue ID	Issue name	Credits	Credit summary
Hea 01	Visual comfort	Up to 6	<ul style="list-style-type: none"> — Potential for disabling glare has been designed out of all relevant building areas. — Good practice daylighting levels have been met. — Floor space in relevant building areas has an adequate view out to reduce eye-strain and provide a link to the outside. — Internal and external lighting systems are designed to avoid flicker and provide appropriate illuminance (lux) levels. — Internal lighting is zoned to allow for occupant control.
Hea 02	Indoor air quality	5	<ul style="list-style-type: none"> — Minimising sources of air pollution through careful design specification and planning. — Building ventilation strategy is designed to be flexible and adaptable to potential future building occupant needs and climatic scenarios.
Hea 03	Safe containment in laboratories	2	<ul style="list-style-type: none"> — Production of an objective risk assessment of the proposed laboratory facilities. — Containment devices such as fume cupboards meet best practice safety and performance requirements and objectives. — Containment level 2 and 3 laboratory facilities to meet best practice safety and performance criteria where specified.
Hea 04	Thermal comfort	3	<ul style="list-style-type: none"> — Thermal modelling carried out to appropriate standards. — Projected climate change scenario(s) considered as part of the thermal model. — The thermal modelling analysis has informed the temperature control strategy for the building and its users.
Hea 05	Acoustic performance	up to 4 credits	<ul style="list-style-type: none"> — The building meets appropriate acoustic performance standards and testing requirements in terms of: <ul style="list-style-type: none"> — Sound insulation — Indoor ambient noise level — Reverberation times.
Hea 06	Safety and security	2	<ul style="list-style-type: none"> — Provision of effective measures which support safe access to and from the building. — Security needs are understood and taken into account in the design and specification.



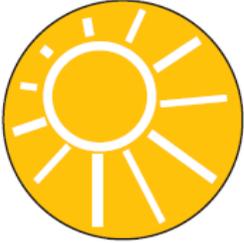
Encouraging active lifestyles



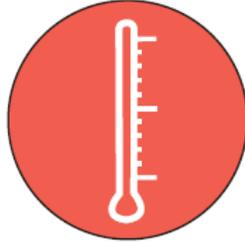
Bringing green space indoors



Optimal water and food quality



Circadian, task and natural light



Thermal, acoustic, and olfactory comfort



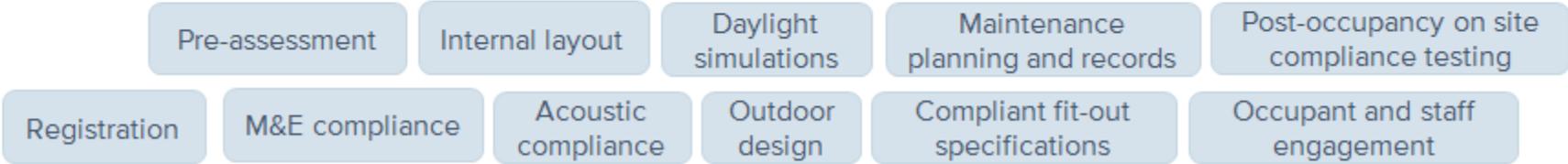
Emotional and mental support

BREEAM includes a section on Health and Wellbeing, with up to **22 credits** available

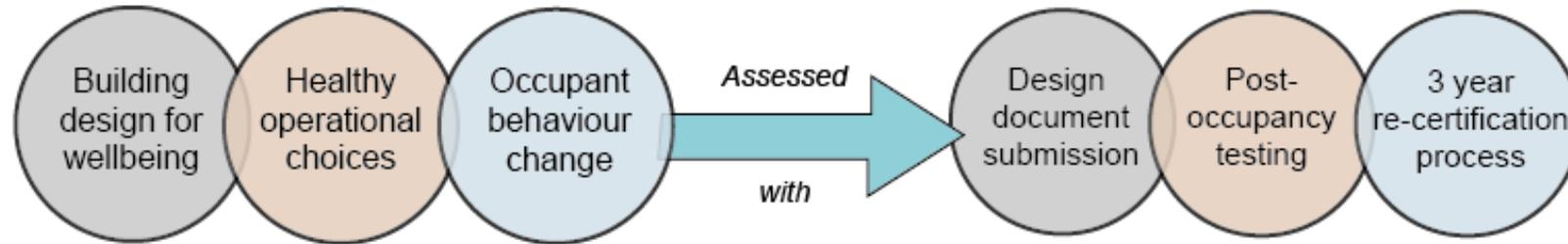
WELL includes **102 credits** worth of Health, Wellbeing and Productivity focussed targets

Certification

Evolution from Design to Operation

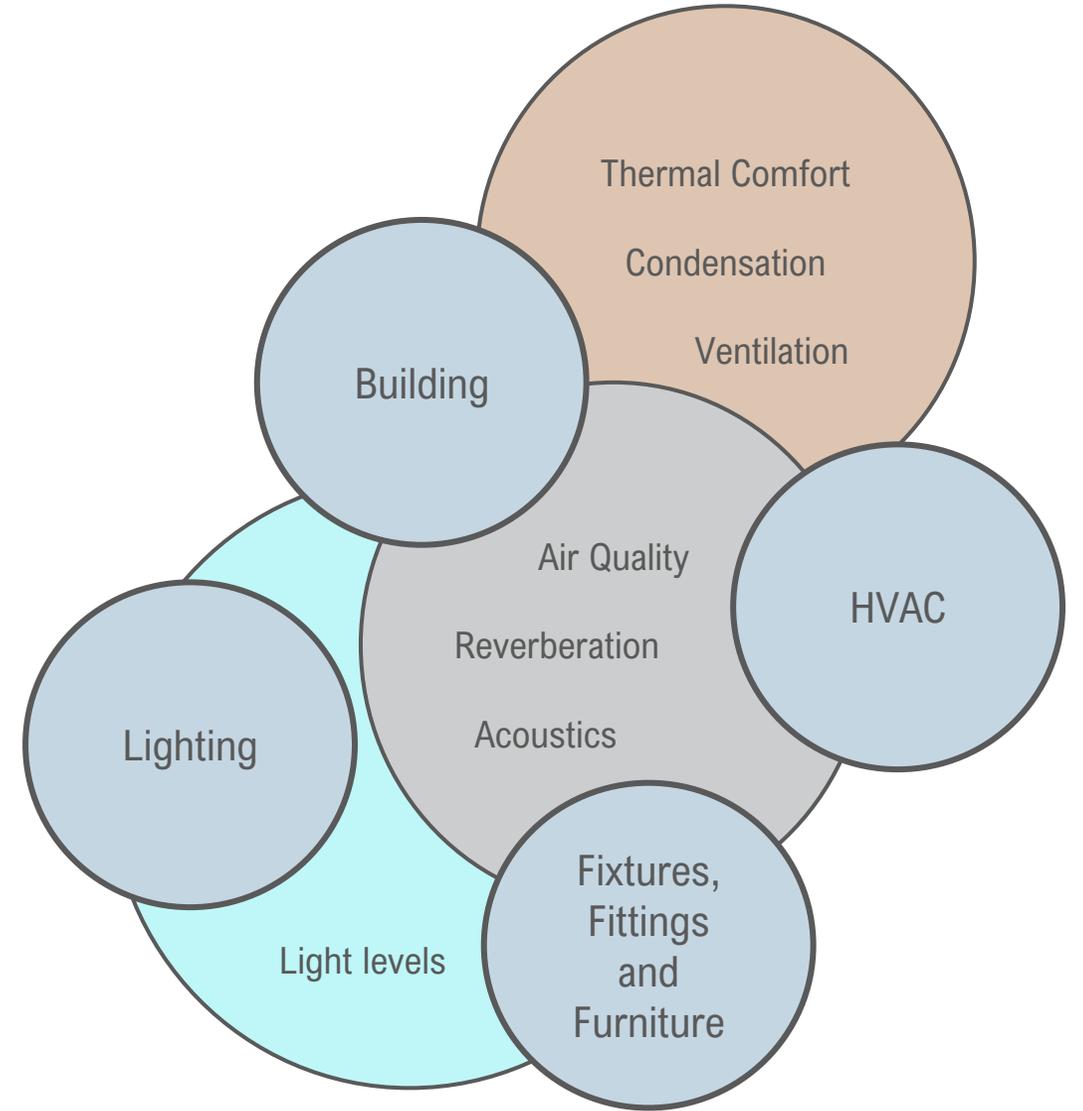
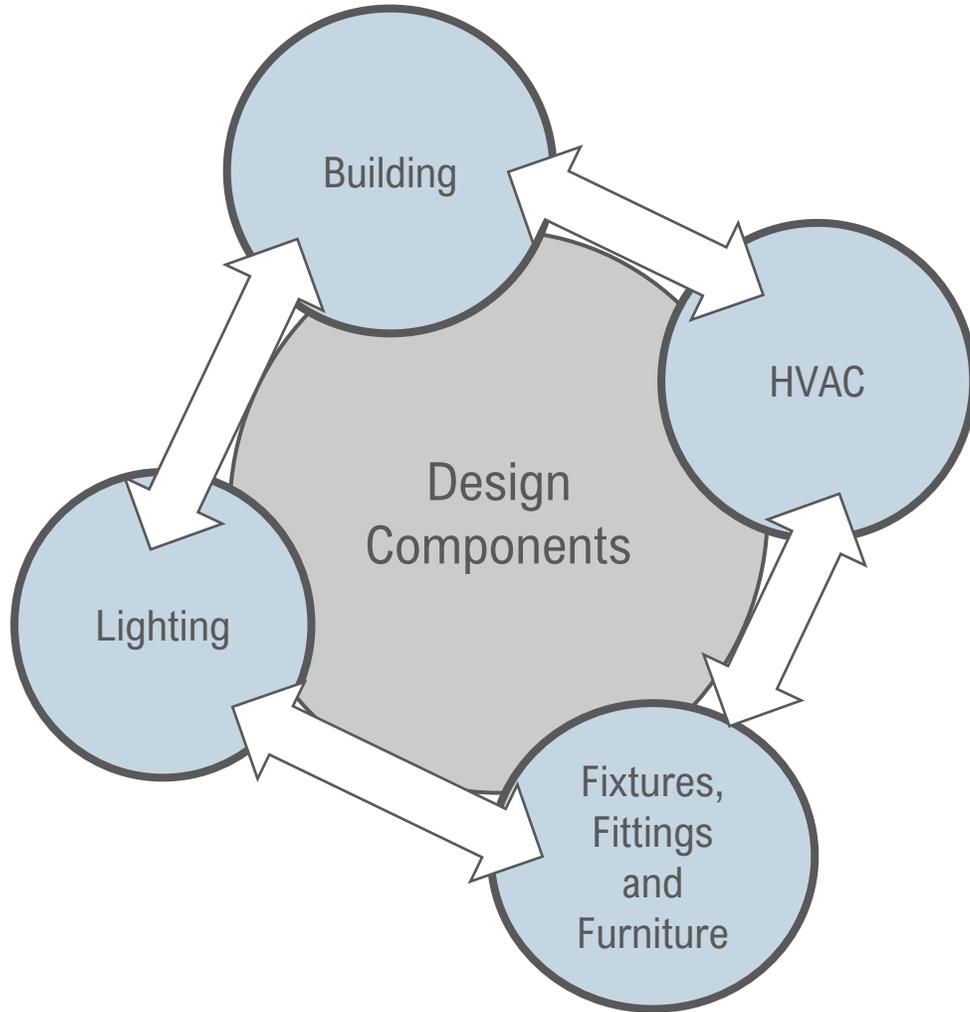


The WELL Standard Process



- Awareness of WELL requirements from early stage
- Simulation/analysis techniques play a role earlier in the design process
- Design stage consideration of evidence
- Need to ensure compliance with post-occupancy spot testing
- Highly collaborative process

Building Design for Wellbeing



The Role of Simulation

What elements of WELL can be modelled?	
WELL Concept	Simulation opportunities
Indoor Air Quality	Internal CFD
Thermal Comfort	Zonal analysis
Ventilation	Natural & mechanical feasibility
Moisture management	Condensation, mould & microbe
Reverberation	Internal material analysis
Acoustics	External intrusion sound pressure, Sound masking & barriers
Lighting	Ambient, circadian, right to light & glare

Feasibility

Bulk zonal modelling

Limited metrics

Lack of resource

Client cost

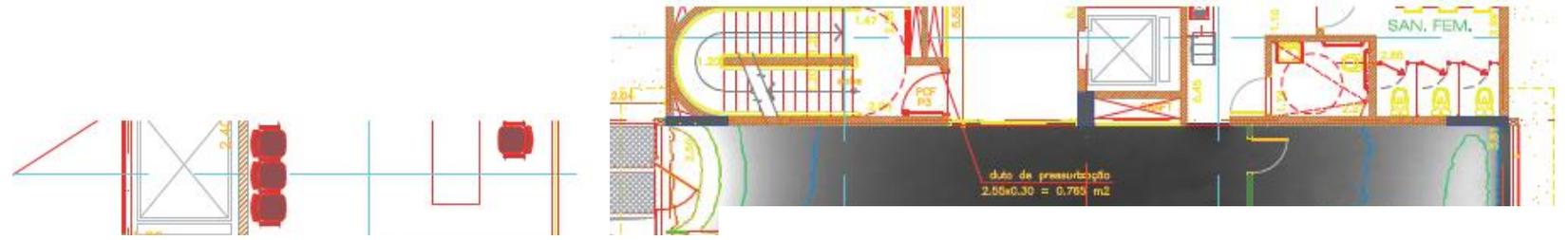
Environmental Analysis: Comfort

Coffee shop example:

- Sizing
- Part L SBEM
- BREEAM Hea03
CIBSE AM11
- DSM



Environmental Analysis: Lighting

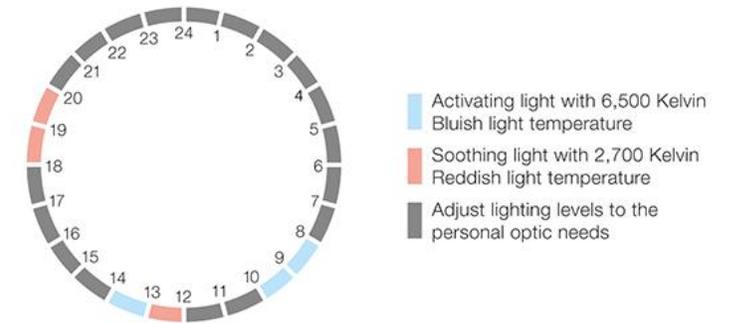
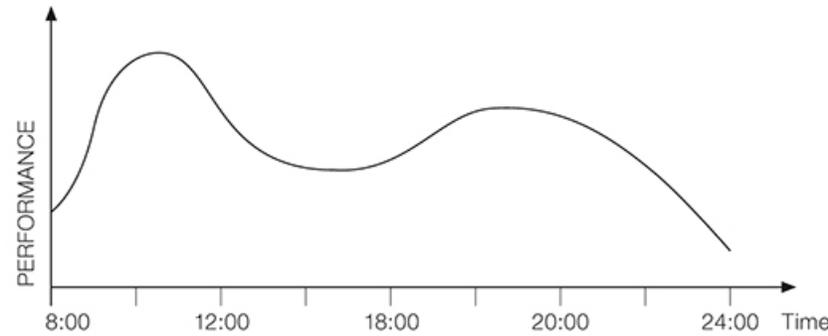


Average performance curve

Lighting needs in the course of the working day

Office example

- ADF & uniformity
- Glazing & shading optimisation
- Lux distribution
- Control



	av [lx]
Workplane	613
Floor	488
70	115
50	307

Zone:	0.750 m
	32 x 32 Points
	0.500 m
Quotient (according to LG7):	Walls / Working Plane: 0.522, Ceiling / Working Plane: 0.187.

Pieces	Designation (Correction Factor)
9	HAVELLSSYLVANIA 0047476 PanelLED 2.600 NW (1.000)

connected load: 9.94 W/m² = 1.62 W/m²/100 lx (Ground area: 38.32 m²)

<http://www.luctra.eu/inglesch/lighting-concept/biologically-light.html>

Environmental Analysis: Air Quality



Air Quality (%) by Time of Day

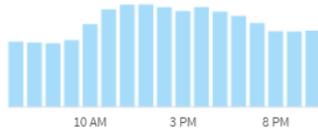


Summary

85 hours within range



CO2 (ppm)



VOC (ppm)



Stale air (ppm)



Dust (µg/m³)



<http://www.wellcertified.com/resources>

Final Thoughts

- Health, Wellbeing & Productivity are the new design metrics
- Greater focus on occupants
- Standard design & rules of thumb are insufficient
- More holistic design approaches required
- Significant opportunities for simulation



Any questions...?

Thank you

Lindsey Malcolm

www.xco2.com
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