NEW EUROPEAN BAUHAUS self-assessment method and tool

Technical Workshop

New European Bauhaus self-assessment method and tool for buildings and living spaces

Beauty KPIs – Quality of Experience

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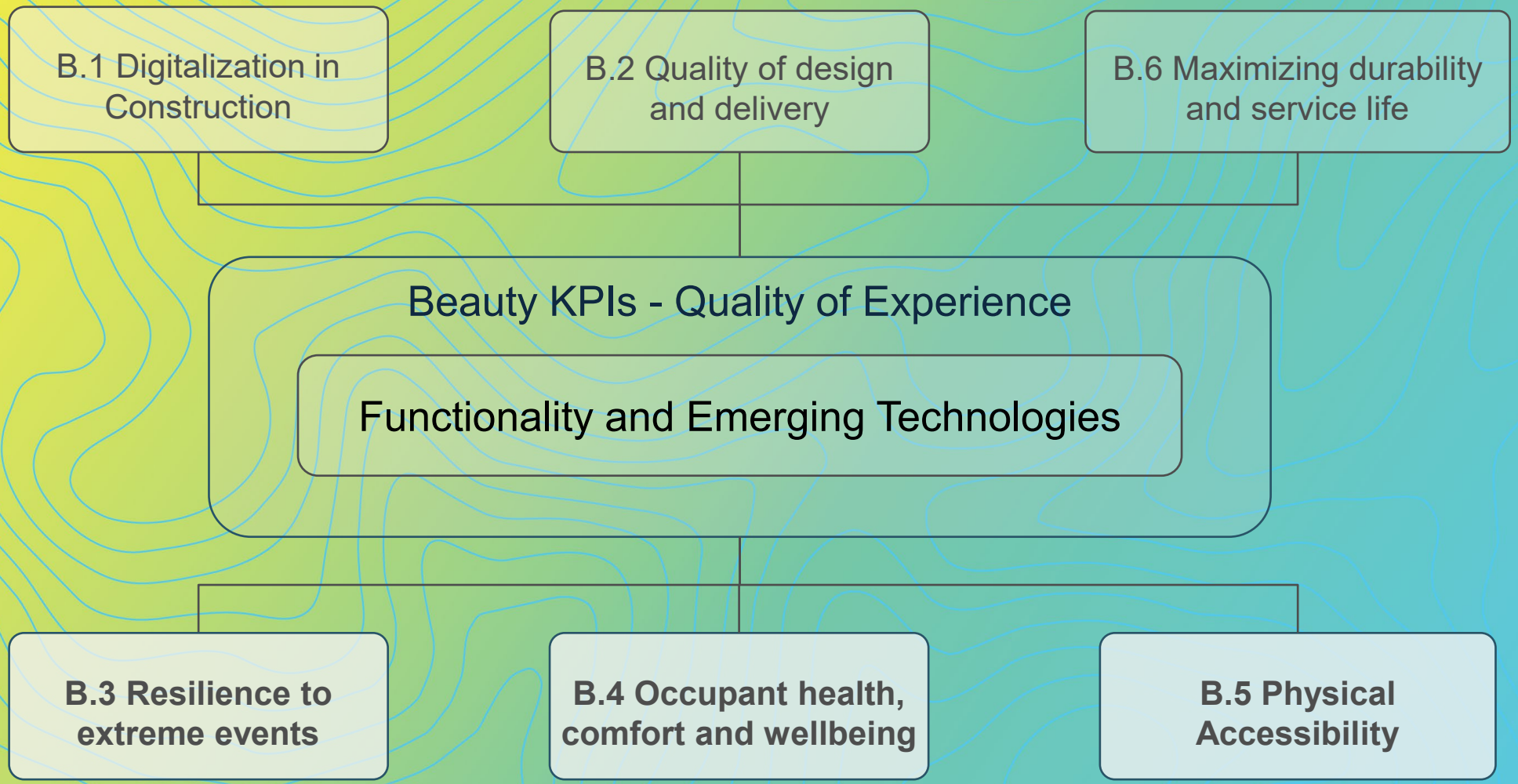
beautiful | sustainable | together


B.1 Digitalization in Construction
B.2 Quality of design and delivery
B.6 Maximizing durability and service life
Beauty KPIs - Quality of Experience
Functionality and Emerging Technologies
B.3 Resilience to extreme events
B.4 Occupant health, comfort and wellbeing
B.5 Physical Accessibility

B.3 Resilience to Extreme Events

Looks to evaluate the extent to which the project is resilient to the multiple hazards that can affect it, through the use of three indicators

B.3.1 Hazard Characterisation: evaluates the level of reliability of the hazard estimates used in the project design, for all hazards that may affect the project

B.3.2 Hazard Resilient Design: evaluates the reliability of the approach used for the hazard resistant design of structural systems, and what measures are implemented by the design to limit damage and promote rapid recovery.

B.3.3 Consequence mitigation: extent to which the project design implements measures to mitigate the consequences of extreme hazards on functionality and on the user community

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Mitigation Recovery Preparedness and Response

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Hazard	**Selection**
Select man-made hazards of relevance to the project	
Wind	✓
Floods (riverine and coastal)	
Earthquakes	✓
Landslides	
Volcanic ash	
Tsunami	✓
Select man-made hazards of relevance to the project	
Fire	✓
Blast	
Total selections	***n* hazards**

B.3 Resilience to Extreme Events

B.3.1 Hazard Characterisation: evaluates the level of reliability of the hazard estimates used in the project design, for all hazards that may affect the project

- The use of probabilistic evaluations of the hazard
- Use of site-specific evaluations of the hazard
- The complexity and reliability of the hazard evaluation method
- Consideration of climate change scenarios
- Co-incident hazards

B.3.1 is evaluated for each hazard

B.3 Resilience to Extreme Events

B.3.2 Hazard Resilient Design: evaluates the reliability of the approach used for the hazard resistant design of structural systems, and what measures are implemented by the design to limit damage and promote rapid recovery.

- Compliance of hazard resistant design with current codes of practice
- Consideration of multiple performance objectives
- Going beyond code requirements – i.e. provision of extra safety
- Structural analysis method used for the design
- Explicit hazard resilient design of non-structural and mechanical components
- Use of design features or devices to prevent/restrict hazard/hazard severity

B.3.2 is evaluated for each hazard

B.3 Resilience to Extreme Events

B.3.3 Consequence mitigation: extent to which the project design implements measures to mitigate the consequences of extreme hazards on functionality and on the user community

Focuses on design aspects that promote **survivability** (i.e. the availability of early warning) and on measures that can be taken to **restore project functionality rapidly** after a hazard event (e.g. availability of back-up systems).

- Early warning systems/alarm systems
- Evacuation routes and evacuation drills
- Accessibility for fire and rescue crews
- Hazard insurance
- Back-up systems for water, energy, communications, security, data systems
- Organizational planning for business continuity

B.3.3 is evaluated independently of hazard

B.3 Resilience to Extreme Events

B.3.1 and B.3.2 indicators are evaluated separately for each hazard, *h*, and are summed. The values of B.3.1 and B.3.2 that enter the KPI Equation are those for the hazard (among the n considered hazards) that provide the minimum sum of indicators

$$B.3.1_h + B.3.2_h = min\{(B.3.1_1 + B.3.2_1), \quad (\ldots), \quad (B.3.1_n + B.3.2_n)\},$$

$$for \ h \in \{1,2,\ldots n\}$$

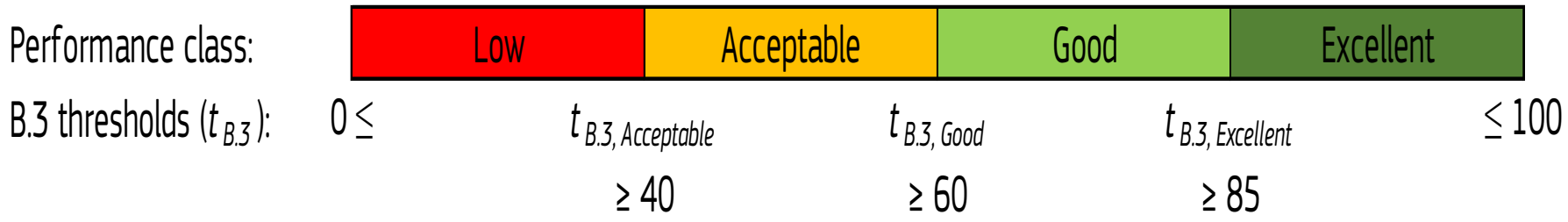
The concept is that the worst hazard performance dominates the evaluation

B.3 Resilience to Extreme Events

The KPI equation is:

$$\text{B.3} = (0.35 \cdot (B.3.1_h + B.3.2_h) + 0.3 \cdot B.3.3) \leq 100$$

Each indicator is evaluated with a score between 0-100



B.4 Occupant Health, Comfort and Wellbeing

Four main areas of project design that have been linked to occupant health, comfort and wellbeing are considered within B.4:

- *Indoor acoustic environment (B.4.1)*
- *Lighting environment (B.4.2)*
- *Thermal comfort (B.4.3)*
- *Promotion of physical movement (B.4.4)*

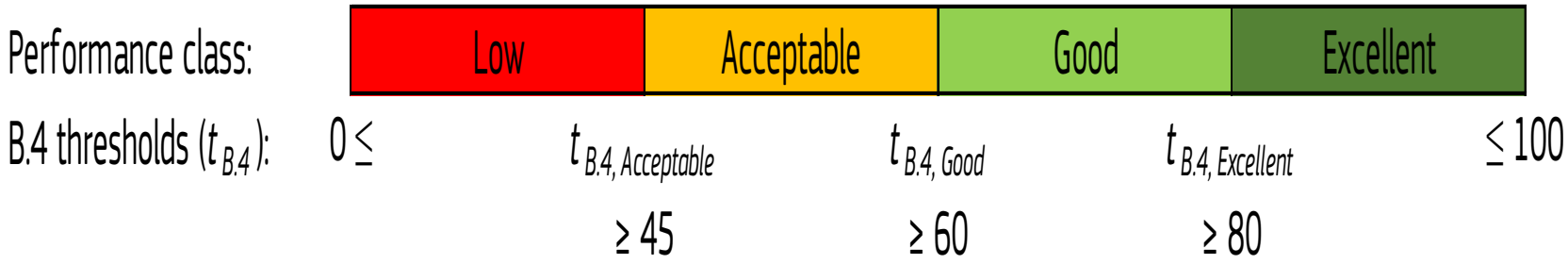
All focus on compliance with best practice standards e.g.TR 17621 (CEN, 2021c), and beyond best-practice guidance that specifically address users with diverse abilities e.g. WELL v2 (IWBI, 2020) and PAS 6463 (BSI, 2022) .

B.4 Occupant Health, Comfort and Wellbeing

The B.4 score is calculated as follows:

$$B.4 = 0.25 \cdot (B.4.1 + B.4.2 + B.4.3 + B.4.4) \leq 100$$

Each indicator is evaluated with a score between 0-100



Each of the indicators is regarded as equally important

B.4 Occupant Health, Comfort and Wellbeing

B.4.1 Indoor Acoustic Environment: evaluates the extent to which the project design provides users with a healthy and productive acoustic environment, that is void of harmful or intrusive noise, and which supports speech intelligibility.

- Consideration of metrics like reverberation time (T) and speech transmission index (STI) – as defined in standards
- Design for sound isolation and sound reducing surfaces
- Impact noise management
- Acoustic zoning
- Availability of quiet spaces
- Ability to regulate/control noise

B.4 Occupant Health, Comfort and Wellbeing

B.4.2 Lighting Environment: evaluates the extent to which the project adopts natural and artificial lighting systems that support health, wellbeing, orientation, safety and the ability to conduct tasks, for all users.

- Lighting for wayfinding – visual contrast
- Lighting for safety – entrances, steps, ramps etc.
- Light exposure and daylight design strategy (illuminance level)
- Electric light quality and glare control
- Ability to regulate/control lighting
- Avoidance of humming/buzzing from lighting

B.4 Occupant Health, Comfort and Wellbeing

B.4.3 Thermal comfort: evaluates the extent to which the design caters for the thermal comfort of diverse users.

A main parameter used in TC evaluation is the predicted mean Vote (PMVo). PMVo relates the imbalance between the actual heat flow from the body into a given environment and the heat flow required for optimum comfort.

There is therefore no one-fits-all solution - the aim is not to ensure thermal comfort for all, but rather to provide a baseline satisfaction for the largest number of people and a level of control to adjust thermal comfort level. Designers should also consider TC design effect on energy use (see Sustainability)

- Thermal performance and zoning
- Radiant thermal comfort
- Humidity control
- Enhanced operable windows

B.4 Occupant Health, Comfort and Wellbeing

B.4.4 Promotion of physical movement: evaluates the extent to which the design encourages physical movement where there are such opportunities.

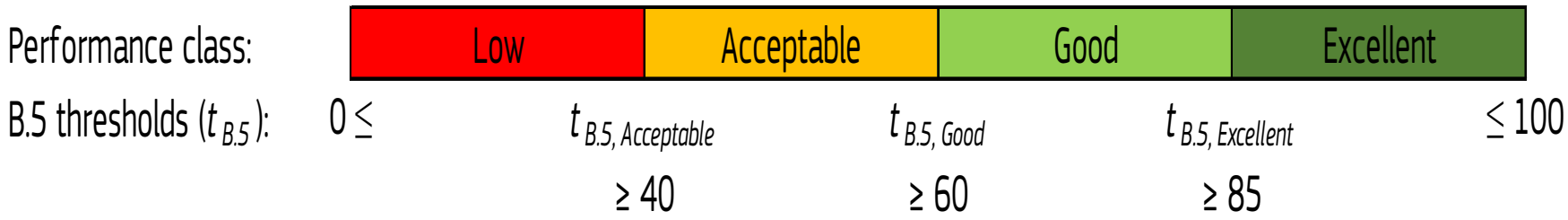
- Facilities for active occupants
- Ergonomic workstation design
- Physical activity spaces
- Site planning and selection
- Active furnishings

B.5 Physical Accessibility for Everyone

B.5 evaluates the extent to which the project design provides ease of physical access in terms of three indicators:

- *Ease of circulation (B.5.1)*
- *Safe wayfinding (B.5.2)*
- *Usability and operation (B.5.3)*.

$$B.5 = 0.33 \cdot (B.5.1 + B.5.2) + 0.34 \cdot B.5.3 \leq 100$$



B.5 Physical Accessibility for Everyone

B.5.1, B.5.2 and B.5.3 are evaluated using a similar approach, i.e.

-

- (A) Non-compliance with EN 17210 results in a zero score
- (B) Basic compliance with EN 17210 results in a minimum score
- (C) Compliance with EN 17210 using the performance criteria specified in TR 17621 (or more stringent) gives a higher score
- (D) Meeting (C) and adopting enhanced design features from beyond best-practice guidance – highest score

B.5 Physical Accessibility for Everyone

B.5.1 Ease of Circulation: evaluates the extent to which the project design enables the movement of different users through, around and between spaces and environments without barriers and without compromise to their safety and experience.

Focuses on evaluation of the adequacy of entrances, horizontal circulation (e.g. across a building floor) and vertical circulation (i.e. access to other floors).

B.5 Physical Accessibility for Everyone

B.5.2 Safe Wayfinding: evaluates the extent to which the design conveys spatial information to users to help them identify and comprehend the various elements within the environment around them.

Focuses on whether:

- sufficient visual contrast to ensure users can easily identify and comprehend the various elements within the environment
- finishes are safe, clear and void of elements or patterns which may create confusion to users
- signage, information and communication systems provide information for users to navigate and use the space independently, including alternative formats for people with specific needs.

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B.3, B.4, B.5

The assessment is ideally conducted at building level, and in the case of a neighbourhood/urban level, one or more representative buildings can be selected for the assessment. If using several buildings, calculate a weighted average score based on their prevalence.

Can be evaluated for newbuild or renovation projects

Applicable to residential and non-residential

If using several buildings, calculate a weighted average score based on their prevalence.

KPI[1]	**Indicator**	**Weight ($w_{B.i.j}$)**
Improving building resilience to extreme events (B.3)	Hazard characterisation (B.3.1)	0.35
	Hazard resilient design (B.3.2)	0.35
	Consequence mitigation (B.3.3)	0.3
Ensuring occupant health, comfort and wellbeing (B.4)	Indoor acoustic environment (B.4.1)	0.25
	Lighting environment (B.4.2)	0.25
	Thermal comfort (B.4.3)	0.25
	Promotion of physical movement (B.4.4)	0.25
Improving accessibility of the built environment for everyone (B.5)	Ease of circulation (B.5.1)	0.33
	Safe wayfinding (B.5.2)	0.33
	Usability and operation (B.5.3)	0.34

Thank you

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