# Reimagining the ICCPC: Survey 1 - Perceptions of PB Codes and Design

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Preliminary Outcomes – Survey 1 – All Questions (as of 17 August 2021)

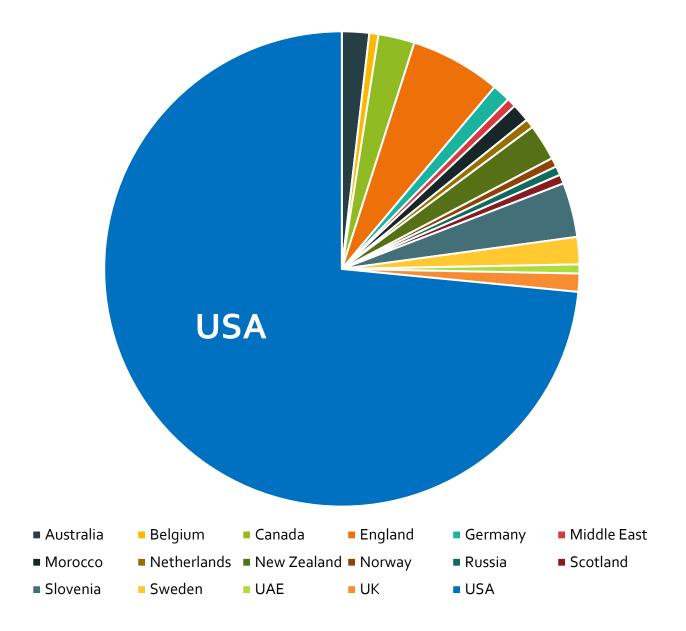
Overview and Context

- Aim was to obtain perceptions no right or wrong answer.
- Some comments about lack of definitions, but it was decided that as a first survey, not to bias by providing too many details. This means there may be different interpretations, but that is OK at this stage.
- Data are based on 170 total responses, but for several questions only about 110 responses. Total number for each question noted (N = \_ ).
  - Note that percentages for each specific question are based on number responding to that question, not a percentage of the overall respondents.
- High percentage of USA respondents, so data are somewhat indicative of USA.
  - Will take time to parse USA only data and to compare between countries, disciplines, etc. That will come later

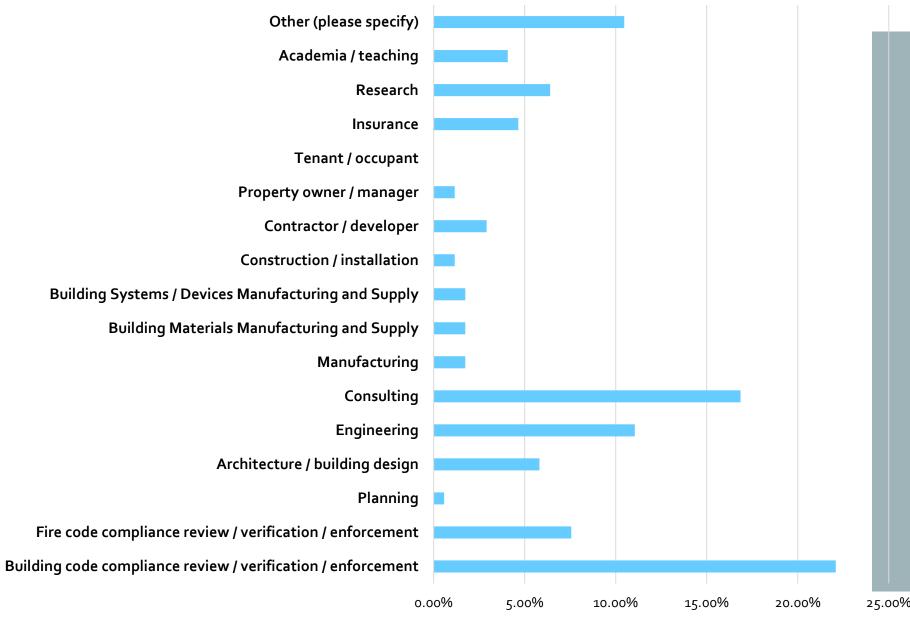
#### Section 1 -Demographics

 This section collected basic information, such as country, state, sector, job function, education, and experience.

## Q1: Country



### Q3: Sector



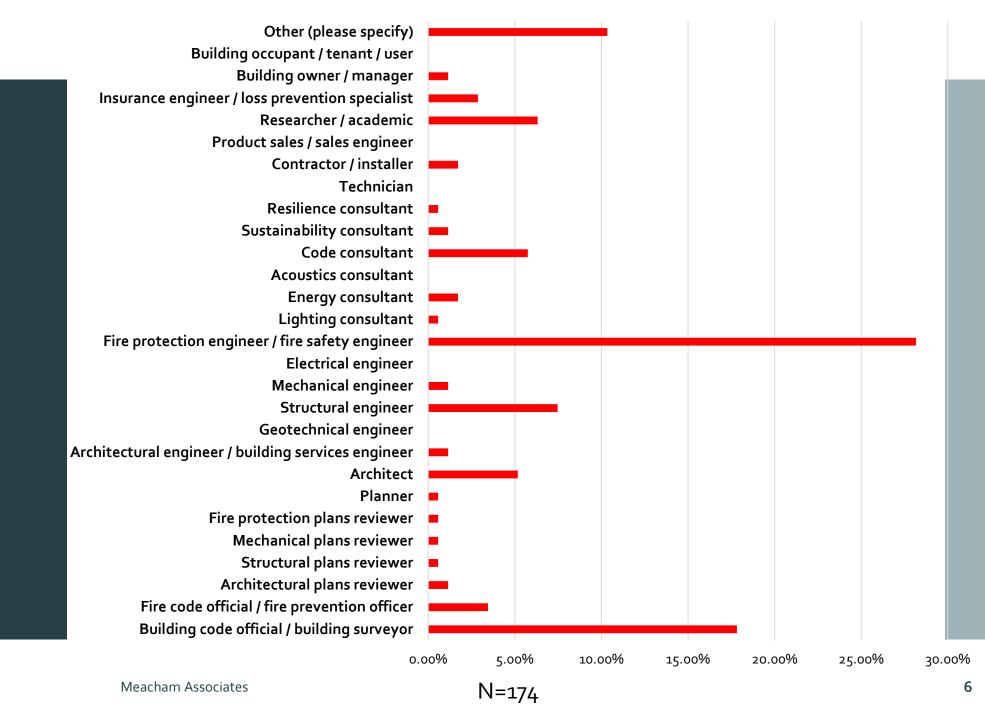
9/3/2021

Meacham Associates

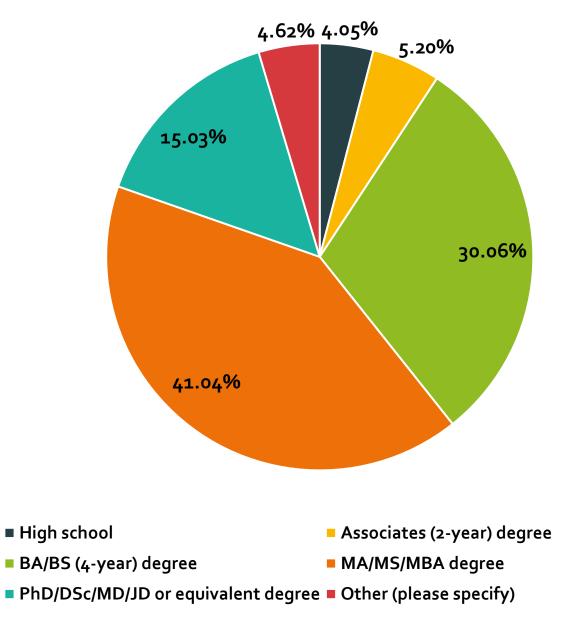
N=172

5

### Q4: Primary Work Area / Function



#### Q<sub>5</sub>: Education



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N=173

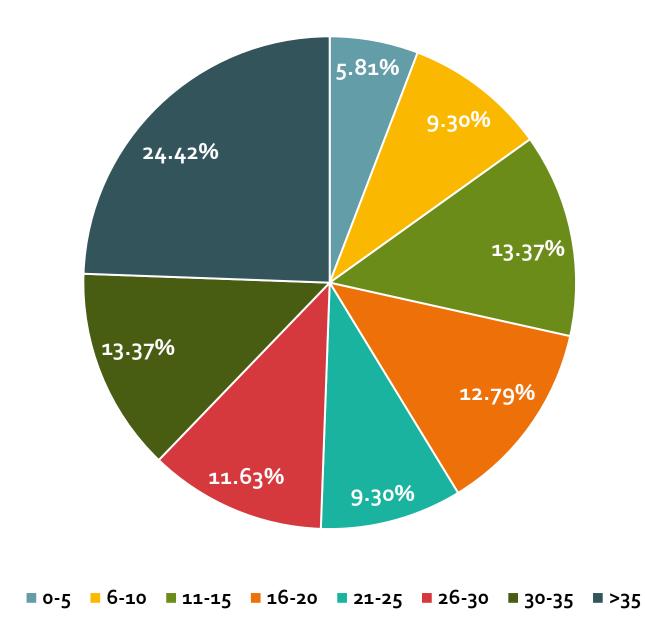
Q6: Licenses and Registration

Other (please specify)	
None / not required	
Licensed / Registered / Chartered Technician	
Incorporated Engineer (via professional society / organization)	-
Chartered Engineer or equivalent (via professional society / organization)	
Chartered Architect or equivalent (via professional society / organization)	
Chartered Planner or equivalent (via professional society / organization)	
Licensed / Registered Professional Engineer or equivalent (via legal licensing / registration)	
Licensed / Registered Architect or equivalent (via legal licensing / registration)	
Licensed / Registered Planner or equivalent (via legal licensing / registration)	
Certified Plans Examiner or equivalent	
Certified Fire Official or equivalent	
Certified Building Official or equivalent	
0.00% 5.00% 10.00% 15.00% 20.00% 25.00% 30.00% 35.00% 40.00%	

Meacham Associates

N=173

Q7: Year of Professional Experience

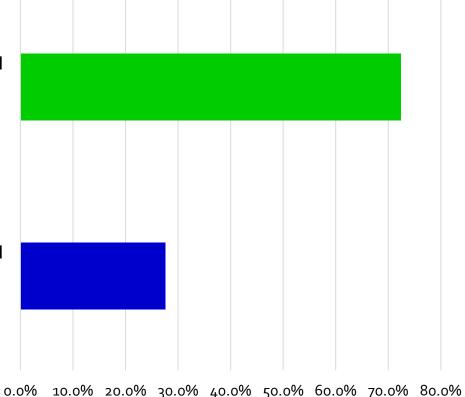


Section 2 – Overall Perceptions of PB Codes and Design

 This section focused on understanding the type of regulatory system respondents work in and how they perceive performance-based systems. Q8: I currently work in a building code / regulatory system that is primarily

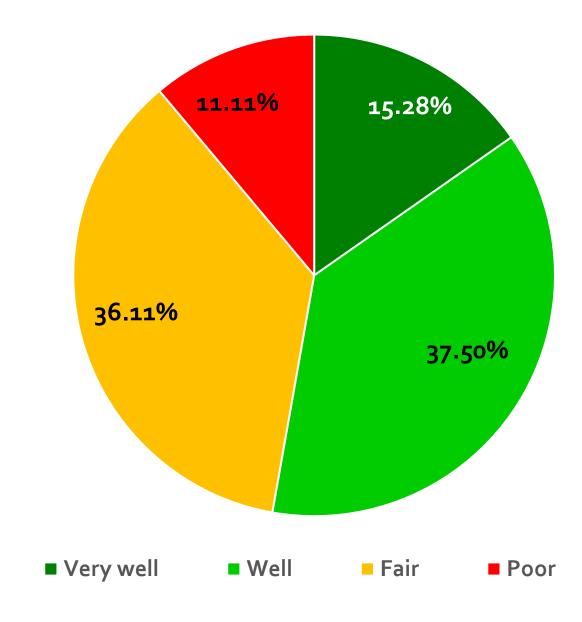
Prescriptive (i.e., a largely prescriptive-based code (regulation) establishes the regulatory requirements)

Performance-based (i.e., a performance-based code (regulation) establishes the regulatory requirements)

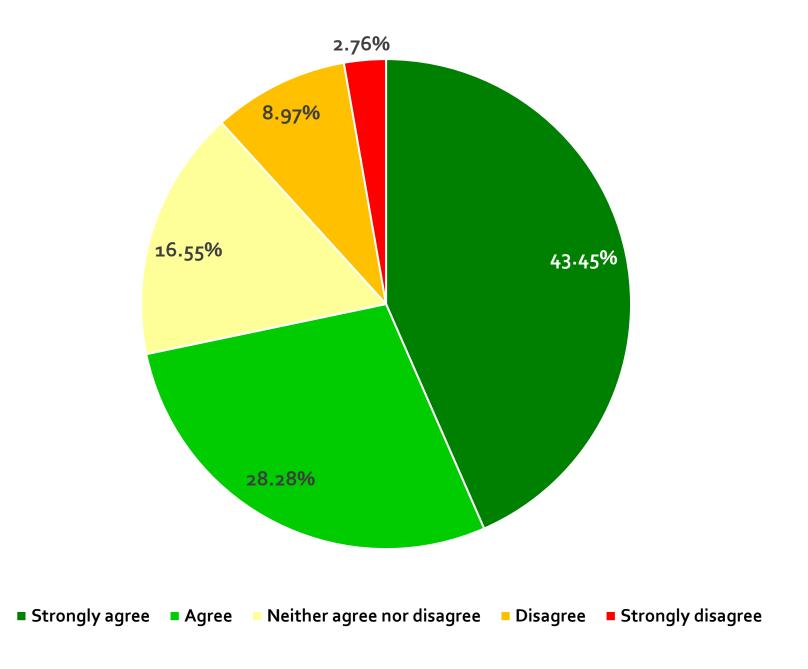


N=145

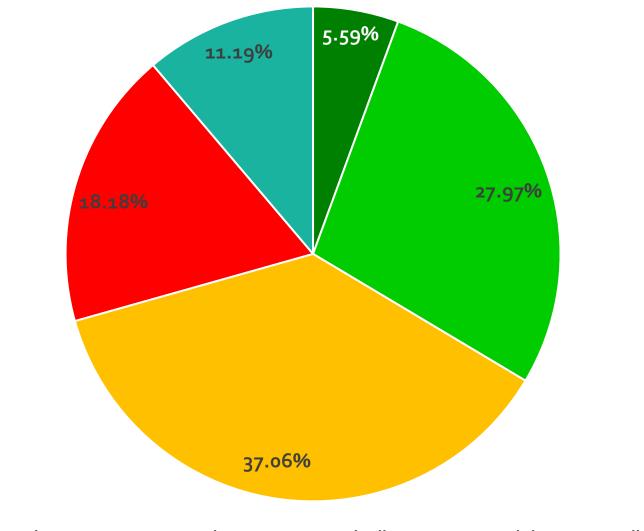
Q9: Please indicate how well you think the building regulatory system in your country / jurisdiction works today in facilitating well-performing buildings.



Q10: I support the concept of a performancebased structure for building codes (regulation)

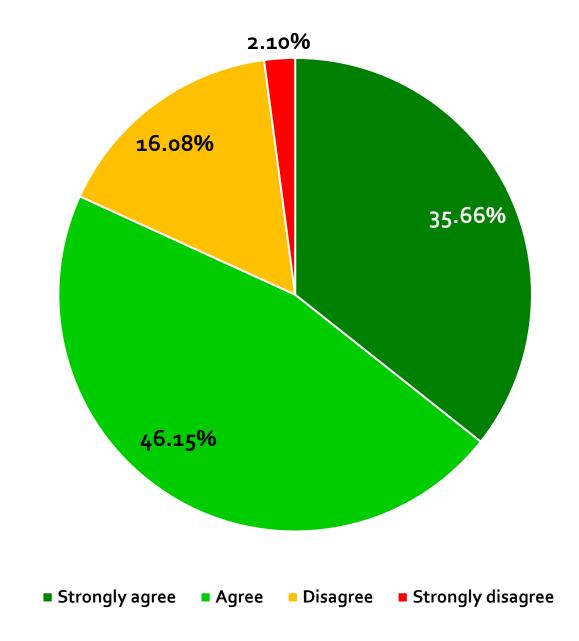


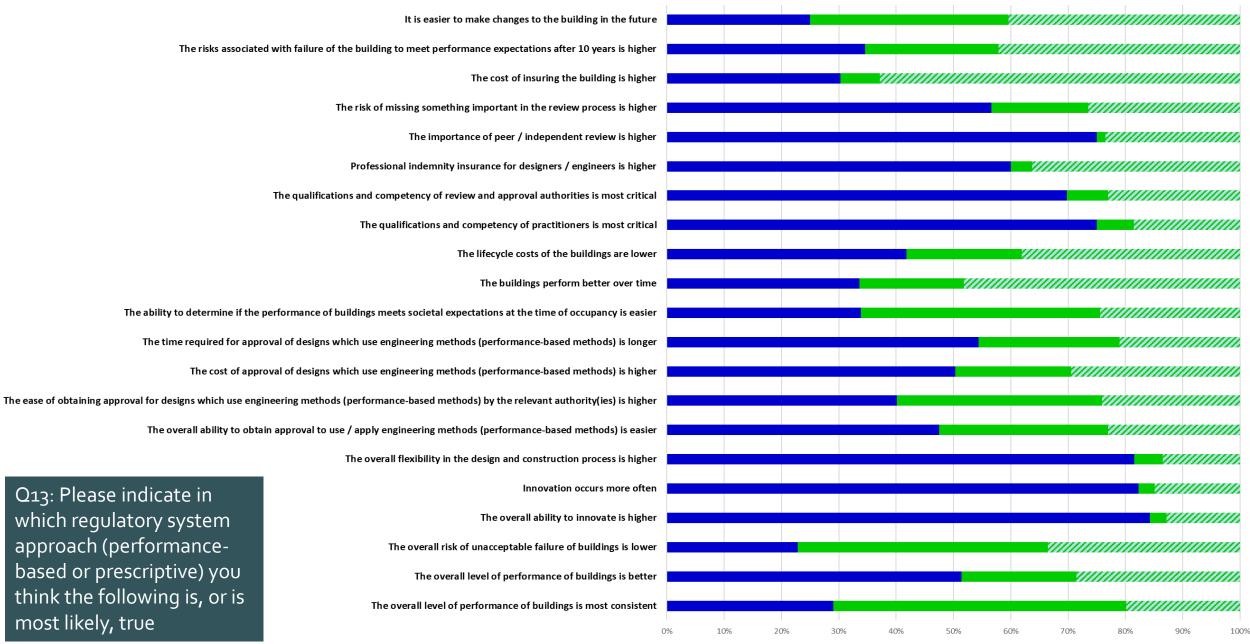
O11: I think that the performance-based building code that is being used or that is available to be adopted and <u>used</u> in my country or jurisdiction, and the necessary regulatory infrastructure to support its use (i.e., acceptable compliance documents and means of verification; adequate support mechanisms for review and approval of PB designs; appropriate system for practitioner qualifications; appropriate insurance structures; etc.), is adequate, appropriate and can be used with a high degree of confidence and comfort.



Strongly agree Agree Disagree Strongly disagree No opinion / not applicable

Q12: Regardless of my answer to Q 11, I think it is possible to develop and implement a performance-based building code (regulation), and supporting building regulatory system infrastructure (i.e., acceptable compliance documents and means of verification; adequate support mechanisms for review and approval of PB designs; appropriate system for practitioner qualifications; appropriate insurance structures; etc.), that I would be comfortable with and that I could use with confidence.





Prescriptive-based code (regulation) system

N=142

About the same in either system

Performance-based code (regulation) system Meacham Associates

Q14: Please indicate the relative importance of the following attributes The existence of a 'recognized' independent third party / peer review mechanism

Qualifications and competency of those reviewing and approving performance-based design

Confidence in tools (e.g., computational models) used in performance-based design

Qualifications and competency of those undertaking performance-based design

Cost of approval of performance-based analysis and design approaches to demonstrate acceptable performance

Cost of approval to use innovative construction methods

Cost of approving innovative materials and systems

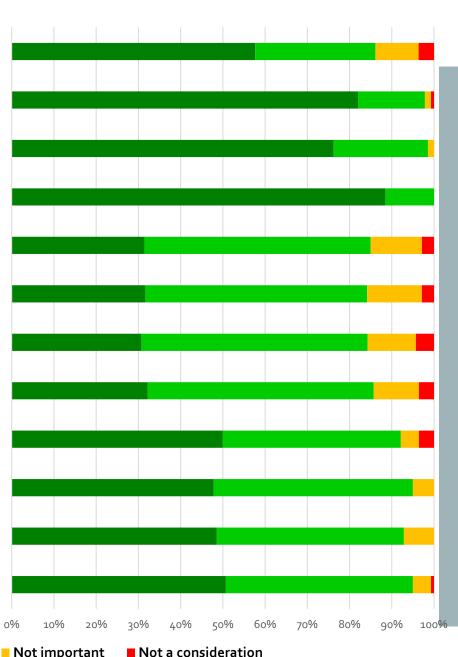
Cost of approving innovative design features and attributes

Ability to apply performance-based analysis and design approaches to demonstrate acceptable performance

Ability to innovate in construction methods

Ability to use innovative materials and systems

Ability to innovate in design features and attributes



Very important

Important Not important

N=140

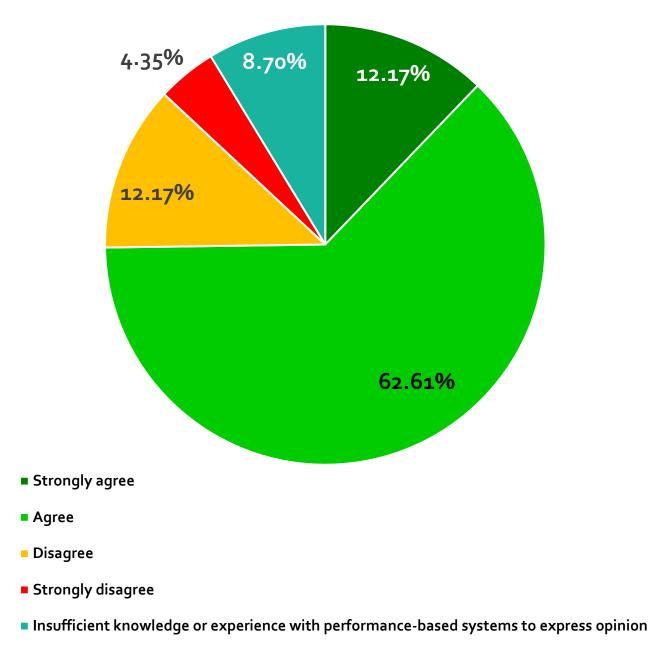
17

Section 3 – Structure of PB Codes and Major Components This section is aimed at understanding perspectives and preferences regarding the general structure of a performance-based building code (regulation) and of the major components. The most widely used structure includes most of the following components (note that different terms are sometimes used):

- the 'high-level' policy or societal goals to be achieved through compliance with the building code (regulations), such as occupant health, safety and welfare, environmental sustainability, resilience, etc. (these can sometimes be in enabling legislation);
- objective statements, which provide clear statements / descriptions of the objectives to be achieved in order to meet the policy- / societal-level goals;
- functional statements, which provide qualitative requirements for buildings or specific building elements (features) that describe how the objectives can be met;
- performance requirements, which provide actual requirements in terms of performance criteria or expanded functional descriptions against which compliance with functional statements will be assessed / performance will be verified;
- acceptable solutions, which describe means by which compliance with the code (regulation) can be demonstrated (including documents that lay out requirements that are 'deemed-to-satisfy' the code, and engineering methods which describe an acceptable analysis and design process); and
- methods of verification, which are used in support of the acceptable solutions, such as test standards, test methods, analytical methods, and computational methods.

There may also be other components, such as risk or performance groups, risk or performance levels, and design basis loads.

Q15: The framework overviewed in the introduction above remains appropriate, sufficiently comprehensive and robust enough to continue to be used as the basic structure for performance-based building codes (regulation)



Q18: Please indicate in which regulatory system approach (performancebased or prescriptive) you think the following is, or is most likely, true

The overall performance of a building, designed to meet the code (regulatory) requirements, will be better known

The resilience of a building designed to meet the code (regulatory) requirements, given expected events that may occur over the...

The risks to occupants in a building designed to meet the code (regulatory) requirements, given expected events that may occur over...

The performance of a building designed to meet the code (regulatory) requirements, given expected impacts over the building's lifetime, is...

The use of different but acceptable means and methods to demonstrate compliance with regulatory requirements is most readily accepted

The pathway to gaining acceptance for various means and methods to demonstrate compliance with regulatory requirements is most clear...

Recognition that there may be multiple acceptable means and methods to demonstrate compliance with regulatory requirements is most clear

The criteria (benchmark values, units of measure, etc.) used to demonstrate compliance with regulatory requirements are most clear

Means and methods to demonstrate compliance with regulatory requirements is most clear

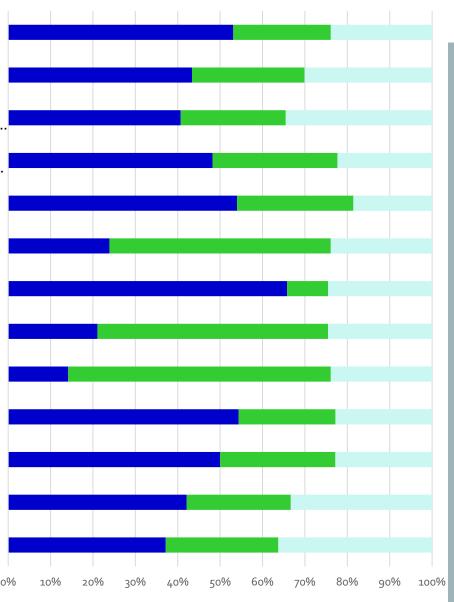
Statements that describe the expected performance of the completed building and its materials, systems and features, and how that...

Statements related to how the building and its materials, systems and features are expected to perform in the finished building are most clear

Statements related to how compliance with the building code (regulation) will achieve the societal (policy) goals are most clear

The overarching societal (or policy) goals intended to be met by the building code (regulation) are most clear

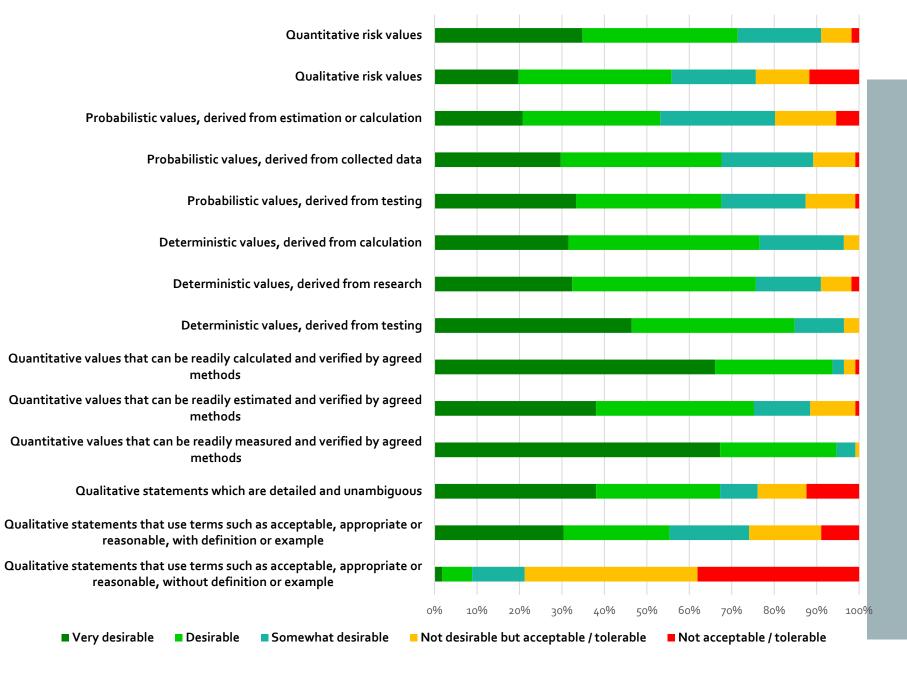
Performance-based code (regulation)



Prescriptive-based code (regulation)

N=115

Q19: Please indicate the desirability of different forms of benchmarks to demonstrate compliance / verify performance



N=114

**O20:** Please indicate how desirable the following approaches would be for building categorization Providing tolerable levels of building performance for the hazards / threats that the building or its occupants might face

Providing quantified measures of the hazards / threats that the building or its occupants might face

Allocating building use types into groups based on the desired resilience performance of the building against events that might impact the building

Allocating building use types into groups based on the potential risk of building failure from events that might impact the building

Allocating building use types into groups based on the potential risk to occupants from events that might impact the building

Having only occupancy or use groups, including reference to risk or vulnerability

Having only occupancy or use groups, with no reference to risk or vulnerability

Very desirable Desirable Somewhat desirable Not desirable but acceptable / tolerable



100%

Not acceptable / tolerable

O21: To what extent are the following measures / indicators of building performance desirable?

Metrics / values related to the affordability of the building to different socio-economic levels Metrics / values related to the guality of the building Metrics / values related to accessibility and usability of the building by people of all abilities Metrics / values related to climate-harming potential of the building Metrics / values related to carbon footprint of the building Metrics / values related to some sustainability measure of the building Metrics / values related to energy performance of the building Metrics / values related to resilience of the building and its systems Metrics / values related to occupant safety from moisture Metrics / values related to occupant safety from fire Metrics / values related to occupant safety from structural collapse Metrics / values related to occupant safety during normal use of the building Metrics / values related to occupant health and wellbeing 0.00%

> Very desirable Desirable

Somewhat desirable

N=114

Not desirable but acceptable / tolerable

60.00%

40.00%

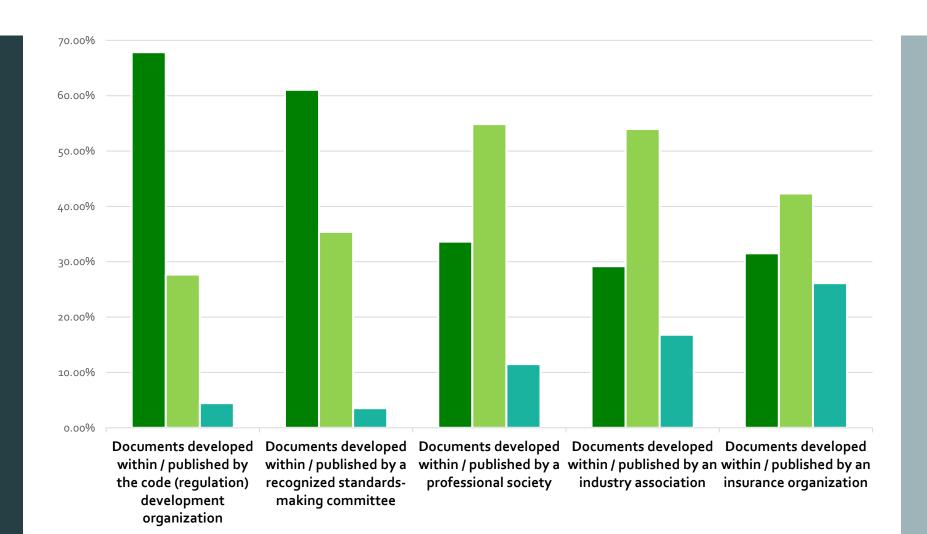
20.00%

Not acceptable / tolerable

80.00%

100.00%

Q22: How important is it that the different types of documents be adopted by reference in the building code (regulation) for their use to be acceptable in demonstrating regulatory compliance and/or verifying that the regulated performance has been achieved?



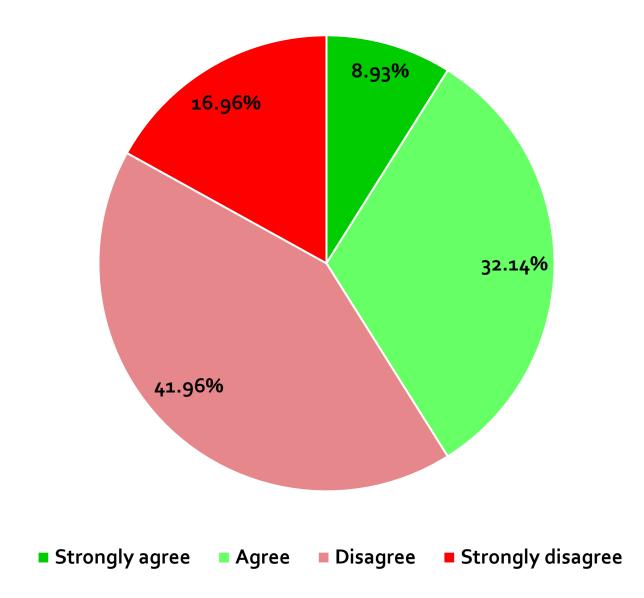
- Must be referenced by the code (regulation) to be acceptable
- Helpful to be referenced by the code (regulation) but not required to be referenced to be acceptable
- Not required to be referenced by the code (regulation) to be acceptable

80.00%

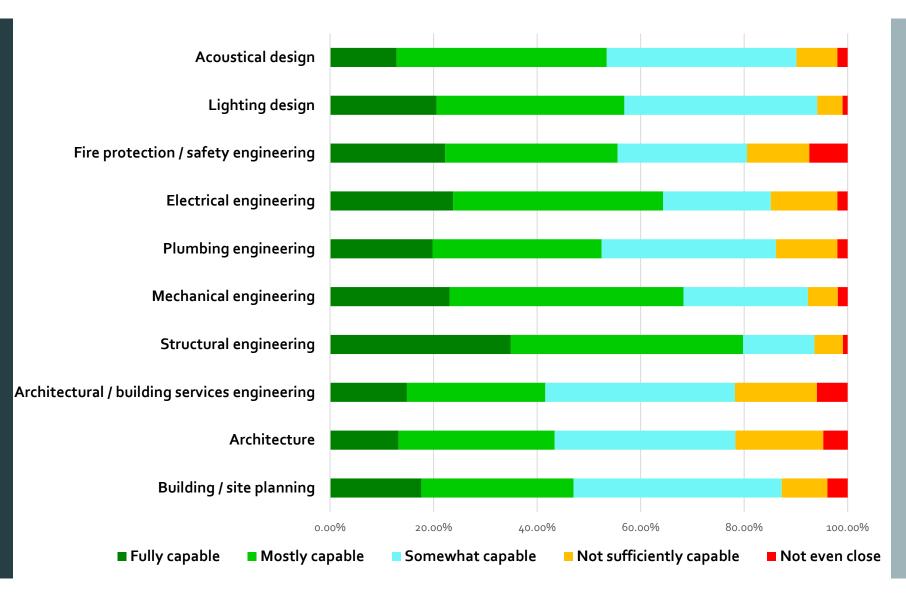


Section 4 – PB Design Approaches  In this section, respondents were asked several questions about how they perceived the capacity for undertaking and reviewing PBD across disciplines, based on current guidelines, and so forth.

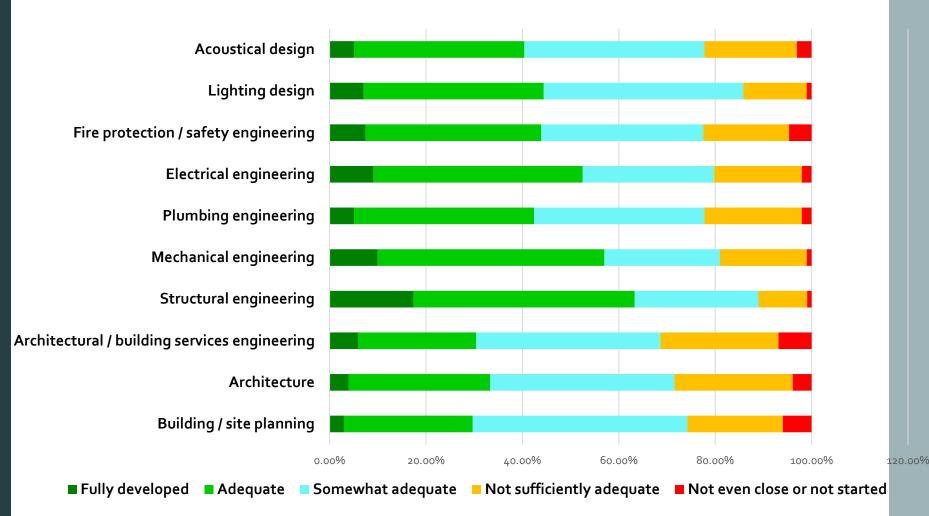
Q23: In general, I think the expertise, capability, data, tools and methods are currently adequate to support robust performance-based designs for most or all aspects of building design.



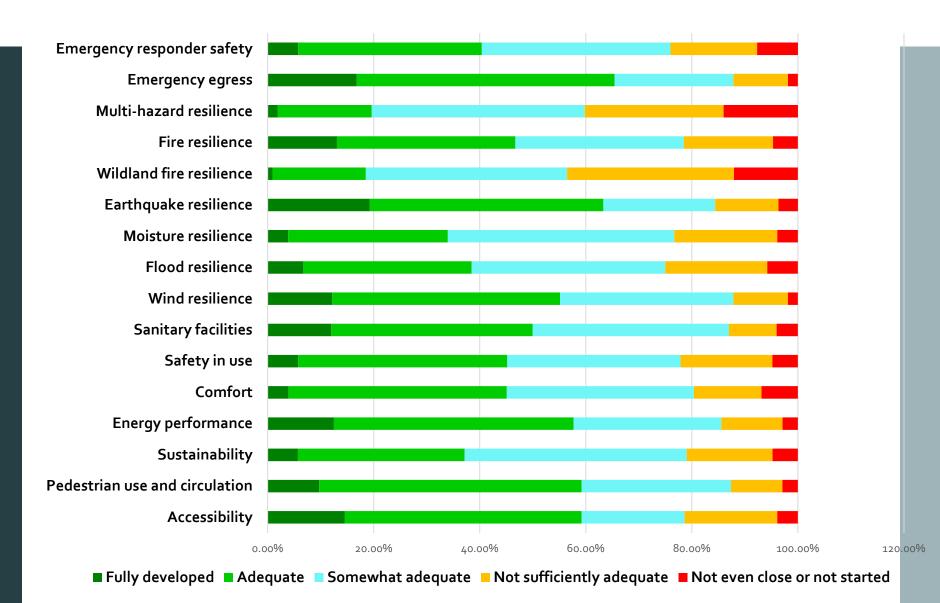
Q24: Please provide your opinion regarding the current capability of the following to produce robust PBDs



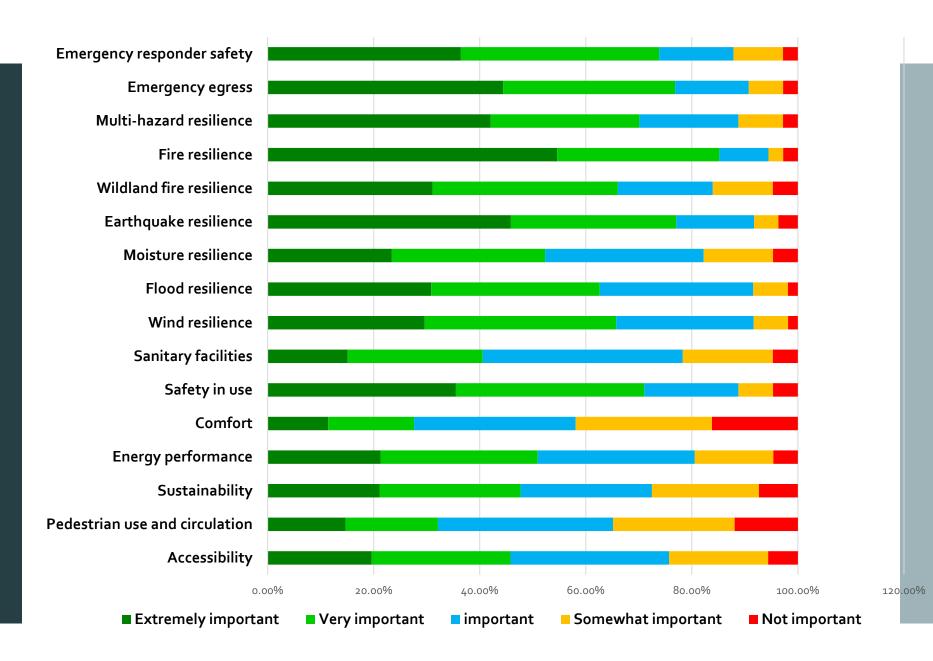
Q25: Please provide your opinion regarding the current adequacy of design standards, guidance and methods of verification for performance-based design within the following disciplines.



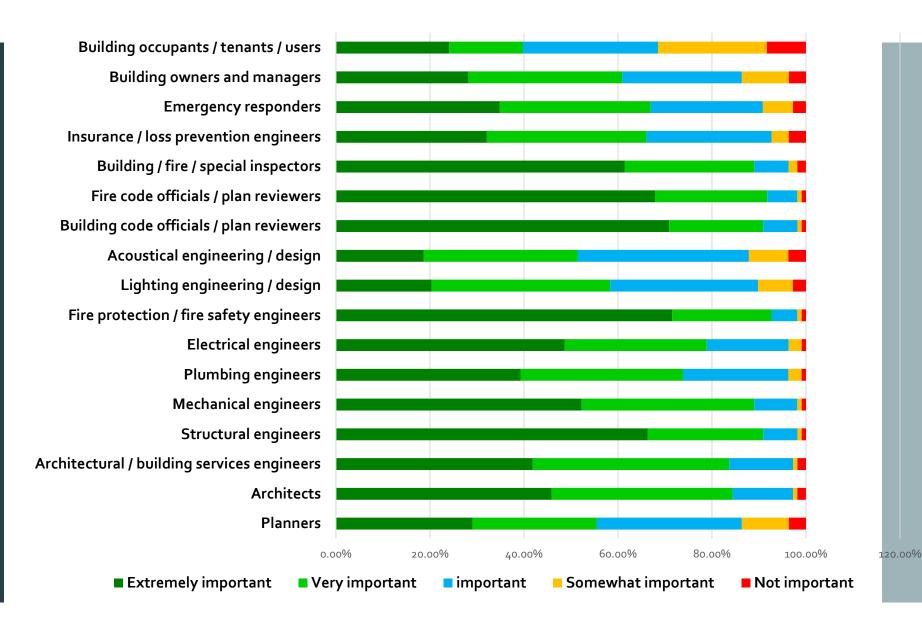
Q26: Please provide your opinion regarding the current capability to develop robust performance -based design for the following building performance objectives.



Q27: Please provide your opinion regarding the importance of third party / peer review of performancebased design for the following building performance objectives.



Q28: Please provide your opinion regarding the importance of investing in education, training, qualifications and competency for the following



Section 5 – Additional Comments  In this section, respondents were asked to provide any additional input related to what to avoid, or what to include, in PB code.

• Note – the full set of responses to Questions 29 and 30 is provided in a separate PDF file.

Key *Preliminary* Summary Points

- Distribution of response from different sectors good, but overall, more data would be better.
  - Survey will stay open if more people want to respond.
- Only a little more than half think current system works well or very well (performance or prescriptive)
- More than 80% believe that a robust PB building code system can be developed and implemented.
- Qualifications, competency, ability to innovate, increasing confidence in verification are key issues.
- Quantification of performance, strong linkage to methods of design and verification / compliance are critically-important issues.
- Peer review, investment in training and education, critical.

# Thank you!

 I would like to express my sincere appreciation to all who took the time to complete Survey 1 and provide their perceptions of, and comments on, performance-based codes and design. This input will be very helpful in reimagining the ICCPC. For anyone else who would like to add their input, Survey 1 will remain open until September 30. Also, please watch for future surveys, roundtable discussion and workshops. Thank you!