

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

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Survey 1 – Comparison of USA and Non-USA Responses

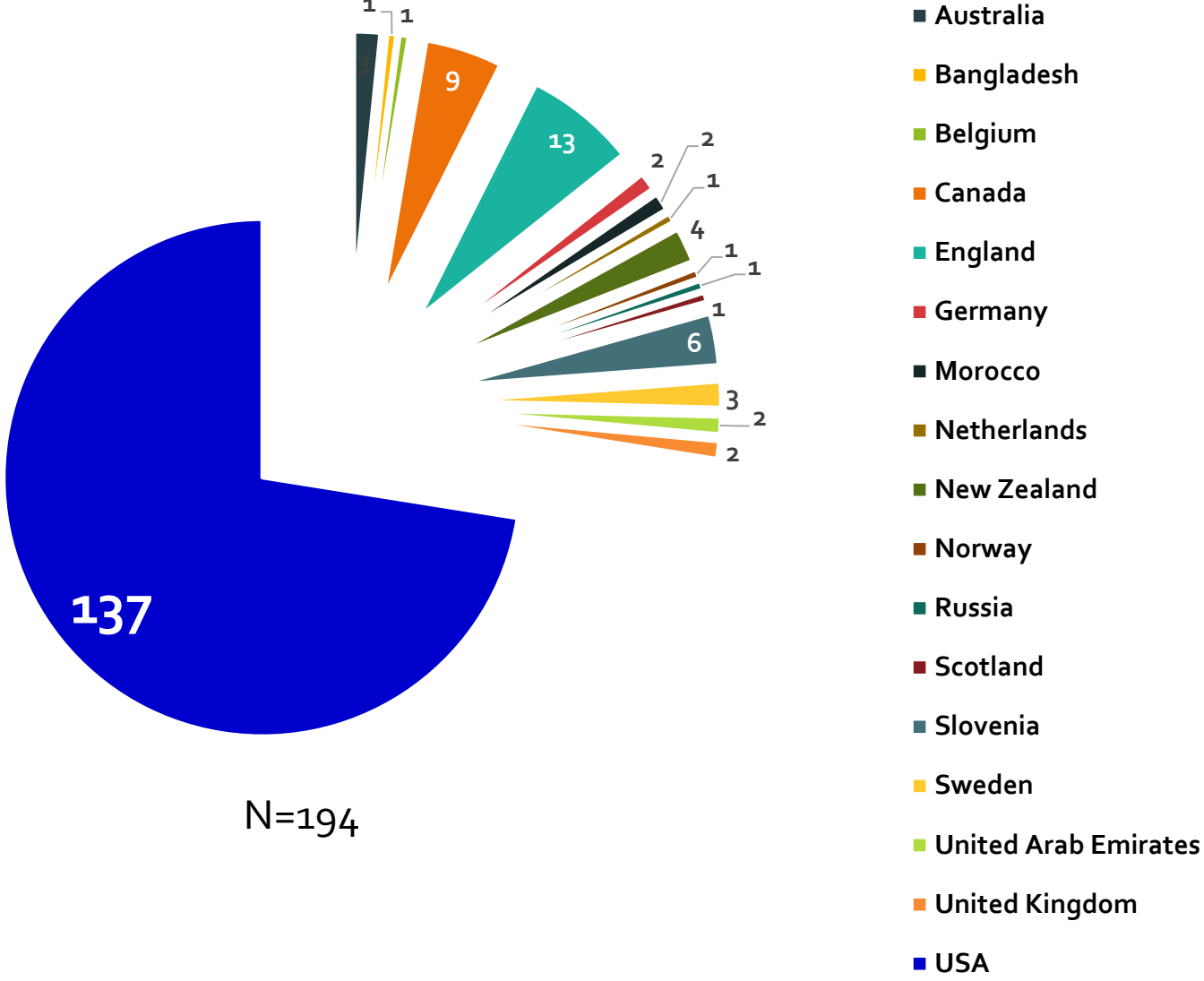
# Overview and Context

- 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.
- There were 194 total responses, but for several questions, only about 130 responses were provided. 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.
- **This presentation compares USA with non-USA respondent data. It also compares some intra-USA responses.**

# Section 1 - Demographics

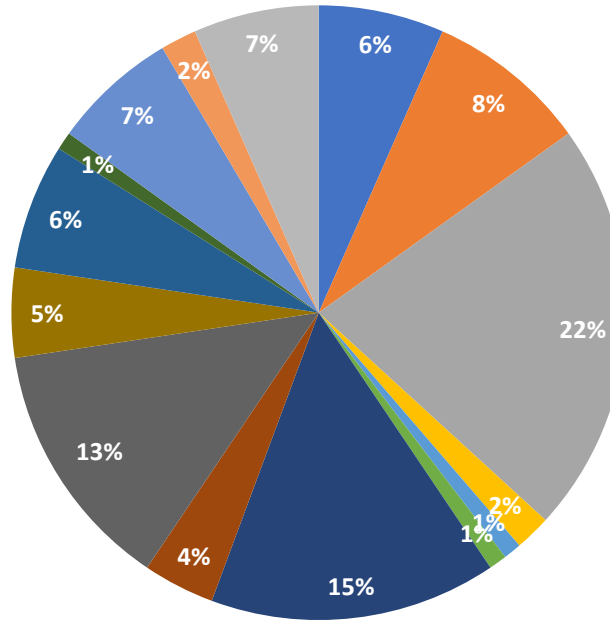
- This section collected basic information, such as country, state, sector, job function, education, and experience.

# Q1: Country

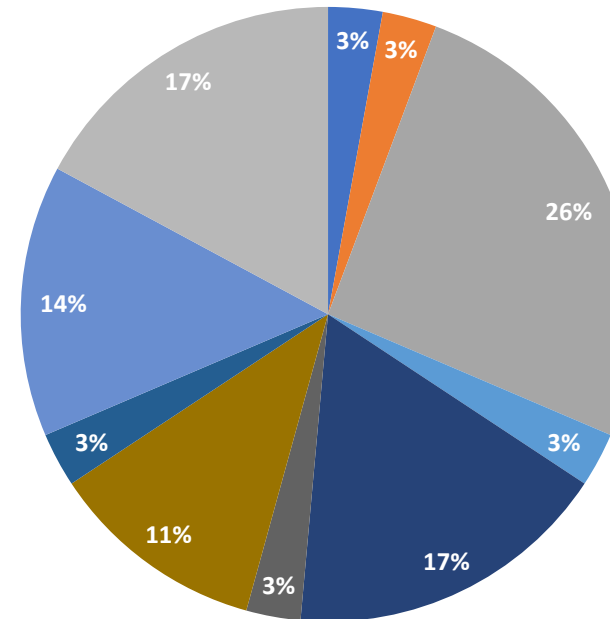


# Q3: Sector

USA  
N=106



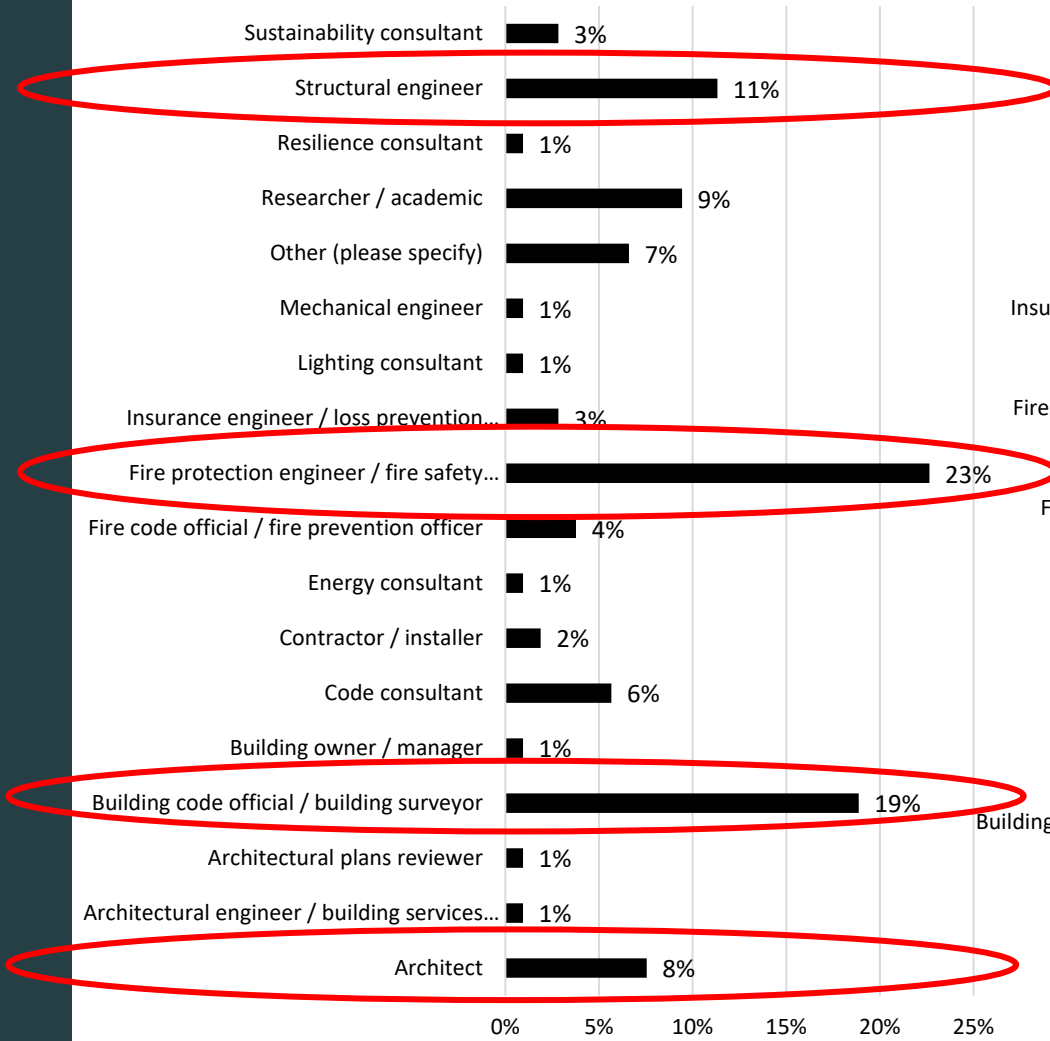
Non-USA  
N=35



- Academia / teaching
- Architecture / building design
- Building code compliance review / verification / enforcement
- Building Materials Manufacturing and Supply
- Building Systems / Devices Manufacturing and Supply
- Construction / installation
- Consulting
- Contractor / developer
- Engineering
- Fire code compliance review / verification / enforcement
- Insurance
- Manufacturing
- Other (please specify)
- Property owner / manager
- Research

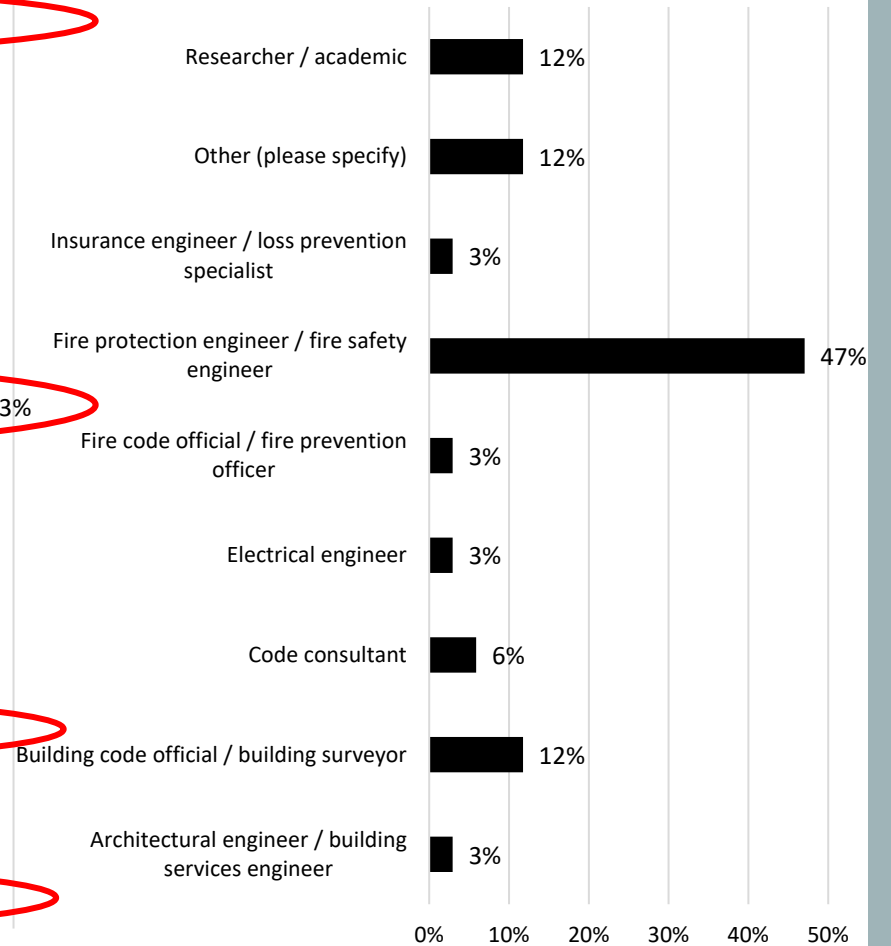
# Q4: Primary Work Area / Function

## USA



N=106

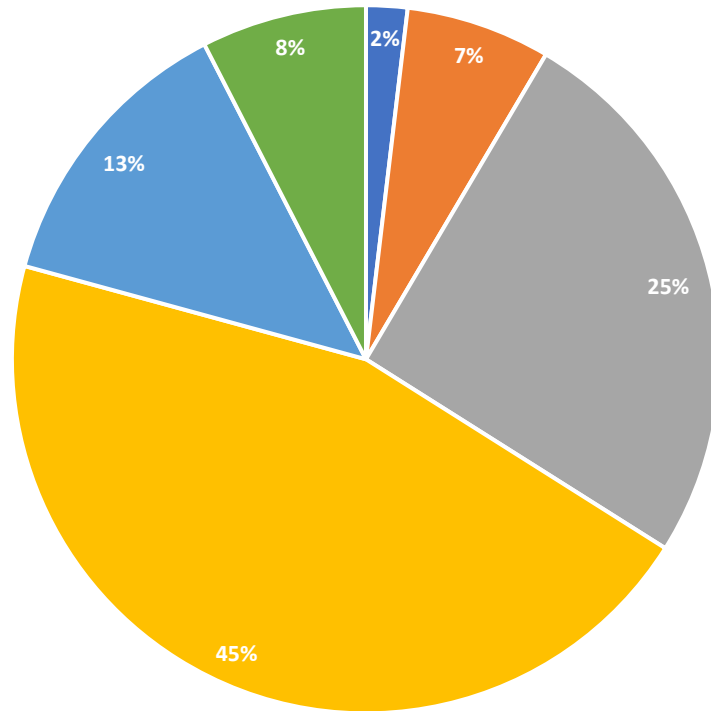
## Non-USA



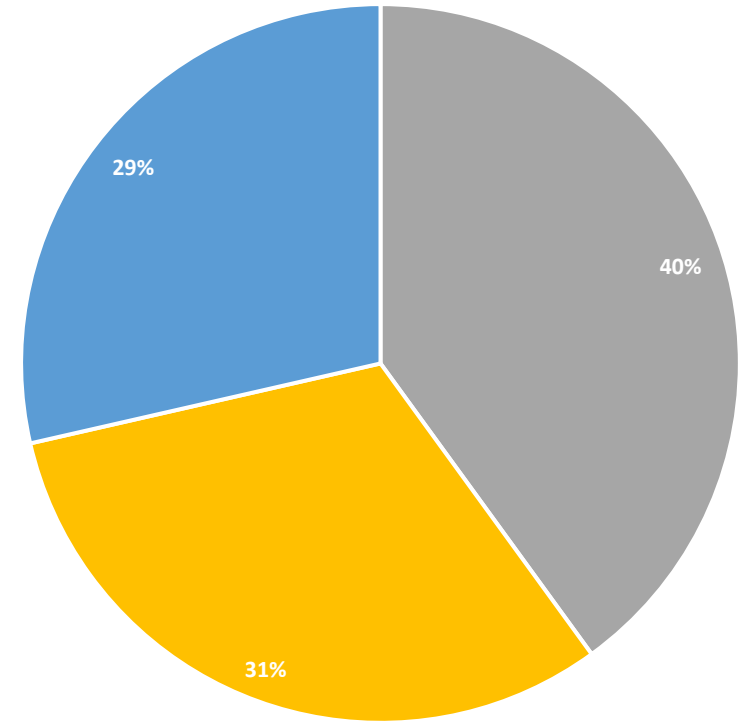
N=34

# Q5: Education

Highest Level of Education for USA Respondents



Highest Level of Education for non-USA Respondents

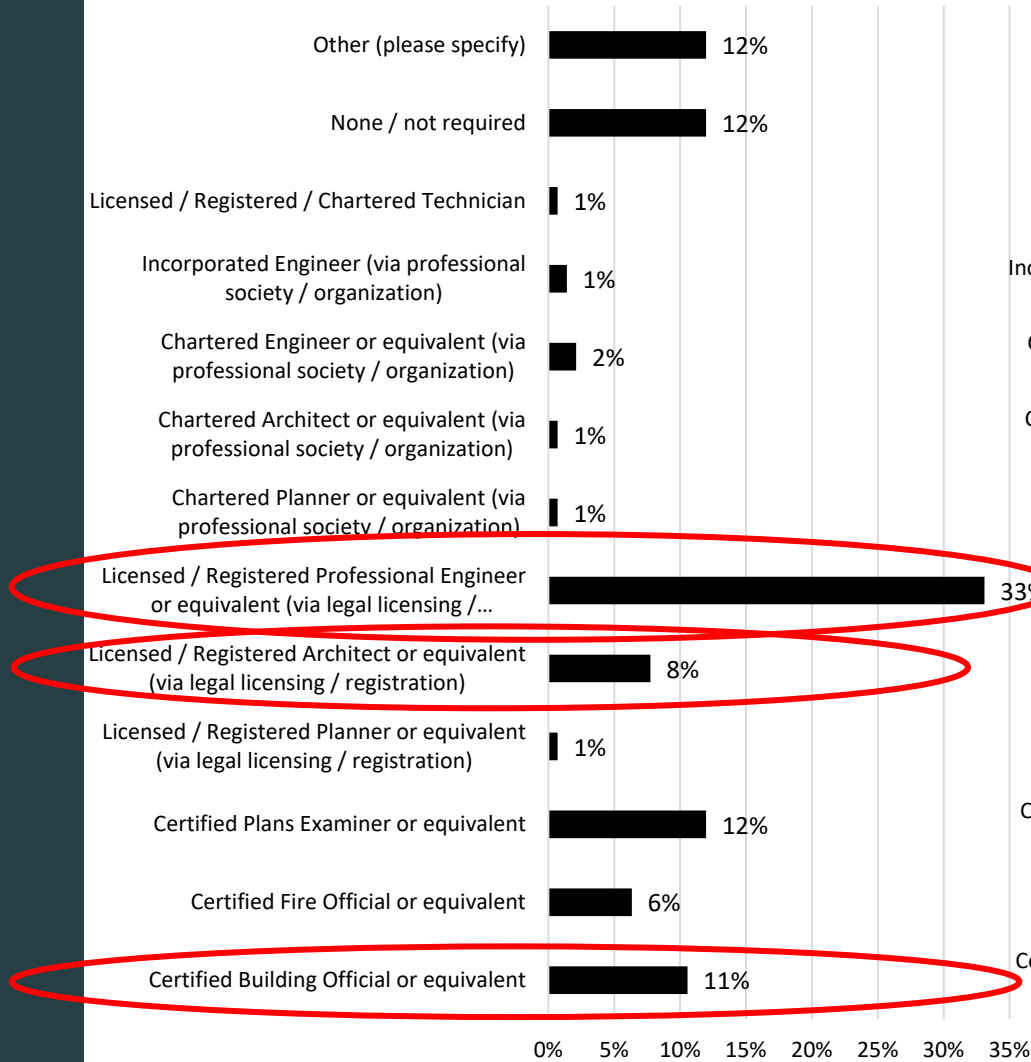


- High school
- Associates (2-year) degree
- BA/BS (4-year) degree
- MA/MS/MBA degree
- PhD/DSc/MD/JD or equivalent degree
- Other (please specify)

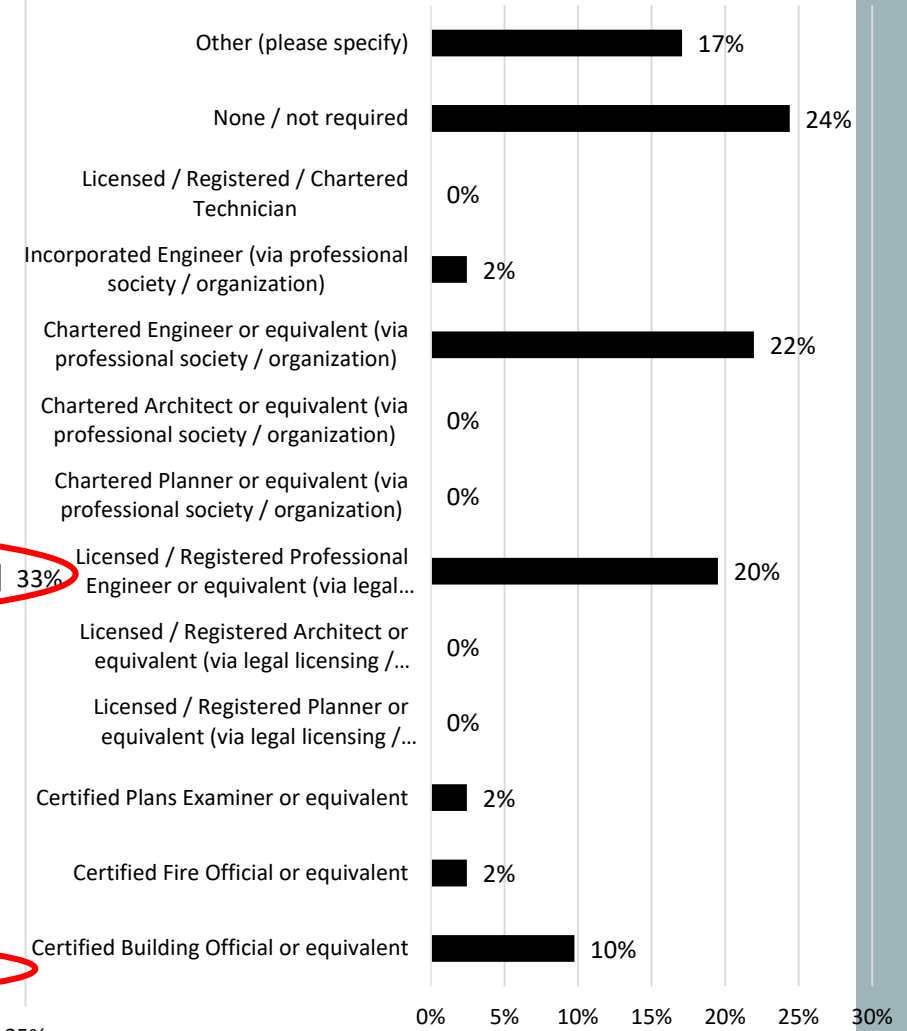
# Q6: Licenses and Registration

USA

Non-USA



N=142

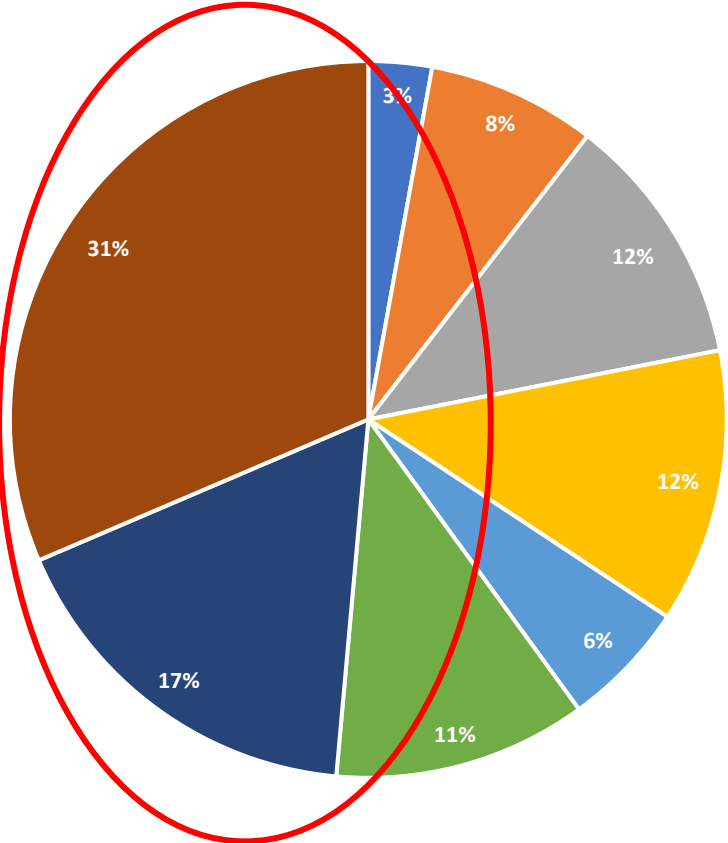


N=41



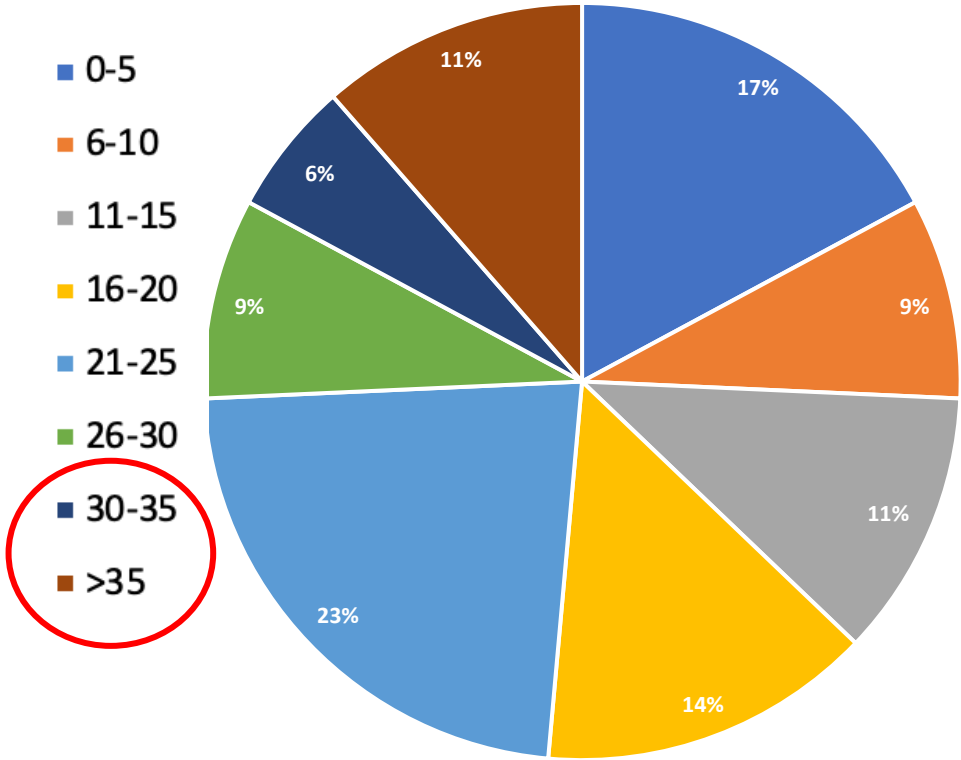
# Q7: Year of Professional Experience

Professional Experience of USA Respondents



N = 105

Professional Experience of non-USA Respondents



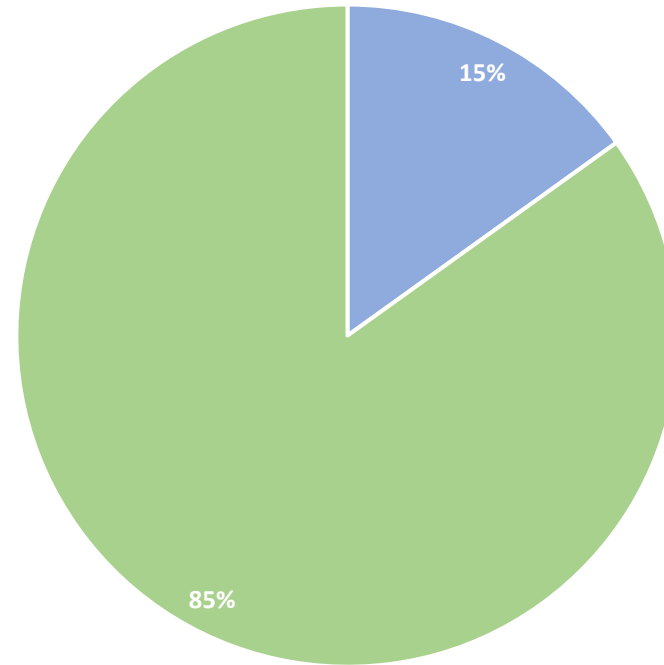
N = 35

## 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.

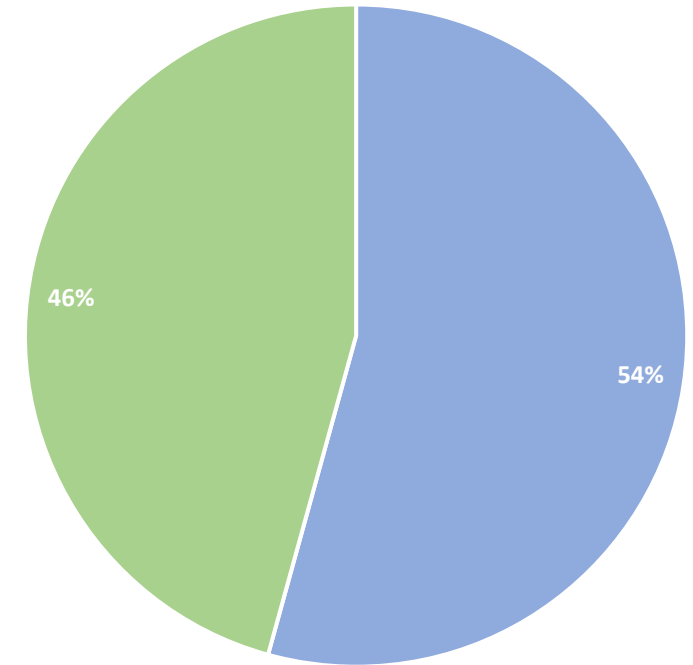
# Q8: What type of regulatory system do you work in?

Building Code / Regulatory System Distribution of USA Respondents



N = 106

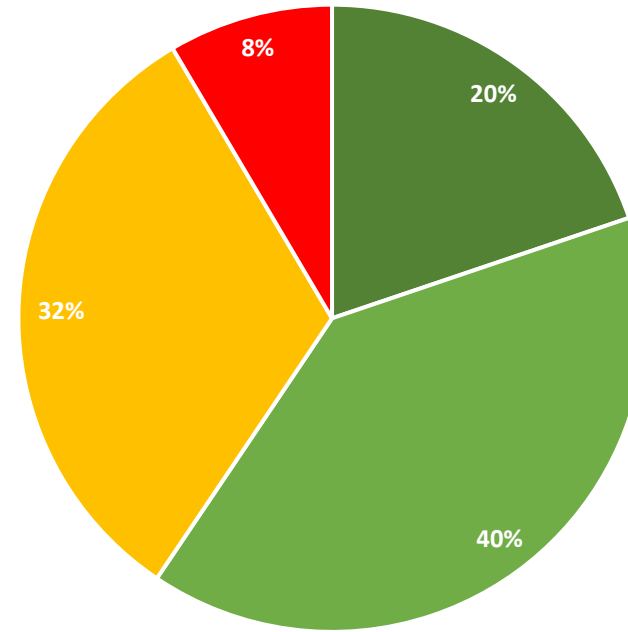
Building Code / Regulatory System Distribution of non-USA Respondents



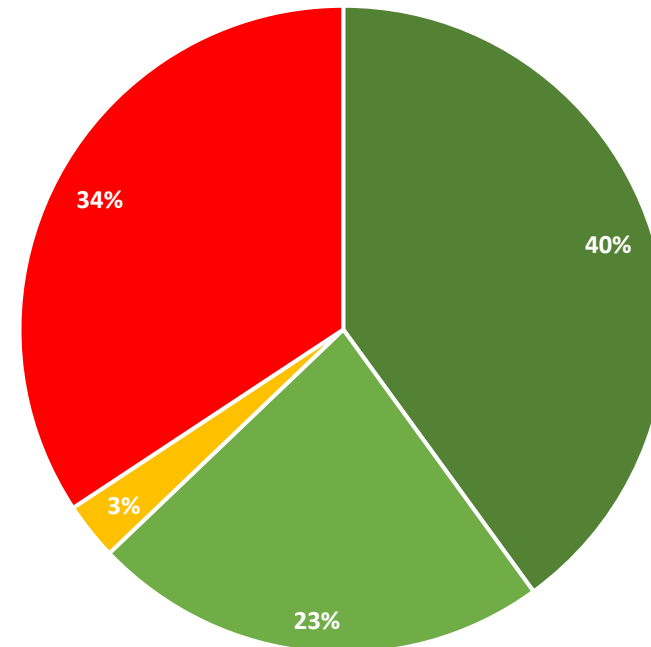
N = 35

Q9: How well do you think your current system is working in facilitating well-performing buildings?

USA N = 106



Non-USA N = 35

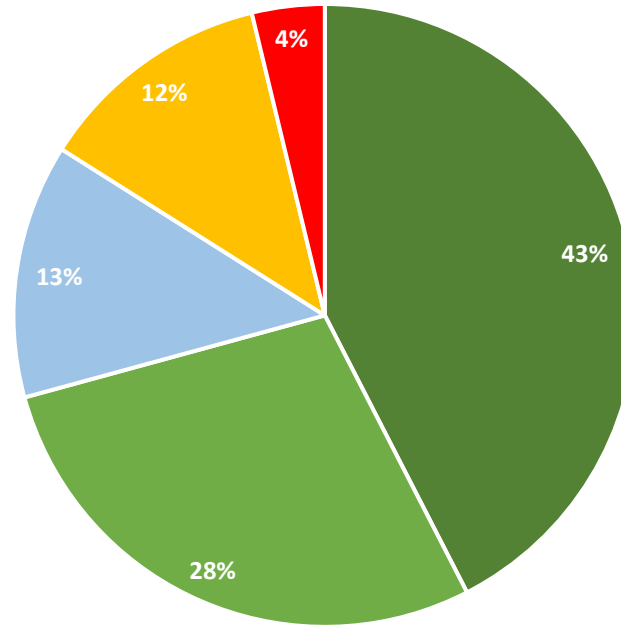


- Very well
- Well
- Fair
- Poor

Q10: I support the concept of a performance-based structure for building codes (regulation)

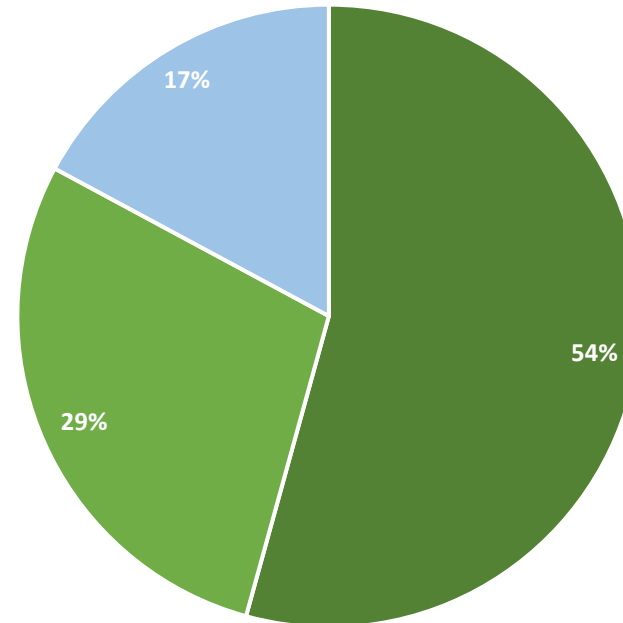
USA

N = 106



Non-USA

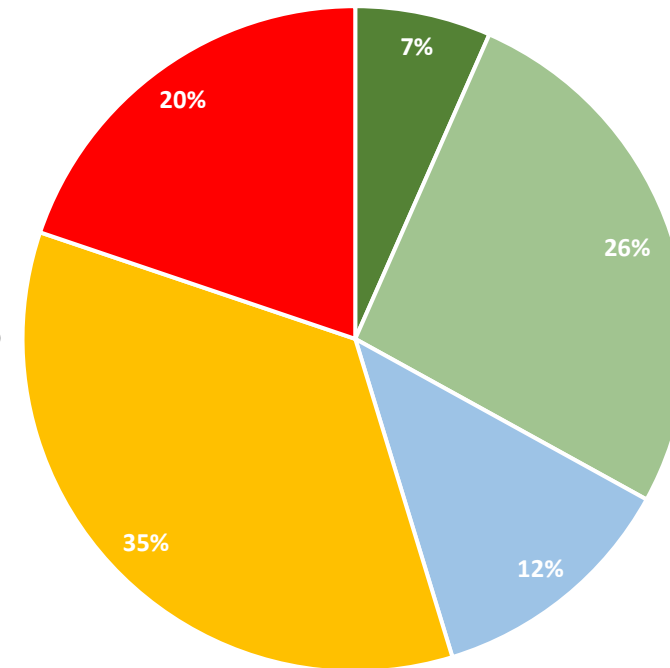
N = 35



Q11: I think that the performance-based building code that is being used or that is available to be adopted and used 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.

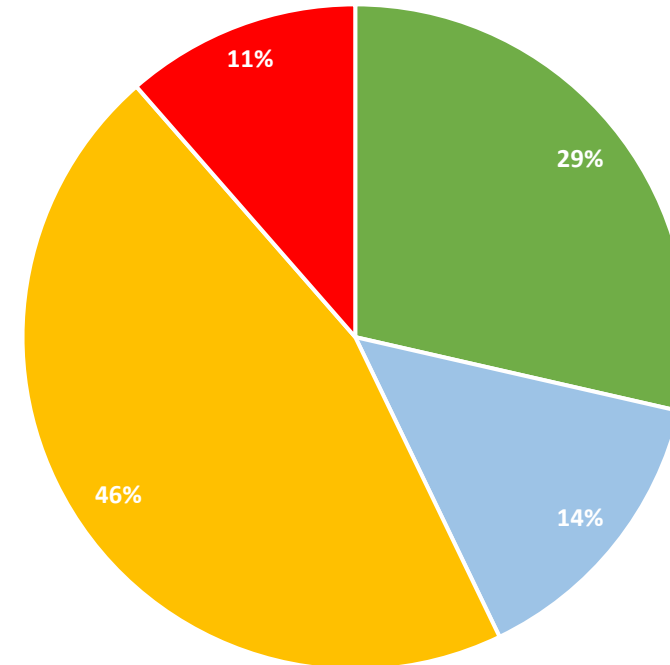
USA

N = 106



Non-USA

N = 35



■ Strongly agree

■ Agree

■ No opinion / not applicable

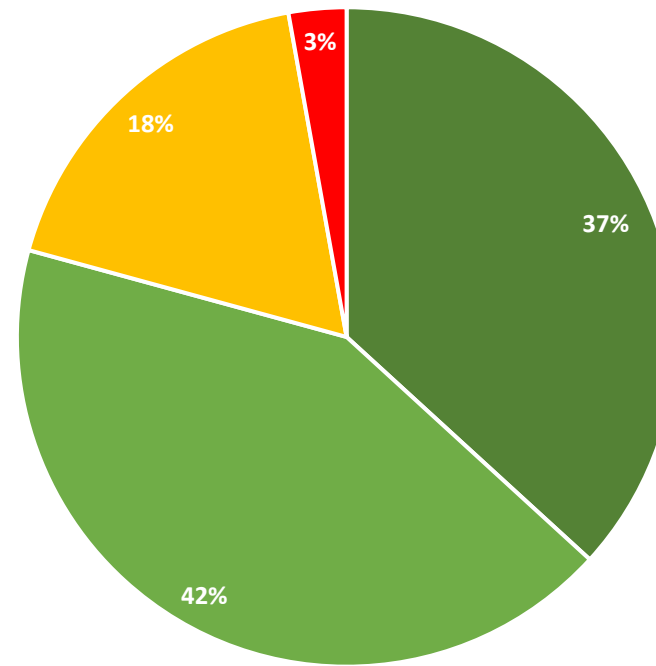
■ Disagree

■ Strongly disagree

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.](#)

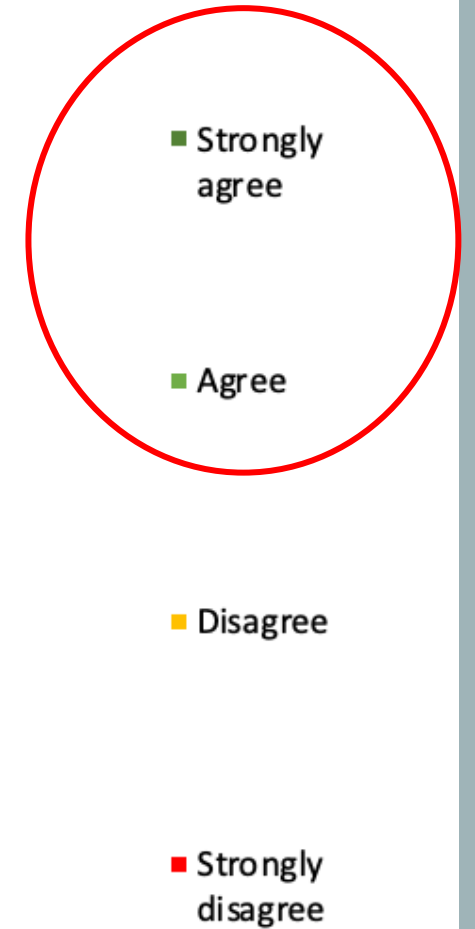
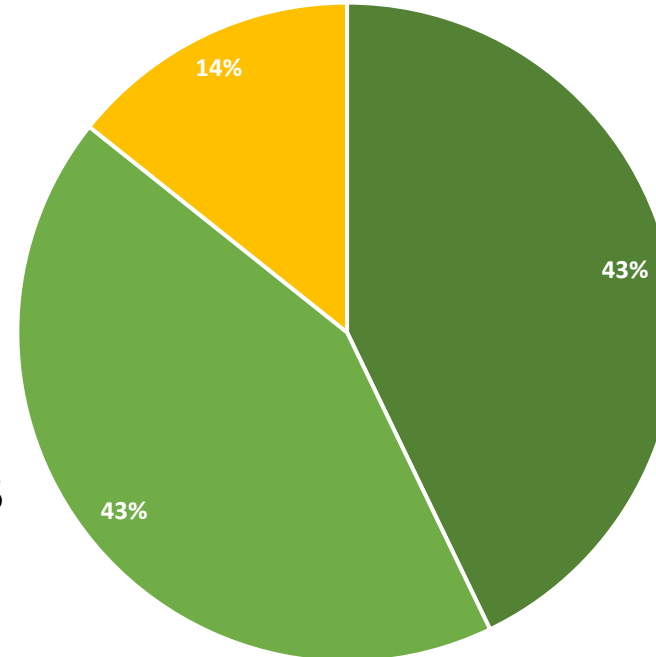
## USA

N = 106



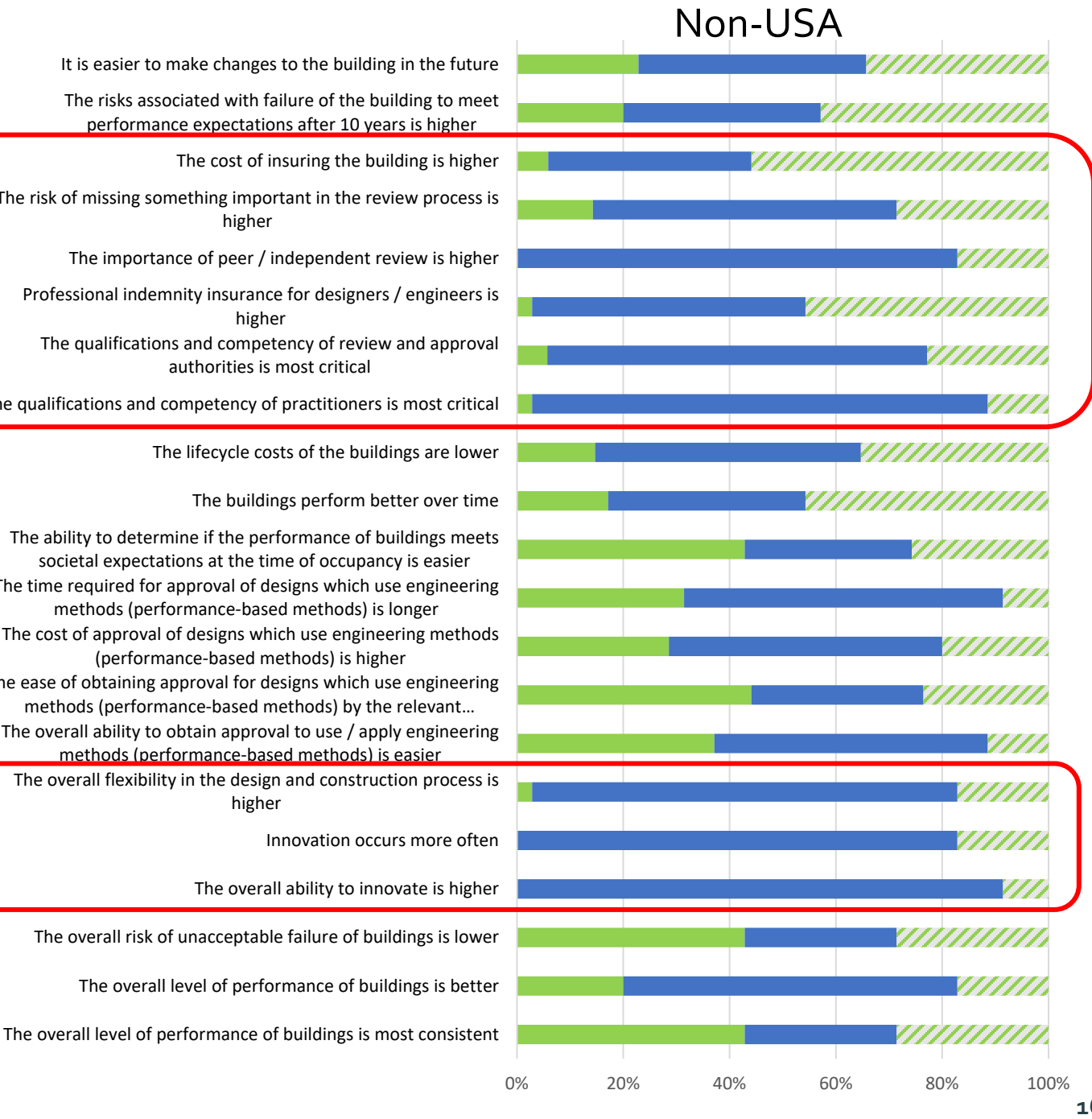
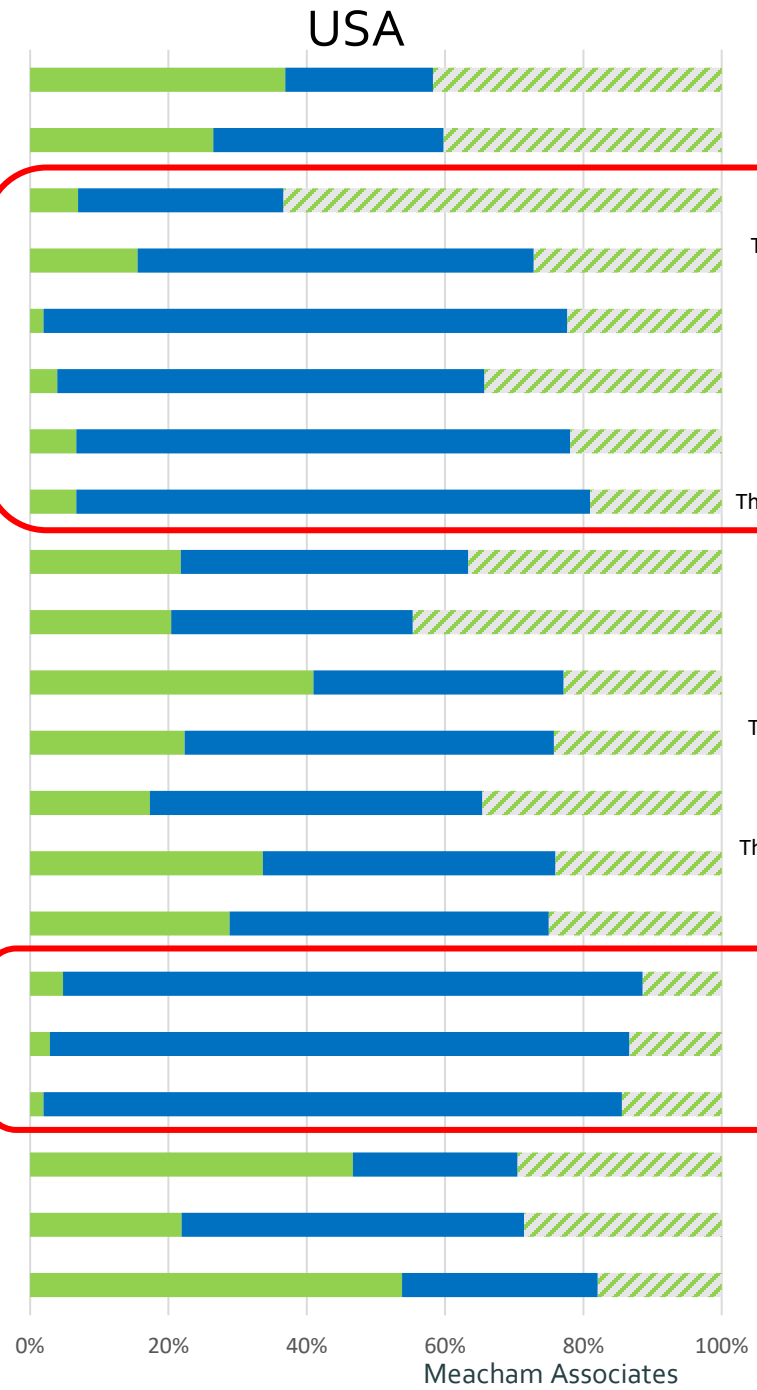
## Non-USA

N = 35



Q13: Please indicate in which regulatory system approach (performance-based or prescriptive) you think the following is, or is most likely, true

- Performance
- Prescriptive
- About the same in either





# Q14: Please indicate the relative importance of the following attributes



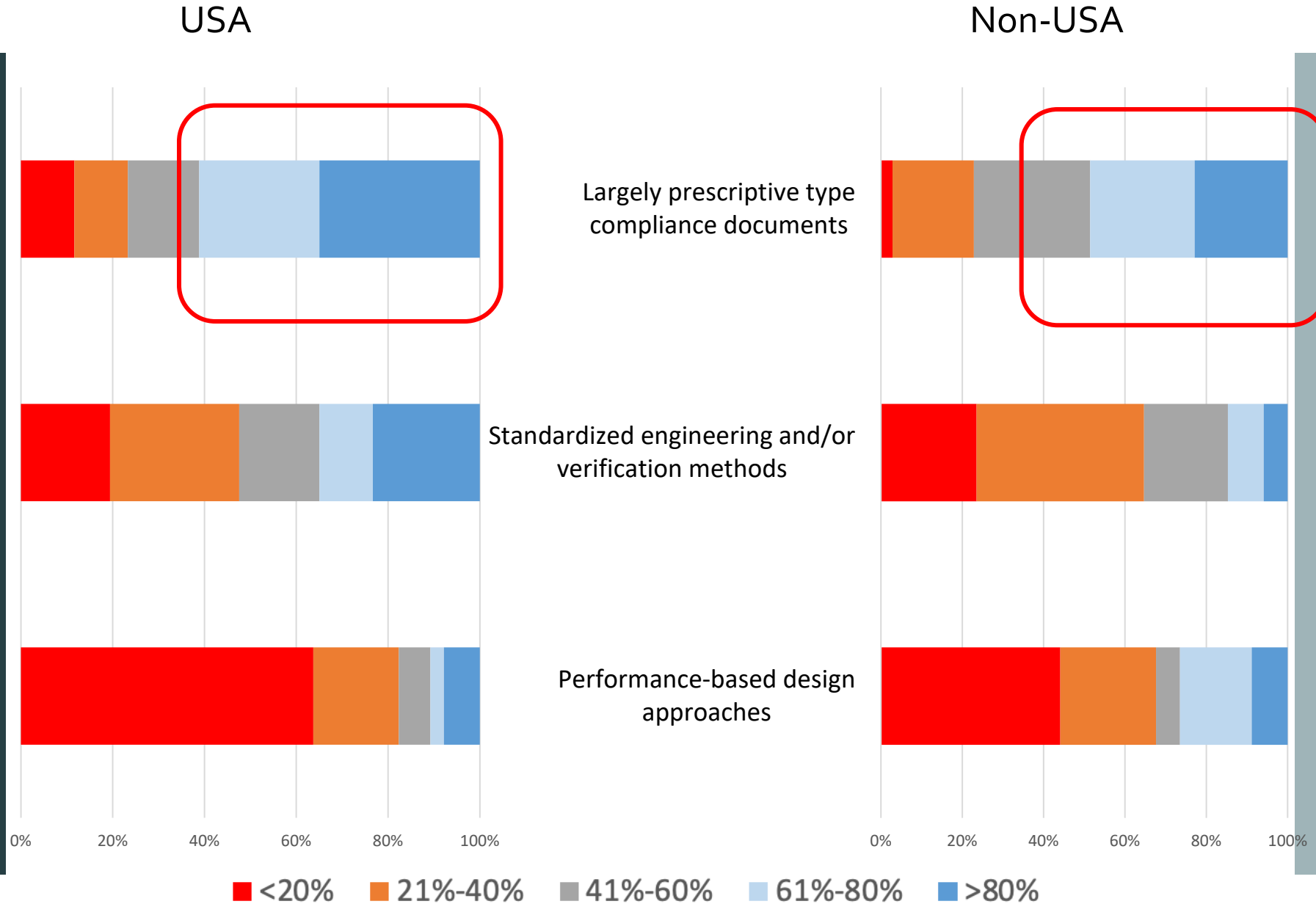
# Section 3 – Structure of PB Codes and Major Components

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):

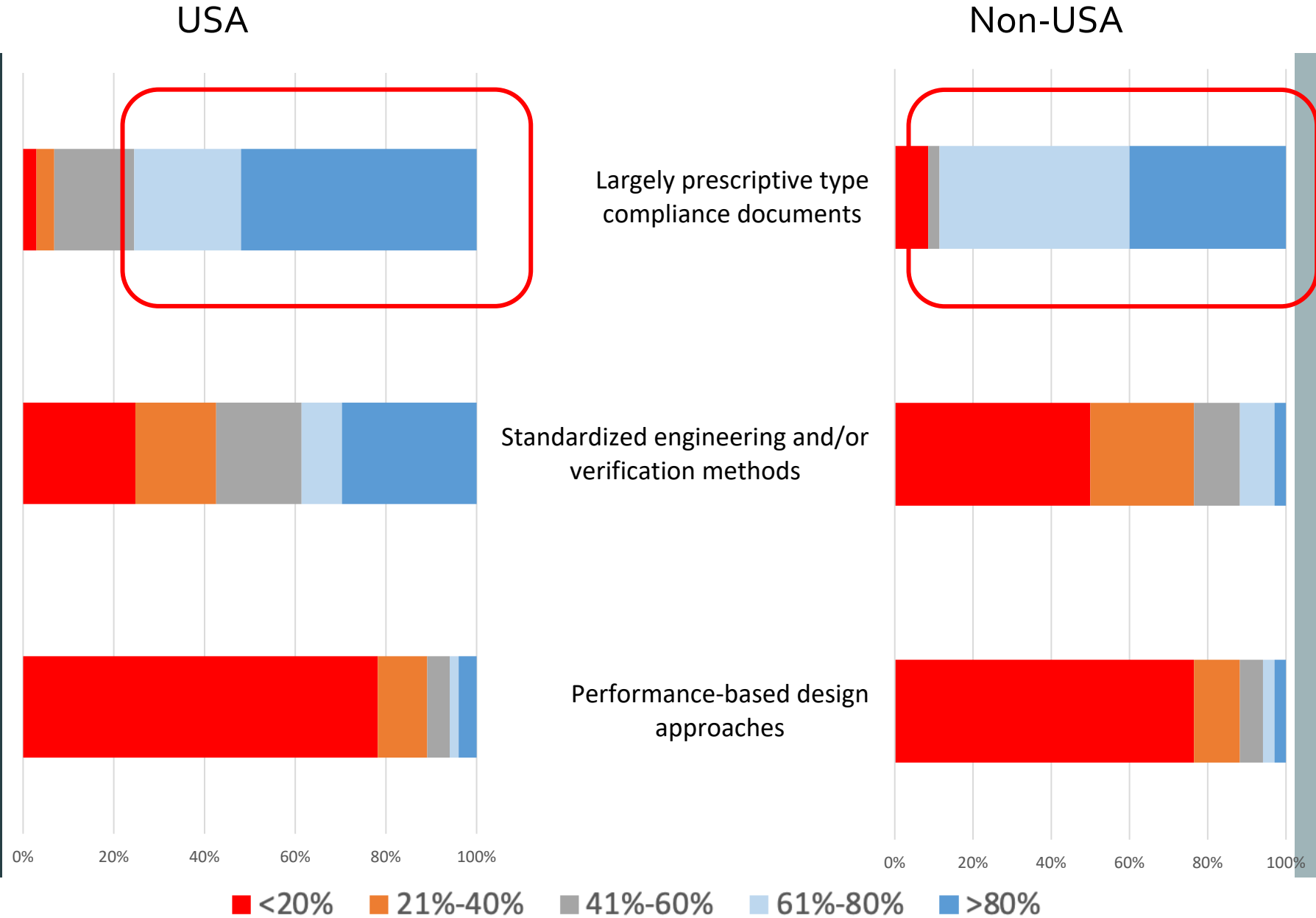
- the 'high-level' policy or societal goals to be achieved through compliance with the building code (regulations), such as occupant health, safety and welfare, environmental sustainability, resilience, etc. (these can sometimes be in enabling legislation);
- objective statements, which provide clear 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: In a building regulatory system that has implemented (adopted, promulgated) a performance-based building code (regulation), what percentage of buildings do you estimate are designed using primarily each of the following approaches:



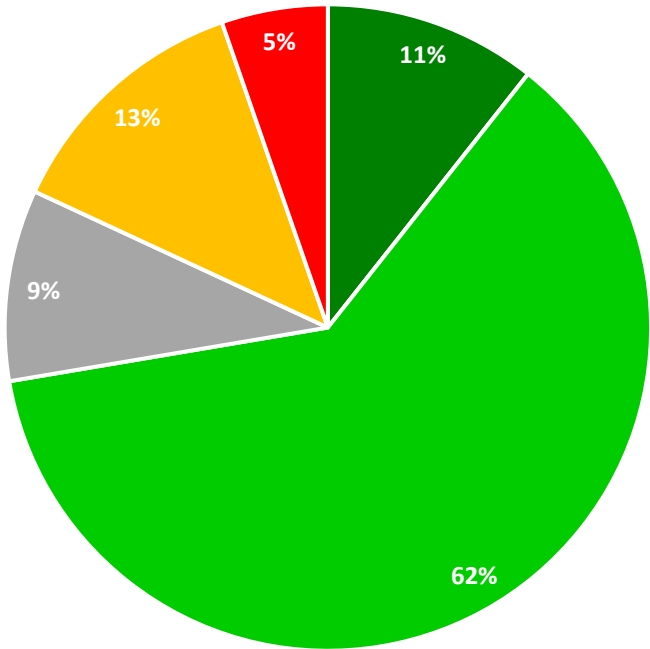
Q16: In a building regulatory system that has implemented (adopted, promulgated) a prescriptive-based building code (regulation), what percentage of buildings do you estimate are designed using primarily each of the following approaches:



Q17: The current framework for PB codes remains appropriate, sufficiently comprehensive and robust enough to continue to be used as the basic structure for performance-based building codes (regulation)

USA

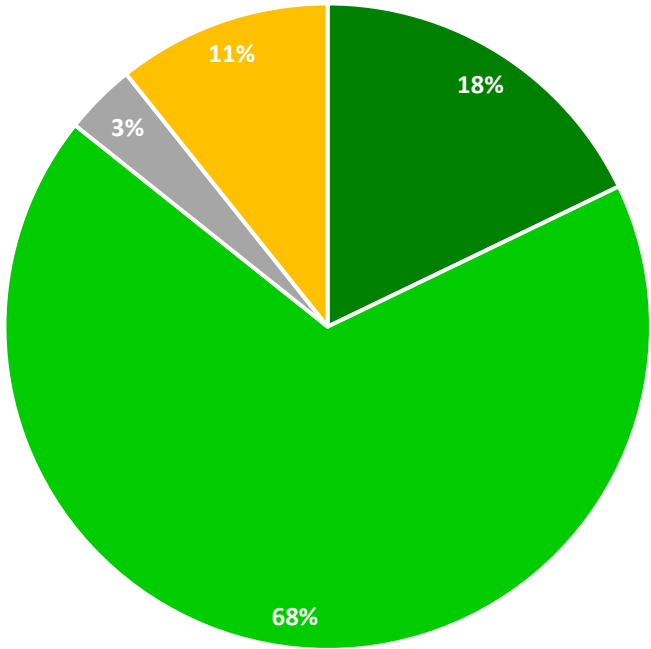
N = 94



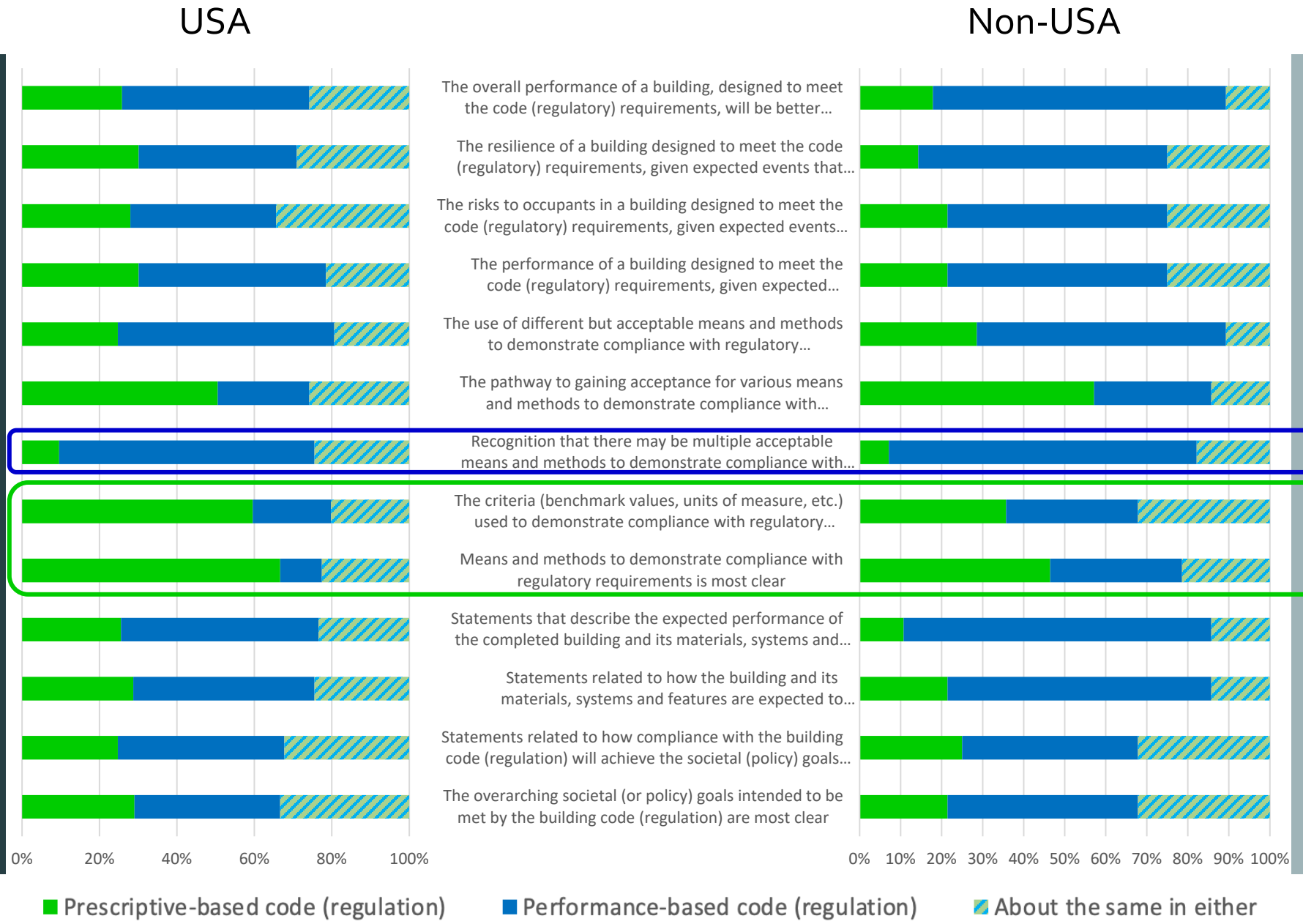
- Strongly agree
- Agree
- Insufficient knowledge or experience with performance-based systems to express opinion
- Disagree
- Strongly disagree

Non-USA

N = 28

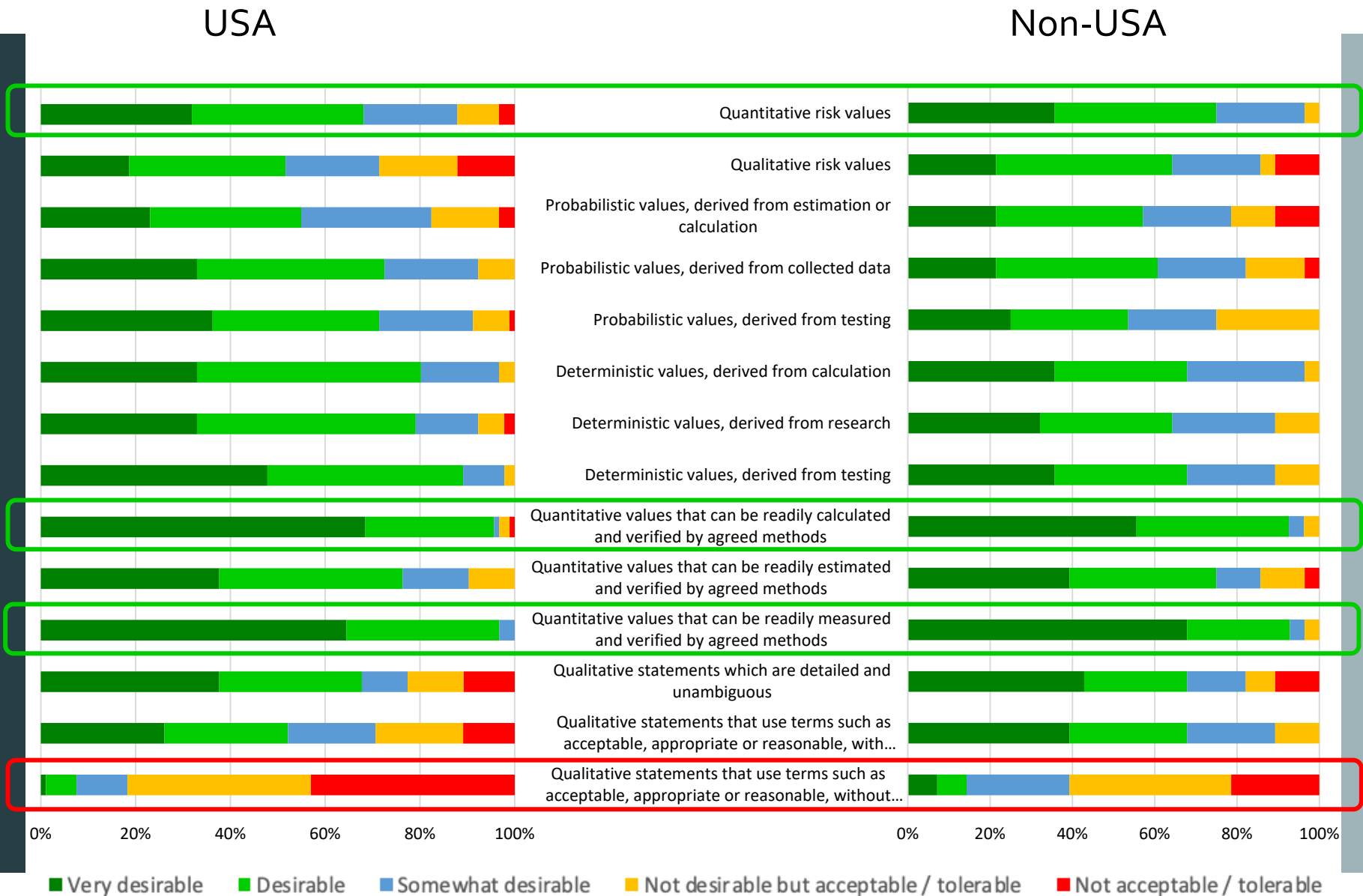


Q18: Please indicate in which regulatory system approach (performance-based or prescriptive) you think the following is, or is most likely, true

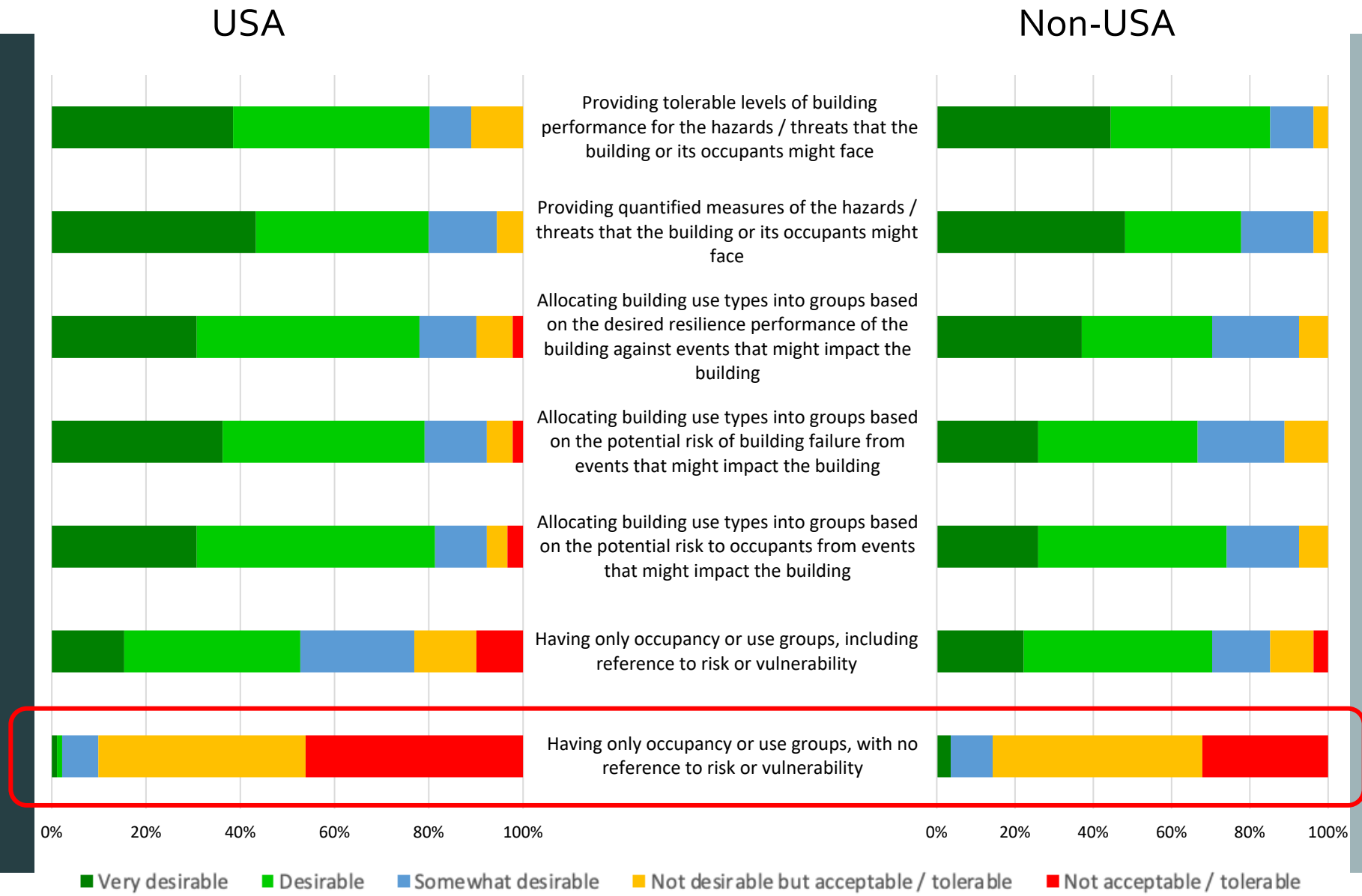


■ Prescriptive-based code (regulation) ■ Performance-based code (regulation) ▨ About the same in either

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

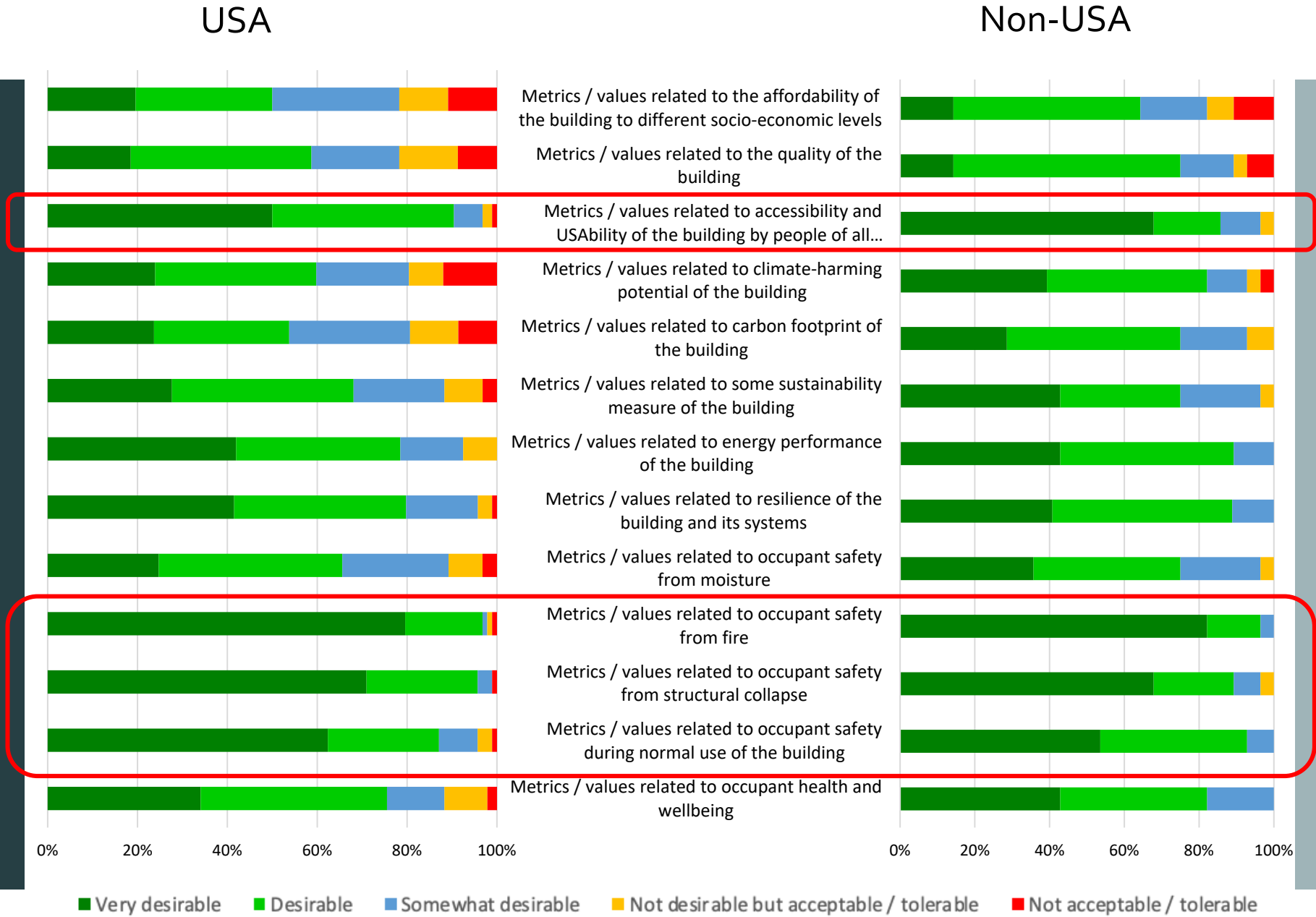


# Q20: Please indicate how desirable the following approaches would be for building categorization

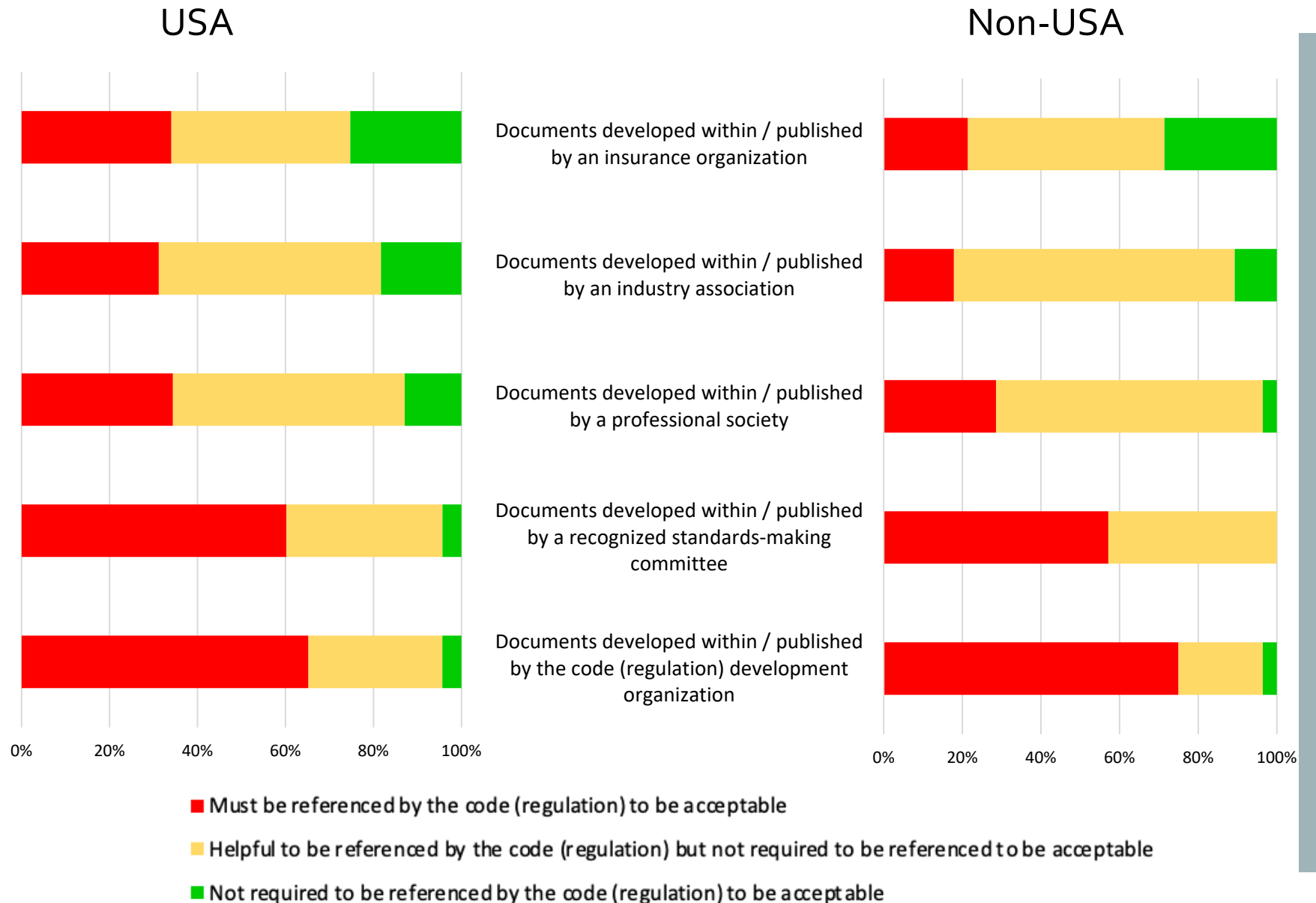




Q21: To what extent are the following measures / indicators of building performance desirable?



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?



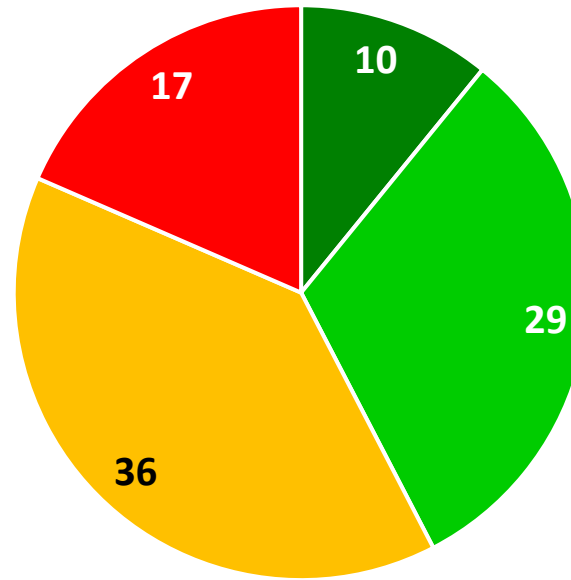
## Section 4 – PB Design Approaches

- 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.

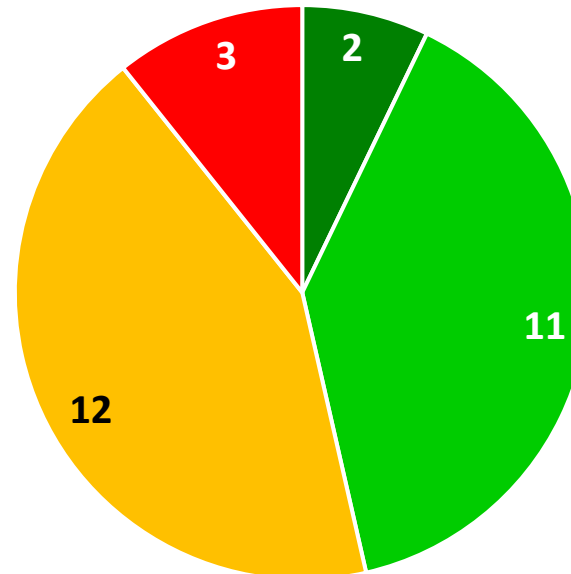
USA

N = 92



Non-USA

N = 28



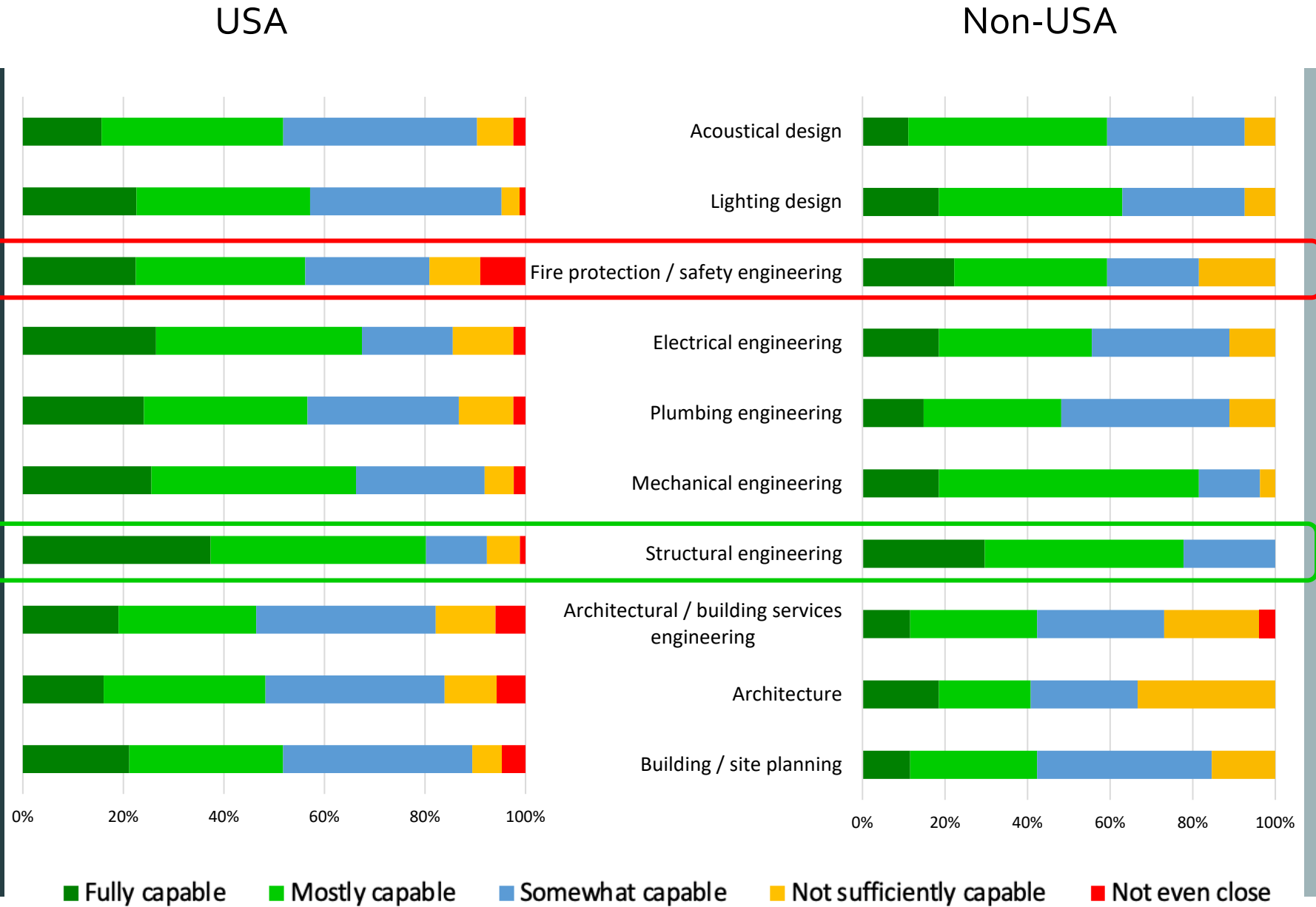
Strongly agree

Agree

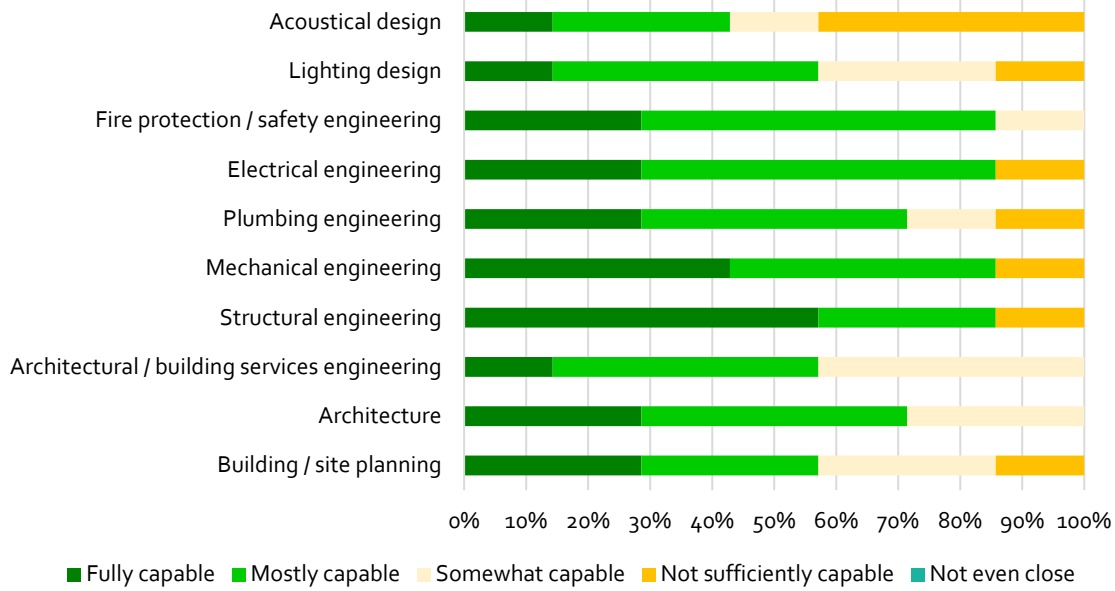
Disagree

Strongly disagree

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

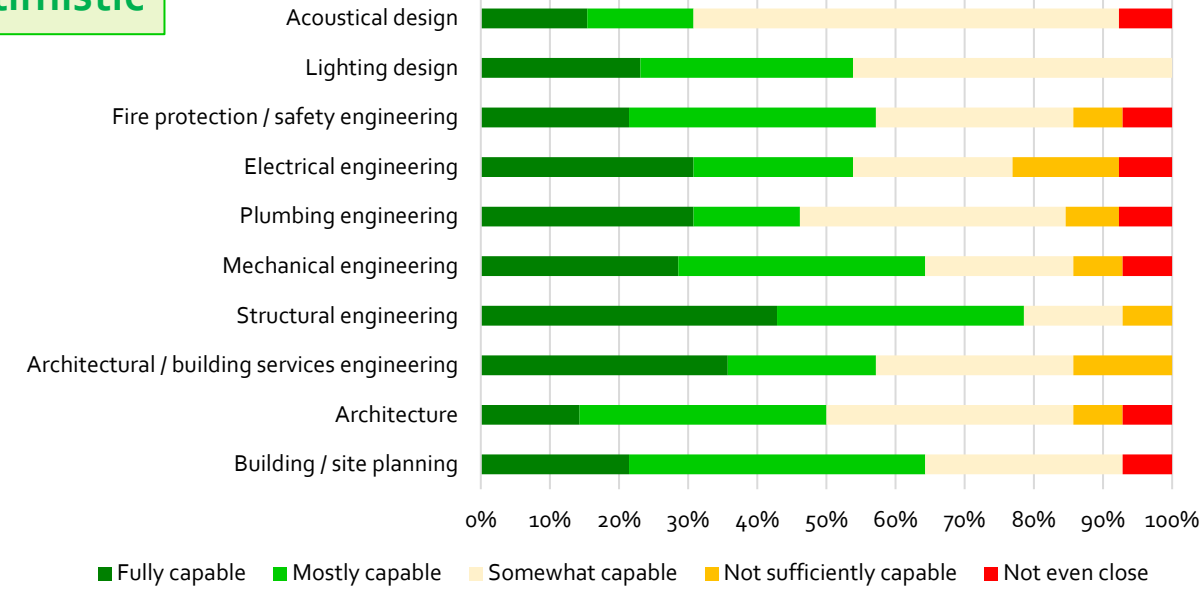


### Architect

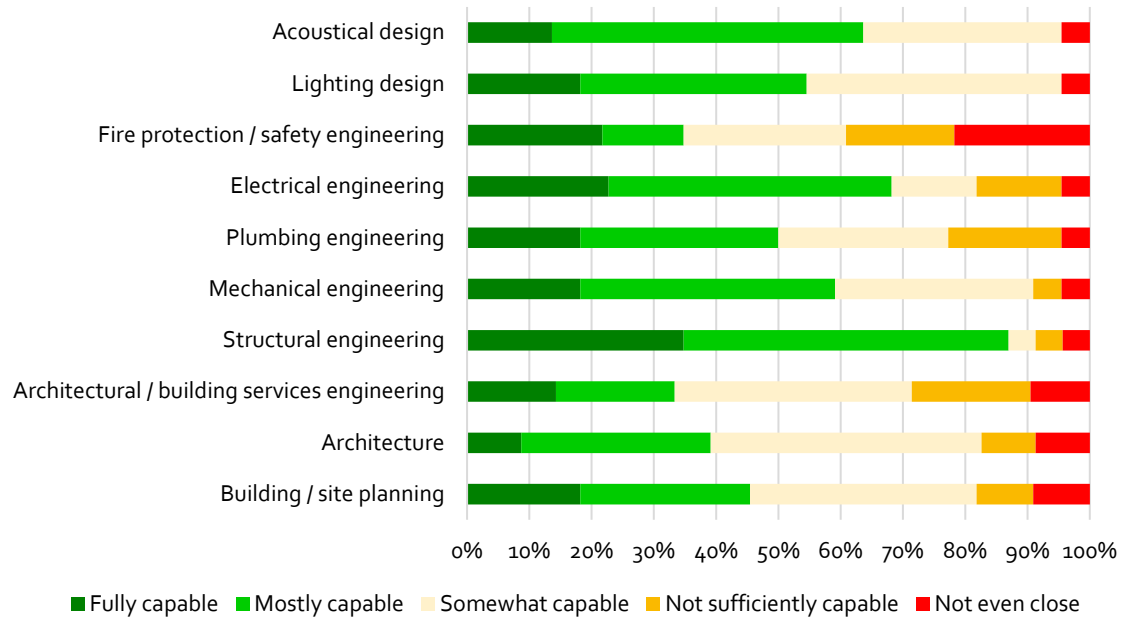


Most Optimistic

### Building code official / building surveyor

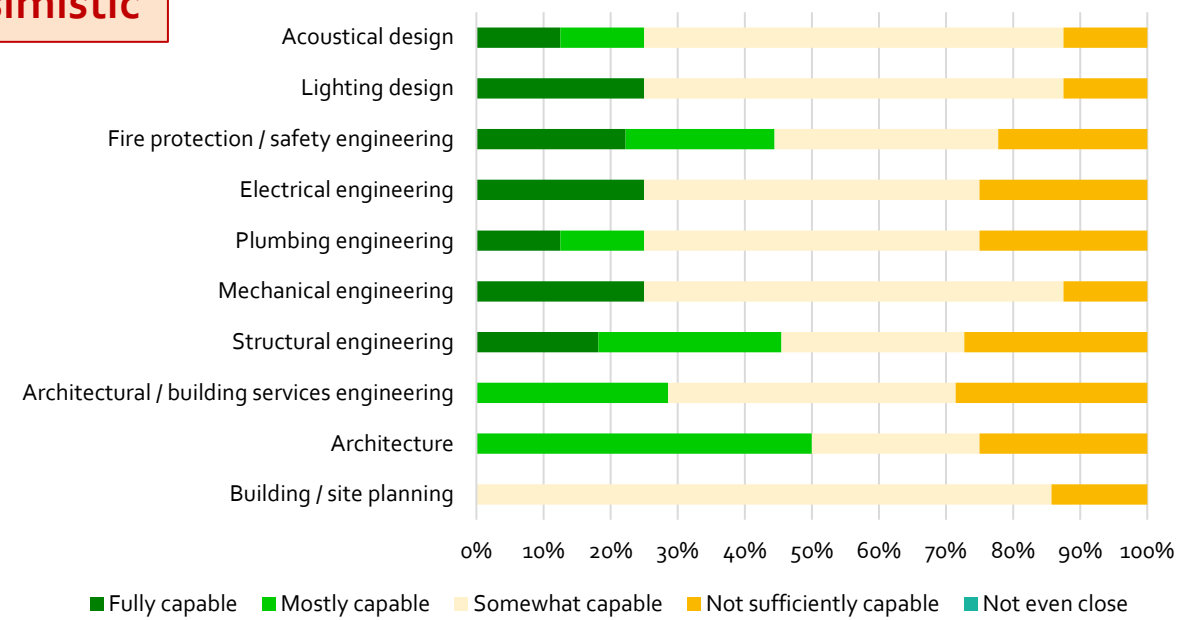


### Fire protection engineer / fire safety engineer



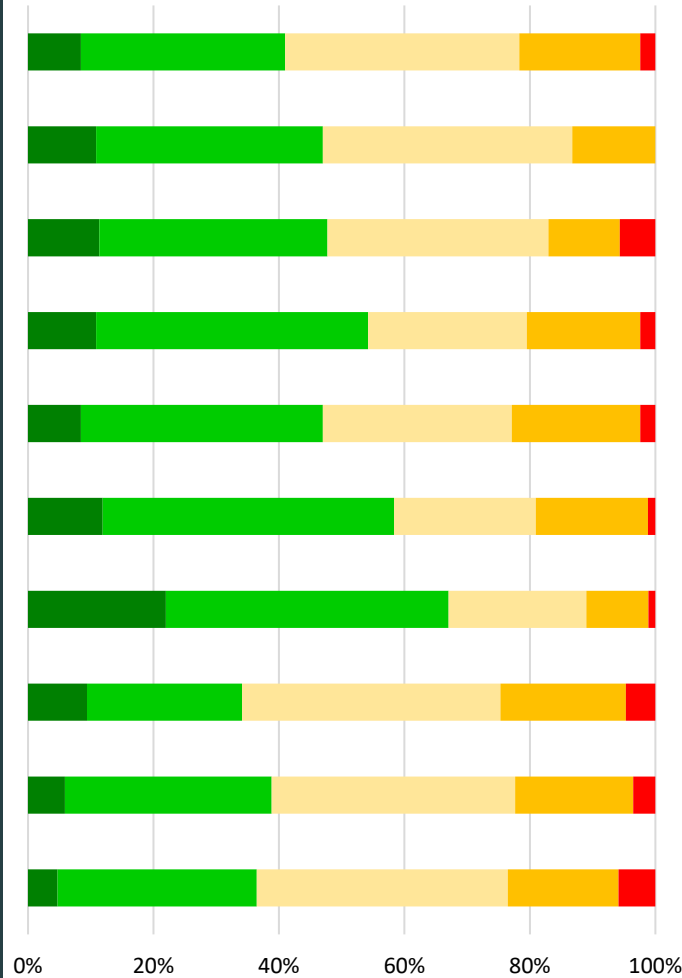
Most Pessimistic

### Structural engineer

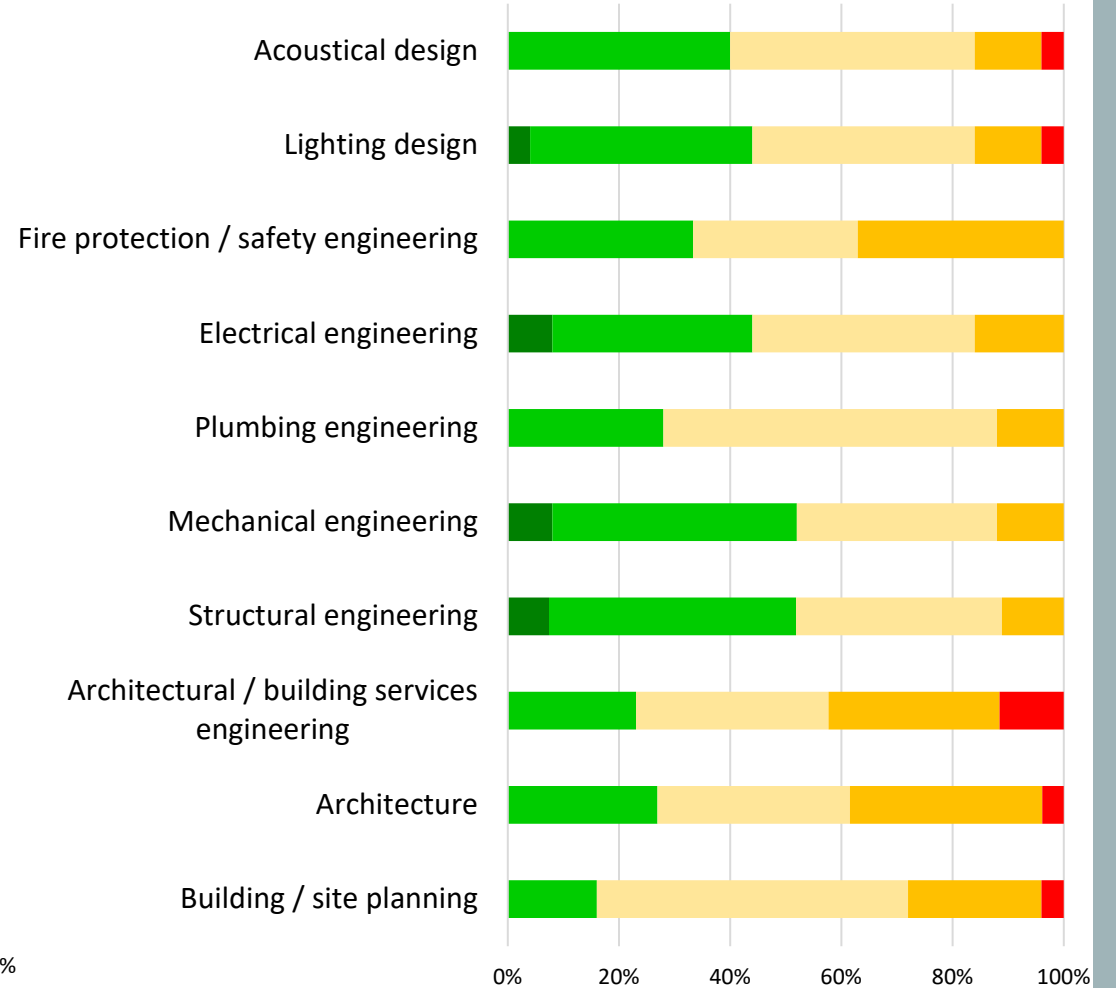


Q25: Please provide your opinion regarding the **current adequacy of design standards, guidance and methods of verification for performance-based design** within the following disciplines.

USA

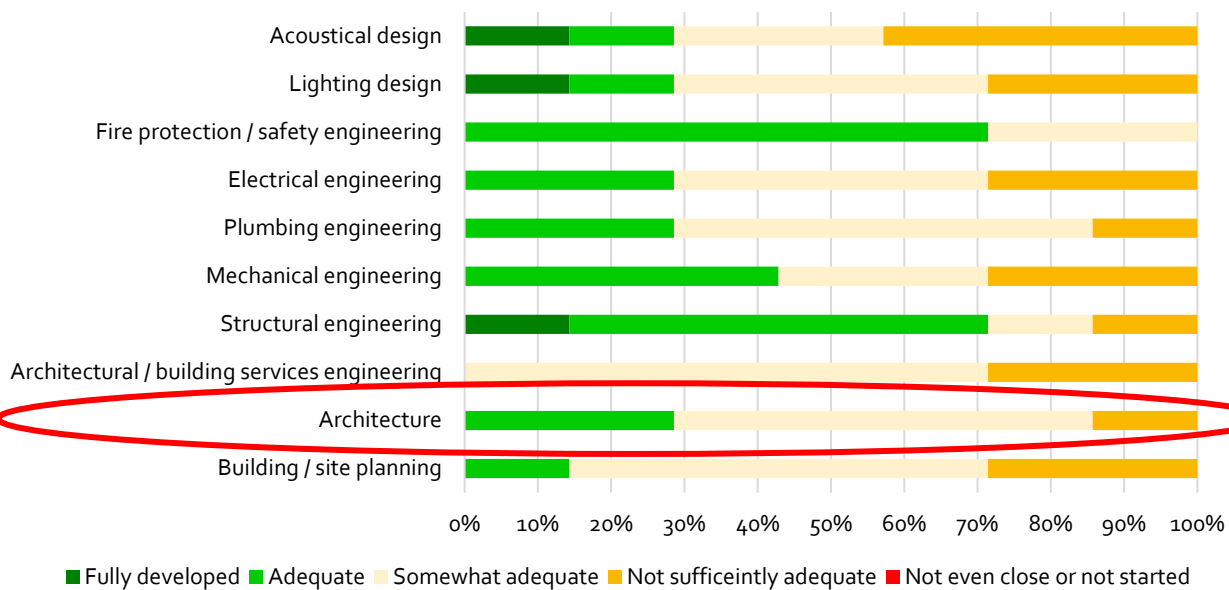


Non-USA

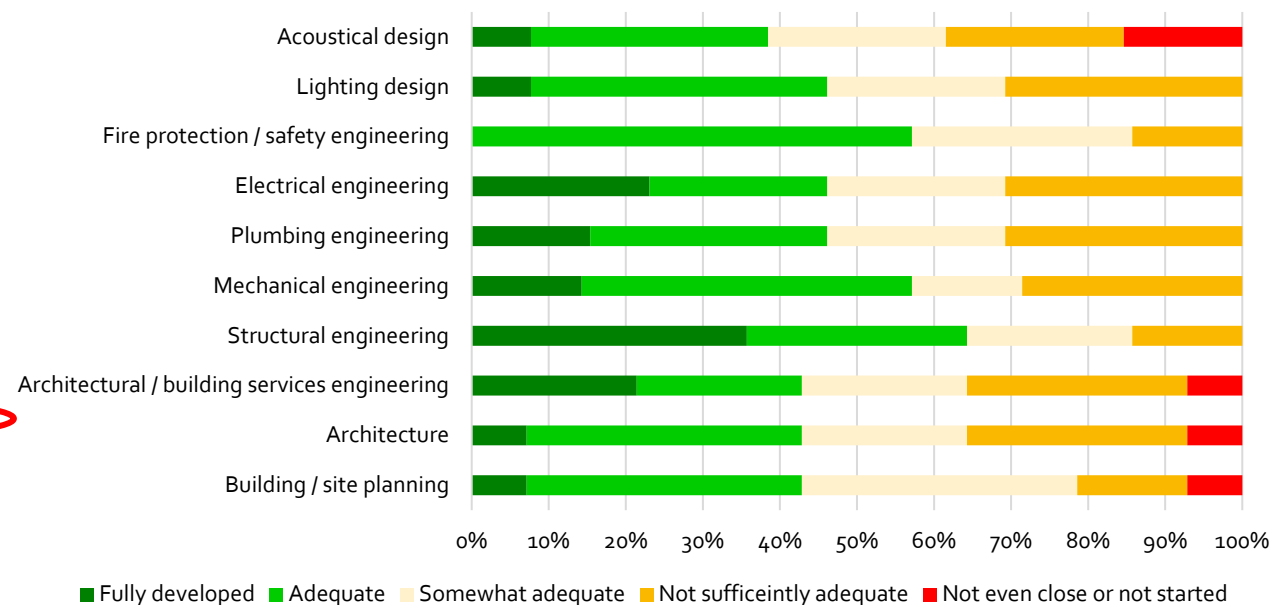


■ Fully developed 
 ■ Adequate 
 ■ Somewhat adequate 
 ■ Not sufficiently adequate 
 ■ Not even close or not started

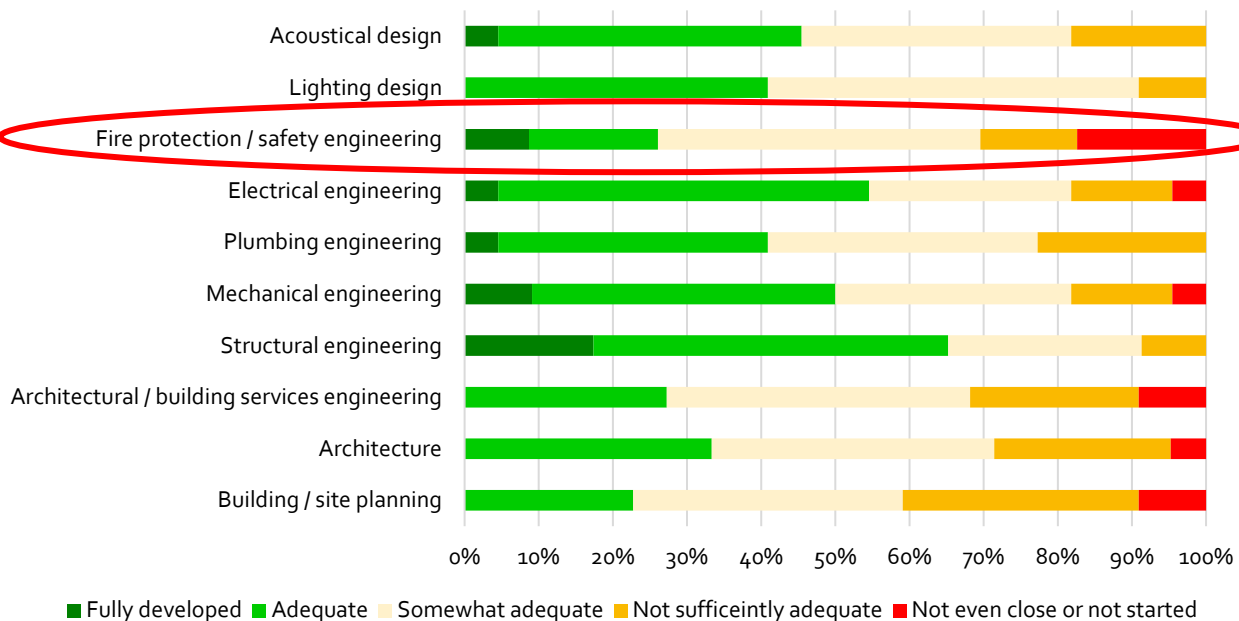
### Architect



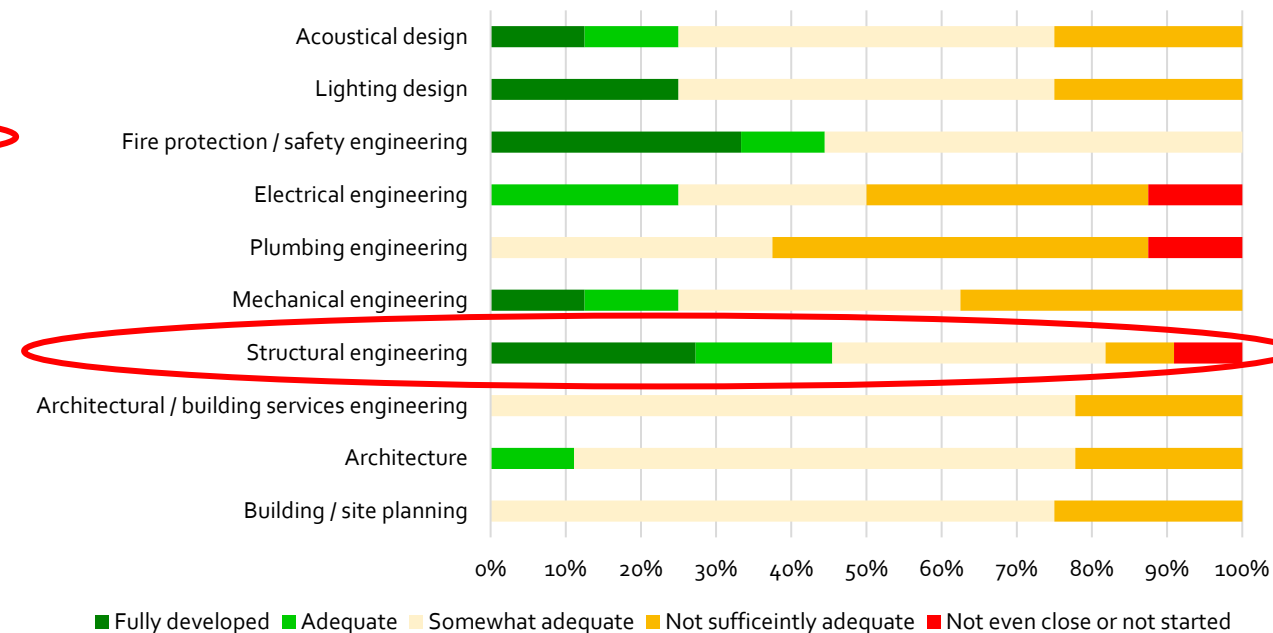
### Building code official / building surveyor



### Fire protection engineer / fire safety engineer

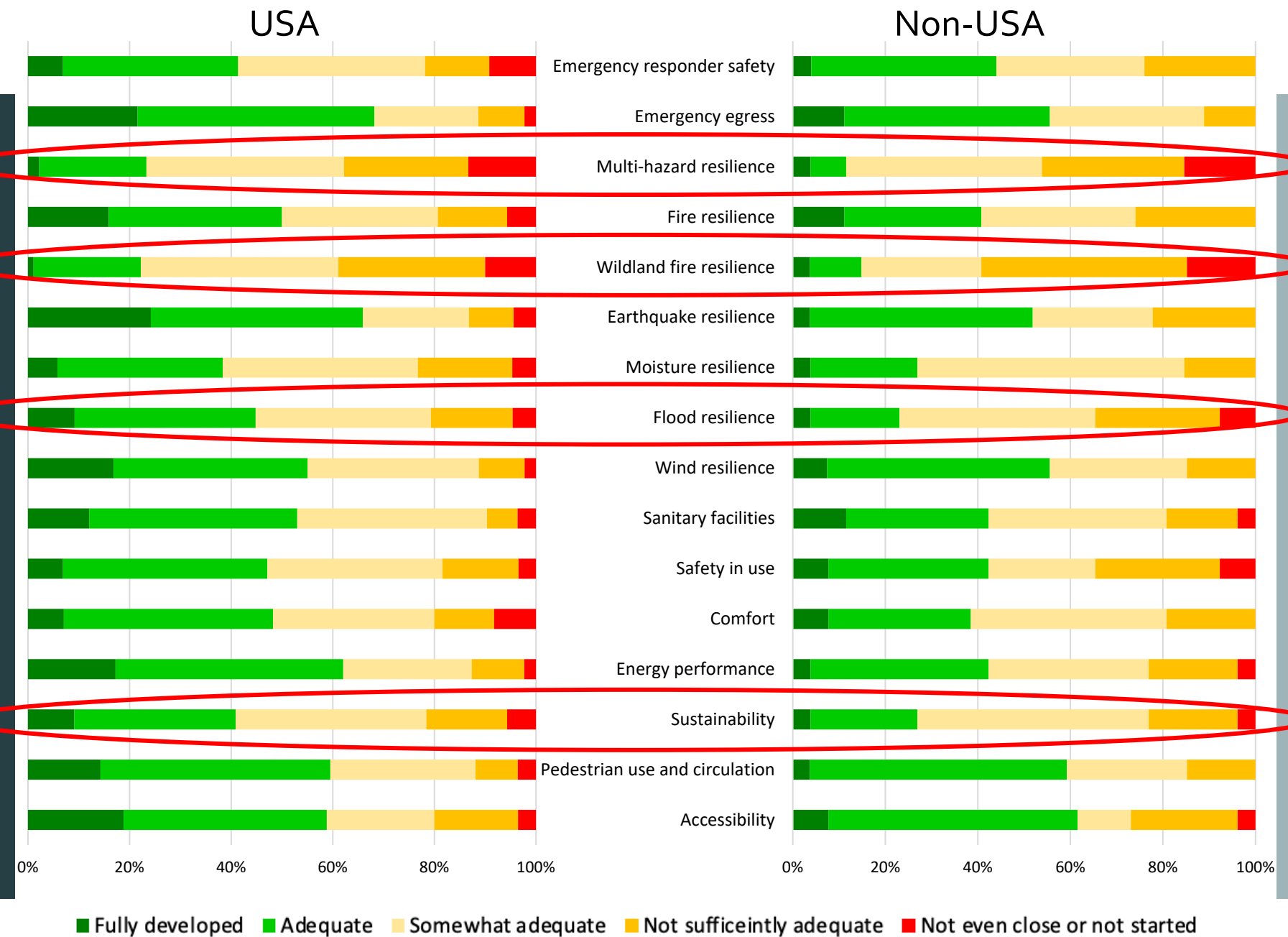


### Structural engineer



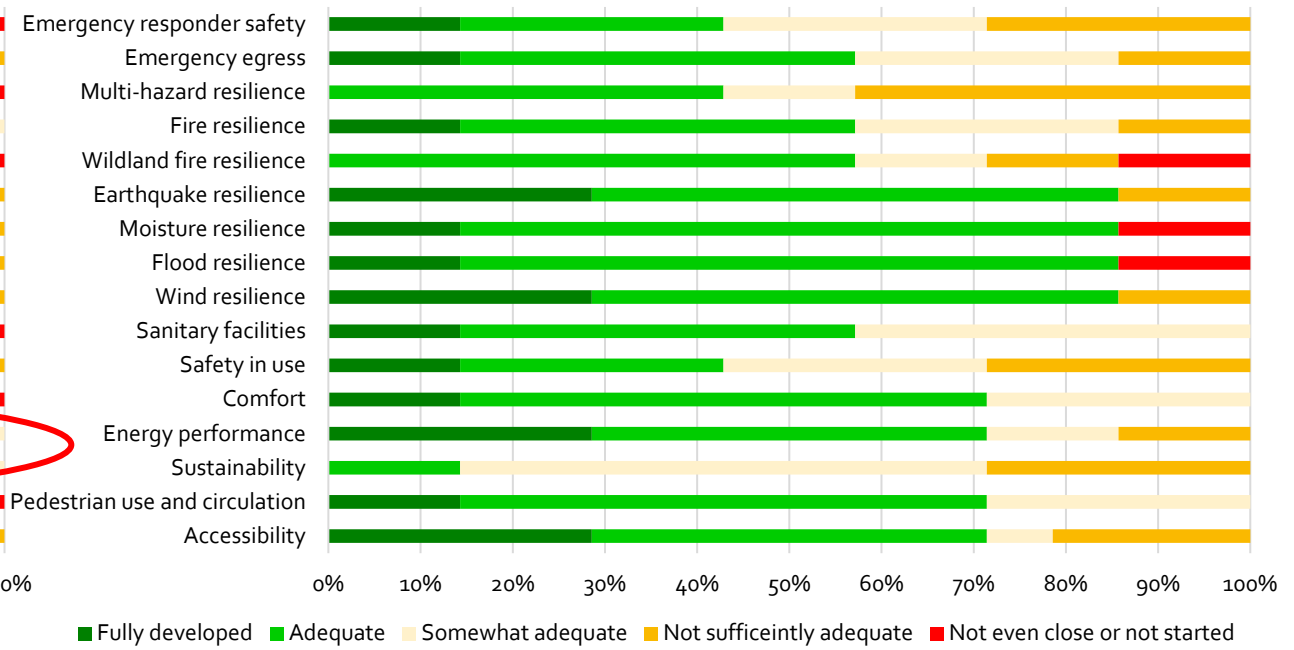


Q26: Please provide your opinion regarding the current capability to develop robust performance-based design for the following building performance objectives.



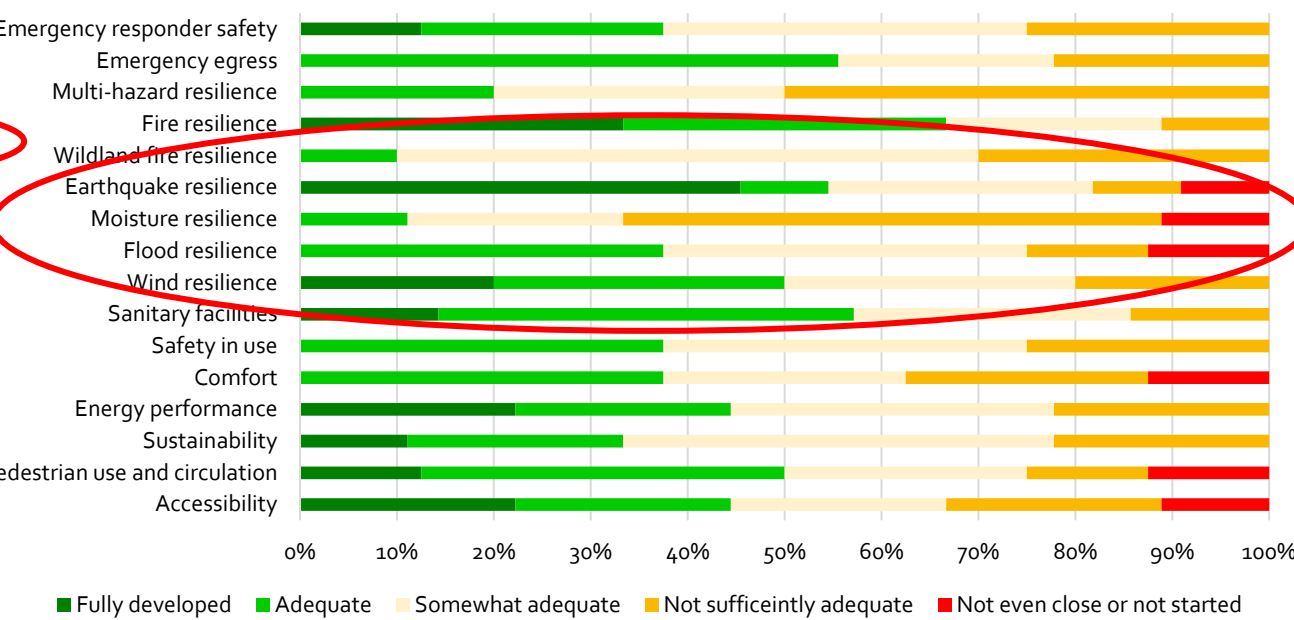
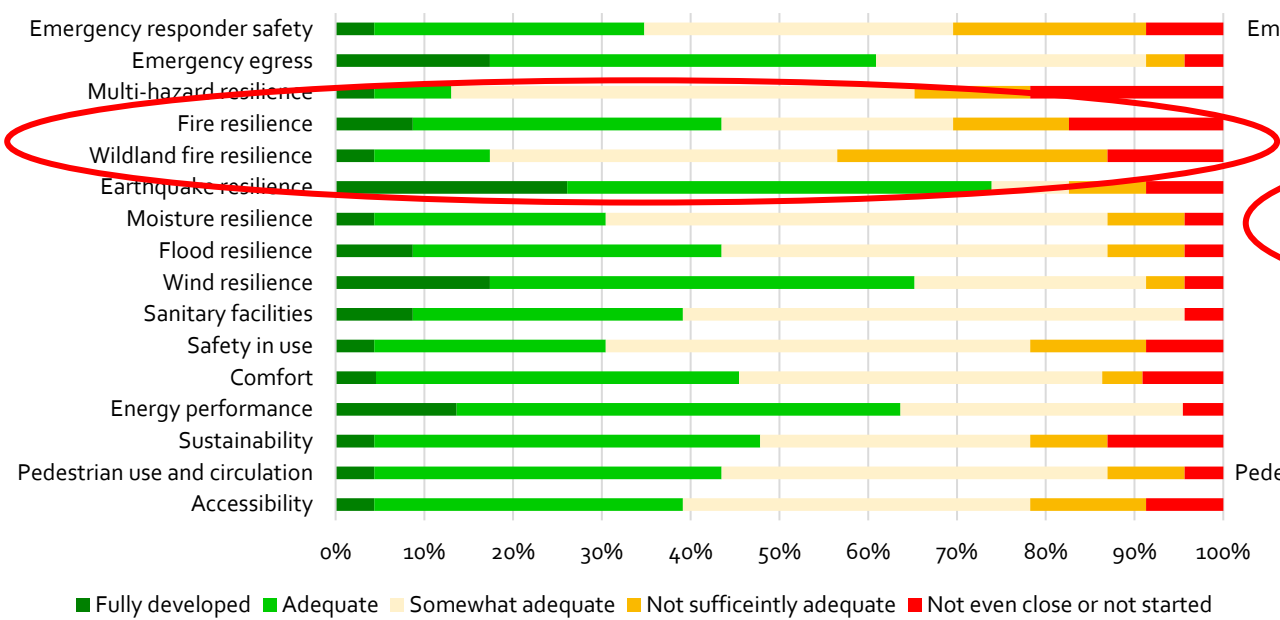
### Architect

### Building code official / building surveyor



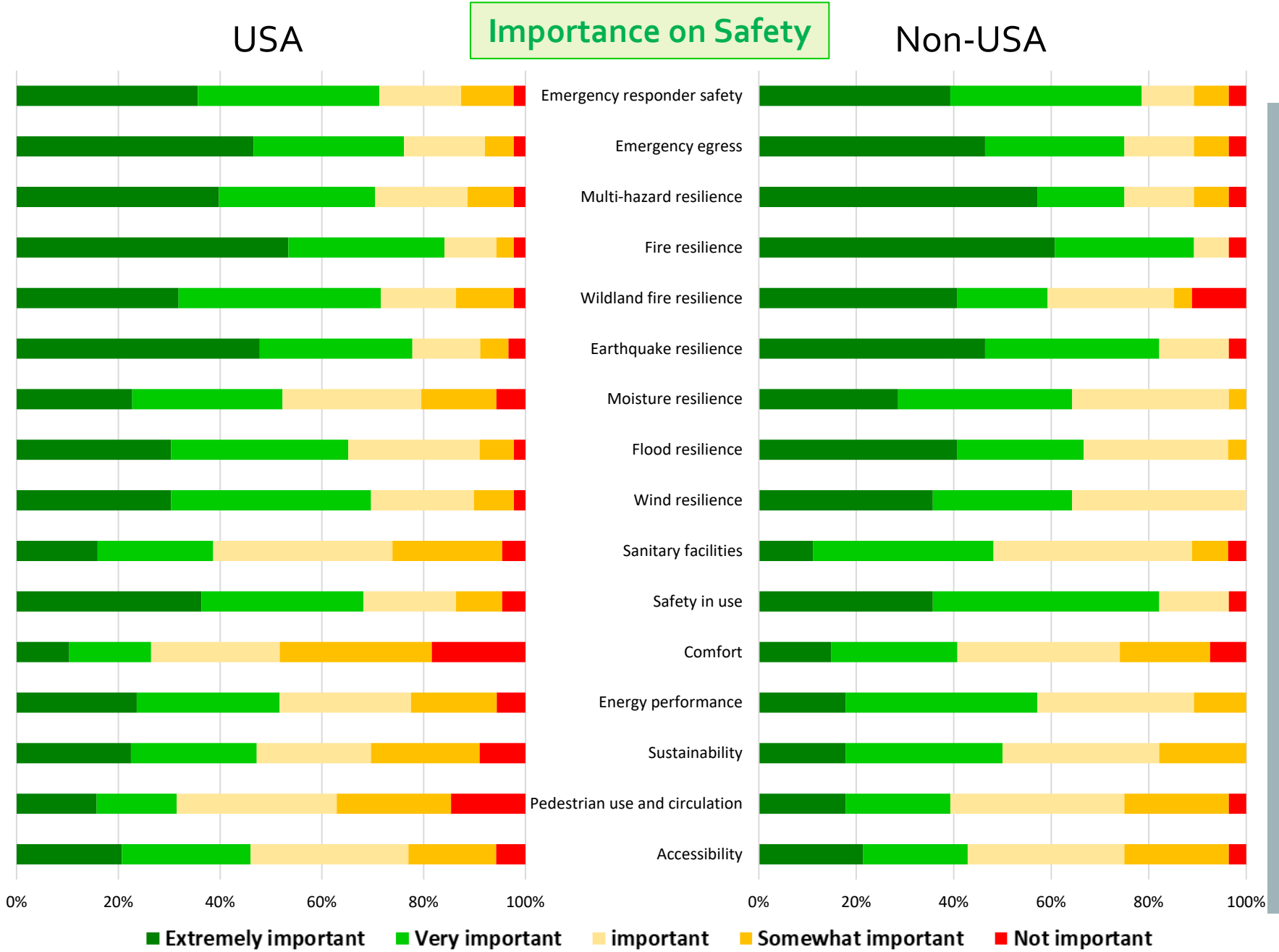
### Fire protection engineer / fire safety engineer

### Structural engineer



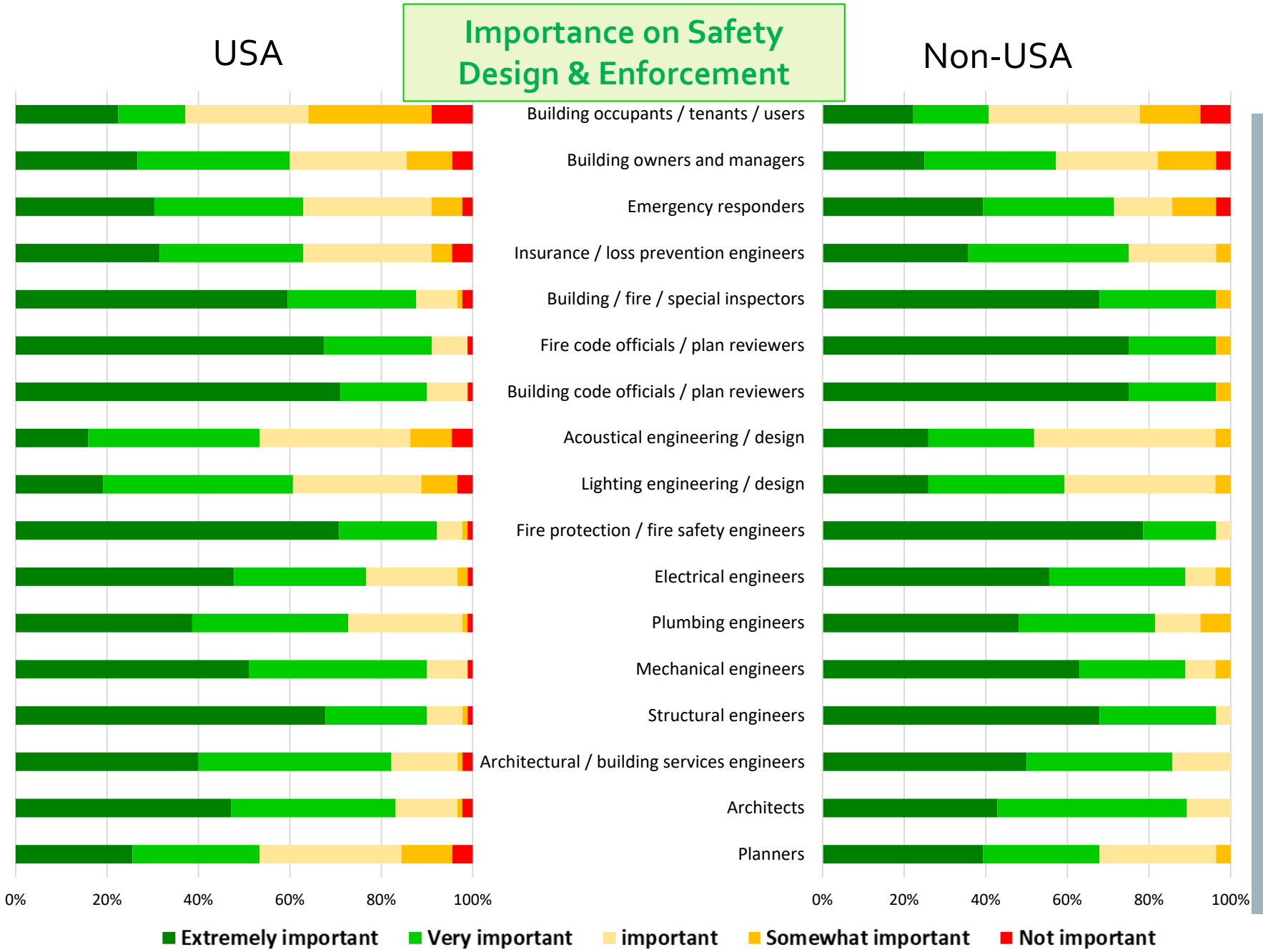
Q27: Please provide your opinion regarding the importance of third party / peer review of performance-based design for the following building performance objectives.

Importance on Safety



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

Importance on Safety Design & Enforcement



## 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 Summary Points

- Responses quite similar within and outside of USA
- 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.
- Quantification of performance, strong linkage to methods of design and verification / compliance are critically-important issues.
- Work needed in all disciplines, all design and verification methods.

## Key Summary Points

- Engineers have more harsh view of their capabilities than architects and enforcement officials
- Engineers want to have more development of standards and guidelines
- Currently doing poor job with sustainability and resilience
- Qualifications, competency, ability to innovate, increasing confidence in verification are key issues.
- Peer review, investment in training and education, essential.

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. Thank you!
- I would also extend my sincere appreciation to Haoyu Chen for his help in analyzing the data and formatting the outcomes for presentation. Thank you!