

Survey 1 Preliminary Outcomes – Free Response Comments – 17 August 2021

Question 29 - Please provide any additional comments or considerations that you think **are extremely important to include** in the development of a robust system of performance-based codes (regulation) and design methods. (N = 82 respondents)

Performance-based design approach is an opportunity to enhance the design to match the objectives of the building owners, occupants and community's stakeholders. By evaluating how building systems are likely to perform under conditions associated with potential hazard events, PBD helps identify the performance capability of a facility and is an integral part of the design process.

Competency of individuals is very difficult to define but extremely important. Competency of checking plus clear accountability through building design and construction. Enforcement that is used to prevent fraudulent activity which is present mainly through counterfeit goods or test reports. Enforcement should be applied to designers and checkers so they take it seriously. Guidance documents should be clear in what they are trying to achieve and kept up to date.

No comments at this time

Education and professionalism of the code enforcement community

Stakeholders involvement.

Training for building officials. ASCE 41 has been a national consensus based standard for a long time, but it is often viewed with suspicion from building officials (and to be honest most engineers are mystified by it as well). Developing a PBD will have zero impact if state and local building officials are not capable of handling it (it probably wont be adopted either...)

Good design intent and commentary - PBD definitions should be somewhat vague to allow engineers to be innovative in their designs. strict definitions will often over constrain the problem and essentially create a prescriptive like code. A good commentary that identifies the intent of provisions will create an environment where the designers and plan checkers (or third part reviewers) can agree and, more importantly, you will end up with a more consistent product.

- There may be a confusion in the use of "performance".
- Prescription in design can result in a specification that satisfies a performance code.
- Description in design can result in a specification that satisfies a performance code.
- The use of the phrase "performance specification" does not really help.
- Whereas a performance based code is different to a code that quantifies the measure required, because a code written to define performance has to be qualitative.
- So is it not better to talk of quantitative and qualitative codes rather than "performance"?
- If codes are about qualitative intentions they can still be responded to in design by specifications that are either prescriptive (identifying proprietary materials, products or systems and their methods by manufacturers) or descriptive (identifying the criteria that are important among a range of proprietary materials, products or systems and their methods by manufacturers).
- The code is NOT the design response, in other words.

There needs to be a balance between providing enough guidance for consistent enforcement and having too much guidance, which results in rigidity. PBD implementation depends on the code officials being willing to exercise judgment, but they need some level of guidance as to what's acceptable, and how they can be assured that the goals are being met, that is, what is acceptable justification.

Climate crisis requires us to implement performance-based codes as quickly as ICC can adopt. UN Secretary General called the IPCC sixth assessment report (AR6) released 8/9/21 a "code red for humanity" and "sounds a death knell for coal and fossil fuels, before they destroy our planet".

Performance based buildings require long term maintenance to maintain the function of the building design. Changes can render the PB design no longer safe. Can non engineers maintain the components of the PB design and future reviewers be able to make appropriate decisions without having a readily available code reference? I think this is a dangerous aspect of PB.

Precise and clear languages in the codes are extremely importance to avoid ambiguity

Building code official and Fire code official confidence in a system of performance based codes and design methods is critical if we want to see progress in this area. Many officials currently do not express confidence in performance based design.

Performance-based design must have real and tangible (i.e. prescriptive) benchmarks. In the case of the current prescriptive-based codes there are multiple, supporting layers of safety built into system - for example the IBC contains material requirements (fire, physical properties, etc.), assembly requirements (structural load resistance, fire resistance, etc.), and building requirements (type, occupancy group, etc.). Any performance-based system MUST include this same philosophy of mutually supporting requirements to ensure safety and durability / resilience of buildings. Long-term thinking; for example, build the best "box" you can because equipment and finishings such as HVAC, lighting, in some cases windows, etc. are much more likely (and easier) to change or update over the long term than the building itself. MUST retain the focus and spirit of neutrality in terms of building materials and commercial interests.

There is no real incentive for AHJs to accept PBD when prescriptive methods are available. Why should they put their ass on the line to accept something they don't understand when prescriptive options are available. If the building was designed to the prescriptive measures and still fails, they AHJ just says "I followed the code" and there are no repercussions. If he accepts a PBD design and it fails, it comes back on the AHJ and his municipality. This is especially important with AHJs who are not professional engineers or architects. I think PBD will always be doomed to failure as a general approach (there will be local exceptions with great AHJs) as long as such designs must be accepted by a risk averse reviewer - which applies to most governmental employees.

Merely being a Registered Design Professional is insufficient. PB Designer and Reviewer should be approved similar to Special Inspector Qualifications.

PBD engineers should have considerable experience, expertise and good judgement. Their goal should not be simply to save their client money using alternative methods. They should try to anticipate all negative factors that could arise.

I am a fire protection engineer with over 40 years of experience. Over that time, I have seen the regulatory fire protection environment (codes and standards) properly become more encompassing and detailed, although prescriptively. However, I have also seen the requirements for becoming a Professional Engineer be eroded, including test requirements and continuing education quality. Most of the fire protection engineers I have worked with are nowhere near capable to perform performance based design. The knowledge of typical fire protection engineers are deficient in code and standards making processes, statistical and probabilistic techniques and their interpretation, probabilistic risk assessment methods, and failure scenario development. Importantly, the intent of requirements is not understood.

What is needed is a standard but flexible system accounting for (i.e. documenting) design decisions, rationale and additional specific information about the building (and site). I have developed an example of this and used it during my service as a code official.

A limitation on many performance based regulations is there is no backstop on performance for prescriptive requirements. In other words, if the building is going for a performance based approach then the envelope can be very poor to the point of having major condensation risks and an adverse impact on comfort. Many architects use performance based compliance as carte blanche on the envelope design while neglecting the occupants.

Continuing to advance the ICC Standard and integrating it into a similiar scheme as the Green Construction Code will be necessary for advancing the PBD methods and process for the next generation of solutions.

Because so few practitioners will have had experience of their own with both PB and Presc approaches, and because the survey did not clarify those distinctions in a meaningful way, I cannot see how the survey responses can be used at all to inform the new ICC project.

n/a

To make PBD work all parties need to accept clearly defined goals. It must also be recognized when there is no real ability to do a PBD due to lack of adequate engineering/scientific knowledge. In addition, the ability to have third party review and validation of a design is critical.

The challenge with solely performance based codes is likely to fail due to the education and awareness of the owner, particularly an owner who is making an investment and is concerned about return. Including the tools to measure the total cost of ownership will be essential to the successful implementation of performance based codes.

In addition, development of tools so the owner can identify clear quantitative measures for the evaluation of performance-based designs so the design team is not trying to deal with ambiguities will be essential for both the design and code evaluation.

The local AHJ can not complete plan review on time now how are we going to do performance review on time, additional only very large AHJ may have the folks able to review the design

It is said that you must have a goal, if you don't know where you are going, any road will take you there. It is also true that if you know where you are going, not just any road will take you there. Innovators and new approaches are sometimes right, but sometimes very wrong. The entire chain from design, construction, verification, to end user deserves to have certainty in the process. Under current codes, designers have the ability to exceed minimum standards should they so choose, but minimum safe practices support this process.

I believe that laying out a strong model regulatory enforcement process is as important as the technical aspects of the performance regulations. It needs to be clear who is responsible for what aspects of the design. There needs to be an independent (lacks conflict of interest) body within the process in the approvals side of things. I think a clear understanding of how the various parts of the system are intended to work together - deemed to satisfy versus a design that mixes both performance and deemed to satisfy. Folks need to understand the spectrum of what could be seen - as little as a basic alternative to deemed to satisfy to a much wider performance approach.

There is no mention of research. Research is very important to keep up with technology and new materials

In the US there are legal or institutional concerns regarding the adoption of new codes. Codes are very much decentralized so the development of a performance based code needs to be associated with a strong educational efforts across not only geographic regions but also institutional building construction sectors (manufacturers, installers, testing laboratories, insurance, AHJs). Without a comprehensive approach to address the entire building regulatory and industry as a multifaceted system, a written performance based code may not find an audience that embraces it. As a new code is developed, it is best to do so with input from all sectors - better to go slowly and succeed than fast and die.

The detail needs to be clear and unambiguous

The baseline assumptions (often based on long historic data) need to be relevant to modern buildings and industry. There is too much evidence that the infrastructure behind code development is out of date. Having said that, this is more 'dangerous' in a prescriptive regulatory scenario.

While it would be nice to have owners that understand probability, I think that it is unreasonable to expect this. It is also not necessary for building inspectors to understand this. However, designers and design reviewers it is important to have a minimum education in probabilities, and statistics to understand performance-based design.

Switching to a design basis that is primarily performance-based would be a very bad idea. Unless you are a lawyer and profit from all the lawsuits that will result from bad designs.

Competency and ethics

Performance based projects require a well-informed user/owner to specify the performance expectations. Code officials and designers are better prepared while user/owner are not.

More attention needs to be given to providing tools and training to regulating authorities to deal with PBD to enable this approach become more commonly used

The ability of states and municipalities to "tinker" with the codes in response to lobbying must be addressed.

There should be additional requirements for designers and reviewers certification and continued education. The peer review process should be well defined.

Owners' willingness, acknowledgment, and commitment to follow the PBD for the life of the building.

California has a HERS registry which is supposed to track compliance, but there is insufficient enforcement of these rules. If a building department does not review the registry, then the design might be compliant, but there is not a step to verify that the building departments actually check the registry. Net effect, can be lax implementation. Suggestion is to publish the data by jurisdiction that shows what percentage of the projects actually achieve full compliance.

Consideration must be made regarding the costs and time to owners to pay and expend for the professional services to achieve a project designed in accordance with performance-based codes. Many owners are not aware of the many layers of review (which costs money and time) involved in a performance-based scenario.

The assumptions underlying the survey do not recognize that in many areas of building design performance parameters are unknown. This is why the Ontario Building Code is referred to as an objective based code with certain clear objectives, functional statements etc., that establish what aspects of established prescriptive requirements are relevant to a performance based approach. In other words the implicit performance achieved by prescribed provisions but only those performance aspects that align with the code objectives. This means that probably most "performance based codes" are a combination of prescriptive and performance. It is not a binary situation. I would add that a problem with codes that provide more flexibility is how licensed professional designers work together - there must be a design coordinator (as required in British Columbia and under the administrative provisions of the National Building Code in relation to alternative solutions) and there must be expert peer review within the owners design consulting team to avoid problems of design coordination which the municipal (local) inspectors may well miss (it is not the role of the municipal inspectors to be a defacto part of the design team providing quality control. Their role is to provide expert audits. Professional designer licensing regimes need to be improved in many jurisdictions to make performance codes work better. This can and should be pushed by governments as was done in British Columbia or by other bodies (such as ICC).

Every demonstration, example, write-up, etc of performance designs that I have ever seen seem to assume conditions that are too perfect, when in reality people and things tend to be far from perfect. One example is the ability and willingness of building occupants to egress as the performance based designer would like. In real life, a high proportion of building occupants may have some degree of physical disability, cognitive impairment, or simply bad judgment. Yet PBD always seems to assume that "perfect" people will be egressing. This alone completely diminishes my trust in PBD. Next, PBD seems to almost universally assume that specified safety features are manufactured, installed and maintained perfectly. In real life, products are often defective at the factory or damaged in transit, imperfectly and incorrectly installed, and very often with poor maintenance over the life of a building. Yet PBD assumes that everything works as it's supposed to. For PBD to become more credible, the design MUST be fault-tolerant. In other words, some of the installed protection features must be assumed to malfunction or not function, and yet still allow the performance objective to be achieved. This problem seems to be most pronounced with advocates of sprinkler protection, who wish to assume that sprinkler systems will always work as intended, when NFPA real-life data shows overall performance (success) of sprinkler systems in most occupancy to be well below 90% overall. Even if sprinklers were 99% effective, would that mean we could design with sprinkler performance assumed, and allow 1% of buildings to have occupants who could be assumed and predicted to perish if there were a fire?

Signage for building and systems needs to be more available to the building users and maintenance staff about the building systems. remote control outlets need to be well labeled. Lighting system controls need to be accessible and understandable. HVAC controls need to be set up to meet the performance requirements. Ventilation needs to be added to stairs because people now occupy stairwells just like corridors.

Different areas of our country will require emphasis on different portions of the performance requirements. Where I am, I do not need to worry about earthquakes. (As yet).

Public perception of what PBD provides greatly exceeds actual results

I think at this juncture the personnel involved are trying their best and have confidence that as time goes on will be up to the best challenges

Not enough highly trained professionals for design, review, or inspection

Design professional are more familiar with Prescriptive code, rather than performance-base code. I think society will get better buildings from prescriptive criteria that is exact and easily understandable.

Current societal views are extremely polarized which leads to no one hearing opposing opinions. This leads to an inaccurate study of the whole. Consequently, politics must be left out when regarding design. The design should be based strictly on tested, verifiable scientific rigor, not from empirical evidence based on emotion or political ideology. The cost of not doing this is far too high, both financially and socially. If the basis for design, whether it be sustainability, accessibility or the like is "settled" through verifiable scientific documentation and observation then it will survive the debate of opposing views. To strap the industry with ever higher construction costs based on theory and ideology is both immoral and manipulative.

I believe that the prescriptive form of construction has and will continue to serve us well and this does not preclude advancement in new technologies promoting more sustainable features. For instance, as MEP systems are modified to be more environmentally friendly and less energy consuming, this leads to lower costs, preferable to all, and therefore meeting both the prescriptive and performance aspects of design.

Perhaps I'm reading more into this survey than is intended but as a builder responsible for constructability I find it more advantageous to clarify the existing code and its numerous contradictions and ambiguities than to supply yet another code or standard that further confuses the building community when most jurisdictions still are using antiquated standards.

Accessibility standards are abhorrent with multiple contradictions across all standards. This has allowed third party inspection firms to interpret the "stricter" condition and is causing the industry to spend millions every year tearing out brand new work to satisfy their interpretation. As an example there are three accessible locations for a toilet off the wall depending on what standard is used, whether public, common or residential, ADA, UFAS, ANSI or the FHA. It would make sense that if one of these locations is accessible then they would all be accessible. I have a list a mile long of these issues. I would prefer to see these clarifications to the existing codes and standards than to provide an entirely new philosophical view on how the codes should be presented, whether prescriptive or performance. It is my opinion that the ICC should be the arbitrator on code interpretation and third party inspectors should have no course but to acquiesce to the ICC codes and standards when they issue an interpretation. Anyway, please disregard irrelevant comments, I take every opportunity to express my opinion regarding accessibility standards. If you made it this far thank you.

Clear pathways of approval, training of plan reviewers, and clear examples.
Many folks can pass the fire protection engineering PE exam. Doesn't mean they can design properly for fire. Need a separate license requirement, re-education and possibly re-exam
Defining clearly areas/disciplines where the two approaches are applicable: prescriptive one and/or PB approach. PB codes should be implemented from and for the prescriptive codes not the inverse.. Innovation is the adequate and only way to transform codes to futuristic ones in symbiosis with the environment and the climate changes challenge.
None
Critical life safety features (structure, fire, egress, etc) must be closely vetted at all levels to ensure public safety. It's not enough to set performance expectations without enforcement and could be dangerous.
Competency and ethics
There needs to be balance between those reviewing and those proposing designs. Without this there is a lack of appropriate challenge within the design phase and from code officials. This means that the desired performance and actual performance may be mismatched.
Consult with the wider industry
Qualifications/certification for those doing the work and peer reviews, along with more support for AHJ's
Exceptions need to be made for historic buildings to allow them to convey their historic character, unimpeded by the application of building code standards (even performance-based standards).
Sufficient information to designers and regulators that the level of education required for performance-based codes is far higher than in a purely prescriptive system
Ensuring a robust review system that can account for new hazards to safety that emerge - particularly in the context of fire safety. Ensure that individuals in the field of research and experienced fire engineers are at the table reviewing hazards that do not fit the existing framework of a given system
Education
<ol style="list-style-type: none"> 1. A clear hierarchy of requirements. Goals, functional provisions, performance metrics should be uniquely structured. 2. Ability to be interpreted by a machine. The semantics of the requirement must allow its interpretation in a machine-understandable format. 3. Holistic approach. All aspects of safety should be considered (protection of life and health, energy efficiency, etc)
Funding for the development of benchmark parameters in order to provide a sufficient amount of relevant information to use in performing a competent performance review and analysis.
Knowledge is power
<ol style="list-style-type: none"> 1. Statistical and/or incident data. 2. Verification metrics for performance criteria.

One of the things missing here is the difficulty in ensuring that the maintenance of the building and its designs can be accomplished by regulatory authorities. Many FD's are required by state laws to perform annual inspections, and how is a first year inspector going to be able to do that? There has to be comprehensive funding established for inspections of these buildings (and not by third party contractors!) by AHJ's which cannot be diverted for other uses by a jurisdiction. There also has to be an understanding that until funding for AHJ's (fire and building depts.) is done, these kinds of designs will take way longer to be approved...Finally, the rent seeking done by professional engineers who think that by virtue of simply having been registered as a P.E. makes them infallible has to be addressed...

My personal experience has largely seen overly simplistic PBD coming out of the US design community with little in the way of any robust review by third parties

From my view, fire protection engineering continues to be like the wild west, and many (not all) consultants operate near the mid-point of the "uncertainty trough." In stark contrast, structural engineers, electrical engineers, and mechanical engineers tend to operate in a much less cavalier manner overall. If fire protection engineering is to mature as other engineering disciplines (i.e., toward actual engineering per specified reliability targets), it must fix these issues. In the meantime, a performance-based code for fire safety would only embolden unethical practices to "make an architect happy." In the current climate, FPEs are not necessarily rewarded for proposing rationale/robust design methods (it is actually the opposite). It becomes a race to the bottom which conflicts with SFPE's code of ethics.

Development of sufficient acceptable methods to demonstrate compliance with stated goals and objectives.

A more robust method for educating code officials regarding PBD is needed; a third-party verification system needs to be widely available; design professionals and code officials need to be on the same page when pursuing a PBD

My survey responses were based on recent experience overseeing the design of 15 vocational training centers located in Morocco with a combined construction value of approximately \$45 million that is funded by the US Government but nominally in accordance with applicable Moroccan building codes and regulations.

I believe that the building design community can ramp up it's support of PBD if there is a way to ensure acceptance by the regulators. As both a fire protection engineer and code official overseeing a large code compliance office, we have seen time-and-time again the presentation of PBD in many formats and experienced a general lack of qualification for doing such work. If you could really hammer down the "wheels to pavement" application of peer review to the code acceptance process and how that system works, we'd get much farther. The work on IBC Appendix O really started a good conversation that needs some more direction to a code official.

Definitions, starting with the terms used in this survey. (Honestly, because even the most basic terms were left undefined, I doubt the survey responses will be reliable.) Recognition that in the U.S., building codes are not just design tools for the convenience of designers and their clients. They are primarily instruments of public policy, and they have also come to play important secondary roles with respect to law, licensure, consumer protection, insurance, valuation, etc. Just treating them as a place to put down your expectations of building performance will fail both those purposes. Also, while it is not my top priority, with the exception of one narrow reference to affordability, nothing in this survey addressed the growing interest in equity as a goal or metric for the built environment.

I elaborated in an earlier section.

Also, AHJ's are the most critical area requiring ongoing training/support/encouragement to successfully implement this - licensed professionals are trained A/Es with STEM academics background and I think could adjust somewhat seamlessly if a well structured PBD framework with appropriate guidance/samples was available.

More specifically, there needs to be clear guidance on the benefits of PBD for AHJs, sample policies in how they can readily adopt it, how they could adjust their permit/inspection applications/reviews/costs, sample policies for 3rd party reviews.....IE: ICC needs to offer consulting services to AHJs to help them implement this at no cost to the jurisdiction for initial setup. AHJs are notoriously understaffed, underresourced, underfunded and have budgeting problems and thus staff training gets hacked and there is ZERO incentive for them to put the effort in so there MUST be a mechanism to make this painless for them.

The owner/architect/contractor/engineer realm I think will gladly/readily adopt this otherwise.

We need more information about firefighter intervention. Performance-based codes can account for the lack of firefighting resources in a particular locale. Current codes don't consider this at all.

n/a

I am not as familiar with performance based as I should be, outside of the standard energy requirements ie.. blower door tests etc..

That being said I think the frame work is there in chapter 1 allowing for alternate means and methods, I would like to see the ICCPC expand on this and provide guidance in the acceptance of alternate means based on performance.

New requirements related to sustainability and circularity

Mindset is very different for a performance based code against a prescriptive based code. Addressing the change in mindset is extremely important for long term robust implementation.

The key area for successful introduction of pbc and pbd is on the verification side: either a reliable third party reviewer system needs to be created and implemented or the authorities need to be better educated in order to provide the verification. Also the pbd and pbc application review process should be better defined, embraced and codified with the stakeholders all educated in both the technical aspects as well as the process. A reliable, recognized and accepted system is in place and followed will encourage further education and qualification. Having already-formally-recognized-standard-making-bodies (like ASTM for this in the USA) publish resources and tools for pb fire safety design also allows the verification process for pb fire safety design to be done with greater confidence by the authorities or peer reviewers.

The systems is more than just the code - all the other parts must be in place for the system to function properly.

Question 30 - Please provide any additional comments or considerations that you think **are extremely important to avoid** in the development of a robust system of performance-based codes (regulation) and design methods. (N = 65)

<p>There are pros and cons to both design methods, however one should not replace the other. We, as a collective group, must keep in mind that prescriptive codes have not failed. And likewise, performance based codes are not implemented solely to reduce cost. Performance Based Design simply allows for flexibility to the existing prescriptive method. Performance based codes are not intended to replace the existing codes, but are very useful in the design process since prescriptive codes lack the innovation element.</p>
<p>No comments at this time</p>
<p>Rushing the development without due process.</p>
<p>Avoid having too many provisions. Prescriptive codes have gotten so complex that many people are not able to keep up with all of the moving parts. PBD should be simpler and keep the focus on making sure the performance of a building is met rather than checking all of the prescriptive boxes.</p>
<p>Define objectives qualitatively so that any metrics can be defined quantitatively. That seems to be the aim. While metrics quantified without defining the qualities they are meant to achieve cannot be understood in their purpose.</p>
<p>Don't leave the guidance so vague or wide open that whatever the code official thinks is acceptable is okay. A thoughtful code official needs a basis for approval, and a code official who doesn't want to think becomes a rubber stamp for the design professional's opinion. And don't leave it entirely to the design professional to decide what is acceptable, either. Our system is predicated on checks and balances, so that should not be removed. This is a difficult balance to strike, to provide just enough guidance, but not too much.</p>
<p>Delay due to older adults to engrained in the incremental history of code adoption, and who won't have to deal with the worst elements of climate change impact on the built environment. I am an older adult who is working on behalf of future generations, and have worked on State Code Technical Advisory Group adopting and amending ICC codes.</p>
<p>It is important to avoid allowing engineers, other design professionals, etc. to design PB unless they have rigorous and ongoing credentialing with professional boards like medical professionals. We have to avoid losing the approved plans/documents over the years showing how the components need to be maintained for the building in order to keep the performance as designed.</p>
<p>Avoid to have too many unnecessary exceptions result in loopholes</p>
<p>Things to avoid: -Trade-offs - e.g. less building envelope insulation for PV or higher SEER HVAC equipment -"Point" systems or similar rankings -Less than holistic thinking, or single-issue thinking -Short-term thinking -Too much flexibility or requirements that are poorly defined or vague</p>
<p>Training, standards, guides and oversight is important at the design and AHJ level. Unbiased third party review is critical.</p>

I anticipate it will in some issues be easier to determine adequate PBD measures and requirements while the necessary research and testing for adequate determination of meeting the requirements are not complete. Avoid the provision of requirements without sufficient bases for execution and confident evaluation by peer assessments.
Documents must be organized and surveyable and must be kept and updated throughout the service life of the building.
Make sure to test all the requirements of the standards that they can be implemented, and develop a user manual that indicates why each requirement exists.
Making things too complicated, arduous or costly. Many PBD efforts need to inform solutions that can be replicated or will inform future prescriptive code options or solutions.
Avoid any reliance on these survey results. For the reasons stated in my various comments, the questions are too unclear, too contradictory, and presume too much knowledge to rely on the responses. Also, while potential respondents were told to allow 30 minutes, there is no way you will get informed, thoughtful responses in that time.
n/a
It is critical to accept PBD methods that have not been fully validated simply because without them you cannot do PBD.
Avoid creating an open ended, non-specific, nebulous construction process that will ultimately become a compliance nightmare.
Struggling as to what to avoid except that the administrative process needs to be held at a high level. Performance design happens in the US often but working from the alternatives section. I think we need to maintain that at a certain level for one-off designs but create a robust approach for broader designs. I guess what I think is important that we need to avoid lumping all "performance-design" concepts in the same bucket. They can vary considerably. Plus much push-back will be seen from those industries that work with the one-off alternative (performance designs). Need to provide a place for these various levels and make it clear.
To avoid giving opportunities to untrained people to design fire in building using PBD. The academic qualification of a designer must be clearly defined.
1. Rushing through the process. 2. Lacking the necessary supporting systems for the regulations to work (standards, technical guidelines, educational programs, etc.) 3. Lacking administrative guidance.
Detail that is vague and open to interpretation and subjective
Allowing any scenario where 'gaming the system' becomes the culture this is where the system in the UK has suffered. The system is largely fine, as ever it is the people (well some!) who are the weakness. Competence is king!

A more robust system can not rely too heavily and exclusively on government (eg local permitting body) oversight. The local plans reviewers have a critical role providing expert technical audits as necessary and managing the process but it is key that the developers design team have highly qualified designers, peer reviewers and a design coordinator. Municipalities in many jurisdictions are subject to joint and several liability which means that they can end up paying 100 of the cost of fixing a defect or covering personal injury or economic loss and then having to subrogate against design consultants etc. This will create liability chill and stop innovation., The developer's design team and contractors need to be highly qualified. I would add that the design team must undertake field review at key construction stages to ensure compliance with approved plans - this is in addition to municipal inspections (by the permitting body).

The more metrics and probabilities around performance expectations at serviceability, life-safety, and collapse of buildings need to be clear with confidence intervals being included. THIs will allow the widest number of options for designers to use innovation to meet the performance objectives.

Please avoid making performance-based design a common occurrence.

Ego

Avoid making the process too complex, which allow people to use PBD jargon to confuse those trying to make a judgement on the merits of a design

You must avoid a system of verification by people or institutions that simply know less than the designer, and thus would not be wise or knowledgeable enough to ask the hard questions that might lead to a critical review or rejection of the design. If anything, reviewers must be MORE knowledgeable than the designer. For example, this is why jurisdictions try to have code officials and plan reviewers who know the code better than the designers and contractors, so that they can be the last line of defense in identifying problems with the proposed design or the construction.

Do not assume users of the code have a common understanding of terms. Define terms. Require the designers to provide both first cost and life cycle costs as part of building design options to comply with a performance code.

Benchmarks that are too easy to achieve or too undefined

Perhaps a combination of performance and prescriptive codes are the way to go. Avoid eliminating objective engineering criteria (structural, mechanical, electrical) from the code. Stick with the areas of planning & design that are more open to interpretation and better suited to a subjective, performance-base process.

See question 29

Anything that would hinder the creative solution process - too much oversight or regulation.

Inclusion of prescriptive codes as a basis of design.

The prescriptive code and PBD objectives need to be in one document. For example in the design of a building, in some instances, a PBD approach can be used, and in others, the prescriptive requirements followed.

again, for CA, have the HERS registry information published, showing how many projects achieve compliance.

Code enforcement agencies need to avoid adopting performance-based codes if their staff are not trained and educated to operate in a performance-based environment. Our current situation is that our code are partial prescriptive-based and partial performance-based. Due to the higher level of nuance and options, going to a full performance based code requires a greater level of education and training of code users and code enforcers.
Clear expectations to the owner of remodels and regulators that a small change can be a big change in performance base design. There needs to be a requirement to review the entire building systems with any change made.
PB codes are not the goal but the impact that these codes might make in our lives.
None
Most engineering practitioners are not prepared to work in PBD, despite expertise in prescriptive design. Extensive education will be required to ensure PBDs provide at least the same performance level as prescriptive designs.
primarily financially based decisions.
Don't just listen to the fire engineering community - ensure that the outcomes expected are clear, communicated and verifiable. Otherwise I am concerned that we are on a path to develop a portion of the built environment where those using the buildings will not understand the potential risks or performance expected.
Vagueness, ambiguities
Avoid the tendency to think that more regulation is better. Set up the goals and let professional achieve them, rather than leaning toward trying to prescriptify performance-based design
Steering way from a situation that all performance designs are invariably compered with the 'deemed to satisfy' prescription.
Consideration of qualitative risk assessments and probabilistic parameters that are not based on a statistical arrays is a doubtful prospect for robust system of performance-based codes.
That this effort is for the purpose of validating consultants performance analysis work for a building or structures design.
Complex solutions
1. Risk assessment and management with insufficient data.
There has to be a liability/criminality scheme incorporated so that those who are able to convince an AHJ to accept an approach can be held properly accountable. Look at Grenfell, nobody has went to prison, and the involved firms have been able to avoid monetary punishment by simply going out of business...
Tread carefully
ICCPC is currently not taken seriously by any building environment stakeholders. A full rewrite, with provisions that only focus on narrow aspects that can be effectively regulated, would be necessary for my support. However, I applaud the effort to open the lines of communication.
Leaving the barn door open in terms of who possesses the knowledge base required for a PBD and can therefore do a design

A level of code complexity that will be extremely difficult for design professionals to apply and AHJs to understand, adopt and enforce. Easier said than done.

Recognize that PBD can be used everywhere, but the first pass needs to address the crazy buildings where the design community and code officials are willing to work together. If we try to address 3-story apartment buildings and strip malls in the redevelopment of the PC, we will never get out the door.

KISS

Do NOT ignore criticality of AHJ adoption - if they're not on board or this makes their lives harder, it will NOT be successful no matter how much the AEC community otherwise wants it

Provide sample applications, established suggested acceptance criteria and the underlying assumptions associated to where a new criteria is otherwise required (don't put all the hard work on the design community to do this for every project for what are otherwise typical values), don't limit this to a few specialized firms (keep it broad-based and useable, put the harsher qualifications on the accepted 3rd party reviewers rather than the design teams, which will speak for itself on whom is fully capable - require certification as a 3rd party reviewer and the associated scope - instill confidence in AHJ the certifications actually mean something and that not everyone can just go get this.....requires whatever ICC training plus completion of not less than 1 PBD project or similar validation such as with getting licensed).....each AHJ should be able to determine for themselves which PBD categories they want to require 3rd party reviews rather than ICC forcing it - ICC can offer suggested guidance but be flexible in how this is conveyed.

Provide enough bounds to be suggested to give guidance on appropriate application/enforcement - IE: if you have someone in sailing school in the ocean, you still give baseline boundaries to stay in while you're learning and you can then explore the nearly limitless bounds after that (or whatever analogy to apply....astronaut training/space travel etc) - without bounds initially, the possibilities are overwhelming and create analysis paralysis both for design teams and AHJs

Per my response to Q29, we must avoid thinking about a building code as simply a design tool for the convenience of designers and their clients. Also, avoid using "resiliency," which is not a word, and avoid using resilience as an attribute of a building; for a building, the term we want is "functional recovery."

I think the fire service needs to be intimately involved in the process of developing these codes. I don't think the fire service sees any benefit to performance-based codes. Unfortunately, the few times I've seen the concept presented to firefighters, the presenter repeatedly referred to cost savings, not safety. The firefighters did not know they would be part of the process and didn't care about cost savings at all.

Avoid going further than a guide or reference material.

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Avoid vague regulatory language.

Trying to over-prescribe performance-based approaches. Focus should be on competence of users, and not trying to account for lack of competence with design / review methods.