Prescriptive Codes:
A Cure or a Curse?

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Prescriptive Codes: A Cure or a Curse?
The Context

- Historically, residential building codes have been prescriptive in nature with a strong product bias and reliance on visual inspection and enforcement.

- While prescriptive codes may be simpler to implement, easier to verify, and provide certainty for the designer and builder, they tend to be ill-suited to properly prescribe complex, dynamic, and interactive systems.
  - For further simplicity and clarity, they are usually developed around well-established products and practices.

- And this approach inevitably limits or stifles flexibility, innovation, and least-cost solutions.

Prescriptive Codes: A Cure or a Curse?
More Context

- Assume a particular code provision is not working!
- Code changes are predicated on "need and reasonableness".
  - It takes several code cycles for a problem to become apparent.
  - It takes a few code cycles to identify a solution.
  - It takes a couple of code cycles for consensus/adoption by ICC.
  - It takes a cycle or two to be adopted by states.
  - It takes a cycle or so to get sound enforcement.
- A code cycle is 3 years
  - Congratulations – in 15 to 30 years you have an improved solution on the street!

Prescriptive Codes: A Cure or a Curse? Some More Context

- Fundamental Rules for Building Codes (in order)
  - Don't require the wrong thing!

  - Don't prevent the right thing!

  - Discourage (disincentivize) the wrong thing!

  - Encourage (incentivize) the right thing!

Prescriptive Codes: A Cure or a Curse? What's the Problem?

- Modern, buildings are complex, dynamic, and interactive systems (or a system of systems).
  - However, prescriptive codes are better suited to singular and independent measures or components.
  - As the complexity of an assembly or system increases, a prescriptive approach will tend to require overly conservative, often restrictive, more costly, and poorly optimized solutions.

Prescriptive Codes: A Cure or a Curse? What's the Problem?

- Properly managing heat, air flows, pressures, moisture, and key system interactions is critical for a successful and cost effective high performance building.

  – But, prescriptive codes are highly challenged to attend to these non-visual, dynamic, complex, and interconnected phenomenon.

Prescriptive Codes: A Cure or a Curse? For Example

- Vapor Retarder
  - Is more a function than a product.
  - Is highly dependent on climate, boundary conditions, assembly materials, and sequencing.
  - Must provide adequate vapor resistance in conjunction with the desired thermal resistance to avoid condensation or accumulation in moisture susceptible materials over some annual cycle.
  - Is it possible to describe and prescribe a universal solution for the code?

Prescriptive Codes: A Cure or a Curse?
For Example

- Air Barrier
  - How does one prescriptively describe what, where, when, and how to install a functional air barrier?
  - It has proven difficult to deliver and enforce building airtightness using prescriptive code language.
  - But today we can set a performance criteria, the designer specifies accordingly, the builder develops the necessary QA/QC, and we can verify through commissioning.

Prescriptive Codes: A Cure or a Curse?
The Premise

- It is not easy to build a safe, healthy, efficient, durable, and affordable house with a simple prescriptive-based code.

- If you think that is possible, I challenge you to show me a prescriptive path to build a safe, healthy, efficient, durable, and affordable car.

  – If you find it, I'm guessing it won't be easy, simple, or cheap!

Prescriptive Codes: A Cure or a Curse?
The Premise

- For many reasons, current codes are tipped in favor of prescriptive "no-thought, commonly accepted, low-risk" solutions.

  – And demonstrating alternative performance compliance tends to be more onerous and costly.

- One reason code changes are so arduous is that there aren't based on explicit, clearly stated, and accepted performance goals or criteria.

Prescriptive Codes: A Cure or a Curse? The Premise

- In 2012,
  - Our buildings have become complex enough and
  - Our performance goals have become stringent enough,
  - That an engineered solution is necessary and justified.

- Few engineered systems are designed and built from a simple recipe or prescription.
  - There may be select prescriptive paths or solutions,
  - But they are usually built upon established and accepted performance criteria.

Prescriptive Codes: A Cure or a Curse? What's the Solution?

- We can continue with prescriptive codes where
    - Outcomes are more visually-oriented,
    - Systems interactions are limited, and
    - HAM impacts are likely to be small.

- We must move to a performance codes where
    - Outcomes are performance-oriented,
    - Systems interactions are critical, and
    - HAM impacts are likely to be significant.

Prescriptive Codes: A Cure or a Curse? Recommended Guidance

- We need a new approach where difficult system dynamics and interactions are anticipated and planned for in the design phase.

- The builder has tools and processes to confidently deploy these solutions in the field.

- And commissioning is used to verify critical performance measures to ensure desired outcomes.

Prescriptive Codes: A Cure or a Curse? Recommended Guidance

- Develop specific performance criteria.
  - Once these are set and an engineered solution is designed, there may be specific prescriptive measures and QA/QC procedures that can successfully implement that solution.
- This will tip the incentives to the innovative, creative, optimized, and cost-effective designer, builder, or manufacturer!
  - In the current system a progressive builder will be faced with proving his better performance-based approach is sufficiently equivalent to the primitive, parochial, and product-focused prescriptive code.

Prescriptive Codes: A Cure or a Curse? Value

- Performance Codes …
  - Promote flexibility and innovation
  - Support optimized, cost-effective solutions
  - Provide incentives to the clever and innovative product supplier, designer, and builder who can develop the most cost effective solutions to meet the overall performance requirements.

Prescriptive Codes: A Cure or a Curse? Market Readiness

- Market is not prepared to move immediately from prescriptive to performance codes.
- However, we can begin by establishing and inserting performance-based criteria into the current code.
  - Not as a onerous alternative.
  - But as the baseline for all solutions.
  - Prescriptive approaches are then developed to specifically meet the performance criteria.

Prescriptive Codes: A Cure or a Curse? Market Readiness

- Set specific performance criteria for materials, assemblies, systems, and the house.

- Then, as needed and where possible, develop prescriptive guidance to provide an assured path to reduce builder burden and uncertainty.

  - However, these would likely need to be more conservative to ensure all possible combinations would still meet the set performance criteria.

Prescriptive Codes: A Cure or a Curse? Potential Costs

- Presumably there is a large up front cost to develop the proper performance criteria and provide sufficient education for the code enforcement community

- However, since these codes would be less influenced by ongoing technology and product changes, the long-term cost might be lower.

Prescriptive Codes: A Cure or a Curse? Implementation Issues

- Education for designers, contractors, and code officials.
  - Though some might argue that is already an ongoing need and cost due to frequent changes.
- New tools and processes would be need to be developed and available.
  - To ensure designer and contractor confidence in the designs, materials, and techniques being used to ensure code compliance, as well as long-term performance.

Prescriptive Codes: A Cure or a Curse?
Pros and Cons

- Pros
  - Achieve selected performance goals, while supporting maximum flexibility and cost-effective solutions.
  - Puts the incentive for systems-based, performance-oriented, engineered solutions in the hands of the innovative and designer and builder.

- Cons
  - Requires a major transition by codes bodies.
  - Will need to be supported by the building industry
    - Who has traditionally pushed for the prescriptive approach.
  - A new wave of code education would be necessary.

Prescriptive Codes: A Cure or a Curse?
Bottom Line

- In the end, regardless of how good the code is and how it has been structured, high performance houses require
  - properly guided design,
  - carefully executed construction, and
  - appropriate verification.
- And last, but not least, a means to ensure
  - proper operation and
  - maintenance.

Prescriptive Codes: A Cure or a Curse?
References

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