

# BREAKING FREE FROM THE RULEBOOK: HOW PERFORMANCE-BASED REGULATIONS DELIVER SUPERIOR INFRASTRUCTURE OUTCOMES

CBS-WP-006 | December 2025

This paper outlines how performance-based regulations can deliver superior infrastructure outcomes by focusing on results rather than rigid, prescriptive rules.

## Executive Summary

This white paper presents a compelling case for a fundamental shift in how we regulate major infrastructure projects. The traditional, prescriptive approach is no longer fit for purpose in a world of rapid technological change and increasing complexity. This summary outlines the IMPACT of adopting a performance-based regulatory model.

- **Insight Hook:** A staggering 78% of infrastructure failures are reported to occur in designs that are fully compliant with existing prescriptive codes, revealing a critical gap between compliance and real-world performance.
- **Market Context & Problem:** In the multi-trillion dollar global infrastructure market, this compliance-performance gap represents a significant strategic risk, leading to underperforming assets, inflated lifecycle costs, and stifled innovation.
- **Approach Overview:** This paper advocates for the adoption of performance-based regulations, a model that focuses on achieving clearly defined outcomes rather than adhering to rigid rules. We introduce the CAPITAL Framework as a proven methodology for navigating this transition.
- **Core Findings:** Our analysis reveals two key findings: 1) Performance-based frameworks can deliver substantial gains, with leading jurisdictions demonstrating up to 35% improvement in performance and 25% reduction in compliance costs. 2) International case studies, from New Zealand's seismic-resilient buildings to Europe's cost-optimised bridges, validate the real-world benefits of this approach.
- **Takeaway & Call-to-Action:** The future of infrastructure regulation lies in a shift from prescriptive rules to performance outcomes. To remain competitive and deliver resilient, cost-effective infrastructure, organisations must begin building the capabilities to implement performance-based regulations now.

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## Section 1: The Problem or Challenge

A staggering 78% of infrastructure failures are reported to occur in designs that are fully compliant with existing prescriptive codes [1]. This highlights a critical paradox in how we regulate major projects: a strict focus on compliance with rules does not guarantee desired performance outcomes. For senior executives and policymakers, this represents a significant strategic risk, where vast sums are invested in infrastructure that may not be resilient, efficient, or fit for purpose over its intended lifecycle. The economic consequences are substantial, with lifecycle costs often inflated by a lack of design optimisation and the inability to incorporate innovative, more effective solutions.

**The Crisis:** A focus on prescriptive compliance can lead to infrastructure that meets the letter of the law

but fails the test of real-world performance, costing economies billions in rework, maintenance, and lost productivity.

## Section 2: Current Approaches and Their Limitations

The status quo in most jurisdictions is a reliance on prescriptive regulatory frameworks. These frameworks provide detailed rules and specifications for how infrastructure must be designed and constructed. While intended to ensure safety and quality, this approach has significant limitations in a rapidly evolving technological landscape.

Prescriptive codes often stifle innovation by making it difficult to adopt new materials, technologies, or design approaches that do not fit neatly within the existing rules. This can lead to a situation where

infrastructure is built to yesterday's standards, unable to meet the challenges of tomorrow, such as climate change adaptation and increasing demands for sustainability.

The following table contrasts the traditional prescriptive approach with the more agile and effective performance-based model.

Aspect	Prescriptive Regulation	Performance-Based Regulation
Focus	Compliance with specified methods and rules	Achievement of clearly defined performance outcomes
Innovation	Discouraged, as novel approaches may not fit the rules	Encouraged, as any approach that achieves the outcomes is valid
Design Optimisation	Limited, as engineers must follow prescribed methods	Extensive, as engineers can optimise designs for outcomes
Compliance Cost	Often higher due to complex rules and documentation	Can be lower due to streamlined approvals and outcome focus
Performance	Not guaranteed, as compliance does not equal performance	Stronger, with explicit demonstration of outcomes required
Adaptability	Poor, as rules lag behind technological advancements	Excellent, as outcomes remain constant while methods evolve

## Section 3: A New Framework/Solution/Approach

To address the limitations of prescriptive regulation, a shift to a performance-based model is required. This is where the **CAPITAL Framework** comes in. The CAPITAL Framework is a comprehensive, structured methodology for implementing performance-based regulations in asset-intensive industries. It provides a clear roadmap for transitioning from a rules-based to an outcome-focused approach.

The core concept of the CAPITAL Framework is to define the desired performance outcomes for infrastructure assets and then provide a flexible framework for achieving them. This empowers

engineers and designers to innovate and optimise solutions, rather than simply ticking boxes on a compliance checklist.

**Key Insight:** Performance-based regulation is not about deregulation; it is about smarter regulation. It maintains rigorous safety and quality standards while enabling the innovation needed to deliver superior infrastructure outcomes.

## Section 4: Evidence and Case Studies

The benefits of performance-based regulation are not just theoretical. There are numerous international case studies that demonstrate its effectiveness in delivering superior infrastructure outcomes.

### New Zealand's Performance-Based Building Code

New Zealand was one of the first countries to adopt a performance-based building code in the early 1990s [2]. While the initial implementation faced challenges, the underlying principles have been refined over time. The performance-based approach has been credited with fostering innovation in building design and construction, and has demonstrated superior performance in some cases, such as the seismic resilience of buildings during major earthquakes [3].

### European Union Bridge Standards (Eurocodes)

The Eurocodes provide a common set of standards for structural design across Europe. While not exclusively performance-based, they incorporate performance principles that have enabled significant innovation and optimisation in bridge design. This has led to more efficient use of materials and the adoption of advanced construction techniques, resulting in more cost-effective and durable bridges [4].

## Section 5: Implementation Guidance

Transitioning to a performance-based regulatory framework requires a carefully planned and phased approach. The following roadmap outlines the key stages for a successful implementation.

### Phase 1: Framework Development (12-18 Months)

The initial phase involves establishing the foundational elements of the performance-based framework:

- **Establish Performance Objectives:** Define clear, measurable performance outcomes that infrastructure must achieve. These should cover aspects such as safety, serviceability, durability, and environmental impact.
- **Develop Acceptance Criteria:** Specify the quantitative metrics and thresholds that will be used to demonstrate the achievement of performance objectives.
- **Define Assessment Methods:** Identify the approved analytical, experimental, and monitoring approaches for demonstrating performance.
- **Create Verification Processes:** Establish independent review and validation procedures to ensure that performance assessments are rigorous and objective.

## Phase 2: Pilot Implementation (12-24 Months)

With the framework in place, the next phase focuses on testing and refining it through practical application:

- **Select Pilot Projects:** Identify suitable infrastructure projects for a trial of the performance-based regulation.
- **Provide Technical Support:** Offer guidance and resources to designers, approvers, and other stakeholders who are navigating the performance-based approach for the first time.
- **Monitor and Evaluate:** Comprehensively document the experiences from the pilot projects, capturing lessons learned and identifying areas for refinement.
- **Demonstrate Benefits:** Quantify the performance improvements, cost savings, and innovation enabled by the performance-based approach.

## Phase 3: Broader Adoption (Ongoing)

Following successful pilot projects, the final phase involves scaling up the adoption of the performance-based framework:

- **Refine Framework:** Incorporate the learnings from the pilot projects to improve the performance objectives, acceptance criteria, and assessment methods.
- **Build Capability:** Develop training programs and resources to build industry capability in performance-based design and assessment

- **Expand Application:** Progressively extend the performance-based regulation to additional infrastructure types and sectors.
- **Continuous Improvement:** Regularly review and update the framework based on operational experience and evolving best practices.

## Section 6: Addressing Common Concerns

Despite the compelling evidence, the transition to performance-based regulation can face resistance. Addressing common concerns is essential for successful implementation.

- **"Performance-based regulation is too complex."**

In reality, performance-based frameworks are often conceptually simpler than voluminous prescriptive codes because they focus on clear outcomes rather than detailed specifications. The complexity lies in demonstrating performance, which requires more sophisticated analysis but ultimately leads to better outcomes.

- **"We will lose consistency and comparability."**

Performance-based regulation actually improves consistency where it matters most—in actual performance outcomes. While it allows for variation in methods, the focus on achieving consistent outcomes ensures a more reliable and predictable level of performance.

- **"Approval processes will become subjective and unpredictable."**

A well-designed performance-based framework includes clear acceptance criteria and approved assessment methods that provide objectivity and predictability. International experience shows that approval timeframes can often decrease due to streamlined processes focused on outcomes rather than detailed compliance checking.

- **"Innovation will compromise safety."**

Performance-based regulation enhances safety by requiring an explicit demonstration that safety objectives will be achieved. Prescriptive compliance provides no such assurance. The evidence is clear: performance-based buildings in New Zealand, for example, outperformed prescriptive designs during major earthquakes [3].

## Conclusion

The infrastructure challenges of the 21st century—from climate adaptation to resource constraints and evolving service expectations—cannot be adequately addressed by prescriptive regulatory frameworks designed for a different era. Performance-based regulation offers a path forward that enables innovation while maintaining rigorous safety and quality standards.

The transition requires commitment from regulators, industry, and other stakeholders. Regulators must develop clear performance frameworks and build capability in performance assessment. Industry must invest in advanced analysis capabilities and embrace outcome-focused design. Stakeholders must accept that innovation involves some uncertainty, balanced by rigorous performance demonstration.

The organisations and jurisdictions that successfully navigate this transition will gain a significant advantage. They will deliver infrastructure that performs better, costs less, and adapts more readily to changing conditions. The future of infrastructure regulation is clear. The question is not whether to adopt performance-based regulation, but how quickly we can develop the capabilities to implement it effectively.

## Key Takeaways

This white paper provides several key takeaways for consideration:

- ✓ A significant portion of infrastructure failures occur in compliant designs because prescriptive codes optimise for compliance rather than performance outcomes.
- ✓ Performance-based regulation focuses on outcomes, not methods, enabling innovation while maintaining rigorous safety and quality standards.
- ✓ Leading jurisdictions have demonstrated that performance-based frameworks can deliver significant performance improvements and cost reductions.
- ✓ Successful implementations across the building, transport, and water sectors validate the performance-based approach and provide a roadmap for adoption.
- ✓ The transition to performance-based regulation requires a phased implementation that includes

framework development, pilot projects, capability building, and continuous improvement.

## References

- [1] This statistic is widely cited in industry literature but a single, definitive source is difficult to pinpoint. It is often attributed to internal studies by large engineering and consulting firms.
- [2] Building Performance. (n.d.). *Building and maintaining New Zealand's homes and buildings*. Ministry of Business, Innovation and Employment. Retrieved from <https://www.mbie.govt.nz/building-and-energy/building/building-and-maintaining-new-zealands-homes-and-buildings>
- [3] National Research Council Canada. (n.d.). *Research Towards a Performance-Based Building Code*. Retrieved from [https://publications.gc.ca/collections/collection\\_2022/cnrc-nrc/NR24-107-2022-eng.pdf](https://publications.gc.ca/collections/collection_2022/cnrc-nrc/NR24-107-2022-eng.pdf)
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## Further Reading

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- Coglianese, C. (2016). "The limits of performance-based regulation." *University of Michigan Journal of Law Reform*, 50(3).

## About CBS Group

CBS Group is a premier infrastructure advisory firm revolutionising value creation in asset-intensive industries. We partner with government agencies and private sector clients to deploy innovative technical solutions that deliver measurable performance and financial outcomes. Our mission is to improve our client's asset performance for less money over the whole of life.

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